

Battery Monitoring System

(Battery monitoring system for larger UPS systems)

BTMS GATEWAY MANUAL

(BM-GW)

Table of content

1. BTMS Gateway.....	3
2. BTMS Gateway WEB User Interface	6
Log-in	6
General description	7
Data center	8
UPS.....	14
String.....	17

1. BTMS Gateway

Order code: BM-GW

Highlights & Features



- Local WEB UI
- real-time data display
- data logging
- history data display (tables, time-plots)
- history and real-time data download
- e-mail, SMS alarming
- Robust and safe connection of BTMS system to BTMS cloud platform.
- Secure access and communication (TLS encryption)
- Local data buffer, no data loss
- User data safety according to GDPR
- Secure remote access to BM-C controllers

System specifications

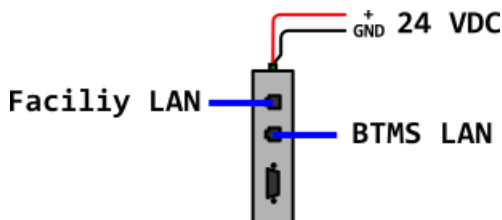
- Up to 32 strings arbitrarily distributed on several UPSs
- Up to 120 batteries / string (3840 batteries / system)
- Temperature and humidity sensor for each string
- Logging data for one year by automatically deleting old data
- Send e-mail and SMS alarms directly from the device

HW Technical specification

Power supply in	12 ... 24 VDC, 1.39 ... 0.72 A
Construction in	Extruded aluminum and heavy-duty steel, IP30
CPU in	Intel® Celeron® N3350 2C @1.1 GHz, TDP: 6 W
System Memory in	1 x DDR3L-1866 SO-DIMM 4 GB
Storage in	128 GB SSD
System I/O Outlet in	Serial 1 x DB9 RS-232/422/485

	Display 1 x VGA	
	Ethernet 2 x RJ-45 isolated* 10/100/1000 Mbps	
	DIO 1 x DB9 8-bit programmable DIO	
	LTE Cat 4 Quectel EG25-G Mini PCIe	
Working temp. in	-20 °C ... +70 °C (-4 °F ... +158 °F)	
Humidity in	0% to 95%	
Vibration Endurance in	2 Gms with storage (5 to 500 Hz, X/Y/Z direction; random, operating)	
Mounting in	DIN rail, wall	
Weight (net/gross) in	0.3 kg (0.67 lb.)/0.45 kg (0.99 lb.)	
Dimensions in	height	125 mm
	width	31 mm
	depth	100 mm

