Application note

API Settings - Enviromental measurement

Representational State Transfer (REST) API

To request a status and values, the GET method is used. To set device parameters, the POST method is used.

1. HTTP request with URI according to the structure:
   http://{host}/{zdroj}?{parametry}
   - Host - IP address or a domain name of the device
   - Resource - name of the resource you want to work with
   - Parameters - attributes and their values that you obtain and set
2. HTTP method GET/POST
3. HTTP header supplemented with basic authorization
   - Username and password encoded in Base64
   - { ‚Authorization': , Basic user:password')
4. HTTP response with status code:
   - Supplemented with data in the body according to the result of the operation
   - 2xx for successful response /operation
   - 4xx for unsuccessful response/operation

Example **URI for obtaining data from the sensor**

Response
Header
200 OK
Data in JSON format

```
{
  „id“: 2,
  „name“: „Hygrometer“,
  „value“: 37.83670425,
  „time“: 1660742611000,
  „unit“: „%“,
  „frequency“: 60000,
  „state“: „Active“,
  „calibration“: 0,
  „min-threshold“: -1000,
  „max-threshold“: 1000
}
```

Resource sensor

Retrieving information from sensors

To retrieve data from sensors, the HTTP GET method is used to the resource sensor. The parameter selects information that will be returned.

Parameter	Value	Type	Meaning
id	0 - number of sensors	uint8	Selects one specific sensor based on the value of the id parameter.
all			Returns information about all available sensors.

Example **How to get information about sensor with id 2**

GET *http://192.168.4.1/sensor?id=2*

Response
Header
200 OK
Data in JSON format

```
{
  „id“: 2,
  „name“: „Hygrometer“,
  „value“: 37.83670425,
  „time“: 1660742611000,
  „unit“: „%“,
  „frequency“: 60000,
  „state“: „Active“,
  „calibration“: 0,
  „min-threshold“: -1000,
  „max-threshold“: 1000
}
```

Setting of the sensor

To set the sensor, the HTTP POST method is used to the resource sensor.
The parameter specifies the item that will be set for the sensor. Multiple items can be set with one request, not multiple sensors.

Parameter	Value	Type	Meaning
id	0 - 255	uint8	Selects one specific sensor based on the value of the id parameter.
name	max. 20 char.	string	Sensor username.
unit	max. 6 characters	string	User defined units of the sensor. Changing them does not result in a conversion of the value.
frequency	1000 - 4294967295	uint32	Measurement frequency in milliseconds.
calibration	1.4E-45 - 3.4028235E38	float	Offset of the measured value by a specified value.
min-threshold	1.4E-45 - 3.4028235E38	float	Setting the monitored minimum of the sensor *coming soon.
max-threshold	1.4E-45 - 3.4028235E38	float	Setting the monitored maximum of the sensor *coming soon.

Example Setting the sensor name and measurement frequency to „once every five seconds“

POST *http://192.168.4.1/Sensor?id=0&name =thermometer&frequency=5000*

Response
Header
200 OK
Data
OK

Resource output

Retrieving information about outputs

To retrieve data about outputs, the HTTP GET method is used to the resource output.
The parameter selects information that will be returned.

Parameter	Value	Type	Meaning
id	0 - 255	uint8	Selects one specific output based on the value of the id parameter.
all			Returns information about all available outputs.

Example Getting information about the output with id 0

GET *http://192.168.4.1/output?id=0*

Response
Header
200 OK
Data in JSON format
{
„id“: 0,
„name“: „Led R“,
„value“: true,
„value-default“: false
}

Setting of the output

To set the output, the HTTP POST method is used to the resource output. The parameter specifies the item that will be set for the output. Multiple items can be set with one request, not multiple outputs.

Parameter	Value	Type	Meaning
id	0 - number of sensors	uint8	Selects one specific output based on the value of the id parameter.
name	max. 20 char.	string	Output username.
value	0 - 1	bool	Sets the current logical value at the output.
value-default	0 - 1	bool	Sets the default logic level at the output when the device is turned on and to which the output returns.

