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IC-Meter Public API, version 1.2

Following document is specifying the public REST API available for IC-Meter customers, in order to retrieve data form the IC-Meter server. The API is password protected which also limits the access to data only from own boxes, and boxes shared with the user. Authentication is handled by applying for a valid access token to the request as described below.

URI	Method	Notes
oauth/token	POST	Retrieve API access token
api/boxlocations/1.0/list/	GET	List available IC-Meter boxes
api/measurements/1.2/days/range/	GET	Retrieve indoor data with 5 minutes measurements within specified date range.
api/weather/1.1/days/range/	GET	Retrieve weather data with measurements for specified date range
api/externaldata/1.0/meters/	GET	List available external meters
api/externaldata/1.0/measurements/range/	GET	Retrieve external meter data within specified date range
api/control/1.0/	GET	Get latest Control ON/OFF status

Overall description

Timestamps

Timestamps are expressed in UTC time (Zulu) e.g. "2011-11-22T22:07:22Z", which applies to both input and output.

Format

yyyy '-' mm '-' dd 'T' hh ':' MM ':' ss 'Z'

yyyy: indicates a four-digit year. It is not allowed to have preceded by 0 and 0000 is not allowed.

mm: indicates a two-digit month of the year, 01 through 12.

dd: indicates a two-digit day of that month, 01 through 31.

T: Separates date and time.

hh: refers to a zero-padded hour between 00 and 24 (where 24 is only used to denote midnight at the end of a calendar day).

mm: refers to a zero-padded minute between 00 and 59.

ss: refers to a zero-padded second between 00 and 59

Retrieve API access token (oauth/token)

Retrieving a valid access token is done via the following POST request, where the username and password are the ones used by the IC-Meter apps.

Format

<https://app.ic-meter.com/icm/oauth/token>

Header

Content-Type: application/x-www-form-urlencoded

Request body

```
client_id=<client id> \  
  &grant_type=<grant type> \  
  &scope=<scope> \  
  &username=<username for app-login> \  
  &password=<password for app-login>
```

Example request url

<https://app.ic-meter.com/icm/oauth/token>

Example header

Content-Type: application/x-www-form-urlencoded

Example request body

```
client_id=trusted-client&grant_type=password&scope=trust&username=demo@ic-meter.com&password=demo
```

Example response

```
{
  "access_token": "9aaaaa5f-f609-4038-9eaf-38f27d6888c1",
  "token_type": "bearer",
  "refresh_token": "e74dd080-975b-4737-8e04-fdfc55e625d0",
  "expires_in": 43199,
  "scope": "trust"
}
```

Receive list of available boxes

Receiving a list of own and shared IC-Meter boxes available for specified user.

Format

```
https://app.ic-meter.com/icm/api/measurements/1.0/list
&access_token=<token> \
```

Example Request

```
https://app.ic-meter.com/icm/api/boxlocations/1.0/list \
?access_token=9aaaaa5f-f609-4038-9eaf-38f27d6888c1
```

Example response

```
{
  "boxQR": "3706C9F5",
  "name": "Neogrid Technologies",
  "room": "Office",
  "ceilingHeight": 3.5,
  "floorArea": 32.0,
  "timezone": "Europe/Copenhagen",
  "fromDate": "2013-04-05T07:01:08Z",
  "lastMeasurementDate": "2015-06-04T10:06:26Z",
  "ownership": "owner"
},
```

Receive Indoor data range

Following request returns indoor data with 5 minutes measurements within specified timestamp range, limited to maximum 31 days. If range is above 31 days, the returned data is truncated.

The server returns 400 (http: BAD_REQUEST), if timestamp format are incorrect or if toDate is less than fromDate. Else, the server returns 200 (http: OK).