Wiring

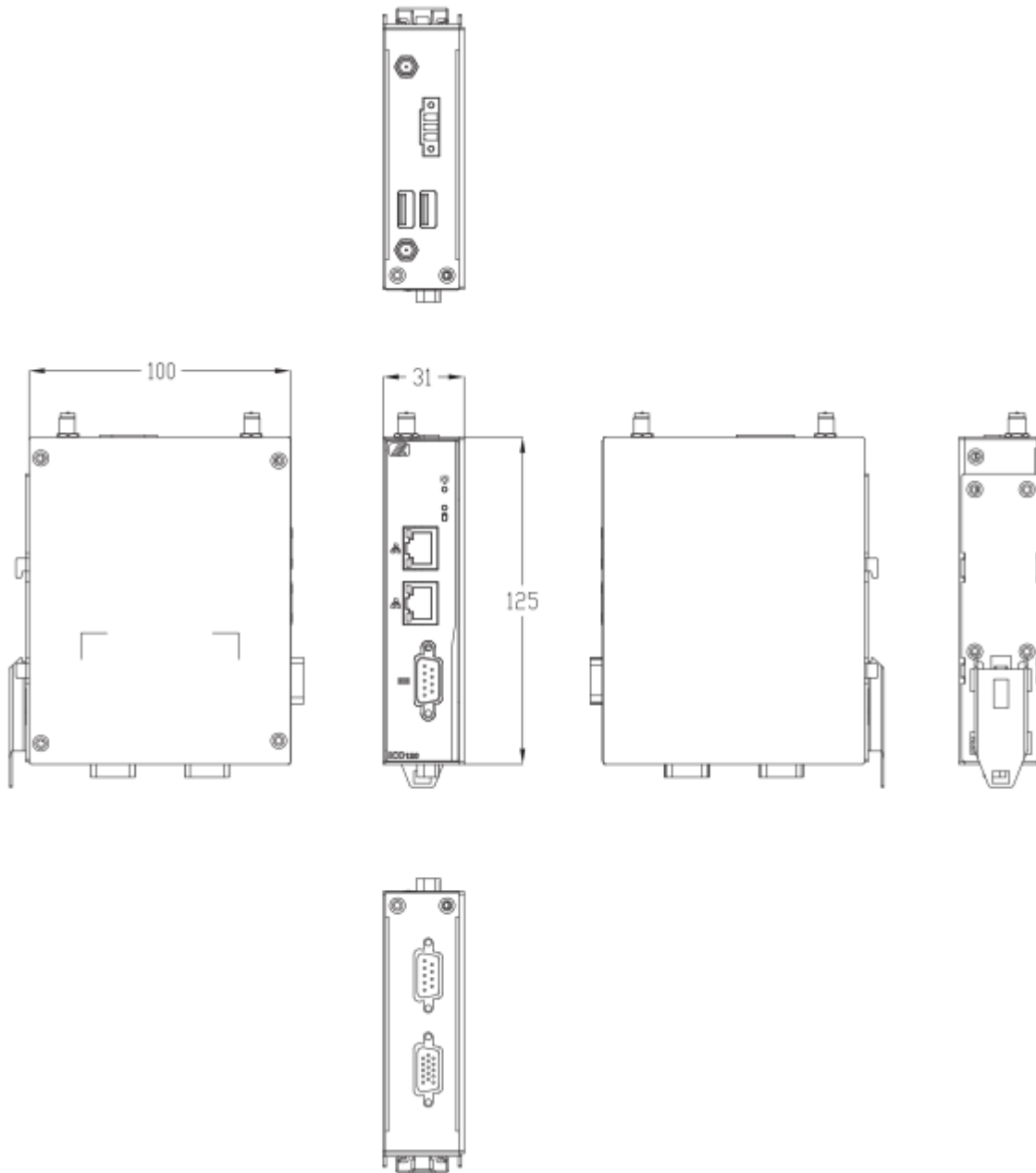


Mounting

- On DIN Rail (35 mm) in control system cabinet

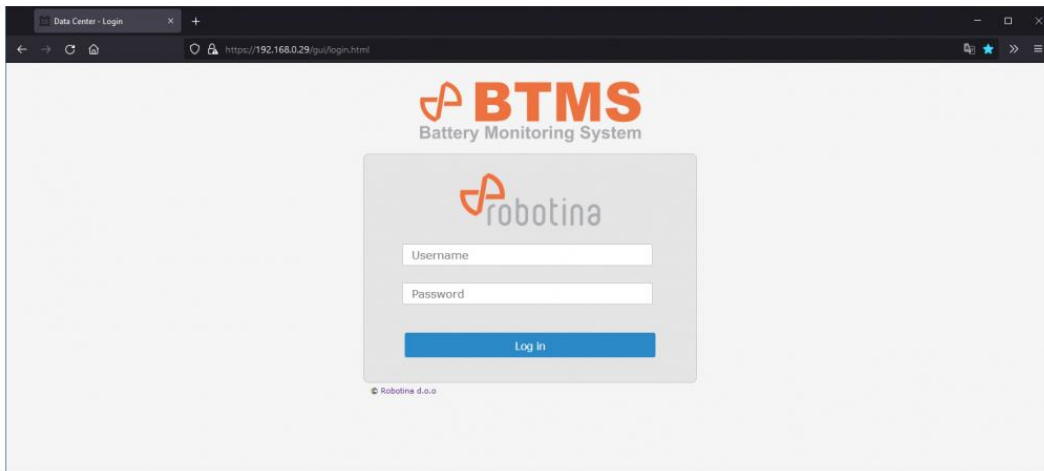


Dimensions



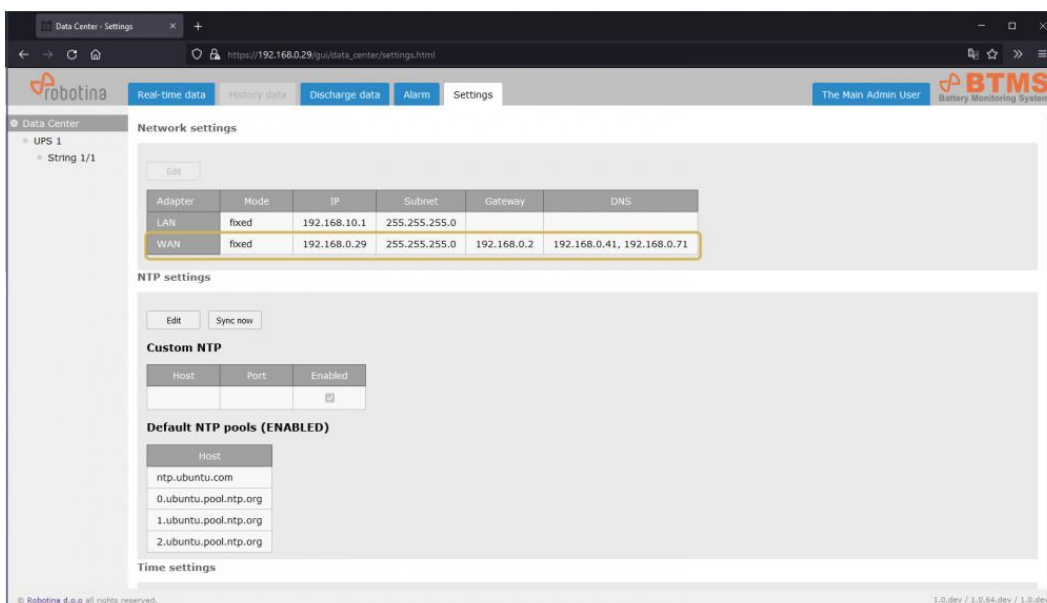
2. BTMS Gateway WEB User Interface

Log-in



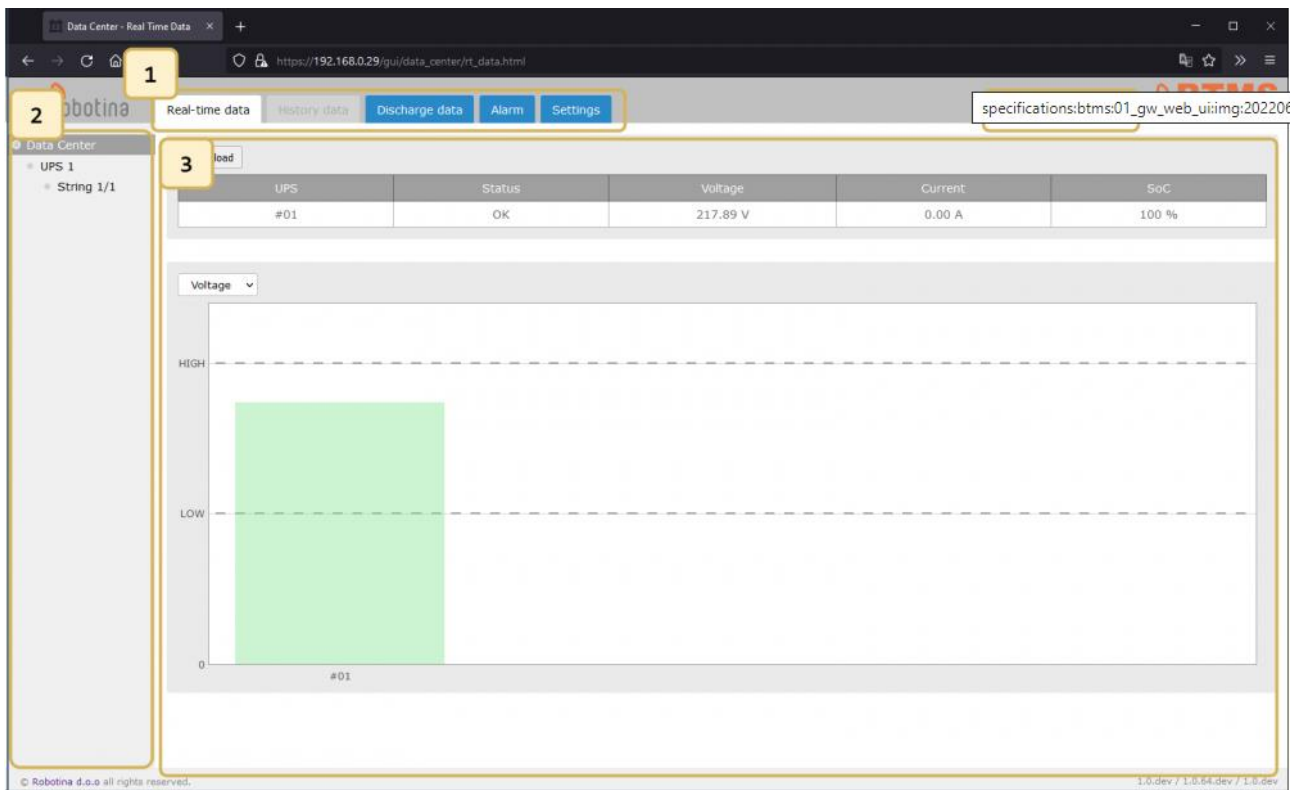
1st time log in:

- Connect Ethernet 2 port to facility LAN
- Connect PC to Ethernet 1 port (standard Ethernet cable between PC and BM-GW Ethernet 1 port)
- For PC Ethernet connection set fixed IP 192.168.10.100.
- Use the Internet browser to go to <https://192.168.10.1>
- Log in as:
 - user: admin
 - password: bmgw!admin
- Check the WAN IP address on the Data center - Settings page and set it if necessary



- Connect the PC to the facility LAN and go to the <https://IP> address of the WAN port

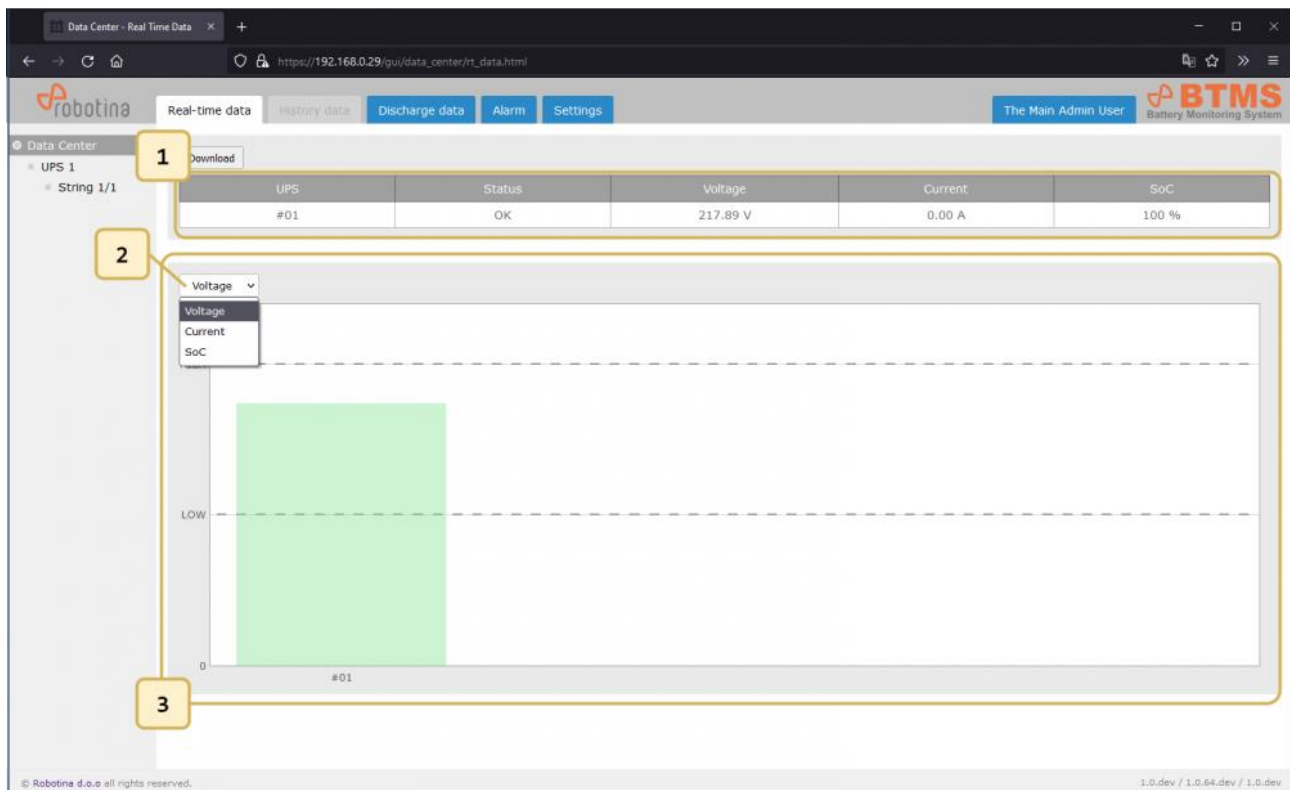
General description



1	Pages tabs
2	Data center tree structure
3	Page data

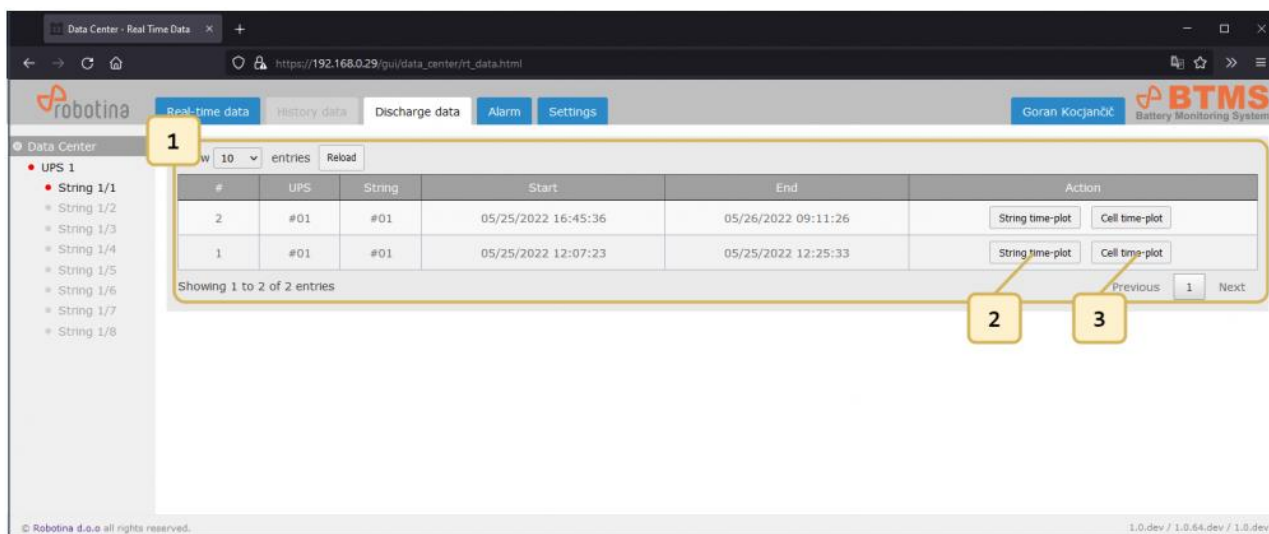
Data center

Real-time data



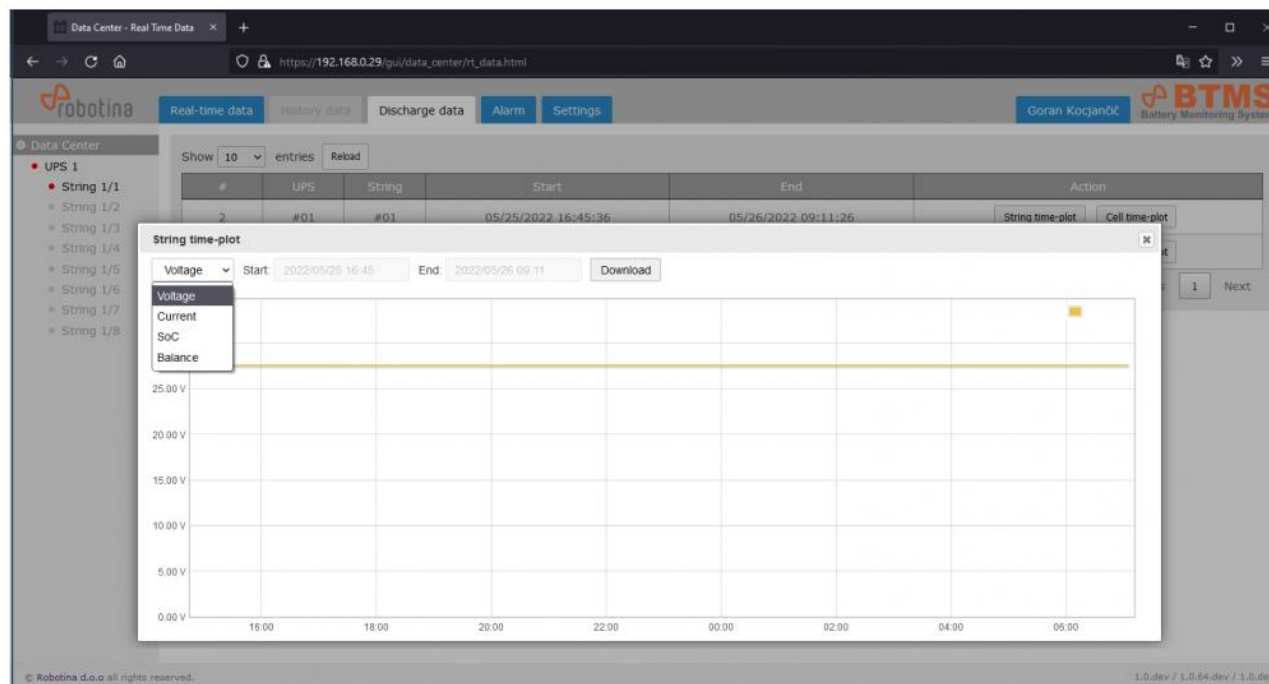
1	Tabular display of data for the Data Center
2	Select a parameter for the graphic display
3	Graphic bar-graph data display for the data center

