[] | *heckert/en/fems/apps/FEMS_App_22_Websocket_JSON_lesend_DE.png*

FEMS App REST/JSON Read Access

Version:2023.6.1

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1. FEMS App REST/JSON Read Access

These instructions describe read access to a Heckert Solar electrical energy storage system via the REST/JSON API. Then, the interface's functionality is explained.

1.1. Prerequisites

The device accessing the electrical energy storage system (e. g. notebook/PC) must have direct access to the IP address of the EMS — e. g. be connected to the same physical network.

1.2. REST/JSON basics

The REST/JSON interface allows access to EMS on the local network via an interface modeled after REST.

1.3. Read access

This app provides an interface based on REST that can be used to read data points in the system.



This app is included in the EMS standard scope of delivery.

The base address for REST access is `http://<USER>:<PASSWORD>@<IP>:80/rest`

- `http` is the protocol
- `<USER>` is the user name. As authentication only takes place via the password, any value (e. g. "x") can be entered here
- `<PASSWORD>` is the password of the user. The default "guest" user in EMS has the password "**user**"
- `<IP>` is the IP address of EMS
- `80` is the port for the REST/JSON API (optional)

So if your EMS has the local IP address '192.168.0.23', the base address for REST access is `http://x:user@192.168.0.23:80/rest`



For security reasons, *Simple Authentication Requests* are not supported, as passwords are transmitted via the URL in this variant. Header authentication must be used explicitly for REST calls. A query directly via the browser (without an extension) is therefore **not** possible. In this case, an error message appears, see figure Error message for *Simple Authentication Requests*. For a query in the browser, please use the Talend API Tester extension as described in here.

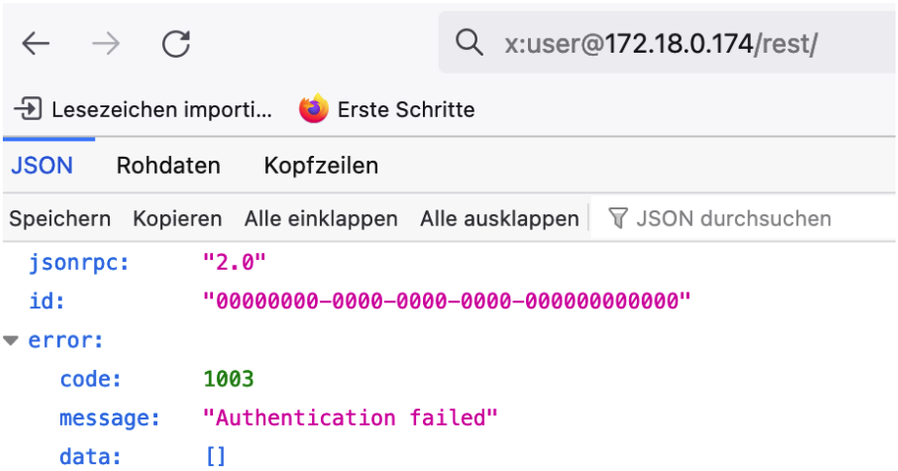


Image 1. Error message for *Simple Authentication Requests*

1.3.1. /channel endpoint

The `/channel` endpoint enables access to individual data points, so-called "channels", in the system.

The full address of the endpoint is:

http://x:<PASSWORD>@<IP>:80/rest/channel/<COMPONENT>/<CHANNEL>

- `<COMPONENTS>` is the ID of the component
- `<CHANNEL>` is the ID of the channel

1.3.2. Data points

The following data points of the *_sum* component can be read out:

Data point	Description	Unit
State	0: Ok, 1: Info, 2: Warning, 3: Fault	
EssSoc	State of Charge [0 - 100]	Percent [%]
EssActivePower	AC-side active power of the electrical energy storage including excess DC generation with hybrid inverter	Watt [W]
EssReactivePower	AC-side reactive power of the electrical energy storage	Volt Ampere Reactive [var]
GridActivePower	Active power at the grid connection point	Watt [W]
GridMinActivePower	Minimum active power ever measured at the grid connection point	Watt [W]
GridMaxActivePower	Maximum active power per measured active power at the grid connection point	Watt [W]