Example Setting the name and the logical level of an output

POST *http://192.168.4.1/output?id=0&name=Led%20R&value=1*

Response
Header
200 OK
Data
OK

Resource dev-config

Retrieving the device's operational configuration

To retrieve the device's operational configuration, the HTTP GET method is used to the resource *dev-config*.
The parameter selects the information that will be returned. Multiple parameters can be requested in order to obtain more information in a single request.

Parameter	Value	Type	Meaning
ntp			Returns the user-set IP address of the NTP server for time synchronization
wifi			Returns true/false about the power-on status of the WiFi access point on the device.
user-time			Returns the current time in seconds in UNIX format.
ip			Returns the user-set IP address of the device.
subnet			Returns the user-set IP address subnet mask.
gateway			Returns the user-set default gateway IP address.
dns			Returns the user-set IP address of the default DNS server.

Example Obtaining NTP and DNS server settings

GET *http://192.168.4.1/dev-config?ntp&dns*

Response
Header
200 OK
Data in JSON format
{
„ntp":"192.168.1.1",
„dns":""
}

Setting the device operational configuration

To set the device's operational configuration, the HTTP POST method is used to the resource *dev-config*. The parameter specifies the item that will be set in the configuration. Multiple items can be set in a single request.

The IP, subnet, gateway, and dns items must be set together in a single request.

Parameter	Value	Type	Meaning
device-user-name	max. 20 char.	string	Sets the user device name.
ntp	X.X.X.X where X can by 0 to 255	string	Sets the user's IP address of the NTP server for time synchronization.
wifi	0 - 1	uint8	Turns the WiFi access point on the device on or off.
user-name	max. 20 char.	string	Sets the username for HTTP access.
user-password	max. 20 char.	string	Sets the user password for HTTP access.
ip	X.X.X.X where X can by 0 to 255	string	Sets the user IP address of the device.
subnet	X.X.X.X where X can by 0 to 255	string	Sets the user IP address subnet mask.
gateway	X.X.X.X where X can by 0 to 255	string	Sets the user's default gateway IP address.
dns	X.X.X.X where X can by 0 to 255	string	Sets the user's default DNS server IP address.
user-time	1000 - 4294967295	uint8	Setting of time in UNIX format in seconds

Example Setting of an NTP server

POST *http://192.168.4.1/dev-config?ntp=192.168.1.1*

Response
Header
200 OK
Data
OK

Resource mqtt-config

Retrieving information about the MQTT communication configuration in the device.

To retrieve information about the MQTT communication configuration in a device, the HTTP GET method is used to the resource *mqtt-config*. The parameter selects the information that will be returned. Multiple parameters can be used to get more information in one request.

Parameter	Value	Type	Meaning
server-ip			Returns the set IP address for connecting to the broker server..
server-port			Returns the configured port for connecting to the broker server.
user-name			Returns the set username for communication with the server.
password			Returns the set user password for communication with the server.
connected			Returns information about the status of the connection to the server.
publish-topic	0 - 255	uint8	The parameter value specifies the publish id of the topic for which information will be returned.
subscribe-topic	0 - 255	uint8	The parameter value specifies the subscribe id of the topic for which it will return information.
active			Returns the setting whether communication via MQTT is enabled or not.
all	1	uint8	If you enter the value of 1, it will return the entire MQTT configuration including the server username and password, otherwise it will return the entire MQTT configuration without the username and password.

Example Get publish topic with id 1 and IP address to connect to broker server

GET *http://192.168.1.59/mqtt-config?publish-topic=1&server-ip*

Response
Header
200 OK
Data in JSON format

```
{
  „server-ip“: „192.168.1.60“,
  „publish-topic“: {
    „id“: 1,
    „active“: false,
    „name“: „“,
    „send-frequency“: 5000,
    „sensor“: 0
  }
}
```

Setting the MQTT communication configuration in the device.