Discharge data

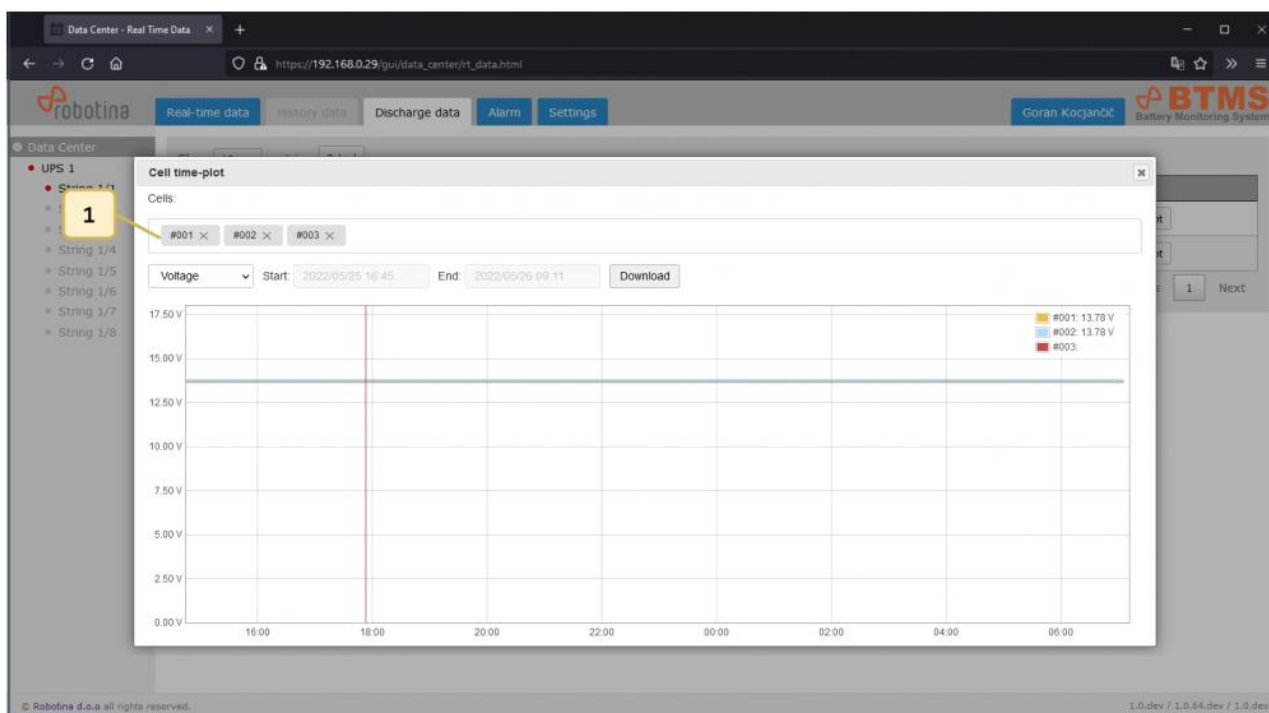


1	Discharge events table
2	String time-plot for discharge event
3	Cell time-plot for discharge event

String time-plot for discharge event



Cell time-plot for discharge event



1 Cell selection

Alarm

The screenshot shows the 'Alarms' sub-page in the Robotina BTMS interface. The page title is 'Data Center - Alarms'. The 'Alarms' sub-page is selected, and the 'Alarms' tab is active. A table lists 14 alarm entries. A yellow box labeled '1' highlights the 'Alarms' sub-page selection, and another yellow box labeled '2' highlights the table.

#	UPS	String	Cell	From	To	Alarm	Status
14	#01	#01	#001	06/07/2022 14:22:20		Temperature high	active
13	#01	#01		06/06/2022 13:35:56	06/06/2022 13:38:24	Current low (discharging)	gone
12	#01	#01		06/06/2022 13:29:16	06/06/2022 13:38:24	Current high (charging)	gone
11	#01	#01		06/06/2022 13:14:48	06/06/2022 13:28:41	Voltage low	gone
10	#01	#01		06/06/2022 13:14:48	06/06/2022 13:28:41	Voltage high	gone
9	#01	#01		06/06/2022 13:14:48	06/06/2022 13:28:41	Current low (discharging)	gone
8	#01	#01		06/06/2022 13:14:48	06/06/2022 13:28:41	Current high (charging)	gone
7	#01	#01		06/06/2022 13:00:19	06/06/2022 13:00:51	Voltage low	gone
6	#01	#01		06/06/2022 12:43:25	06/06/2022 13:00:51	Voltage high	gone
5	#01	#01		06/06/2022 12:43:25	06/06/2022 13:00:51	Current low (discharging)	gone

1 Alarms sub-page selection

2 Alarms table

E-mails

Robotina Battery Monitoring System (BTMS) interface showing E-mails sent for an alarm. The interface includes navigation tabs for Real-time data, History data, Discharge data, Alarm, and Settings. The current view is 'E-mails' under the 'Alarms' section.

#	UPS	String	Cell	Alarm	Time	Contact	Status	Error
6	#01	#01		current low (discharging)	06/06/2022 13:40:49	The Main Admin User / razvoj@3-port.si	failed	SMTP server not configured
5	#01	#01		current low (discharging)	06/06/2022 13:40:39	Uroš Marušič / uros.marusic@3-port.si	failed	Couldn't connect to host, port: localhost, 25; timeout -1
4	#01	#01		3 events from 2022-06-06T13:14:48+02:00 to 2022-06-06T13:29:16+02:00	06/06/2022 13:32:05	The Main Admin User / razvoj@3-port.si	failed	Couldn't connect to host, port: localhost, 25; timeout -1
3	#01	#01		3 events from 2022-06-06T13:14:48+02:00 to 2022-06-06T13:29:16+02:00	06/06/2022 13:32:05	Uroš Marušič / uros.marusic@3-port.si	failed	Couldn't connect to host, port: localhost, 25; timeout -1
2	#01	#01		3 events from 2022-06-06T13:00:51+02:00 to 2022-06-06T13:14:48+02:00	06/06/2022 13:17:06	The Main Admin User / razvoj@3-port.si	failed	Couldn't connect to host, port: localhost, 25; timeout -1
1	#01	#01		3 events from 2022-06-06T13:00:51+02:00 to 2022-06-06T13:14:48+02:00	06/06/2022 13:17:05	Uroš Marušič / uros.marusic@3-port.si	failed	Couldn't connect to host, port: localhost, 25; timeout -1

Showing 1 to 6 of 6 entries

SMS

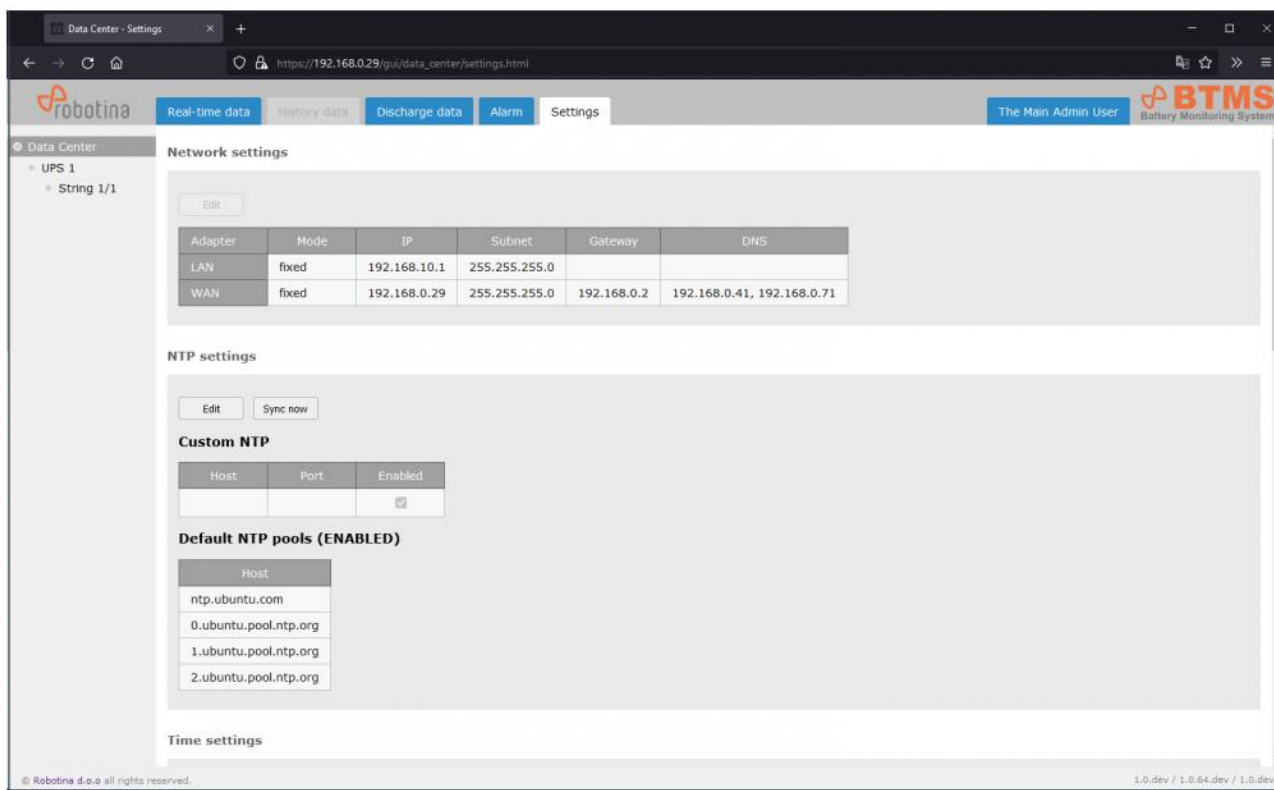
Robotina Battery Monitoring System (BTMS) interface showing SMS sent for an alarm. The interface includes navigation tabs for Real-time data, History data, Discharge data, Alarm, and Settings. The current view is 'SMS' under the 'Alarms' section.

