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## Content

Content .....	1
IC-Meter Public API, version 2.0.....	1
Overall description .....	2
Retrieve API access token (oauth/token).....	2
Retrieve list of available buildings .....	3
Retrieve list of units for a specified building.....	4
Indoor climate data for specified building .....	4
Indoor climate data for specified unit .....	6
Activity index hour data for specified building .....	8
Activity index hour data for specified unit.....	9
Outdoor climate data for specified building.....	11
Outdoor climate data for specified unit .....	12
Revision history .....	14

## IC-Meter Public API, version 2.0

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/buildings/2.0	GET	Retrieve list of available buildings
api/buildings/2.0/units	GET	Retrieve list of available buildings
api/buildings/2.0/building/indoor	GET	Indoor climate data for specified building. Includes data for all units in the building
api/buildings/2.0/indoor/measurements	GET	Indoor climate data for specified unit.
api/buildings/2.0/building/activityIndex	GET	Activity index hour data for specified building. Includes data for all units in the building.
api/buildings/2.0/activityIndex	GET	Activity index hour data for specified unit. Includes data for all units in the building.

api/buildings/2.0/building/outdoor	GET	Outdoor climate data for specified building. Weather data will be the same for all units within the building.
api/buildings/2.0/outdoor/measurements	GET	Outdoor climate data for specified unit.

## 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> \
  &password=<password>
```

### 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=read&username=demo@ic-meter.com&password=demo
```

### Example response

```
{
  "access_token": "878bd3a9-e83c-439a-9910-df79f5b41d7c",
  "token_type": "bearer",
  "refresh_token": "609e0054-8ca3-4201-8e10-2e64f8c5a1d4",
  "expires_in": 40325,
  "scope": "read"
}
```

## Retrieve list of available buildings

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

### Format

```
https://app.ic-meter.com/icm/api/buildings/2.0 \
?extended=<extended> \
&hide_empty=<hide_empty> \
&access_token=<token>
```

If extended is enabled all units and external meters for each building are included. Valid values are 'true' and 'false'. 'false' is the default. If hide\_empty is enabled buildings with no units or external meters are omitted. Valid values are 'true' and 'false'. 'false' is the default.

### Example Request

```
https://app.ic-meter.com/icm/api/buildings/2.0 \
?extended=false \
&hide_empty=false \
&access_token=f04a48c8-6765-4167-9422-8c32e6757648
```

### Example response

```
[{
  "buildingId": 908686,
  "name": "Neogrid Technologies",
  "latitude": 57.012738,
  "longitude": 9.988313,
  "timezone": "Europe/Copenhagen",
  "addressCity": "Aalborg",
  "addressCountry": "Denmark",
  "addressDoor": "10",
  "addressPlace": "North Denmark Region",
  "addressPostcode": "9220",
```

```
"addressStreet": "Niels Jernes Vej",  
"floorarea": 32.0,  
"ownership": "shared"  
}]
```

## Retrieve list of units for a specified building

Following request returns a list of units for the specified building. Only units where user are owner or units which are shared with the user can be viewed.

### Format

```
https://app.ic-meter.com/icm/api/buildings/2.0/units/<building_id> \  
?access_token=<token>
```

### Example Request

```
https://app.ic-meter.com/icm/api/buildings/2.0/units/908686 \  
?access_token=e8b3c05b-adf0-4272-838a-b44ae91b9825
```

### Example Response

```
[{  
  "unitId": 4519,  
  "name": "Test On/Off",  
  "boxId": "69e70e14",  
  "xTypeName": "ON/OFF"  
}]
```

## Indoor climate data for specified building

Following request returns indoor data measurements with 5 minutes resolution within specified timestamp range or a relative time period. If data are requested for a long time period, response time will be slow. Includes data for all units in the building.

For both requests, the output format can be either JSON or CSV. This is specified by the using 'csv' in the url or leaving it out.

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 (range)

```
https://app.ic-  
meter.com/icm/api/buildings/2.0/building/indoor/\[csv/\]<building\_id> \  
?start\_time=<start\_time> \  
&end\_time=<end\_time> \  
&resolution=<resolution> \  
&access\_token=<token>
```

Valid resolutions are: 'minute', 'hour' and 'day'.

### Example Request (range)

```
https://app.ic-meter.com/icm/api/buildings/2.0/building/indoor/908686 \
  ?start_time=2018-10-31T22:00:00Z \
  &end_time=2018-10-31T23:00:00Z \
  &resolution=minute \
  &access_token=ac6af051-e9ff-4ed2-ba22-c9da347892b5
```

### Format (relative)

```
https://app.ic-meter.com
/icm/api/buildings/2.0/building/indoor/[csv/]<building_id> \
  ?period<period> \
  &resolution=<resolution> \
  &access_token=<token>
```

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

Valid resolutions are: 'minute', 'hour' and 'day'.

