



Resilient Power Control Module

RPCM



User Manual

For models:

RPCM DC ATS 76A

RPCM DC 232A

Version 202011162130

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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 mm² cross section); 24A (with a cross section of 2.5 mm² wires).

Overconsumption 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 re-set 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.

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

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

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

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

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

Contacts of technical support for the RPCM product:

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

Technical support <https://rpcm.pro>

Feedback <https://rpcm.pro/#contacts>

2. Installing RPCM

Brief description of the section:

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

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

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

2.1. Operating Instructions and Specifications

2.1.1. Before You Begin

- The RPCM must not be connected to an electrical system 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. Technical Characteristics RPCM DC ATS 76A, RPCM DC 232A

Characteristics	RPCM DC ATS 76A	RPCM DC 232A
Inputs		
Power	3.648 kVA @ 48VDC	11.136 kVA @ 48VDC
Connection	2 DC inputs	1 DC input
Connection Type	Spring terminals (1.5-16 mm ²)	Screw terminals: rigid cable (25-95 mm ²); flexible cable (35-95 mm ²)
Rated voltage	-48VDC (42-58VDC)	-48VDC (42-58VDC)
Outlets		
Number of connections	10 clamp terminals	10 clamp terminals
Connection Type	Clamp terminals: 4 mm ²	Clamp terminals: 4 mm ²
Rated voltage	-48VDC	-48VDC
Rated and maximum current	30A (with a cross section of 4 mm ²); 24A (with a cross section of 2.5 mm ²)	30A (with a cross section of 4 mm ²); 24A (with a cross section of 2.5 mm ²)
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)
Light indication (display)		
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
Other options		
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

Characteristics	RPCM DC ATS 76A	RPCM DC 232A
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)

Contacts of technical support for the RPCM product:

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

Technical support <https://rpcm.pro>

Feedback <https://rpcm.pro/#contacts>

2.2. Mounting 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:

- 1 install the rack nuts as in Figure 2.2.1;
- 2 mount the module RPCM on the rack and secure it as shown in Figure 2.2.2;
- 3 prepare the power lines to connect the module as shown in Figure 2.2.3 for RPCM DC ATS 76A or Figure 2.2.4 for RPCM DC 232A;
- 4 connect the power cables to the inputs;
- 5 connect power cables of the power equipment to outlet clamp terminals.

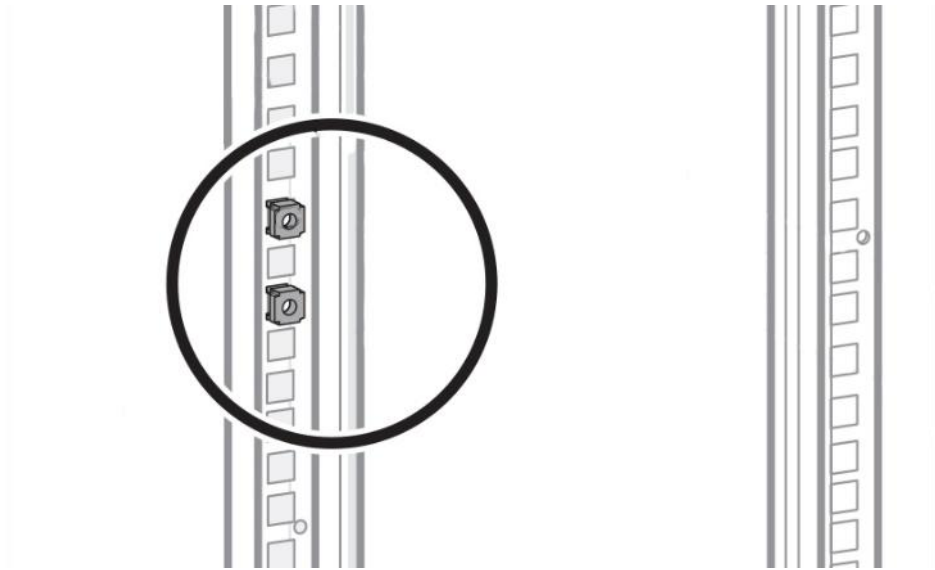


Figure 2.2.1. Inserting rack nuts.

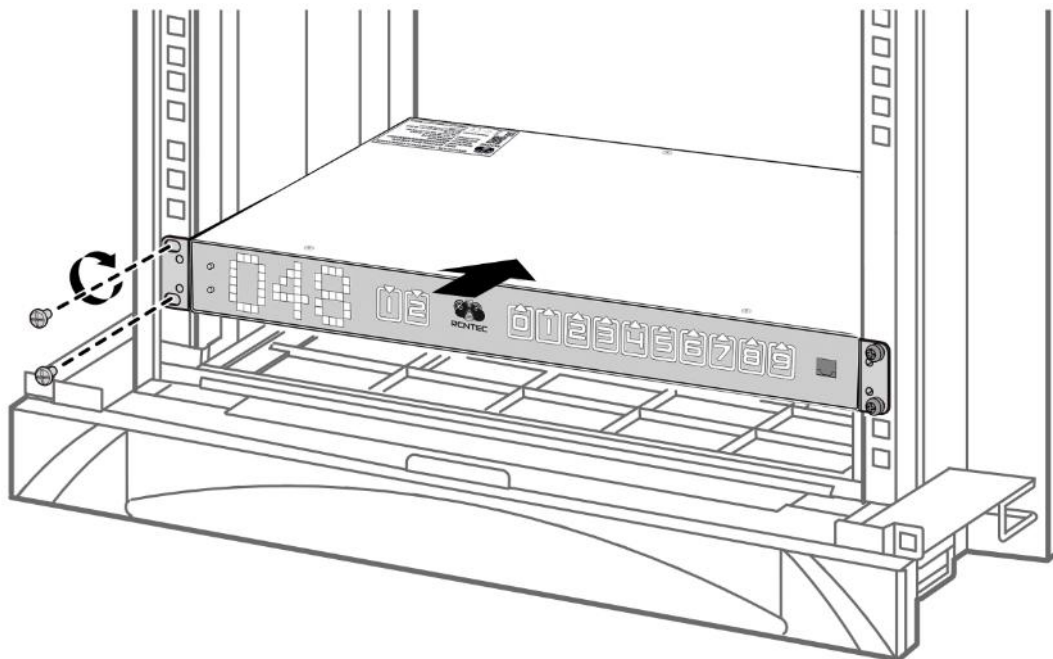


Figure 2.2.2. Mounting the Resilient Power Control Module (RPCM).

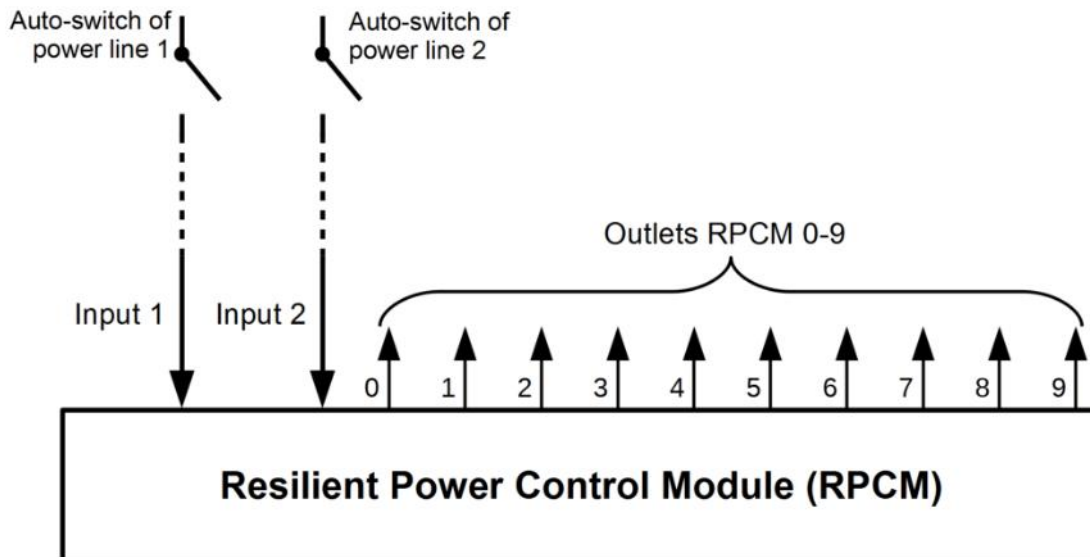


Figure 2.2.3. Connecting RPCM DC ATS 76A.

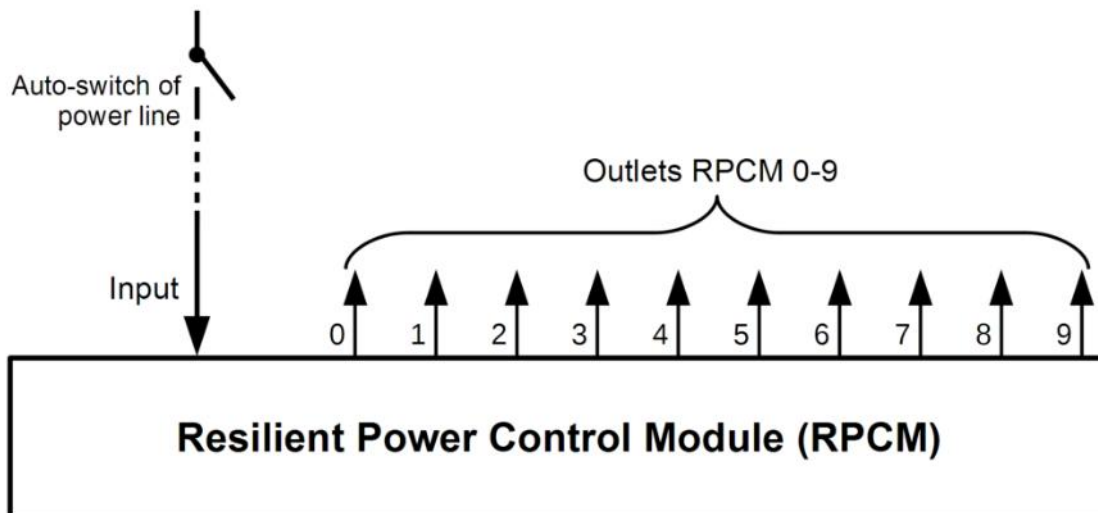


Figure 2.2.4. Connecting RPCM DC 232A.

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.

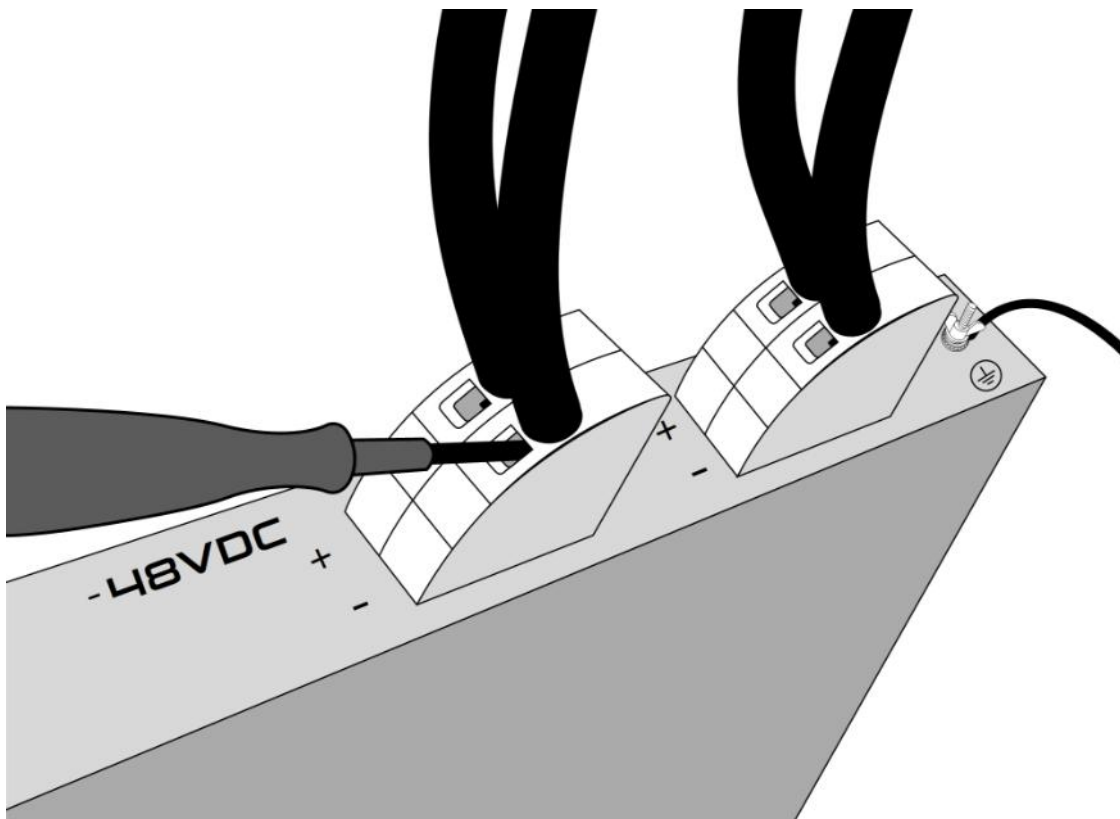


Figure 2.2.5. Connecting wires to the input terminals of RPCM DC ATS 76A.

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.

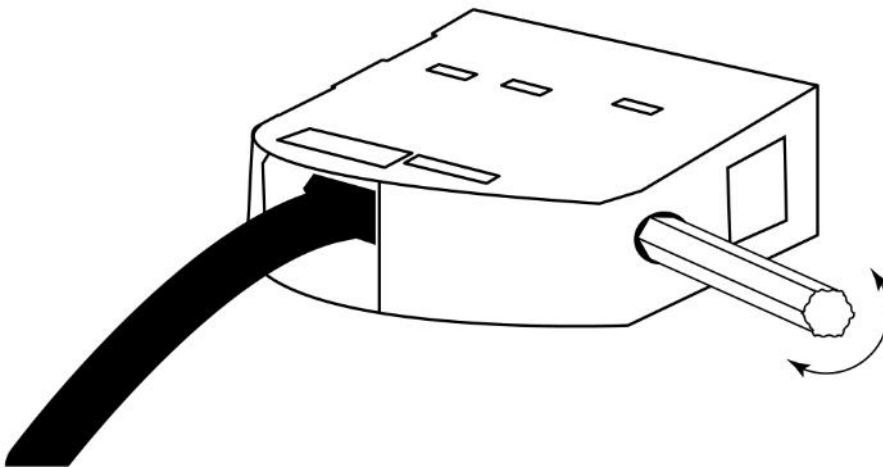


Figure 2.2.6. Connect the conductor to the input terminal of RPCM DC 232A.

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.

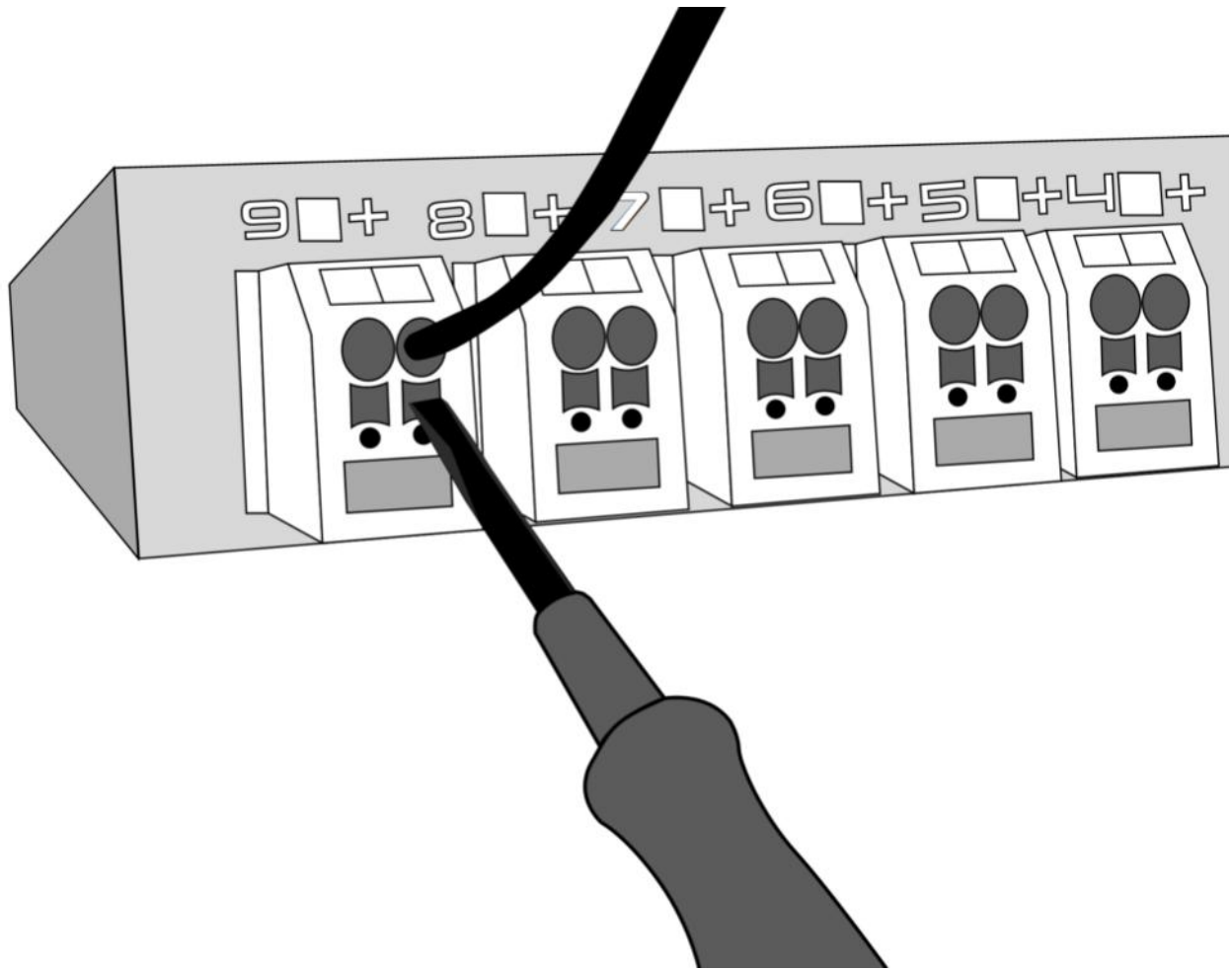


Figure 2.2.7. Connecting the conductor to the RPCM DC ATS 76A or RPCM DC 232A outlet terminal.

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 skipping of the desired message press and release the top or the bottom button. The result will appear on the screen within 5 seconds. Switching occurs in a circle (cyclically). Thus, if you press the lower button, for example, "Voltage" will be shown, then "Current strength on input", then "Power", "IP address", "MAC address", "Serial name", "Serial number", "User message", then again "Voltage", "Input current" and so on.

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

3.1.2. How RPCM Get IP Addresses

Basic methods for assigning IP addresses:

Assignment by DHCP;

Auto-assignment of IP addresses by Zero Configuration (APIPA or IPv4LL);

Manual assignment of static IP.

The options are examined in order.

3.1.3. Assigning IP Address by DHCP

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

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

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

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

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

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

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

3.1.5. Manual Assignment of Static IP Addresses

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

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

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

3.2. System Requirements

3.2.1. Power 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.

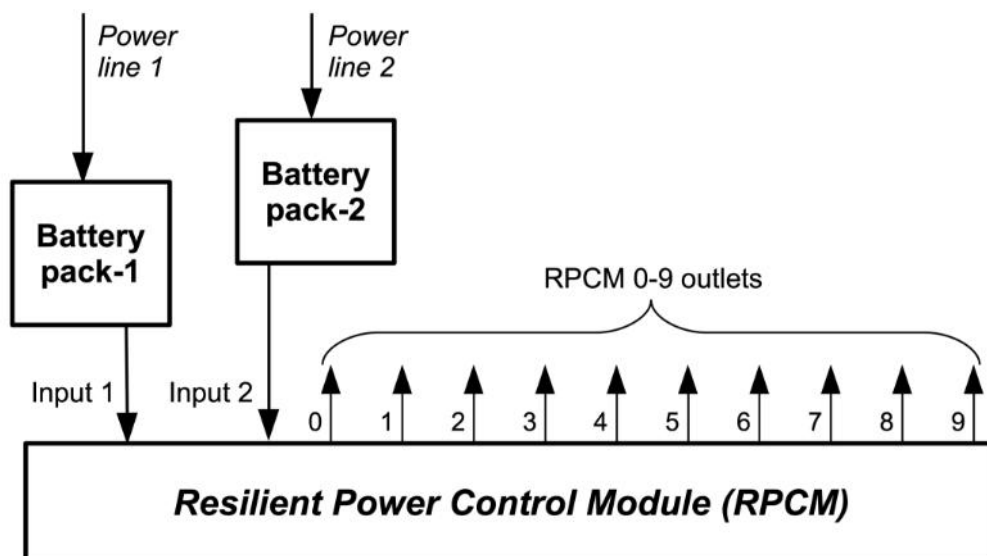


Figure 3.3.1. Scheme for RPCM DC ATS 76A .

3.3.2. Scheme for RPCM DC 232A

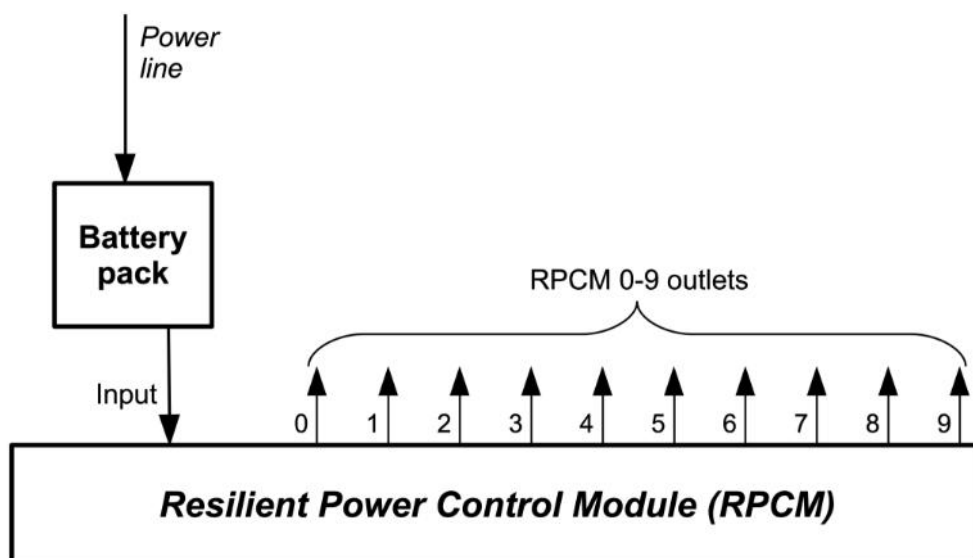


Figure 3.3.2. Scheme with a single power supply unit — for RPCM DC 232A.

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.

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

4.1. Physical Interface

4.1.1. General Information about Appearance and Control Elements

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

Overall dimensions are height 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.

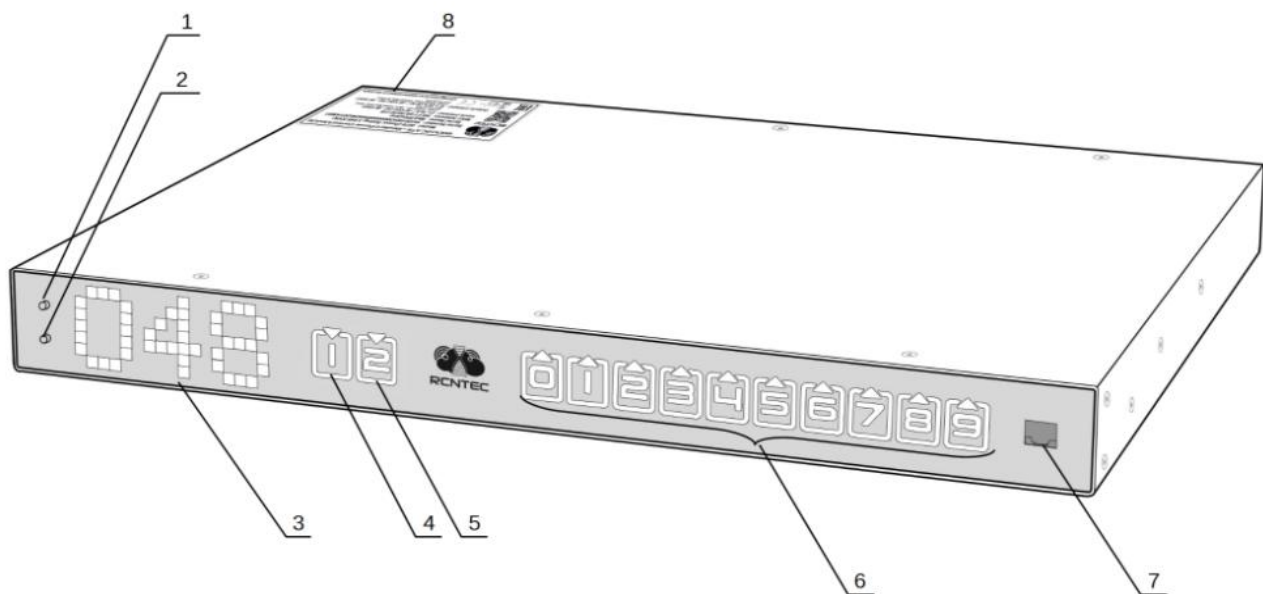


Figure 4.1.1. Front panel with indicators and controls RPCM DC ATS 76A.

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.

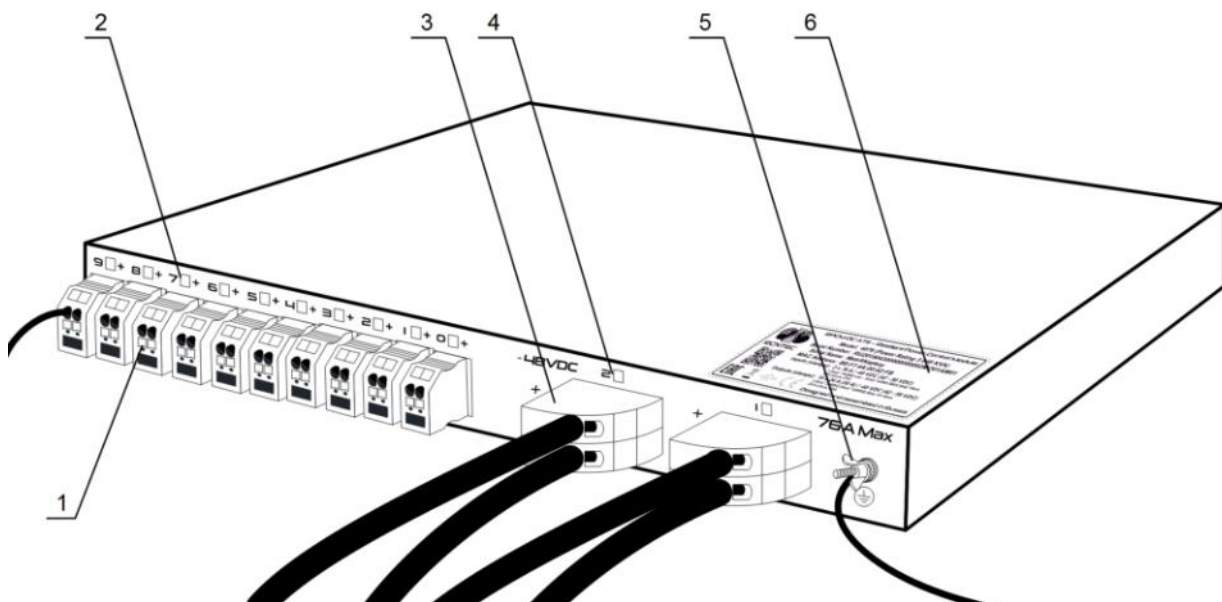


Figure 4.1.2. Rear side of RPCM DC ATS 76A.

Legend:

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

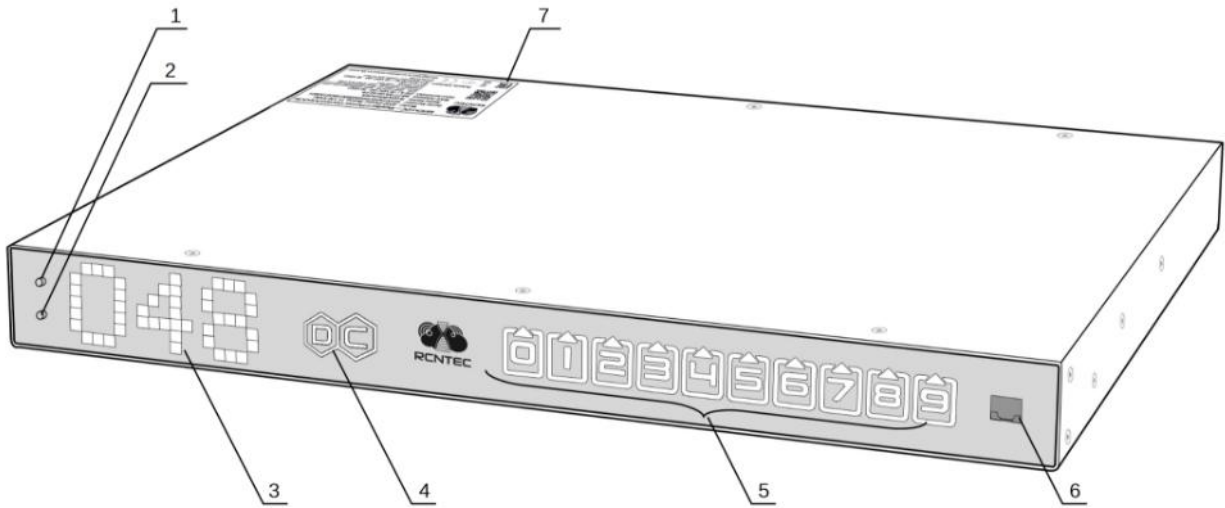


Figure 4.1.3. Front panel with indicators and controls RPCM DC 232A.

Legend:

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

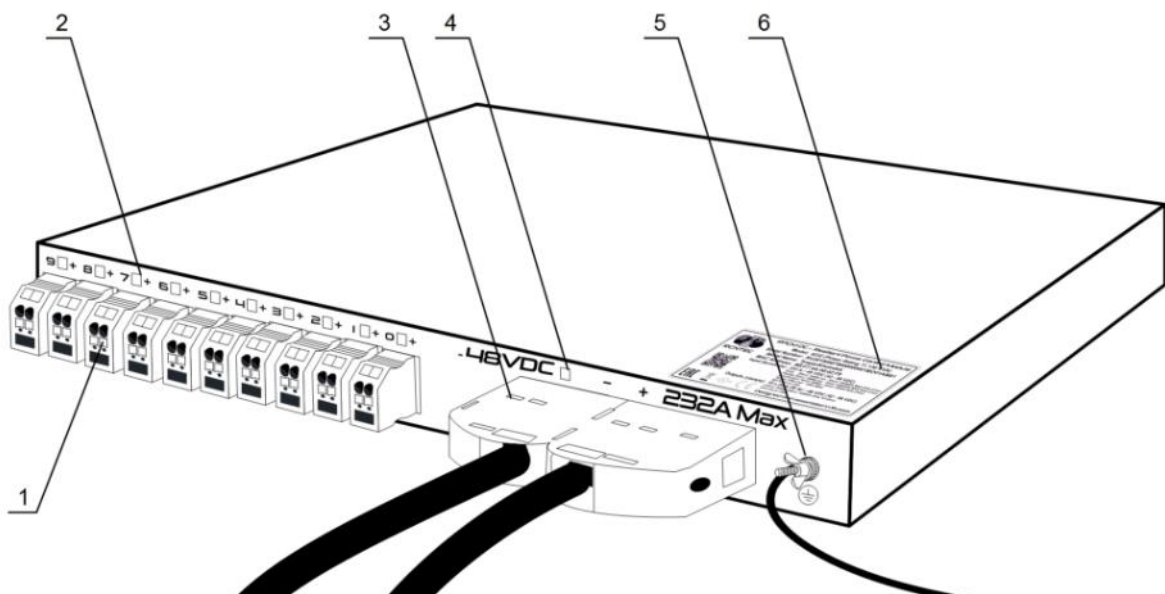


Figure 4.1.4. Rear side of RPCM DC 232A.

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	RU2017101100000002-MO01DN01
User message	English characters and numbers	Any, for example "#01"

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

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

The top button toggles the values in reverse order.

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.

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: Troubleshooting and Regular Operations

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

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

There are available combinations of operations. For example, when overloading RPCM on input according to default survival priorities, the 9th outlet automatically disconnected. In such 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 operations for RPCM. If there are no reasons these 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 operations in the order for select outlet, then to regular operations of administrative disconnection and activation of outlet.

Table 4.1.2. Available operations in Control Mode.

Function / Message	Object	Mode	Description
<i>Control Mode! Be Careful!</i>			Message alerting that Control Mode has been entered
<i>Return To View Mode</i>		Regular	Menu item to return to View Mode
Operations for RPCM			
<i>Beeper Switch OFF</i>		Regular	Turn off the beeper
<i>Reset All Short Circuits</i>		<i>Troubleshooting</i>	Reset outlets that have been turned off due to short circuits. Make sure to remove SHORT CIRCUIT conditions first!
Operations with the Inlet			
<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)
Operations with the output			
<i>Outlet N OC Switch OFF</i>	<i>N</i> — Outlet 0-9	Troubleshooting	Switch off the outlet, when it was turned off due to overload
<i>Outlet N IOC Switch OFF</i>	<i>N</i> — Outlet 0-9	Troubleshooting	Switch off the outlet, when it was turned off due to overload on Inlet
<i>Outlet N OV Switch OFF</i>	<i>N</i> — Outlet 0-9	Troubleshooting	Switch off the outlet, when it was turned off due to overvoltage
<i>Outlet N SC Switch OFF</i>	<i>N</i> — Outlet 0-9	Troubleshooting	Switch off the outlet, when it was turned off due to short circuit
<i>Outlet N MF Switch OFF</i>	<i>N</i> — Outlet 0-9	Troubleshooting	Switch off the outlet, when it was turned off due to on malfunction
<i>Outlet N Switch ON</i>	<i>N</i> — Outlet 0-9	Regular	Switch ON outlet
<i>Outlet N Switch OFF</i>	<i>N</i> — Outlet 0-9	Regular	Switch OFF outlet

4.2. Web Interface of RPCM

4.2.1. General Information

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

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

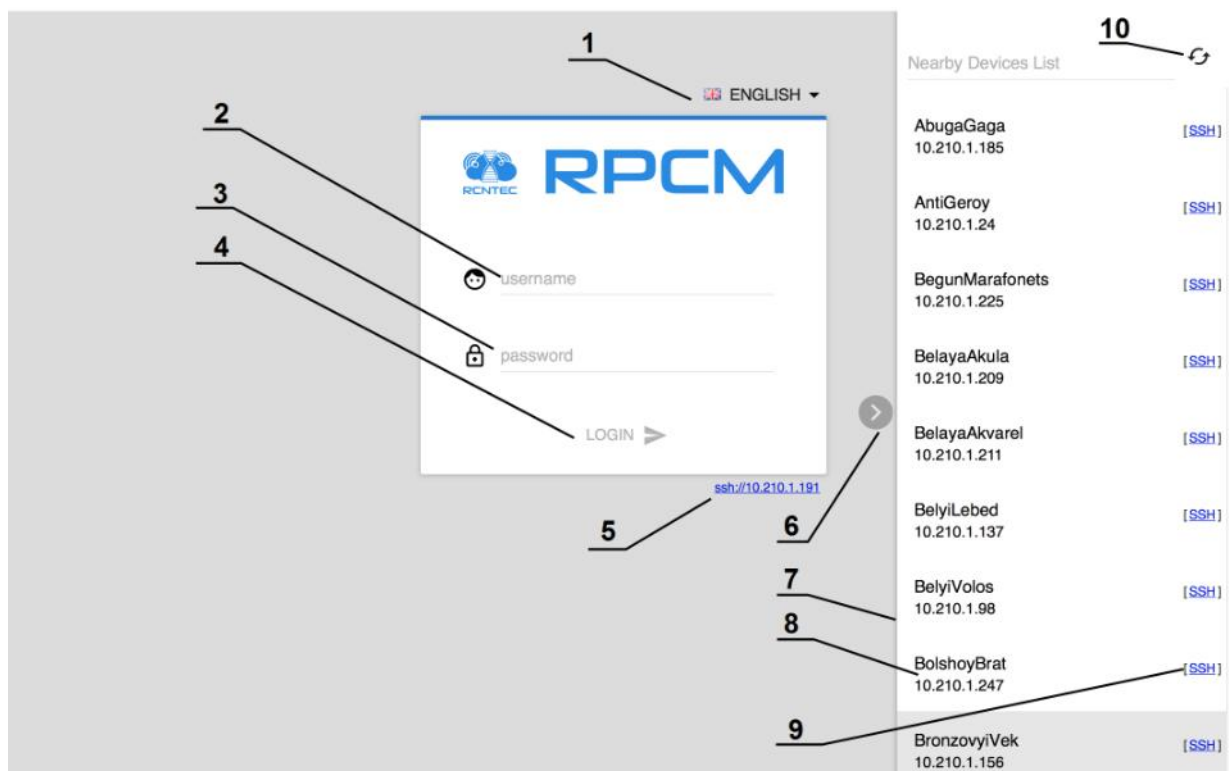


Figure 4.2.1. Login window.

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.

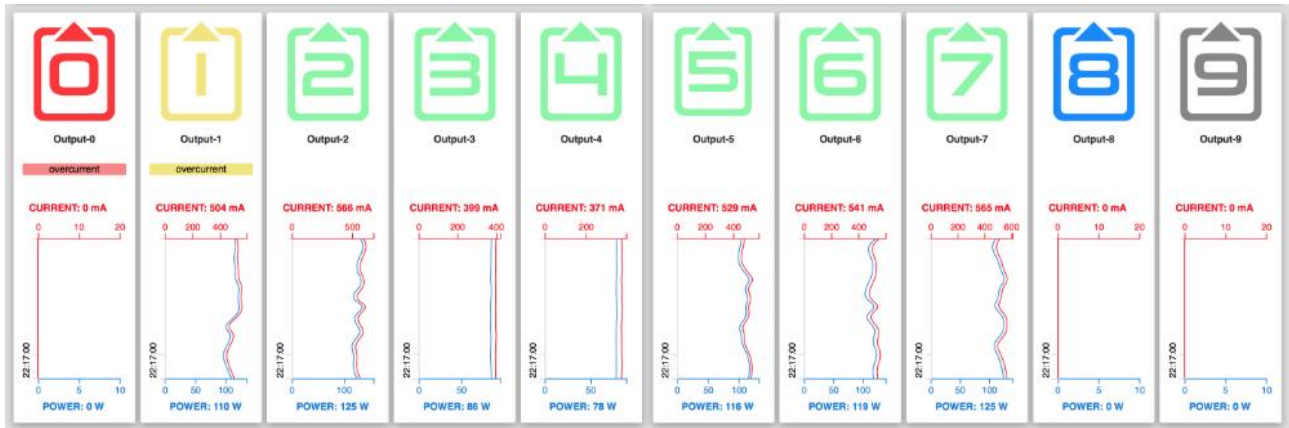


Figure 4.2.3. An example of the color coding on the Dashboard of RPCM's web interface

4.2.4. Top Control Bar

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

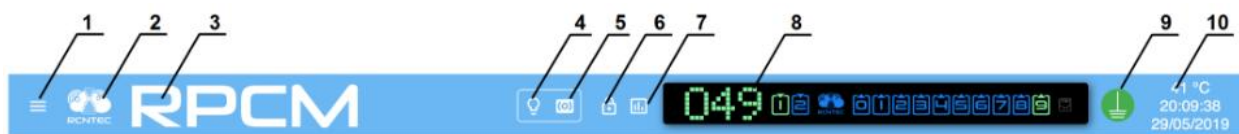


Figure 4.2.4. Control elements on the Top Control Bar.

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.

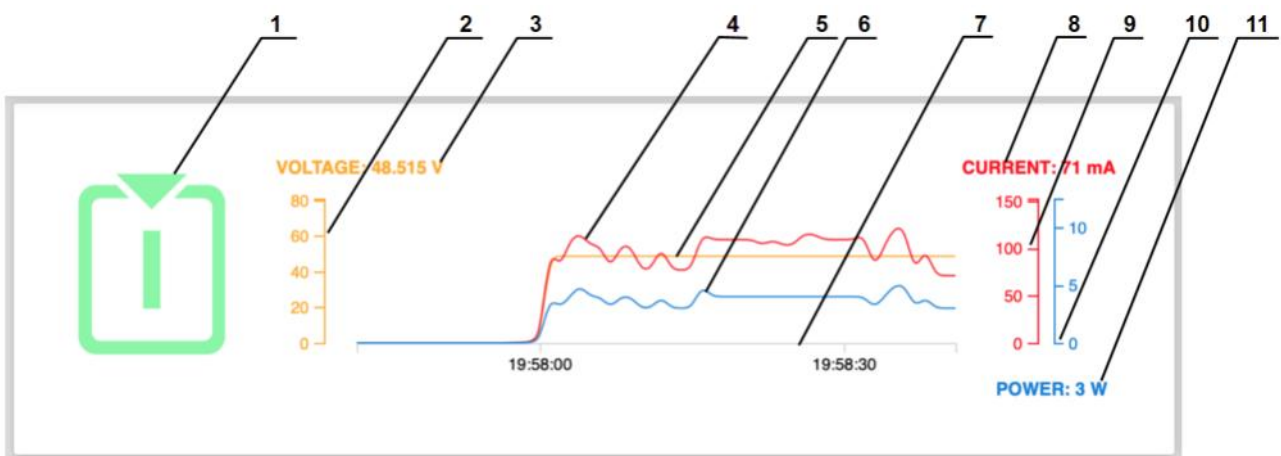


Figure 4.2.5. Block of information about input status in View Mode.

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

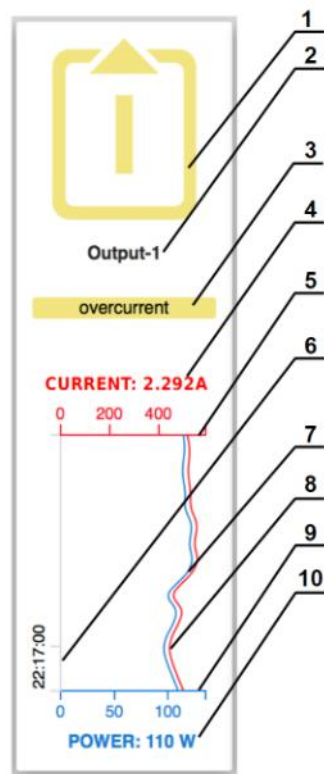


Figure 4.2.6. Block of information about the outlets status in the View Mode.

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 (see section 4.2.3. *Description of the 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.

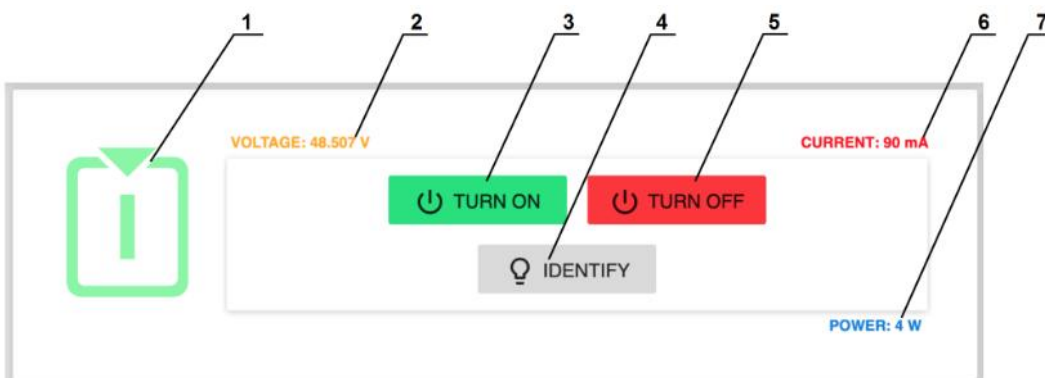


Figure 4.2.8. Controlling the status of inputs in Control Mode for RPCM DC ATS 76A.

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.

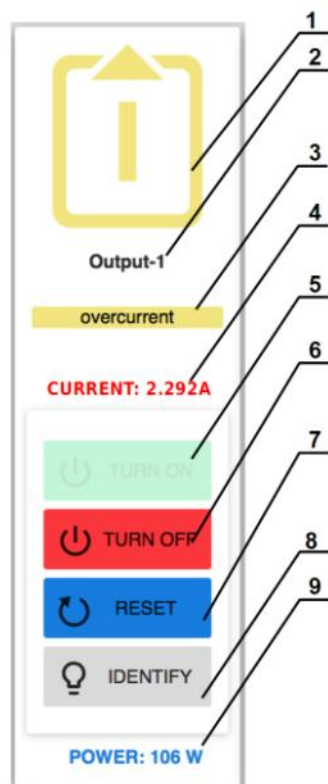


Figure 4.2.9. Controlling the status of the outlets in Control Mode.

Legend:

- 1 — outlet number;
- 2 — outlet name;
- 3 — status message;
- 4 — instant outlet current consumption value (milliamperes);
- 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.

Warning! You are using non-encrypted connection! If you proceed, your login and password will be visible on the network.
To switch to secure connection click https://10.210.1.191/sign_in

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.

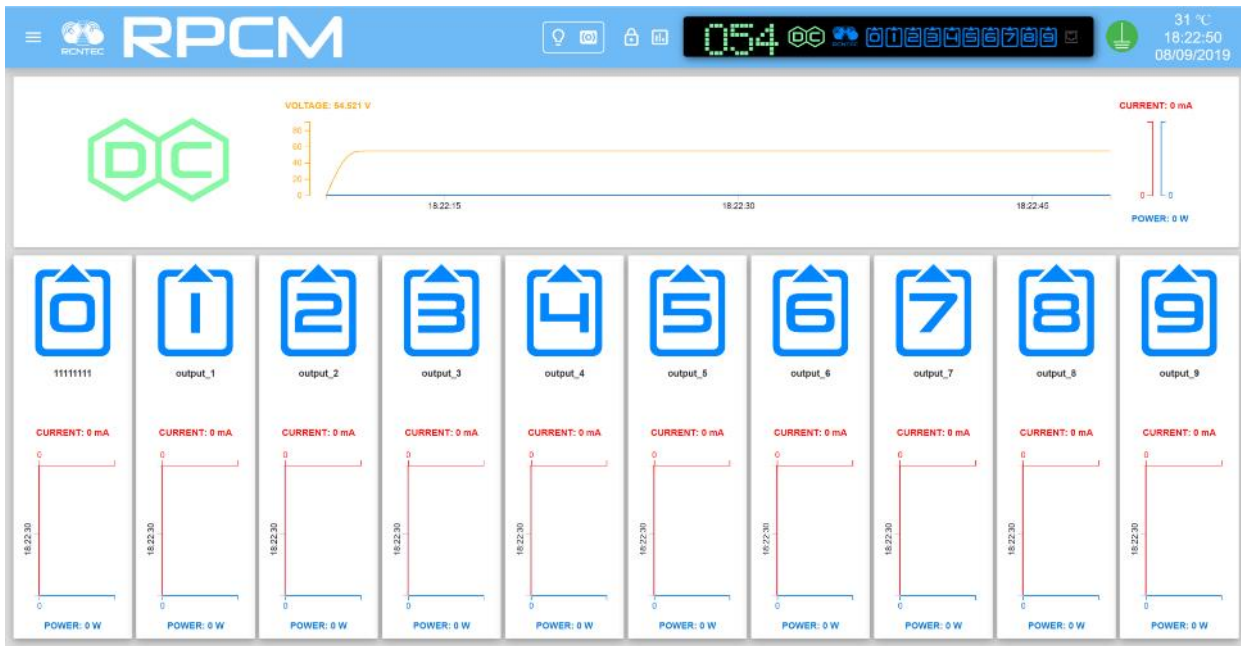


Figure 4.2.13. Dashboard in View Mode RPCM DC 232A.



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



Figure 4.2.15. 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.

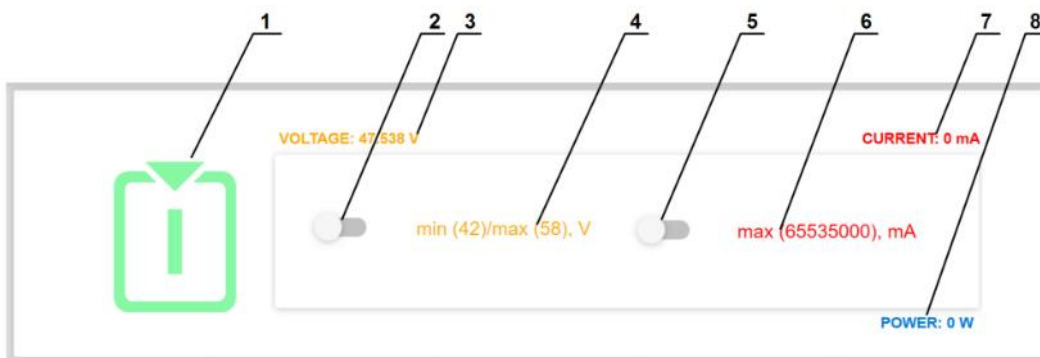


Figure 4.2.16. Show Limits settings RPCM DC with ATS for input 2.

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.

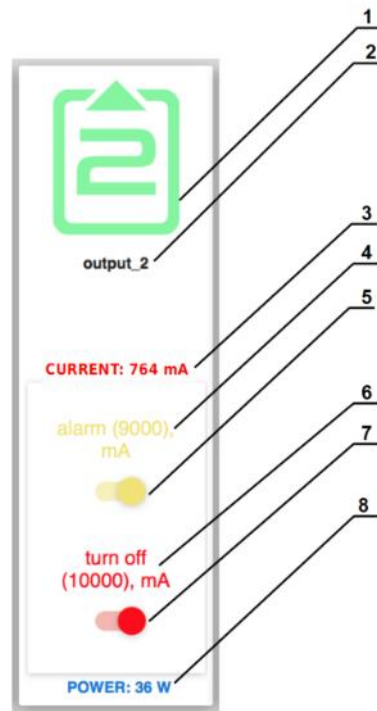


Figure 4.2.17. Settings for demonstrating the established limits RPCM DC ATS 76A.

Legend of the 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.

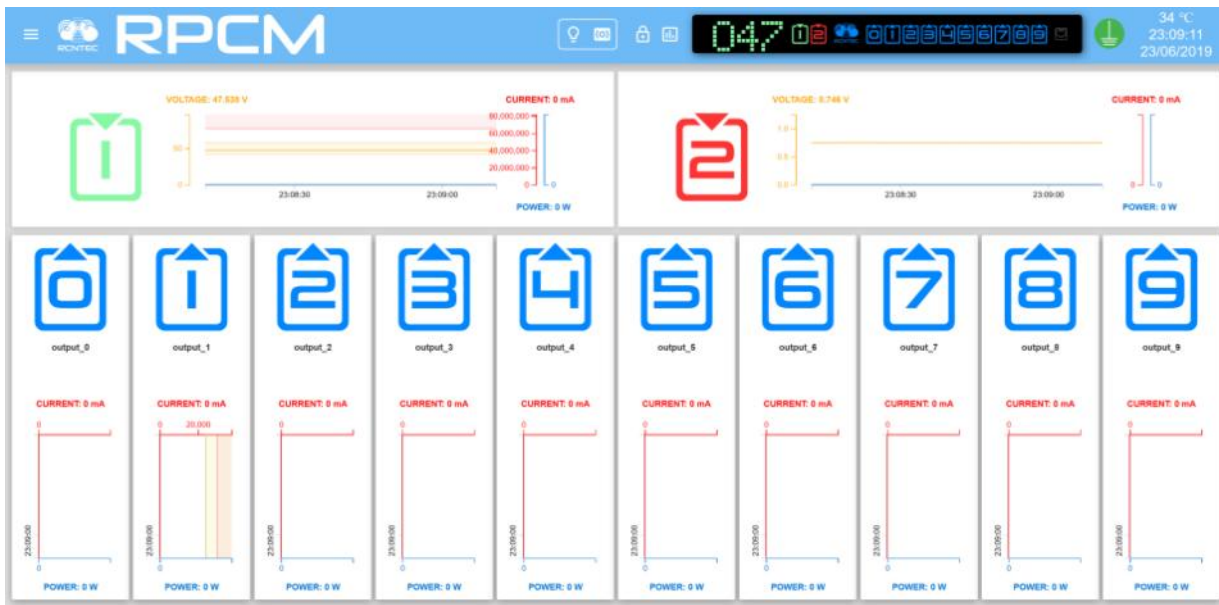


Figure 4.2.18. The Dashboard control panel in the "Show Limits mode".