#	UPS	String	Cell	Alarm	Time	Contact	Status	Error
6	#01	#01		2 events from 2022-06-06T13:29:16+02:00 to 2022-06-06T13:38:24+02:00	06/06/2022 13:40:39	Uroš Marušič / uros.marusic@3-port.si	failed	Connection refused (Connection refused)
5	#01	#01		3 events from 2022-06-06T13:14:48+02:00 to 2022-06-06T13:29:16+02:00	06/06/2022 13:32:05	Uroš Marušič / uros.marusic@3-port.si	failed	Connection refused (Connection refused)
4	#01	#01		2 events from 2022-06-06T13:00:51+02:00 to 2022-06-06T13:14:48+02:00	06/06/2022 13:17:06	Uroš Marušič / uros.marusic@3-port.si	failed	Connection refused (Connection refused)
3	#01	#01		2 events from 2022-06-06T12:43:25+02:00 to 2022-06-06T13:00:51+02:00	06/06/2022 13:03:59	Uroš Marušič / uros.marusic@3-port.si	failed	Connection refused (Connection refused)
2	#01	#01		2 events from 2022-06-06T07:38:22Z to 2022-06-06T10:43:25Z	06/06/2022 12:47:57	Uroš Marušič / uros.marusic@3-port.si	failed	Connection refused (Connection refused)
1	#01	#01		2 events from 2022-06-06T07:35:55Z to 2022-06-06T07:38:22Z	06/06/2022 09:42:23	Uroš Marušič / uros.marusic@3-port.si	failed	Connection refused (Connection refused)

Showing 1 to 6 of 6 entries

Settings

Network settings, NTP settings



The screenshot shows the 'Settings' page for the Robotina BTMS. The 'Network settings' section includes a table with the following data:

Adapter	Mode	IP	Subnet	Gateway	DNS
LAN	fixed	192.168.10.1	255.255.255.0		
WAN	fixed	192.168.0.29	255.255.255.0	192.168.0.2	192.168.0.41, 192.168.0.71

The 'NTP settings' section includes a 'Custom NTP' table:

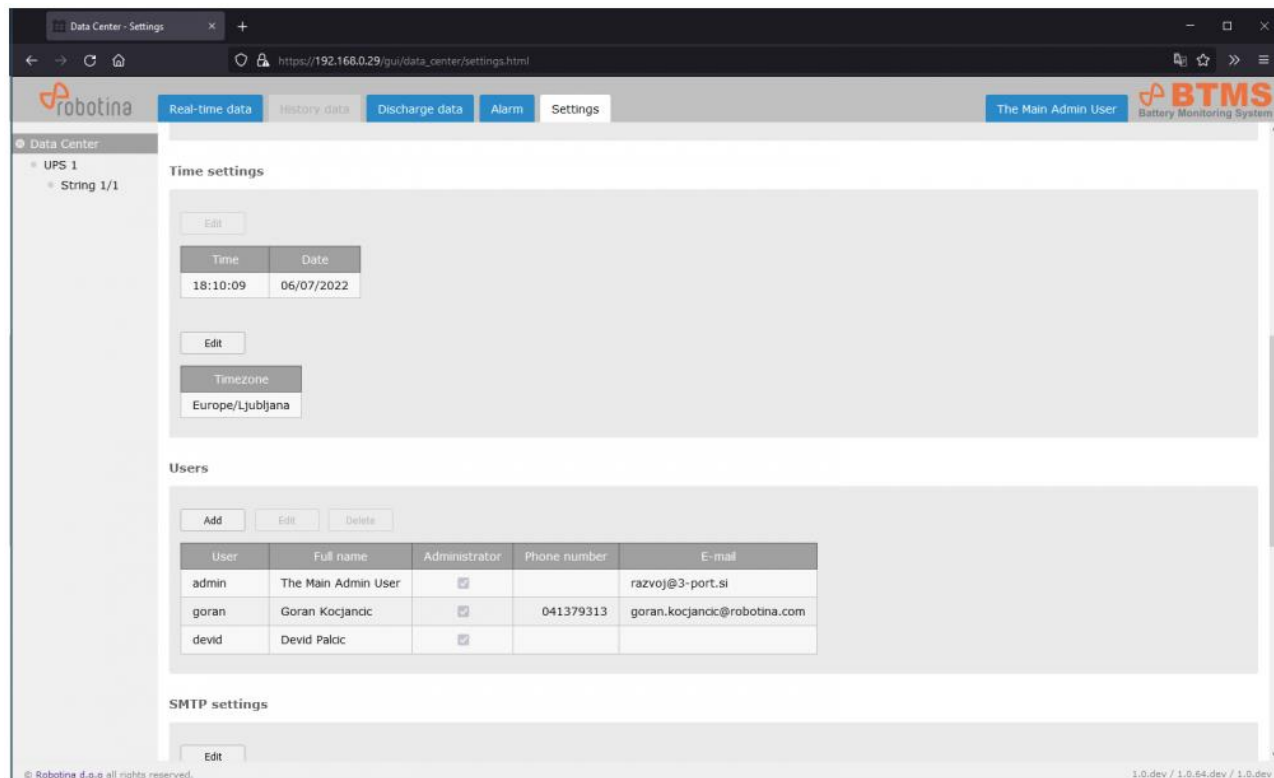
Host	Port	Enabled
		<input checked="" type="checkbox"/>

Below it are the 'Default NTP pools (ENABLED)' listed as:

- ntp.ubuntu.com
- 0.ubuntu.pool.ntp.org
- 1.ubuntu.pool.ntp.org
- 2.ubuntu.pool.ntp.org

The 'Time settings' section is partially visible at the bottom.

Time settings, Users



The screenshot shows the 'Settings' page for the Robotina BTMS, focusing on 'Time settings' and 'Users'.

The 'Time settings' section displays:

Time	Date
18:10:09	06/07/2022

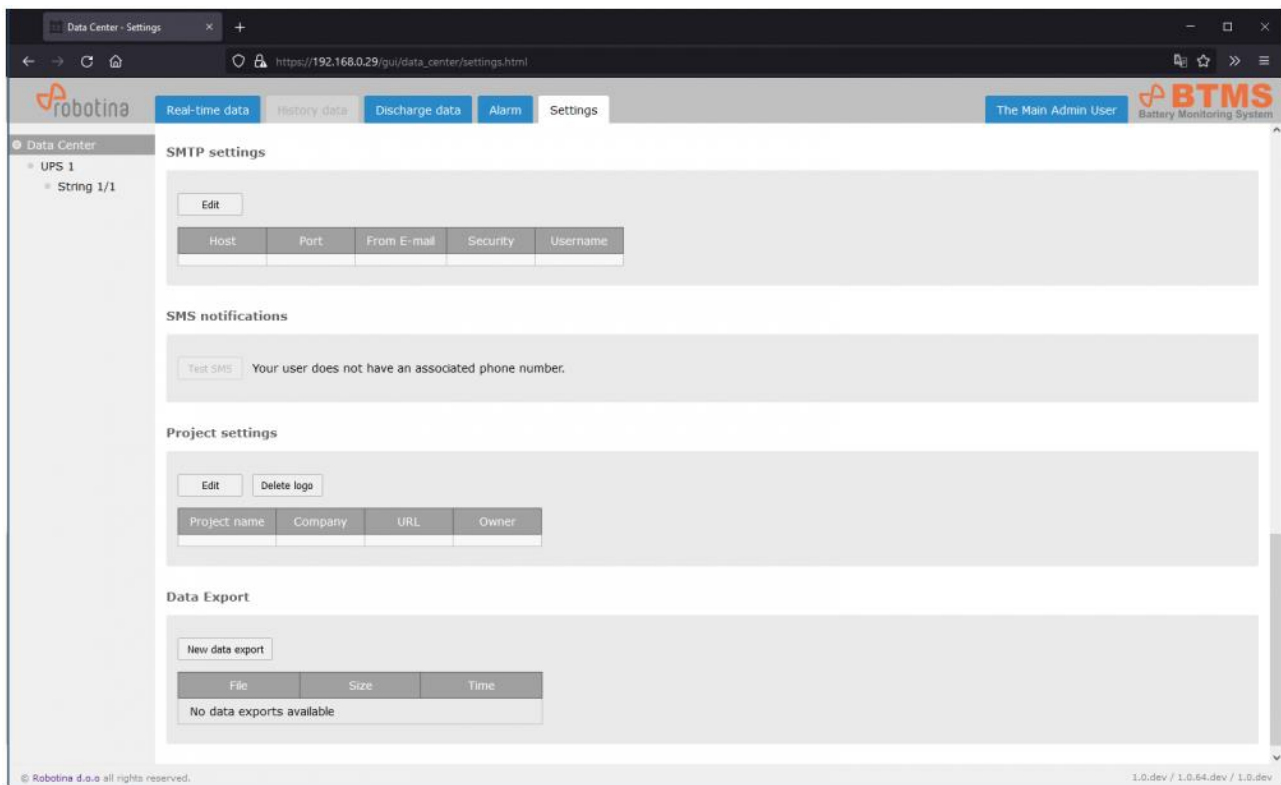
Below this is the 'Timezone' dropdown menu set to 'Europe/Ljubljana'.

The 'Users' section includes a table with the following data:

User	Full name	Administrator	Phone number	E-mail
admin	The Main Admin User	<input checked="" type="checkbox"/>		razvoj@3-port.si
goran	Goran Kocjancic	<input checked="" type="checkbox"/>	041379313	goran.kocjancic@robotina.com
devid	Devid Palcic	<input checked="" type="checkbox"/>		

The 'SMTP settings' section is partially visible at the bottom.