### Example Request (relative)

```
https://app.ic-meter.com/icm/api/buildings/2.0/building/indoor/908686 \
  ?start_time=2018-10-31T22:00:00Z \
  &end_time=2018-10-31T23:00:00Z \
  &resolution=minute \
  &access_token=ac6af051-e9ff-4ed2-ba22-c9da347892b5
```

### Example Response

```
{
  "buildingId": 908686,
  "name": "Neogrid Technologies",
  "latitude": 57.012738,
  "longitude": 9.988313,
  "timezone": "Europe/Copenhagen",
  "addressCity": "Aalborg",
  "addressCountry": "Denmark",
  "addressDoor": "10",
  "addressPlace": "North Denmark Region",
  "addressPostcode": "9220",
  "addressStreet": "Niels Jernes Vej",
  "floorarea": 32.0,
  "ownership": "shared",
  "units": [{
    "unitId": 4519,
    "name": "Test On/Off",
    "xTypeName": "ON/OFF",
    "indoorMeasurements": [{
      "time": "2018-10-31T22:59:23Z",
      "temperature": 22.03,
```

```

        "humidity": 35.86,
        "co2": 610.0,
        "noiseAverage": 32.0,
        "noisePeak": 32.0,
        "xTypeValue": 0.0
    },
    {
        "time": "2018-10-31T22:53:55Z",
        "temperature": 22.07,
        "humidity": 35.79,
        "co2": 614.0,
        "noiseAverage": 32.0,
        "noisePeak": 32.0,
        "xTypeValue": 0.0
    }
  ],
  "boxId": "69e70e14"
}],
"externalMeters": []
}

```

## Indoor climate data for specified unit

Following request returns indoor data measurements for a specified unit with 5 minutes resolution within specified timestamp range or a relative time period. If data are requested for a long time period, response time will be slow.

For both requests, the output format can be either JSON or CSV. This is specified by the using 'csv' in the url or leaving it out.

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 (range)

```

https://app.ic-meter.com/icm/api/buildings/2.0/indoor/measurements/[csv/]<unit_id> \
  ?start_time=<start_time> \
  &end_time=<end_time> \
  &resolution=<resolution> \
  &access_token=<token>

```

Valid resolutions are: 'minute', 'hour' and 'day'.

### Example Request (range)

```

https://app.ic-meter.com/icm/api/buildings/2.0/indoor/measurements/4519 \
  ?start_time=2018-09-30T22:00:00Z \
  &end_time=2018-10-31T23:00:00Z \
  &resolution=minute \
  &access_token=ac6af051-e9ff-4ed2-ba22-c9da347892b5

```

### Format (relative)

```
https://app.ic-meter.com/icm/api/buildings/2.0/indoor/measurements/[csv/]<unit_id> \
?period<period> \
&resolution=<resolution> \
&access_token=<token>
```

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

Valid resolutions are: 'minute', 'hour' and 'day'.

### Example Request (relative)

```
https://app.ic-meter.com/icm/api/buildings/2.0/indoor/measurements/4519 \
?period=24-hours \
&resolution=minute \
&access_token=ac6af051-e9ff-4ed2-ba22-c9da347892b5
```

### Example Response

```
{
  "unitId": 4519,
  "name": "Test On/Off",
  "xTypeName": "ON/OFF",
  "indoorMeasurements": [{
    "time": "2018-11-23T15:12:13Z",
    "temperature": 24.85,
    "humidity": 29.82,
    "co2": 1093.0,
    "noiseAverage": 32.1,
    "noisePeak": 35.6,
    "xTypeValue": 1.0
  },
  {
    "time": "2018-11-23T15:06:41Z",
    "temperature": 24.85,
    "humidity": 30.33,
    "co2": 1126.0,
    "noiseAverage": 32.0,
    "noisePeak": 34.4,
    "xTypeValue": 1.0
  },
  {
    "time": "2018-11-23T15:01:40Z",
    "temperature": 24.88,
    "humidity": 30.42,
    "co2": 1155.0,
    "noiseAverage": 35.29,
    "noisePeak": 42.1,
    "xTypeValue": 1.0
  }
  ],
  "boxId": "69e70e14"
}
```

## Activity index hour data for specified building

Following request returns activity index data within specified timestamp range or a relative time period. If data are requested for a long time period, response time will be slow. Includes data for all units in the building.

For both requests, the output format can be either JSON or CSV. This is specified by the using 'csv' in the url or leaving it out.