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 rpcadmin 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]: RU2017101100000002M001DN02 [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 rpcadmin >

```

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.

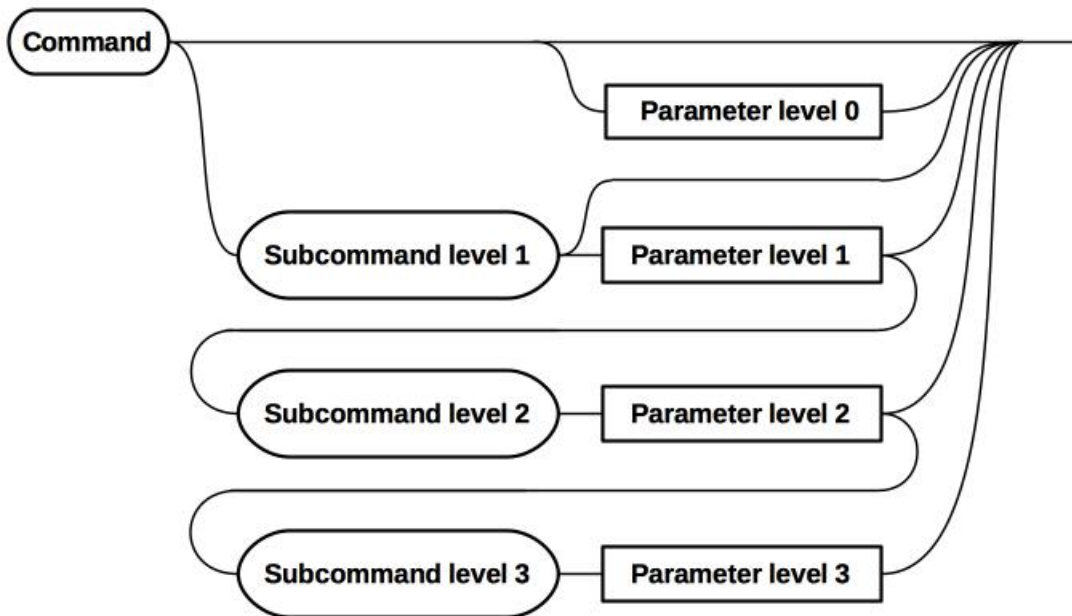


Figure 4.3.2. General scheme of the command line interface.

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:

PCM Commands description:

```

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

```

```

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

```

```

adminState      enable/disable snmp
community      adjust SNMP community settings
trap           adjust SNMP traps settings
user           adjust SNMP users settings
set time       - set new time
value          value
zone          zone
synchronization toggle ntp synchronization
set user <username> - set parameters for username
authenticator  set Authenticator for user
accessLevel    set Access Level for user
disabled       disables user account
enabled        enables user account
password       set password for user
set help       - show this help

```

Type 'help' to get suggestions

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

```
set output 0 ?
```

Help displays:

RPCM Commands description:

```

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

```

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

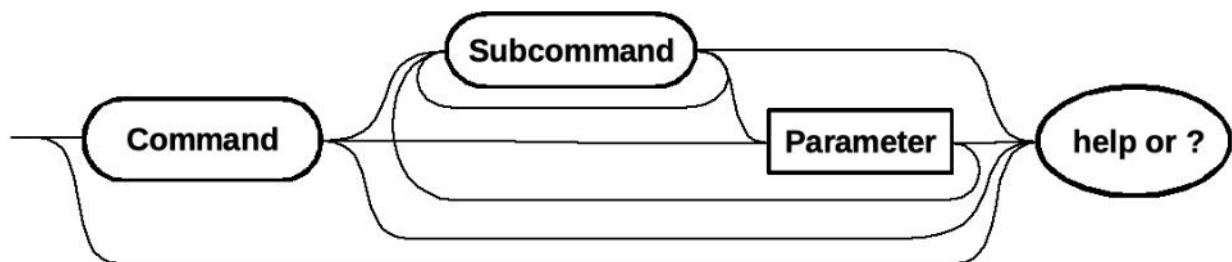


Figure 4.3.3. General scheme of obtaining information

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 `https://<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.

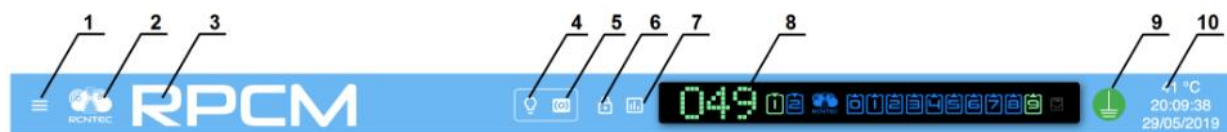


Figure 4.4.3. "Inputs" Section — main window.

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 ("Show Limits" button);
- 8 — Virtual Front Panel, a click on this object switch to Dashboard;
- 9 — grounding icon;
- 10 — group of service values: internal temperature in degrees Celsius, time and date.

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.

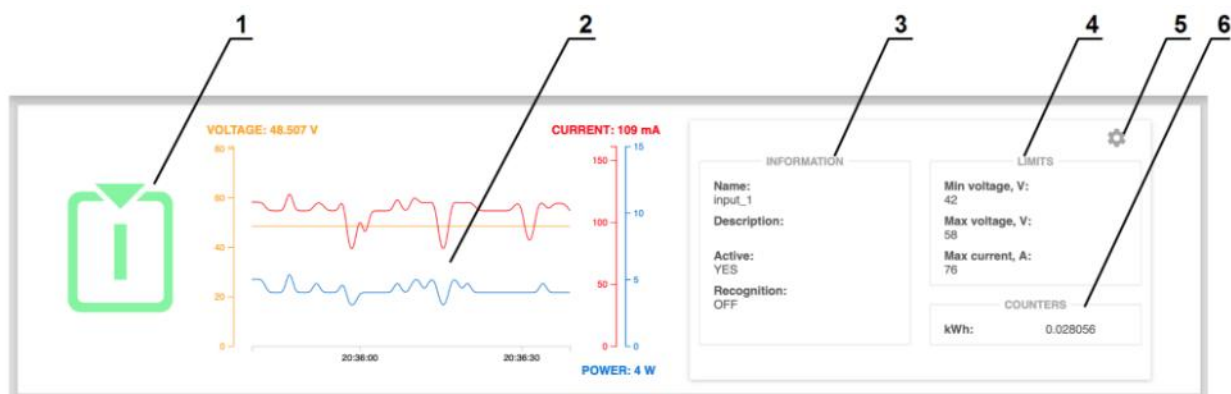


Figure 4.4.4. Input information panel.

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.

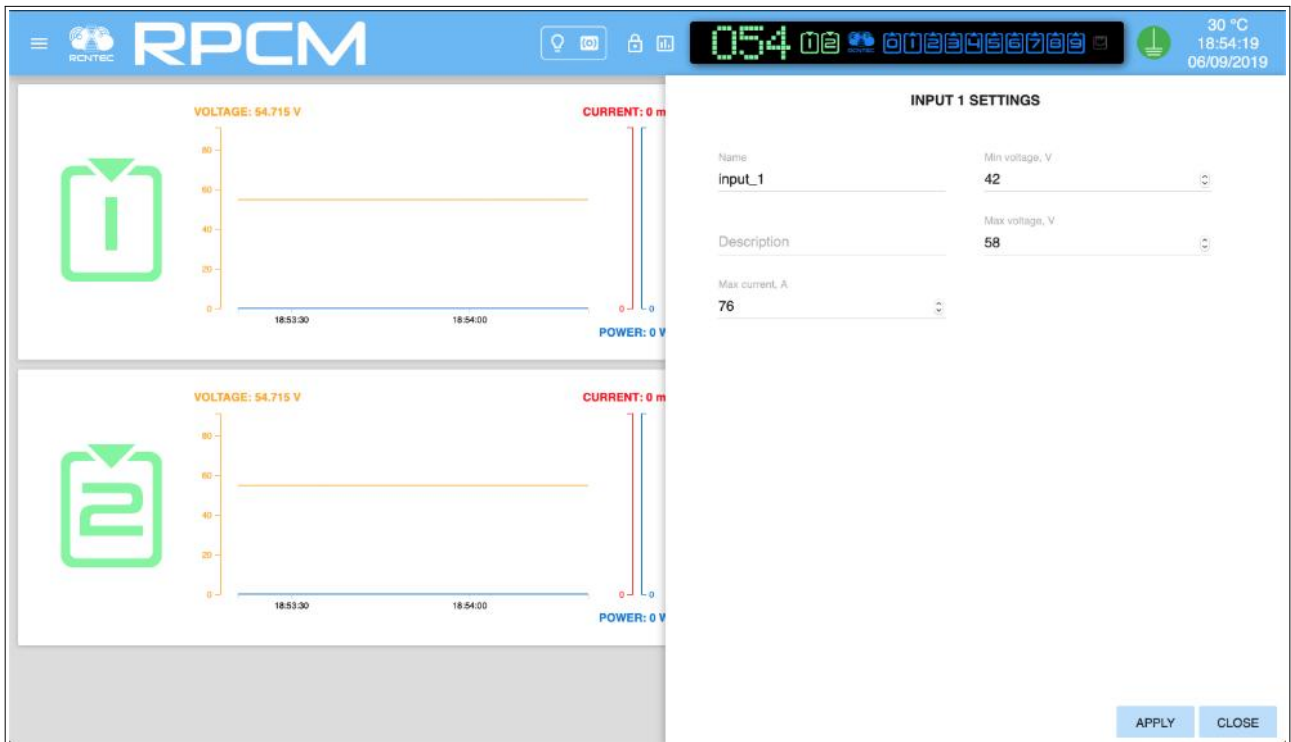


Figure 4.4.5. INPUT SETTINGS pop-up window (entering the main parameters).

Note: Input 2 is configured in the same way.

4.4.6. Management of Inlets in Control Mode

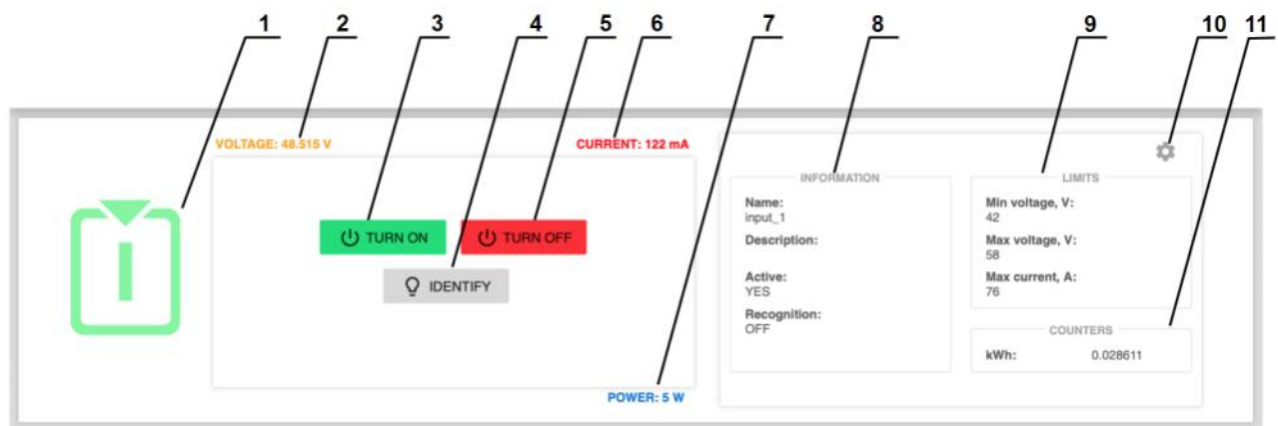


Figure 4.4.6. Control Mode of the Input Section.

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.

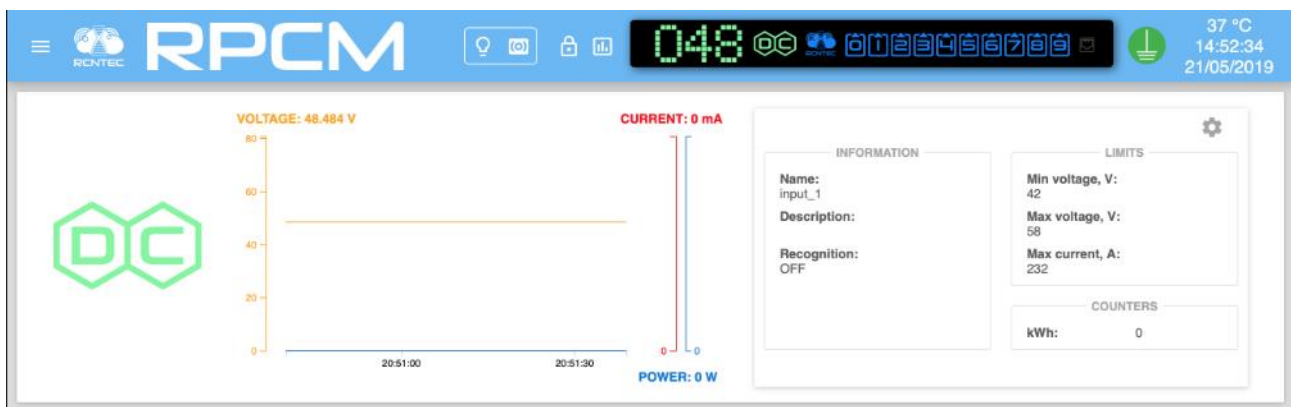


Figure 4.4.7. "Inputs" Section — main window of RPCM DC 232A.

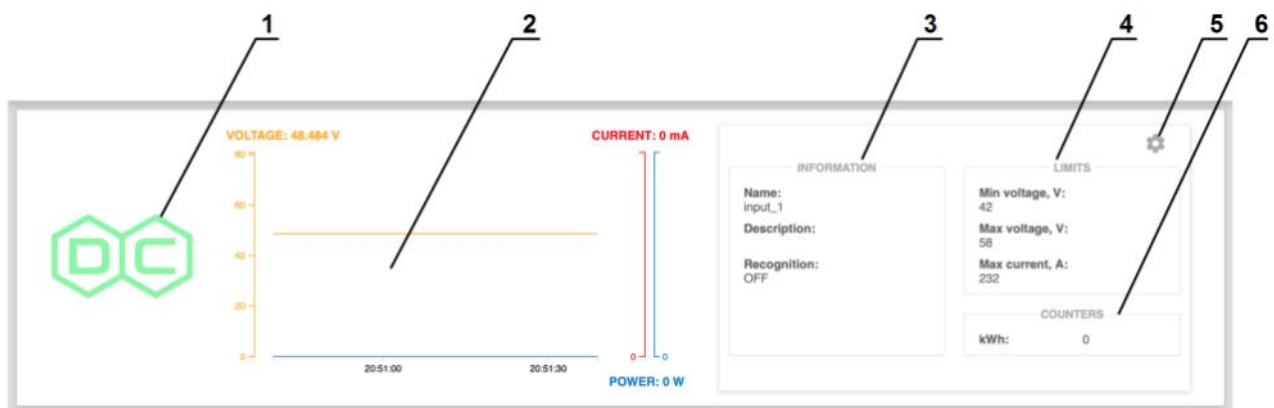


Figure 4.4.8. Input panel of RPCM DC 232A.

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.

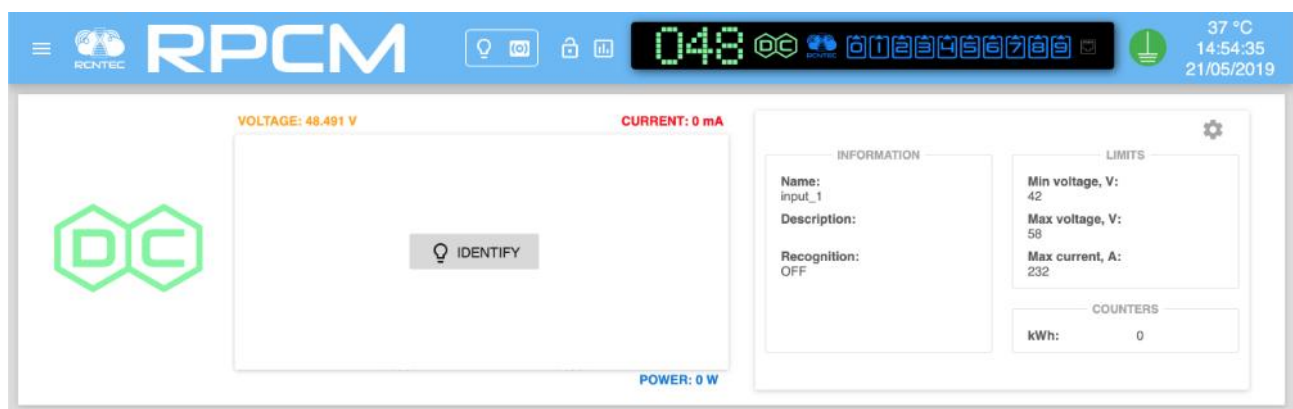


Figure 4.4.9. Control input area in Control Mode for RPCM DC 232A.

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.

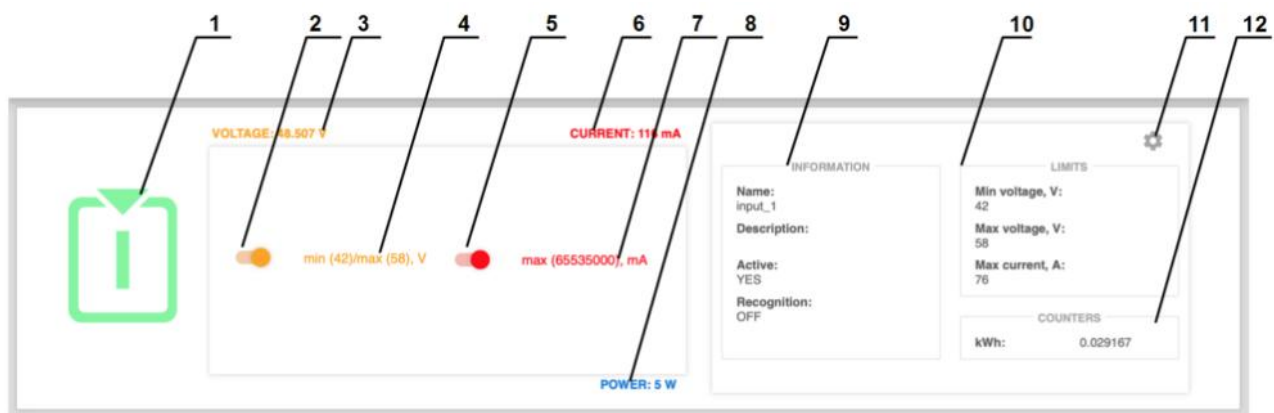


Figure 4.4.11. The setting items for *Showing Current Limits*.

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: `https://<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.

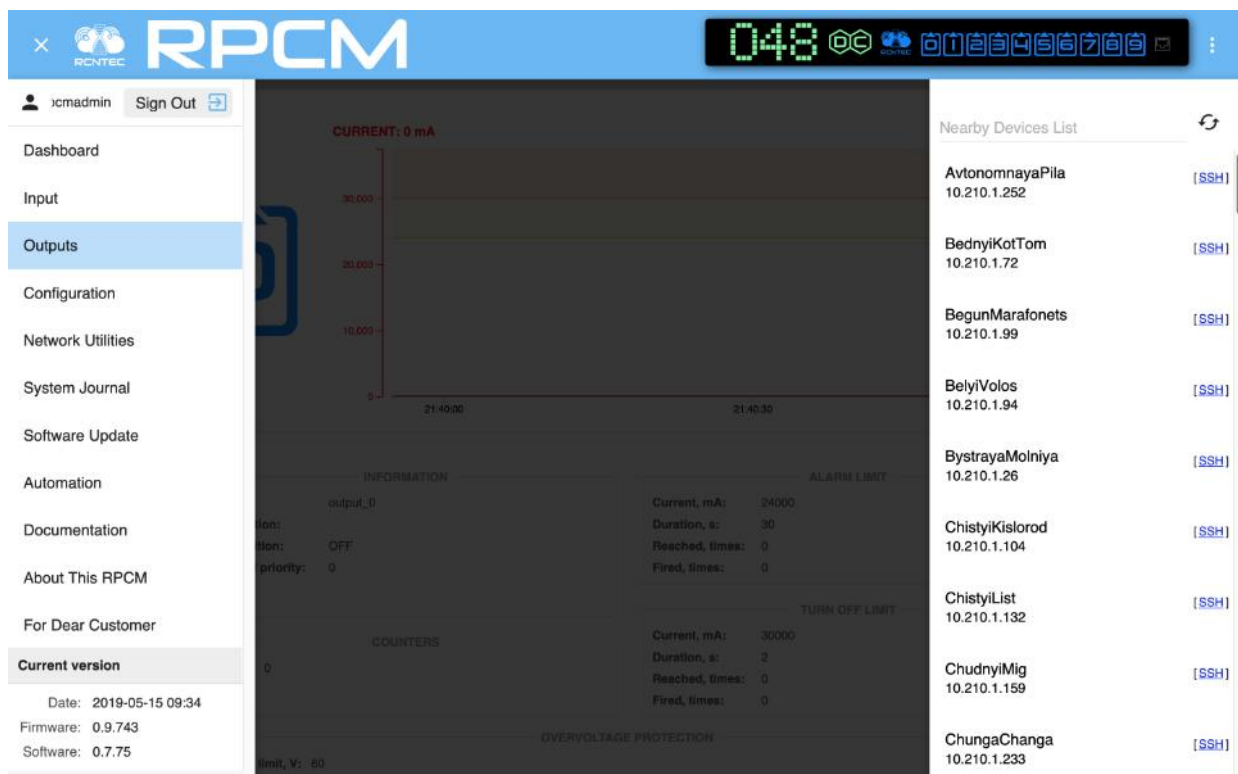


Figure 4.5.1. Select menu is the Outputs item.

4.5.2. Output (Outlets) section

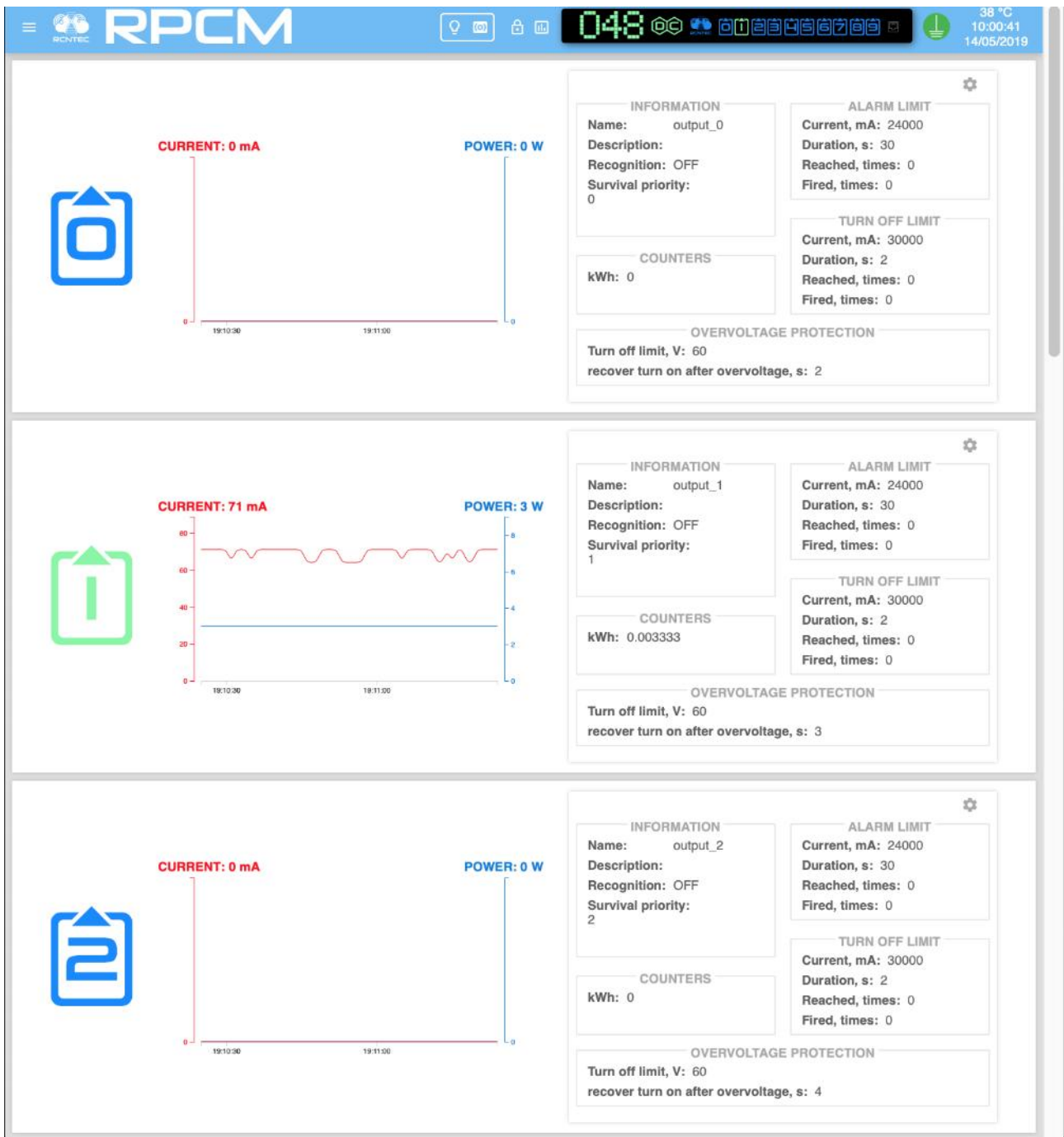


Figure 4.5.2. Main window of the section Outputs

4.5.3. Top Control Bar

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

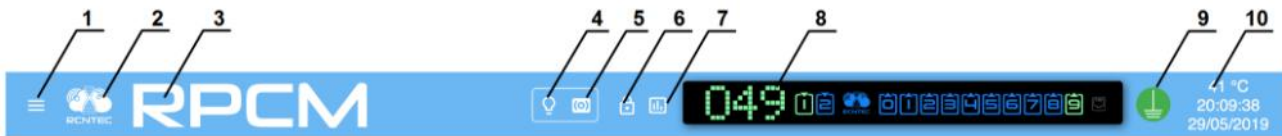


Figure 4.5.3. Top Control Bar

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.

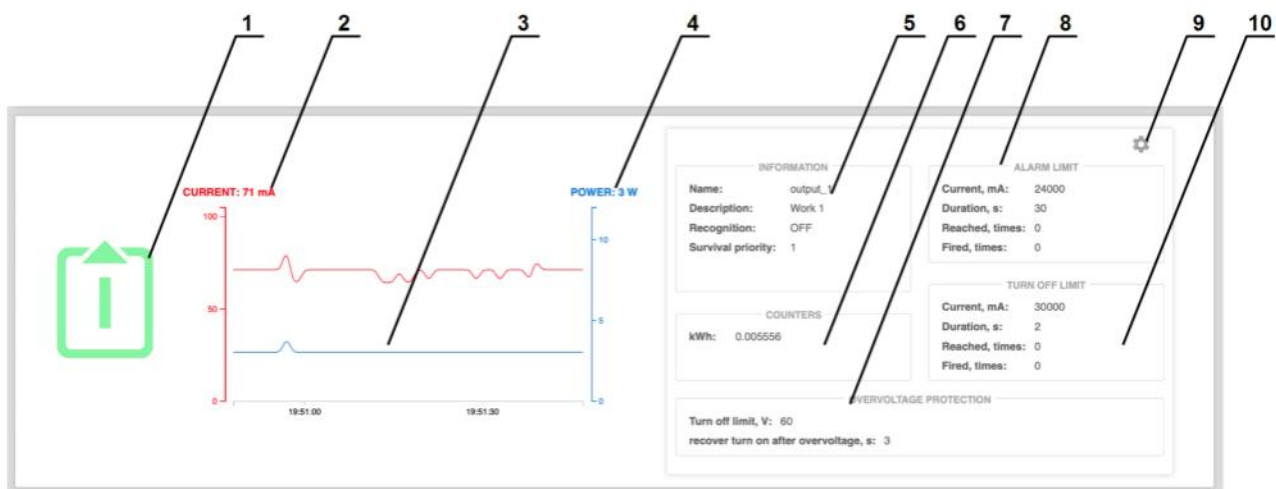


Figure 4.5.4. Presentation of technical outlet parameters.

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;
- **don't turn on automatically after startup** — when voltage is applied to the RPCM after a complete shutdown, this output will remain off;
- **turn on after start-up, s** — delay at start-up; set to avoid high in-rush currents and to start infrastructure in correct order during start-up after power blackout;
- **survival priority** — priority with which the channels are deactivated in case of a general overload (highest is 0, lower is 9, the higher the priority, the later the channel is disconnected in the event of input overload);
- **restart delay, s** — timeout between turning off and turning on when power on outlets restart, up to 65534 seconds max;
- **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.

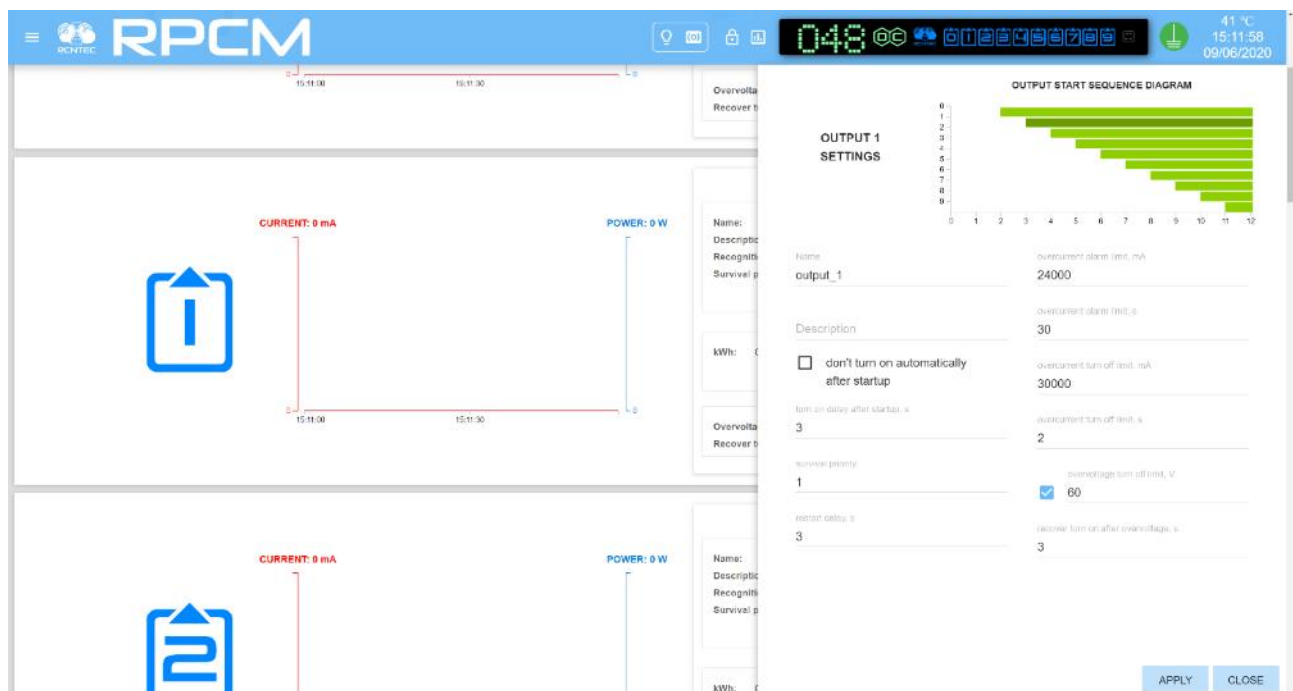


Figure 4.5.5. The OUPUT SETTINGS pop-up window.

4.5.7. Management of Outlets in Control Mode

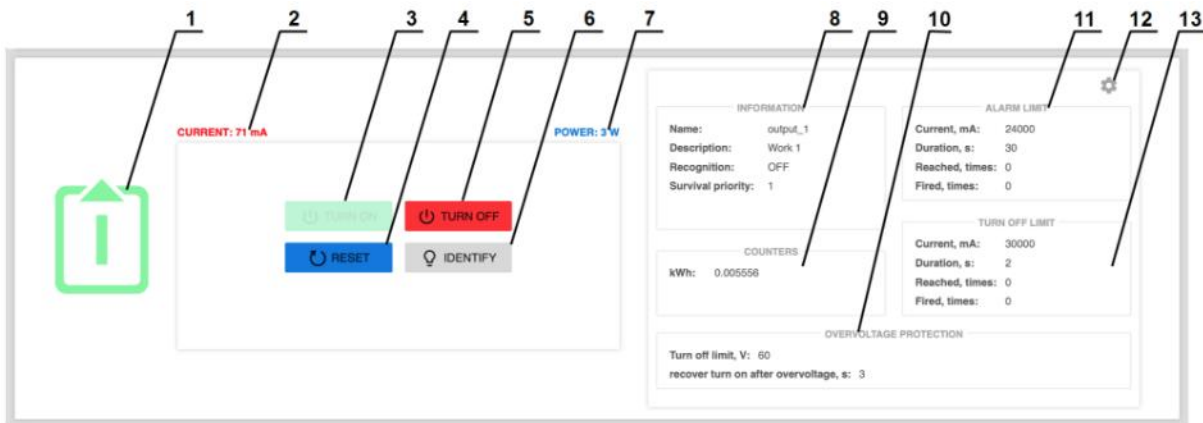


Figure 4.5.6. Outlet panel in Control Mode.

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 — “*OVERVOLTAGE PROTECTION*” block;
- 11 — “*ALARM LIMIT*” block;
- 12 — “*gear*” button to open the “*OUTPUT SETTINGS*” pop-up window;
- 13 — “*TURN OFF LIMIT*” block.

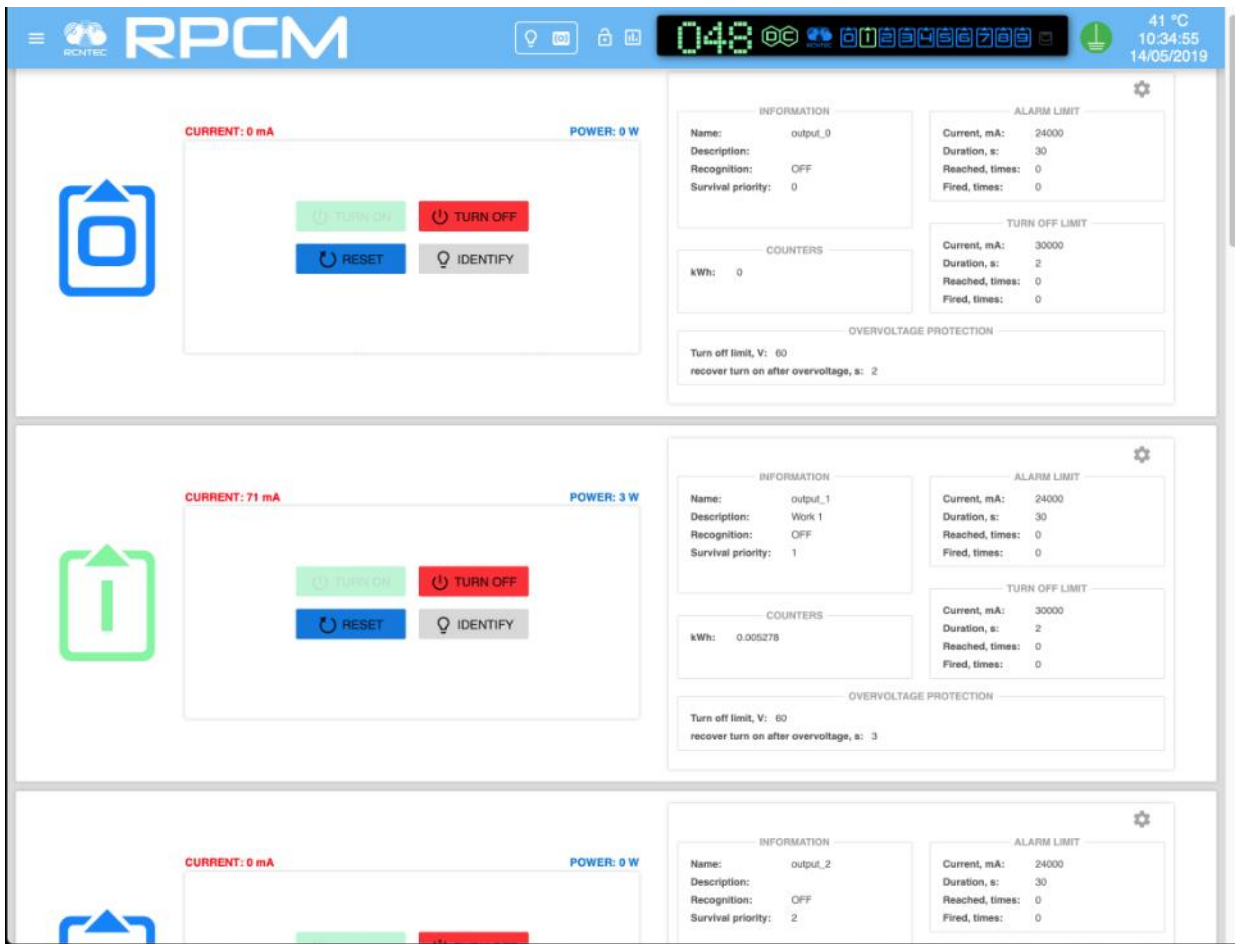


Figure 4.5.7. General view of the Outputs section in Control Mode.

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.

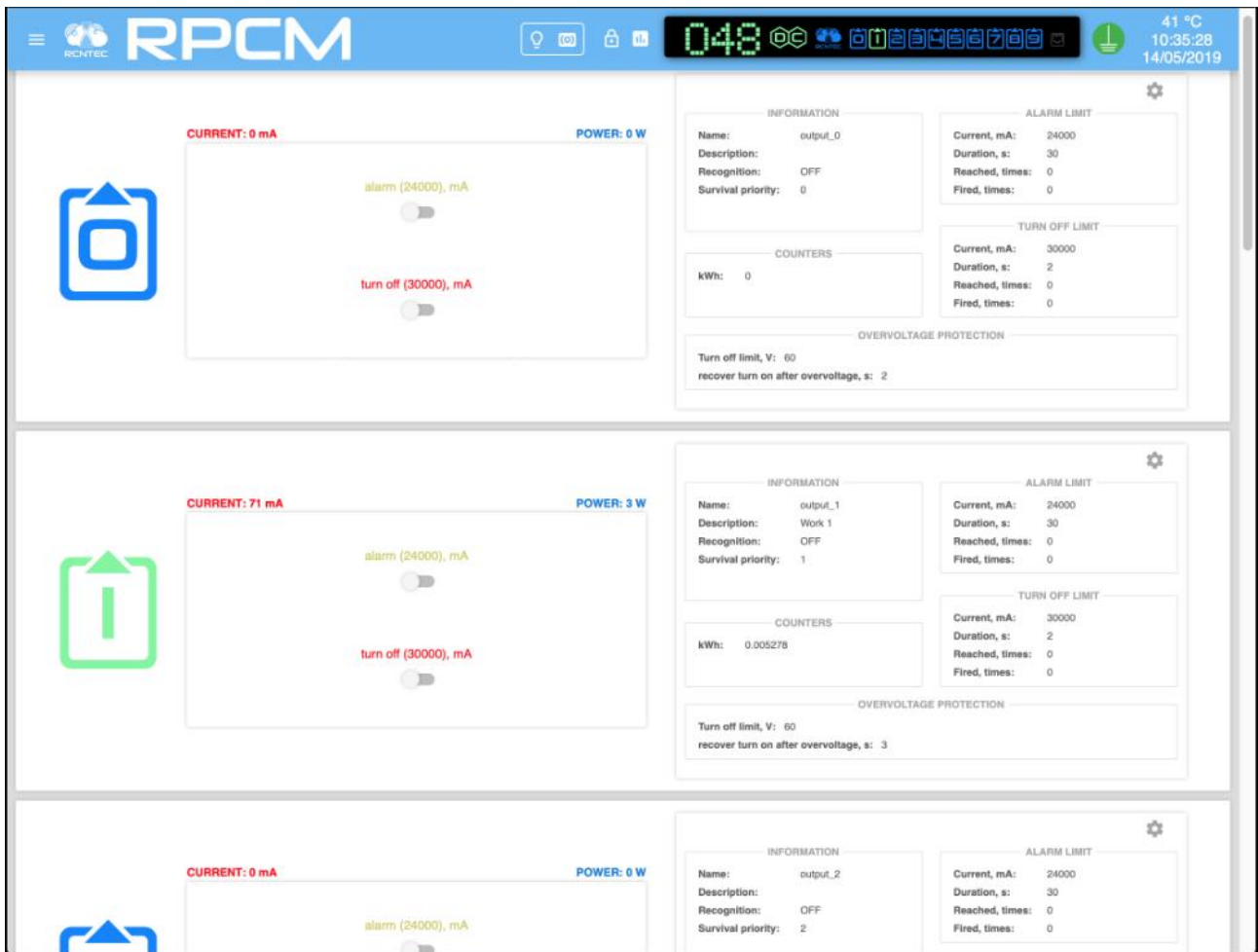


Figure 4.5.8. Showing Current Limits configuration.



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: `https://<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

There are management panels under the Top Control Bar 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

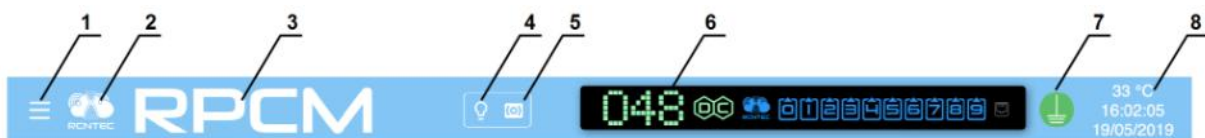


Figure 4.6.4. "Top Control Bar" in Configuration section.

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 shows the RPCM web interface configuration section. The top navigation bar includes the RPCM logo, a location icon, a digital clock showing 04:48, and system status icons for temperature (38 °C), time (20:29:05), and date (05/09/2020). The main content area is divided into several panels:

- Users (3) / Groups (4):** A table listing users and their group memberships. Red annotation 1 is placed over the table.
- RADIUS:** A table for RADIUS server configuration. Red annotation 12 is placed over the table.
- Location / Tech Contact:** Fields for location and technical contact information. Red annotation 2 is placed over the location field.
- Cloud connection / Cloud Registration:** Options for cloud connectivity. Red annotation 7 is placed over the registration options.
- Network Settings:** Configuration for IPv4 (DHCP, address, subnet mask, gateway, DNS). Red annotation 3 is placed over the network settings.
- Front Panel Display Settings / Global options:** Customization options for the device's display. Red annotation 9 is placed over the display settings.
- SNMP agent:** Configuration for the SNMP agent, including administrative state, port, engine ID, and context. Red annotation 4 is placed over the MIB files list.
- Date/Time / NTP:** Settings for the device's date, time, and NTP servers. Red annotation 5 is placed over the NTP settings.
- SMTP Settings / Mail Recipients (1):** Configuration for email notifications. Red annotation 6 is placed over the SMTP settings.
- API Service Settings:** Configuration for the API service. Red annotation 8 is placed over the API key field.
- Backup / Restore:** Options to download or restore the device configuration. Red annotation 10 is placed over the backup options.
- Web Interface Language:** Selection of the language for the web interface. Red annotation 11 is placed over the language dropdown.
- Restart RPCM HLC:** A button to restart the High-Level Controller. Red annotation 13 is placed over the restart 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 settings panel;
- 6 — SMTP Setting panel;
- 7 — Cloud Connection / Cloud Registration panel.
- 8 — API Settings panel;
- 9 — Front panel Display settings panel;
- 10 — Backup/Restore panel;
- 11 — Language selecting panel;
- 12 — RADIUS servers settings panel;
- 13 — HLC (High Level Controller) bypass button.

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

4.6.5. Setting Up System User Accounts And Groups

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

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

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

Users (8)		Groups (7)
User name↑	Group	Status
Tor	Mstiteli	enabled
hulk	administrators	enabled
newuser	administrators	enabled
nightuser	administrators	enabled
nightuser2	rpcmadmingroup	enabled

Click row to edit or update user

RELOAD ADD

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

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

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

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

The 'New User' window features a blue header and a white background. It contains the following fields and controls:

- User name:** A text input field containing 'newuser2'.
- Disabled:** A toggle switch currently turned on (blue).
- Password:** A text input field with masked characters (dots).
- Confirm Password:** A text input field with masked characters (dots).
- Expiration seconds:** A text input field containing '3600'.
- Access level:** A dropdown menu currently set to 'administrators'.
- Authenticator:** Three radio button options: 'Local' (selected), 'Local & RADIUS', and 'RADIUS'.

At the bottom right, there are two 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.

The 'Edit User' window features a green header and a white background. It contains the following fields and controls:

- User name:** A text input field containing 'newuser2'.
- Disabled:** A toggle switch currently turned off (grey).
- Password:** A text input field with masked characters (dots).
- Confirm Password:** A text input field with masked characters (dots).
- Expiration seconds:** A text input field containing '3600'.
- Access level:** A dropdown menu currently set to 'superuser'.
- Authenticator:** Three radio button options: 'Local', 'Local & RADIUS', and 'RADIUS' (selected).

At the bottom right, there are three buttons: 'DELETE' (in red), 'CANCEL', and 'UPDATE'.

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

The following input fields are available in this window:

- **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;
- **Authenticator** — “Local”, “Local & RADIUS” “RADIUS”.

Note.

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

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

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

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

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

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

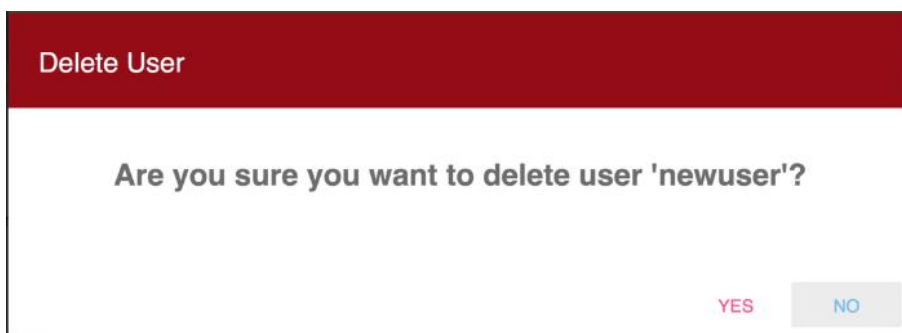
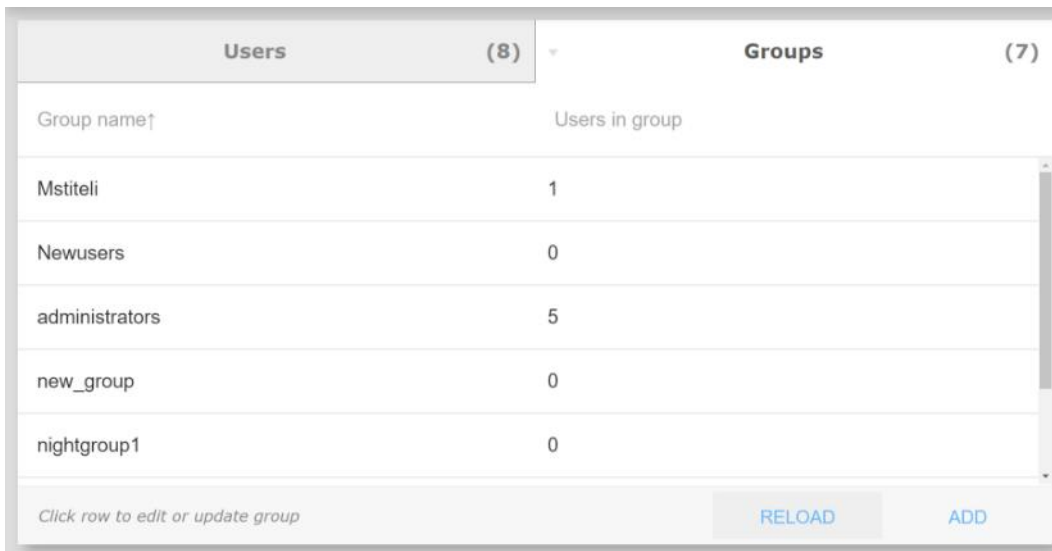


Figure 4.6.9. "Delete User" confirmation window.

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

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



Users (8)	Groups (7)
Group name	Users in group
Mstiteli	1
Newusers	0
administrators	5
new_group	0
nightgroup1	0

Click row to edit or update group

RELOAD ADD

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

To enter a new group, press the **ADD** button.

This window serves to fill a group name and set UNIX-like permission Read-Write-eXecute (RWX).

Objects for set permission is following:

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

New Group

Group name

Permissions

Please setup permissions for group, please note, you cannot remove read permissions (this feature will work in future releases)

Configuration	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
Inputs	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
Output 0	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
Output 1	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
Output 2	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
Output 3	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
Output 4	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
Output 5	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
Output 6	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
Output 7	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
Output 8	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
Output 9	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	<input type="checkbox"/> Execute
System journal	<input checked="" type="checkbox"/> Read		
Automation	<input checked="" type="checkbox"/> Read	<input type="checkbox"/> Write	
Utils			<input checked="" type="checkbox"/> Execute

CANCEL CREATE

Figure 4.6.11. "New Group" window.

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

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

Edit Group

Group name
rpcmadm

Permissions
 Please setup permissions for group, please note, you cannot remove read permissions (this feature will work in future releases)

Configuration	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input type="checkbox"/> Execute Actions
Inputs	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Execute Actions
Output 0	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Execute Actions
Output 1	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Execute Actions
Output 2	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Execute Actions
Output 3	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Execute Actions
Output 4	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Execute Actions
Output 5	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Execute Actions
Output 6	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Execute Actions
Output 7	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Execute Actions
Output 8	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Execute Actions
Output 9	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	<input checked="" type="checkbox"/> Execute Actions
System journal	<input checked="" type="checkbox"/> Read		
Automation	<input checked="" type="checkbox"/> Read	<input checked="" type="checkbox"/> Write	
Utils			<input checked="" type="checkbox"/> Execute Actions

DELETE
CANCEL
UPDATE

Figure 4.6.12. "Edit Group" window.

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

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

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

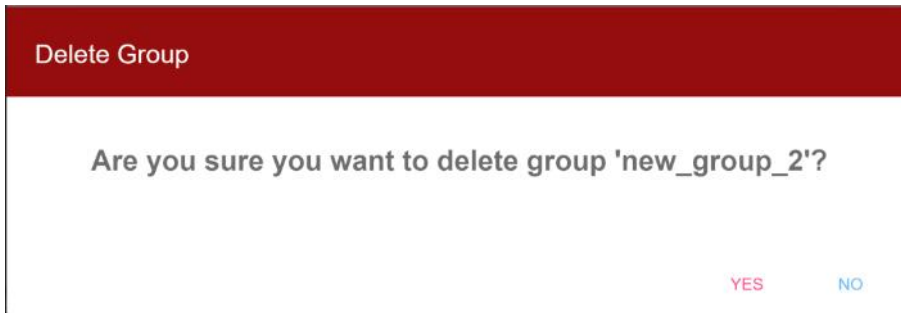


Figure 4.6.13. "Delete Group" window.

4.6.6. Information about Technical Support Location and Contacts

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

The following fields are displayed in the Location tab:

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

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

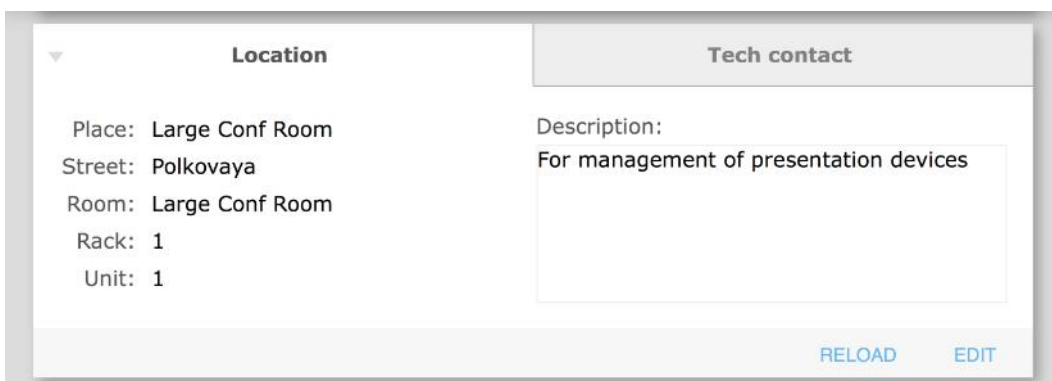


Figure 4.6.14. Location and Tech contact panel. The "Location" tab is active.

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

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

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

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

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

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

Figure 4.6.17. The "Edit Tech Contact" window.

4.6.7. Network Settings

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

It is also possible to configure static IP address settings.

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

The following fields are available in the Network Settings area:

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

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

Network Settings

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 4.6.18. "Network Settings" panel.

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

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

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

To cancel changes, click **CANCEL**.

4.6.8. SNMP Settings

4.6.8.1. General Settings of SNMP

The SNMP panel contains four tabs:

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

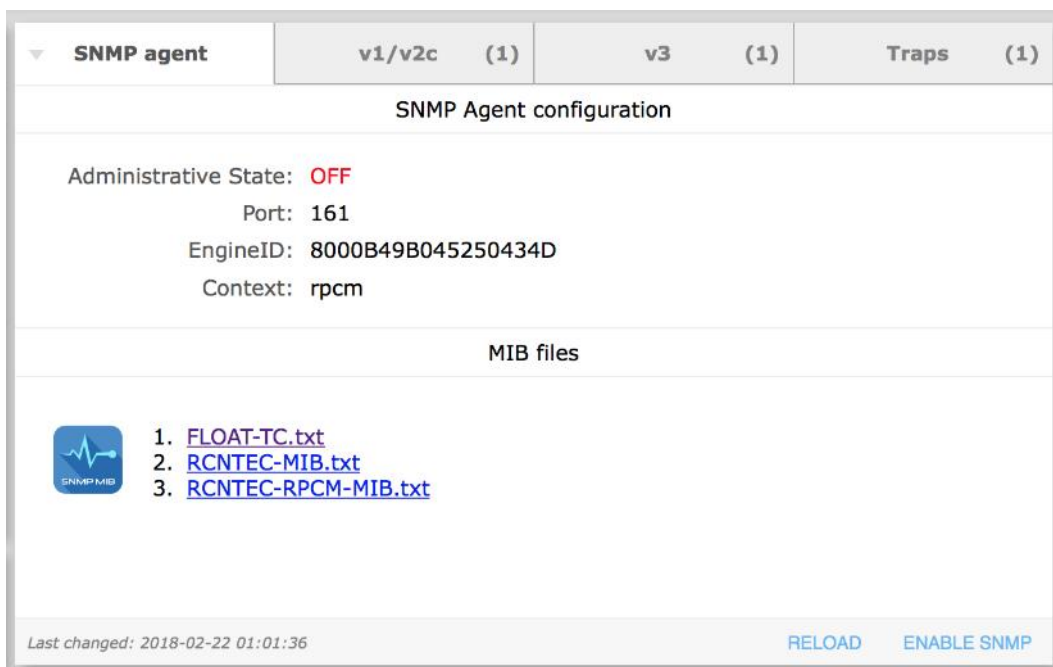


Figure 4.6.20. SNMP management panel. "SNMP agent" tab is active.

The SNMP Agent tab consists of two areas:

- 1 *SNMP Agent configuration* — to get information and enable / disable SNMP agent service;
- 2 *MIB files* — MIB files download links.

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

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

The fields are:

- **Administrative State** — the state of SNMP agent service - ON or OFF, by default — OFF;
- **Port** — port for network access - 161;
- **EngineID** — unique device identifier to distinguish it among other interrogated devices according to SNMP protocol;

- **Context** — name of context (ContextName).

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

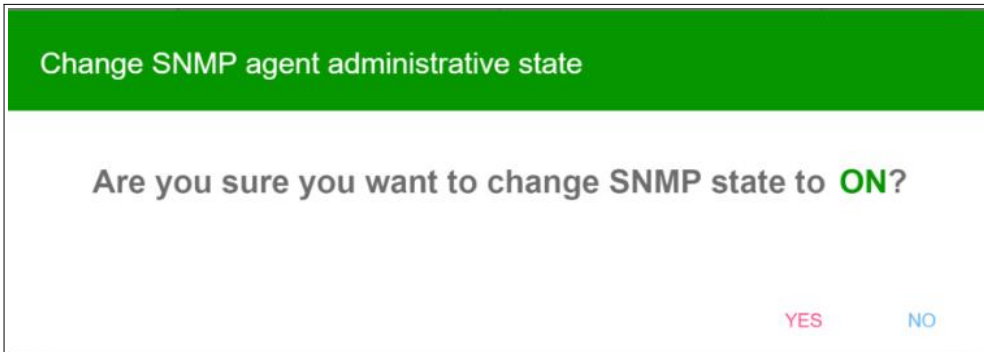


Figure 4.6.21. Window confirmation that SNMP is enabled.



Figure 4.6.22.

SNMP management panel. SNMP agent is ON.

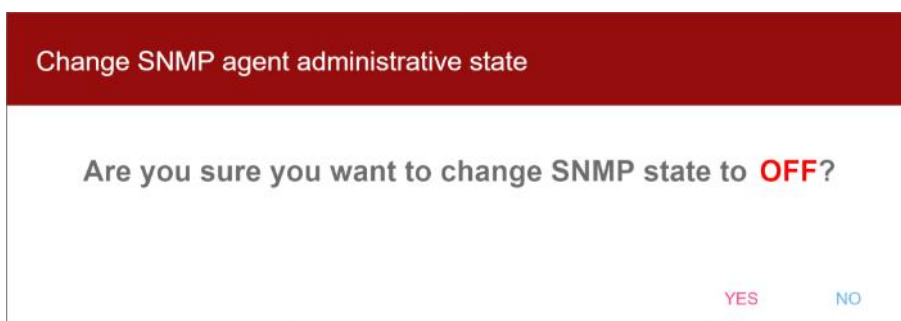


Figure 4.6.23. Window to confirm disabling of SNMP.

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

Additional information.

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

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

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

Note. The SNMP community name is case sensitive.

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

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

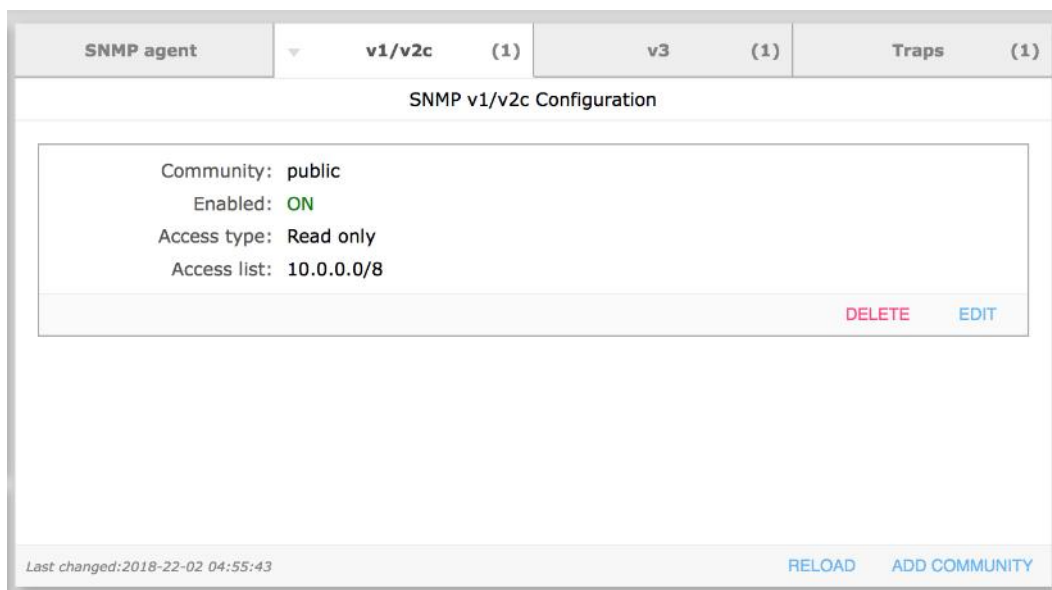


Figure 4.6.24. SNMP management panel. The tab "v1/2c" is active.

This tab provides information:

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

This tab has the following action buttons:

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

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

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

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

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

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

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

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

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

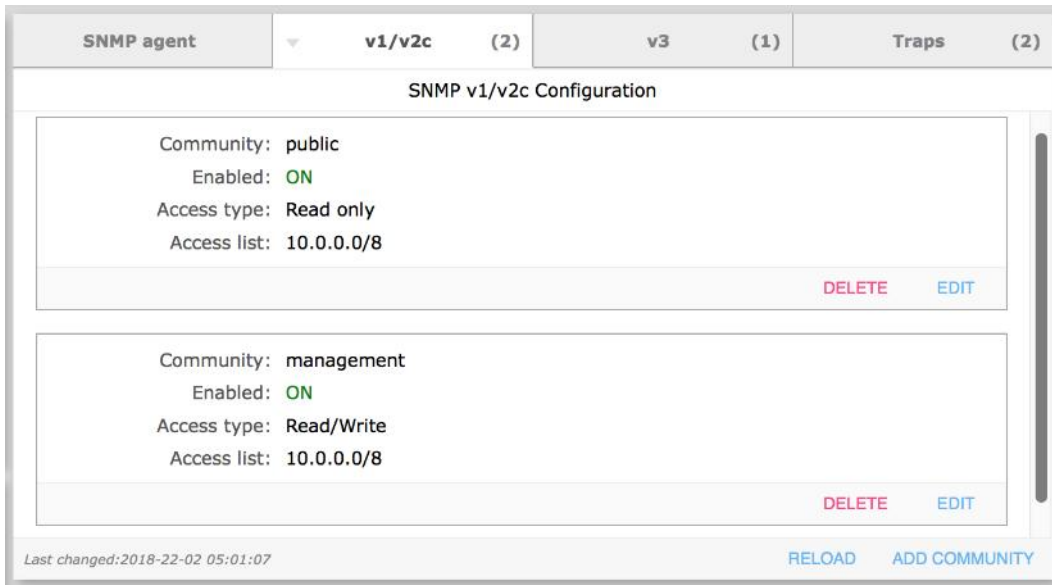


Figure 4.6.26. SNMP management panel, "v1/2c" tab. The new SNMP community "management" was created.

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

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

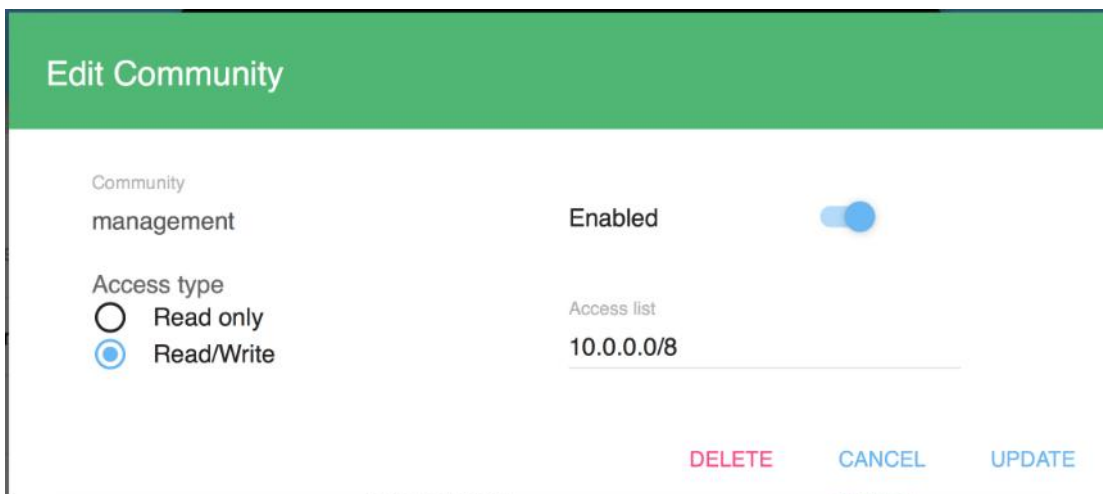


Figure 4.6.27. The "Edit Community" (SNMP) window.

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

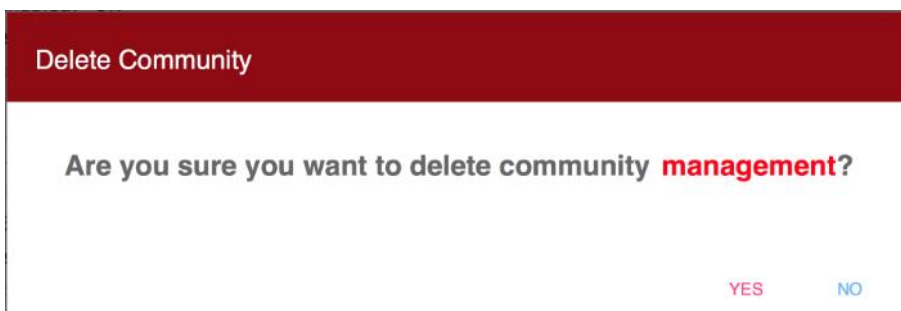


Figure 4.6.28. Confirmation of removal of the SNMP community record.

4.6.8.3. Access management via *SNMPv3* protocol

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

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

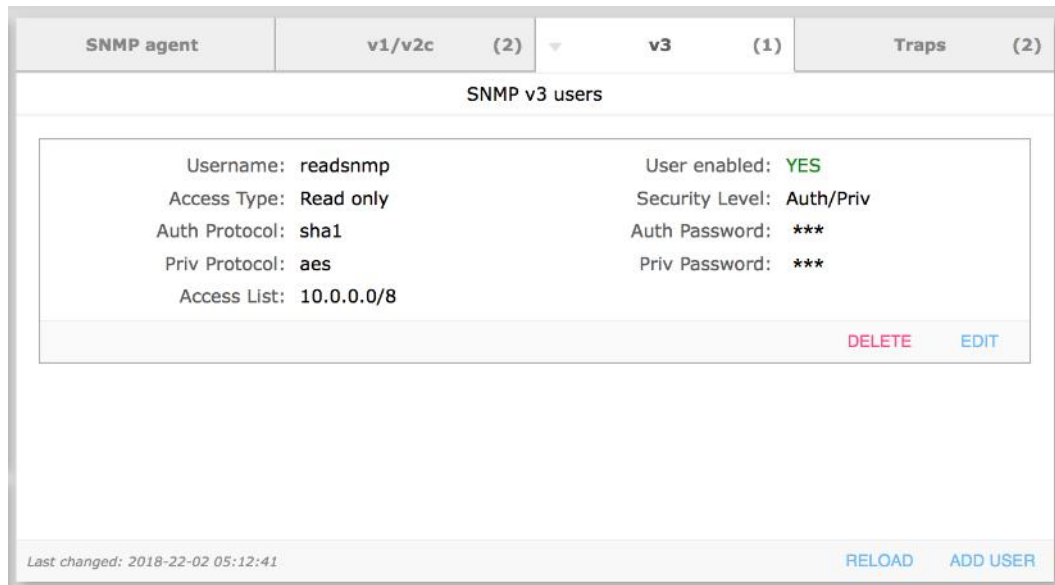


Figure 4.6.29. SNMP management panel, "SNMP v3 Users" tab.

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

- **Username** — username;
- **Access Type** — either "Read only" or "Read / Write";
- **Auth Protocol** — authentication protocol: "md5" or "sha1";
- **Priv Protocol** — encryption protocol: "des" or "aes";
- **Access List** — which IP addresses/subnets are allowed for this user (if you need to specify multiple IP addresses or subnets, type them in separated by commas);
- **User enabled** — "YES" or "NO";
- **Security Level** — NoAuth/NoPriv (just username for authentication), Auth/NoPriv (use password but no encryption), Auth/Priv (use password and encryption);
- **Auth Password** — password of the user for authentication;
- **Priv Password** — key for encryption.

This tab has the following action buttons:

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

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

Note. Version 0.9.1 of RPCM software include the "authPriv" authenticate method only.

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

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

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

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

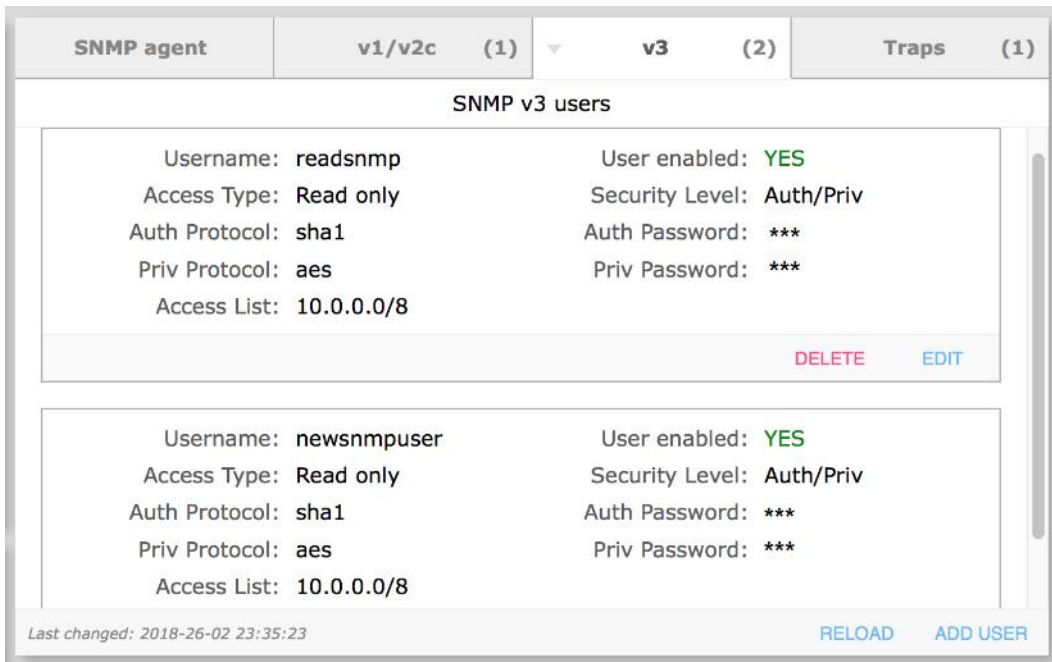


Figure 4.6.31. SNMP management panel. "SNMP v3 Users" tab. A new SNMP user record has been created.

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

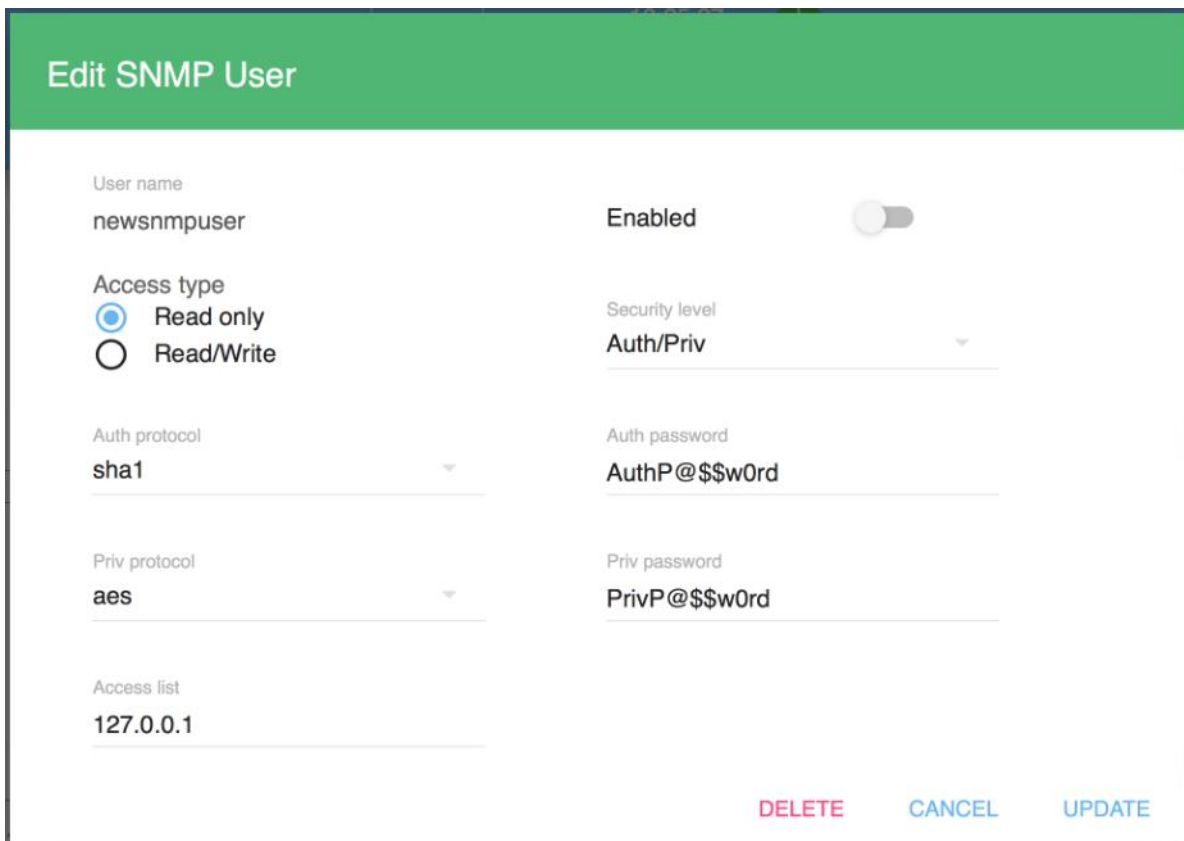


Figure 4.6.32. "Edit SNMP User" window.

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

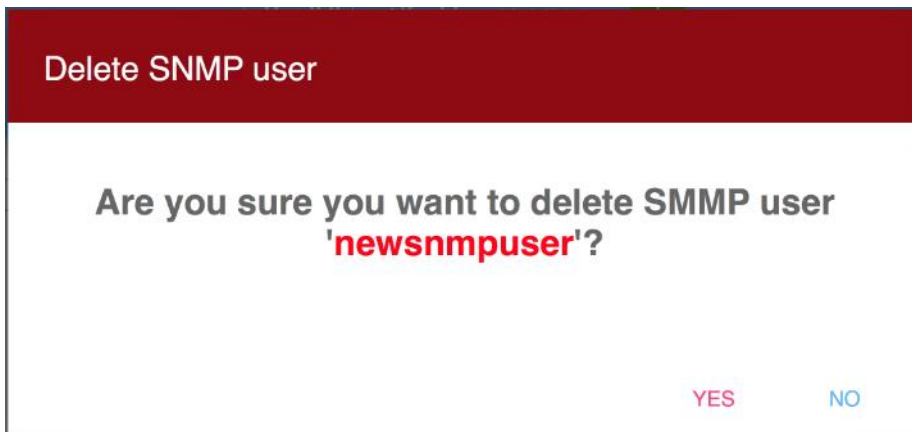


Figure 4.6.33. Window confirming the removal of the current SNMPv3 user account.

4.6.8.4. Configuring SNMP Traps

SNMP traps are configured in the *Traps tab*.

Additional information:

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

SNMP Trap configuration record has the following attributes:

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

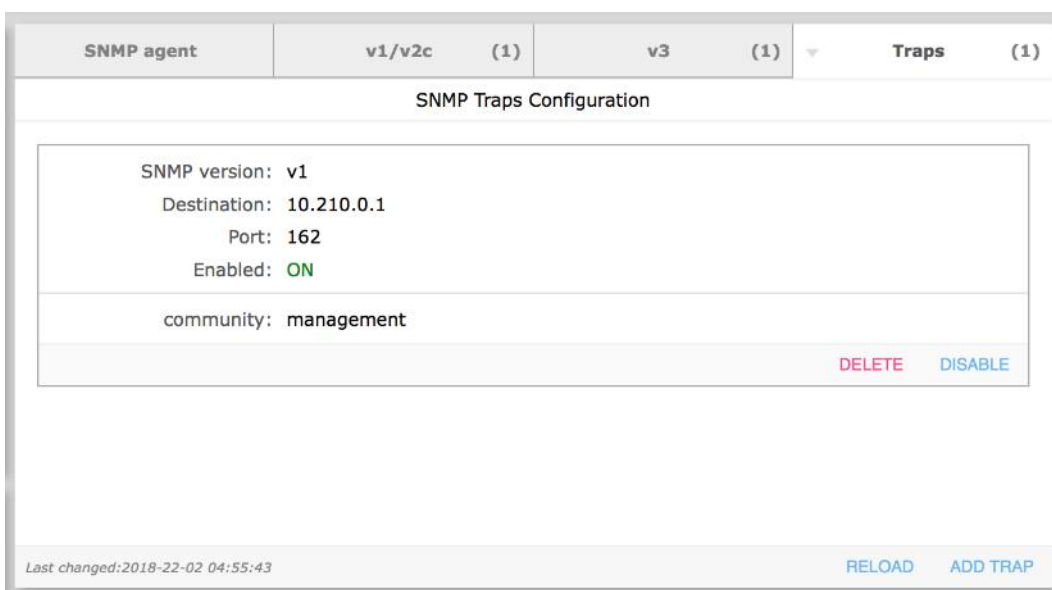


Figure 4.6.34. SNMP management panel. The "Traps" tab.

Each SNMP trap configuration record contains the following buttons:

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

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

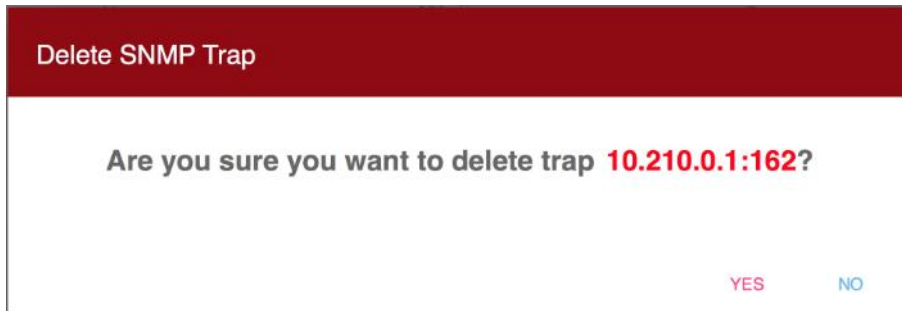


Figure 4.6.35. Window confirming deletion of SNMP Trap configuration settings.

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.

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

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

- **Destination** — IPv4 trap destination address;

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

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

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

4.6.9. Time Management Panel

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

It has two fields:

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

There are two buttons available: —

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

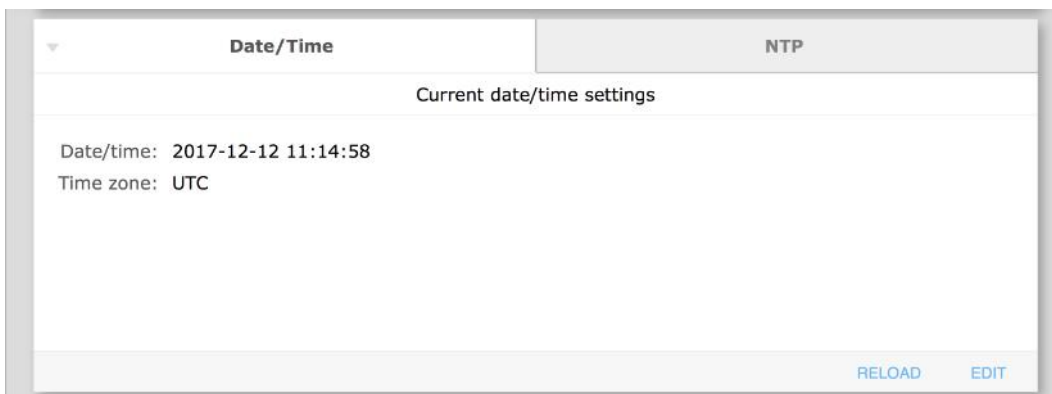


Figure 4.6.37. "*Date/Time*" tab for managing system time.

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

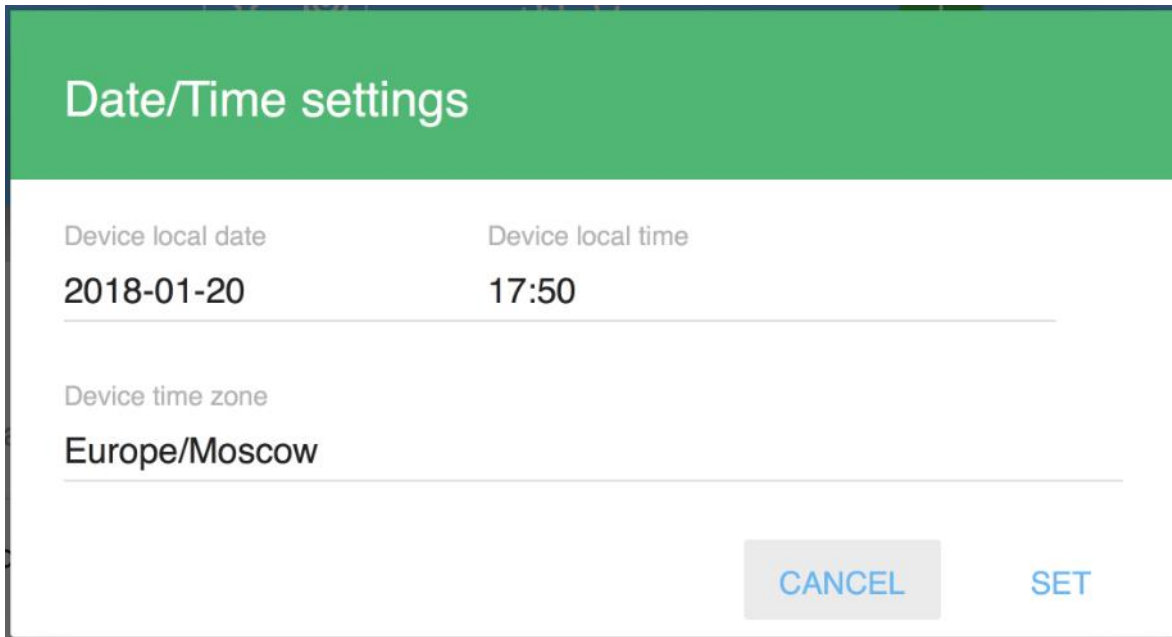


Figure 4.6.38. "Date/Time settings" pop-up windows for adjusting system time and time zone.

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

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

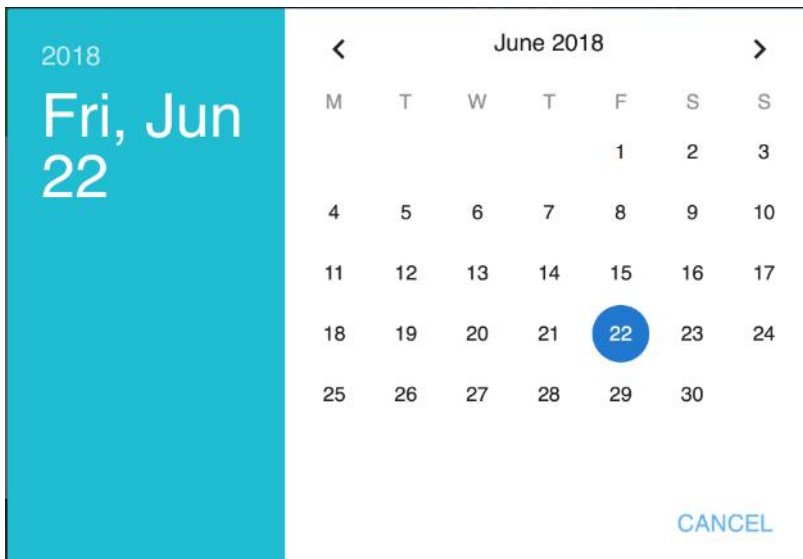


Figure 4.6.39. Pop-up calendar window for changing the system date.

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

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

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

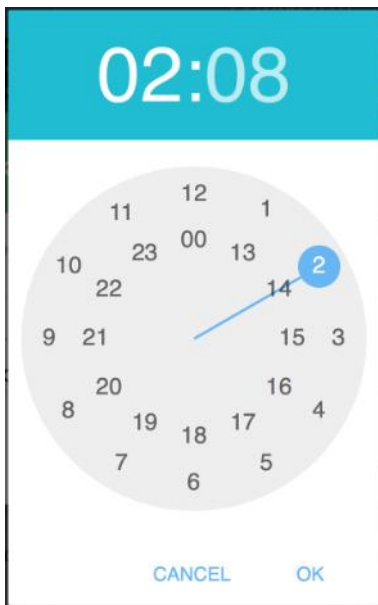


Figure 4.6.40. Time change pop-up - clock adjustment.

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

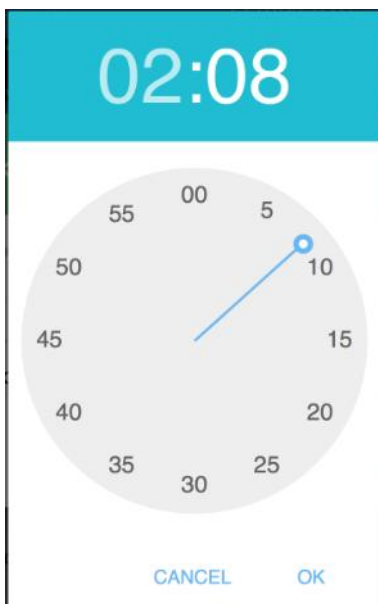


Figure 4.6.41. Time change pop-up window — minutes adjustment.

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

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

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

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

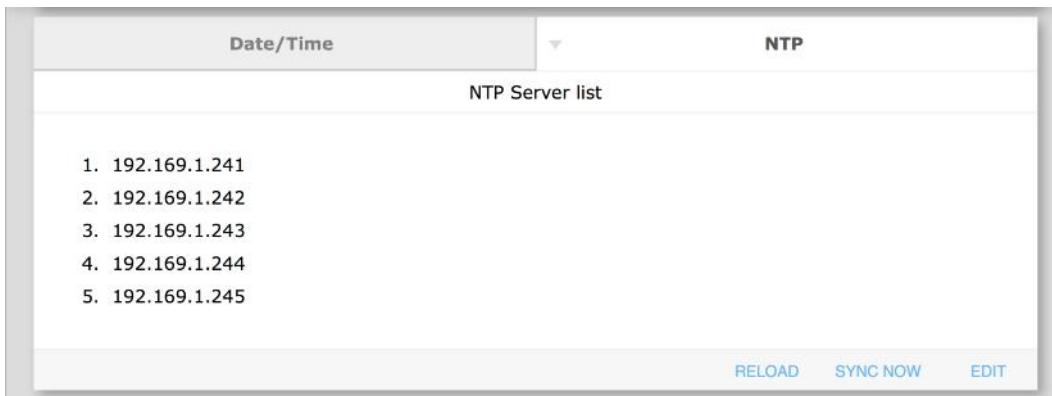


Figure 4.6.42. "NTP" tab for setting up time servers.

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

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

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

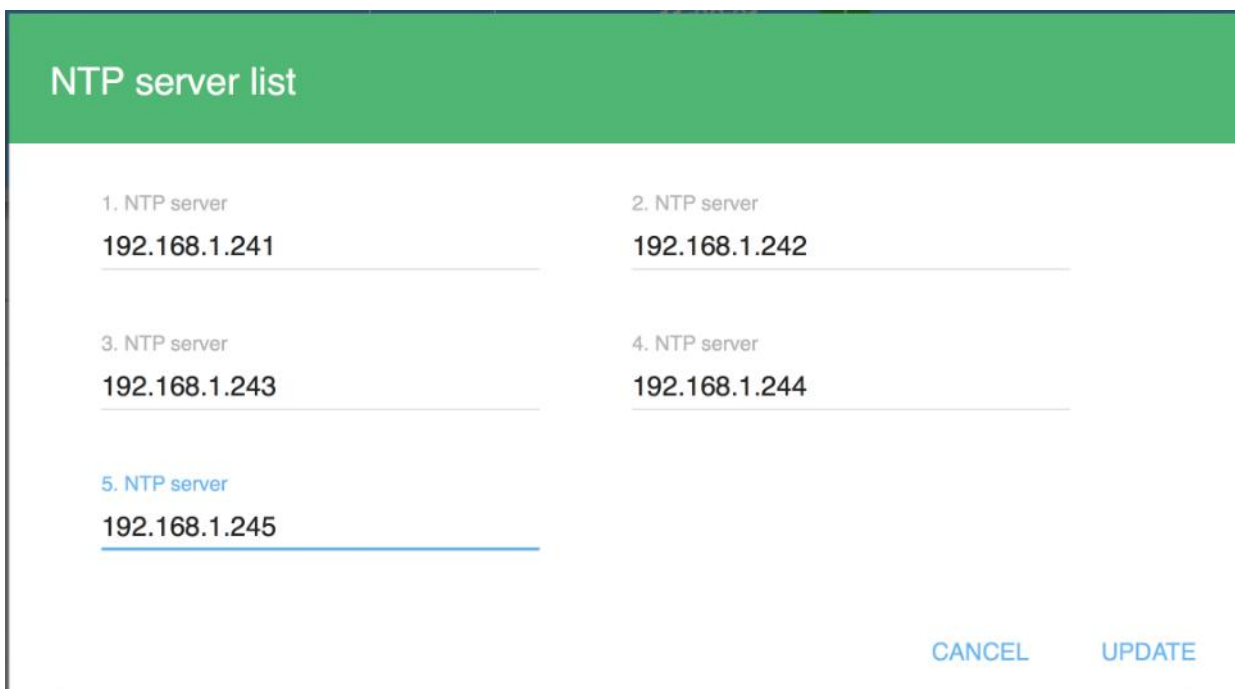


Figure 4.6.43. Pop-up window for editing NTP address servers.

4.6.10. SMTP Settings and Mail recipients

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

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

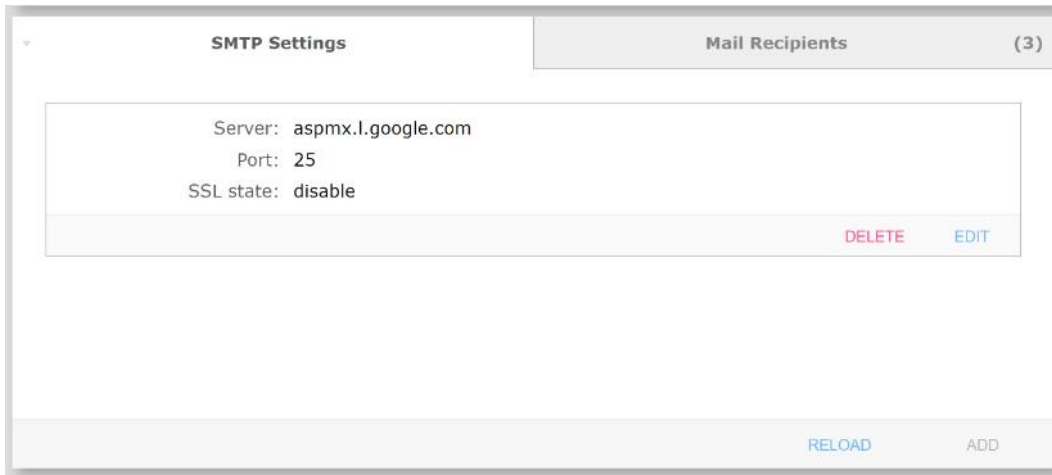


Figure 4.6.44. SMTP management panel, "SMTP Settings" tab.

SMTP Settings tab has the following fields:

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

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

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

New SMTP Server

Server: s1.localdomain.com

Port: 587

HELO domain: localdomain.com

Auth type: PLAIN

Username: noreply@localdomain.local

Password:

SSL state:

- enable
- disable
- enable-dontverify-cert
- tls

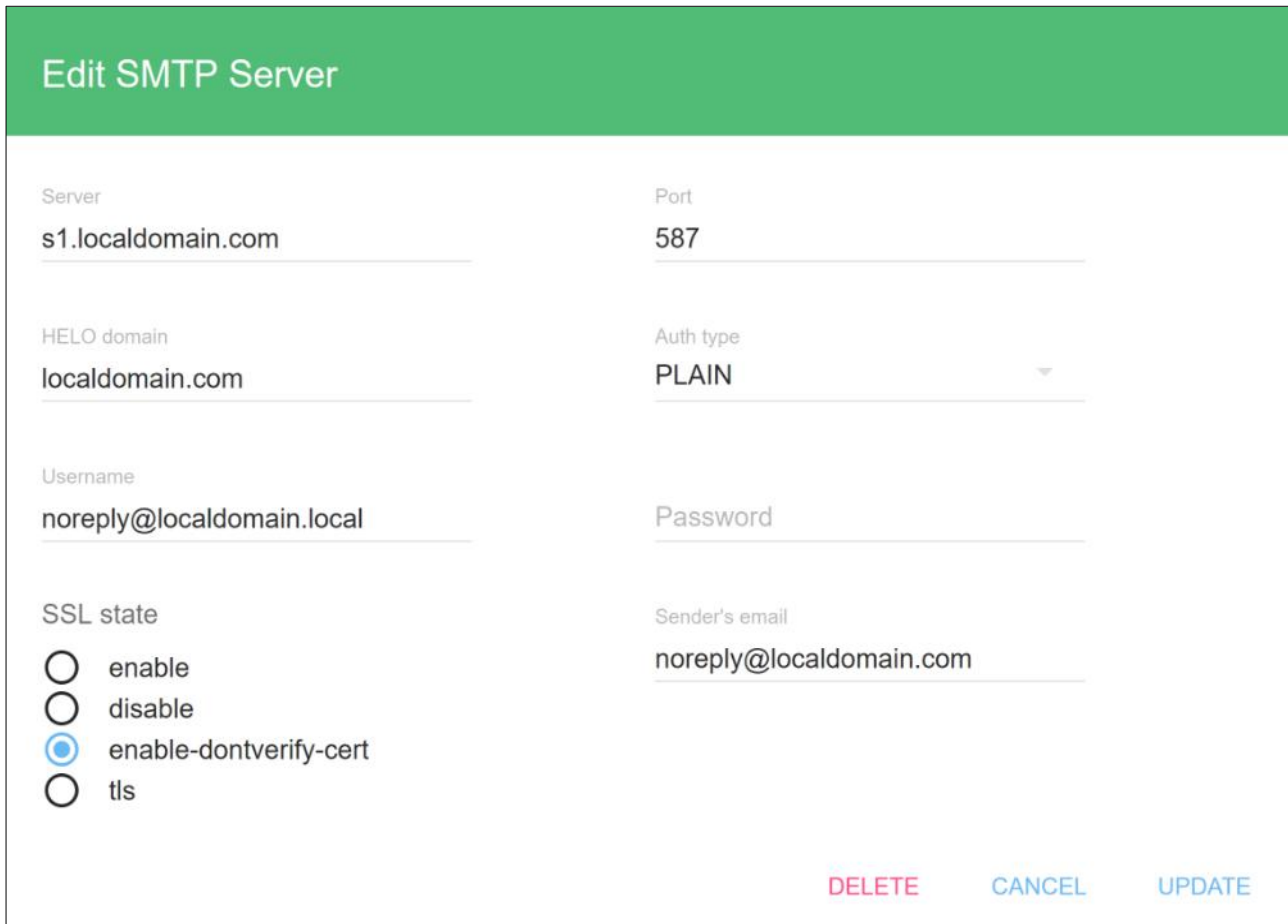
Sender's email: noreply@localdomain.com

CANCEL CREATE

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

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

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



Edit SMTP Server

Server: Port:

HELO domain: Auth type:

Username: Password:

SSL state:

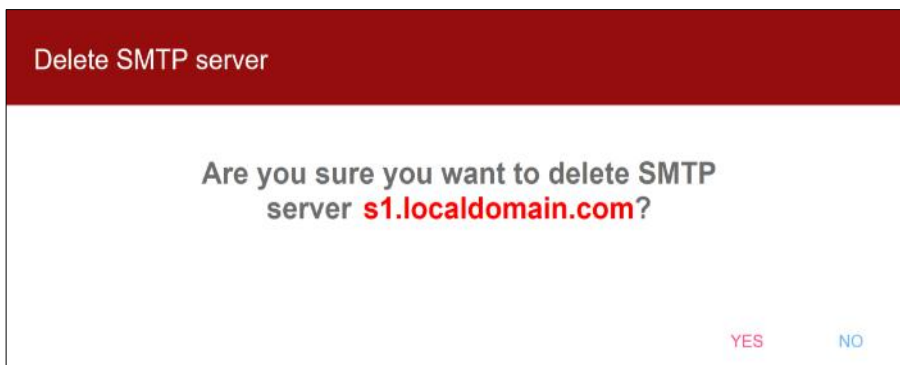
- enable
- disable
- enable-dontverify-cert
- tls

Sender's email:

DELETE **CANCEL** **UPDATE**

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

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



Delete SMTP server

Are you sure you want to delete SMTP server **s1.localdomain.com**?

YES **NO**

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

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

Email recipient records have following fields:

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

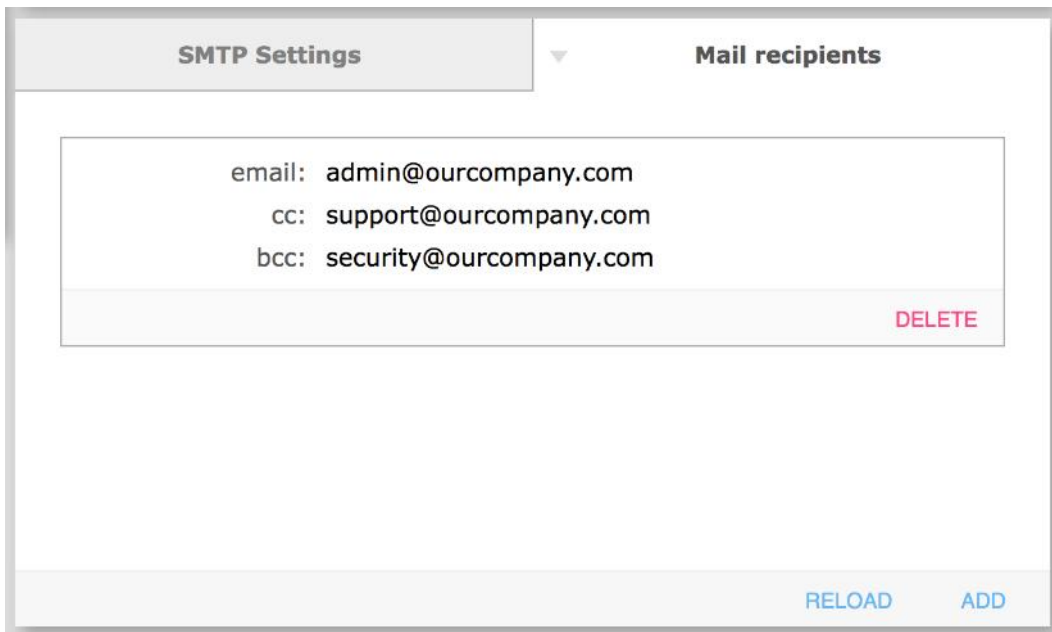


Figure 4.6.48. SMTP management panel. The "Mail recipients" tab.

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

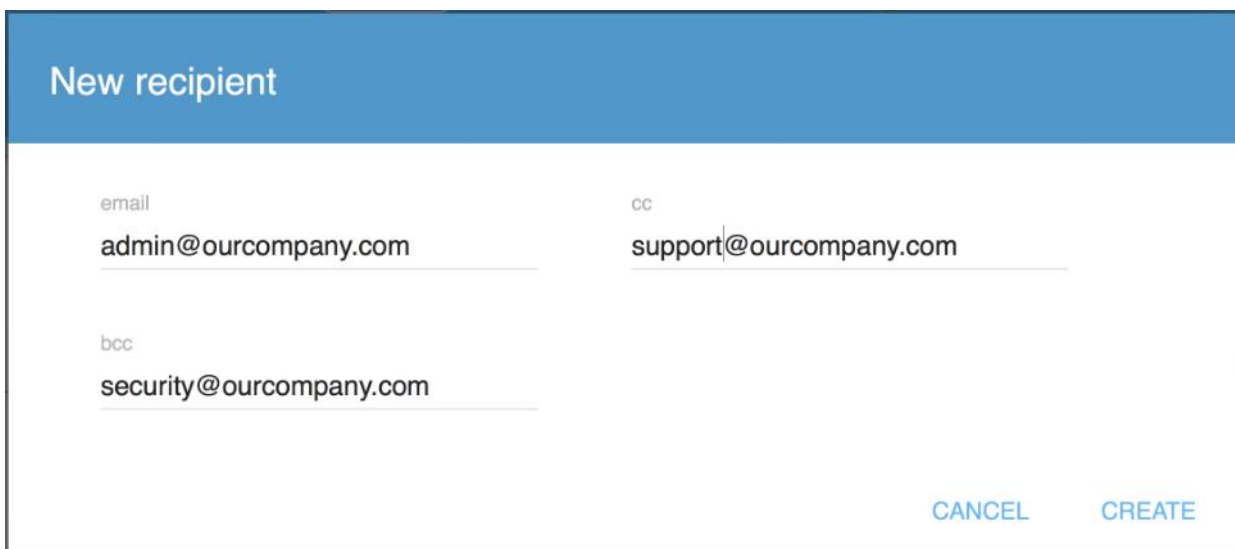


Figure 4.6.49. "New recipient" pop-up window.

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

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

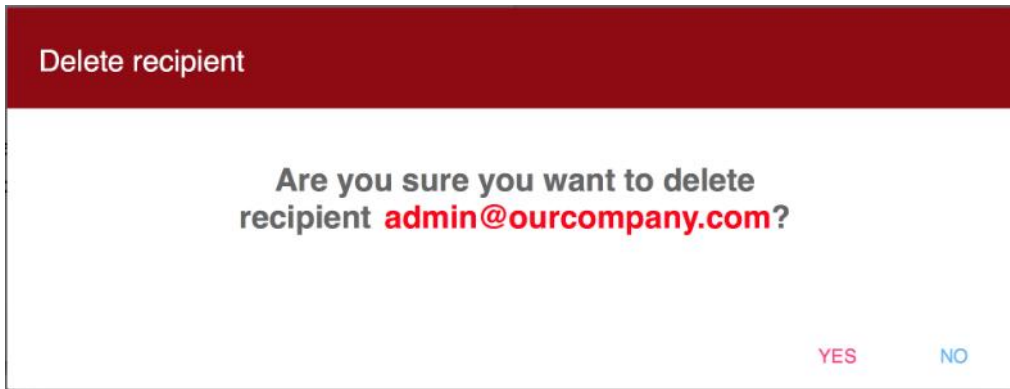


Figure 4.6.50. "Delete recipient" confirmation pop-up window.

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

4.6.11. Cloud Connection Settings (RPCM.CLOUD)

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

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

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

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

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

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

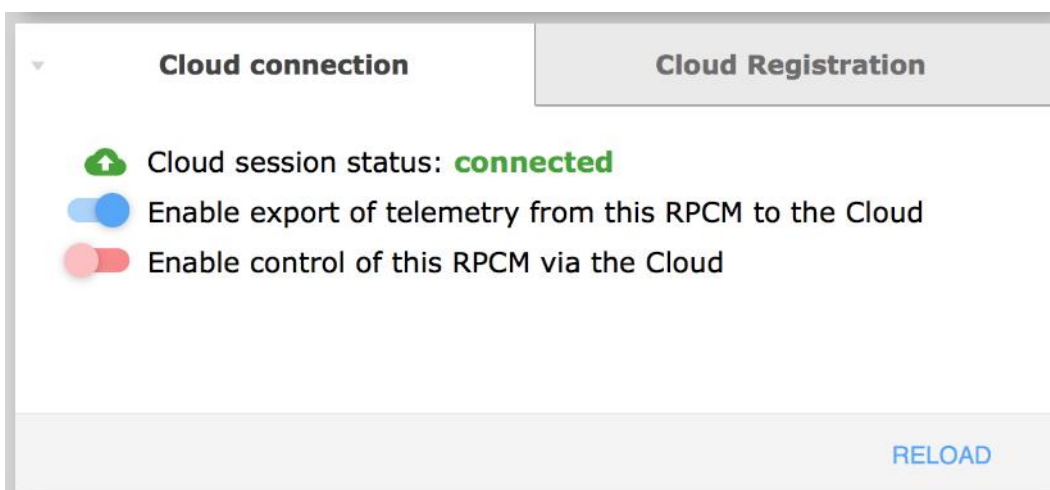


Figure 4.6.51. RPCM Cloud configuration panel — "Cloud Connection" tab

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

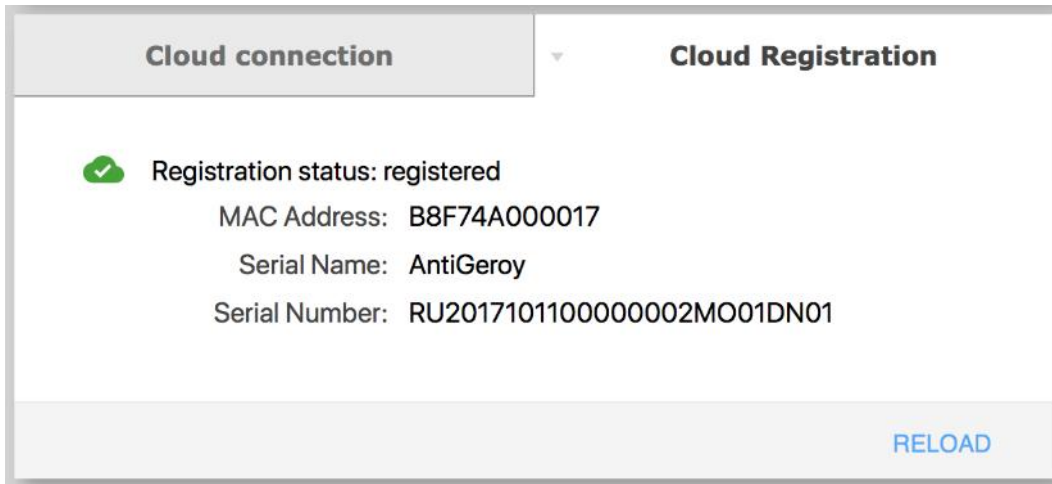


Figure 4.6.55. RPCM Cloud configuration panel — "Cloud Registration" tab.

4.6.12. API Service Settings

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

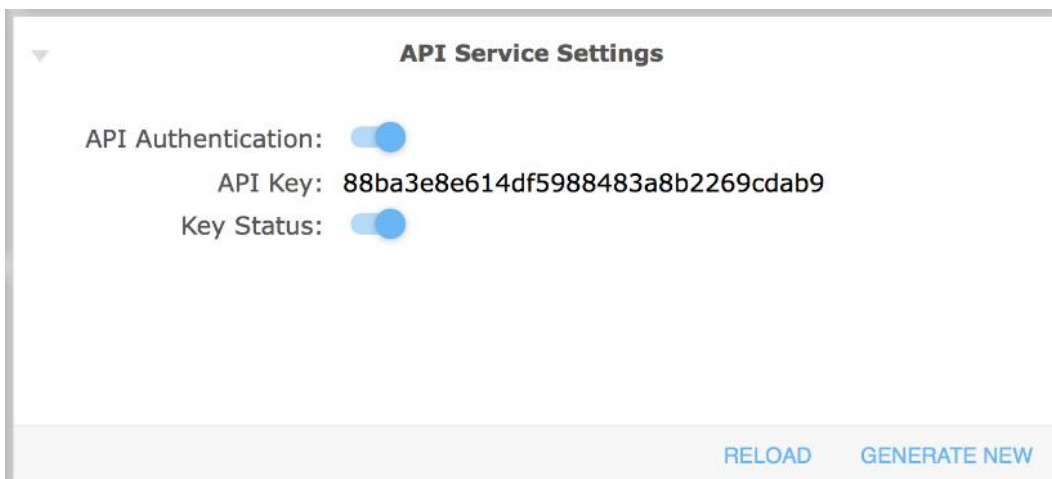


Figure 4.6.53. The "API Settings" area.

This panel includes the following fields and controls:

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

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

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

4.6.13. Front Panel Display Settings

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

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

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

Table 4.6.1. Messages displayed on the display.

Value Name	Unit of measurement	Example of message
Voltage	Volt, V	48
Current	Amps, A	23
Power	Kilowatts, KW	1.1
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	RU2017101100000002M001DN01
User Message	English characters and numbers	Any, for example "N01"

The screenshot shows a web interface titled "Front panel Display settings". It contains three configuration fields:

- Custom message:** A text input field with the value "RPCM-1". Above the field is a small grey note: "Custom text, maximum 31 characters."
- Text color:** A dropdown menu currently set to "Yellow".
- Will shown by default:** A dropdown menu currently set to "UserMessage".

At the bottom right of the settings area, there are two blue buttons: "SAVE" and "RELOAD".

Figure 4.6.54. Front Panel Display setting.