SNMP settings, SMS notifications, Project settings, Data export



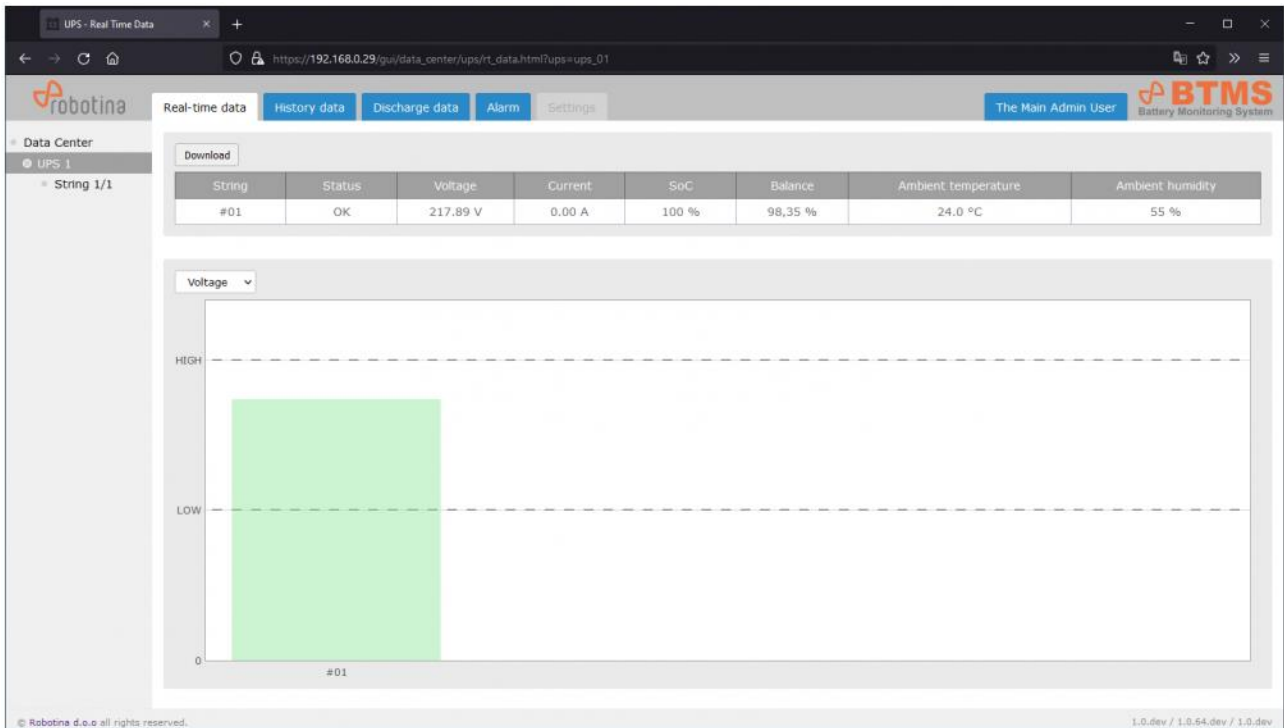
The screenshot shows the 'Data Center - Settings' page in a web browser. The browser address bar shows 'https://192.168.0.29/gui/data_center/settings.html'. The page has a navigation menu with 'Real-time data', 'History data', 'Discharge data', 'Alarm', and 'Settings' (selected). The user is logged in as 'The Main Admin User'. The left sidebar shows a tree view with 'Data Center', 'UPS 1', and 'String 1/1'. The main content area is divided into four sections:

- SMTP settings:** Contains an 'Edit' button and a table with columns: Host, Port, From E-mail, Security, Username.
- SMS notifications:** Contains a 'Test SMS' button and a message: 'Your user does not have an associated phone number.'
- Project settings:** Contains 'Edit' and 'Delete logo' buttons and a table with columns: Project name, Company, URL, Owner.
- Data Export:** Contains a 'New data export' button and a table with columns: File, Size, Time. Below the table, it says 'No data exports available'.

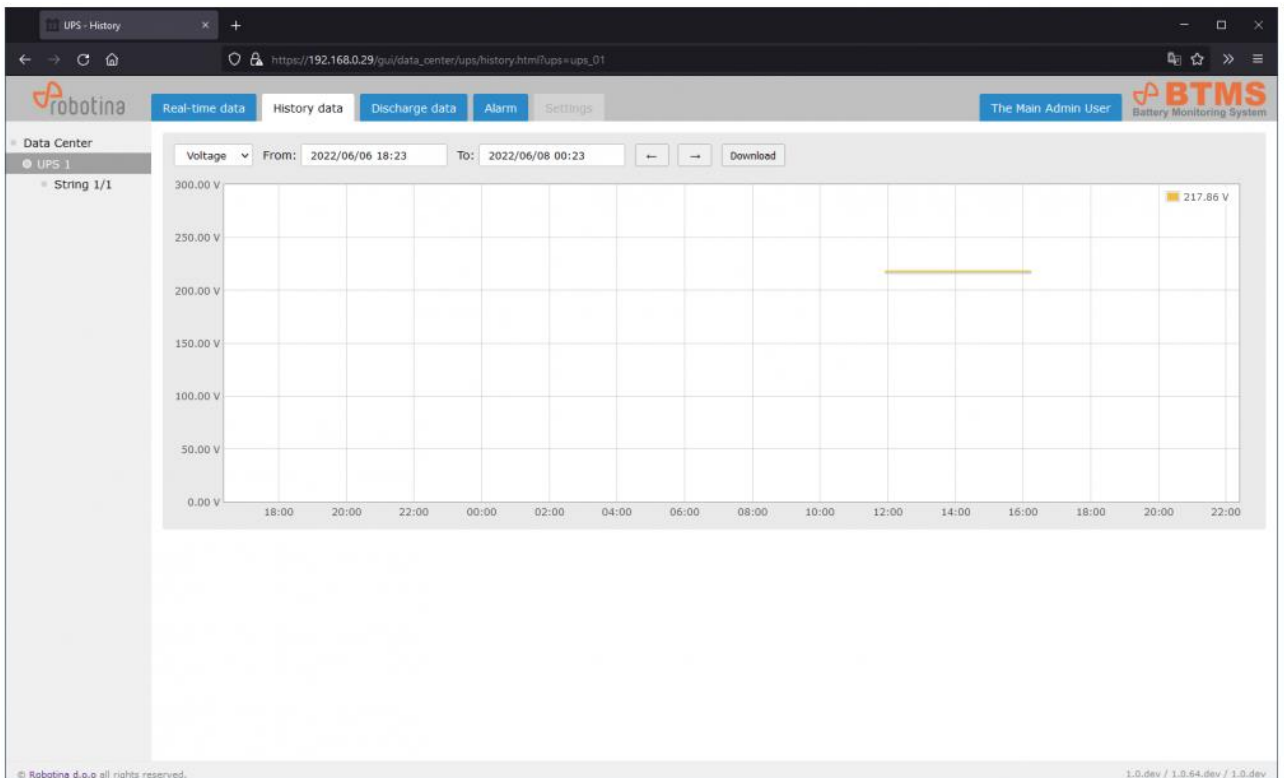
At the bottom of the page, there is a copyright notice: '© Robotina d.o.o. all rights reserved.' and version information: '1.0.dev / 1.0.64.dev / 1.0.dev'.