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 (range)

```
https://app.ic-meter.com/  
/icm/api/buildings/2.0/building/activityIndex/[csv/]<building_id>  
?start_time=<start_time> \  
&end_time=<end_time> \  
&access_token=<token>
```

### Example Request (range)

```
https://app.ic-meter.com/icm/api/buildings/2.0/building/activityIndex/908686 \  
?start_time=2018-09-30T22:00:00Z \  
&end_time=2018-10-31T23:00:00Z \  
&access_token=ac6af051-e9ff-4ed2-ba22-c9da347892b5
```

### Format (relative)

```
https://app.ic-meter.com /  
/icm/api/buildings/2.0/building/activityIndex/[csv/]<building_id> \  
?period<period> \  
&access_token=<token>
```

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

### Example Request (relative)

```
https://app.ic-meter.com/icm/api/buildings/2.0/building/activityIndex/908686 \  
?period=24-hours \  
&access_token=ac6af051-e9ff-4ed2-ba22-c9da347892b5
```

### Example Response

```
{  
  "buildingId": 908686,  
  "name": "Neogrid Technologies",  
  "latitude": 57.012738,  
  "longitude": 9.988313,  
  "timezone": "Europe/Copenhagen",
```



```

"addressCity": "Aalborg",
"addressCountry": "Denmark",
"addressDoor": "10",
"addressPlace": "North Denmark Region",
"addressPostcode": "9220",
"addressStreet": "Niels Jernes Vej",
"floorarea": 32.0,
"ownership": "shared",
"units": [{
  "unitId": 4519,
  "name": "Test On/Off",
  "xTypeName": "ON/OFF",
  "activityIndexMeasurements": [{
    "time": "2018-11-23T14:00:00Z",
    "co2": 823.5683767839919,
    "noiseAverage": 36.955555555555556,
    "noisePeak": 43.377777777777778
  },
  {
    "time": "2018-11-23T13:00:00Z",
    "co2": 610.7065512210542,
    "noiseAverage": 39.455555555555556,
    "noisePeak": 46.288888888888889
  },
  {
    "time": "2018-11-23T12:00:00Z",
    "co2": 822.8058738627891,
    "noiseAverage": 39.977777777777778,
    "noisePeak": 46.633333333333333
  },
  {
    "time": "2018-11-23T11:00:00Z",
    "co2": 198.76212463246847,
    "noiseAverage": 33.833333333333336,
    "noisePeak": 41.777777777777777
  },
  {
    "time": "2018-11-23T10:00:00Z",
    "co2": 586.9258408018754,
    "noiseAverage": 34.311111111111111,
    "noisePeak": 41.133333333333333
  }
  ]},
  "boxId": "69e70e14"
}],
"externalMeters": []
}

```

## Activity index hour data for specified unit

Following request returns activity index data within specified timestamp range or a relative time period. If data are requested for a long time period, response time will

be slow. Includes data for specified unit.

For both requests, the output format can be either JSON or CSV. This is specified by the using 'csv' in the url or leaving it out.

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 (range)

```
https://app.ic-meter.com/ /icm/api/buildings/2.0/activityIndex/[csv/]<unit_id> \
?start_time=<start_time> \
&end_time=<end_time> \
&access_token=<token>
```

### Example Request (range)

```
https://app.ic-meter.com/ /icm/api/buildings/2.0/activityIndex/4519 \
?start_time=2018-09-30T22:00:00Z \
&end_time=2018-10-31T23:00:00Z \
&access_token=ac6af051-e9ff-4ed2-ba22-c9da347892b5
```

### Format (relative)

```
https://app.ic-meter.com /icm/api/buildings/2.0/activityIndex/[csv/]<unit_id> \
?period<period> \
&access_token=<token>
```

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

### Example Request (relative)

```
https://app.ic-meter.com/icm/api/buildings/2.0/indoor/measurements/4519 \
?period=24-hours \
&access_token=ac6af051-e9ff-4ed2-ba22-c9da347892b5
```

### Example Response

```
{
  "unitId": 4519,
  "name": "Test On/Off",
  "xTypeName": "ON/OFF",
  "activityIndexMeasurements": [{
    "time": "2018-11-23T14:00:00Z",
    "co2": 823.5683767839919,
    "noiseAverage": 36.955555555555556,
    "noisePeak": 43.377777777777778
  },
  {
    "time": "2018-11-23T13:00:00Z",
    "co2": 610.7065512210542,
    "noiseAverage": 39.455555555555556,
    "noisePeak": 46.28888888888889
  },
  ],
}
```

```
{
  "time": "2018-11-23T12:00:00Z",
  "co2": 822.8058738627891,
  "noiseAverage": 39.97777777777778,
  "noisePeak": 46.63333333333333
}],
"boxId": "69e70e14"
}
```

## Outdoor climate data for specified building.

Following request returns weather data for specified building. Measurements are supplied within specified timestamp range or a relative time period. If data are requested for a long time period, response time will be slow. Weather data will be the same for all units within the building.

For both requests, the output format can be either JSON or CSV. This is specified by the using 'csv' in the url or leaving it out.