Format

```
https://app.ic-meter.com/icm/api/measurements/1.2/days/range/<box QR> \
?fromDate=<yyyy-MM-dd'T'HH:mm:ss'Z'> \
&toDate=<yyyy-MM-dd'T'HH:mm:ss'Z'>
&access_token=<token>
```

Example Request

```
https://app.ic-meter.com/icm/api/measurements/1.2/days/range/efde07df \
?fromDate=2013-11-01T00:00:00Z \
&toDate=2013-11-02T00:00:00Z \
&access_token=9aeaaa5f-f609-4038-9eaf-38f27d6888c1
```

Example Response

```
{
  "cols": [{
    "id": "realtime",
    "label": "Time",
    "type": "string",
    "pattern": ""
  },
  {
    "id": "Temperature",
    "label": "Temperature (°C)",
    "type": "number",
    "pattern": ""
  },
  {
    "id": "Humidity",
    "label": "Humidity (%)",
    "type": "number",
    "pattern": ""
  },
  {
    "id": "CO2",
    "label": "CO2 (ppm)",
    "type": "number",
    "pattern": ""
  },
  {
    "id": "NoiseAvg",
    "label": "NoiseAvg (dB(A))",
    "type": "number",
    "pattern": ""
  },
  {
    "id": "NoisePeak",
    "label": "NoisePeak (dB(A))",
    "type": "number",
    "pattern": ""
  },
  {
    "id": "Xtype",
    "label": "Xtype",
    "type": "number",
    "pattern": ""
  }
],
```

```

"rows": [{
  "c": [{
    "v": "2013-11-01T00:02:10Z"
  },
  {
    "v": 22.32
  },
  {
    "v": 45.71
  },
  {
    "v": 588.0
  },
  {
    "v": 41.6
  },
  {
    "v": 45.3
  },
  {
    "v": 280.0
  }
]}]
}

```

Optionally this request supports a different output format and/or relative time periods:

Format

```

https://app.ic-meter.com/icm/api/measurements/1.2/days/range/<box QR> \
  ?period=<period> \
  &output_format=<format> \
  &access_token=<token>

```

Example Request

```

https://app.ic-meter.com/icm/api/measurements/1.2/days/range/efde07df \
  ?period=1-week \
  &output_format=simple \
  &access_token=9aeeea5f-f609-4038-9eaf-38f27d6888c1

```

```

[
  {
    "realtime": "2017-11-30T23:03:10Z",
    "Temperature": 23.09,
    "Humidity": 31.82,
    "CO2": 1032.0
  },
  {
    "realtime": "2017-11-30T23:08:08Z",
    "Temperature": 23.07,
    "Humidity": 31.82,
    "CO2": 1033.0
  }
]

```

```
]
}
```

Valid periods are: '10-min', '1-hour', '24-hours', '1-week', '30-days', '1-month' and '1-year'. If a long period is specified the response time will be slow.

Valid output formats are 'google' and 'simple'. If unspecified the default is 'google'. The 'google' format has less overhead than the 'simple' format. The 'simple' format can be easier to parse e.g. by an analytics tool such as Microsoft PowerBI.

Receive Weather data range

Following request returns weather data with measurements within specified timestamp range, limited to maximum 31 days. If range is above 31 days, the returned data is truncated.

The server returns 400 (http: BAD_REQUEST), if timestamp format are incorrect or if toDate is less than fromDate. Else the server returns 200 (http: OK).

Format

```
https://app.ic-meter.com/icm/api/weather/1.1/days/range/<box QR> \
?fromDate=<yyyy-MM-dd'T'HH:mm:ss'Z'> \
&toDate=<yyyy-MM-dd'T'HH:mm:ss'Z'> \
&access_token=<token>
```

Example Request

```
https://app.ic-meter.com/icm/api/weather/1.1/days/range/efde07df \
?fromDate=2013-11-01T00:00:00Z \
&toDate=2013-11-02T00:00:00Z \
&access_token=9aeeea5f-f609-4038-9eaf-38f27d6888c1
```