UPS

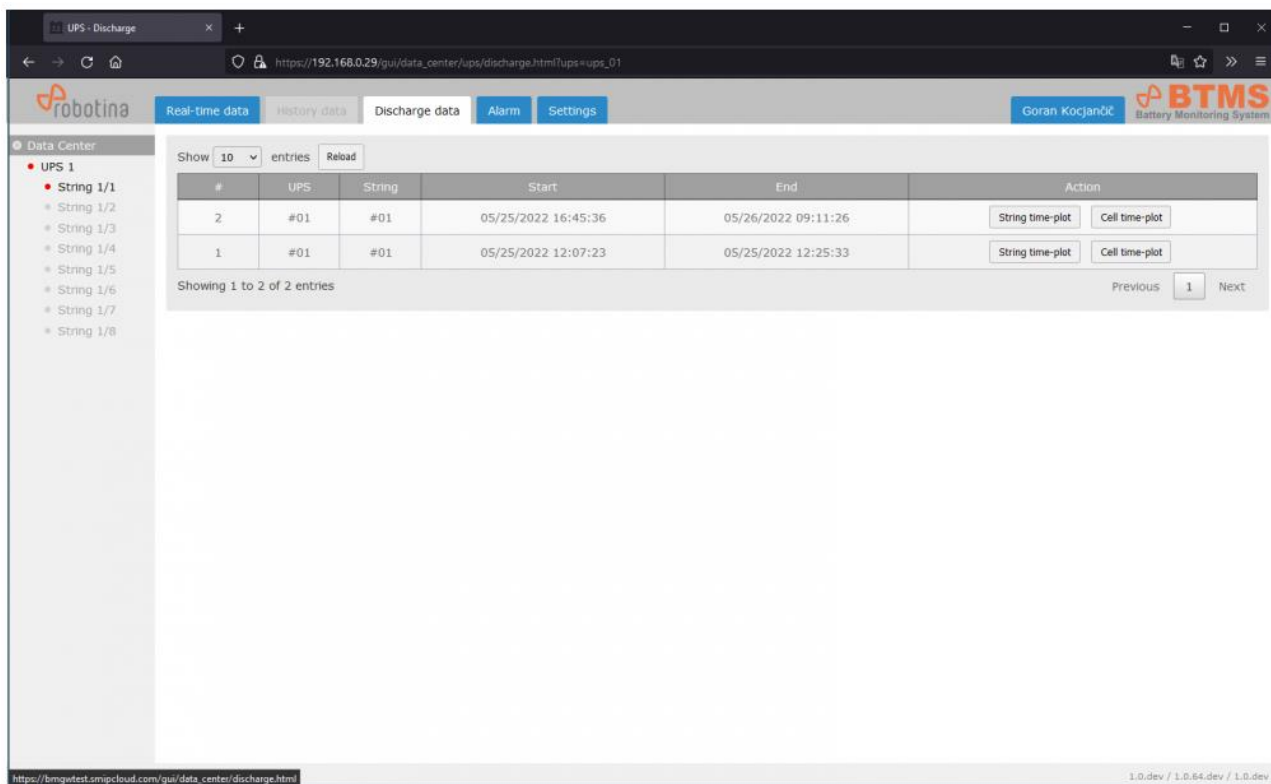
Real-time data



History data



Discharge data

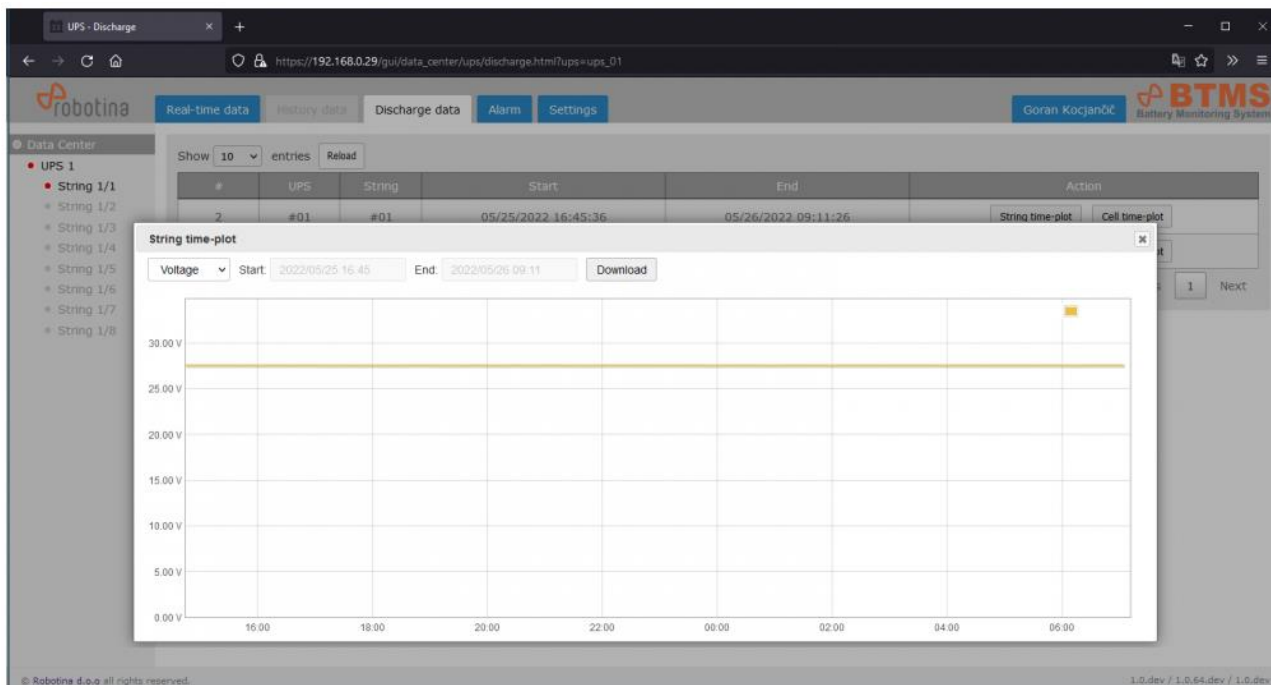


The screenshot shows the 'Discharge data' tab in the BTMS interface. A table displays two discharge events:

#	UPS	String	Start	End	Action
2	#01	#01	05/25/2022 16:45:36	05/26/2022 09:11:26	String time-plot Cell time-plot
1	#01	#01	05/25/2022 12:07:23	05/25/2022 12:25:33	String time-plot Cell time-plot

Showing 1 to 2 of 2 entries

String time-plot



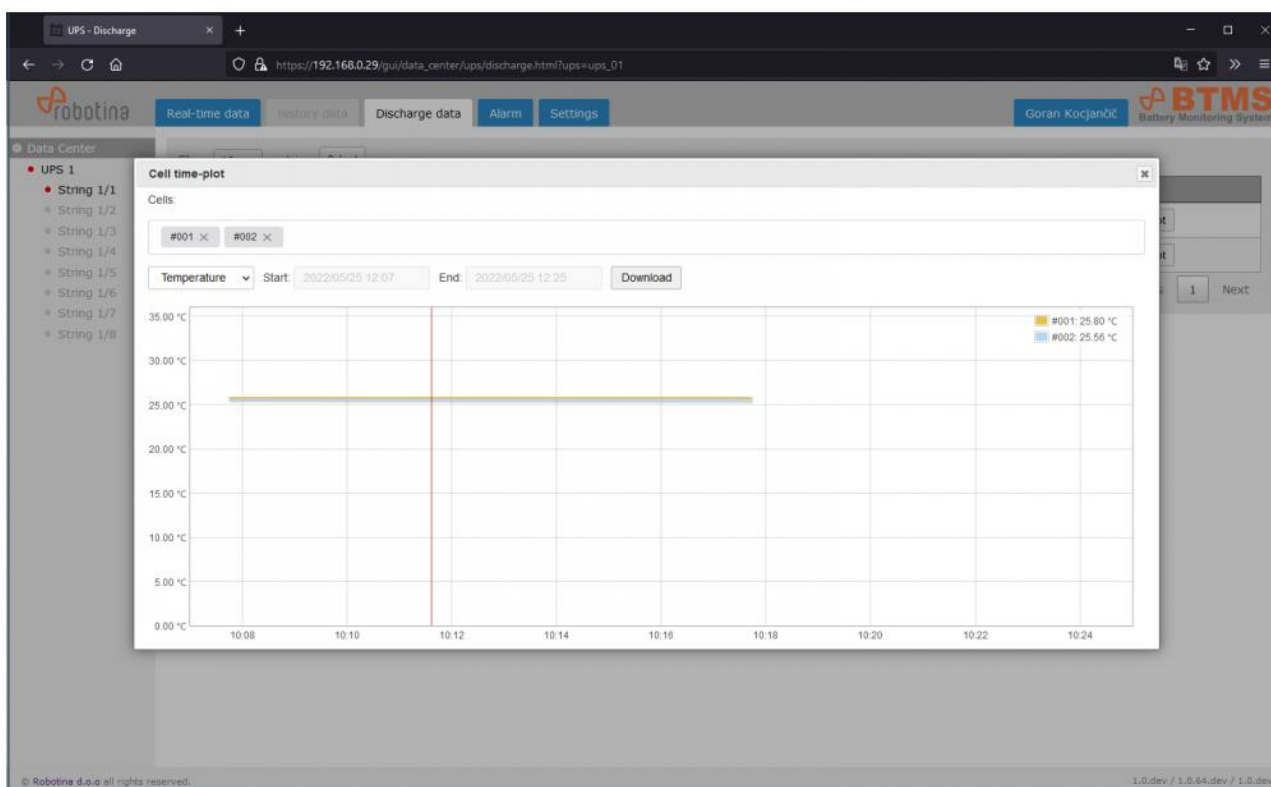
The screenshot shows the 'String time-plot' window overlaid on the discharge data table. The window displays a graph of voltage over time for a specific string.

String time-plot

Voltage Start: 2022/05/25 16:45 End: 2022/05/26 09:11 Download

The graph shows a constant voltage of approximately 28.00 V from 16:00 on May 25 to 06:00 on May 26. The y-axis ranges from 0.00 V to 30.00 V, and the x-axis shows time intervals from 16:00 to 06:00.

Cell time-plot



Alarm

The screenshot shows the 'Alarm' window in the Robotina BTMS interface. The window title is 'UPS - Alarms' and it contains a table of alarm events. The table has columns for #, String, Cell, From, To, Alarm, and Status. The table shows 14 entries, with the first entry being 'Temperature high' for cell #001 at 06/07/2022 14:22:20.

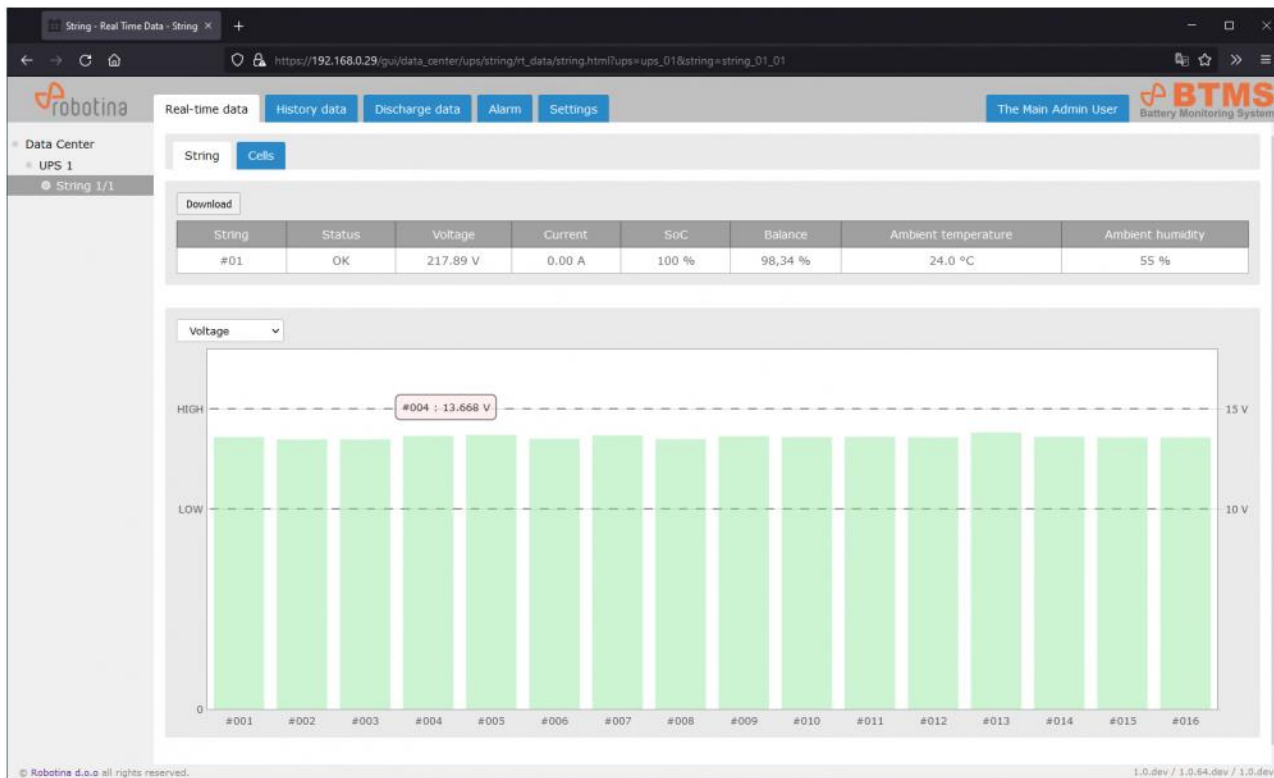
#	String	Cell	From	To	Alarm	Status
14	#01	#001	06/07/2022 14:22:20		Temperature high	active
13	#01		06/06/2022 13:35:56	06/06/2022 13:38:24	Current low (discharging)	gone
12	#01		06/06/2022 13:29:16	06/06/2022 13:38:24	Current high (charging)	gone
11	#01		06/06/2022 13:14:48	06/06/2022 13:28:41	Voltage low	gone
10	#01		06/06/2022 13:14:48	06/06/2022 13:28:41	Voltage high	gone
9	#01		06/06/2022 13:14:48	06/06/2022 13:28:41	Current low (discharging)	gone
8	#01		06/06/2022 13:14:48	06/06/2022 13:28:41	Current high (charging)	gone
7	#01		06/06/2022 13:00:19	06/06/2022 13:00:51	voltage low	gone
6	#01		06/06/2022 12:43:25	06/06/2022 13:00:51	Voltage high	gone
5	#01		06/06/2022 12:43:25	06/06/2022 13:00:51	Current low (discharging)	gone