Front Panel Display Settings has the following fields:

- **Custom message** — message displayed on the display when User Message option is selected in "What to show by default" field or when user reaches User Message by using buttons on the physical front display panel (up to 31 characters);
- **Text color** — color of the Custom Message;

- **What to show by default** — use this field to select what will be shown on physical display upon start-up of the RPCM (see Table 4.6.1).

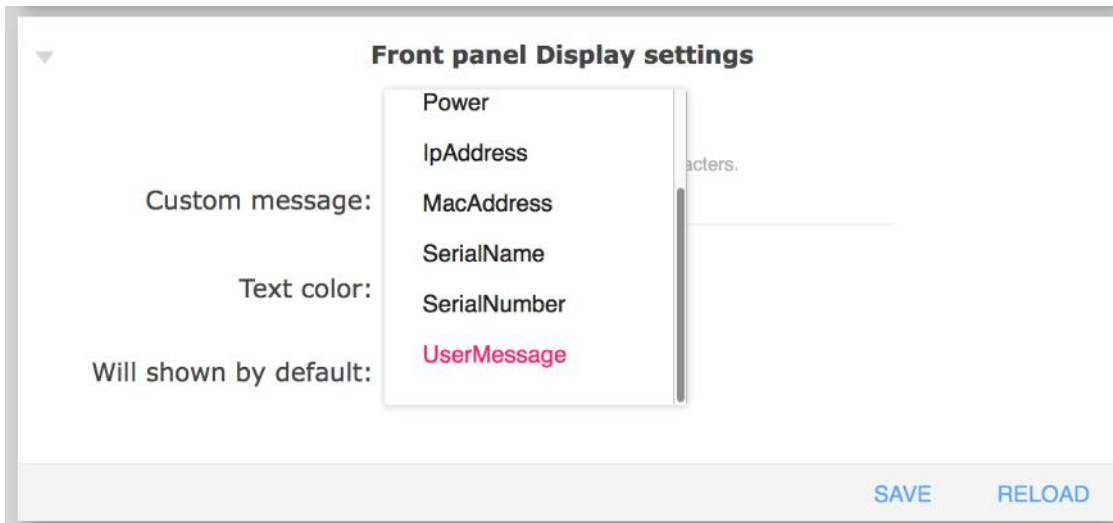


Figure 4.6.55. Select the default message to display.

4.6.14. Backup and restore settings

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

Clicking **DOWNLOAD CONFIGURATION** initiates download of backup configuration file.

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

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

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

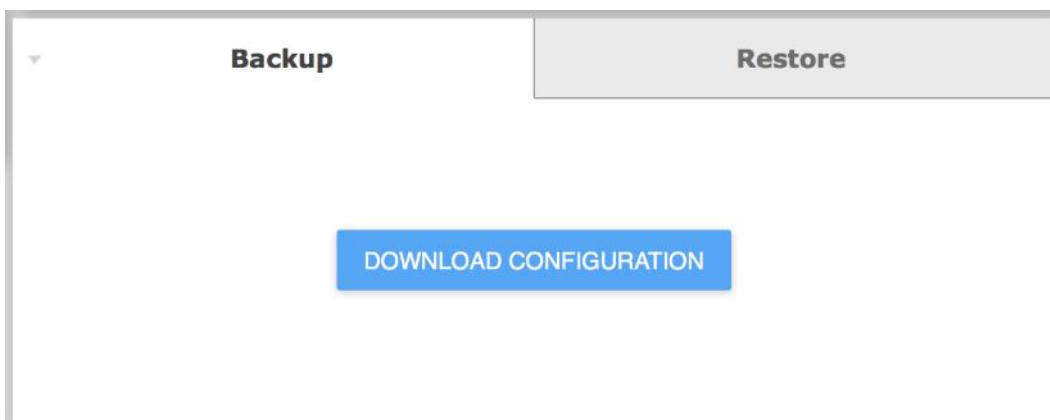


Figure 4.6.56. Backup tab.

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

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

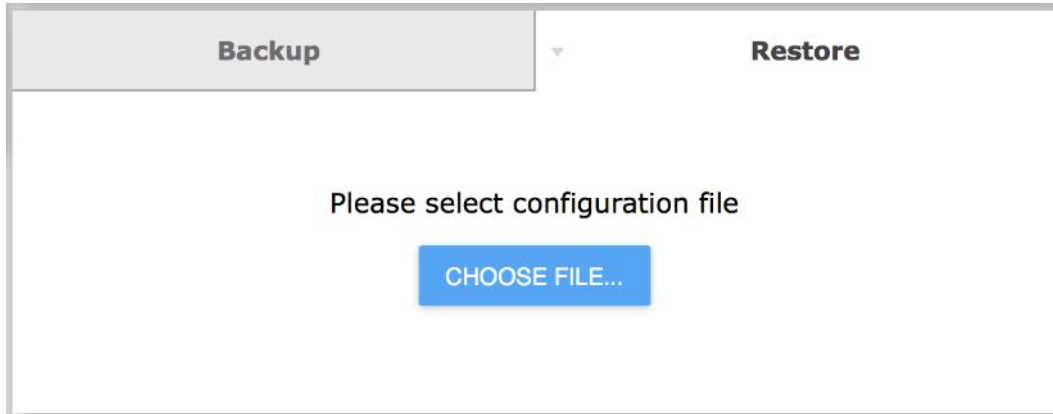


Figure 4.6.57. Restore tab.

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

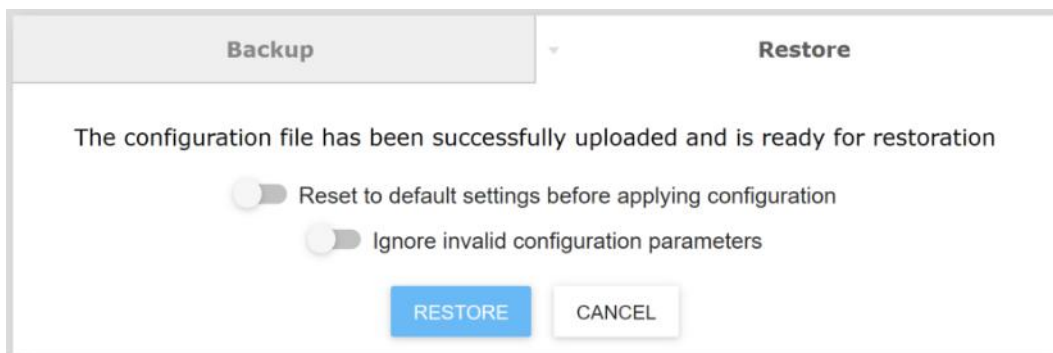


Figure 4.6.58. Restore tab — the selection of options for restore .

These restore options are available:

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

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

There will be shown the progress indicator after pressing the RESTORE button

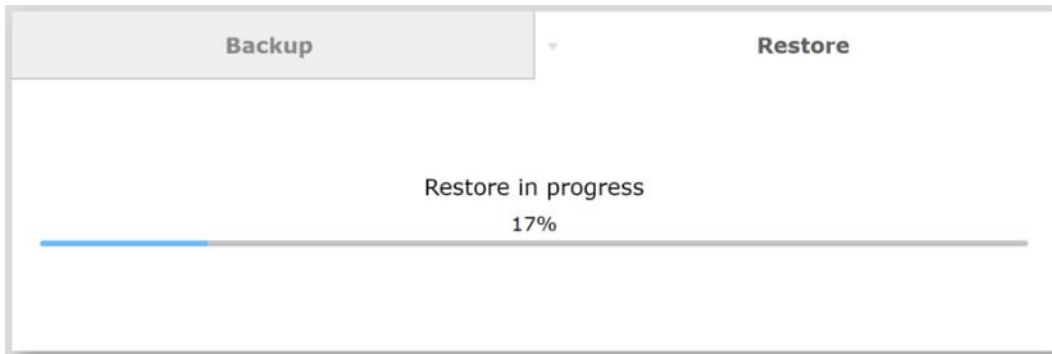


Figure 4.6.59. Restore tab — the progress indicator.

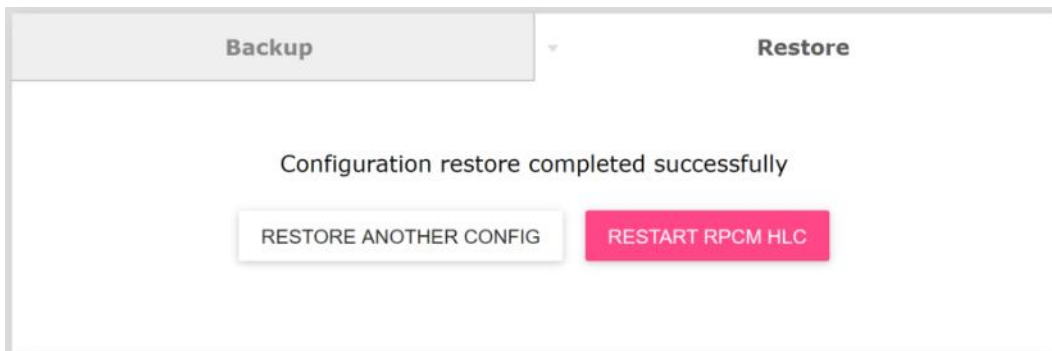


Figure 4.6.60. Restore tab — a confirmation of **RESTART RPCM HLC**.

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

RESTORE ANOTHER CONFIG;

RESTART RPCM HLC.

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

4.6.15. Web Interface Language

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

Press popup menu for select available language.

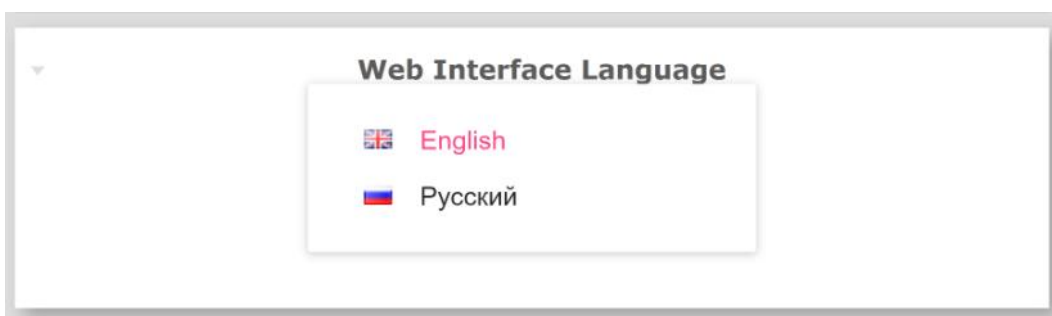


Figure 4.6.61. Web Interface Language panel.

4.6.16. RADIUS server setting

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

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

RADIUS		
Server	Priority	Status
192.168.1.1	10	disabled
10.5.4.3	1	disabled
10.210.1.194	1	enabled

RELOAD ADD SERVER

Figure 4.6.62. RADIUS panel.

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

New RADIUS server

Server
Radius-1

Priority
1

Secret
.....

Use incoming group attribute

Port
1812

Enabled

Use incoming session timeout attribute

CANCEL CREATE

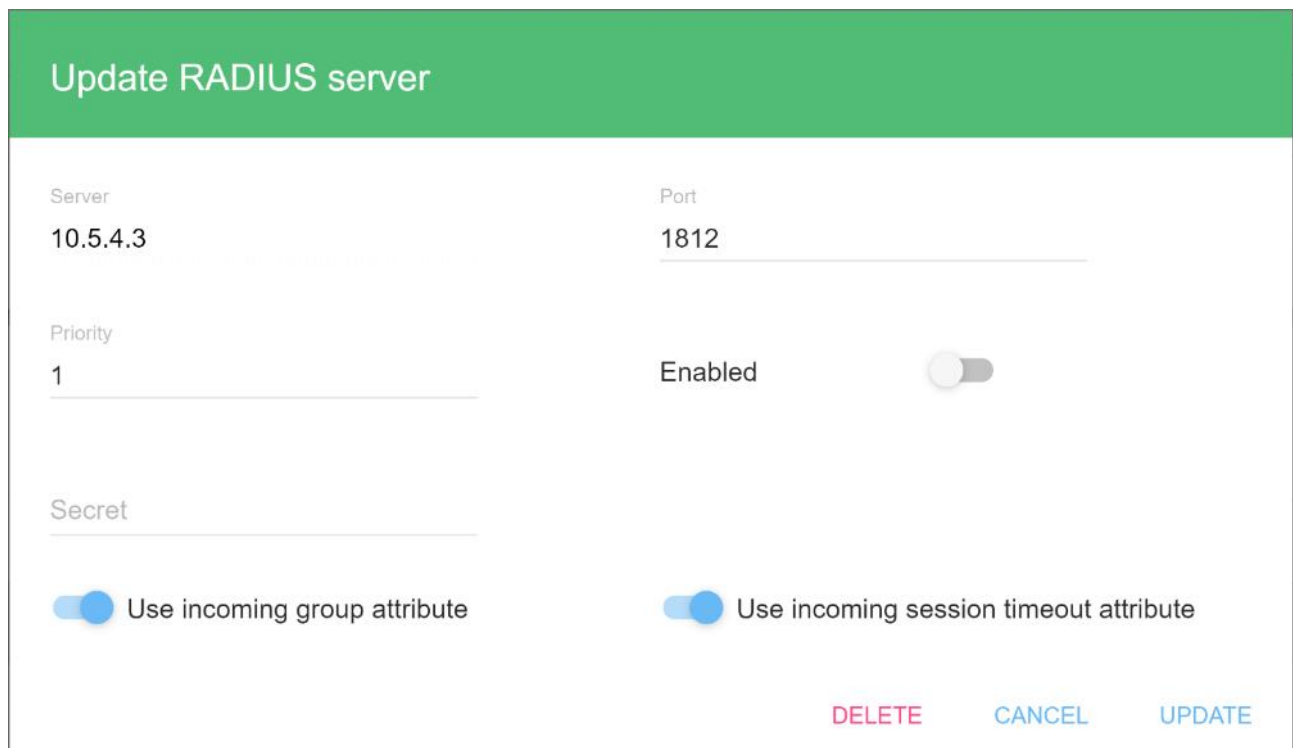
Figure 4.6.63. "New RADIUS server" window.

Fields are available:

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

Click on RADIUS server record on RADIUS panel to change setting.

The window "Update RADIUS server" will show.



The screenshot shows a window titled "Update RADIUS server" with a green header. The main content area is white and contains several form elements:

- Server:** A text input field containing "10.5.4.3".
- Port:** A text input field containing "1812".
- Priority:** A text input field containing "1".
- Enabled:** A label "Enabled" next to a toggle switch that is currently turned off.
- Secret:** A text input field that is currently empty.
- Use incoming group attribute:** A toggle switch that is turned on (blue).
- Use incoming session timeout attribute:** A toggle switch that is turned on (blue).

At the bottom right of the window, there are three buttons: "DELETE" (pink), "CANCEL" (blue), and "UPDATE" (blue).

Figure 4.6.64. "Update RADIUS server" window.

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

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

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

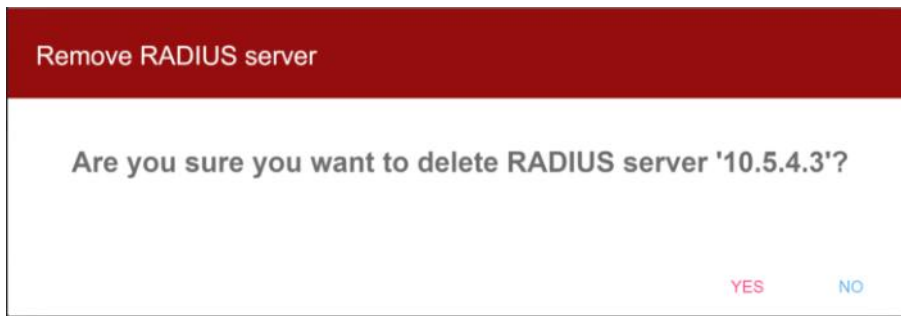


Figure 4.6.65. “Delete RADIUS server” window.

4.6.17. Restart RPCM HLC

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

Figure 4.6.66. “Restart RPCM HLC” panel.

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

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

Note. Some details about RPCM Software and Firmware.

RPCM uses 3 controllers:

High Level Controller (HLC), which runs Software;

Low Level Controller (LLC), which runs Firmware;

Display Controller, which runs Display Firmware.

Low Level Controller is responsible for low level operations such as input and outlet management, ATS (for RPCM AC ATS 16A, RPCM AC ATS 32A, RPCM DC ATS 76A), meters, overload and short circuit protection.

Display Controller is responsible for external displays.

High Level Controller is responsible for the user interfaces, including web interface, SSH CLI, REST API, SNMP and so on.

Software updates may include *Firmware* updates.

4.7. 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: `https://<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 Number;*
- *Serial Name;*
- *Software version;*
- *Software release date;*
- *Firmware version;*
- *Firmware date.*

Update file selection and process control area contains the following:

- *Software update file;*
- *State;*
- *Progress.*

And also the following buttons:

- **CHOOSE FILE;**
- **CANCEL;**
- **UPDATE FIRMWARE;**

- **UPLOAD.**

In the Information area, the sequence of the update is shown graphically:

- 1 **Select the firmware file;**
- 2 **Upload the file to the device;**
- 3 **Start the update process;**
- 4 **Restart the device.**

At the bottom of the window there is a button **CLOSE**, which is pressed to go to the section *Control Panel (Dashboard)*.

4.7.3. Update procedure

The update procedure is as follows:

With the help of the **CHOOSE FILE** buttons, operating system file selection window appears.

During the entire set of update processes, status information will be displayed in the window:

- *Software update file* — selected file;
- *State*;
- *Progress*;

NOTE. When RPCM is eligible for update, update files are available in device section of the <https://my.rpcm.cloud/> when the device is registered in the cloud, or can be obtained by contacting technical support in any convenient way. By default, update files have the *.rpcm* extension.



Figure 4.7.3. Step 1 — selecting an update file.

After file selection, the **UPLOAD** button is activated.

The file upload stage — Stage 1 — consists of two successively starting processes:

- the process of uploading a file;
- verification process.

By clicking on the **UPLOAD** button, a copy of the update file is transferred to the RPCM and its subsequently verified.

In the bottom right corner, a pop-up window appears with information about the progress of the update and buttons for a pause depicted as two vertical lines "||".

In the main window of "*Software Update*" at this stage, the **UPLOAD** button changes to **PAUSE**.



Figure 4.7.4. Ready to upload the update file.



Figure 4.7.5. File upload process

After the upload, RPCM starts verification of the update file. In the main window "Software update" at this stage, the **PAUSE** button changes to **UPDATE**. At this stage, the new **UPDATE** button is inactive and will become active only after the verification procedure is finished.

After the verification procedure is completed, the **UPDATE** button becomes active. When you click on it, the update procedure begins.



Figure 4.7.6. RPCM is ready to be updated.

Clicking on the **UPDATE** button starts the process of installation of the new Software.



Figure 4.7.7. Applying the update.

After the update is applied, the update validation step occurs.

Externally, there are no changes except for the message **Verifying applied update...**



Figure 4.7.8. Verifying an update.

After successful completion of the update and validation procedure, the high level control module needs to be restarted.

The **UPDATE** button is changed to **RESTART TO FINALIZE UPDATE**.

To restart, you must click on the **RESTART TO FINALIZE UPDATE** button, which will appear instead of the blocked **UPDATE**.



Figure 4.7.9. Window with the "RESTART TO FINALIZE UPDATE" button.

After clicking on the active item, a window with a confirmation message will appear to restart the device.

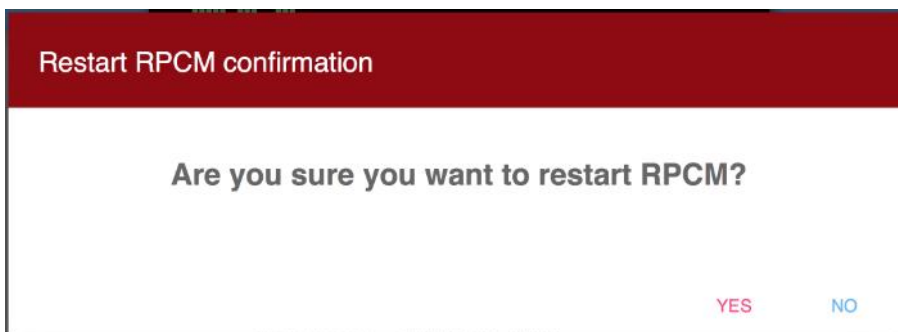


Figure 4.7.10. A window confirming restart.

If you press "YES" the controller will restart. The update does not affect the operation of the electrical part, including the connected client devices to the RPCM outlets. The power is not cut off.

If you select "NO", the changes are rolled back.

You have to update firmware (if necessary) after a successful reboot of the HLC.

IMPORTANT for models with two inputs (76A)! When updating the firmware is running, Input 1 must be powered, otherwise the power will be temporarily cut off during the firmware update process. If it is not possible to apply voltage to Input 1, then you can update the firmware later, when it becomes possible to supply power to Input 1, or when a temporary disconnection of consumers will be acceptable.

4.7.2. 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 Con-
troller 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: *https://<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.

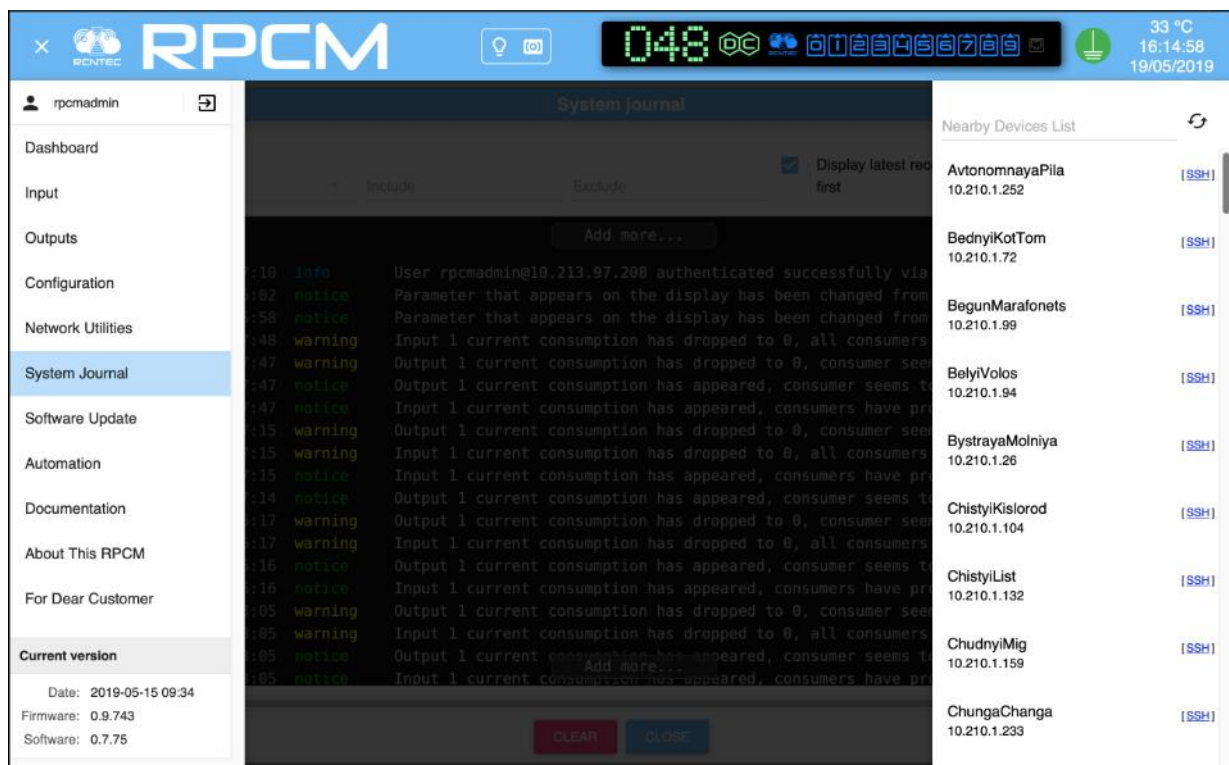


Figure 4.8.1. Menu to go to the "System journal" section.

4.8.2. Description of the System Journal Window

The Event Log window has 3 areas:

- 1 — *Filter bar*;
- 2 — *Information window*;
- 3 — *Action buttons*.

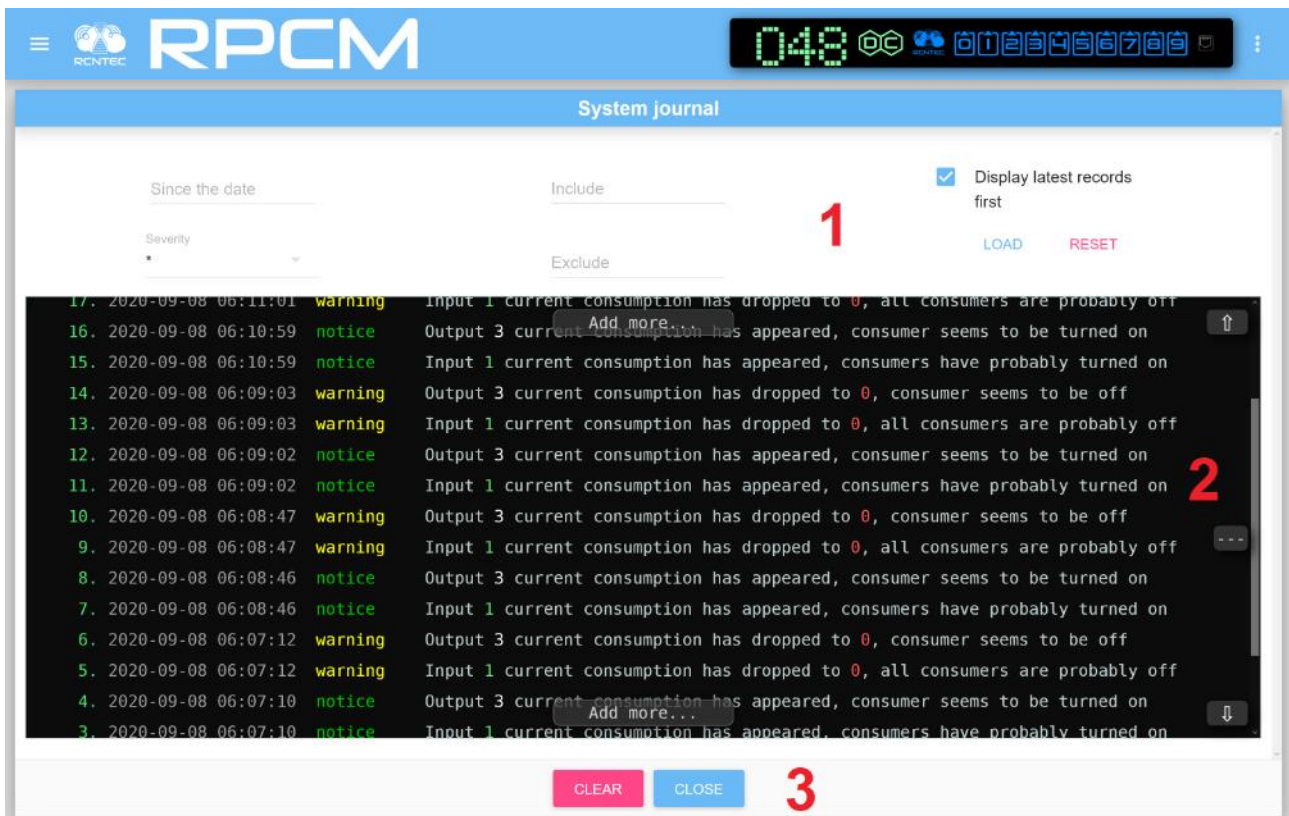


Figure 4.8.2. Main window of the "System Journal".

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.

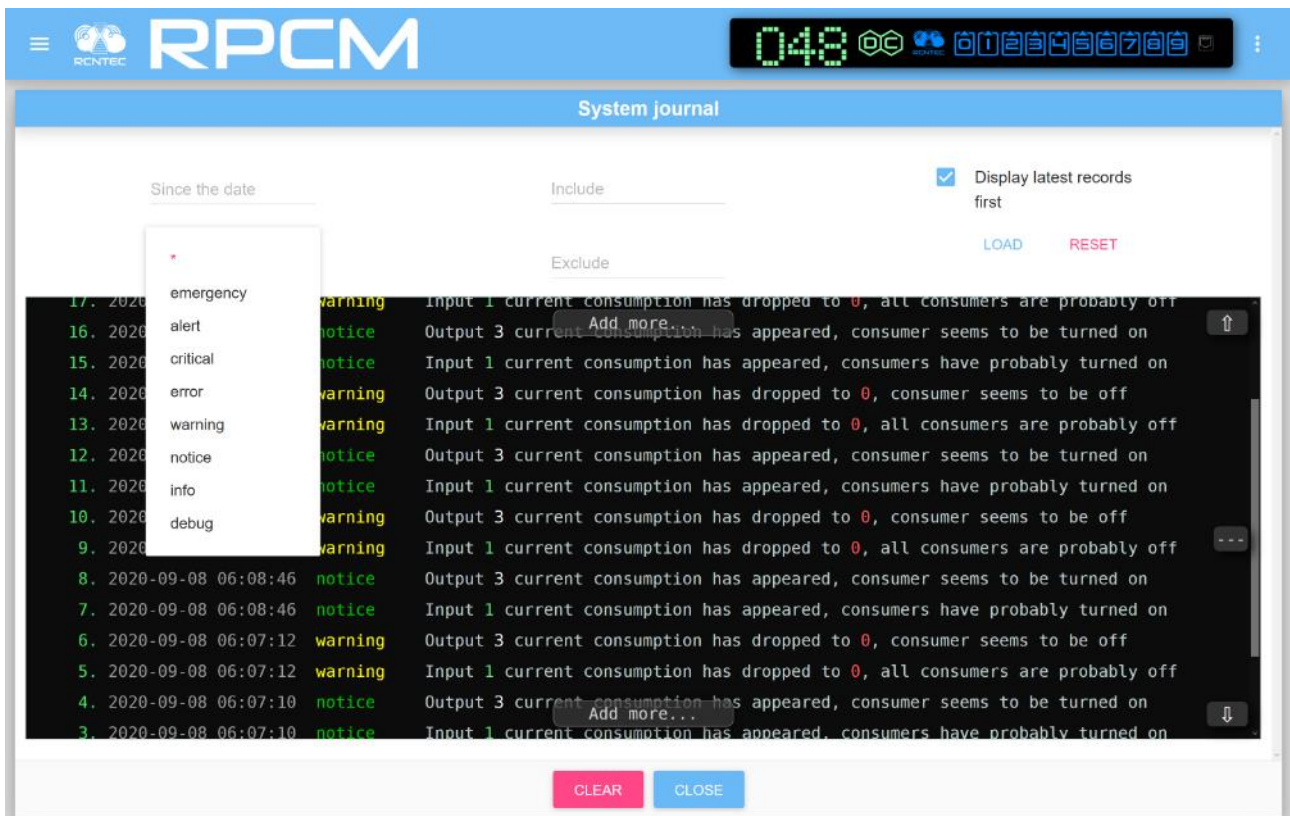
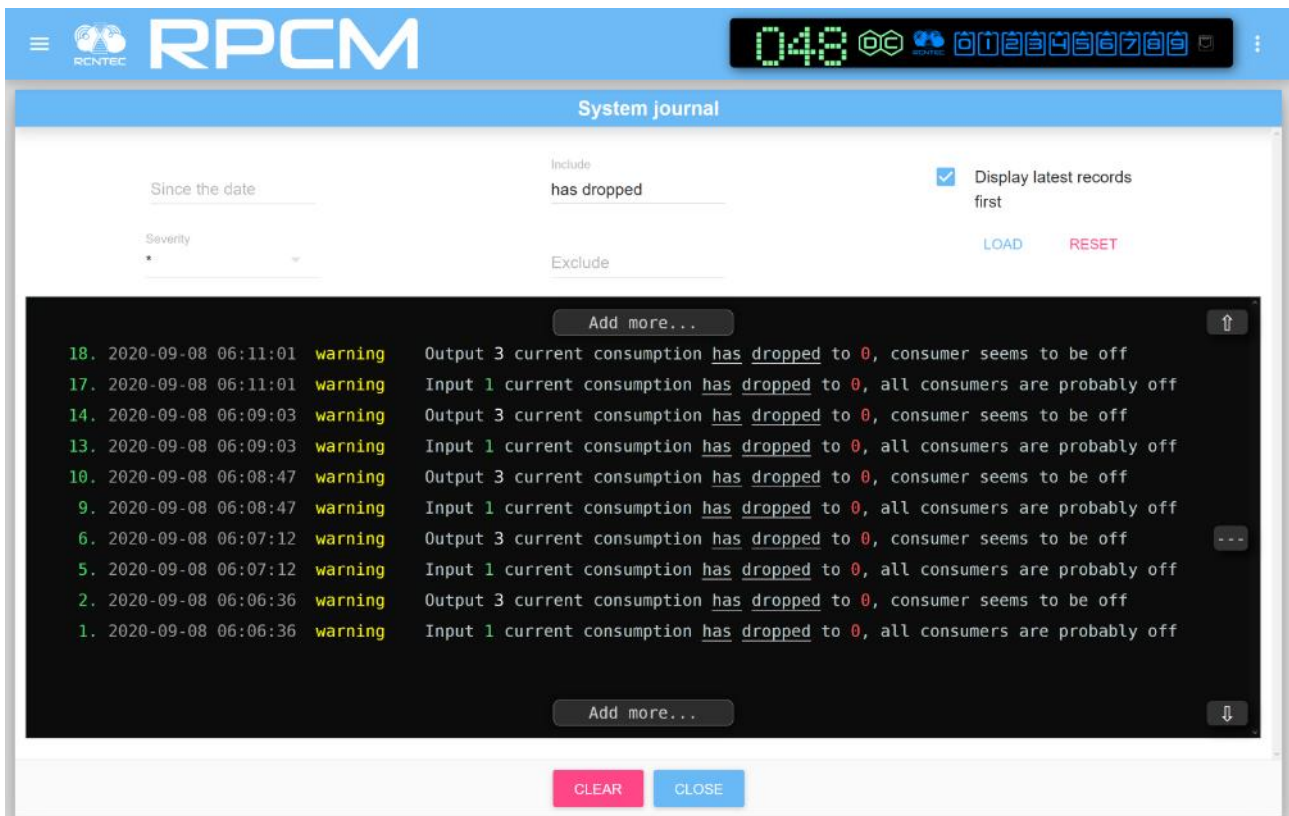


Figure 4.8.4. Drop-down menu for "Type of messages".

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 Include item. Only messages that contain words "has dropped" are displayed.*

Use the **LOAD** and **RESET** buttons 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: `https://<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.

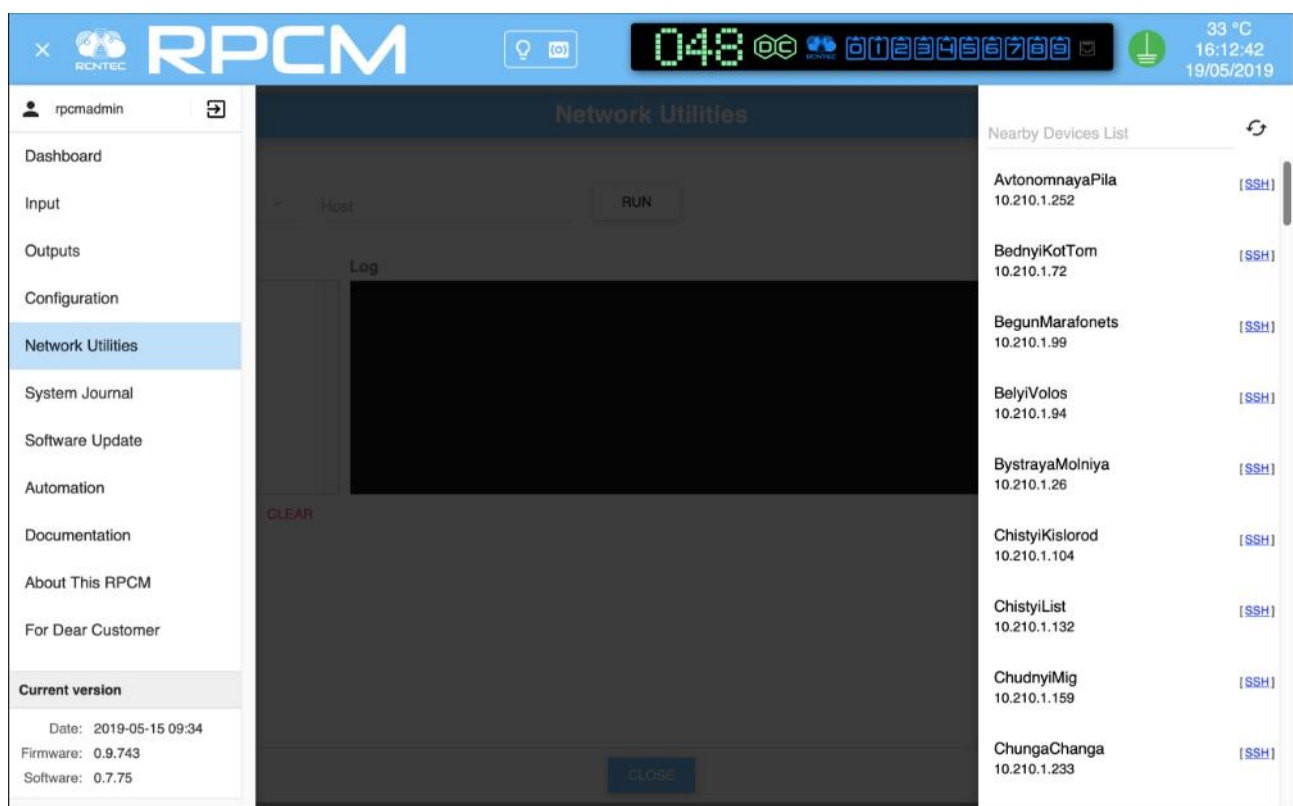


Figure 4.9.1. Menu to go to the "Network Utilities" section.

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.

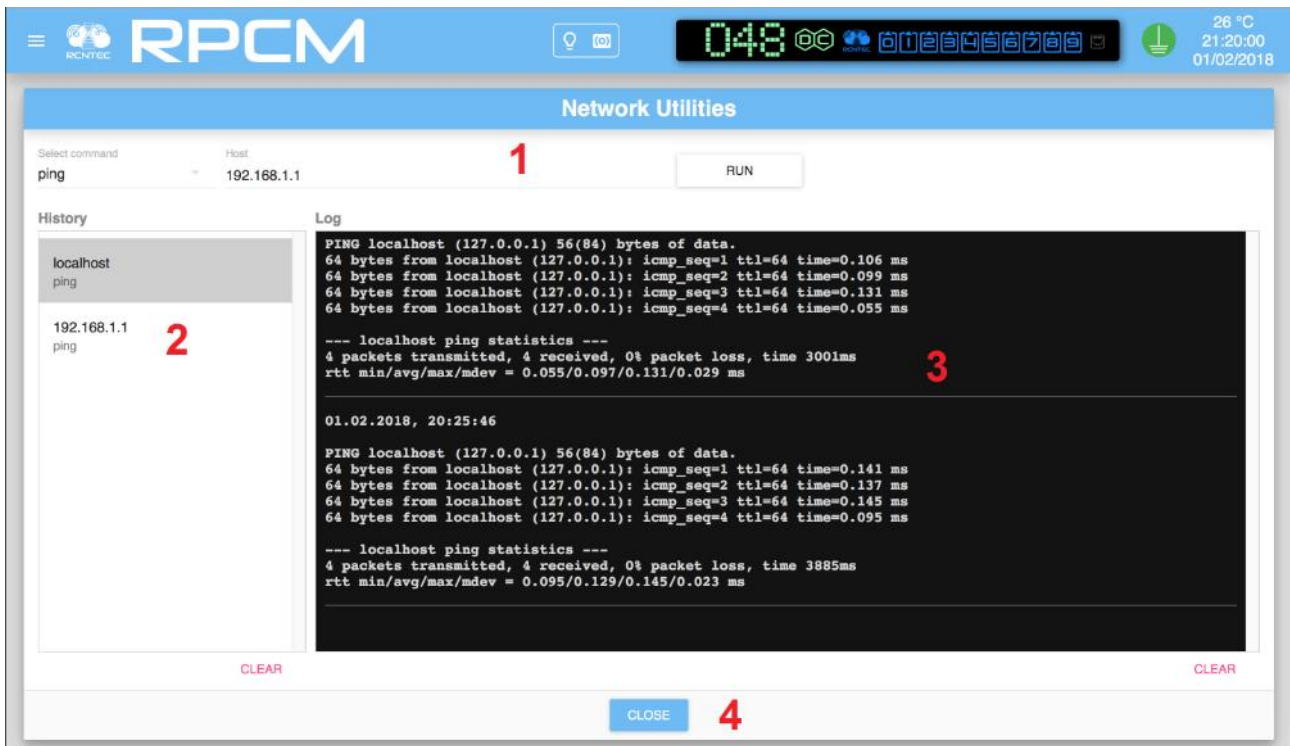


Figure 4.9.2. Window of the "Network Utilities" section.

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.

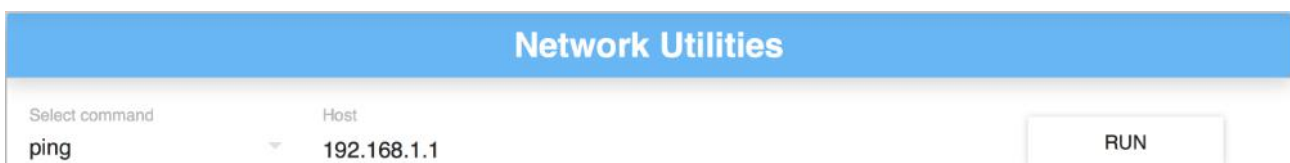


Figure 4.9.3. The command area of the "Network Utilities" section.

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 `https://<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.

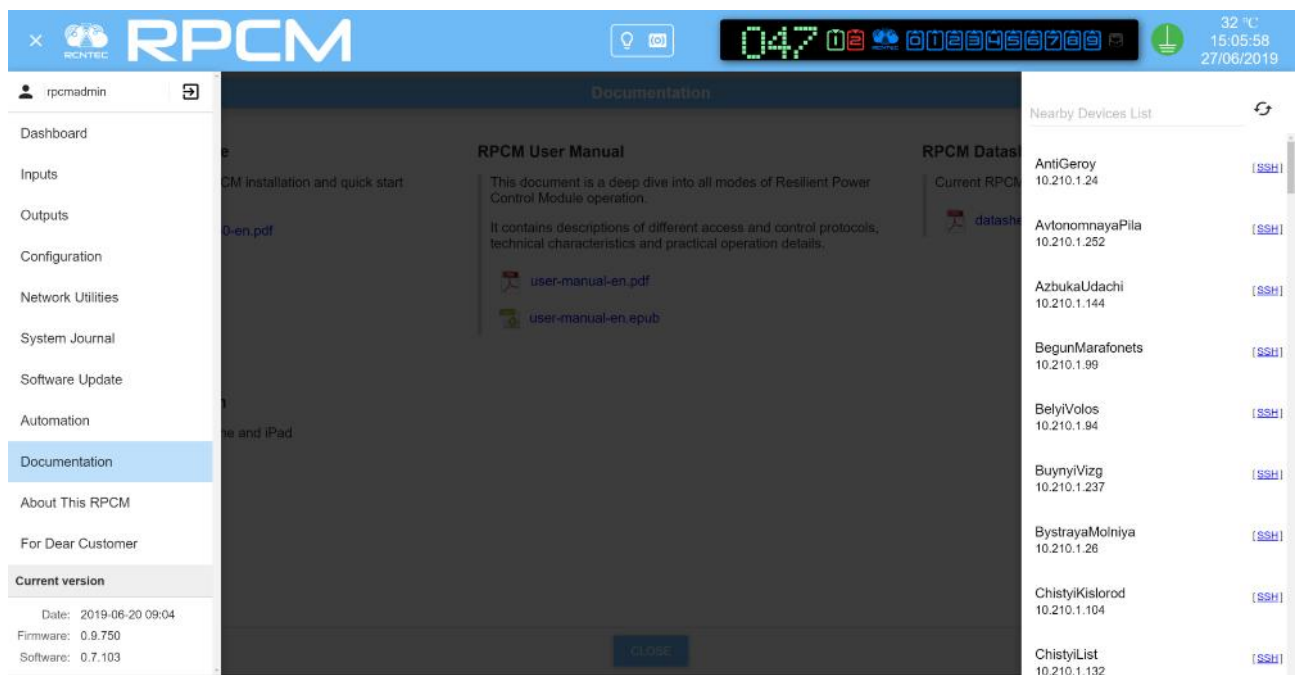


Figure 4.10.1. Menu to go to the "Documentation" section.

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

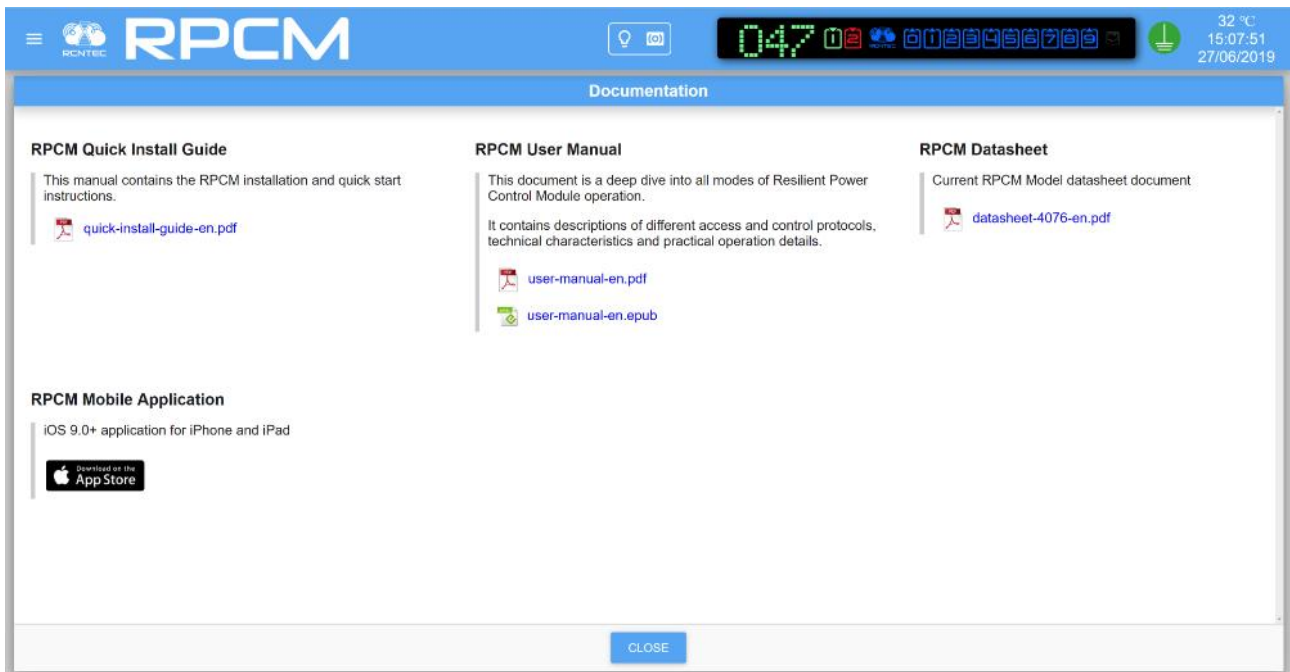


Figure 4.10.2. The window of the "Documentation" section.

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: `https://<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

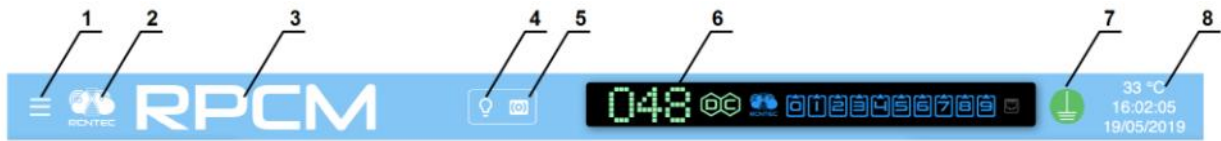


Figure 4.11.3. Section "Automation" — the top bar of the Top Control Bar.

Legend:

- 1 — the call button of the jump menu;
- 2 — RCNTEC logo, (click on the link to RCNTEC company website — rcntec.com);
- 3 — name of RPCM (by clicking on the link it goes to RPCM product site — 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 shows the RPCM Automation section interface. At the top, there is a blue header with the RPCM logo, a lightbulb icon, a digital display showing '048', and system status icons for temperature (48 °C), time (19:57:27), and date (04/06/2019). On the left, a 'DEVICE LIST' sidebar shows two devices: 'antminer_s11' (green) and 'dragonmint_t1' (yellow), with a red '10' callout. The main content area is divided into several sections:

- 1**: A green document icon.
- 2**: Device details for 'antminer_s11', including 'Device type: Bitmain_S9' and 'Description:'. A red '9' callout is in the top right corner.
- 3**: Restart information showing 'Last restart: 2019-06-04 11:16:57' and 'Next restart in, s: 54'.
- 4**: 'CONSUMPTION' section with 'Monitoring: NO' and 'Alarm: NO'.
- 5**: 'HASHRATE' section with 'Monitoring: YES', 'Current value, GH/s: 20484.15', and 'Alarm: NO'.
- 6**: 'PING' section with 'Monitoring: NO' and 'Alarm: NO'.
- 7**: 'TCP PORT' section with 'Monitoring: NO' and 'Alarm: NO'.
- 8**: 'MINER STATUS' section showing 'Last successful check at: 2019-06-04 19:57:23', 'Frequency: 750', 'Miner Count: 3', and 'Model: 0'. It also displays 'Total Hash Rate 5s, GHS: 20514.09' and 'Total Hash Rate AV, GHS: 20484.15'.
- 11**: A 'sort by name' button at the bottom left.

At the bottom of the Miner Status section, there is a table with columns CHAIN#, ACN, ACS, RATE, and HW. The table contains three rows of data:

CHAIN#	ACN	ACS	RATE	HW
6	84	00000000 00000000 00000000 00000000 00000000 00000000 00000000 ...	8873.78	0
7	84	00000000 00000000 00000000 00000000 00000000 00000000 00000000 ...	8805.56	0
8	84	00000000 00000000 00000000 00000000 00000000 00000000 00000000 ...	8834.75	0

Below the table, there is a 'RATE: 20514.09' label.

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 and estimated time to a next reboot;
- 4 — "**CONSUMPTION**" subsection for information about current consumption parameters and corresponding actions of RPCM;
- 5 — "**HASHRATE**" subsection for information about the configured parameters for the mining devices and the corresponding actions of RPCM;
- 6 — "**PING**" subsection for information about the availability of the device over the network when testing through ICMP echo request/reply (ping) and the corresponding actions of RPCM;
- 7 — "**TCP PORT**" subsection for information on the availability of the network resource available at specified TCP port and the corresponding actions of RPCM;
- 8 — "**MINER STATUS**" subsection for information on specific parameters of mining, this area should be displayed if you set up a special mining device, what is supported RPCM Software;
- 9 — "gear" button to open the settings pop-up window.
- 10 — "**DEVICE LIST**" subsection — the list of configured devices in sorted order;
- 11 — "**ADD DEVICE**" button to open the "Add device" pop-up window.

Note that sections from 1 to 9 are unique for each device that you add. In the case of multiple devices, scroll is used to view information on devices that did not fit in one screen. Also, a quick transition to the desired device is carried out by clicking the particular watchdog name in the "**LIST OF DEVICES**" subsection.

4.11.4. Description of the Subsections of the Automation Section**4.11.4.1. Outlet Number**

The output number looks similar to the other sections: "Dashboard" and "Outputs". Figure 4.11.3. 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 and Next Reboot

In Figure 4.11.4., this section is marked with the number "3".

Displays the date and time of the last reboot, as well as the time zone in UTC format.

4.11.4.4. "CONSUMPTION" Subsection

In Figure 4.11.4., this section is indicated by the number "4".

A summary of the monitoring settings for current consumption is displayed. Below are the parameters of this section displayed in the general window "Automation":

- **Monitoring** — has two values "NO" or "YES", the field is intended to indicate the watchdog status;
- **Current value, mA** — current value at the moment;
- **Alarm limit, mA** — current value to trigger the alert;
- **Alarm limit, s** — stabilization delay before alarm;
- **Alarm** — the field is intended to alarm you of a critical situation;
- **Last alarm time** — information about the date and time of the last alarm;
- **Restart limit, mA** — current value to trigger the restart;
- **Restart limit, s** — stabilization delay before restart;

- **Restart in progress** — if the consumer device is in the process of rebooting, this will be displayed in this field;
- **Auto restart initiated at:** — the date and time the device reset procedure was started;
- **Last check time** — time of last control.

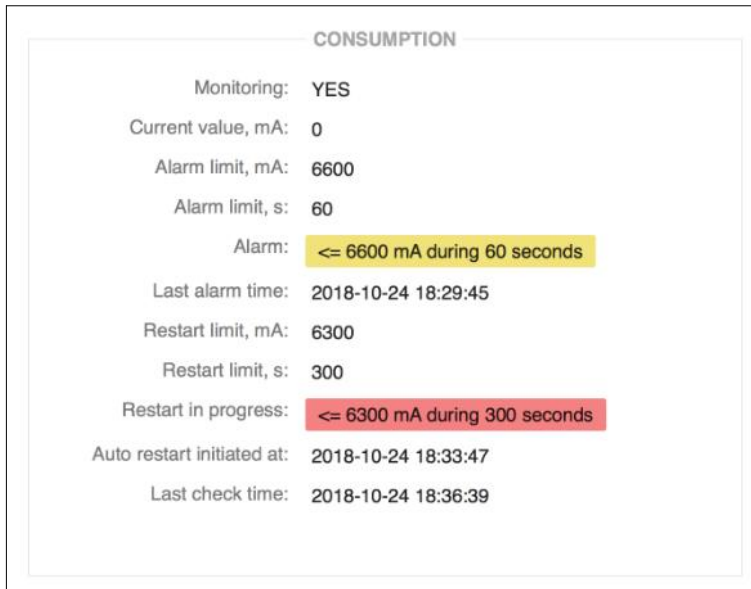


Figure 4.11.5. "Automation" section — "CONSUMPTION" subsection.

4.11.4.5. "HASHRATE" Subsection

In Figure 4.11.4., this section is marked with the number "5".

It demonstrates basic information about the status of *hashrate level* monitoring.

More information. *Hashrate* — a unit of measurement that allows to determine the effective computing power of equipment involved in the production of crypto currency.

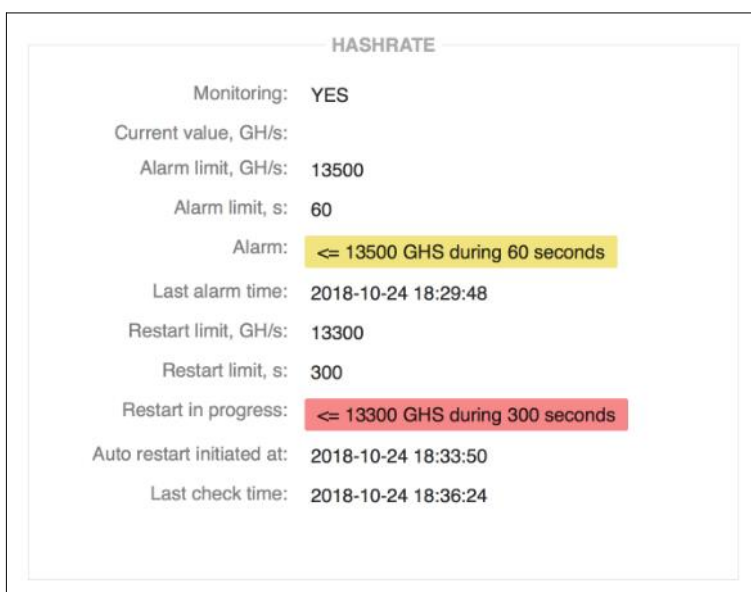


Figure 4.11.6. "Automation" Section— "HASHRATE" subsection

A summary of the monitoring settings for *"HASHRATE"* subsection is displayed.

- **Monitoring** — has two values *"NO"* or *"YES"*, the field is intended to indicate the watch-dog 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 watch-dog 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.

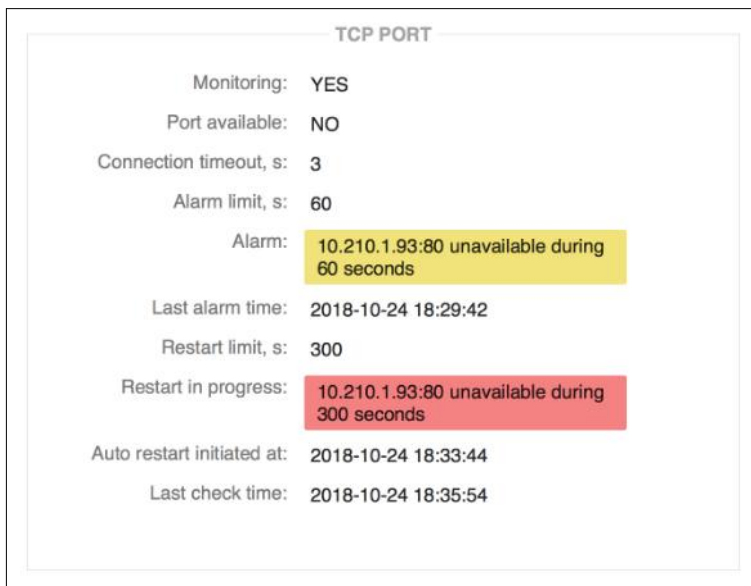


Figure 4.11.8. "Automation" section — "TCP port" subsection.

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.

4.11.4.9. “Edit device” Window

In Figure 4.11.4., this section is indicated by the number "9".

Click the “gear” button on the top right of the subsection to open the pop-up editing window.

Figure 4.11.10. “Edit device” pop-up window.

There are following buttons at the bottom right corner of the window: “DELETE”, “CLOSE”, “SAVE”.

- **SAVE** — to confirm the information entered;
- **CLOSE** — to close the window without saving (discarding changes);
- **DELETE** — delete this particular watchdog configuration.

4.11.4.10. "LIST OF DEVICES" Subsection

In Figure 4.11.4., this section is marked with the number "10".

This area shows list of devices that are being monitored and has "**ADD DEVICE**" button to open the new watchdog configuration pop-up window.

Clicking on any of the configured devices automatically positions the interface web page on the parameters area of this device.

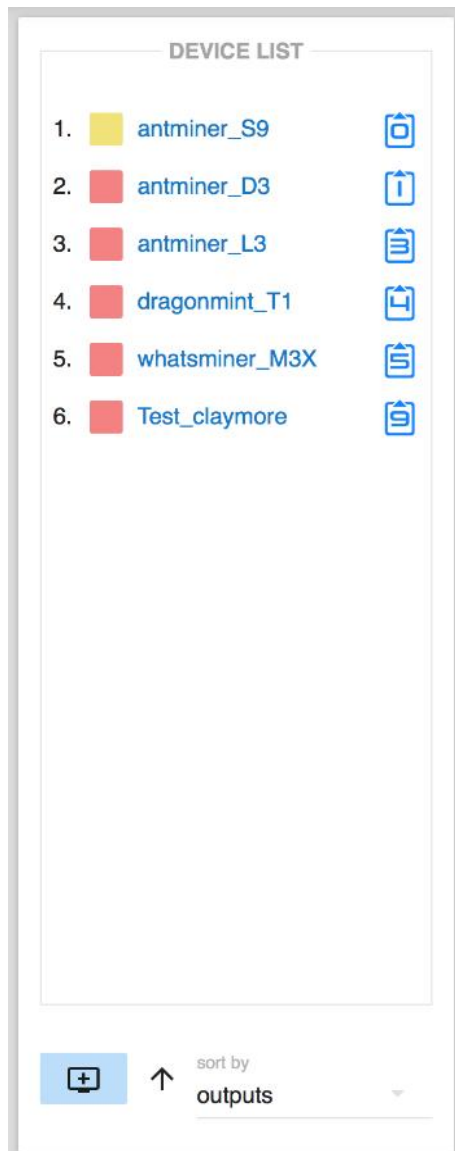


Figure 4.11.11. The "Device List" subsection. As an example, 6 devices with different configurations of miners have been created. At the bottom there is an "ADD DEVICE" button (depicted as monitor with "+" sign) as well as "sort by" drop down selection option.

4.11.5. Managing Parameters

4.11.5.1. Parameters Common to All Types of Monitoring

To configure a new watchdog automation, click "ADD DEVICE" button to open a configuration pop-up windows. This pop-up window has more parameters than than are available in view mode of the "Automation" interface.

Figure 4.11.12. The "Add device" pop-up window with "Outputs" drop-down menu.

In the "Add device" pop-up window on the left side there are fields for values common to all types of watchdogs:

Subsection **DEVICE** includes fields:

- **Name** — watchdog name;
- **Device type** — the drop-down menu to select from predefined values of different miners and other devices;
- **Description** (comment up to 254 characters)
- **Outputs** — the device can be connected to one or several outlets, which are selected in this field.

Figure 4.11.13 shows the "Device type" drop-down menu. The "Bitmain L3 +" item is selected (so it's highlighted in red).

The screenshot shows the 'Add device' window with the following fields and options:

- DEVICE**
 - Name: Bitmain-L3-new
 - Device type: Bitmain L3+ (highlighted)
 - Other options: Bitmain D3, Bitmain S9
 - Outputs: (dropdown menu)
- CONSUMPTION**
 - Consumption monitoring
- TCP PORT**
 - TCP port monitoring
- HASHRATE**
 - Hashrate monitoring
- PING**
 - Ping monitoring
- MONITORING INTERVAL**
 - Check interval, s: 6
 - Min. restart interval, s: 600

Buttons: 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 fields and options:

- DEVICE**
 - Name: Bitmain-L3-New
 - Device type: Bitmain L3+
 - Description: (text area)
 - Outputs: Output 3, Output 4, Output 5, Output 6, Output 7, Output 8 (highlighted), Output 9 (highlighted)
- CONSUMPTION**
 - Consumption monitoring
- TCP PORT**
 - TCP port monitoring
- HASHRATE**
 - Hashrate monitoring
- PING**
 - Ping monitoring

Buttons: 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 configure 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.

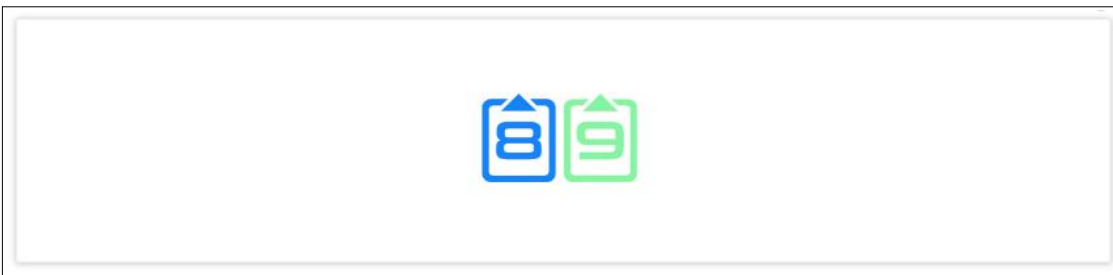


Figure 4.11.15. Two outputs: Output 8 without load, Output 9 under load.

Note. If the CONSUMPTION test on a device that uses several power socket is enabled, then the mA limit is defined as the sum of the currents of all the sockets involved. Current value, mA, Alarm limit, mA, Restart limit for reload, mA — they all operate with a sum of currents. .

In the "**MONITORING INTERVAL**" subsection (see Figure 4.11.11) two important parameters have to be configured:

- *Check interval, s* — interval between tests performed by the watchdog
- *Min. restart interval, s* — indicates the number of seconds during which under no circumstances will the subsequent restart be performed

The minimum restart interval plays an important role when monitoring is done using several simultaneous tests. Its application prevents multiple restarts of the same device due to triggering of restart by several tests at the same time. For example, if network becomes unavailable, it can simultaneously trigger restart by following tests: ping monitoring, TCP port monitoring, and a hashrate monitoring.

4.11.5.2. Configure Monitoring Parameters

In the right part of the "*Add device*" pop-up window you can configure:

- watchdog based on consumption;
- watchdog based on hashrate;
- watchdog based on TCP port monitoring;
- watchdog based on ICMP echo request/reply (ping).

You can use one type of monitoring, as well as two, three or all four simultaneously. To do this, you need to activate appropriate check boxes.

When the desired monitoring type is activated, fields with parameters specific for this particular test type appear.

Figure 4.11.16 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 is divided into several sections:

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

At the bottom right of the interface 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 the 'Add device' configuration page. It features a blue header with the title 'Add device'. Below the header, there are several sections for configuration:

- General Information:** Fields for Name, Device type (dropdown), Description, and Outputs (dropdown).
- MONITORING INTERVAL:** Fields for Check interval, s and Min. restart interval, s, both with spinner controls.
- Consumption monitoring:** A checkbox that is currently unchecked.
- TCP port monitoring:** A checkbox that is currently unchecked.
- HASHRATE:** A section with a checked checkbox for 'Hashrate monitoring'. It includes fields for:
 - API IP address or FQDN
 - 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:** A section with a checked checkbox for 'Ping monitoring'. It includes fields for:
 - IP address or FQDN
 - 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 of the form, 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 close the window without saving (cancel).

IMPORTANT! Since only one ICMP packet is sent within the "**Check interval, s**", it is recommended to assign sufficiently large interval for "**Min. duration for alarm, s**" and "**Min. duration for restart, s**" parameters to make sure they fit several test intervals, so that several ICMP packets will be sent during stabilization delays to ensure enough statistics is gathered to make informed alarm/restart decision. It is also not recommended to make the "**Check interval, s**" too long.

4.11.6. Combination of Tests

Different devices may have different symptoms of failure.

For example, if a device responds to ICMP packets, it does not necessarily mean that the service is working. If the TCP port responds to requests — it does not always mean that the system is working properly. A group of tests allows you to detect more failure situations to automatically initiate a corrective restart, rather than a single test. In some cases, one test is enough, in other cases not, it all depends on the problem you are solving.

When some tests are combined, the load adds up. But a large number and high frequency of inspections create an additional load that can interfere with the network and the device being tested.

In many cases, different network based tests can perform similar functions.

For example, the main task of the test "**PING**" is to check the availability of the device on the network and stability of connection with it. Other functions such as "**HASHRATE**" and "**TCP PORT**" monitoring can indirectly perform the same function. Therefore, simultaneous running of all three tests: "**PING**", "**HASHRATE**" and "**TCP PORT**" on a single target may not always be efficient.

The "**CONSUMPTION**" test is performed locally on RPCM and therefore it is well suited to be combined with all other types of check

4.12. About This RPCM

This chapter describes the "About This RPCM" section of the Resilient Power Control Module (RPCM).

You can go to this section by using the menu item *Documentation* or by typing `https://<name_or_IP_RPCM>/about/` in the browser (if authentication was successful before).



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

This section is designed to demonstration general information about this RPCM.

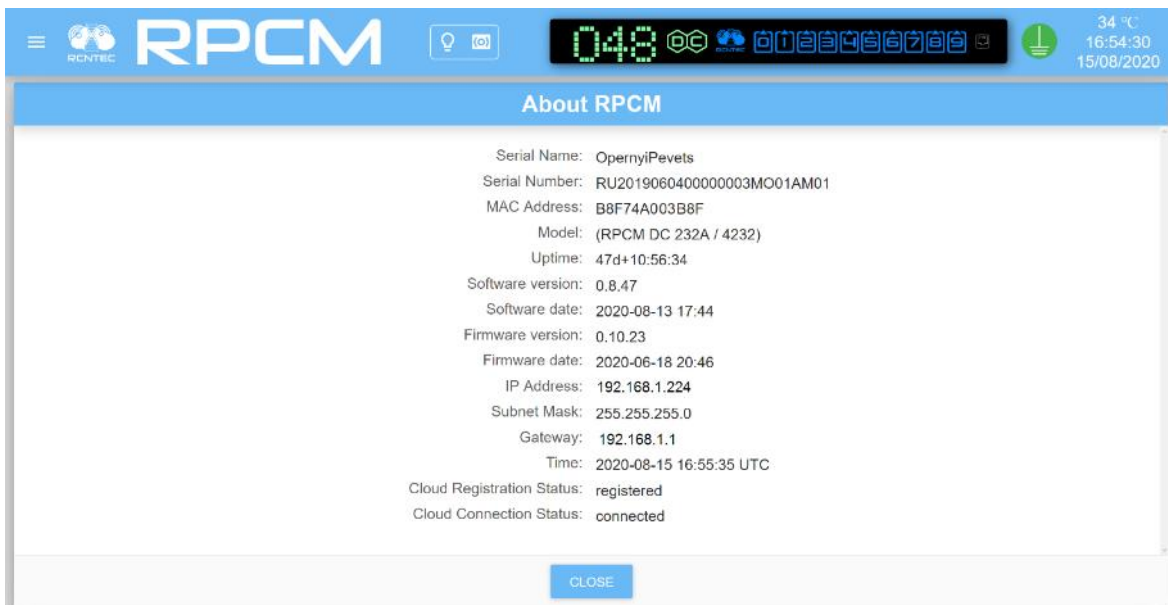


Figure 4.10.2. The window of the "Documentation" section.

The **CLOSE** button will switch you to the Dashboard.

5. The Reference for RPCM REST API

5.1. General information

5.1.1 Accessing REST API

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

The REST API is available over the protocols

for HTTP — TCP port 8888;

for HTTPS — TCP port 8443.

5.1.2 Authentication

By default endpoint is available without authentication. API authentication can be switched on in web interface or via command line interface.

Once authentication is turned on, it is necessary to include the API key with each request. Two methods of API key inclusion are supported:

First method — in the body of URL:

for HTTP:

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

for HTTPS:

```
curl -k -X GET https://192.168.1.24:8443/api/cachedStatus?apikey=373ac3fde3ae0740e0fb76e912e3e18e
```

Second method — in the header of HTTP/HTTPS.

for HTTP:

```
curl -X GET http://192.168.1.24:8888/api/cachedStatus -H API-KEY:373ac3fde3ae0740e0fb76e912e3e18e
```

for HTTPS:

```
curl -X GET https://192.168.1.24:8443/api/cachedStatus -k -H API-KEY:373ac3fde3ae0740e0fb76e912e3e18e
```

If API keys are provided both ways, the key, provided inside of the URL will be used.

Further descriptions and examples of requests and replies in this paragraph assume authentication is switched off.

If the service is unavailable, the message is:

```
'{"resultOfLastCommand":"FAILED","reason":"SERVICE_UNAVAILABLE"}'
```


5.1.3 Parameters

There are two notations of parameters:

- 1 REST API parameters in the URL directly;
- 2 JSON parameters in a queries (commands). Example: {"id": 18}

5.2. Protocol Commands

5.2.1. Get Device Status

5.2.1.1. Overview

It returns the current status of RPCM in JSON format.

5.2.1.2. Get API Status

Command:

```
GET /api/status
```

Example:

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

REPLY:

```
{
  "rOLC": "OK",
  "sNa": "OpernyiPevets",
  "sNu": "RU2019060400000003M001AM01",
  "MAC": "B8F74A000306",
  "hwV": 232,
  "fwV": "0.10.41",
  "fwRD": "20200926103429",
  "rtcB": "20100104230141",
  "rtc": "20110605150344",
  "r": 255,
  "LR": 40,
  "R": 32,
  "p": "YES",
  "g": 150,
  "temp": 37,
  "b": 0,
  "exB": {
    "top": {
      "pr": "NO",
      "ms": 1214558013
    },
    "bottom": {
      "pr": "NO",
      "ms": 1933079292
    }
  },
  "ats": {
```

```
"aL": 1,
"gg": 0,
"lines": {
  "1": {
    "mV": 48119,
    "admS": "ON",
    "rS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.385
  },
  "2": {
    "mV": 0,
    "admS": "ON",
    "rS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.385
  }
},
"channels": {
  "0": {
    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.0
  },
  "1": {
    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.350833
  },
  "2": {
    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
```

```
"iWa": 0,  
"aKWh": 0.0  
},  
"3": {  
  "admS": "ON",  
  "actS": "ON",  
  "tC": "ON",  
  "cbFS": "OFF",  
  "oAFS": "OFF",  
  "oTFS": "OFF",  
  "loTFS": "OFF",  
  "rS": "OFF",  
  "ovTFS": "OFF",  
  "iMa": 0,  
  "iWa": 0,  
  "aKWh": 0.033889  
},  
"4": {  
  "admS": "ON",  
  "actS": "ON",  
  "tC": "ON",  
  "cbFS": "OFF",  
  "oAFS": "OFF",  
  "oTFS": "OFF",  
  "loTFS": "OFF",  
  "rS": "OFF",  
  "ovTFS": "OFF",  
  "iMa": 0,  
  "iWa": 0,  
  "aKWh": 0.0  
},  
"5": {  
  "admS": "ON",  
  "actS": "ON",  
  "tC": "ON",  
  "cbFS": "OFF",  
  "oAFS": "OFF",  
  "oTFS": "OFF",  
  "loTFS": "OFF",  
  "rS": "OFF",  
  "ovTFS": "OFF",  
  "iMa": 0,  
  "iWa": 0,  
  "aKWh": 0.0  
},  
"6": {  
  "admS": "ON",  
  "actS": "ON",  
  "tC": "ON",  
  "cbFS": "OFF",  
  "oAFS": "OFF",  
  "oTFS": "OFF",  
  "loTFS": "OFF",  
  "rS": "OFF",  
  "ovTFS": "OFF",  
  "iMa": 0,  
  "iWa": 0,  
  "aKWh": 0.0  
},  
"7": {
```

```

    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.0
  },
  "8": {
    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.0
  },
  "9": {
    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.0
  }
}
},
"WE": "F833006B45",
"RPCM": 1
}

```

5.2.1.3. Getting the Cached Status

Command

```
GET /api/cachedStatus
```

An information about a device status, what a controller send for short period ~1sec. c.

Example:

```
curl -X GET http://192.168.1.24:8888/api/cachedStatus
```

REPLY:

```

{
  "rOLC": "OK",
  "sNa": "OpernyiPevets",
  "sNu": "RU2019060400000003M001AM01",
  "MAC": "B8F74A000306",
  "hwV": 232,
  "fwV": "0.10.41",
  "fwRD": "20200926103429",
  "rtcB": "20100104230141",
  "rtc": "20110605150544",
  "r": 255,
  "LR": 40,
  "R": 32,
  "p": "YES",
  "g": 150,
  "temp": 37,
  "b": 0,
  "exB": {
    "top": {
      "pr": "NO",
      "ms": 1214678712
    },
    "bottom": {
      "pr": "NO",
      "ms": 1933199992
    }
  },
  "ats": {
    "aL": 1,
    "gG": 0,
    "lines": {
      "1": {
        "mV": 48127,
        "admS": "ON",
        "rS": "OFF",
        "iMa": 0,
        "iWa": 0,
        "aKWh": 0.385,
        "name": "input_1",
        "description": "TEST"
      },
      "2": {
        "mV": 0,
        "admS": "ON",
        "rS": "OFF",
        "iMa": 0,
        "iWa": 0,
        "aKWh": 0.385,
        "name": "input_2",
        "description": ""
      }
    }
  },
  "channels": {
    "0": {
      "admS": "ON",
      "actS": "ON",
      "tC": "ON",
      "cbFS": "OFF",

```

```
"oAFS": "OFF",
"oTFS": "OFF",
"loTFS": "OFF",
"rS": "OFF",
"ovTFS": "OFF",
"iMa": 0,
"iWa": 0,
"aKWh": 0.0,
"name": "TEST",
"description": "bla bla",
"restartDelay": 3
},
"1": {
  "admS": "ON",
  "actS": "ON",
  "tC": "ON",
  "cbFS": "OFF",
  "oAFS": "OFF",
  "oTFS": "OFF",
  "loTFS": "OFF",
  "rS": "OFF",
  "ovTFS": "OFF",
  "iMa": 0,
  "iWa": 0,
  "aKWh": 0.350833,
  "name": "output_1",
  "description": "",
  "restartDelay": 10
},
"2": {
  "admS": "ON",
  "actS": "ON",
  "tC": "ON",
  "cbFS": "OFF",
  "oAFS": "OFF",
  "oTFS": "OFF",
  "loTFS": "OFF",
  "rS": "OFF",
  "ovTFS": "OFF",
  "iMa": 0,
  "iWa": 0,
  "aKWh": 0.0,
  "name": "output_2",
  "description": "",
  "restartDelay": 3
},
"3": {
  "admS": "ON",
  "actS": "ON",
  "tC": "ON",
  "cbFS": "OFF",
  "oAFS": "OFF",
  "oTFS": "OFF",
  "loTFS": "OFF",
  "rS": "OFF",
  "ovTFS": "OFF",
  "iMa": 0,
  "iWa": 0,
  "aKWh": 0.033889,
  "name": "output_3",
```

```
    "description": "",
    "restartDelay": 3
  },
  "4": {
    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.0,
    "name": "output_4",
    "description": "",
    "restartDelay": 3
  },
  "5": {
    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.0,
    "name": "output_5",
    "description": "",
    "restartDelay": 3
  },
  "6": {
    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.0,
    "name": "output_6",
    "description": "",
    "restartDelay": 3
  },
  "7": {
    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
```

```

    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.0,
    "name": "output_7",
    "description": "",
    "restartDelay": 3
  },
  "8": {
    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
    "iWa": 0,
100 7721 100 7721 0 0 28076 0 ---:---:---:---:---:---:--- 28076": 0.0,
    "name": "output_8",
    "description": "",
    "restartDelay": 3
  },
  "9": {
    "admS": "ON",
    "actS": "ON",
    "tC": "ON",
    "cbFS": "OFF",
    "oAFS": "OFF",
    "oTFS": "OFF",
    "loTFS": "OFF",
    "rS": "OFF",
    "ovTFS": "OFF",
    "iMa": 0,
    "iWa": 0,
    "aKWh": 0.0,
    "name": "output_9",
    "description": "",
    "restartDelay": 3
  }
}
},
"we": "F8AD006B45",
"RPCM": 1,
"rtcHLC": "20201106150543",
"softwareVersion": "0.8.74",
"softwareReleaseDate": "20201102133232",
"networkInfo": {
  "interfaceState": "up",
  "type": "dhcp",
  "ipAddress": "10.210.1.55",
  "netmask": "255.255.255.0",
  "gateway": "10.210.1.1",
  "primaryDNS": "185.83.242.34",
  "secondaryDNS": "10.210.146.237"
}

```



```
},
"lAKWh": {
  "1": 0.385,
  "2": 0.385
},
"CAKWh": {
  "0": 0.0,
  "1": 0.350833,
  "2": 0.0,
  "3": 0.033889,
  "4": 0.0,
  "5": 0.0,
  "6": 0.0,
  "7": 0.0,
  "8": 0.0,
  "9": 0.0
},
"cbFF": {
  "0": 0,
  "1": 0,
  "2": 0,
  "3": 0,
  "4": 1,
  "5": 1,
  "6": 0,
  "7": 1,
  "8": 0,
  "9": 0
},
"COALM": {
  "0": 8000,
  "1": 24000,
  "2": 24000,
  "3": 24000,
  "4": 24000,
  "5": 24000,
  "6": 24000,
  "7": 24000,
  "8": 24000,
  "9": 9000
},
"COALS": {
  "0": 29,
  "1": 30,
  "2": 30,
  "3": 30,
  "4": 30,
  "5": 30,
  "6": 30,
  "7": 30,
  "8": 30,
  "9": 5
},
"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": 8000,  
  "1": 30000,  
  "2": 30000,  
  "3": 30000,  
  "4": 30000,  
  "5": 30000,  
  "6": 30000,  
  "7": 30000,  
  "8": 30000,  
  "9": 9500  
},  
"COTLS": {  
  "0": 11,  
  "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  
}
```

```
"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": 3,
  "1": 3,
  "2": 4,
  "3": 5,
  "4": 6,
  "5": 7,
  "6": 8,
  "7": 9,
  "8": 10,
  "9": 11
},
"ctofiop": {
  "0": 7,
  "1": 1,
  "2": 2,
  "3": 3,
  "4": 4,
  "5": 5,
  "6": 6,
  "7": 7,
  "8": 8,
  "9": 9
},
"lmiv": {
  "1": 45,
  "2": 90
},
"lmaV": {
  "1": 51,
  "2": 250
},
"luta": {
  "1": 232,
  "2": 200
},
"covt": {
  "0": 65500,
  "1": 60,
  "2": 60,
  "3": 60,
  "4": 60,
  "5": 60,
```

```

    "6": 60,
    "7": 60,
    "8": 60,
    "9": 60
  },
  "cRaOVS": {
    "0": 65535,
    "1": 3,
    "2": 4,
    "3": 5,
    "4": 6,
    "5": 7,
    "6": 8,
    "7": 9,
    "8": 10,
    "9": 11
  },
  "cOVTF": {
    "0": 65535,
    "1": 65535,
    "2": 65535,
    "3": 65535,
    "4": 65535,
    "5": 65535,
    "6": 65535,
    "7": 65535,
    "8": 65535,
    "9": 65535
  },
  "laSWMs": {
    "1": 138642237555,
    "2": 138642237555
  },
  "caSWMs": {
    "0": 0,
    "1": 126366924083,
    "2": 0,
    "3": 12255947235,
    "4": 0,
    "5": 0,
    "6": 1105525,
    "7": 0,
    "8": 0,
    "9": 18260712
  }
}

```

5.2.1.4. Query and Return the Status with Full Keys Names

Command:

```
GET /api/cachedStatusWithFullNames
```

Example:

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

REPLY:

```
{
  "resultOfLastCommand": "OK",
  "serialName": "OpornyiPevets",
  "serialNumber": "RU2019060400000003M001AM01",
  "MAC": "B8F74A000306",
  "hardwareVersion": 232,
  "firmwareVersion": "0.10.41",
  "firmwareReleaseDate": "20200926103429",
  "rtcBoot": "20100104230141",
  "rtc": "20110605151335",
  "restartReason": 255,
  "llcResetsCount": 40,
  "restartsCount": 32,
  "displayModePrintFromHLC": "YES",
  "globalFlagsOfLLC": 150,
  "temperature": 37,
  "buzzerState": 0,
  "externalButtons": {
    "top": {
      "pressed": "NO",
      "microseconds": 1215148950
    },
    "bottom": {
      "pressed": "NO",
      "microseconds": 1933670229
    }
  },
  "ats": {
    "activeLine": 1,
    "groundGood": 0,
    "lines": {
      "1": {
        "millivolts": 48127,
        "adminState": "ON",
        "recognitionState": "OFF",
        "instantMilliamps": 0,
        "instantWatts": 0,
        "accumulatedKWh": 0.385,
        "name": "input_1",
        "description": "TEST"
      },
      "2": {
        "millivolts": 0,
        "adminState": "ON",
        "recognitionState": "OFF",
        "instantMilliamps": 0,
        "instantWatts": 0,
        "accumulatedKWh": 0.385,
        "name": "input_2",
        "description": ""
      }
    }
  },
  "channels": {
    "0": {
      "adminState": "ON",
      "actualState": "ON",
      "triggerControl": "ON",
      "circuitBreakerFiredState": "OFF",

```

```

    "overcurrentAlarmFiredState": "OFF",
    "overcurrentTurnOffFiredState": "OFF",
    "lineOvercurrentTurnOffFiredState": "OFF",
    "recognitionState": "OFF",
    "overvoltageTurnOffFiredState": "OFF",
    "instantMilliamps": 0,
    "instantWatts": 0,
    "accumulatedKWh": 0.0,
    "name": "TEST",
    "description": "bla bla",
    "restartDelay": 3
  },
  "1": {
    "adminState": "ON",
    "actualState": "ON",
    "triggerControl": "ON",
    "circuitBreakerFiredState": "OFF",
    "overcurrentAlarmFiredState": "OFF",
    "overcurrentTurnOffFiredState": "OFF",
    "lineOvercurrentTurnOffFiredState": "OFF",
    "recognitionState": "OFF",
    "overvoltageTurnOffFiredState": "OFF",
    "instantMilliamps": 0,
    "instantWatts": 0,
    "accumulatedKWh": 0.350833,
    "name": "output_1",
    "description": "",
    "restartDelay": 10
  },
  "2": {
    "adminState": "ON",
    "actualState": "ON",
    "triggerControl": "ON",
    "circuitBreakerFiredState": "OFF",
    "overcurrentAlarmFiredState": "OFF",
    "overcurrentTurnOffFiredState": "OFF",
    "lineOvercurrentTurnOffFiredState": "OFF",
    "recognitionState": "OFF",
    "overvoltageTurnOffFiredState": "OFF",
    "instantMilliamps": 0,
    "instantWatts": 0,
    "accumulatedKWh": 0.0,
    "name": "output_2",
    "description": "",
    "restartDelay": 3
  },
  "3": {
    "adminState": "ON",
    "actualState": "ON",
    "triggerControl": "ON",
    "circuitBreakerFiredState": "OFF",
    "overcurrentAlarmFiredState": "OFF",
    "overcurrentTurnOffFiredState": "OFF",
    "lineOvercurrentTurnOffFiredState": "OFF",
    "recognitionState": "OFF",
    "overvoltageTurnOffFiredState": "OFF",
    "instantMilliamps": 0,
    "instantWatts": 0,
    "accumulatedKWh": 0.033889,
    "name": "output_3",

```

```
    "description": "",
    "restartDelay": 3
  },
  "4": {
    "adminState": "ON",
    "actualState": "ON",
    "triggerControl": "ON",
    "circuitBreakerFiredState": "OFF",
    "overcurrentAlarmFiredState": "OFF",
    "overcurrentTurnOffFiredState": "OFF",
    "lineOvercurrentTurnOffFiredState": "OFF",
    "recognitionState": "OFF",
    "overvoltageTurnOffFiredState": "OFF",
    "instantMilliamps": 0,
    "instantWatts": 0,
    "accumulatedKWh": 0.0,
    "name": "output_4",
    "description": "",
    "restartDelay": 3
  },
  "5": {
    "adminState": "ON",
    "actualState": "ON",
    "triggerControl": "ON",
    "circuitBreakerFiredState": "OFF",
    "overcurrentAlarmFiredState": "OFF",
    "overcurrentTurnOffFiredState": "OFF",
    "lineOvercurrentTurnOffFiredState": "OFF",
    "recognitionState": "OFF",
    "overvoltageTurnOffFiredState": "OFF",
    "instantMilliamps": 0,
    "instantWatts": 0,
    "accumulatedKWh": 0.0,
    "name": "output_5",
    "description": "",
    "restartDelay": 3
  },
  "6": {
    "adminState": "ON",
    "actualState": "ON",
    "triggerControl": "ON",
    "circuitBreakerFiredState": "OFF",
    "overcurrentAlarmFiredState": "OFF",
    "overcurrentTurnOffFiredState": "OFF",
    "lineOvercurrentTurnOffFiredState": "OFF",
    "recognitionState": "OFF",
    "overvoltageTurnOffFiredState": "OFF",
    "instantMilliamps": 0,
    "instantWatts": 0,
    "accumulatedKWh": 0.0,
    "name": "output_6",
    "description": "",
    "restartDelay": 3
  },
  "7": {
    "adminState": "ON",
    "actualState": "ON",
    "triggerControl": "ON",
    "circuitBreakerFiredState": "OFF",
    "overcurrentAlarmFiredState": "OFF",
```

```

    "overcurrentTurnOffFiredState": "OFF",
    "lineOvercurrentTurnOffFiredState": "OFF",
    "recognitionState": "OFF",
    "overvoltageTurnOffFiredState": "OFF",
    "instantMilliamps": 0,
    "instantWatts": 0,
    "accumulatedKWh": 0.0,
    "name": "output_7",
    "description": "",
    "restartDelay": 3
  },
  "8": {
    "adminState": "ON",
    "actualState": "ON",
    "triggerControl": "ON",
    "circuitBreakerFiredState": "OFF",
    "overcurrentAlarmFiredState": "OFF",
    "overcurrentTurnOffFiredState": "OFF",
    "lineOvercurrentTurnOffFiredState": "OFF",
    "recognitionState": "OFF",
    "overvoltageTurnOffFiredState": "OFF",
    "instantMilliamps": 0,
    "instantWatts": 0,
    "accumulatedKWh": 0.0,
    "name": "output_8",
    "description": "",
    "restartDelay": 3
  },
  "9": {
    "adminState": "ON",
    "actualState": "ON",
    "triggerControl": "ON",
    "circuitBreakerFiredState": "OFF",
    "overcurrentAlarmFiredState": "OFF",
    "overcurrentTurnOffFiredState": "OFF",
    "lineOvercurrentTurnOffFiredState": "OFF",
    "recognitionState": "OFF",
    "overvoltageTurnOffFiredState": "OFF",
    "instantMilliamps": 0,
    "instantWatts": 0,
    "accumulatedKWh": 0.0,
    "name": "output_9",
    "description": "",
    "restartDelay": 3
  }
}
},
"we": "F893006B45",
"rpcm": 1,
"rtcHLC": "20201106151334",
"softwareVersion": "0.8.74",
"softwareReleaseDate": "20201102133232",
"networkInfo": {
  "interfaceState": "up",
  "type": "dhcp",
  "ipAddress": "10.210.1.55",
  "netmask": "255.255.255.0",
  "gateway": "10.210.1.1",
  "primaryDNS": "185.83.242.34",
  "secondaryDNS": "10.210.146.237"
}

```



```
},
"lineAccumulatedKWh": {
  "1": 0.385,
  "2": 0.385
},
"channelAccumulatedKWh": {
  "0": 0.0,
  "1": 0.350833,
  "2": 0.0,
  "3": 0.033889,
  "4": 0.0,
  "5": 0.0,
  "6": 0.0,
  "7": 0.0,
  "8": 0.0,
  "9": 0.0
},
"circuitBreakerFiringFacts": {
  "0": 0,
  "1": 0,
  "2": 0,
  "3": 0,
  "4": 1,
  "5": 1,
  "6": 0,
  "7": 1,
  "8": 0,
  "9": 0
},
"channelOvercurrentAlarmLimitMilliamps": {
  "0": 8000,
  "1": 24000,
  "2": 24000,
  "3": 24000,
  "4": 24000,
  "5": 24000,
  "6": 24000,
  "7": 24000,
  "8": 24000,
  "9": 9000
},
"channelOvercurrentAlarmLimitSeconds": {
  "0": 29,
  "1": 30,
  "2": 30,
  "3": 30,
  "4": 30,
  "5": 30,
  "6": 30,
  "7": 30,
  "8": 30,
  "9": 5
},
"channelOvercurrentAlarmLimitReached": {
  "0": 0,
  "1": 0,
  "2": 0,
  "3": 0,
  "4": 0,
  "5": 0,
```

```

    "6": 0,
    "7": 0,
    "8": 0,
    "9": 0
  },
  "channelOvercurrentAlarmFired": {
    "0": 0,
    "1": 0,
    "2": 0,
    "3": 0,
100 10470 100 10470 0 0 36228 0 --:--:-- --:--:-- --:--:-- 36354 "4": 0,
    "5": 0,
    "6": 0,
    "7": 0,
    "8": 0,
    "9": 0
  },
  "channelOvercurrentTurnOffLimitMilliamps": {
    "0": 8000,
    "1": 30000,
    "2": 30000,
    "3": 30000,
    "4": 30000,
    "5": 30000,
    "6": 30000,
    "7": 30000,
    "8": 30000,
    "9": 9500
  },
  "channelOvercurrentTurnOffLimitSeconds": {
    "0": 11,
    "1": 2,
    "2": 2,
    "3": 2,
    "4": 2,
    "5": 2,
    "6": 2,
    "7": 2,
    "8": 2,
    "9": 2
  },
  "channelOvercurrentTurnOffLimitReached": {
    "0": 0,
    "1": 0,
    "2": 0,
    "3": 0,
    "4": 0,
    "5": 0,
    "6": 0,
    "7": 0,
    "8": 0,
    "9": 0
  },
  "channelOvercurrentTurnOffFired": {
    "0": 0,
    "1": 0,
    "2": 0,
    "3": 0,
    "4": 0,
    "5": 0,

```

```
"6": 0,
"7": 0,
"8": 0,
"9": 0
},
"channelAdministrativeStatus": {
  "0": 1,
  "1": 1,
  "2": 1,
  "3": 1,
  "4": 1,
  "5": 1,
  "6": 1,
  "7": 1,
  "8": 1,
  "9": 1
},
"channelTurnOnDelayOnStartup": {
  "0": 3,
  "1": 3,
  "2": 4,
  "3": 5,
  "4": 6,
  "5": 7,
  "6": 8,
  "7": 9,
  "8": 10,
  "9": 11
},
"channelTurnOffOnInputOverloadPriority": {
  "0": 7,
  "1": 1,
  "2": 2,
  "3": 3,
  "4": 4,
  "5": 5,
  "6": 6,
  "7": 7,
  "8": 8,
  "9": 9
},
"lineMinimumVoltage": {
  "1": 45,
  "2": 90
},
"lineMaximumVoltage": {
  "1": 51,
  "2": 250
},
"lineUserTotalAmps": {
  "1": 232,
  "2": 200
},
"overvoltageThreshold": {
  "0": 65500,
  "1": 60,
  "2": 60,
  "3": 60,
  "4": 60,
  "5": 60,
```

```

    "6": 60,
    "7": 60,
    "8": 60,
    "9": 60
  },
  "recoverAfterOvervoltageSeconds": {
    "0": 65535,
    "1": 3,
    "2": 4,
    "3": 5,
    "4": 6,
    "5": 7,
    "6": 8,
    "7": 9,
    "8": 10,
    "9": 11
  },
  "channelOvervoltageTurnOffFacts": {
    "0": 65535,
    "1": 65535,
    "2": 65535,
    "3": 65535,
    "4": 65535,
    "5": 65535,
    "6": 65535,
    "7": 65535,
    "8": 65535,
    "9": 65535
  },
  "lineAccumulatedSantiWattsMilliseconds": {
    "1": 138642237555,
    "2": 138642237555
  },
  "channelAccumulatedSantiWattsMilliseconds": {
    "0": 0,
    "1": 126366924083,
    "2": 0,
    "3": 12255947235,
    "4": 0,
    "5": 0,
    "6": 1105525,
    "7": 0,
    "8": 0,
    "9": 18260712
  }
}

```

5.2.2. Getting the Software Version

It returns the current software version of RPCM in JSON format.

Command:

```
GET /api/softwareVersion
```

Example:

```
curl -X GET http://192.168.1.52:8888/api/softwareVersion
```

REPLY:

```
{"resultOfLastCommand": "OK", "softwareVersion": "0.3.25"}
```

5.2.3. Outlet Status Getting

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:

```
7{
  "rOLC": "OK",
  "ats": {
    "channels": {
      "0": {
        "admS": "ON",
        "actS": "ON",
        "tC": "ON",
        "cbFS": "OFF",
        "oAFS": "OFF",
        "oTFS": "OFF",
        "loTFS": "OFF",
        "rS": "OFF",
        "ovTFS": "OFF",
        "iMa": 0,
        "iWa": 0,
        "aKWh": 0.0
      }
    }
  },
  "RPCM": 1
}
```

5.2.4. Outlet Status Setting

5.2.4.1. Change the Outlet Status

Command:

```
PUT /api/channel/channelNumber/newState
```

Parameters:

channelNumber = [0-9] (Outlet number of interest (single digit))

newState = on|off (desired state)

Example:

```
curl -X PUT http://10.210.1.52:8888/api/channel/0/on
```

```
curl -X PUT http://10.210.1.52:8888/api/channel/0/off
```

REPLY:

```
{
  "rOLC": "OK",
  "ats": {
    "channels": {
      "0": {
        "admS": "ON",
        "actS": "ON",
        "t1C": "ON",
        "t2C": "ON",
        "cbFS": "OFF",
        "fSC1": 0,
        "fSC2": 0,
        "oAFS": "OFF",
        "oTFS": "OFF",
        "loTFS": "OFF",
        "rS": "OFF",
        "ovTFS": "OFF",
        "iMa": 0,
        "iWa": 0,
        "iVA": 0,
        "iVar": 0,
        "aKWh": 1.909722,
        "aKVAh": 1.914167,
        "aKVarh": -0.049722
      }
    }
  },
  "RPCM": 1
}
```

5.2.4.2. How to Use a Mask

Change multiple-outlets status

Command:

```
PUT /api/multiple-outlets/mask/[mask]/[state]
```

Parameters:

mask - bit outlet mask

if mask = 3 — set inlets: 0 and 1 to ON

if mask = 1023 — set all inlets (0 - 9) to ON

state = [on, off]

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

Example:

```
curl -X PUT http://192.168.1.24:8888/api/multiple-outlets/mask/3/on
```

Setting of recognition to ON

Command:

```
PUT /api/recognition/mask/[mask]
```

Parameters:

mask — bit outlet mask, where 0-9 bits for outlets (14-15 bits for inlets).

if mask = 0 – turn off recognition for all

if mask = 3 — turn off recognition 0 and 1 outlets.

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

Example:

```
curl -X PUT http://192.168.1.24:8888/api/recognition/mask/0
```

5.2.4.3 Reboot All Outlets

Command:

```
PUT /api/(channels|outputs|outlets)/restart
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/outputs/restart
```

Outlets will be rebooted with restart delays for every port. Restart delay is a timeout between outlet turning off and turning on.

5.2.4.4 Turn On All Outlets

Command:

```
PUT /api/(channels|outputs|outlets)/on
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/outputs/on
```

5.2.4.5 Reboot of All Outlets

Command:

```
PUT /api/(channels|outputs|outlets)/off
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/outputs/off
```

5.2.4.6 Reboot of an Outlet

Command:

```
PUT /api/(channel|output|outlet)/channelNumber/restart
```

Parameters:

channelNumber = [0-9]

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/output/1/restart
```

5.2.4.7 Outlet Reboot with a Delay

Command:

```
PUT /api/(channel|output|outlet)/(channelNumber)/restart/restartDelay
```

Parameters:

channelNumber = [0-9]

restartDelay = [1-65535]

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/output/1/restart/3
```

5.2.4.8 Restart Delay Setting for Outlet

Command:

```
PUT /api/(channel|output|outlet)/channelNumber/restart/delay/restartDelay
```

Parameters:

channelNumber = [0-9]

restartDelay = [1-65535]

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/output/1/restart/delay/10
```


5.2.5. Input Status Setting

5.2.5.1. Change Input State

Command:

```
PUT /api/input/[inputNumber]/[state]
```

Parameter:

inputNumber — the number of an input[1, 2]

state - [on, off]

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

Example:

```
curl -X PUT http://192.168.1.24:8888/api/input/1/on
```

5.2.5.2. Active Input Setting

Command:

```
PUT /api/inlet/[inputNumber]/activate
```

Parameters:

inputNumber —input number [1, 2]

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

Example:

```
curl -X PUT http://192.168.1.24:8888/api/inlet/1/activate
```

5.2.5.3. Current Limit Setting

Command:

```
PUT /api/input/[inputNumber]/current-limit/[limit]
```

Parameters:

inputNumber — input number [1, 2]

limit — maximum of available current.

REPLY: GET /api/status is used as a system response

Example:

```
curl -X PUT http://192.168.1.24:8888/api/input/1/current-limit/10
```

5.2.5.4. Input Recognition Setting

Command:

```
PUT /api/input/[inputNumber]/recognition/[state]
```

Parameters:

inputNumber — input number [1, 2]

state — [on, off]

REPLY: GET /api/status is used as a system response

Example:

```
curl -X PUT http://192.168.1.24:8888/api/input/1/recognition/on
```

5.2.6. Date and Time Operations

5.2.6.1. How to Get Information about Time and Date

Command:

```
GET /api/time
```

Example:

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

REPLY

```
{"resultOfLastCommand": "OK", "time": "2020-11-05 11:33:33 +0300"}
```

5.2.6.2. Date and Time Setting

Command:

```
PUT /api rtc/[timeData]
```

Parameters:

timeData is a value consisting of

```
[year][month][day][hour][minute][second]
```

Example:

```
curl -X PUT http://192.168.1.42:8888/api/time/20201105114233
```

REPLY:

```
{"resultOfLastCommand": "OK", "time": "2020-11-05 14:42:33 +0300"}
```

The effect of this command will be permanent, provided that the “Use NTP server” parameter is set to “OFF”. In case the parameter is enabled, the time will be synchronized with the NTP servers time within 5 to 10 seconds.