Example Response

```
{
  "cols": [{
    "id": "realtime",
    "label": "realtime",
    "type": "string",
    "pattern": ""
  },
  {
    "id": "temperature",
    "label": "temperature",
    "type": "number",
    "pattern": ""
  },
  {
    "id": "humidity",
    "label": "humidity",
    "type": "number",
    "pattern": ""
  }
}
```

```
    },
    {
      "id": "solarrad_inddir",
      "label": "solarrad_inddir",
      "type": "number",
      "pattern": ""
    },
    {
      "id": "wind_speed",
      "label": "wind_speed",
      "type": "number",
      "pattern": ""
    },
    {
      "id": "solarrad_dir",
      "label": "solarrad_dir",
      "type": "number",
      "pattern": ""
    },
    {
      "id": "wind_direction",
      "label": "wind_direction",
      "type": "number",
      "pattern": ""
    },
    {
      "id": "solarrad",
      "label": "solarrad",
      "type": "number",
      "pattern": ""
    }
  ]],
  "rows": [{
    "c": [{
      "v": "2013-11-01T00:00:00Z"
    },
    {
      "v": 9.5
    },
    {
      "v": 93.3000030517578
    },
    {
      "v": 0.0
    },
    {
      "v": 2.48548476894934
    },
    {
      "v": 0.0
    },
    {
      "v": 209.8
    },
  ]
},
```

```

    {
        "v": 0.0
    }
}

```

Optionally this request supports a different output format and/or relative time periods:

Format:

```

https://app.ic-meter.com/icm/api/weather/1.1/days/range/<box QR> \
?period=<period> \
&output_format=<format> \
&access_token=<token>

```

Example Request

```

https://app.ic-meter.com/icm/api/weather/1.1/days/range/efde07df \
?period=1-week \
&output_format=simple \
&access_token=9aeaea5f-f609-4038-9eaf-38f27d6888c1

```

Example Response

```

[
  {
    "realtime": "2017-12-01T23:00:00Z",
    "temperature": -0.8,
    "humidity": 86,
    "solarrad_inddir": 0,
    "wind_speed": 1.4912908613696014,
    "solarrad_dir": 0,
    "wind_direction": 209.7,
    "solarrad": 0
  },
  {
    "realtime": "2017-12-02T00:00:00Z",
    "temperature": -0.8,
    "humidity": 88,
    "solarrad_inddir": 0,
    "wind_speed": 1.9262506959357353,
    "solarrad_dir": 0,
    "wind_direction": 213.5,
    "solarrad": 0
  }
]

```

Valid periods are: '10-min', '1-hour', '24-hours', '1-week', '30-days', '1-month' and '1-year'. If a long period is specified the response time will be slow.

Valid output formats are 'google' and 'simple'. If unspecified the default is 'google'.

The 'google' format has less overhead than the 'simple' format. The 'simple' format can be easier to parse e.g. by an analytics tool such as Microsoft PowerBI.

List available external meters

Following request returns a list of available external meters and their group relationship

Format

```
https://app.ic-meter.com/icm/icm/api/externaldata/1.0/meters \
?access_token=<token>
```

Example Request

```
https://app.ic-meter.com/icm/api/externaldata/1.0/meters?access_token=9aeeea5f-
f609-4038-9eaf-38f27d6888c1
```

Example Response

```
{
  {
    "groupId": null,
    "group": "Dummy Group",
    "type": "Dummy Meters",
    "grossArea": {
      "value": "100.0",
      "unit": "m2"
    },
  },
  "meters": [{
    "id": "10007",
    "meterIdentification": "dummy",
    "name": "Dummy Meter",
    "supplier": "Dummy Supplier",
    "type": "Dummy Meter",
    "unit": "Wh"
  }]
}
```

Receive external meter data range

Following request returns external meter data with a 1 hour interval within specified timestamp range, limited to maximum 31 days. If range is above 31 days, the returned data is truncated.

The server returns 400 (http: BAD_REQUEST), if timestamp format are incorrect or if toDate is less than fromDate. Else, the server returns 200 (http: OK).