Showing 1 to 10 of 14 entries

String

Real-time data

String



Cells

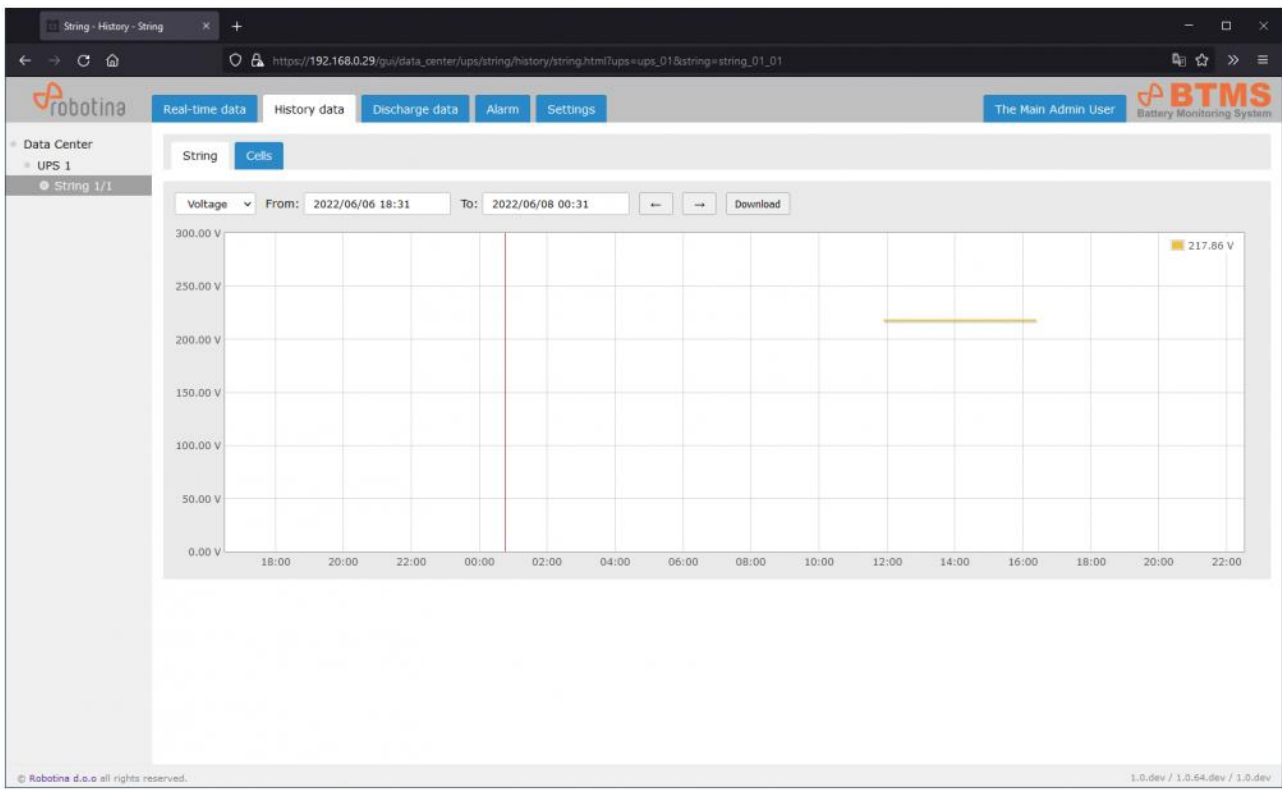
The screenshot shows the 'Cells' view in the BTMS interface. It features a navigation bar with 'Real-time data', 'History data', 'Discharge data', 'Alarm', and 'Settings'. The main content area displays a detailed table of cell data.

Cell	Status	Voltage	Resistance	Temperature	SoC	SoH
#001	OK	13.611 V	18.036 mΩ	300.0 °C	100 %	76 %
#002	OK	13.502 V	16.718 mΩ	300.0 °C	100 %	79 %
#003	OK	13.506 V	16.674 mΩ	300.0 °C	100 %	79 %
#004	OK	13.666 V	15.875 mΩ	300.0 °C	100 %	81 %
#005	OK	13.725 V	15.655 mΩ	300.0 °C	100 %	82 %
#006	OK	13.529 V	15.439 mΩ	300.0 °C	100 %	82 %
#007	OK	13.703 V	15.058 mΩ	300.0 °C	100 %	83 %
#008	OK	13.512 V	18.096 mΩ	300.0 °C	100 %	76 %
#009	OK	13.655 V	15.747 mΩ	300.0 °C	100 %	82 %
#010	OK	13.611 V	15.647 mΩ	300.0 °C	100 %	82 %

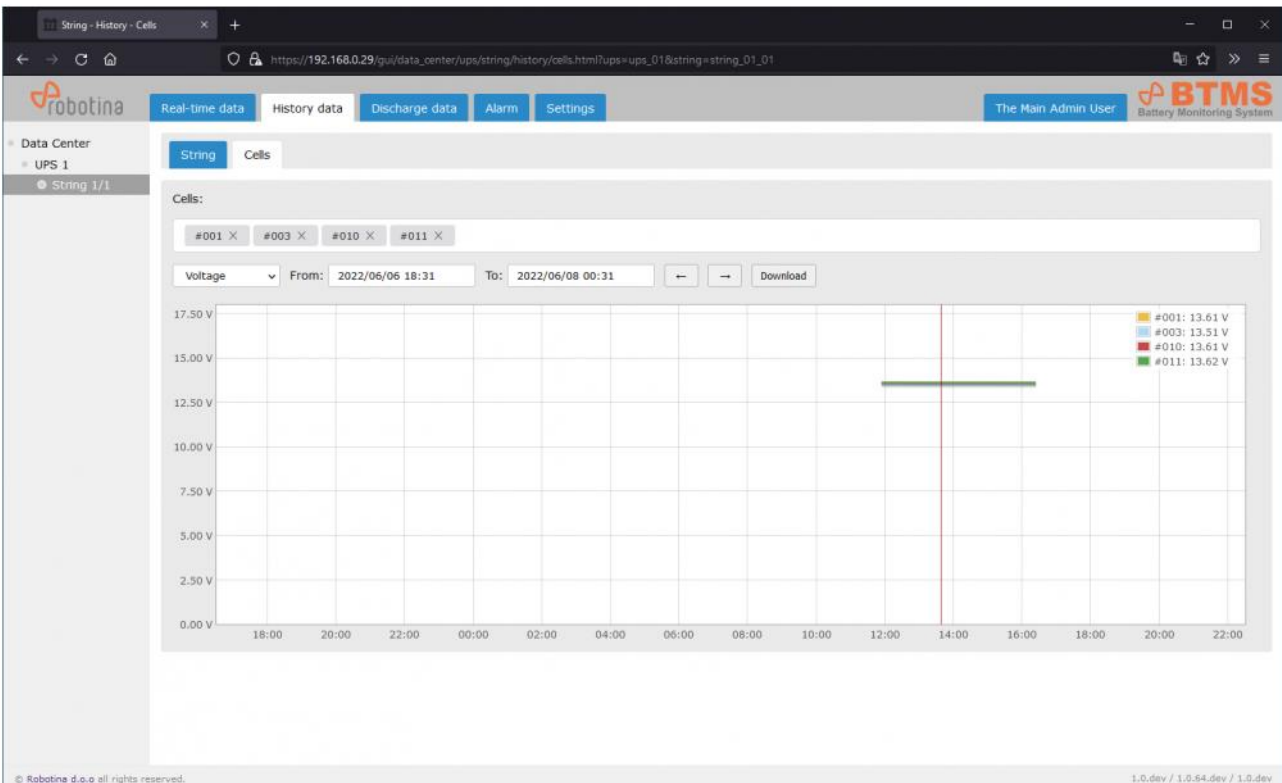
The table includes a 'Show 10 entries' dropdown and a 'Download' button. The footer indicates 'Showing 1 to 10 of 16 entries' and navigation buttons for 'Previous', '1', '2', and 'Next'.

History data

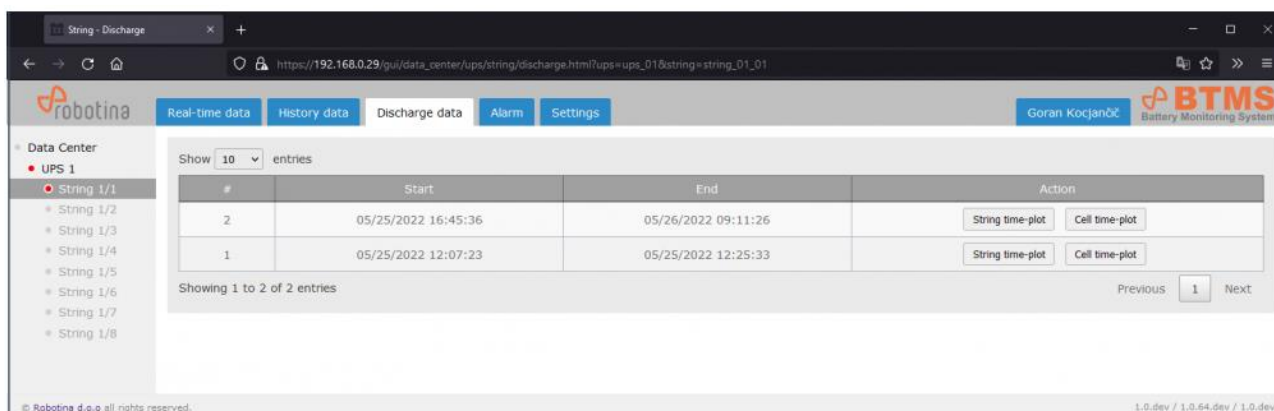
String



Cells



Discharge data



String - Discharge

https://192.168.0.29/gui/data_center/ups/string/discharge.html?ups=ups_01&string=string_01_01

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Real-time data History data Discharge data Alarm Settings

Data Center

- UPS 1
 - String 1/1
 - String 1/2
 - String 1/3
 - String 1/4
 - String 1/5
 - String 1/6
 - String 1/7
 - String 1/8