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 (range)

```
https://app.ic-meter.com/ /icm/api/buildings/2.0/activityIndex/[csv/]<unit_id> \
?start_time=<start_time> \
&end_time=<end_time> \
&access_token=<token>
```

### Example Request (range)

```
https://app.ic-meter.com/ /icm/api/buildings/2.0/activityIndex/4519 \
?start_time=2018-09-30T22:00:00Z \
&end_time=2018-10-31T23:00:00Z \
&access_token=ac6af051-e9ff-4ed2-ba22-c9da347892b5
```

### Format (relative)

```
https://app.ic-meter.com/icm/icm/api/buildings/2.0/building/outdoor/<building_id> \
?period<period> \
&resolution=<resolution> \
&access_token=<token> \
&output_format<format> \
&access_token=<token>
```

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

### Example Request (relative)

```
https://app.ic-meter.com/icm/api/buildings/2.0/building/outdoor/908686 \
```

```
?period=24-hours \
&resolution=hour \
&access_token=f0b3cef3-9fdf-4176-957f-a633e2a58d0b
```

### Example Response

```
{
  "unitId": 4519,
  "name": "Test On/Off",
  "xTypeName": "ON/OFF",
  "activityIndexMeasurements": [{
    "time": "2018-11-23T14:00:00Z",
    "co2": 823.5683767839919,
    "noiseAverage": 36.955555555555556,
    "noisePeak": 43.37777777777778
  },
  {
    "time": "2018-11-23T13:00:00Z",
    "co2": 610.7065512210542,
    "noiseAverage": 39.455555555555556,
    "noisePeak": 46.28888888888889
  },
  {
    "time": "2018-11-23T12:00:00Z",
    "co2": 822.8058738627891,
    "noiseAverage": 39.97777777777778,
    "noisePeak": 46.63333333333333
  }
  ],
  "boxId": "69e70e14"
}
```

### Outdoor climate data for specified unit

Following request returns weather data for specified unit. Measurements are supplied within specified timestamp range or a relative time period. If data are requested for a long time period, response time will be slow.

For both requests, the output format can be either JSON or CSV. This is specified by the using 'csv' in the url or leaving it out.

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 (range)

```
https://app.ic-meter.com /icm/api/buildings/2.0/outdoor/measurements/<unit_id> \
?start_time=<start_time> \
&end_time=<end_time> \
&resolution=<resolution> \
&access_token=<token>
```

### Example Request (range)

```
https://app.ic-meter.com/icm/api/buildings/2.0/outdoor/measurements/4519 \
?start_time=2018-09-30T22:00:00Z \
&end_time=2018-10-31T23:00:00Z \
&resolution=hour \
&access_token=f0b3cef3-9fdf-4176-957f-a633e2a58d0b
```

### Format (relative)

```
https://app.ic-meter.com/icm/api/buildings/2.0/outdoor/measurements/<unit_id> \
?period<period> \
&resolution=<resolution> \
&access_token=<token> \
&output_format<format> \
&access_token=<token>
```

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

### Example Request (relative)

```
https://app.ic-meter.com/icm/api/buildings/2.0/outdoor/measurements/4519 \
?period=24-hours \
&resolution=hour \
&access_token=f0b3cef3-9fdf-4176-957f-a633e2a58d0b
```

### Example Response

```
[{
  "timestamp": "2018-12-11T13:00:00Z",
  "temperature": 5.0,
  "humidity": 74.5,
  "windSpeed": 6.6,
  "windDirection": 5.3
},
{
  "timestamp": "2018-12-11T12:00:00Z",
  "temperature": 5.1,
  "humidity": 71.5999984741211,
  "windSpeed": 6.4,
  "windDirection": 2.8
},
{
  "timestamp": "2018-12-11T11:00:00Z",
  "temperature": 5.0,
  "humidity": 76.4000015258789,
  "windSpeed": 5.6,
  "windDirection": 353.2
},
{
  "timestamp": "2018-12-11T10:00:00Z",
  "temperature": 5.0,
  "humidity": 77.69999694824219,
```

```

    "windSpeed": 5.6,
    "windDirection": 354.6
  },
  {
    "timestamp": "2018-12-11T09:00:00Z",
    "temperature": 4.7,
    "humidity": 80.5999984741211,
    "windSpeed": 4.6,
    "windDirection": 349.6
  },
  {
    "timestamp": "2018-12-11T08:00:00Z",
    "temperature": 3.9,
    "humidity": 78.9000015258789,
    "windSpeed": 4.0,
    "windDirection": 343.1
  }
]

```

## Revision history

Version	Date	Author	Description
2.0	11-12-2018	Neogrid Technologies/hls	New version describing the new 2.0 API's
2.0.1	04-01-2019	Neogrid Technologies/hls	Typo rettet I links ic-eter -> ic-meter