Format

```
https://app.ic-meter.com/icm/api/externaldata/1.0/measurements/range/ \  
<meter id> \  
?fromDate=<yyyy-MM-dd'T'HH:mm:ss'Z'> \  
&toDate=<yyyy-MM-dd'T'HH:mm:ss'Z'> \  
&access_token=<token> \  

```

Example Request

```
http://app.ic-meter.com/icm/api/externaldata/1.0/measurements/range/10007 \  
?fromDate=2014-08-31T22:00:00Z \  
&toDate=2014-09-30T22:00:00Z \  
&access_token=9aeeea5f-f609-4038-9eaf-38f27d6888c1
```

Example Response

```
{  
  "cols": [{  
    "id": "realtime",  
    "label": "realtime",  
    "type": "string",  
    "pattern": ""  
  },  
  {  
    "id": "value (Wh)",  
    "label": "value (Wh)",  
    "type": "number",  
    "pattern": ""  
  }],  
  "rows": [{  
    "c": [{  
      "v": "2014-08-31T22:00:00Z"  
    }],  
    {  
      "v": 2000.0  
    }  
  },  
  {  
    "c": [{  
      "v": "2014-08-31T23:00:00Z"  
    }],  
    {  
      "v": 0.0  
    }  
  },  
  {  
    "c": [{  
      "v": "2014-09-01T00:00:00Z"  
    }],  
    {  
      "v": 0.0  
    }  
  }  
}
```

Optionally this request supports a different output format and/or relative time periods:

Format

```
https://app.ic-meter.com/icm/api/externaldata/1.0/measurements/range/ \
    <meter id> \
    ?period=<period> \
    &output_format=<format> \
    &access_token=<token> \
```

Example Request

```
http://app.ic-meter.com/icm/api/externaldata/1.0/measurements/range/10007 \
    ?period=1-week \
    &output_format=simple \
    &access_token=9aeeeea5f-f609-4038-9eaf-38f27d6888c1
```

Example Response

```
[
  {
    "realtime": "2014-08-31T22:00:00Z",
    "value (Wh)": 2000.0
  },
  {
    "realtime": "2014-08-31T23:00:00Z"
    "value (Wh)": 0.0
  },
  {
    "realtime": "2014-09-01T00:00:00Z"
    "value (Wh)": 0.0
  }
]
```

Valid periods are: '10-min', '1-hour', '24-hours', '1-week', '30-days', '1-month' and '1-year'. If a long period is specified the response time will be slow.

Valid output formats are 'google' and 'simple'. If unspecified the default is 'google'. The 'google' format has less overhead than the 'simple' format. The 'simple' format can be easier to parse e.g. by an analytics tool such as Microsoft PowerBI.

Get current control status

Following request returns current control status. This is particularly useful when automatic control ON/OFF is enabled for controlling equipment by polling this API request.

The server returns NO_CONTENT status 204 if Control ON/OFF is not enabled for the specified box.

Format

`https://app.ic-meter.com/icm/icm/api/control/1.0/<box QR> \`
`?access_token=<token>`

Example Request

`https://app.ic-meter.com/icm/api/control/1.0/efde07df?access_token=9aeeea5f-f609-4038-9eaf-38f27d6888c1`

Example Response

```
{
  "qr": "efde07df",
  "realtime": "2016-09-01T11:06:11Z",
  "automatic": true,
  "control": true
}
```

Revision history

Version	Date	Author	Description
1.0	12-11-2013	Neogrid Technologies/hls	Initial release
1.1	19-03-2014	Neogrid Technologies/hls	Box identification changed to QR code
1.1.1	23-5-2014	Neogrid Technologies/hls	Enabled https for REST api
1.1.2	22-09-2014	Neogrid Technologies/hls	Example of parameters for login URL added
1.1.3	05-06-2015	Neogrid Technologies/hls	Box list and external meters added
1.1.4	27-05-2016	Neogrid Technologies/boa	Oauth POST request
1.1.5	01-09-2016	Neogrid Technologies/boa	Control status added
1.1.6	15-12-2016	Neogrid Technologies/boa	Add noise and xtype to measurements range v1.2
1.1.7	19-06-2017	Neogrid Technologies/boa	Correct login oauth token documentation
1.1.8	07-12-2017	Neogrid Technologies/boa	Add output_format and period requests parameters to data requests