Show 10 entries

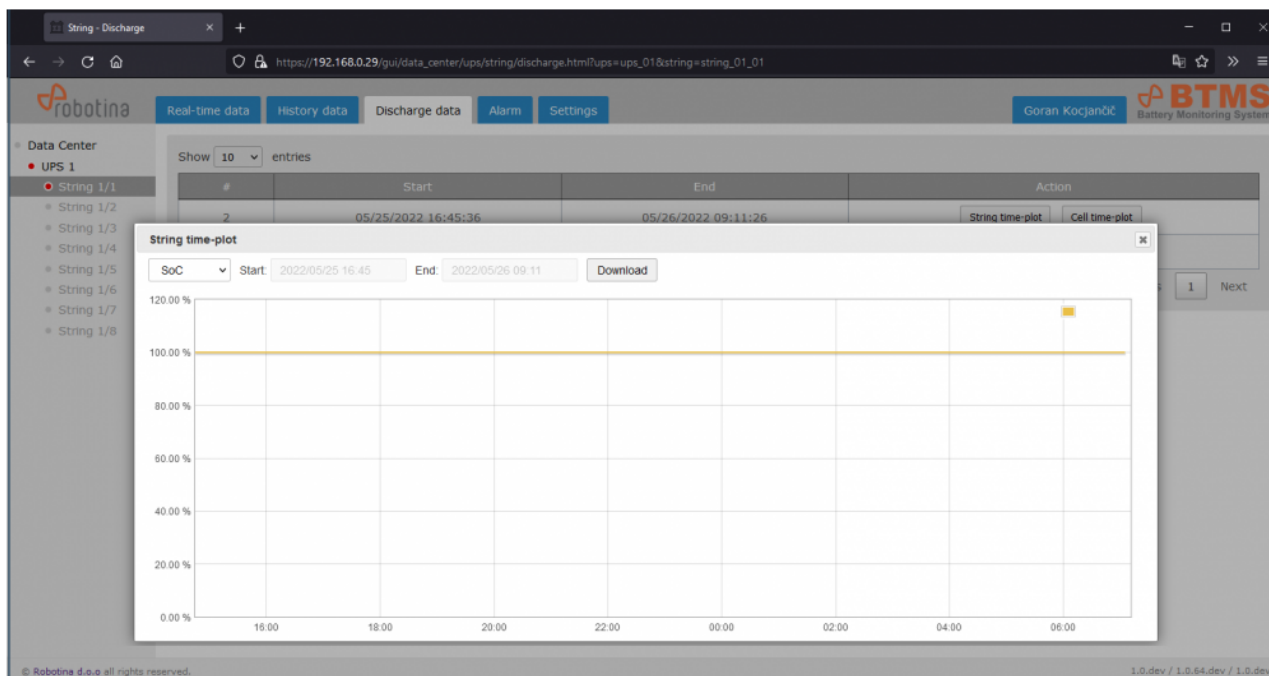
#	Start	End	Action
2	05/25/2022 16:45:36	05/26/2022 09:11:26	String time-plot Cell time-plot
1	05/25/2022 12:07:23	05/25/2022 12:25:33	String time-plot Cell time-plot

Showing 1 to 2 of 2 entries

Previous 1 Next

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String time-plot



String - Discharge

https://192.168.0.29/gui/data_center/ups/string/discharge.html?ups=ups_01&string=string_01_01

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Real-time data History data Discharge data Alarm Settings

Data Center

- UPS 1
 - String 1/1
 - String 1/2
 - String 1/3
 - String 1/4
 - String 1/5
 - String 1/6
 - String 1/7
 - String 1/8

Show 10 entries

#	Start	End	Action
2	05/25/2022 16:45:36	05/26/2022 09:11:26	String time-plot Cell time-plot

String time-plot

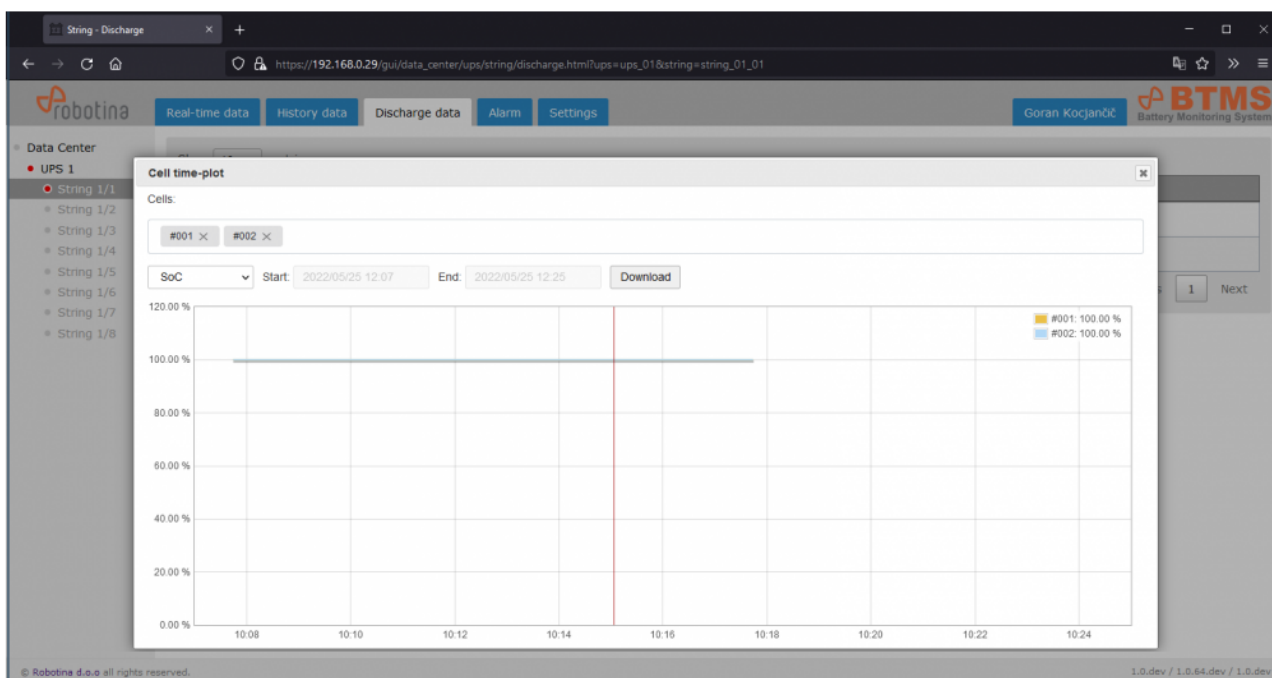
SoC Start: 2022/05/25 16:45 End: 2022/05/26 09:11 Download

120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%

16.00 18.00 20.00 22.00 00.00 02.00 04.00 06.00

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Cell time-plot



Alarm

String - Alarms

Real-time data History data Discharge data Alarm Settings

The Main Admin User BTMS Battery Monitoring System

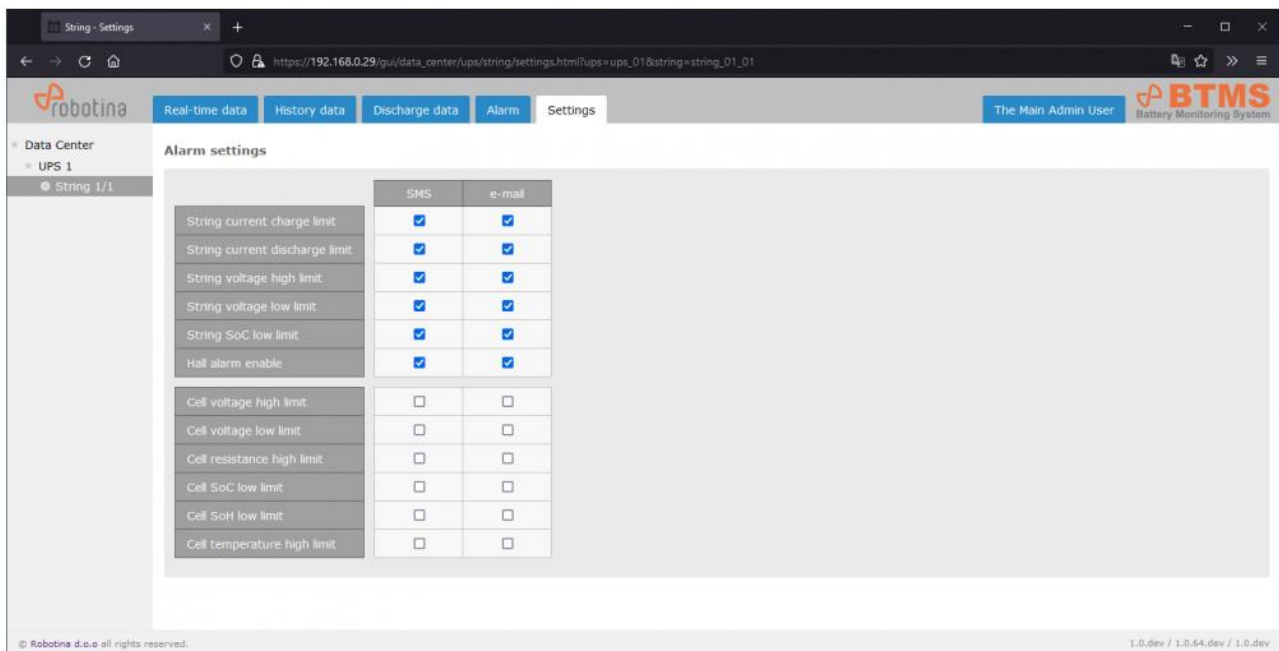
Show 10 entries Reload Download

#	Cell	From	To	Alarm	Status
14	#001	06/07/2022 14:22:20		Temperature high	active
13		06/06/2022 13:35:56	06/06/2022 13:38:24	Current low (discharging)	gone
12		06/06/2022 13:29:16	06/06/2022 13:38:24	Current high (charging)	gone
11		06/06/2022 13:14:48	06/06/2022 13:28:41	Voltage low	gone
10		06/06/2022 13:14:48	06/06/2022 13:28:41	Voltage high	gone
9		06/06/2022 13:14:48	06/06/2022 13:28:41	Current low (discharging)	gone
8		06/06/2022 13:14:48	06/06/2022 13:28:41	Current high (charging)	gone
7		06/06/2022 13:00:19	06/06/2022 13:00:51	Voltage low	gone
6		06/06/2022 12:43:25	06/06/2022 13:00:51	Voltage high	gone
5		06/06/2022 12:43:25	06/06/2022 13:00:51	Current low (discharging)	gone

Showing 1 to 10 of 14 entries Previous 1 2 Next

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Settings



String - Settings

https://192.168.0.29/gui/data_center/ups/string/settings.html?ups=ups_01&string=string_01_01

robotina | Real-time data | History data | Discharge data | Alarm | Settings | The Main Admin User | BTMS Battery Monitoring System

Data Center

- UPS 1
 - String 1/1

Alarm settings

	SMS	e-mail
String current charge limit	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
String current discharge limit	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
String voltage high limit	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
String voltage low limit	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
String SoC low limit	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hall alarm enable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Cell voltage high limit	<input type="checkbox"/>	<input type="checkbox"/>
Cell voltage low limit	<input type="checkbox"/>	<input type="checkbox"/>
Cell resistance high limit	<input type="checkbox"/>	<input type="checkbox"/>
Cell SoC low limit	<input type="checkbox"/>	<input type="checkbox"/>
Cell SoH low limit	<input type="checkbox"/>	<input type="checkbox"/>
Cell temperature high limit	<input type="checkbox"/>	<input type="checkbox"/>

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