5.2.7. Beeper Setting

Command:

```
PUT /api/beeper/[state]
```

Parameters:

state - [on, off, alternate, disable, enable]

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

Example:

```
curl -X PUT http://192.168.1.24:8888/api/beeper/on
```

5.2.8. Front Display Messages Settings

5.2.8.1. User Message Setting

Command:

```
PUT /api/display/user-message
```

Parameters:

message

fgColor

Return is:

```
true
```

Example:

```
curl -X PUT http://192.168.1.42:8888/api/display/user-message -d '{"fgColor":"grey","message":"hello"}
```

5.2.8.2. Default Message Setting

Command:

```
PUT /api/display/what-to-show
```

Parameters:

whatToShow

REPLY:

```
true
```

Example:

```
curl -X PUT http://192.168.1.42:8888/api/display/what-to-show -d '{"whatToShow":"userMessage"}
```

5.2.8.3. User Message Getting

Command:

```
GET /api/display/user-message
```

REPLY:

```
{"message":"hello","fgColor":"grey"}
```

Example:

```
curl -X GET http://192.168.1.42:8888/api/display/user-message
```

5.2.8.4. Get current display message

Command:

```
GET /api/display/what-is-shown
```

REPLY:

```
"userMessage"
```

Example:

```
curl -X GET http://192.168.1.42:8888/api/display/what-is-shown
```

5.2.8.5. 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,X19=1,X20=
    1,X22=1,X23=1,X24=1,X25=1,X26=1,X27=1,X28=1,X30=1,X32=1,X33=1,X35=1,X36=1,X37=1,X38=1,X39=
    1,X40=1,X41=1,X42=1,X43=1,X44=1,X45=1,X46=1,X47=1,X48=1,X49=1,X50=1,X51=1,X52=1,X53=1,X54=
    1,X55=1,X56=1,X57=1,X58=1,X59=1,X60=1,X61=1,X62=1,X63=1,X64=1,X65=1,X66=1,X67=1,X68=1,X69=
    1,X70=1,X71=1,X72=1,X73=1,X74=1,X75=1,X76=1,X77=1,X78=1,X79=1,X80=1,X81=1,X82=1}',
    "chain_xtime8":
    '{X4=1,X5=1,X6=1,X7=1,X8=1,X9=1,X10=1,X11=1,X12=1,X13=1,X14=1,X15=1,X16=1,X20=1,X21=1,X22=
    1,X24=1,X25=1,X26=1,X27=1,X28=1,X29=1,X30=1,X31=1,X32=1,X33=1,X34=1,X35=1,X36=1,X37=1,X38=
    1,X39=1,X40=1,X41=1,X42=1,X43=1,X44=1,X45=1,X46=1,X47=1,X48=1,X49=1,X50=1,X51=1,X52=1,X53=
    1,X54=1,X55=1,X56=1,X57=1,X58=1,X59=1,X60=1,X61=1,X62=1,X63=1,X64=1,X65=1,X66=1,X67=1,X68=
    1,X69=1,X70=1,X71=1,X72=1,X73=1,X74=1,X75=1,X76=1,X77=1,X78=1,X79=1,X80=1,X81=1,X82=1,X83=
    1}',
    "chain_offside_6": '0',
    "chain_offside_8": '0',
    "chain_opencore_6": '0',
    "chain_opencore_8": '0',
    "miner_version": '30.0.1.3',
    "miner_id": '80141d006f904814'
  }
],
  "id": 1
},
"lastSuccessUpdateMinerState": '2019-09-21 14:38:29',
"minerStats": {
  "Total Hash Rate AV, GHS": 189.32,
  "Total Hash Rate 5s, GHS": 68.467,
  "Frequency": 606,
  "Miner Count": 3,
  "Model": 0,
  "table": {
    "column_names": [
      'CHAIN#',
      'ACN',
      'ACS',

```



```

    }
  },
  "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,

```



```

    }
  },
  "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,

```



```

    }
  },
  "12": {
    "name": "Large-Router",
    "settings": {
      "checkIntervalSeconds": 6,
      "interRestartIntervalSeconds": 600,
      "consumption": {
        "alarmBottomLimitMilliamps": null,
        "restartBottomLimitMilliamps": null,
        "alarmSeconds": null,
        "restartSeconds": null
      },
      "hashRate": {
        "hashrateMeasurementUnit": null,
        "api": {
          "port": null,
          "unavailabilityTimeoutSeconds": null
        },
        "alarmBottomLimit": null,
        "restartBottomLimit": null,
        "alarmSeconds": null,
        "restartSeconds": null
      }
    }
  },
  "13": {
    "name": "Small-Switch",
    "settings": {
      "checkIntervalSeconds": 6,
      "interRestartIntervalSeconds": 600,
      "consumption": {
        "alarmBottomLimitMilliamps": null,
        "restartBottomLimitMilliamps": null,
        "alarmSeconds": null,
        "restartSeconds": null
      },
      "hashRate": {
        "hashrateMeasurementUnit": null,
        "api": {
          "port": null,
          "unavailabilityTimeoutSeconds": null
        },
        "alarmBottomLimit": null,
        "restartBottomLimit": null,
        "alarmSeconds": null,
        "restartSeconds": null
      }
    }
  },
  "14": {
    "name": "Medium-Switch",
    "settings": {
      "checkIntervalSeconds": 6,
      "interRestartIntervalSeconds": 600,
      "consumption": {
        "alarmBottomLimitMilliamps": null,
        "restartBottomLimitMilliamps": null,
        "alarmSeconds": null,

```

```

        "restartSeconds": null
    },
    "hashRate": {
        "hashrateMeasurementUnit": null,
        "api": {
            "port": null,
            "unavailabilityTimeoutSeconds": null
        },
        "alarmBottomLimit": null,
        "restartBottomLimit": null,
        "alarmSeconds": null,
        "restartSeconds": null
    }
}
},
"15": {
    "name": "Large-Switch",
    "settings": {
        "checkIntervalSeconds": 6,
        "interRestartIntervalSeconds": 600,
        "consumption": {
            "alarmBottomLimitMilliamps": null,
            "restartBottomLimitMilliamps": null,
            "alarmSeconds": null,
            "restartSeconds": null
        },
        "hashRate": {
            "hashrateMeasurementUnit": null,
            "api": {
                "port": null,
                "unavailabilityTimeoutSeconds": null
            },
            "alarmBottomLimit": null,
            "restartBottomLimit": null,
            "alarmSeconds": null,
            "restartSeconds": null
        }
    }
},
"16": {
    "name": "Small-Server",
    "settings": {
        "checkIntervalSeconds": 6,
        "interRestartIntervalSeconds": 600,
        "consumption": {
            "alarmBottomLimitMilliamps": null,
            "restartBottomLimitMilliamps": null,
            "alarmSeconds": null,
            "restartSeconds": null
        },
        "hashRate": {
            "hashrateMeasurementUnit": null,
            "api": {
                "port": null,
                "unavailabilityTimeoutSeconds": null
            },
            "alarmBottomLimit": null,
            "restartBottomLimit": null,
            "alarmSeconds": null,
            "restartSeconds": null
        }
    }
}
}

```

```

    }
  },
  "17": {
    "name": "Medium-Server",
    "settings": {
      "checkIntervalSeconds": 6,
      "interRestartIntervalSeconds": 600,
      "consumption": {
        "alarmBottomLimitMilliamps": null,
        "restartBottomLimitMilliamps": null,
        "alarmSeconds": null,
        "restartSeconds": null
      },
      "hashRate": {
        "hashrateMeasurementUnit": null,
        "api": {
          "port": null,
          "unavailabilityTimeoutSeconds": null
        },
        "alarmBottomLimit": null,
        "restartBottomLimit": null,
        "alarmSeconds": null,
        "restartSeconds": null
      }
    }
  },
  "18": {
    "name": "Large-Server",
    "settings": {
      "checkIntervalSeconds": 6,
      "interRestartIntervalSeconds": 600,
      "consumption": {
        "alarmBottomLimitMilliamps": null,
        "restartBottomLimitMilliamps": null,
        "alarmSeconds": null,
        "restartSeconds": null
      },
      "hashRate": {
        "hashrateMeasurementUnit": null,
        "api": {
          "port": null,
          "unavailabilityTimeoutSeconds": null
        },
        "alarmBottomLimit": null,
        "restartBottomLimit": null,
        "alarmSeconds": null,
        "restartSeconds": null
      }
    }
  },
  "19": {
    "name": "Modem",
    "settings": {
      "checkIntervalSeconds": 6,
      "interRestartIntervalSeconds": 600,
      "consumption": {
        "alarmBottomLimitMilliamps": null,
        "restartBottomLimitMilliamps": null,
        "alarmSeconds": null,

```

```

        "restartSeconds": null
      },
      "hashRate": {
        "hashrateMeasurementUnit": null,
        "api": {
          "port": null,
          "unavailabilityTimeoutSeconds": null
        },
        "alarmBottomLimit": null,
        "restartBottomLimit": null,
        "alarmSeconds": null,
        "restartSeconds": null
      }
    }
  },
  "20": {
    "name": "Custom",
    "settings": {
      "checkIntervalSeconds": 6,
      "interRestartIntervalSeconds": 600,
      "consumption": {
        "alarmBottomLimitMilliamps": null,
        "restartBottomLimitMilliamps": null,
        "alarmSeconds": null,
        "restartSeconds": null
      },
      "hashRate": {
        "hashrateMeasurementUnit": null,
        "api": {
          "port": null,
          "unavailabilityTimeoutSeconds": null
        },
        "alarmBottomLimit": null,
        "restartBottomLimit": null,
        "alarmSeconds": null,
        "restartSeconds": null
      }
    }
  }
}

```

Example:

```
curl -X GET http://192.168.1.10:8888/api/automation/device-types
```

5.2.9.3. Get the Automation Devices List

Command:

```
GET /api/automation/devices
```

REPLY:

```

{
  "1": {
    "deviceType": 6,
    "name": "dragonmint_t1",
    "description": "",
    "checkIntervalSeconds": 6,
    "interRestartIntervalSeconds": 600,

```

```
"consumption": {
  "alarmBottomLimitMilliamps": null,
  "restartBottomLimitMilliamps": null,
  "alarmSeconds": null,
  "restartSeconds": null,
  "enabled": false
},
"hashRate": {
  "api": {
    "ipAddress": "192.168.1.37",
    "port": 4028,
    "unavailabilityTimeoutSeconds": 3
  },
  "alarmBottomLimit": 15700,
  "restartBottomLimit": 8000,
  "alarmSeconds": 60,
  "restartSeconds": 300,
  "enabled": true
},
"ping": {
  "ipAddress": null,
  "connectTimeout": null,
  "upperLimitMilliseconds": null,
  "alarmPacketLossPercentage": null,
  "restartPacketLossPercentage": null,
  "alarmSeconds": null,
  "restartSeconds": null,
  "enabled": false
},
"tcpPortAvailability": {
  "ipAddress": null,
  "port": null,
  "connectTimeout": null,
  "alarmSeconds": null,
  "restartSeconds": null,
  "enabled": false
},
"outputs": [
  1
]
},
"6": {
  "deviceType": 3,
  "name": "antminer_s11",
  "description": "",
  "checkIntervalSeconds": 6,
  "interRestartIntervalSeconds": 1800,
  "consumption": {
    "alarmBottomLimitMilliamps": null,
    "restartBottomLimitMilliamps": null,
    "alarmSeconds": null,
    "restartSeconds": null,
    "enabled": false
  },
  "hashRate": {
    "api": {
      "ipAddress": "192.168.1.161",
      "port": 4028,
      "unavailabilityTimeoutSeconds": 3
    },

```

```

    "alarmBottomLimit": 19000,
    "restartBottomLimit": 10,
    "alarmSeconds": 60,
    "restartSeconds": 300,
    "enabled": true
  },
  "ping": {
    "ipAddress": null,
    "connectTimeout": null,
    "upperLimitMilliseconds": null,
    "alarmPacketLossPercentage": null,
    "restartPacketLossPercentage": null,
    "alarmSeconds": null,
    "restartSeconds": null,
    "enabled": false
  },
  "tcpPortAvailability": {
    "ipAddress": null,
    "port": null,
    "connectTimeout": null,
    "alarmSeconds": null,
    "restartSeconds": null,
    "enabled": false
  },
  "outputs": [
    3
  ]
}

```

Example:

```
curl -X GET http://192.168.1.10:8888/api/automation/devices
```

5.2.9.4. Automation Set Up

Command:

```
POST /api/automation
```

Parameters:

deviceType — ID deviceType;

name —name (digitals, letters, symbols [-_] from 0 to 25 characters);

description — comment(digitals, letters, grammatical symbols from 0 to 255 characters);

checkIntervalSeconds — checking timeout, s (number 1 to 5 digits);

interRestartIntervalSeconds — min. timeout to restart, s (number 1 to 5 digits);

consumptionEnabled — circumstance monitoring (true/false).

If test is ON, following parameters are necessary:

consumptionAlarmBottomLimitMilliamps — the bottom threshold of the current consumption value, reaching of which triggers for alarm, mA (number 1 to 5 digits);

consumptionRestartBottomLimitMilliamps — the bottom threshold of the current consumption value, reaching of which triggers for restart, mA (number 1 to 5 digits);

consumptionAlarmSeconds — stabilization delay in seconds for alarm, s (number 1 to 5 digits);

consumptionRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

hashRateEnabled — hashrate monitoring (true/false).

If test is ON, following parameters are necessary:

hashRateApiIPAddress — IP address or FQDN for API Requests

hashRateApiPort —API port

hashRateApiUnavailabilityTimeoutSeconds — time interval during which the API has to respond to the request, s (number 1 to 5 digits)

hashRateAlarmBottomLimit — the bottom threshold of the hashrate value, reaching of which triggers an alarm, GH/s (number 1 to 7 digits)

hashRateRestartBottomLimit — the bottom threshold of the hashrate value, reaching of which triggers a restart, GH/s (from 1 to 5 digits);

hashRateAlarmSeconds — stabilization delay in seconds for alarm, s (from 1 to 5 digits);

hashRateRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

pingEnabled —ICMP access monitoring (ping) (true/false);

If test is ON, following parameters is necessary:

pingIPAddress — IP address or FQDN for ICMP Requests

pingConnectTimeoutSeconds — time interval during which the device should send the ICMP echo reply packet in response to ICMP echo request (from 1 to 5 digits);

pingUpperLimitMilliseconds — maximum round-trip latency value in milliseconds, exceeding of which causes the packets to be considered los (from 1 to 5 digits);

pingAlarmPacketLossPercentage — percentage of lost packets (top limit), which triggers an alarm, %

pingRestartPacketLossPercentage — percentage of lost packets (top limit), which triggers a restart, %

pingAlarmSeconds — 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,"consumptionAlarmSeconds":60,"consumptionRestartBottomLimitMilliamps":4300,"consumptionRestartSeconds":300,"hashRateApiPort":4028,"hashRateApiUnavailabilityTimeoutSeconds":3,"hashRateAlarmBottomLimit":16700,"hashRateAlarmSeconds":60,"hashRateRestartBottomLimit":16500,"hashRateRestartSeconds":300,"interRestartIntervalSeconds":600,"name":"test","outputs":[8],"hashRateEnabled":true,"hashRateApiIPAddress":"127.0.0.1","tcpPortAvailabilityIPAddress":"127.0.0.1","tcpPortAvailabilityPort":"80","tcpPortAvailabilityConnectTimeout":"3","tcpPortAvailabilityAlarmSeconds":"60","tcpPortAvailabilityRestartSeconds":"300","pingEnabled":false}'
```

5.2.9.5. Automation Configuration Setting

Command:

```
PUT /api/automation
```

Parameters:

id — ID automation

deviceType — ID deviceType;

name —name (digitals, letters, symbols [-_] from 0 to 25 characters);

description — comment(digitals, letters, grammatical symbols from 0 to 255 characters);

checkIntervalSeconds — checking timeout, s (number 1 to 5 digits);

interRestartIntervalSeconds — min. timeout to restart, s (number 1 to 5 digits);

consumptionEnabled — circumstance monitoring (true/false).

If test is ON, following parameters are necessary:

consumptionAlarmBottomLimitMilliamps — the bottom threshold of the current consumption value, reaching of which triggers for alarm, mA (number 1 to 5 digits);

consumptionRestartBottomLimitMilliamps — the bottom threshold of the current consumption value, reaching of which triggers for restart, mA (number 1 to 5 digits);

consumptionAlarmSeconds — stabilization delay in seconds for alarm, s (number 1 to 5 digits);

consumptionRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

hashRateEnabled — hashrate monitoring (true/false).

If test is ON, following parameters are necessary:

hashRateApiIPAddress — IP address or FQDN for API Requests

hashRateApiPort — API port

hashRateApiUnavailabilityTimeoutSeconds — time interval during which the API has to respond to the request, s (number 1 to 5 digits)

hashRateAlarmBottomLimit — the bottom threshold of the hashrate value, reaching of which triggers an alarm, GH/s (number 1 to 7 digits)

hashRateRestartBottomLimit — the bottom threshold of the hashrate value, reaching of which triggers a restart, GH/s (from 1 to 5 digits);

hashRateAlarmSeconds — stabilization delay in seconds for alarm, s (from 1 to 5 digits);

hashRateRestartSeconds — stabilization delay in seconds for restart, s (from 1 to 5 digits);

pingEnabled — ICMP access monitoring (ping) (true/false);

If test is ON, following parameters are necessary:

pingIPAddress — IP address or FQDN for ICMP Requests

pingConnectTimeoutSeconds — time interval during which the device should send the ICMP echo reply packet in response to ICMP echo request (from 1 to 5 digits);

pingUpperLimitMilliseconds — maximum round-trip latency value in milliseconds, exceeding of which causes the packets to be considered los (from 1 to 5 digits);

pingAlarmPacketLossPercentage — percentage of lost packets (top limit), which triggers an alarm, %

pingRestartPacketLossPercentage — percentage of lost packets (top limit), which triggers a restart, %

pingAlarmSeconds — 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,"consumptionAlarmSeconds":60,
"consumptionRestartBottomLimitMilliamps":4300,"consumptionRestartSeconds":300,"hashRateApiPort":4028,
"hashRateApiUnavailabilityTimeoutSeconds":3,"hashRateAlarmBottomLimit":16700,"hashRateAlarmSeconds":60,
"hashRateRestartBottomLimit":16500,"hashRateRestartSeconds":300,"interRestartIntervalSeconds":600,
"name":"test2","outputs":[8],"hashRateEnabled":true,"hashRateApiIPAddress":"127.0.0.1",
"tcpPortAvailabilityIPAddress":"127.0.0.1","tcpPortAvailabilityPort":"80",
"tcpPortAvailabilityConnectTimeout":"3",
"tcpPortAvailabilityAlarmSeconds":"60",
"tcpPortAvailabilityRestartSeconds":"300",
"pingEnabled":false}'
```

5.2.9.6. Delete Automation

Command:

```
DELETE /api/automation
```

Parameters:

id — ID automation

REPLY:

```
{ "id":1947 }
```

Example:

```
curl -X DELETE http://192.168.1.42:8888/api/automation -d '{"id":1947}'
```

5.2.10 Additional commands for automation

5.2.10.1 General information

This section contains automation commands in REST API notation using keys.

Parameters used:

Automation-Name-value — the name of the automation settings — you can use numbers, upper and lower case characters, and signs — and `_`. length should be from 1 to 25;

Device-Type-Name-value — the type of device to set, numbers, upper and lower case characters, and symbols: `-`, `+` and `_` are used, length should be from 1 to 25;

Outlets-Numbers-value — numbers of outputs — numbers in the form of single digits from 0 to 9, it is possible to specify several outputs, separated by commas.

Description-Text-value — description (comment up to 254 characters), can contain upper and lower case characters, punctuation marks and spaces (including tabs).

Check-Interval-Seconds-value — the interval between checks in seconds, an integer from 1 to 99999 or the service word default for the default value.

Restart-Interval-Seconds-value — the interval between reboots in seconds, an integer from 1 to 99999 or the default keyword for the default value.

Enabled-value — set permission (enables) for a particular property or function, service words are used: `on` or `off` (enable or disable).

Alarm-Bottom-Limit-Milliamps-value — the lower current limit at which the alarm is triggered, an integer from 1 to 99999 or the default service word for the default value.

Restart-Bottom-Limit-Milliamps-value — the lower current limit at which a restart is triggered, an integer from 1 to 99999, or the default word for the default value.

Timeout-Alarm-Seconds-value — control interval (delay) in seconds before the notification, an integer from 1 to 99999, or the service word default for the default value.

Timeout-Restart-Seconds-value — control interval (delay) in seconds before notification, an integer from 1 to 99999, or the default service word for the default value.

Alarm-Bottom-Limit-Hashrate-Value — The lower hashrate limit at which an alert is triggered, an integer from 1 to 99999, or the default keyword for the default value.

Restart-Bottom-Limit-Hashrate-Value — The lower hashrate limit at which a restart is triggered, an integer from 1 to 99999, or the default keyword for the default value.

API-IP-Address-Value — IP address of the mining device that needs to be checked.

API-TCP-Port-Value — TCP port of the mining device for the API connection, which needs to be checked, an integer up to 65535 or the default keyword for the default value.

API-Unavailability-Timeout-Seconds-Hasrate-value — control interval (delay) in seconds before the notification, an integer from 1 to 99999, or the default service word for the default value.

IP-Address-Value — the IP address of the device to be checked for availability.

Connect-Timeout-Value — allowable timeout of the device before sending a response over the network, the availability of which must be checked as an integer from 1 to 99999.

Upper-Limit-Milliseconds-Value — maximum ICMP packet transit time (Max. Latency limit, ms), an integer from 1 to 99999.

Alarm-Packet-Loss-Percentage-Value — the maximum allowed number of lost packets in% for notification.

Restart-Packet-Loss-Percentage-Value — the maximum allowable number of lost packets in% for reboot.

Alarm-Seconds-Value — alarm delay time in seconds, an integer from 1 to 99999.

Restart-Seconds-Value — restart grace period in seconds, an integer from 1 to 99999.

TCP-Port-Value — TCP port of a network device for checking the availability of a TCP service, which must be checked, an integer up to 65535.

5.2.10.2 Adding Automation Test Settings

Command:

```
POST /api/automation/name/Automation-Name-value/device-type-name/Device-Type-Name-value/
outputs/Outlets-Numbers-value/description/Description-Text-value/check-interval-seconds/
Check-Interval-Seconds-value/inter-restart-interval-seconds/Restart-Interval-Seconds-value
```

Example:

```
curl -X POST http://192.168.1.24:8888/api/automation/name/Automation1/device-type-name/
Bitmain_D3/outputs/1/description/desc/check-interval-seconds/2/inter-restart-interval-
seconds/300
```

5.2.10.3 Adding Automation Test Settings with Default Values

Command:

```
POST /api/automation/name/Automation-Name-value/device-type-name/Device-Type-Name-value/
outputs/Outlets-Numbers-value
```

Example:

```
curl -X POST http://192.168.1.24:8888/api/automation/name/Automation1/device-type-name/
Bitmain_D3/outputs/2
```

5.2.10.4 Changing the Settings of Automation Test Settings to Default Values

Command:

```
PUT /api/automation/name/Automation-Name-value/default
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/default
```

5.2.10.5 Changing the Name of Automation Test Settings

Command:

```
PUT /api/automation/name/Automation-Name-value/name/a
```

Example:

```
curl -X PUT https://192.168.1.24:8888/api/automation/name/Automation1/name/a
```

5.2.10.6 Changing the Description of Automation Test Settings

Command:

```
PUT /api/automation/name/Automation-Name-value/description/Description-Text-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/description/desc
```

5.2.10.7 Changing the Device Type

Command:

```
PUT /api/automation/name/Automation-Name-value/device-type-name/Device-Type-Name-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/device-type-name/Bitmain_D3
```

5.2.10.8 Modifying Outlets

Command:

```
PUT /api/automation/name/Automation-Name-value/outputs/Outlets-Numbers-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/outputs/3,4
```

5.2.10.9 Changing Check Interval Seconds (Value or Default)

Command:

```
PUT /api/automation/name/Automation-Name-value/check-interval-seconds/Check-Interval-Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/check-interval-seconds/12
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/check-interval-seconds/default
```

5.2.10.10 Changing Inter Restart Interval Seconds (Value or Default)

Command:

```
PUT /api/automation/name/Automation-Name-value/inter-restart-interval-seconds/Restart-Interval-Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/inter-restart-interval-seconds/120
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/inter-restart-interval-seconds/default
```

5.2.10.11 Deleting Automation Test Settings by Name

Command:

```
DELETE /api/automation/name/Automation-Name-value
```

Example:

```
curl -X DELETE http://192.168.1.24:8888/api/automation/name/AntMiner-1
```

5.2.10.12 Setting a Consumption test in One Command

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/enabled/Enabled-value/alarm-bottom-limit-milliamps/Alarm-Bottom-Limit-Milliamps-value/restart-bottom-limit-milliamps/Restart-Bottom-Limit-Milliamps-value/alarm-seconds/Timeout-Alarm-Seconds-value/restart-seconds/Timeout-Restart-Seconds-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/enabled/on/alarm-bottom-limit-milliamps/default/restart-bottom-limit-milliamps/default/alarm-seconds/30/restart-seconds/60
```

5.2.10.13 Setting the Consumption Test with Default Parameters

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/defaults/enabled/Enabled-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/defaults/enabled/on
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/defaults/enabled/off
```

5.2.10.14 Enabling / Disabling the Consumption Test

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/enabled/Enabled-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/enabled/on
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/enabled/off
```

5.2.10.15 Setting Alarm Bottom Limit Milliamps for a Consumption Test

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/alarm-bottom-limit-milliamps/Alarm-Bottom-Limit-Milliamps-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/alarm-bottom-limit-milliamps/120
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/alarm-bottom-limit-milliamps/default
```

5.2.10.16 Configuring Restart Bottom Limit Milliamps for a Consumption Test

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/restart-bottom-limit-milliamps/Restart-Bottom-Limit-Milliamps-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/restart-bottom-limit-milliamps/120
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/restart-bottom-limit-milliamps/default
```

5.2.10.17 Configuring Alarm Seconds for a Consumption Test

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/alarm-seconds/Timeout-Alarm-Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/alarm-seconds/120
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/alarm-seconds/default
```

5.2.10.18 Configuring Restart Seconds for a Consumption Test

Command:

```
PUT /api/automation/name/Automation-Name-value/consumption/restart-seconds/Timeout-Restart-Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/restart-seconds/120
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/consumption/restart-seconds/default
```

5.2.10.19 Configuring a Hash-Rate Test in One Command**Command:**

```
PUT /api/automation/name/Automation-Name-value/hash-rate/enabled/Enabled-value/alarm-bottom-limit/Alarm-Bottom-Limit-Hashrate-Value/restart-bottom-limit/Restart-Bottom-Limit-Hashrate-Value/alarm-seconds/Timeout-Alarm-Seconds-value/restart-seconds/Timeout-Restart-Seconds-value/api-ip-address/API-IP-Address-Value/api-port/API-TCP-Port-Value/api-unavailability-timeout-seconds/API-Unavailability-Timeout-Seconds-Hashrate-value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/enabled/on/alarm-bottom-limit/default/restart-bottom-limit/default/alarm-seconds/20/restart-seconds/40/api-ip-address/192.168.0.1/api-port/default/api-unavailability-timeout-seconds/default
```

5.2.10.20 Setting Hash Rate with Default Parameters**Command:**

```
PUT /api/automation/name/Automation-Name-value/hash-rate/defaults/enabled/Enabled-value/api-ip-address/API-IP-Address-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/defaults/enabled/on/api-ip-address/192.168.0.2
```

5.2.10.21 Enabling / Disabling a Hash-Rate Test**Command:**

```
PUT /api/automation/name/Automation-Name-value/hash-rate/enabled/Enabled-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/enabled/on
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/enabled/off
```

5.2.10.22 Configuring the Alarm Bottom Limit for a Hash-Rate Test**Command:**

```
PUT /api/automation/name/Automation-Name-value/hash-rate/alarm-bottom-limit/Alarm-Bottom-Limit-Hashrate-Value
```


Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/alarm-bottom-limit/100
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/alarm-bottom-limit/default
```

5.2.10.23 Configuring the Restart Bottom Limit for a Hash-Rate Test**Command:**

```
PUT /api/automation/name/Automation-Name-value/hash-rate/restart-bottom-limit/Restart-Bottom-Limit-Hashrate-Value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/restart-bottom-limit/100
```

```
curl -X PUT https://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/restart-bottom-limit/default
```

5.2.10.24 Configuring Alarm Seconds for a Hash-Rate Test**Command:**

```
PUT /api/automation/name/Automation-Name-value/hash-rate/alarm-seconds/Timeout-Alarm-Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/alarm-seconds/100
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/alarm-seconds/default
```

5.2.10.25 Configuring Restart Seconds for a Hash-Rate Test**Command:**

```
PUT /api/automation/name/Automation-Name-value/hash-rate/restart-seconds/Timeout-Restart-Seconds-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/restart-seconds/100
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/restart-seconds/default
```

5.2.10.26 Configuring API IP Address for a Hash-Rate Test**Command:**

```
PUT /api/automation/name/Automation-Name-value/hash-rate/api-ip-address/API-IP-Address-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/api-ip-address/192.168.1.1
```

5.2.10.27 Configuring API Port for a Hash-Rate Test

Command:

```
PUT /api/automation/name/Automation-Name-value/hash-rate/api-port/API-TCP-Port-Value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/api-port/123
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/api-port/default
```

5.2.10.28 Configuring the API Unavailability Timeout Seconds Parameter for a Hash-Rate Test

Command:

```
PUT https://192.168.1.24:8888/api/automation/name/Automation-Name-value/hash-rate/api-unavailability-timeout-seconds/API-Unavailability-Timeout-Seconds-Hasrate-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/api-unavailability-timeout-seconds/100
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/hash-rate/api-unavailability-timeout-seconds/default
```

5.2.10.29 Single Command for a Ping Test Setup

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/enabled/Enabled-value/ip-address/IP-Address-Value/connect-timeout-seconds/Connect-Timeout-Value/upper-limit-milliseconds/Upper-Limit-Milliseconds-Value/alarm-packet-loss-percentage/Alarm-Packet-Loss-Percentage-Value/restart-packet-loss-percentage/Restart-Packet-Loss-Percentage-Value/alarm-seconds/Alarm-Seconds-Value/restart-seconds/Restart-Seconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/enabled/on/ip-address/192.168.0.1/connect-timeout-seconds/30/upper-limit-milliseconds/20/alarm-packet-loss-percentage/30/restart-packet-loss-percentage/70/alarm-seconds/30/restart-seconds/60
```

5.2.10.30 Enabling / Disabling Ping Test

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/enabled/Enabled-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/enabled/on
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/enabled/off
```

5.2.10.31 Configuring IP Address for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/ip-address/IP-Address-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/ip-address/192.168.1.1
```

5.2.10.32 Configuring Connect Timeout Seconds for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/connect-timeout-seconds/Connect-Timeout-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/connect-timeout-seconds/25
```

5.2.10.33 Setting Upper Limit Milliseconds for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/upper-limit-milliseconds/Upper-Limit-Milliseconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/upper-limit-milliseconds/22
```

5.2.10.34 Configuring Alarm Packet Loss Percentage for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/alarm-packet-loss-percentage/Alarm-Packet-Loss-Percentage-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/alarm-packet-loss-percentage/33
```

5.2.10.35 Configuring Restart Packet Loss Percentage for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/restart-packet-loss-percentage/  
Restart-Packet-Loss-Percentage-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/restart-packet-  
loss-percentage/77
```

5.2.10.36 Configuring Alarm Seconds for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/alarm-seconds/Alarm-Seconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/alarm-seconds/32
```

5.2.10.37 Configuring Restart Seconds for a Ping

Command:

```
PUT /api/automation/name/Automation-Name-value/ping/restart-seconds/Restart-Seconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/ping/restart-  
seconds/62
```

5.2.10.38 Configuring TCP Port Availability Test in One Command

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/enabled/Enabled-  
value/ip-address/IP-Address-Value/port/TCP-Port-Value/connect-timeout-seconds/Connect-  
Timeout-Value/alarm-seconds/Alarm-Seconds-Value/restart-seconds/Restart-Seconds-Value
```

Example:

```
curl -X PUT https://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-  
availability/enabled/on/ip-address/192.168.0.1/port/3333/connect-timeout-seconds/20/alarm-  
seconds/30/restart-seconds/60
```

5.2.10.39 Enabling / Disabling the TCP Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/enabled/Enabled-value
```

Examples:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-  
availability/enabled/on
```

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-  
availability/enabled/off
```

5.2.10.40 Configuring IP Address for a TCP Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/ip-address/IP-Address-Value
```

Example:

```
curl -X PUT https://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-availability/ip-address/192.168.11.11
```

5.2.10.41 Configuring TCP Port for a TCP Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/port/TCP-Port-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-availability/port/2222
```

5.2.10.42 Configuring Connect Timeout Seconds for a TCP Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/connect-timeout-seconds/Connect-Timeout-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-availability/connect-timeout-seconds/22
```

5.2.10.43 Configuring Alarm Seconds for a TCP Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/alarm-seconds/Alarm-Seconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-availability/alarm-seconds/33
```

5.2.10.44 Configuring Restart Seconds for a TCP Port Availability Test

Command:

```
PUT /api/automation/name/Automation-Name-value/tcp-port-availability/restart-seconds/Restart-Seconds-Value
```

Example:

```
curl -X PUT http://192.168.1.24:8888/api/automation/name/Automation1/tcp-port-availability/restart-seconds/63
```

5.3. JSON Return in Case of Unrecognized Command

```
{"resultOfLastCommand":"FAILED","reason":"UNKNOWN_COMMAND"}
```

5.4 Translation of Fields in JSON Returns

```
# Serial Name of the device
'sNa' => 'serialName',

# Serial Number of the device
'sNu' => 'serialNumber',

# Release Date Firmware
'fwRD' => 'firmwareReleaseDate',

# Temperature
'temp' => 'temperature',

# Active input
'aL' => 'activeLine',

# Priority Entry
'pL' => 'priorityLine',

# Indication of earth connection. At a value of 15, there is no ground, the other is present.
'gG' => 'groundGood',

# Input variable voltage detected
'frA' => 'frequencyAvailable',

# The frequency at the input, multiplied by 100. In order to get the actual frequency the value should be divided by 100
'fre' => 'frequency',

# Voltage
'vol' => 'voltage',

# Accumulated kilowatt hour value on input or output from the beginning of device life
'aKWh' => 'accumulatedKWh',

# Accumulated value of kilovolt-ampere-hours on input or output from the beginning of life of the device. Negative values mean that the kilovolt-amperes were considered in the 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 capaci-
tive nature of the reactive load at the time of reading. Positive values mean the induc-
tive nature of the reactive load at the time of reading.
'iVar' => 'instantVars',

# Number of short-circuit protection trips
'cbFF' => 'circuitBreakerFiringFacts',

# Over current limit in milliamperes for output without disabling input
'coALM' => 'channelOvercurrentAlarmLimitMilliamps',

# Pause to confirm current overflow before erecting the flag
'coALS' => 'channelOvercurrentAlarmLimitSeconds',

# The number of excess current exceeding the set limit without waiting for an acknowledg-
ment pause
'coALR' => 'channelOvercurrentAlarmLimitReached',

# The number of excess current exceeding the established limit with the expectation of a
confirming pause
'coAF' => 'channelOvercurrentAlarmFired',

# Over current limit in milliamperes for output with disconnection of input
'coTLM' => 'channelOvercurrentTurnOffLimitMilliamps',

# Pause to confirm current overflow before erecting the flag
'coTLS' => 'channelOvercurrentTurnOffLimitSeconds',

# The number of excess current exceeding the set limit without waiting for an acknowledg-
ment pause
'coTLR' => 'channelOvercurrentTurnOffLimitReached',

# The number of facts that the output is disconnected from exceeding the current limit in
excess of the set limit while waiting for a confirming pause
'coTF' => 'channelOvercurrentTurnOffFired',

# Device model
```

```
'hwV' => 'hardwareVersion',

# Firmware version
'fwV' => 'firmwareVersion',

# Real time clock value at the time of device startup
'rtcB' => 'rtcBoot',

# Flag of necessity to return to priority input after its restoration
'FF' => 'forceFailback',

# Pause before returning to priority input after recovery
'fFDS' => 'forceFailbackDelaySeconds',

# Activity of visual indication (flashing) of input or output
'rS' => 'recognitionState',

# Flag for disabling output based on detection of current overload
'loTFS' => 'lineOvercurrentTurnOffFiredState',

# The administrative status of the power-on output
'cAS' => 'channelAdministrativeStatus',

# Pause before powering on the device
'cTOD' => 'channelTurnOnDelayOnStartup',

# The priority of output survival when input is overloaded. Outlets with large values will
be turned off before the outlets with lower values.
'cTOFIOP' => 'channelTurnOffOnInputOverloadPriority',

# Minimum allowable input voltage
'lMiV' => 'lineMinimumVoltage',

# Maximum allowable input voltage
'lMaV' => 'lineMaximumVoltage',

# Minimum input frequency
'lMiF' => 'lineMinimumFrequency',

# Maximum allowable input frequency
'lMaF' => 'lineMaximumFrequency'
```


6. Command Reference of RPCM CLI

A brief description of the section:

6.1. General Description of the Command System

6.2. Command: help

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. Command: set output —it serves to control the outlet by setting various parameters.

6.10. Command: 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 *keys* (one or more).

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

WARNING! The CLI command line interface uses the function of autocompletion of parameters, including during deletion. Because it is strongly recommended to avoid similar names, for example, user accounts, names of devices for automation, e-mail addresses and so on.

To avoid erroneous operation of commands due to auto-completion parameters:

- do not use similar names of devices, users, and so on;
- do not work with RPCM in poor communication conditions;
- it is also recommended to always monitor the state of the system using the *show all* command sets;
- carefully read the obsessed commands before pressing the "Enter" key.

Limit conventions:

- Voltage — min. value 10V, max. value 58V;
- Time indicators — min. value 0 seconds, max. value 65535 seconds.

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

6.2. Command *help*

6.2.1. Getting List of Commands

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

Example:

`help`

The return is:

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 for 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 0 ?
```

The return is:

RPCM Commands description:

```

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

```

For example, get help *set output 0-9 overcurrent*

```
set output 0 overcurrent ?
```

The return is:

RPCM Commands description:

```

set output 0-9 overcurrent alarm - tune overcurrent alarm limits
set output 0-9 overcurrent turn off - tune overcurrent turn off limits
set output 0-9 overcurrent help - show this help

```

6.2.3. Auto-completion as a simplified help

To simplify the input of commands and parameters in the command line, you can use auto-completion by pressing the **Tab** key twice. At the set time this function can serve as a short help as it speeds up instruction set.

For example, following the command set output upon twice pressing **Tab**, the system will remind you to specify the output number

```
0 1 2 3 4 5 6 7 8 9
```

Following the command `set output 0` (already with the indication of the number) upon double pressing **Tab** a hint about the available functions will appear:

```
? description help mode name off on overcurrent recognition
```

6.3. Exit commands for *exit* and *quit*

These are two analogous commands that serve to properly conclude an SSH session. Entering the command:

```
exit
```

```
or
```

```
quit
```

The running processes in this session cease, and the session is closed. To resume operation, you must re-establish the SSH connection.

6.4. Commands: *add* and *delete*

These commands are used to create or delete entities in the RPCM management system, such as user accounts, automation settings, and so on.

ATTENTION! Since the CLI command line interface uses the auto-completion function for parameters, including when deleting, it is recommended to refrain from using similar names, for example, user accounts, device names for automation, e-mail addresses, and so on.

Help displays:

```
add ?
```

The return is:

RPCM Commands description:

```
add automation
  device-name  - add automation device
add cloud     - add cloud registration certificate
add mail      - add email 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 Commands: add command

```
delete ?
```

A response of the system:

RPCM Commands description:

```
delete automation
  device-name  - delete automation device
delete mail
  recipient    - delete email notification recipients
delete ntp
  server       - delete ntp server from configuration
delete smtp
  server       - delete smtp server from configuration
delete snmp   - delete snmp configuration item
  community    delete snmp community
  user         delete snmp user
delete user   - delete local user from RPCM
delete help   - show this help
```

6.4.1 Commands: *add automation* and *delete automation*

Serves to set or remove a device for automatic monitoring and control (reboot).

Note. For more detailed information, it is recommended to refer to the sections: "4.11 Automation tools" and "5.6. Monitoring and monitoring of specialized devices for mining using RPCM".

Commands: `add automation` with the `device` 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 outlets)

Display help:

```
add automation ?
```

The return is:

```
RPCM Commands description:
  add automation device-name NAME device-type DEVICE-TYPE outputs OUTPUTS
                                     - adds automation for device
Required parameters:
  device-name                       - name of the new automation device,
                                     1 to 25 characters
  device-type                       - type name of the miner device,
                                     1 to 25 characters
  outputs                           - numbers of RPCM outputs
                                     ("[0-9]" or "[0-9], [0-9], ...")
Optional parameters:
  --description                     - description of the new automation device,
                                     1 to 254 characters
  --default                         - set default values for parameters
                                     check-interval-seconds
                                     and inter-restart-interval-seconds
  --check-interval-seconds          - check interval of automation tests in
                                     seconds
  --inter-restart-interval-seconds - interval between restarts of automation
                                     device in seconds
```

```

Example:
  add automation device-name Name device-type Bitmain_D3 outputs "1, 2, 4" --d
escription TestDevice --default
  add automation device-name Name device-type Bitmain_D3 outputs "1" --descrip
tion TestDevice --default
  add automation device-name Name device-type Bitmain_D3 outputs "1" --descrip
tion TestDevice --check-interval-seconds 10 --inter-restart-interval-seconds 100
Type 'help' to get suggestions

```

The command `delete automation device` is used to disconnect the device from the automation and control system RPCM.

After applying the command, the device will not be loaded when critical parameters are accessed.

Required parameters:

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

Display help:

```
delete automation ?
```

The return is:

```

delete automation device-name - device name to delete configured automation
for
Type 'help' to get suggestions

```

6.4.2 Deleting with autocompletion

Autocompletion of a parameter, for example, the device name for monitoring or the name of the account in some cases helps to speed up the work, but sometimes it can lead to undesirable consequences. For example, when executing a delete command.

IMPORTANT! Removal is done without confirmation.

If the specified value matches the already existing parameter, pressing the "Tab" key is not required. Auto-completion will work immediately when you press the Enter key.

You need to carefully consider the removal procedure and carefully check which objects are to be deleted.

Remove the automation device "*DEVICE-12*" by using autocompletion.

List the available devices with the command `show all automations`.

The return is:

```

ID Name Device Type Outputs
-----
2 DEVICE-2 Bitmain_D3 2
6 DEVICE-12 Bitmain_D3 2
Type 'help' to get suggestions

```


Since we have two devices with similar names: "*DEVICE-2*" and "*DEVICE-12*". When deleting the desired element with autocompletion, you must enter a unique combination of symbols, the determinant. In this case, it will be "*DEVICE-1*".

To delete, just enter the command `delete automation device-name DEVICE-1`

The return is:

```
Automation Device ID: 6, Name: 'DEVICE-12' has been deleted
```

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

```
AntiGeroy [10.210.1.24] 2 rpcmadmin>
```

```
Output all devices with show all automations
```

The return is:

```
show all automations
ID Name Device Type Outputs
-----
2 DEVICE-2 Bitmain_D3 2
14 DEVICE-1 Bitmain_D3 0
15 DEVICE-10 Bitmain_D3 9
```

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

Remove the device "*DEVICE-1*"

```
delete automation device-name DEVICE-1
```

The return is:

```
Automation Device ID: 14, Name: 'DEVICE-1' has been deleted
```

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

If we enter the same command again:

```
delete automation device-name DEVICE-1
```

Device "*DEVICE-10*" will be deleted, without asking for confirmation:

```
Automation Device ID: 15, Name: 'DEVICE-10' has been deleted
```

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

Such a scenario occurs, for example, when there is a bad connection, when the response of the interface is "delayed" by the commands entered. Also such situations occur when incorrect input of a non-existent parameter.

Returning to the previous version, when we have two devices "*DEVICE-2*" and "*DEVICE-12*".

If you need to delete "*DEVICE-2*", but by mistake entered "*DEVICE-1*" (the "1" key was pressed instead of the "2" key), then the `delete automation device-name DEVICE-1` command did not will give an error message, and delete "*DEVICE-12*".

6.4.3 Command *add cloud*

This command submit offline registration data form RCNTEC.

Help ask:

```
add cloud ?
```

The return is:

```
add cloud certificate - command to submit offline registration data
                      from RCNTEC
```

Type 'help' to get suggestions

6.4.4 Commands: *add mail* and *delete mail*

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

Used parameters:

recipient — main recipient;

--cc — address for sending a carbon copy;

--bcc — address for sending a blind carbon copy.

The return is:

```
add mail ?
```

The return is:

Please add email recipients, example:

```
add mail recipient info@example.com --cc "duty@example.com, ivan@example.com" --bcc "se-
curity@example.com"
```

Example of use:

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

The return is:

```
Email recipient added
```

The *delete* command with the *mail* is used to delete the details of the specified recipient.

Help displays:

```
delete mail recipient ?
```

The return is:

RPCM Commands:

```
delete mail recipient <email@example.com> - delete email notification recipient
```

Example of use:

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

The return regarding deletion of recipient:

```
Recipient user@yandex.ru deleted
```

6.4.5 Commands: *add ntp server* and *delete ntp server*

Commands: `add ntp server` is used to specify the NTP server (time service).

The command `delete ntp server` is used to remove the NTP server (time service) from the RPCM settings.

The argument specifies the IP address or server name.

The help for the commands `add ntp server ?` Or `delete ntp server ?` Is the same:

```
Please specify valid IP address or hostname
```

Example. Creating an NTP server with IP 192.168.1.251

```
add ntp server 192.168.1.251
```

The return is:

```
Server 192.168.1.251 has been added
```

To remove the NTP server from IP 192.168.1.251:

```
delete ntp server 192.168.1.251
```

```
Server has been deleted
```

6.4.6 Commands: *add smtp server* and *delete smtp server*

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

Commands: `add smtp server` is used to add a set of parameters required for sending e-mail messages.

The command `delete smtp server` is used to delete a set of parameters for the specified smtp server.

These options are available for `add smtp server`:

Required

Server — server address: IP or hostname (short name or FQDN) from 5 to 128 characters long;

Port — TCP port number from 1 to 65535.

Additional:

Helo — indicator of the sender's domain in FQDN format up to 128 characters;

Username — username used for server authentication and used as the "From:" field, up to 32 characters;

Password — password of the user account used for server authentication, up to 32 characters;

AuthType — authentication method by the server. Standard values for the SMTP protocol are used: PLAIN, LOGIN, CRAM_MD5;

SSL — encryption parameter; the default values are: enable, disable, enable-dontverify-cert.

The return is:

```
add smtp server ?
```

The return is:

```
Required parameters:
Server   - address must be an ip address or hostname, 5 to 128 characters
Port     - TCP port number from 1 to 65535

Optional parameters:
Helo     - domain is optional, however if provided it must be FQDN of
          your domain, up to 128 characters
Username - username used for authentication with server, up to 255 characters
Password - password for server authentication, up to 255 characters
AuthType - authentication type used for server: PLAIN, LOGIN, CRAM_MD5
SSL      - encryption parameter: enable, disable, enable-dontverify-cert, tls
From     - from field in the notification message, up to 255 characters

Example:
add smtp server smtp.gmail.com port 587 --helo gmail.com --username user@gmail.com --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
add smtp server smtp.example.com port 25 --username user --password password --authType plain --helo example.com --ssl enable --from info@example.com

Type 'help' to get suggestions
```

Please note that at the very bottom of the help output is an expanded example for the Yandex-Mail email:

```
add smtp server smtp.yandex.ru port 25 --username user@yandex.ru --password MyPassword --authType plain --helo yandex.ru --ssl enable --from user@yandex.ru
```

If the command is entered correctly, the system will return:

```
SMTP server added or existing one updated
```

The command `delete smtp server` deletes the connection data to the specified smtp server.

The return is:

```
delete smtp server ?
```

The return is:

```
RPCM Commands:
delete smtp server <server> - delete smtp server from configuration
```

Example of use:

```
delete smtp server smtp.yandex.ru
```

The return is:

```
Server smtp.yandex.ru deleted
```

6.4.7 Commands: *add* and *delete* with *snmp*

Additional information.

The first version of the protocol *SNMPv1* is organized most simply and least safely. The basis of *SNMPv1* security is the Community-based Security Model, i.e. authentication based on a single text string—a kind of group name and a two-in-one password (there is even the term "*community-string*"). In fact, the name *community* and this is a kind of password. This "key" is broadcast in the body of the message in clear text. *Community* are of two types: *read-only* (read only values of variables) and *read-write* (reading and writing values of variables). Despite the low level of security, *SNMPv1* due to the ease of implementation is still in use.

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

The third version of the protocol *SNMPv3* already supports *User-based Security Model* and *traffic encryption*.

By default, the Resilient Power Control Module contains *community* — "*public*" with read-write access.

Note. The SNMP community name is case sensitive.

The help for available options for `add snmp` and `delete snmp` is shown below.

```
add snmp ?
```

Help displays:

```
RPCM Commands description:
```

```
add snmp community - add specific SNMPv2 command
add snmp trap      - add SNMP Trap command
add snmp user      - add specific SNMPv3 user
add snmp help      - show this help
```

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

```
community - add specific SNMPv2 command
```

And

```
delete snmp ?
```

The return is:

```
RPCM Commands description:
```

```
delete snmp community - delete specific SNMPv2 command
delete snmp trap      - delete specific SNMP Trap command
delete snmp user      - delete specific SNMPv3 user
delete snmp help      - show this help
```

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

```
community - delete specific SNMPv2 command
```

6.4.7.1. Commands: *add* and *delete* with *snmp community*

Commands: `add snmp` and `delete snmp` is used to create a community of * SNMP v1 and v2c * protocols.

When you create one, the required parameters are filled in:

--accessList — allowed subnet or a separate IP address;

--accessType — access type, `ro` or `rw` values are used;

--enabled — newly created community will be enabled or disabled (this property can be changed later), respectively `yes` or `no` values are available.

Note! You can use auto-hint by tabbing twice.

```
add snmp community public
```

```
--accessList --accessType --enabled
Type 'help' to get suggestions
```

Example: creating community *public*

For example, `--accessList` have the value * `10.0.0.0 / 8` ; `--accessType` * has the value `rw` and `--enabled - no`

```
add snmp community public --accessList 10.0.0.0/8 --accessType rw --enabled no
```

The return is:

```
Community public added.
```

The command `delete snmp community` is for deleting a community using the SNMP v1 and v2c protocol.

To delete, just specify the name community.

Example: Deleting the community *public*

```
delete snmp community public
```

The return is:

```
Community public deleted.
```

6.4.7.2 The commands: *add* and *delete* with *snmp user*

Additional information. SNMPv3 can have the security level:

authPriv — authentication and encryption, the maximum level of security (access with password authentication Auth Password — method HMAC-MD5-96, and with AES-128 encryption by Priv Password key.)

Commands: `add` and `delete` with the `snmp user` to create a user account using the *SNMPv3 protocol*

When you create the required parameters are filled in:

--accessList — the allowed subnet or a separate IP address;

--accessType — access type, the values of *ro* or *rw* are used;

--authPass — SNMP user account password string;

--authProt — used authentication protocol by password;

--enabled — the newly created account will be enabled or disabled (this property can be changed later), respectively *yes* or *no*;

--privPass — keyword (password) for encryption;

--privProt — type of encryption;

--secLevel — type of authentication.

Attention! There is no standard help output for this command. You can use auto-hint with double-tabbing.

```
add snmp user newrpcmuser
```

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

```
No user options specified for user: newrpcmuser
Example: add snmp user newrpcmuser --accessList 10.0.0.0/24 --accessType ro --authPass
deadbeef --privPass deadbeef --authProt sha1 --privProt aes --secLevel authPriv --enabled
yes
Type 'help' to get suggestions
```

Example: Creating the SNMPv3 account *newrpcmuser*

For example *--accessList* have the value *10.0.0.0/8*;

--accessType — *rw*;

--enabled — *no*;

--authPass — *AuthPa\$\$w0rd*;

--authProt — *sha1*;

--privPass — *Pr1vPa\$\$w0rd*;

--privProt — *aes*;

--secLevel — *authPriv*.

The command to create an SNMPv3 *newrpcmuser* account with the specified parameters:

```
add snmp user newrpcmuser --accessList 10.0.0.0/8 --accessType rw --authPass AuthPa$$w0rd
--authProt sha1 --enabled no --privPass Pr1vPa$$w0rd --privProt aes --secLevel authPriv
```

The return is:

```
User newrpcmuser added.
```

The `delete snmp user` command is for deleting a user account in the *SNMPv3* framework.

To delete, just specify the name of the *SNMPv3* user account.

Example: Deleting the *SNMPv3* account *newrpcmuser*

```
delete snmp user newrpcmuser
```

The return is:

```
User newrpcmuser deleted.
```

6.4.7.3 Commands: *add snmp trap* and *delete snmp trap*

Additional information:

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

The commands: `add snmp user` and `delete snmp user` are for creating and deleting target settings for sending messages within the *SNMP Trap* service

Commands: `add snmp trap` and `delete snmp trap` creates *SNMP trap* settings.

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
```

6.4.8 Commands: *add* and *delete* of user and group

6.4.8.1 Create and delete user

Command: add user.

Help ask: add user ?:

The return is:

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

Command: delete user.

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 delete the user:

```
delete user testuser
```

The return is:

```
User 'testuser' has been deleted.
```

6.4.8.2 Create and delete a group

To create a group, use Commands: add group.

Help ask:

```
add group ?
```

The return is:

```
Please provide groupname to add
```

Help ask:

```
delete group ?
```

The return is:

```
Please provide username of one of existing users
```

Example. Create and delete *tescli2*.

To create group:

```
add group testcli2
```

The return is:

```
Group testcli2 added with default permissions, please dont forget to adjust them
```

To delete group:

```
delete group testcli2
```

The return is:

```
Group testcli2 is deleted.
```

6.4.9 Add and delete with radius server

Commands: *add* and *delete* with the radius server are used to create and delete a RADIUS authentication/authorization server entry.

When creating, the required parameters are filled in:

IP or FQDN of the RADIUS server;

secret <access key>, may include letters, numbers and punctuation marks from 8 to 128 characters;

Extra options:

--port — <0-65534> — a port for work with the RADIUS server;

--priority — value <0-65534> — if several RADIUS servers are specified, priority is set for use;

--use-vs-a-group — “yes” or “no” to use group attributes;

--use-vs-a-session-timeout — “yes” or “no” to use session attributes;

--enabled — “yes” or “no” — the newly created RADIUS entry will be allowed or denied use.

Help request:

```
add radius server 192.169.1.1 ?
```

The return is:

RPCM Commands description:

```

add radius server <ip> secret <secret> - add radius-server
                                         shared secret can contain
                                         alphanumeric, punctuation,
                                         minimum 8 maximum 128 characters
--port <0-65534> - radius server's UDP port
                                         (1812 by default)
--enabled <yes|no> - is server enabled
                                         (no by default)
--use-vsa-group <yes|no> - use incoming group attribute
--use-vsa-session-timeout <yes|no> - use incoming session
                                         timeout attribute
--priority <1-100> - server usage priority
                                         higher is more priority

```

```

Example: add radius server 1.2.3.4 secret mySharedSecret --enabled yes
         add radius server 1.2.3.4 secret mySuperSecretShared --port 1812--

```

Example: It is creating a server with IP 192.168.1.1 with the keyword *secret mySharedSecret* with priority 1, port 1812, initially allowed for use, --accessList be 10.0.0.0/8; --accessType is rw and --enabled — no.

```
add radius server 1.2.3.4 secret mySuperSecretShared --port 1812 --enabled yes
```

The return is:

```
Radius server was 192.168.1.1 added
```

To remove it, you need to specify the name or IP RADIUS server.

Example: removing the RADIUS server 192.168.1.1.

```
delete radius server 192.169.1.1
```

The return is:

```
Server 192.168.1.1 was deleted
```

6.5. Command *restart* 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 output*

This allows you to restart the device (provided that the connected device allows it and the correct settings are configured on it).

Additional options are available for the restart command:

--after — delay before restart;

--off-delay— delay for turn on power supply.

Help displays:

```
restart ?
```

The return is:

RPCM Commands description:

```
restart output 0-9 - restart output
  --after [0-9] + [mshd]? option to delay restart
  --off-delay [0-9] + [mshd]? option to set off delay
restart help - show this help
```

An example of applying the command `restart output` to the output `0`

```
restart output 0
```

Restarting output 0 after 0 seconds with off delay 3 seconds

```
[o ... 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 high-level-controller*

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

6.6.1 General Information about the show command

Below is a brief list of the keys of Command show with comments:

- **action confirmation** — show confirmation of critical actions for the web-interface;
- **active users** — list of users connected to the management system;
- **all** — data on items on the majority of system objects;
- **api**— displays information about REST API state and authentication setup;
- **automation device** — displays information about device, if it is connected to the RPCM automation system for monitoring and control purposes (reboot);
- **cloud** — displays parameters for interaction with the centralized ("cloud") RPCM control system — RPCM.CLOUD;
- **button-control** — displays show button control mode;
- **configuration** — displays configuration restoration statuses;
- **show display** — displays RPCM display settings;
- **everything** — displays information about the state of the system;
- **group** — displays information about specific groups and permissions;
- **input 1-2** — data about the status of inputs 1 - 2;
- **show logs** — show RPCM logs
- **mail recipients** — show configured mail recipients for alerts;
- **nearby-devices** — show another RPCM in this network, which are accessible and can be detected via *Bonjour* protocol
- **network** — displays network settings and details;
- **ntp** — displays ntp settings;
- **output 0-9** — data on the status of the outputs 0 - 9;
- **radius servers** — an information radius server;
- **temperature** — value of internal temperature RPCM;
- **time** — It displays the value of the system time or a list of time zones;
- **update** — show RPCM software update information;

- **user** — shows the detailed information about the user, including the list of entered commands;
- **version** — firmware version and system time;
- **help** — Help displays. You can also use the question mark ?