ProductionActivePower	Active power of the PV yield and, if applicable, yield from external inverters	Watt [W]
ProductionMaxActivePower	Maximum measured active power of the PV system	Watt [W]
ProductionAcActivePower	Active power of the external AC inverters	Watt [W]
ProductionDcActualPower	Power of the DC generation of the hybrid inverter	Watt [W]
ConsumptionActivePower	Active power of the electrical consumption	Watt [W]
ConsumptionMaxActivePower	Maximum active power of the electrical consumption ever measured	Watt [W]
EssActiveChargeEnergy	Cumulative electrical energy of the AC-side battery charging incl. excess PV generation at the hybrid inverter	Watt hours [Wh]
EssActiveDischargeEnergy	Cumulative electrical energy from electrical energy storage to consumption via AC output of the inverter incl. PV generation	Watt hours [Wh]
GridBuyActiveEnergy	Cumulative electrical energy of grid consumption	Watt hours [Wh]
GridSellActiveEnergy	Cumulative electrical energy of grid feed-in	Watt hours [Wh]
ProductionActiveEnergy	Cumulative electrical energy of PV generation + external inverter generation	Watt hours [Wh]
ProductionAcActiveEnergy	Cumulative electrical energy of the external inverters	Watt hours [Wh]
ProductionDcActiveEnergy	Cumulative electrical energy of the PV generation of the inverter	Watt hours [Wh]
ConsumptionActiveEnergy	Cumulative electrical consumption	Watt hours [Wh]
EssDcChargeEnergy	Cumulative DC electrical energy of battery charging	Watt hours [Wh]
EssDcDischargeEnergy	Cumulative DC electrical energy of storage discharge	Watt hours [Wh]
EssDischargePower	Actual AC-side active power of the electrical energy storage	Watt [W]
GridMode	1: On-Grid, 2: Off-Grid	

Table 1. Data points of the *_sum* component

1.3.3. Example 1 — Querying the state of charge: cURL

The command-line program cURL comes preinstalled on both Windows and Linux.

To read out the state of charge of the electrical energy storage, send a `GET` request to the address: http://x:user@192.168.0.23:80/rest/channel/_sum/EssSoc

You will receive a response in JSON format:

Windows

The following command saves the response in JSON format in the *out.json* file

```
>curl -o out.json http://x:user@192.168.0.23:80/rest/channel/_sum/EssSoc
```

To output the contents of the file, use :

```
>type out.json
```

Output:

```
{"address":"_sum/EssSoc","type":"INTEGER","accessMode":"RO","text":"","unit":"%","value":
99}
```

The state of charge value is found under *value*. In the example above, it is 99 %.

Linux

The following command saves the response in JSON format in the *out.json* file

```
$curl -o out.json http://x:user@192.168.0.23:80/rest/channel/_sum/EssSoc
```

To output the contents of the file, use :

```
>cat out.json
```

Output:

```
{"address":"_sum/EssSoc","type":"INTEGER","accessMode":"RO","text":"","unit":"%","value":
99}
```

The state of charge value is found under *value*. In the example above, it is 99 %.

1.3.4. Example 2 — Querying the state of charge: Python

Python versions for Windows and Linux are available here: https://www.python.org/downloads/

To read out the state of charge of the electrical energy storage, a `GET` request must also be sent to the address: `http://x:user@192.168.0.23:80/rest/channel/_sum/EssSoc` must also be sent.

The *requests* library, which must be imported at the beginning, can be used for this:

```
import requests

url = 'http://192.168.0.23:80/rest/channel/_sum/EssSoc'

user = 'x'
password = 'user'

session = requests.Session()
session.auth = (user, password)

response = session.get(url)
response.raise_for_status()
```

The command returns a response in JSON format. Output it using the following command:

```
print(response.text)
```

Output:

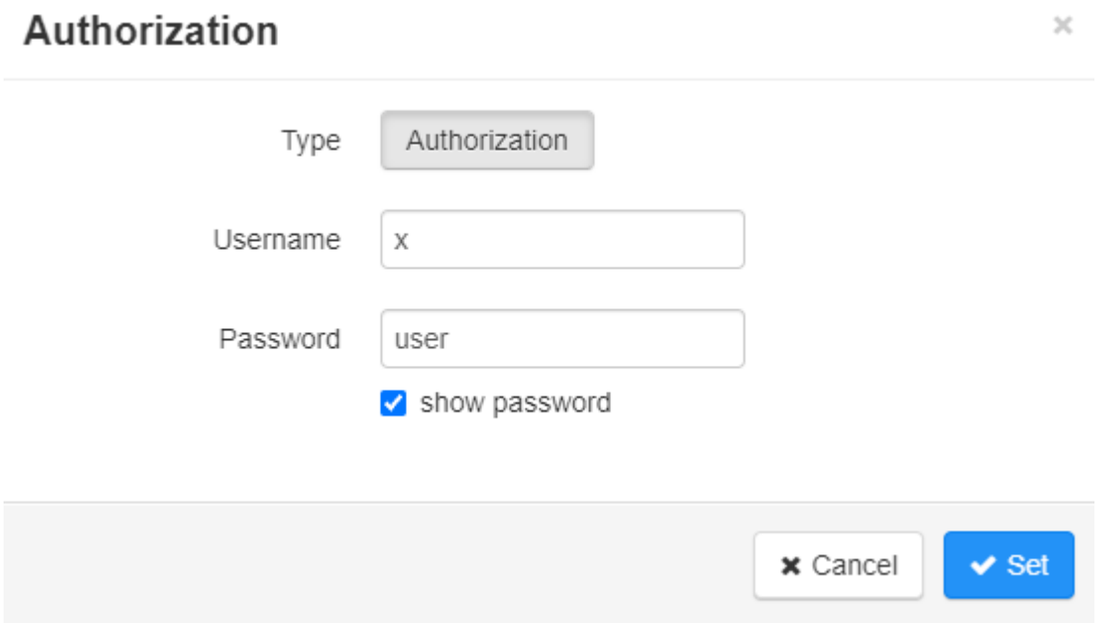
```
{"address":"_sum/EssSoc","type":"INTEGER","accessMode":"RO","text":"","unit":"%","value":
99}
```

The state of charge value is found under *value*. In the example above, it is 99 %.

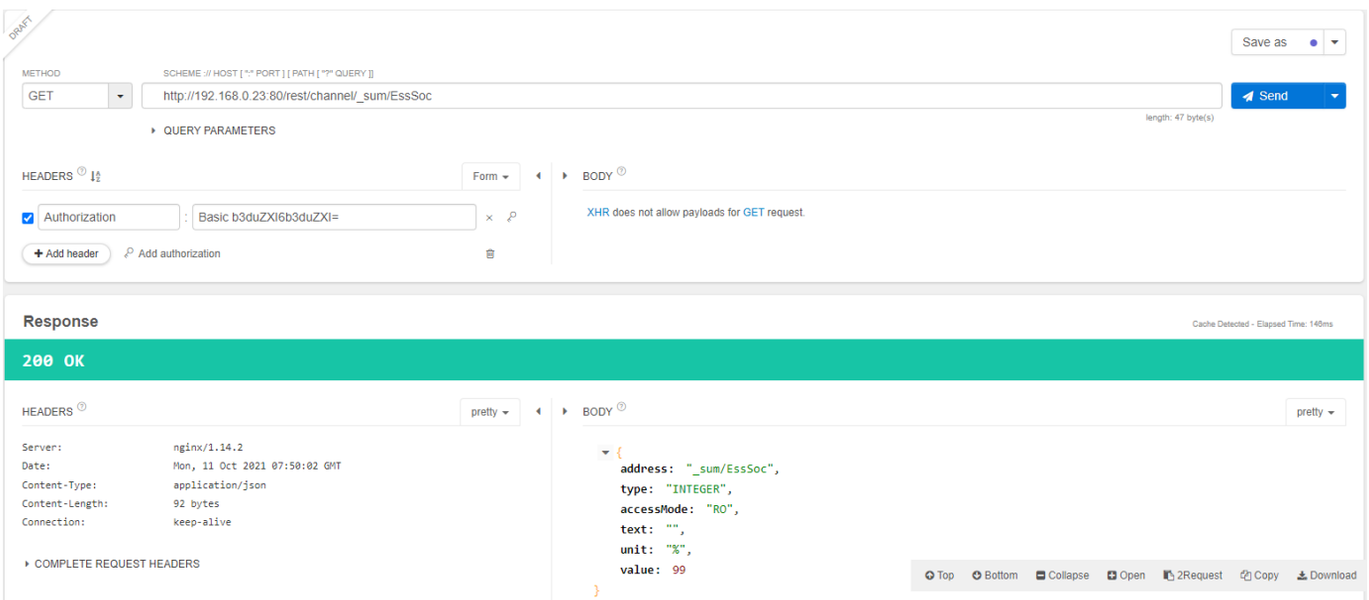
1.3.5. Example 3 — Querying the state of charge: Talend API Tester

Talend API Tester is an extension for Google Chrome that allows you to test REST APIs.

First, an *Authorization* header must be added:



Then, execute the GET request.



The state of charge value is found under *value*. In the example above, it is 99 %.

2. Contact us

For support, please contact:

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3. Directories

3.1. List of illustrations

Image 1. Error message for Simple Authentication Requests

3.2. List of tables

Table 1. Data points of the _sum component