To set the communication configuration using the MQTT protocol in the device, the HTTP POST method is used to the resource *mqtt-config*. The parameter specifies the item that will be set in the configuration. Multiple parameters can be used to get more information in one request.

The server-ip and server-port items must be set together in one request.

Parameter	Value	Type	Meaning
server-ip	X.X.X.X where X can by 0 to 255	string	Sets the IP address for connecting to the broker server.
server-port	0 - 65535	uint16	Sets the port for connecting to the broker server.
user-name	max. 20 char.	string	Sets the username for connecting to the broker server. If empty, a connection without authentication will be used.
password	max. 40 char.	string	Sets the password for connecting to the broker server. If empty, a connection without authentication will be used
publish-topic	0 - 255	uint8	The parameter value specifies the publish id of the topic that will be set. For more information see *Setting a publish topic*
subscribe-topic	0 - 255	uint8	The parameter value specifies the subscribe topic id that will be set. For more information see *Setting a subscribe topic*.
active	0 - 1	bool	Turn on/off communication via MQTT protocol.

Example Setting the IP address and port of the target broker server

POST *http://192.168.4.1/mqtt-config?server-ip=192.168.1.100&server-port=1863*

Response
Header
200 OK
Data
OK

Setting of the subscribe topic

To set up the subscribe topic in the device, the HTTP POST method is used to the resource *mqtt-config* with the *subscribe-topic* parameter. The parameter value determines the id of the subscribe topic that will be set.
Along with the *subscribe-topic* parameter, at least one other setting parameter is required, which determines what is set in the subscribe topic. Multiple setting parameters can be used simultaneously, but the request must always contain exactly one *subscribe-topic* parameter.

Parameter	Value	Type	Meaning
name	max. 40 char.	string	Sets the topic name and registers the subscribe topic with the broker server.
target-id	0 - 255	uint8	Specifies the output id that will be activated when an incoming message is evaluated.
operation	0 - 3	uint8	Specifies the operation for evaluating the output activation when a message is received. 0 - not set, 1 - equal to, 2 - less than, 3 - greater than.
value-type	0 - 2	uint8	Specifies the type of value for evaluating the output activation when a message is received. 0 - not set, 1 - float, 2 - string.
value	1.4E-45 - 3.4028235E38	float	First it is necessary to set value-type to a valid value. It determines the value for evaluating the output activation when a message is received.
active	0 - 1	bool	Sets the subscribe topic as active or inactive in the device.

Example Setting of the entire subscribe topic, if the returned value is below 100, output with id 0 is activated

POST *http://192.168.1.59/mqtt-config?subscribe-topic=0&name=OMT/test&target-id=0&operation=2&valuetype=1&value=100&active=1*

Response
Header
200 OK
Data
OK

Setting the publish topic

To set the publish topic in the device, the HTTP POST method is used to the resource mqtt-config with the *publish-topic* parameter. The parameter value determines the id of the publish topic that will be set.
Along with the *publish-topic* parameter, at least one other setting parameter is required, which determines what is set in the publish topic. Multiple setting parameters can be used simultaneously, but the request must always contain exactly one *publish-topic* parameter.

Parameter	Value	Type	Meaning
name	max. 40 char.	string	Sets the topic name and registers the publish topic with the broker server.
source-id	0 - 255	uint8	Specifies an ID of the sensor t. Its value is sent to the broker server.
send-frequency	1000 - 4294967295	uint32	Frequency of data sending in milliseconds
active	0 - 1	bool	Frequency of data sending in milliseconds

Example Setting up an entire publish topic when the value is sent every 5 seconds

POST *http://192.168.1.59/mqtt-config?publish-topic=1&name=OMT/test&send-frequency=1000&active=1*

Response
Header
200 OK
Data
OK