6.6.2 Using *show help*

General view (example):

```
show ?
```

System answer:

RPCM Commands description:

```
show action-confirmation - show confirmation of actions for the web interface
show active
  users                 - show users and sessions currently logged in
show all                - show information about all inputs, outputs
                        counters, automations, groups or users
show api                - show REST API state and authentication setup
show automation
  device-name <name>   - show automation configured for device name
show cloud              - show RPCM.CLOUD related information
show configuration     - show configuration restoration statuses
show button-control    - show button control mode
show display           - show RPCM display settings
show everything        - show everything important in one screen
show group <groupname> - show information about specific group
show input 1           - show information on particular input
show logs              - show RPCM logs
show mail
  recipients           - show configured mail recipients
show nearby-devices    - show nearby devices detected via bonjour
show network           - show network settings and details
show ntp               - show ntp settings
show output 0-9        - show information on particular output
show radius server     - show detailed information about
                        specific radius server
show smtp              - show SMTP mail servers configuration and
                        list of notification recipients
show snmp              - show SNMP configuration
show temperature       - show RPCM internal temperature
show time              - show RPCM time configuration
show version           - show RPCM software version and system time
show update            - show RPCM software update information
show user <username>  - show detailed user information
  history              - show commands history of user
show help              - show this help
```

Type 'help' to get suggestions

6.6.3 Command *show action-confirmation*

It show a status of critical operations confirmation: disconnecting and resetting power outlets. In the web interface, this function corresponds to the setting in the menu *Configuration -> Global option -> Get second confirmation from user for Turn Off/Reset requests*:

Example:

```
show action-confirmation
```

The return is:

```
Confirmation of actions for the web interface is enabled
Type 'help' to get suggestions
```

6.6.4 Command *show active users*

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

Example:

```
show active users
```

The return is:

```
-----
[Record ID]: 1
[Username]: rpcmadmin
  [Group]: superuser
[IP Address]: 10.213.68.28
[Interface]: WEB
[Authenticator]: local
  [Expires]: 2020-09-17 19:29:08
  [Idle]: 28466s
[Session ID]: 20200917152908__10_213_68_28__local__eaed174e
-----
```

```
[Record ID]: 2
[Username]: rpcmadmin
  [Group]: superuser
[IP Address]: 10.213.68.28
[Interface]: WEB
[Authenticator]: local
  [Expires]: 2020-09-17 19:29:08
  [Idle]: 28466s
[Session ID]: 20200917152908__10_213_68_28__local__16b8a9da
-----
```

```
[Record ID]: 3
[Username]: rpcmadmin
  [Group]: superuser
[IP Address]: 10.213.97.208
[Interface]: ssh
[Authenticator]: local
  [Expires]: 2020-09-18 03:23:34
  [Idle]: 0s
[Session ID]: 20200917232321__10_213_97_208__local__a5294753
-----
```

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


6.6.5 Command *show api*

It is used for display information about REST API setting.

Information:

- *API Interface enabled / disabled*
- *API Authentication enabled / disabled*
- *Key* — a key value.

Command:

```
show api
```

The return is:

```

      API Interface:                               enabled
API Authentication:                             disabled
-----
      Key: 97d2cd29b113084d85a19318e4ac7ef5      enabled
Type 'help' to get suggestions
```

6.6.6 Command *show automation*

Displays information about device, if it is connected to the RPCM automation system for monitoring and control purposes (reboot).

Note. For more detailed information, it is recommended to refer to the sections: "4.11 Automation tools" .

Required parameters:

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

Display help:

```
show automation ?
```

Answer system

```
show automations device-name - device name to show configured automation for
```

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

Note. The value of the parameter *name* should be clarified using the `show all automation` command. For more details, see " 6.7. Structure *show all- show command all* "

Example. Suppose you need to display information about the device with the name `Antminer_S9`.

Use the command:

```
show automation device name Antminer_S9
```

The return is:

```

                [ID]: 2
            [Device Type]: Bitmain_S9
                [Name]: Antminer_S9
            [Description]:
                [Outputs]: 1
            [Check Interval Seconds]: 6
    [Inter Restart Interval Seconds]: 600
            [Consumption Test Enabled]: OFF
            [Hash Rate Test Enabled]: ON
    [Hash Rate Alarm Bottom Limit]: 13500
    [Hash Rate Restart Bottom Limit]: 13300
            [Hash Rate Alarm Seconds]: 60
    [Hash Rate Restart Seconds]: 300
            [Hash Rate API IP Address]: 192.168.1.93
                [Hash Rate API Port]: 4028
    [Hash Rate API Unavailability Timeout Sec.]: 3
                [Ping Test Enabled]: OFF
    [TCP Port Availability Test Enabled]: OFF

```

Type 'help' to get suggestions

6.6.7 Command *show button-control*

It displays permission for switch to Control mode on the front panel.

Command:

```
show button-control
```

The return is:

```
Button control mode is enabled
```

Type 'help' to get suggestions

6.6.8 Command *show cloud*

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

Example:

```
show cloud
```

The return is:

```
RPCM.CLOUD Information
```

```
-----
Telemetry export to cloud: enabled
    Registration status: registered
    Cloud session status: connected
```

Type 'help' to get suggestions

6.6.9 Command *show configuration*

This command displays a status of restoring from a backup configuration.

Help ask:

```
show configuration ?
```

The return is:

```
show configuration restore status      - show current status of
                                       configuration restoration
show configuration last restore result - show the result of the last
                                       configuration restore
```

Type 'help' to get suggestions

6.6.9.1 Command *show configuration restore status*

This command displays a status of restore RPCM configuration from a backup file or “Idle” if there no restore processes.

Command:

```
show configuration restore status
```

The return is:

```
Idle
```

Examples:

```
- to upload configuration file
  scp RPCM_FirstBatchSeven_20181128_194640.config
rpcmadmin@10.0.0.1:RPCM_FirstBatchSeven_20181128_194640.config
- to download configuration file
  scp rpcmadmin@10.0.0.1:config ./
```

6.6.9.2 Command *show configuration last restore result*

This command displays a result of last restore processes.

```
show configuration last restore result
```

The return is:

```
No data on the last restore result
```

Type 'help' to get suggestions

6.6.10 Command *show display*

It shows the messages set on the hardware display of the device.

Available options:

- *user message* — sets a custom message;
- *default message* — allows you to select data to be shown on the display by default.

Default message content may be following :

- *voltage*,
- *current*,
- *power*,
- *ipAddress*,
- *macAddress*,
- *serialName*,
- *serialNumber*,
- *userMessage*.

Help ask:

show display?

The return is:

```
show display user message - show custom message to be displayed
show display default message - show parameter that will be displayed
```

Type 'help' to get suggestions

Example 1. Show user message.

Command:

show display user message

The return is:

```
[User Message]: 'RPCM-FOR-NETWORK'
[Color]: green
```

Type 'help' to get suggestions

Example 2. Get information, what is default message.

Command:

show display default message ?

The return is:

```
'voltage' is now displayed
```

Type 'help' to get suggestions

6.6.11 Command *show everything*

It displays general information about the system status.

Data on the status of inputs and outlets, grounding, internal temperature of the device, and the load at each outlet are presented. Also, service information about the serial number, serial name, firmware version and software are displayed.

Example:

```
show everything
```

The return is:

```

[Serial Name]: OpornyiPevets           [Temperature]: 36C
[Serial Number]: RU201906040000003M001AM01 [Ground]: GOOD
[Firmware Version]: 0.10.41           [Firmware Release Date]: 20200926103429
[Software Version]: 0.8.66           [Software Release Date]: 20200930095251
[Model/Hardware Version]: 4232/RPCM DC 232A [Uptime]: 01:59:34
-----
[Input 1]:          48.321V    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

```

6.6.12 Command *show group*

It display an information about group permissions settings by the classical UNIX scheme: Read-Write-eXecute.

Parameter: *group name*.

Help ask:

```
show group ?
```

The return is:

```

Please provide group name..
Type 'help' to get suggestions

```

Example. Show permissions for *new_group*.

Command:

```
show group new_group
```

The return is:

```

[Groupname]: new_group
-----
[Grobal configuration]: Read access
    [Inputs]: Read access, Write access
    [Output 0]: Read access, Write access
    [Output 1]: Read access, Write access

```

```

[Output 2]: Read access, Write access
[Output 3]: Read access, Write access
[Output 4]: Read access, Write access
[Output 5]: Read access, Write access
[Output 6]: Read access, Write access
[Output 7]: Read access, Write access
[Output 8]: Read access, Write access
[Output 9]: Read access, Write access
[System Logs]: Read access
[Automation]: Read access, Write access
[Utilities]: Execution access

```

Type 'help' to get suggestions

6.6.13 Command *show input*

It displays information about the status of inputs.

As a parameter it is required to specify the number of input: *1* or *2*

Example:

```
show input 1
```

The return is:

```

(P<->N)                [Input]: 1
                        [Name]: name_num_1
                        [Description]: On_The_Wall
                        [Voltage]: 48.321
[Minimum Allowed Voltage]: 45
[Maximum Allowed Voltage]: 58
[Maximum Allowed Current Amps]: 200
[Instant Milliamps]: 0
[Instant Watts]: 0
[Accumulated KWh]: 0.382778

(P<->N) SWAP INPUT PHASE AND NEUTRAL WIRES TO BE ABLE
        TO CATCH SHORT CIRCUITS TO PROTECTIVE EARTHING

```

6.6.14 Command *show logs*

Displays the system messages — logs.

Get help:

```
show logs ?
```

The return is:

RPCM Commands description:

```

show logs              - show all RPCM logs
  --since <date>       - show logs since date
  --severity <level>  - show logs with severity level
  --include <string>  - show logs that include a string
  --exclude <string>  - show logs that do not include a string

```

```
--reverse      - show logs in reverse order
show logs help - show this help
```

Type 'help' to get suggestions

Parameters:

```
--since <date> — display log entries from the specified date;
--severity <level> — show log entries the selected severity level;
--include <string> — show log entries that include the specified expression (character string);
--exclude <string> — show log entries that do not include the specified expression (character string);
--reverse — show log records in reverse order;
```

If no parameter is specified, all log entries are displayed.

The information is displayed on the page, at the end of each page the following message is displayed: *"Press 'space' for next page or press 'q' to quit ..."*

You can continue the output by pressing the **"Space"** key stop the output by pressing the key **"Q"**.

Example 1. Display all records:

```
show logs
```

The return is:

```
Time Severity Message
-----
2018-09-03 20: 01: 21.648 informational RPCM has started.
2018-09-03 20: 01: 34.644 informational User x@192.168.7.79 authentication failed via ssh
2018-09-03 20: 01: 35.621 informational User x@192.168.7.79 authentication failed via ssh
2018-09-03 20: 01: 35.868 informational User x@192.168.7.79 authentication failed via ssh
2018-09-03 20: 01: 43.935 informational User rpcadmin@192.168.7.79 authenticated successfully via ssh
2018-09-03 20: 02: 47.022 notice User x has been added by rpcadmin@192.168.7.79 via CLI
2018-09-03 20: 02: 49.818 informational User rpcadmin@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 rpcadmin@192.168.66.252 authenticated successfully via WEB
2018-09-03 20: 04: 58.084 informational User x@192.168.66.252 authenticated successfully via ssh
2018-09-03 20: 05: 13.932 notice User x@192.168.7.79 via CLI has been set API Authentication to: ON
2018-09-03 20: 05: 35.559 notice Added Monitored Device ID: 1, name: test by x@192.168.66.252 via CLI
Press 'space' for next page or press 'q' to quit ...
```

Example 2. Display of all records starting from the date 2020-01-01, the level of the message character is "notice".

Command:

```
show logs --since 2020-09-03 --severity informational --include User
```

The return is:

```
Time                Severity           Message
-----
2020-09-03 19:00:15.654 informational User rpcadmin@10.213.66.36 authenticated success-
fully via WEB by local with session id 20200903160015__10_213_66_36__local__c73cf78f
2020-09-04 07:29:53.767 informational User rpcadmin@10.210.1.148 authenticated success-
fully via WEB by local with session id 20200904042952__10_210_1_148__local__a2647950
2020-09-04 07:36:00.556 informational User rpcadmin@10.210.1.148 authenticated success-
fully via ssh by local with session id 20200904043600__10_210_1_148__local__d00a00c1
2020-09-04 08:18:07.619 informational User rpcadmin@10.210.1.148 logged out
2020-09-04 08:35:49.541 informational User rpcadmin@10.213.117.156 authenticated suc-
cessfully via WEB by local with session id 20200904053549__10_213_117_156__local__c7be98a0
2020-09-04 08:38:32.791 informational User rpcadmin@10.213.117.156 authenticated suc-
cessfully via WEB by local with session id 20200904053832__10_213_117_156__local__3c754c44
2020-09-04 08:40:54.364 informational User rpcadmin@10.210.1.148 authenticated success-
fully via WEB by local with session id 20200904054054__10_210_1_148__local__0064b197
2020-09-04 08:56:20.821 informational User rpcadmin@10.210.1.148 authenticated success-
fully via WEB by local with session id 20200904055620__10_210_1_148__local__43f6b6fa
2020-09-04 09:11:05.645 informational User rpcadmin@10.210.1.148 authenticated success-
fully via WEB by local with session id 20200904061105__10_210_1_148__local__385074ce
2020-09-04 10:58:57.751 informational User rpcadmin@10.213.67.16 authenticated success-
fully via WEB by local with session id

Press 'space' for next page or press 'q' to quit...
```

6.6.15 Command *show mail recipients*

It display a list of mail recipients for messages about system events.

Command:

```
show mail recipients
```

The return is:

```
SMTP Mail Recipients:
-----
1.  to: igor@smtp.com
    cc: duty@example.com, ivan@example.com, ivan@example.com
2.  to: evgenii.zemchik@rcntec.com
    cc: duty@example.com, ivan@example.com
3.  to: 12das@inbox.ru
    cc: 12das@inbox.ru
    bcc: 12das@inbox.ru
4.  to: info@example.com
    cc: duty@example.com, ivan@example.com
    bcc: security@example.com

Type 'help' to get suggestions
```


6.6.16 Command *show nearby-devices*

Nearby devices — another RPCMs in this network, they are accessible and can be detected via *Bonjour* protocol.

Use command `show nearby-devices` for collecting information about these devices.

Example:

```
show nearby-devices
```

The return is:

```
Nearby RPCM devices:
      RPCM mDNS Name      IP address      TTL
-----
AvtonomnayaPila-RPCM.local.  192.168.1.20    89
BegunMarafonets-RPCM.local.  192.168.1.47    101
  BelyeUkho-RPCM.local.     192.168.1.115   101
  BelyiFlag-RPCM.local.     192.168.1.166   101
  BelyiShokolad-RPCM.local.  192.168.1.118   101
```

There are *Serial Names*, *IP addresses* and *TTL* in this list.

6.6.17 Command *show network*

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

Example of use:

```
show network
```

The return is:

```
[Bonjour Network Name]: BelyiVolos-RPCM.local
[Hostname]: BelyiVolos-RPCM
  [Current System Time]: 2000-01-06 17:39:59 +0000
    [MAC Address]: B8: F7: 4A: 00: 00: 27
[Network Type]: DHCP
[DHCP Hostname]: BelyiVolos-RPCM
[IP Address]: 192.168.1.148
[Netmask]: 255.255.255.0
[Default Gateway]: 192.168.1.1
[Primary DNS Server]: 192.168.242.36
[Secondary DNS Server]: 192.168.97.45
```

6.6.18 Command *show of ntp*

It is used to display a list of time servers using NTP protocol.

```
show ntp
```

The return is:

```
NTP configuration
-----
[NTP Servers]: 195.168.1.241, 195.168.1.242, 195.168.1.243, 195.168.1.244
```

6.6.19 Command *show output*

It displays outlet status information.

As a parameter it is required to specify the outlet number from 0 to 9

Example:

```
show output 3
```

Information about this outlet (3):

```

[Output]: 3
[Actual State]: ON
[Admin State]: ON
[Name]: Output_3
[Description]:
[Restart Delay]: 3
[Instant Milliamps]: 0
[Instant Watts]: 0
[Instant VAs]:
[Instant Vars]:
[Accumulated KWh]: 0.031667
[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]: 5
[Turn Off on Input Overload Priority]: 99 (higher values shut down first)
[Turn On Delay on Startup Seconds]: 99
Type 'help' to get suggestions

```

6.6.20 Command *show radius server*

It show information about RADIUS servers.

Help ask:

```
show radius server ?
```

The return is:

RPCM Commands description:

```

show radius server <server> - show detailed information about
                             specific radius server

```

Type 'help' to get suggestions

Example. Show an information about RADIUS server with IP 192.168.1.1.

Command:

```
show radius server 192.168.1.1
```

The return is:

```

[Server]: 192.168.1.1
[Priority]: 10
[UDP Port]: 1812
[Secret Key]: ** hidden **
[Disabled]: NO
[Use Group VSA]: NO
[Use Session Timeout VSA]: NO

Detailed information about Vendor Specific Attributes supported by RPCMs
is available in documentation

Type 'help' to get suggestions
```

6.6.21 Command *show smtp*

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

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

Example of use

```
show smtp
```

The return is:

```

SMTP Servers:
-----
  Server: smtp.gmail.com
  Port: 587
  SSL: enable
  Login Type: plain
HELO Domain: gmail.com
  From: user@gmail.com
  Username: user@gmail.com
  Password: *****

SMTP Recipients:
-----
1.  to: igor@example.com
    cc: duty@example.com, ivan@example.com, ivan@example.com

Type 'help' to get suggestions
```

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

The return is:

```

SMTP Servers:
-----
  Server: smtp.yandex.ru
  Port: 25
```

```

    SSL: enable
  Login Type: plain
HELO Domain: yandex.ru
  Username: user@yandex.ru
  Password: MyPassword

```

```
SMTP Recipients:
```

```

-----
1. to: user@yandex.ru
   Type 'help' to get suggestions

```

6.6.22 Command *show snmp*

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

The `--reveal-keys` key 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: readsntp 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: readwritesntp User enabled: YES
  AccessType: ReadWrite Security Level: AuthPriv
Auth Protocol: sha1 Auth Password: *****
Priv Protocol: aes Priv Password: *****
  Access List: 10.0.0.8

```

The help in the command is implemented only by a hint at auto-completion.

6.6.23 Command *show temperature*

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

Example:

```
show temperature
```

Temperature value:

```
Temperature : 32C
```

6.6.24 Command *show time*

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

The available keys are zones, help or ?

Help displays:

```
show time ?
```

The return is:

```
RPCM Commands description:
  show time-show time configuration
  show time zones - show available timezones
  show time help - show this help message
```

6.6.24.1. Getting information about the system time

It is used simply as a `show time` output command with no parameters.

Example:

```
show time
```

The return is:

```
Time configuration
-----
Timezone : Europe / Moscow
Local Time : 2017-11-13 03:31:43 +0300
UTC Time : 2017-11-13 00:31:43 UTC
Time Offset : 10800
NTPServers: No NTP servers configured
```

6.6.24.2. Command *show time zones*

It is used to display a list of time zones.

Format:

```
show time zones
```

```
Timezones:
-----
Antarctica/Casey           Antarctica/South_Pole      Antarctica/Vostok
Antarctica/Rothera        Antarctica/DumontDURville  Antarctica/Syowa
Antarctica/McMurdo        Antarctica/Macquarie       Antarctica/Palmer
```

Antarctica/Mawson	Antarctica/Troll	Antarctica/Davis
GMT-0	Iceland	Cuba
MST	Libya	Indian/Christmas
Indian/Kerguelen	Indian/Reunion	Indian/Maldives
Indian/Mayotte	Indian/Mahe	Indian/Cocos
Indian/Antananarivo	Indian/Mauritius	Indian/Chagos
Indian/Comoro	Singapore	Arctic/Longyearbyen
Japan	Navajo	MET
GMT	Mexico/BajaSur	Mexico/General
Mexico/BajaNorte	EST5EDT	US/Mountain
US/Samoa	US/Pacific-New	US/East- Indiana
US/Aleutian	US/Eastern	US/Alaska
US/Pacific	US/Michigan	US/Central
US/Indiana-Starke	US/Hawaii	US/Arizona
America/Santa_Isabel	America/Louisville	America/Yellowknife
America/Puerto_Rico	America/El_Salvador	America/Jujuy
America/Nassau	America/St_Lucia	America/Godthab
America/Guadeloupe	America/Anchorage	America/Virgin
America/Whitehorse	America/Caracas	America/Catamarca
America/Santo_Domingo	America/Nome	America/Tijuana
America/Maceio	America/Ensenada	America/Iqaluit
America/Cayman	America/Merida	America/Noronha
America/Hermosillo	America/St_Johns	America/Grand_Turk
America/Menominee	America/Port-au-Prince	America/Cordoba
America/Porto_Acre	America/Aruba	America/Detroit
America/Marigot	America/Dawson_Creek	America/Thule
America/Danmarkshavn	America/Guayaquil	America/Anguilla
America/St_Thomas	America/Ojinaga	America/Metlakatla
America/Santarem	America/Montevideo	America/Mendoza
America/Rosario	America/Montreal	America/Fort_Nelson
America/Adak	America/Lima	America/Edmonton
America/Boa_Vista	America/Los_Angeles	America/Winnipeg
America/Chihuahua	America/Bogota	America/Grenada
America/New_York	America/North_Dakota/New_Salem	
America/North_Dakota/Center		
America/North_Dakota/Beulah	America/Moncton	America/Guatemala
America/Kralendijk	America/Dominica	America/Mazatlan
America/Cancun	America/Punta_Arenas	America/Bahia
America/Vancouver	America/Cuiaba	America/Nipigon
America/Tegucigalpa	America/Port_of_Spain	America/La_Paz
America/Santiago	America/Porto_Velho	America/Panama
America/Recife	America/Rankin_Inlet	America/Belem
America/Sao_Paulo	America/Yakutat	America/Belize
America/St_Barthelemy	America/Phoenix	America/Blanc-Sablon
America/Pangnirtung	America/Mexico_City	America/Guyana
America/Shiprock	America/Manaus	America/Araguaina
America/Swift_Current	America/Rainy_River	America/Resolute
America/Creston	America/Costa_Rica	America/Montserrat
America/Kentucky/Louisville	America/Kentucky/Monticello	America/Miquelon
America/Paramaribo	America/Matamoros	America/Goose_Bay
America/Jamaica	America/ Indianapolis	America/Atka
America/Antigua	America/Chicago	America/Curacao
America/Regina	America/Coral_Harbour	America/St_Kitts
America/Campo_Grande	America/Sitka	America/Halifax
America/Eirunepe	America/Fort_Wayne	America/Monterrey
America/St_Vincent	America/Scoresbysund	America/Cayenne
America/Knox_IN	America/Glace_Bay	America/Bahia_Banderas
America/Havana	America/Asuncion	America/Rio_Branco
America/Juneau	America/ Indiana/Knox	America/

Indiana/Petersburg		
America/Indiana/Tell_City	America/Indiana/Vincennes	America/Indiana/Marengo
America/Indiana/Winamac	America/Indiana/Indianapolis	America/Indiana/Vevay
America/Managua	America/Toronto	America/Dawson
America/Inuvik	America/Thunder_Bay	America/Boise
America/Lower_Princes	America/Barbados	America/Argentina/Jujuy
America/Argentina/San_Juan	America/Argentina/Catamarca	America/Argentina/Tucuman
America/Argentina/Cordoba	America/Argentina/Rio_Gallegos	
America/Argentina/Mendoza		
America/Argentina/Ushuaia	America/Argentina/San_Luis	America/Argentina/La_Rioja
America/Argentina/Salta	America/Argentina/Buenos_Aires	
America/Argentina/ComodRivadavia		
America/Cambridge_Bay	America/Fortaleza	America/Atikokan
America/Buenos_Aires	America/Martinique	America/Tortola
America/Denver	Africa/Bujumbura	Africa/Asmera
Africa/Bamako	Africa/Gaborone	Africa/Sao_Tome
Africa/Bangui	Africa/Libreville	Africa/Juba
Africa/Khartoum	Africa/Kampala	Africa/Casablanca
Africa/Mbabane	Africa/Lusaka	Africa/Cairo
Africa/Lome	Africa/Luanda	Africa/Ouagadougou
Africa/Mogadishu	Africa/Conakry	Africa/Maputo
Africa/Blantyre	Africa/Porto-Novo	Africa/Banjul
Africa/Tripoli	Africa/Malabo	Africa/Tunis
Africa/Niamey	Africa/Dar_es_Salaam	Africa/Harare
Africa/Brazzaville	Africa/Bissau	Africa/Dakar
Africa/Douala	Africa/Windhoek	Africa/Abidjan
Africa/Ndjamena	Africa/Lagos	Africa/Lubumbashi
Africa/Monrovia	Africa/Kigali	Africa/Freetown
Africa/Nairobi	Africa/Addis_Ababa	Africa/Djibouti
Africa/El_Aaiun	Africa/Accra	Africa/Nouakchott
Africa/Ceuta	Africa/Timbuktu	Africa/Maseru
Africa/Asmara	Africa/Johannesburg	Africa/Kinshasa
Africa/Algiers	NZ-CHAT	Iran
Egypt	Europe/London	Europe/Helsinki
Europe/Chisinau	Europe/Guernsey	Europe/Uzhgorod
Europe/Prague	Europe/Oslo	Europe/Busingen
Europe/Vilnius	Europe/Brussels	Europe/Moscow
Europe/Bratislava	Europe/Zaporozhye	Europe/Skopje
Europe/Isle_of_Man	Europe/Budapest	Europe/Vatican
Europe/Podgorica	Europe/Stockholm	Europe/Minsk
Europe/Kaliningrad	Europe/Kirov	Europe/Paris
Europe/Malta	Europe/Jersey	Europe/Kiev
Europe/Vienna	Europe/Belgrade	Europe/Riga
Europe/Copenhagen	Europe/Andorra	Europe/Tiraspol
Europe/San_Marino	Europe/Sofia	Europe/Sarajevo
Europe/Ulyanovsk	Europe/Lisbon	Europe/Mariehamn
Europe/Rome	Europe/Nicosia	Europe/Volgograd
Europe/Simferopol	Europe/Madrid	Europe/Istanbul
Europe/Tirane	Europe/Saratov	Europe/Astrakhan
Europe/Belfast	Europe/Warsaw	Europe/Athens
Europe/Samara	Europe/Bucharest	Europe/Zurich
Europe/Tallinn	Europe/Monaco	Europe/Ljubljana
Europe/Gibraltar	Europe/Amsterdam	Europe/Vaduz
Europe/Luxembourg	Europe/Berlin	Europe/Dublin
Europe/Zagreb	EET	ROK
Brazil/West	Brazil/DeNoronha	Brazil/East
Brazil/Acre	Zulu	Chile/EasterIsland
Chile/Continental	Australia/Yancowinna	Australia/Brisbane
Australia/Lindeman	Australia/Broken_Hill	Australia/North

Australia/Hobart	Australia/South	Australia/Queensland
Australia/Currie	Australia/Lord_Howe	Australia/West
Australia/NSW	Australia/LHI	Australia/ACT
Australia/Perth	Australia/Darwin	Australia/Victoria
Australia/Melbourne	Australia/Canberra	Australia/Adelaide
Australia/Eucla	Australia/Sydney	Australia/Tasmania
GMT0	Kwajalein	GB-Eire
PRC	Poland	Pacific/Fiji
Pacific/Tahiti	Pacific/Auckland	Pacific/Kosrae
Pacific/Wallis	Pacific/Truk	Pacific/Efate
Pacific/Tongatapu	Pacific/Samoa	Pacific/Apia
Pacific/Marquesas	Pacific/Fakaofu	Pacific/Niue
Pacific/Wake	Pacific/Norfolk	Pacific/Midway
Pacific/Bougainville	Pacific/Honolulu	Pacific/Majuro
Pacific/Enderbury	Pacific/Galapagos	Pacific/Kwajalein
Pacific/Saipan	Pacific/Palau	Pacific/Pitcairn
Pacific/Ponape	Pacific/Guam	Pacific/Noumea
Pacific/Pohnpei	Pacific/Johnston	Pacific/Nauru
Pacific/Kiritimati	Pacific/Rarotonga	Pacific/Gambier
Pacific/Guadalcanal	Pacific/Chatham	Pacific/Easter
Pacific/Port_Moresby	Pacific/Pago_Pago	Pacific/Funafuti
Pacific/Tarawa	Pacific/Yap	Pacific/Chuuk
EST	Universal	NZ
Hongkong	Portugal	MST7MDT
ROC	GB	UCT
PST8PDT	GMT+0	WET
CET	Etc/GMT-0	Etc/GMT+8
Etc/GMT-4	Etc/GMT+1	Etc/GMT+9
Etc/GMT-11	Etc/GMT	Etc/GMT+12
Etc/GMT-10	Etc/GMT-2	Etc/GMT+6
Etc/GMT-6	Etc/Zulu	Etc/GMT+5
Etc/GMT0	Etc/GMT-9	Etc/GMT+10
Etc/GMT-5	Etc/GMT-3	Etc/Universal
Etc/GMT+2	Etc/UCT	Etc/GMT-13
Etc/GMT-8	Etc/GMT-7	Etc/GMT+3
Etc/GMT+0	Etc/GMT-14	Etc/GMT+7
Etc/UTC	Etc/GMT+11	Etc/GMT-1
Etc/Greenwich	Etc/GMT+4	Etc/GMT-12
Canada/Mountain	Canada/Yukon	Canada/East-Saskatchewan
Canada/Eastern	Canada/Saskatchewan	Canada/Newfoundland
Canada/Pacific	Canada/Central	Canada/Atlantic
W-SU	Jamaica	Eire
UTC	Atlantic/Stanley	Atlantic/St_Helena
Atlantic/Canary	Atlantic/Reykjavik	Atlantic/Faeroe
Atlantic/Cape_Verde	Atlantic/Madeira	Atlantic/South_Georgia
Atlantic/Azores	Atlantic/Bermuda	Atlantic/Jan_Mayen
Atlantic/Faroe	CST6CDT	Asia/Tbilisi
Asia/Shanghai	Asia/Choibalsan	Asia/Aden
Asia/Urumqi	Asia/Dili	Asia/Yangon
Asia/Aqtobe	Asia/Yekaterinburg	Asia/Kathmandu
Asia/Brunei	Asia/Krasnoyarsk	Asia/Tel_Aviv
Asia/Singapore	Asia/Bangkok	Asia/Tomsk
Asia/Vientiane	Asia/Chungking	Asia/Magadan
Asia/Qyzylorda	Asia/Srednekolymsk	Asia/Dubai
Asia/Bishkek	Asia/Atyrau	Asia/Qatar
Asia/Dacca	Asia/Hebron	Asia/Ulaanbaatar
Asia/Harbin	Asia/Famagusta	Asia/Saigon
Asia/Kabul	Asia/Khandyga	Asia/Kashgar
Asia/Pontianak	Asia/Kuala_Lumpur	Asia/Tehran
Asia/Macao	Asia/Anadyr	Asia/Jakarta

Asia/Barnaul	Asia/Baku	Asia/Vladivostok
Asia/Ulan_Bator	Asia/Hong_Kong	Asia/Ho_Chi_Minh
Asia/Baghdad	Asia/Dushanbe	Asia/Aqtau
Asia/Chongqing	Asia/Makassar	Asia/Jerusalem
Asia/Omsk	Asia/Hovd	Asia/Amman
Asia/Jayapura	Asia/Oral	Asia/Phnom_Penh
Asia/Colombo	Asia/Muscat	Asia/Macau
Asia/Kolkata	Asia/Irkutsk	Asia/Ashkhabad
Asia/Ujung_Pandang	Asia/Calcutta	Asia/Nicosia
Asia/Yerevan	Asia/Taipei	Asia/Sakhalin
Asia/Rangoon	Asia/Kamchatka	Asia/Pyongyang
Asia/Ust-Nera	Asia/Istanbul	Asia/Katmandu
Asia/Kuwait	Asia/Yakutsk	Asia/Riyadh
Asia/Beirut	Asia/Bahrain	Asia/Thimbu
Asia/Tokyo	Asia/Seoul	Asia/Karachi
Asia/Gaza	Asia/Ashgabat	Asia/Samarkand
Asia/Thimphu	Asia/Manila	Asia/Novosibirsk
Asia/Tashkent	Asia/Chita	Asia/Damascus
Asia/Almaty	Asia/Novokuznetsk	Asia/Dhaka
Asia/Kuching	Turkey	Greenwich
Israel	HST	Factory

6.6.25 Command *show update*

Displays the status of the system during the upgrade.

Using:

```
show update
```

The following are the possible responses of the system.

If updating is idle:

```
Current update status:
-----
Software Update Status: Idle
-----
Firmware Update Status: Idle
-----
Type 'help' to get suggestions
```

Ready to start the update procedure:

```
Current update status:
-----
                Status: Ready to start software update
-----
```

The update process is started:

```
Software update has started ...
```

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

If there was an attempt to start the update process before the update file was finished, the system will respond:

```
We are not ready to start update, software update file should be uploaded and
verified ... Preliminary recovery procedure is in progress:
```

```
Current update status:
```

```
-----
      Status: Recovery procedure is in progress ...
      Progress: 5.73%
-----
```

Application update:

```
Current update status:
```

```
-----
      Status: Applying update ...
      Progress: 14.88%
-----
```

The update application is being checked:

```
Current update status:
```

```
-----
      Status: Verifying applied update ...
      Progress: 41.17%
-----
```

Update completed, the system asks to restart High Level Controller (HLC):

```
Current update status:
```

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

For more details, please refer to the section: "[4.7. Updating the RPCM Software](#)".

6.6.26 Command *show user*

It is used to display detailed information about the user.

Keys available: history

6.6.26.1. Displaying User Information

It is used with the parameter *username*

Help:

```
show user ?
```

The return is:

```
Please provide username to show information about
```

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

You can get information about users after pressing tab.

Command:

```
show user <Tab button>
```

The return is:

```
rpcmadmin test379 vasya
```

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

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

Command:

```
show user rpcmadmin
```

The return is:

```

      [Username]: rpcmadmin
      [User Disabled]: NO
      [Authenticator]: LOCAL
      [Group]: superuser
      [Last Login Time]: 2020-04-21 20:52:22
      [User Changed At]: 2019-12-12 01:19:58
      [User Created At]: 2019-12-12 01:19:58
[Session Expiration Timeout]: 3600

Active user's sessions:

Source IP Address      Applied Group  Session expires at  Timeout  Idle
-----
WEB    10.213.97.208  superuser        2020-04-05 23:30:37  3600s    1381s
WEB    10.210.6.88   superuser        2020-04-06 21:18:40  3600s    1303s
ssh    10.213.97.208  superuser        2020-04-21 23:19:52  3600s     0s

Type 'help' to get suggestions

```

In particular, you can see the data:

- **Username;**
- **User Disabled** (if “NO” — user enabled);
- **Access Level** — privilege level;
- **Last Login Time** — time of the last login to the system;
- **User Changed At** — time when the user parameters were last modified;
- **User Created At** — user creation time;
- **Session Expiration Timeout** — session termination time (for security reasons the session is not allowed to remain open indefinitely).

6.6.26.2. Command *show user history*

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

Example. We receive information about the commands entered by the user *rpcmadmin*:

```
show user rpcmadmin history
```

List of used commands:

```
History for user: rpcmadmin
1: add user testuser
2: whoami
3: add user?
4: delete user?
5: delete user testuser
6: add?
7: exit
```

6.6.27 Command *show version*

It displays information about the firmware version and device software, as well as the serial name, serial number, uptime and system time.

Example:

```
show version
```

Information about the RPCM module:

```
      [Serial Name]: AntiGeroy
      [Serial Number]: RU2017101100000002M001DN01
      [Model]: 1502
      [Hardware Version]: RPCM
      [Uptime]: 36d+11:44:14
      [Software Version]: 0.7.100
      [Software Release Date]: 20190610154514
      [Firmware Version]: 0.9.748
      [Firmware Release Date]: 20190528215402
      [Current System Time Zone]: Europe/Moscow
      [Current System Time]: 2019-07-04 12:40:02 +0300
```

Type 'help' to get suggestions

6.7. Command *show all*

It serves to display various information about RPCM elements.

It includes the following:

- **automation** — a list of all connected devices for automation management (on/off or reboot);
- **counters** — values of power counters for connected devices set thresholds for preliminary notifications and shutdown;
- **groups** — general information about all groups;
- **inputs** — data about all inputs (1-2);
- **outputs** — information about all outlets;
- **users** — a list of all registered users of the system;
- **groups** — a list of system security group with information about permissions;
- **radius servers** — an information about RADIUS servers;
- **help**.

Help displays (for example):

```
show all help
```

The return is:

RRPCM Commands description:

```
show all automations - show all configured automations
show all counters   - show counters for device, like circuit breaker firings
                    alarm limit firings and overload turn off firings
show all groups     - show information about all groups
show all inputs     - show information about all inputs
  names             show all names for inputs
  descriptions      show all descriptions for inputs
  meter readings    show all input instant and accumulated meter readings
  limits            show all limits for inputs
show all outputs    - show information about all outputs
  alarm limits      show alarm limits and action delays for outputs
  descriptions      show all outputs descriptions
  limits            show all limits and action delays for outputs
  meter readings    show all outputs instant and accumulated meter
                    readings
  names             show all outputs names
  survival priorities show all outputs turn off on Input overload
                    priorities
  startup delays    show turn on startup delays for outputs
  turn off limits   show turn off limits and action delays for outputs
show all radius
```

```

servers          - show all configured radius servers
show all users   - show all users accounts
logs             show all users login and logout logs
show all help    - show this help

```

Type 'help' to get suggestions

6.7.1 Command *show all automations*

Displays information about automated devices.

Note. For more detailed information, it is recommended to refer to the sections: "4.11 Automation tools" and "5.6. Monitoring and monitoring of specialized devices for mining using RPCM".

On the question mark, instead of a hint, simply a list of devices is displayed:

```
show all automations ?
```

The return is:

```

ID Name Device Type Outputs
1 dragonmint_t1 DragonMint_T1 0
2 Antminer_S9 Bitmain_S9 1
3 Antminer_D3 Bitmain_D3 1
4 Antminer_L3_plus Bitmain_L3 + 1
5 nonexistent_claymore Claymore 1

```

Type 'help' to get suggestions

A similar list displays for any other parameter value.

Displays information about automated devices.

Note. For more detailed information, it is recommended to refer to the sections: "4.11 Automation tools".

On the question mark, instead of a hint, simply a list of devices is displayed:

```
show all automation ?
```

The return is:

```

ID Name Device Type Outputs
1 dragonmint_t1 DragonMint_T1 0
2 Antminer_S9 Bitmain_S9 1
3 Antminer_D3 Bitmain_D3 1
4 Antminer_L3_plus Bitmain_L3 + 1
5 nonexistent_claymore Claymore 1

```

Type 'help' to get suggestions

A similar list displays for any other parameter value.

6.7.2 Command *show all counters*

It serves for demonstration of meter readings

Example of work:

```
show all counters
```

Information about the meters:

Over-	Over-	Over-	Over-	Over-
	current	current	current	current
	Circuit	Alarm	Alarm	Turn Off
	Breaker	Limit	Fired	Limit
	Fired	Reached	Reached	Fired
	Facts	Times	Facts	Times
	Facts	Facts	Facts	Facts
[Output 0]:	1	0	0	0
[Output 1]:	3	0	0	0
[Output 2]:	6	29164	457	0
[Output 3]:	2	0	0	0
[Output 4]:	2	0	0	0
[Output 5]:	1	0	0	0
[Output 6]:	0	35	3	33
[Output 7]:	0	0	0	0
[Output 8]:	3	0	0	0
[Output 9]:	2	0	0	0

6.7.3 Command *show all groups*

Show an information about all security groups with permissions.

Note. Object permissions in RPCM have to set UNIX-style: Read-Write-eXecute — *RWX* notation.

The notation of a list:

Glb — Global config RPCM;

Inp — Inputs 1..2 ;

Ou# — Outputs 0..9;

Log — System logs permissions;

Aut — Automation configuration;

Utl — for use to Utilities permissions.

Help ask:

```
show all groups ?
```

The return is:

RPCM Commands description:

```
show groups - groups and their permissions
```

Type 'help' to get suggestions

Example. How to use:

```
show all groups
```

The return is:

```

      Groupname Glb Inp Ou0 Ou1 Ou2 Ou3 Ou4 Ou5 Ou6 Ou7 Ou8 Ou9 Log Aut Utl
-----
* administrators RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX R RW X
  superuser RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX R RW X
  nightgroup1 R R R R R R R R R R R R R R R R X
  rpcmadmingroup R R R R R R R R R R R R R R R R X
  Newusers RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX R RW X
  Mstiteli R RWX R RWX RX RWX RWX RWX RW RWX RWX RWX R R X
  new_group R RW RW RW RW RW RW RW RW RW RW RW RW R RW X
  testcli RW RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX RWX R RW X
-----

R: Read access, W: Write access, *: Your user Group
N: No access, X: Access to execute Turn Off, Turn On or Restart
                Backup configuration, Restart High Level Controller, etc..

Glb - Global config, Inp - Inputs 1..2, Ou# - Outputs 0..9
Log - System logs, Aut - Automation configuration, Utl - Utilities

Type 'help' to get suggestions

```

6.7.4 Command *show all inputs*

Displays information about the inputs.

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

The call to the `show all inputs ?` immediately displays information about the inputs.

Example of work:

```
show all inputs
```

The return is:

```
[Input 1]: 226V @ 50.01Hz 0.000A 0.000KW (ACTIVE, PRIORITY)
[Input 2]: 227V @ 50.01Hz 0.000A 0.000KW
```

For the command, the auto-completion prompt is available. By double pressing the **Tab** key, the following list of parameters is displayed:

```
descriptions limits meter names
```

6.7.4.1 Command *show all inputs names*

It shows the names of inputs.

Example of use:

```
show all inputs names
```

Information on the names of inputs:

```
[Input 1] input_1
[Input 2] input_2
```


6.7.4.2 Command *show all inputs descriptions*

It shows the descriptions of inputs.

Example of use:

```
show all inputs descriptions
```

Description of inputs:

```
show all inputs descriptions
[Input 1] Main
[Input 2] Reserve
```

6.7.4.3 Command *show all inputs limits*

It shows the current limits for inputs.

Example of use:

```
show all inputs limits
```

Information on the limits:

	Current Voltage	Minimum Voltage	Maximum Voltage	Current Frequency	Minimum Frequency	Maximum Frequency
[Input 1]:	234V	89V	250V	49.99Hz	45.00Hz	65.00Hz (ACTIVE, PRIORITY)
[Input 2]:	235V	90V	240V	49.99Hz	45.00Hz	65.00Hz

6.7.4.4 Command *show all inputs 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	Accumul Kvars	Accumul KVAh
[Input 1]:	0	0	796.28	-1437.20	623.85
[Input 2]:	31	-1	170.16	8.42	173.73

Type 'help' to get suggestions

6.7.5 Command *show all outputs*

It displays information about the outlet.

The available keys s are: *alarm, descriptions, help, limits, meter, names, startup, survival, turn.*

Help call via command `show all outputs ?`

RPCM Commands description:

```
show all outputs alarm
  limits - show alarm limits and action delays for outputs
show all outputs limits - show all limits and action delays for outputs
show all outputs meter
```

```

readings          - show all outputs instant and accumulated meter readings
show all outputs recover
turn on limits    - show recover turn on limits and action delays for outputs
show all outputs startup
delays           - show turn on startup delays for outputs
show all outputs turn
off limits       - show turn off limits and action delays for outputs
show all outputs help - show this help

```

Type 'help' to get suggestions

The show all outputs construct without parameters displays outlet information about the outlets

Example of use:

```
show all outputs
```

The return is:

```

[Output 0]: ON <admin: ON> 0mA 0W
[Output 1]: ON <admin: ON> 0mA 0W
[Output 2]: ON <admin: ON> 0mA 0W
[Output 3]: ON <admin: ON> 0mA 0W
[Output 4]: ON <admin: ON> 0mA 0W
[Output 5]: ON <admin: ON> 0mA 0W
[Output 6]: ON <admin: ON> 0mA 0W
[Output 7]: ON <admin: ON> 0mA 0W
[Output 8]: ON <admin: ON> 0mA 0W
[Output 9]: ON <admin: ON> 0mA 0W

```

For the show all outputs, a hint is available with auto-completion. Pressing the **Tab** key twice, will display following list of parameters:

```
? meter descriptions startup survival turn
```

6.7.5.1 Command *show all outputs alarm limits*

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

Use:

```
show all outputs alarm limits
```

The return is:

	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	9500	30	0	0
[Output 1]:	0	NO	9501	30	0	0
[Output 2]:	0	NO	9000	30	29164	457
[Output 3]:	0	NO	9501	31	0	0
[Output 4]:	0	NO	9500	30	0	0
[Output 5]:	0	NO	9500	30	0	0
[Output 6]:	0	NO	1000	5	35	3
[Output 7]:	0	NO	9500	30	0	0

```
[Output 8]:      0      NO      9500      30      0      0
[Output 9]:      0      NO      9500      30      0      0
```

6.7.5.2 Command *show all outputs turn off limits*

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

Use:

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

Limit value information:

	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

6.7.5.3 Command *show all outputs limits*

It displays the current limit values after which an alarm is sent and current limit values for shut-down.

Use:

```
show all outputs limits
```

Limit value information:

	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	9500	30	0	0
[Output 1]:	0	NO	9500	30	0	0
[Output 2]:	0	NO	9500	30	0	0
[Output 3]:	0	NO	9500	30	0	0
[Output 4]:	0	NO	9500	30	0	0
[Output 5]:	0	NO	9500	30	0	0
[Output 6]:	0	NO	9500	30	0	0
[Output 7]:	0	NO	9500	30	0	0
[Output 8]:	0	NO	9500	30	0	0
[Output 9]:	0	NO	9500	30	0	0

```

                                Over-    Over-    Over-    Over-
                                current  current  current  current
                                Turn Off Turn Off Turn Off Turn Off
                                Limit    Limit    Reached  Fired
                                Times
Instant Turn Off  Over-    Over-    Over-    Over-
Milliamps Turn Off  current  current  current  current
Active    Limit    Milliams Seconds Times    Times
[Output 0]:      0      NO      10000    2      0      0
[Output 1]:      0      NO      10000    2      0      0
[Output 2]:      0      NO      10000    2      0      0
[Output 3]:      0      NO      10000    2      0      0
[Output 4]:      0      NO      10000    2      0      0
[Output 5]:      0      NO      10000    2      0      0
[Output 6]:      0      NO      10000    2      0      0
[Output 7]:      0      NO      10000    2      0      0
[Output 8]:      0      NO      10000    2      0      0
[Output 9]:      0      NO      10000    2      0      0

                                Over-    Recover    Over-
                                voltage  after     voltage
                                Turn Off Over-     Turn Off
                                Active   voltage  Fired
                                Volts   Seconds  Times
Voltage Turn Off  Limit    voltage  Fired
[Output 0]:      230    OFF     disabled disabled 65535
[Output 1]:      230    OFF     disabled disabled 65535
[Output 2]:      230    OFF     disabled disabled 65535
[Output 3]:      230    OFF     disabled disabled 65535
[Output 4]:      230    OFF     disabled disabled 65535
[Output 5]:      230    OFF     disabled disabled 65535
[Output 6]:      230    OFF     disabled disabled 65535
[Output 7]:      230    OFF     disabled disabled 65535
[Output 8]:      230    OFF     disabled disabled 65535
[Output 9]:      230    OFF     disabled disabled 65535

Type 'help' to get suggestions

```

6.7.5.4 Command *show all outputs meter readings*

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

Use:

show all outputs meter readings

Information about the meters:

```

Instant  Inst  Accumul  Inst  Accumul  Inst  Accumul
Milliamps Watts  KWh    Vars   KVarh   VAs    KVAh
[Output 0]:      0      0      0.000    0      0.006    0      0.047
[Output 1]:      0      0      0.651    0      0.089    0      0.712
[Output 2]:      0      0     241.670    0      0.040    0     241.746
[Output 3]:      0      0      0.000    0      0.108    0      0.092
[Output 4]:      0      0      0.000    0      0.045    0      0.078
[Output 5]:      0      0      0.000    0      0.088    0      0.099
[Output 6]:      0      0     65.848    0      0.075    0     65.855
[Output 7]:      0      0      0.013    0      0.117    0      0.112
[Output 8]:      0      0      0.000    0      0.009    0      0.080
[Output 9]:      0      0      0.000    0      0.098    0      0.124

```

6.7.5.5 Command *show all outputs startup delays*

it indicates information about the delay in applying voltage to the outlets when the power is turned on.

Use:

```
show all outputs startup delays
```

```

    Turn On Delay At Startup
[Output 0]: 3 seconds
[Output 1]: 3 seconds
[Output 2]: 4 seconds
[Output 3]: 11 seconds
[Output 4]: 6 seconds
[Output 5]: 7 seconds
[Output 6]: 3 seconds
[Output 7]: 9 seconds
[Output 8]: 10 seconds
[Output 9]: 11 seconds

```

6.7.5.6 Command *show all outputs survival priorities*

It displays information about survival priority, affecting the order of switching off the voltage supply to the outlets with a general excess of the permissible current.

For RPCM 1502 — the total current limit is 16A; for RPCM 1532 — 32A, for RPCM ME 1563 — 63A.

The higher the number, the higher the priority and the sooner the device will be turned off.

An additional parameter `sorted` indicating the sorting according to the survival priorities is available.

A brief hint is shown when pressing the **Tab** key twice:

```
show all outputs survival priorities
```

Hint:

```
sorted
```

Use:

With the usual sorting:

```
show all outputs survival priorities
```

The return is:

```

    Output Priority Name
[Output 0]: 9 output_0
[Output 1]: 1 output_1
[Output 2]: 2 output_2
[Output 3]: 3 output_3
[Output 4]: 4 output_4
[Output 5]: 5 output_5
[Output 6]: 6 output_6
[Output 7]: 7 output_7

```

```
[Output 8]: 8 output_8
[Output 9]: 9 output_9
```

With prioritization:

```
show all outputs survival priorities sorted
```

The return is:

```
Output Priority Name
-----
[Output 1]: 1 output_1
[Output 2]: 2 output_2
[Output 3]: 3 output_3
[Output 4]: 4 output_4
[Output 5]: 5 output_5
[Output 6]: 6 output_6
[Output 7]: 7 output_7
[Output 8]: 8 output_8
[Output 0]: 9 output_0
[Output 9]: 9 output_9
```

6.7.6 Command *show all radius servers*

Show an information about RADIUS servers.

The notation of a list:

Prio — server priority, lower number is higher priority;

Server — a RADIUS server address;

Port — a port and the protocol;

Options — additional options.

Example. How to use:

```
show all radius servers
```

The return is:

Prio	Server	Port	Secret	Options
10	192.168.1.1	1812/udp	** hidden **	
1	10.5.4.3	1812/udp	** hidden **	D, G, T
1	10.210.1.194	1812/udp	** hidden **	

D: Server is disabled, G: Accept and use Group Vendor Specific Attribute
T: Accept and Use Session Timeout Vendor Specific Attribute
Servers with higher priority will used first

Type 'help' to get suggestions

6.7.7 Command *show all users*

6.7.7.1. General Information about Command *show all users*

It displays information about users.

The available keys are: *log*, *help*.

Help displays:

```
show all users ?
```

The return is:

RPCM Commands description:

```
show all users      - show all existing users
show all users log  - show all users login and logout logs
show all users logs --last N - show last N records of users logins and logouts
show all users help - show this help
```

Pressing the **Tab** key provides brief help:

```
show all users <Tab>
```

The return is:

```
? help logs
```

Without parameters, it displays information about system users:

```
show all users
```

The return is:

Username	Group	Authenticator	Last Login	Disabled
nightuser	administrators	LOCAL+RADIUS	2019-12-12 01:18:47	NO
rpcadmin	superuser	LOCAL	2020-04-08 21:21:52	NO
nightuser2	rpcmadmingroup	RADIUS	2020-04-08 18:35:59 +0000	NO
newuser	administrators	RADIUS	2020-04-08 18:35:59 +0000	NO
rpcmtest	administrators	RADIUS	2020-04-08 18:35:59 +0000	NO
Tor	Mstiteli	LOCAL+RADIUS	2020-02-05 13:31:32	NO
hulk	administrators	LOCAL	2020-02-05 13:35:46	NO
radius	administrators	RADIUS	2020-04-08 18:35:59 +0000	YES

Displayed Group is configured locally and may be different for radius authenticated users. Actual applied group for user displayed by:
'show user <username>' or 'show active users' commands

6.7.7.2. Command *show all users logs*

The available parameter is: *--last N*

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

Ask help:

```
show all users logs <Tab>
```

The return is:

```
--last
```

Example 1. Command *Show all users logs* without parameter:

```
show all users logs
```

The return is:

Username	Type	Login time	Logout Time
rpcmadmin	ssh	2019-04-12 07:17:59	2019-04-12 07:21:15
rpcmadmin	WEB	2019-04-12 10:21:26	2019-04-16 19:52:52 +0000
rpcmadmin	WEB	2019-04-12 10:23:07	2019-04-16 19:52:52 +0000
rpcmadmin	ssh	2019-04-12 13:51:03	2019-04-12 13:54:28
rpcmadmin	ssh	2019-04-12 18:47:18	2019-04-12 18:48:06
rpcmadmin	WEB	2019-04-16 15:07:21	2019-04-16 19:52:52 +0000
rpcmadmin	WEB	2019-04-16 15:39:01	2019-04-16 19:52:52 +0000
rpcmadmin	ssh	2019-04-16 17:44:44	2019-04-16 18:47:54
rpcmadmin	WEB	2019-04-16 17:48:43	2019-04-16 19:52:52 +0000
rpcmadmin	ssh	2019-04-16 19:07:40	2019-04-16 19:52:52 +0000

Example 2. With the parameter *--last*

```
show all users logs --last
```

The return is:

Username	Type	Login time	Logout Time
rpcmadmin	ssh	2018-01-31 21:56:49	2018-01-31 22:10:57
rpcmadmin	ssh	2018-01-31 23:11:00	
rpcmadmin	web	2018-01-31 23:12:40	
rpcmadmin	ssh	2018-01-31 23:20:10	
rpcmadmin	web	2018-01-31 23:23:54	

6.8. Command *set*

6.8.1. General Description of the Command *set*

It is the main command to set the required values within the RPCM work setup.

Below is a brief list of keys for the command *set* with comments:

- **action confirmation** — set confirmation of critical actions for the web-interface;
- **all** — used with second level key 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;
- **group** — system security group settings;
- **input** — for managing the input, allows you to set up a variety of settings for each of the inputs;
- **output** — for managing the outlet, allows you to set up a variety of settings for each of the outlets;
- **radius server** — settings of server RADIUS;
- **snmp** — settings of configuration SNMP;
- **time** — time settings;
- **user** — settings for the user;
- **group** — group settings;
- **help** — call help.

You can use the *TAB* key for auto-completion (prompts) and the service word `help` or the question mark `?` for displaying information about valid parameters.

The output of the command `set ?`

RPCM Commands description:

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

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

```

adminState          enable/disable snmp
community           adjust SNMP community settings
trap                adjust SNMP traps settings
user                adjust SNMP users settings
set time            - set new time
value               value
zone                zone
synchronization    toggle ntp synchronization
set user <username> - set parameters for username
authenticator       set Authenticator for user
accessLevel         set Access Level for user
disabled            disables user account
enabled             enables user account
password            set password for user
set help            - show this help

```

Type 'help' to get suggestions

6.8.2 Command *set action confirmation*

Enables or disables confirmation of critical operations: disconnecting and resetting power leads. The web interface corresponds to the setting in the menu **Configuration -> Global options -> Get second confirmation from user for Turn Off/Reset requests**.

Available parameters:

enabled

disabled

help

Help ask:

```
set action confirmation ?
```

The return is:

RPCM Commands description:

```

set action confirmation - set confirmation of actions for the web interface
  enabled               to enabled (will double check dangerous actions)
  disabled              to disabled
set action confirmation
  help                  - show this help

```

Type 'help' to get suggestions

Example. Second confirmation from user for Turn Off/Reset requests will set On.

The command is:

```
set action confirmation enabled
```

The return is:

```
Confirmation of actions for the web interface is enabled
```

6.8.3. Command *set all*

Help ask :

set all ?

The return is:

RPCM Commands description:

```

set all inputs          - set input force failback
  force failback       configuration (available on RPCM1502/RPCM1532)
  delay                set stabilization delay
  off                  disable failback
  on                   enable failback
set all outputs        - set all outputs state
  off                  turn them off
  on                   turn them on
set all help           - show this help

```

Type 'help' to get suggestions

6.8.3.1. Command *set all inputs*

Use this command for force failback turn off/on and set failback delay.

Help ask:

set all inputs ?

The return is:

```

set all inputs force failback delay - Sets Force Failback Delay switching for Inputs
(in seconds)
                                     on  - Enables Force Failback switching for Inputs
                                     off  - Disables Force Failback switching for Inputs

```

Type 'help' to get suggestions

Example 1. Set inputs force failback delay to 9 seconds.

Command:

```
set all inputs force failback delay 9
```

The return is:

```
Force Failback Delay has been set to 9 seconds
```

Type 'help' to get suggestions

Example 2. Set inputs force failback to ON.

Command:

```
set all inputs force failback on
```

The return is:

```
Force Failback has been set to ON
```

Type 'help' to get suggestions

6.8.3.2. Command *set all outputs*

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

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

Help ask:

```
set all outputs ?
```

The return is:

RPCM Commands description:

```
set all outputs off - set all outputs state to off
set all outputs on  - set all outputs state to on
set all outputs help - show this help
```

Type 'help' to get suggestions

Example 1. Set inputs force failback to OFF and ON.

Turn OFF command:

```
set all outputs off
```

The return is:

Turning outputs 0-9 OFF...

[oooooooooooo]

```
[Output 0]: OFF <admin: OFF>      0mA      0W
[Output 1]: OFF <admin: OFF>      0mA      0W
[Output 2]: OFF <admin: OFF>      0mA      0W
[Output 3]: OFF <admin: OFF>      0mA      0W
[Output 4]: OFF <admin: OFF>      0mA      0W
[Output 5]: OFF <admin: OFF>      0mA      0W
[Output 6]: OFF <admin: OFF>      0mA      0W
[Output 7]: OFF <admin: OFF>      0mA      0W
[Output 8]: OFF <admin: OFF>      0mA      0W
[Output 9]: OFF <admin: OFF>      0mA      0W
```

Type 'help' to get suggestions

Turn ON command:

```
set all outputs on
```

The return is:

Turning outputs 0-9 ON...

[0000000000]

```
[Output 0]: ON <admin: ON>        0mA      0W
[Output 1]: ON <admin: ON>        0mA      0W
[Output 2]: ON <admin: ON>        0mA      0W
[Output 3]: ON <admin: ON>        0mA      0W
```

```
[Output 4]: ON <admin: ON> 0mA 0W
[Output 5]: ON <admin: ON> 0mA 0W
[Output 6]: ON <admin: ON> 0mA 0W
[Output 7]: ON <admin: ON> 0mA 0W
[Output 8]: ON <admin: ON> 0mA 0W
[Output 9]: ON <admin: ON> 0mA 0W
```

Type 'help' to get suggestions

6.8.4. Command *set api*

Command `set api` is used to set the conditions for accessing the API.

Available options:

- **generate-new-key** - is used to generate access keys;
- **key key-body** - allows or prohibits the use of this key — *enable / disable* parameters, respectively;
- **authentication** - enables or disables key authentication service using *enable / disable* parameters.

Help call:

```
set api ?
```

The return is:

RPCM Commands help:

```
set api generate-new-key - generate new access key for API
set api key enable | disable - enable or disable access key for API
set api authentication enable | disable - toggle API service authentication
```

Type 'help' to get suggestions

Example 1. Key generation:

Call command:

```
set api generate-new-key
```

The return is:

```
New key: 659d8a7a78f701c7ae139a14fa5cfc48
Key successful saved
```

Type 'help' to get suggestions

Example 2. Prohibit the use of this key with the command:

```
set api key 659d8a7a78f701c7ae139a14fa5cfc48 disable
```

The return is:

```
Key: 659d8a7a78f701c7ae139a14fa5cfc48 successful disabled
```

Type 'help' to get suggestions

To re-enable the use of this key, enter the command:

```
set api key 659d8a7a78f701c7ae139a14fa5cfc48 enable
```

The return is:

```
Key: 659d8a7a78f701c7ae139a14fa5cfc48 successful enabled
Type 'help' to get suggestions
```

Example 3. Disable the service *API authentication*.

Command:

```
set api authentication disable
```

The return is:

```
API Authentication successful disabled
Type 'help' to get suggestions
```

Re-enable *authentication* service:

```
set api authentication enable
```

The return is:

```
API Authentication successful enabled
Type 'help' to get suggestions
```

6.8.5. Command *set button-control*

Turn ON / OFF switching to Control mode with front panel buttons. View mode will work property.

Parameters:

enabled / disabled

Help ask:

```
set button-control ?
```

The return is:

```
RPCM Commands description:
set button-control      - set button control mode
  enabled                to enabled
  disabled               to disabled (will disable control from physical
                        buttons)
set button-control help - show this help
Type 'help' to get suggestions
```

Example. Turn OFF and turn ON switching to Control mode

Command (turn OFF):

```
set button-control disabled
```

The return is:

```
Button control mode is DISABLED
Type 'help' to get suggestions
```

Command (turn ON):

```
set button-control enabled
```

The return is:

```
Button control mode is ENABLED
Type 'help' to get suggestions
```

6.8.6. Command *set buzzer*

It serves to control the sound signal.

The available keys are: alternate, on, off

The on parameter turns on the speaker sound of the RPCM module, which helps to find the device in the rack.

The parameter off disables the speaker sound of the RPCM module.

The parameter alternate changes the speaker sound period.

Help displays: set buzzer ?

The return is:

```
set buzzer alternate - set buzzer to alternate
set buzzer off - turn buzzer off
set buzzer on - turn buzzer on
set buzzer help - show this help
```

Example 1. Command *set buzzer alternate*

It sets the mode of periodic sound mode.

Example:

```
set buzzer alternate
```

The return is:

```
Buzzer set to ALTERNATING
```

Example 2. Command *set buzzer on*

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

Example:

```
set buzzer on
```

The return is:

```
Buzzer turned ON
```

Example 3. Command *set buzzer off*

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

Example:

```
set buzzer off
```

The return is:

```
Buzzer turned OFF
```

6.8.7. Command *set cloud*

It is used for enables export telemetry information to RPCM.CLOUD

Parameters:

exportTelemetry (enable / disable) — permission or prohibit export telemetry information.

Help ask:

```
set cloud ?
```

The return is:

```
set cloud exportTelemetry enable - enables export telemetry information
                                to RPCM.CLOUD
                                disable - disables export telemetry information
                                         to RPCM.CLOUD
```

Type 'help' to get suggestions

Example. Enable export telemetry information.

Command:

```
set cloud exportTelemetry enable
```

The return is:

```
Export of telemetry to the cloud is now: enabled
```

```
RPCM.CLOUD Information
```

```
-----
Telemetry export to cloud: enabled
  Registration status: registered
  Cloud session status: connected
```

Type 'help' to get suggestions

6.8.8. Command *set display*

6.8.8.1. General information About Using *set display*

Used to set or change the default message on the screen.

Available options:

- **user message** — sets the user message.
- **default message** — allows you to select the data to be shown on the display by default.

By default, the display shows the network voltage. The parameter *user message* allows to specify exclusive message. By default, this is an empty value (no characters).

In turn, the parameter *default message* allows you to choose to use as a default message either the built-in parameters or a message specified by the user.

Help:

```
set display ?
```

The return is:

```
set display user message - custom message to be displayed
set display default message - parameter that will be
Type 'help' to get suggestions
```

6.8.8.2 Setting User Message

When setting a user message from one word, you just need to specify this word in after the parameter *user message*.

For example:

```
set display user message RPCM-1
```

```
User Message is 'RPCM-1'
Color is 'blue'
```

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

Note. For a custom message, the question mark ? Is not interpreted as a help request, and is also a message symbol.

When setting a custom message of several words, you just need to specify in quotes the text to display on the display.

For example, you need to set the output message "*RPCM # 1*"

Command:

```
set display user message "RPCM # 1"
```

The return is:

```
User Message changed from 'RPCM-1' to 'RPCM # 1'
Foreground color is 'red'
Background color is 'black'
```

6.8.8.3. Selection of Information for the Default Message

Help:

```
set display default message ?
```

The return is:

```
Please enter the display.

Required parameters:
  message - parameter that will be displayed

Supported default messages: voltage, current, power, ipAddress,
                           macAddress, serialName, serialNumber,
                           userMessage

Example:
  set display default message test macAddress
  set display default message voltage
```

Type 'help' to get suggestions

To set a custom message as the default:

```
set display default message userMessage
```

The return is:

```
Default Message changed from 'voltage' to 'userMessage'
```

Type 'help' to get suggestions

Note. In this case, the user message must be pre-set by the command

```
set display user message " user-message "
```

To set IP, you must use the parameter *ipAddress*

```
set display default message ipAddress
```

The return is:

```
Default Message changed from 'userMessage' to 'ipAddress'
```

Type 'help' to get suggestions

Now the IP address will be displayed as the default message.

You can return the mains voltage as a default by typing:

```
set display default message voltage
```

The return is:

```
Default Message changed from 'ipAddress' to 'voltage'
Type 'help' to get suggestions
```

6.8.9. Command *set group*

For setting UNIX-group permission: Read-Write-eXecute.

Also there is UNIX-like notation: `rwX`

Required parameter:

group name.

Available parameters:

- global_config** — set permission of RPCM global configuration;
- inputs** — set permission of inputs configuration;
- output0 ... -- output9** — set permission of outlets configuration;
- userlogs** — set permission of access to logs;
- automation** — set permission of access to automation tools;
- utils** — set permission of access to system tools.

IMPORTANT! Prohibition or permission, as well as a change in account privileges, occurs immediately, without a request for confirmation from the user. Please consider this if you need to perform actions with the rpcmadmin master record.

Help ask:

```
set group new_group ?
```

The return is:

RPCM Commands description:

```
set group <groupname>
  --global_config <permissions> - rw (Read, Write)
  --inputs        <permissions> - rwX (Read, Write, Execute)
  --output0       <permissions> - rwX (Read, Write, Execute)
  --output1       <permissions>   ...
  --output2       <permissions>
  --output3       <permissions>
  --output4       <permissions>
  --output5       <permissions>
  --output6       <permissions>
  --output7       <permissions>
  --output8       <permissions>
  --output9       <permissions>
  --userlogs      <permissions> - r (Read)
  --automation    <permissions> - rwX (Read, Write, Execute)
  --utils         <permissions> - x Execute)
```

Example. Disabling to change global configuration for *new_group*.

The command is:

```
set group new_group --global_config r
```

The return is:

```
New permissions applied to group: new_group
Type 'help' to get suggestions
```

6.8.10. Command *set input*

Use command `set input` for configuration inputs.

You should use number input as necessary parameters — digits 1 и 2.

Others parameters:

- **active** — set active input;
- **name** — inputs name, max 26 symbols allowed: digits, english alphabetic symbols, английского алфавита, symbols “minus” and “underlining”;
- **description** – a comment, max 256 allowed: digits, english alphabetic symbols, английского алфавита, symbols “minus”, “underlining” and space;
- **frequency** — setting frequency limits;
- **current** — setting max. current limit in Amps, when the limit is reached, the outputs will be turned off in accordance with survival priority settings;
- **voltage** — setting min. and max. voltage limit;
- **on | off** — administrative turn on /off;
- **prioritized** — set input as prioritized input to be used;
- **recognition** — recognition state, turns on or off blinkinng input.

Help ask:

```
set input ?
```

The return is:

```
RPCM Commands description:
```

```
set input 1-2 active      - Set input as Active (switch to input)
                    name  - Input name, 26 characters long brief description. Should
                           contain alphanumerical characters, hyphens, under-
                           scores.
```

```

description - Extended description, 256 characters long description.
               Should contain alphanumerical, punctuation characters and
               spaces
frequency    - Set Frequency limits for input
current     - Set Current limit for input
voltage     - Set Voltage limits for input
on | off    - Administrative status of input
prioritized - Set input as prioritized input to be used
recognition - Recognition state, turns on or off blinkinng input

```

Type 'help' to get suggestions

Example 1. Setting input 1 as active (for RPCM with ATS only).

Command:

```
set input 1 active
```

The return is:

```
Active Input is set to 1
```

Type 'help' to get suggestions

Example 2. Setting input 1 as prioritized (for RPCM with ATS only).

Command:

```
set input 1 prioritized
```

The return is:

```
Priority Input is set to 1
```

Type 'help' to get suggestions

Example 3. Setting name of input 2 to "LINE-2".

Command:

```
set input 1 name LINE-1
```

The return is:

```
Name for Input 1 has been updated
```

Type 'help' to get suggestions

Example 4. Setting description input 2 as "Reserve Line". If you want use two or more words, you should use quotation marks.

Command:

```
set input 2 description " Main Line"
```

The return is:

```
Description for Input 1 has been updated
Type 'help' to get suggestions
```

Attention. You can use command `show input` for check results.

Check configuration of input 2 after commands from examples 3 and 4.

Command:

```
show input 1
```

The return is:

```
          [Input]: 1
            [Name]: LINE-1
      [Description]: Main Line
          [Voltage]: 48.321
[Minimum Allowed Voltage]: 45
[Maximum Allowed Voltage]: 58
[Maximum Allowed Current Amps]: 200
      [Instant Milliamps]: 0
      [Instant Watts]: 0
    [Accumulated KWh]: 0.382778
```

Example 5. Turning on recognition for input 1.

Command:

```
set input 1 recognition on
```

The return is:

```
Recognition for Input 1 has been turned ON
Type 'help' to get suggestions
```

Example 6. Administrative turn off input 1.

Command:

```
set input 1 off
```

The return is:

```
Administrative state for Input 1 has been changed to OFF
Type 'help' to get suggestions
```

6.8.10.1. Command *set input frequency limit*

Not for RPCM DC. Use this command for frequency top and bottom limits in RPCM AC.

Help ask (also the input number is necessary):

```
set input 1 frequency ?
```

The return is:

RPCM Commands description:

```
set input 1-2 frequency limit min - minimum allowed frequency at
                                specified on input
                                max - maximum allowed frequency at
                                specified on input
```

Type 'help' to get suggestions

Example. Set frequency limits from 48Hz to 61Hz (for RPCm AC only).

Command:

```
set input 1 frequency limit min 48 max 61
```

The return is:

```
Minimum frequency value is set to 48.00Hz for Input 1
Maximum frequency value is set to 61.00Hz for input 1
```

Type 'help' to get suggestions

6.8.10.2. Command *set input current limit*

Use this command for a top current limit.

Help ask (also the input number is necessary):

```
set input 1 current ?
```

The return is:

RPCM Commands description:

```
set input 1-2 current limit - Set the input current limit in Amps.
                              When the limit is reached, the outputs
                              will be turned off in accordance
                              with survival priority settings
```

Type 'help' to get suggestions

Example. Set top current limit 8A.

Command:

```
set input 1 current limit 8
```

The return is:

```
Input 1 limit of current has been set to: 8A
```

Type 'help' to get suggestions

6.8.10.3 Command *set input voltage limit*

Use this command for voltage top and bottom limits.

Help ask (also the input number is necessary):

```
set input 1 voltage ?
```

The return is:

```
set input 1-2 voltage limit min - minimum allowed voltage at
                                specified on input
                                max - maximum allowed voltage at
                                specified on input
```

Type 'help' to get suggestions

Example. Set voltage limits from 45V to 51V.

Command:

```
set input 1 voltage limit min 45 max 51
```

The return is:

```
Minimum voltage value is set to 45 for Input 1
Maximum voltage value is set to 51 for Input 1
```

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

6.8.11. Command *set radius server*

For changing of RADIUS servers settings.

Required parameters:

ip — IP of RADIUS server ;

secret key.

Available parameters:

priority <priority> — numbers from 1 to 100, then more then high priority;

port <port> — from 1 to 65534;

enabled <yes|no> ;

use-vsa-group <yes|no> — enable or disable VSA (Vendor-Specific Attributes) answer from RADIUS server;

use-vsa-session-timeout <yes|no> — timeout VSA answer from RADIUS server.

Help ask:

```
set radius server ?
```

The return is:

RPCM Commands description:

```
set radius server <ip> secret <secret key> - set shared secret
                    priority <priority>      1-100, server usage priority
                                                higher is more priority
                    port <port>              port 1-65534
                    enabled <yes|no>         enabled flag
                    use-vsa-group <yes|no>    to use Group VSA from radius
                                                server response
                    use-vsa-session-timeout <yes|no> to use Session Timeout VSA from
                                                radius server response
```

If you want to add new radius server, use add command.

Type 'help' to get suggestions

Example. Set RADIUS server priority (IP 192.168.1.1) to 12.

The command is:

```
set radius server 192.168.1.1 secret password-key priority 12
```

The return is:

Radius server 192.168.1.1 updated

Type 'help' to get suggestions

6.8.12. Command *set snmp*

It is for updating SNMP parameters.

The available keys are: adminState, community, user, help OR ?

Help displays:

```
set snmp ?
```

The return is:

RPCM Commands description:

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

Type 'help' to get suggestions

6.8.12.1 Command *set snmp adminState*

It administratively enables or disables the SNMP agent, allowing or denying work with this protocol.

The available values are: *on* or *off*.

Help displays:

```
set snmp adminState ?
```

The return is:

```
Please set 'on' or 'off'.
```

Example. Turning SNMP access off and on again.

stopping the agent:

```
set snmp adminState off
```

The return is:

```
SNMP Agent administrative state is now off
```

Agent startup:

```
set snmp adminState on
```

The return is:

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

6.8.12.2. Command *set snmp community*

It controls the configuration of access via SNMP version *1* and *2c*.

Options available are the following:

- **--accessList** — allowed subnet or a separate IP address;
- **--accessType** — access type; *ro* or *rw* values are used;
- **--enabled** — newly created community will be enabled or disabled (this property can be changed later), *yes* or *no* values are available.

Only the short auto-completion help is available.

The command `set snmp community` displays the names of the created community after the key **Tab** is pressed twice.

```
newcommunity public
```

If there is only one community entry in the system, you can use the auto-completion hint:

set snmp community public -- after the key **Tab** is pressed twice, it will return:

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

Example. Allowing access by community *public* by setting the option *--enabled* to *yes*

```
set snmp community public --enabled yes
```

The return is:

```
Community public updated
```

6.8.12.3. Command *set snmp user*

Command *set snmp user* for editing the properties of the user account in the framework of using the protocol *SNMPv3*

Options available are the following:

- **--accessList** — allowed subnet or a separate IP address;
- **--accessType** — access type; *ro* or *rw* values are used;
- **--authPass** — SNMP user account password string;
- **--authProt** — used authentication protocol by password;
- **--enabled** — newly created account will be enabled or disabled (this property can be changed later), values are *yes* or *no*;
- **--privPass** — keyword (password) for encryption;
- **--privProt** — type of encryption;
- **--secLevel** — type of authentication.

Attention! There is no standard hint output for this command. You can use auto-hint with double tabbing.

set snmp user — after pressing the **Tab** key twice, it will display a list of existing users

```
newsnmpuser newrpcuser2
```

If there is only one SNMP user account in the system, you can use the auto-completion hint:

set snmp user newrpcuser 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 *newrpcuser* account by setting the *--enabled* option to *yes*.

```
set snmp user newrpcuser --enabled yes
```

The return is:

```
SNMPv3 user: newrpcuser updated.
```

6.8.13. Command *set time*

It set the system time and time zone.

The available keys are: value,zone, help or ?

Help displays: set time ?

The return is:

RPCM Commands description:

```
set time value          - set time for RPCM
set time zone          - set time zone
set time synchronization - toggle synchronization via NTP protocol
set time help          - show this help
```

6.8.13.1. Command *set time value*

Set the system time.

Help displays:

set time value ?

The return is:

Setting time to:

Please specify the date and time or just the time in the following format: YYYY-MM-DD HH:MM:SS

Example: "2017-06-05 14:32:11" or "20:22:33"

Example 1. Setting the system time in full format (date + time).

```
set time value 2017-11-13 19:38:39
```

The return is:

Setting time to: 2017-11-13

Time has been set

Attention! The quotes are required when setting the exact time in the format "*YYYY-MM-DD HH:MM:SS*".

Example 2. Correcting the system time.

```
set time value 00:13:06
```

The return is:

Setting time to: 00:13:06

Time has been set

6.8.13.2. Command *set time zone*

It set the time zone.

Help displays:

```
set time zone ?
```

The return is:

```
Invalid timezone has been provided, please use <tab> suggestions to select valid timezone
or use 'show time zones' command to see complete list of time zones
```

The return follows that you need to use the `show time zones` command to get information about time zones

Example. We will establish a time zone for Moscow.

```
set time zone Europe/Moscow
```

The return is:

```
Timezone Europe/Moscow has been set
```

6.8.14. Command *set user*

6.8.14.1. General information

It is used to enabling or disabling user.

Available parameters:

accessLevel — setting privilege level;

disabled;

enabled;

password — changing user password.

IMPORTANT! Prohibition or permission, as well as a change in account privileges, occurs immediately, without a request for confirmation from the user. Please consider this if you need to perform actions with the `rpcadmin` master record.

Help ask:

```
set user ?
```

The return is:

RPCM Commands description:

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

```
If you want to add new user, use add command.
```

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

6.8.14.2. Setting privilege level

For example user *newuser* will get set superuser level:

Help ask:

```
set user newuser accessLevel ?
```

The return is:

```
Please provide correct Access Level, the one of: superuser, administrators
```

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

The command is:

```
set user newuser accessLevel superuser
```

The return is:

```
Access Level has been successfully changed
```

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

6.8.14.3. Disable or enable some user

How to disable user:

The command is:

```
set user newuser disabled
```

The return is:

```
User newuser is now disabled
```

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

Note. The use of a question mark “?” in this case it does not cause a help output and does not affect the result of the lock.

```
set user newuser disabled ?
```

The return is:

```
User newuser is now disabled
```

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

How to enable user:

```
set user newuser enabled
```

The return is:

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

6.8.14.4. Change password

How to change password.

The command is:

```
set user newuser password
```

The return is:

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

The return is after successfully confirmation:

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

Password has to include english letters, numbers and symbols: underline and hyphen.

If new password has non-available symbols, you get warning:

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

If new password and confirmation are not identically, you get warning:

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


6.9. Command *set output*

This command serves to control the outlet by setting various parameters.

Help ask:

```
set output 0 ?
```

The return is:

```
RPCM Commands description:
set output 0-9 description      - set output description
set output 0-9 name           - set output name
set output 0-9 off            - turn off output number 0-9
set output 0-9 on             - turn on output number 0-9
set output 0-9 overcurrent    - tune overcurrent limits
  alarm                       for alarming
  turn off                    for turning off
set output 0-9 overvoltage    - set output overvoltage turn off
  turn off                    configuration
  disabled                    disable it
  limit volts 0-65534         set limit in volts
set output 0-9 recognition    - set output 0-9 recognition state
  off                          to off
  on                            to on
set output 0-9 recover turn on - set recover turn on after overvoltage
  after overvoltage           configuration
  disabled                    disable recover turn on
  seconds 0-65534             set stabilization delay before turning on
set output 0-9 survival priority - set output turn off on input overload
  priority                    priority
set output 0-9 help          - show this help

Type 'help' to get suggestions
```

6.9.1 Command *set output description*

This command set an outlet description.

Example of use:

```
set output 0 description "Outlet 0"
```

The return is:

```
Description for Output 0 has been updated
Type 'help' to get suggestions
```

6.9.2 Command *set output name*

This command set an outlet name.

Example of use:

```
set output 0 name "Out-0"
```

The return is:

```
Description for Output 0 has been updated
Type 'help' to get suggestions
```

6.9.3 Command *set output off*

It administratively disables the specified outlet from 0 to 9.

Example of use:

```
set output 9 off
```

The return is:

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

6.9.4 Command *set output on*

It administratively includes the specified outlet from 0 to 9.

Example of use:

```
set output 9 on
```

The return is:

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

6.9.5 Command *set output overcurrent*

it allows you to control power current consumption.

It is possible to set the threshold value for pre-alarm *alarm* and then turn off.

The available options are: alarm, turn off, help

Help ask:

```
set output 9 overcurrent ?
```

The return is:

```
RPCM Commands description:
  set output 0-9 overcurrent alarm    - tune overcurrent alarm limits
  set output 0-9 overcurrent turn off - tune overcurrent turn off limits
  set output 0-9 overcurrent help    - show this help
Type 'help' to get suggestions
```

6.9.5.1. Command *set output overcurrent alarm limit*

Available level 1 parameters indicating current units are: amps, milliamps, and time unit seconds` for the delay parameter of the signal.

Available are level 2 parameters, indicating the numerical values of the parameters.

Help ask:

```
set output 9 overcurrent alarm limit
```

The return is:

RPCM Commands description:

```
set output 0-9 overcurrent
  alarm limit amps 0.000-10.000 - set limit in amps
set output 0-9 overcurrent
  alarm limit milliamps 0-10000 - set limit in milliamps
set output 0-9 overcurrent
  alarm limit seconds 0-65535 - set alarm confirmation
                                delay in seconds
set output 0-9 overcurrent
  alarm limit help - show this help
```

Example 1. Setting alarm outlet limit to 9A to outlet 9.

Command:

```
set output 9 overcurrent alarm limit amps 9.00
```

The return is:

```
New overcurrent alarm limit for output 9 is 9.0 amps (was 9.5 amps)
```

Example 2. Setting the delay for the alarm limit in 5 seconds for the outlet 9.

Command:

```
set output 9 overcurrent alarm limit seconds 5
```

The return is:

```
New overcurrent alarm limit confirmation delay for output 9 is 5 seconds (was 30 seconds)
```

6.9.5.2. Command *set output overcurrent turn off limit*

Available level 1 parameters indicating current units are: amps, milliamps, and time unit seconds` for the delay parameter of the signal.

Available level 2 parameters indicating the numerical values of the parameters of level 1.

Help ask:

```
set output 9 overcurrent turn off limit ?
```

The return is:

RPCM Commands description:

```
set output 0-9 overcurrent turn off limit - tune overcurrent turn off
                                  limits
  amps 0.000-10.000 set limit in amps
  milliamps 0-10000 set limit in milliamps
  seconds 0-65535 set turn off confirmation
                                  delay in seconds
set output 0-9 overcurrent turn off help - show this help
```

Example 1. Setting turn off outlet limit to 9.5A for outlet 9.

Command:

```
set output 9 overcurrent turn off limit amps 9.50
```

The return is:

```
New overcurrent turn off limit for output 9 is 9.5 amps (was 10.0 amps)
```

Example 2. Setting the delay for turn off to 5 seconds for the outlet 9.

```
set output 9 overcurrent turn off limit seconds 5
```

The return is:

```
New overcurrent turn off limit confirmation delay for output 9 is 5 seconds (was 2 seconds)
```

6.9.6 Command *set output overvoltage*

It turn ON overcurrent control and set ann overcurrent top limit.

Help ask:

```
set output 0 overvoltage ?
```

The return is:

RPCM Commands description:

```
set output 0-9 overvoltage turn off - tune overvoltage turn off
set output 0-9 overvoltage help      - show this help
```

Type 'help' to get suggestions

Command *set output overvoltage turn off limit*.

Help ask:

```
set output 0 overvoltage turn on ?
```

The return is:

RPCM Commands description:

```
set output 0-9 overvoltage turn off limit - tune overvoltage turn off
  volts 0-65534                               set limit in volts
  disabled                                     disable overvoltage turn off
set output 0-9 overvoltage turn help         - show this help
```

Type 'help' to get suggestions

Example 1. Setting a limit of 50V.

Command:

```
set output 0 overvoltage turn off limit volts 240
```

The return is:

```
New overvoltage turn off limit for output 0 is 50 volts (was disabled)
```

Type 'help' to get suggestions

Example 2. Disabling an overvoltage turn OFF limit.

Command:

```
set output 0 overvoltage turn off limit disabled
```

The return is:

```
Disable overvoltage turn off limit for output 0 (was 50 volts)
```

Type 'help' to get suggestions

6.9.7 Command *set output recognition*

It includes LED backlighting on the back of the panel to make it easier to find the desired outlet in the rack.

The two available state are: on and off.

Help ask:

```
set output 9 recognition ?
```

The return is:

```
set output 0-9 recognition off - set output 0-9 recognition blinking off
set output 0-9 recognition on - set output 0-9 recognition blinking on
set output 0-9 recognition help - show this help
```

6.10. Command *set automation*

6.10.1. General Information

The command `set automation` is intended for editing the properties of automation for selected device.

Required:

- **name** — the name of the connected device for which the automation rules are configured;

Available options:

- **name** — the new name of the connected device for which automation rules are configured;
- **device-type** — type of supported miner (device for crypto currency production);
- **description** — additional description of the device up to 254 characters;
- **outputs** — outlets numbers, where the device is connected (one or more) in the format "[0-9]" or "[0-9], [0-9]..."
- **check-interval-seconds** — check interval in seconds;
- **inter-restart-interval-seconds** — the protection interval between reboots in seconds;
- **test** — test configuration for Automation.

Display help:

```
set automation ?
```

The return is:

```
set automation device-name - device name to set configured automation for
```

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

Example a query help with device name:

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

The return is:

```
PCM Commands description:
```

```
set automation device-name DEVICE-2
  check-interval-seconds - interval between automation tests in
                        seconds
  default                - set default values for parameters
                        check-interval-seconds and
                        inter-restart-interval-seconds
  description            - description of device, 1 to 254
                        characters
```

```

device-type          - type of device, 1 to 25 characters
inter-restart-interval-seconds - interval between restarts of device in
                        seconds
new-name            - new name of device, 1 to 25 characters
outputs            - number of RPCM outputs ("[0-9]" or
                        "[0-9], [0-9], ...")
test               - configure Automation test

```

Example:

```

set automation device-name DEVICE-2 new-name Name
set automation device-name DEVICE-2 description Description

```

Type 'help' to get suggestions

Example. Add a Description for the device named "DEVICE-2".

The command is:

```
set automation device name DEVICE-2 name description New_Description_for_DEVICE-2
```

The return is:

```
Description changed from '' to 'New_Description_for_DEVICE-2`'
```

6.10.2. Command *set automation test*

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

Contains following:

- **consumption** — according to current consumption. When the consumption drops below the set limit, it indicates the idle operation and the device reboots;
- **hash-rate** — hash level, only for mining devices of supported types;
- **ping** — using ICMP packages similar to the command *ping*;
- **tcp-port-availability** — by the availability of the TCP port.

Help ask:

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

The return is:

```

set automation device-name <name> test
consumption          - Consumption test
hashrate            - Hashrate test
ping                - Ping test
tcp-port-availability - TCP Port Availability test

```

Type 'help' to get suggestions

6.10.2.1. Command *set automation device test consumption*

Used to specify the monitoring of the current consumption level.

Available options:

- **enabled** — answer "yes" or "no" to enable (enable) this control method;
- **alarm-bottom-limit-milliamps** — the lower limit of current consumption in mA, upon which the notification occurs (a warning is sent);
- **restart-bottom-limit-milliamps** — the lower limit of current consumption in mA, after which the device reboots;
- **alarm-seconds** — the delay time in seconds before the notification (sending a warning);
- **restart-seconds** — delay time in seconds before rebooting the device;
- **default** — set all parameters to the default value.

Help ask:

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

The return is:

```
set automation device-name DEVICE-NAME test consumption

Parameters:
  --enabled yes|no           - enables Consumption test
  --alarm-bottom-limit-milliamps - alarm bottom limit milliamps of automatio
n device
  --restart-bottom-limit-milliamps - restart bottom limit milliamps of automat
ion device
  --alarm-seconds           - time in seconds to trigger the alarm afte
r reaching
                           the alarm-bottom-limit-milliamps
  --restart-seconds         - time in seconds to trigger the restart af
ter 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-b
ottom-limit-milliamps 4500 --restart-bottom-limit-milliamps 4300 --alarm-seconds
60 --restart-seconds 300
  set automation device-name testName test consumption --alarm-bottom-limit-mi
lliamps 4600
  set automation device-name testName test consumption --enabled no

Type 'help' to get suggestions
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 --alarm-bottom-limit-milliamps 3500 --restart-bottom-limit-milliamps 3300 --alarm-seconds 600 --restart-seconds 3000
```

The return is:

```
Automation Device ID: 5, Name: 'DEVICE-2' has been updated
Consumption Enabled changed from 'OFF' to 'ON'
Consumption Alarm Bottom Limit Milliamps set to '3500'
Consumption Restart bottom Limit Milliamps set to '3300'
Consumption Alarm Seconds set to '600'
Consumption Restart Seconds set to '300'
```

Type 'help' to get suggestions

Example 2. Turn off current consumption testing for this device:

```
set automation device name DEVICE-2 test consumption --enabled no
```

The return is:

```
Automation Device ID: 5, Name: 'nonexistent_claymore' has been updated
Consumption Enabled changed from 'ON' to 'OFF'
```

Type 'help' to get suggestions

6.10.2.2. Command *set automation device test hashrate*

It is used to specify the settings for monitoring the level of hashrate of specialized devices (miners) for mining crypto currency.

This setting applies only to preset devices for mining. It is not applicable for other devices.

Available options:

- **enabled** — answer "yes" or "no" to enable (enable) this control method;
- **api-ip-address** — IP Address for API access to the miner (device for crypto currency production);
- **api-port** — TCP port for API access to the miner (device for crypto currency extraction);
- **api-unavailability-timeout-seconds** — a valid timeout when the monitored device is unavailable;
- **alarm-bottom-limit** — the lower limit of the hash, after which an alert occurs (a warning is sent out);
- **restart-bottom-limit** — the lower limit of the hash, after which the device reboots;

- **alarm-seconds** — the delay time in seconds before the notification (sending a warning);
- **restart-seconds** — delay time in seconds before rebooting the device;
- **default** — set all parameters to the default value.

Note. At the time of writing, the following types of devices for mining are supported:

Bitmain S9, Bitmain D3, Bitmain L3 +

Whatsminer M3X

Claymore

DragonMint T1

Help ask:

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

The return is:

```
set automation device-name DEVICE-2 test hashrate

Parameters:
  --enabled yes|no           - enables Hashrate test
  --api-ip-address           - api IP Address of miner device
  --api-port                 - api port of miner device
  --api-unavailability-timeout-seconds - api unavailability timeout in seconds
  --alarm-bottom-limit       - alarm bottom limit hashrate for device
  --restart-bottom-limit     - restart bottom limit hashrate for device
  --alarm-seconds            - time in seconds to trigger the alarm
                             after reaching the alarm-bottom-limit
  --restart-seconds          - time in seconds to trigger the restart
                             after reaching the restart-bottom-limit
  --default                  - set default values for all parameters

Example:
  set automation device-name testName test hashrate --enabled yes --api-ip-address
127.0.0.1 --default
  set automation device-name testName test hashrate --enabled yes --api-ip-address
127.0.0.1 --api-port 4028 --api-unavailability-timeout-seconds 3 --alarm-bottom-limit
16700 --restart-bottom-limit 16500 --alarm-seconds 60 --restart-seconds 300
  set automation device-name testName test hashrate --api-unavailability-timeout-seconds
4
  set automation device-name testName test hashrate --enabled no

Type 'help' to get suggestions
```

Example 1. Set for a device with the name "DEVICE-2" lower hash limit for alerting 13500, reboot limit of 13300, delay before 60 seconds warning, delay before restart in 300 seconds, change IP to 10.210.1.93.

```
set automation device-name DEVICE-2 test hashrate --enabled yes --api-ip-address
10.210.1.93 --api-port 4028 --api-unavailability-timeout-seconds 3 --alarm-bottom-limit
13500 --restart-bottom-limit 13300 --alarm-seconds 60 --restart-seconds 300
```

The return is:

```
Automation Device ID: 2, Name: 'DEVICE-2' has been updated
Hash Rate Enabled changed from 'OFF' to 'ON'
Hash Rate API IP Address set to '10.210.1.93'
```

```
Hash Rate API Port set to '4028'
Hash Rate API Unavailability Timeout Seconds set to '3'
Hash Rate Alarm Bottom Limit set to '13500'
Hash Rate Restart Bottom Limit set to '13300'
Hash Rate Alarm Seconds set to '60'
Hash Rate Restart Seconds set to '300'
```

Type 'help' to get suggestions

Example 2. Turn off the hash testing for this device and change the IP address to 10.210.1.91:

```
set automation device-name DEVICE-2 test hashrate --enabled no --api-ip-address
10.210.1.91
```

The return is:

```
Automation Device ID: 2, Name: 'DEVICE-2' has been updated
Hash Rate Enabled changed from 'ON' to 'OFF'
Hash Rate API IP Address changed from '10.210.1.93' to '10.210.1.91'
```

Type 'help' to get suggestions

6.10.2.3. Command *set automation device test ping*

This design is designed to configure the monitoring method using ICMP packets similar to the ping command.

Available options:

- **enabled** — answer "yes" or "no" to enable (enable) this control method;
- **ip-address** — IP Address for testing (sending ICMP packets);
- **connect-timeout-seconds** — an acceptable timeout when the monitored device does not have time to respond;
- **upper-limit-milliseconds** — the limit in milliseconds for the packet to pass;
- **alarm-packet-loss-percentage** — the percentage of loss in packets under which the notification is performed;
- **restart-packet-loss-percentage** — the percentage of loss in packets under which the re-boot is performed;
- **alarm-seconds** — the delay time in seconds before the notification (sending a warning);
- **restart-seconds** — delay time in seconds before rebooting the device;
- **default** — set all parameters to the default value.

Help ask:

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

The return is:

```

set automation device-name DEVICE-NAME test ping

Parameters:
--enabled yes|no           - enables Ping test
--ip-address                - IP Address of the remote device
--connect-timeout-seconds  - connect timeout in seconds
--upper-limit-milliseconds - limit in milliseconds after which echo reply
                           is considered lost
--alarm-packet-loss-percentage - alarm packet loss percentage
--restart-packet-loss-percentage - restart packet loss percentage
--alarm-seconds             - time in seconds to trigger the alarm after
                           reaching the alarm-packet-loss-percentage
--restart-seconds           - time in seconds to trigger the restart after
                           reaching the restart-packet-loss-percentage
--default                   - set default values for all parameters

Example:
set automation device-name testName test ping --enabled yes --ip-address 127.0.0.1 --
default
set automation device-name testName test ping --enabled yes --ip-address 127.0.0.1 --
connect-timeout-seconds 3 --upper-limit-milliseconds 100 --alarm-packet-loss-percentage 50
--restart-packet-loss-percentage 80 --alarm-seconds 10 --restart-seconds 60
set automation device-name testName test ping --connect-timeout-seconds 4
set automation device-name testName test ping --enabled no

Type 'help' to get suggestions

```

Example: Set for a device with the name *"nonexistent_claymore"*, delay before replying in 3 seconds, packet loss percentage for notification 50, packet loss limit for reboot 80, delay before notification in 10 seconds, delay before reboot to 60 seconds, change IP to 10.210.1.243.

The command is:

```

set automation device name nonexistent_claymore test ping enabled yes --ip-address
10.210.1.243 --connect-timeout-seconds 3 --upper-limit-milliseconds 100 --alarm-packet-
loss-percentage 50 --restart-packet-loss-percentage 80 --alarm-seconds 10 --restart-sec-
onds 60

```

The return is:

```

Automation Device ID: 5, Name: 'nonexistent_claymore' has been updated
Ping Connect Timeout changed from '5' to '3'
Ping Upper Limit Milliseconds changed from '3000' to '100'
Ping Alarm Packet Loss Percentage changed from '5' to '50'
Ping Alarm Seconds changed from '60' to '10'
Ping Restart Packet Loss Percentage changed from '10' to '80'
Ping Restart Seconds changed from '120' to '60'
Ping Enabled already 'ON'
Ping Ip Address already '10.210.1.243'

```

6.10.2.4. Command *set automation device test tcp-port-availability*

Used to specify the settings for monitoring by accessibility of the selected TCP port.

Available options:

- **enabled** — answer "yes" or "no" to enable (enable) this control method;
- **ip-address** — IP Address for port access to the device;
- **port** — TCP port for accessing the device;
- **connect-timeout-seconds** — an acceptable timeout when the monitored device does not have time to respond;
- **alarm-seconds** — the delay time in seconds before the notification (sending a warning);
- **restart-seconds** — delay time in seconds before rebooting the device;
- **default** — set all parameters to the default value.

Help ask:

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

The return is:

```
set automation device-name DEVICE-NAME test tcp-port-availability

Parameters:
--enabled yes|no          - enables TCP Port Availability test
--ip-address              - IP Address of the remote device
--port                   - port of the remote device
--connect-timeout-seconds - connect timeout in seconds
--alarm-seconds          - time in seconds to trigger the alarm after reaching
                          the connect-timeout-seconds
--restart-seconds        - time in seconds to trigger the restart after reaching
                          the connect-timeout-seconds
--default                 - set default values for all parameters

Example:
set automation device-name testName test tcp-port-availability --enabled yes --default
set automation device-name testName test tcp-port-availability --enabled yes --ip-ad-
dress 127.0.0.1 --port 80 --connect-timeout-seconds 3 --alarm-seconds 10 --restart-seconds
60
set automation device-name testName test tcp-port-availability --ip-address 127.0.0.2
set automation device-name testName test tcp-port-availability --enabled no

Type 'help' to get suggestions
```

Example 1. Set for the device with the name "*nonexistent_claymore*", TPC port 80, timeout at connection in 3 seconds, delay before notification in 10 seconds, delay before reboot in 60 seconds, change IP to 10.210.1.243.

The command is:

```
set automation device-name DEVICE-2 test tcp-port-availability --enabled yes --ip-address
10.210.1.243 port 80 --connect-timeout-seconds 3 --alarm-seconds 10 --restart-seconds 60
```

The return is:

```
Automation Device ID: 5, Name: 'nonexistent_claymore' has been updated
  TCP Port Availability Enabled changed from 'OFF' to 'ON'
  TCP Port Availability IP Address set to '10 .210.1.243 '
  TCP Port Availability Port set to '80'
  TCP Port Availability Connect Timeout set to '3'
  TCP Port Availability Alarm Seconds set to '10'
  TCP Port Availability Restart Seconds set to '60'
```

Type 'help' to get suggestions

Example 2. Disable testing for this device on the TCP port:

```
set automation device-name DEVICE-2 test tcp-port-availability --enabled no
```

The return is:

```
Automation Device ID: 5, Name: 'nonexistent_claymore' has been updated
  TCP Port Availability Enabled changed from 'ON' to 'OFF'
```

6.11. Command *start*

6.11.1. General information

It is used to run additional procedures.

Help ask:

start ?

Output of information about the command:

RPCM Commands description:

```

start firmware
  update          - start firmware update procedure
start update      - start software update procedure
                   (software update file should already be uploaded)
start configuration
  restore         - start configuration restoration procedure
                   (configuration file should already be uploaded)

```

Type 'help' to get suggestions

6.11.2. Command *start update*

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

Help ask:

start update?

The return is:

```
We are not ready to start update, software update file should be uploaded and verified...
```

For information on the operation of this construction, refer to section 4.7. *Updating the RPCM software*.

6.11.3. Command *start firmware update*

Used to update the firmware.

The firmware have to updated after installing the software.

The procedure requires a separate manual start.

Use:

```
start firmware update
```

For more details, please refer to the section: "4.7. *Updating the RPCM software*".

6.11.4 Command *start configuration restore*

Use this command to restore of configuration from a backup file.

You can upload a backup file before start configuration restore. For example:

```
scp RPCM_FirstBatchSeven_20181128_194640.config
rpcmadmin@10.0.0.1:RPCM_FirstBatchSeven_20181128_194640.config
```

Help ask:

```
start configuration restore ?
```

The return is:

```
start configuration restore      - start configuration restoration procedure
                                (configuration file should already
                                be uploaded)

Parameters:
  --with-reset-to-default yes|no - reset RPCM to default settings before
                                restoration procedure
  --skip-invalid-params yes|no  - skip invalid params

Example:
  start configuration restore
  start configuration restore --with-reset-to-default yes
  start configuration restore --with-reset-to-default yes --skip-invalid-param
s yes
  start configuration restore --skip-invalid-params yes

Type 'help' to get suggestions
```

Parameters:

--with-reset-to-default yes/no — by default is OFF;

--skip-invalid-params yes/no — by default is OFF.

Note. By default, a "delta restore" of the configuration will be performed — only those sections will be restored, that are in the backup file. All settings that were before the start of the restore and which are not in the backup file will be saved. If you need to restore all setting strictly from backup, you can use parameter `start configuration restore--with-reset-to-default yes`.

Example. To restore configuration without additional parameters:

Command:

```
start configuration restore
```

The return is:

```
Configuration restore without reset started...
Type 'help' to get suggestions
```

For information about a progress of restoring use command:

```
show configuration restore status
```


The return is:

```
Process of restoring the configuration... Progress: 6%  
Type 'help' to get suggestions
```

Next step you need to restart High Level Controller (HLC)

Command:

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

6.12. Command *whoami*

Displays the name of the active user account in which the system is running.

Example:

```
whoami
```

The return is:

```
Current username is 'rpcmadmin'
```

6.13. Command *ping*

It is used to diagnose network connections.

Help displays: ping ?

Information about the command:

```
RPCM Commands description:  
ping <hostname or ip> - ICMP ping to ip address or hostname
```

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.

Parameters:

- **update** — interrupts the update procedure deletes all downloaded data and starts the recovery procedure;
- **configuration restore** — interrupts the restore procedure, deletes all loaded configuration file.

Display help:

```
cancel ?
```

The return is:

RPCM Commands description:

```
cancel update          - abort software update procedure
                        (it will abort software update procedure, remove
                        all uploaded data and start recovery procedure)
cancel configuration
restore                - abort configuration restore procedure
                        (it will remove uploaded configuration)
```

Type 'help' to get suggestions

6.14.1 *Cancel update*

Command:

```
cancel update
```

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

6.14.2. *Cancel configuration restore*

Command:

```
cancel configuration restore
```

For more information about the configuration restore process, it is recommended to refer to the sections: "*4.6.14. Backup and Restore Settings*" and "*6.11.4 Command start configuration restore*".

Appendices

Brief description of these appendices:

Appendix 1. Troubleshooting contains information about the main ways to eliminate minor problems, as well as about contacting support services.

Appendix 2. Specifications describes the technical characteristics, functions of the device and various requirements, including safety and environmental protection.

Appendix 1. Troubleshooting

ATTENTION! Before you start any action, you need to check whether the grounding is properly connected.

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

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. Fault 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. To reset the password, you must press top button on the device and hold for ~20 seconds. (See section 4.6. <i>RPCM Configuration Management</i>). WARNING! Resetting to factory settings will reset all settings, including network settings.
The connection is not established, there is no access via the Ethernet network, for other devices the network is functioning properly.	Reboot the <i>High Level Controller (HLC)</i> running the Software. This module restarts without interrupting the power supply of the connected devices. To reboot the High Level Controller, simultaneously press both buttons on the device and hold for 11-13 seconds.

Malfunctions when connecting devices to the RPCM outlets

Possible malfunctions when connecting devices to the RPCM power outlets are included in Table A1.3.

Table A1.3. Connecting devices malfunctions 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 of technical support for the RPCM product:

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

Technical support <https://rpcm.pro>

Feedback <https://rpcm.pro/#contacts>

Appendix 2. Specifications

Table A2.1. Technical characteristics of RPCM DC ATS 76A and RPCM DC 232A.

Name of the characteristics	RPCM DC ATS 76A	RPCM DC 232A
Inputs		
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 ²)	Screw terminals: rigid cable (25-95 mm ²); flexible cable (35-95 mm ²)
Rated voltage	-48 VDC (42-58VDC)	-48 VDC (42-58VDC)
Outlets		
Number of connections	10 clamp terminals	10 clamp terminals
Connection Type	Clamp terminals: 4 mm ²	Clamp terminals: 4 mm ²
Rated voltage	48VDC	48VDC
Rated and maximum current	30A (with a cross section of 4 mm ²); 24A (with a cross section of 2.5 mm ²)	30A (with a cross section of 4 mm ²); 24A (with a cross section of 2.5 mm ²)
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.
Light indication (display)		
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 at the output / overcurrent at the inputs	On / off / short / overcurrent at the output / overcurrent at the inputs
Remote control and monitoring		
Input Status	On / off / mismatch parameters / activity; voltage / current / power	On / off / mismatch parameters / activity; voltage / current / power

Name of the characteristics	RPCM DC ATS 76A	RPCM DC 232A
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
Other options		
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
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 allow 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 utilization materials on a contractual basis with an organization that has a license for ecological utilization.

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.

Recognition — an object identification. For power management, you need to accurately identify the object: a separate input, output, or the entire RPCM. To solve this problem, a backlight or a sound signal (beeper) can be used.

Administrative status — the object status as defined by the RPCM administrator (user). “*Administratively off*” means that the power supply has been turn off by the administrator. The state “*administratively on, hardware off*” means that, according to the administrative settings, power should be supplied, but it was interrupted at the hardware level, for example, an overload or short circuit protection of the RPCM was triggered.

“**Cold**” **start** — start power to the RPCM from an external source after a complete shutdown. A “**cold**” **restart** terminates and resumes power to the RPCM outlets.

Network

DHCP — Dynamic Host Configuration Protocol is based on the TCP / IP stack. It is used to automatically assign an IP address and other network parameters to network nodes.

DHCP server — service to support the DHCP protocol in the network.

Zero Configuration (Networking) — technology to quickly set up a local TCP / IP network without a DHCP server and manually configure settings. When using this method of network address configuration, IP is automatically assigned from the range *169.254.xxx.xxx*, network mask (Netmask) *255.255.0.0* (Another notation - CIDR standard - *169.254.0.0/16*).

APIPA — Automatic Private IP Addressing — Atomic addressing in a private network. It has another name — **Zero Configuration (Networking)**.

IPv4LL — IPv4 Link Local - also referred to as **Zero Configuration Networking** or **APIPA (Automatic Private IP Addressing)**.

MAC address — Media Access Control (address) or hardware address — 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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