

# HSRW Weather Station at Campus Kamp-Lintfort



*Fig.: HSRW Weather Station, Campus Kamp-Lintfort*

## Dashboard for Real-Time Data



Fig.: Interactive real-time data plots. **Click on the image** or [here](#) to open the Grafana dashboard.

## Sensors

Measurement	Sensor	Datasheet
Temperature	PT100 platinum wire, TF type 2018	<a href="#">TF type 2018</a>
Temperature / Humidity	PT100 & capacitive element, TF type 3033	<a href="#">TF type 3033</a>
Wind Speed	Cup anemometer, TF type 4035	<a href="#">TF type 4035</a>
Wind Direction	Wind direction sensor, TF type 4123	<a href="#">TF type 4123</a>
Barometer	Piezoresistive element, TF type 5004	<a href="#">TF type 5004</a>
Precipitation	Tipping bucket rain gauge, TF type 7041	<a href="#">TF type 7041</a>
Soil Moisture	Time Domain Reflectometer, IMKO TRIME-PICO64	<a href="#">TRIME-PICO64</a>
Photosynthetically Active Radiation	Kipp & Zonen PQS 1 PAR Quantum Sensor	<a href="#">PQS 1 PAR</a>
Solar Radiation	Pyranometer, Kipp & Zonen SMP10	<a href="#">SMP10</a>

## Access Real-Time Online Data

The data of our weather station is available for free to everyone! All data is made available in a JSON-format:

Key	Unit	Comment
wind_speed	km/h	
wind_direction	degrees	
air_temperature	°C	
air_relhumidity	%	
smp10	W/m2	
pqsl	µmol/m2s	
soil_moisture	%	Sensor not relevant
soil_tempblue	°C	Sensor not relevant

soil_tempred	°C	Sensor not relevant
air_pressure	hPa	
precipitation	mm	
created_at	ISO8601	UTC

## RESTful API to Request Real-Time Online Data

The RESTful Application Programming Interface (API) is used to download data or retrieve data in its own programs.

### Examples

Retrieve the last 20 sensor data from all sensors since 12th Nov. 2021, 14:55:32, Central European Time (CET, Germany):

<https://weather.eolab.de/api/weather/2021-11-12T14:55:32.000+0100>

Retrieve every fifth measurement from all sensors between two timestamps (date + time):

<https://weather.eolab.de/api/weather/2021-11-12T14:55:32.000+0100/2021-11-12T14:59:32.000+0100/5>

Second timestamp in milliseconds since 1970-01-01 00:00:00 UTC (Universal Time Coordinates ~ Greenwich Mean Time)

<https://weather.eolab.de/api/weather/2021-11-12T14:55:32.000+0100/1636734789719/5>

### API Documentation

The API is now available under <https://weather.eolab.de/api>.

Two different **timestamp (date + time) types** are supported:

- time in ms since 1970-01-01 00:00:00 UTC
- [ISO8601](#)

The ISO8601 date-time standards can have different formats. A common one is: YYYY-MM-DD 'T' hh:mm:ss .sss 'Z'

Z is the offset from the UTC timezone, e.g. 2020-12-31T21:45:10.500+0100 is Dec. 31, 2020, 21:45 plus 10.5 seconds in UTC +1h, i.e. Central European Time CET (not summer time CEST!).

The same timestamp in UTC: 2020-12-31T20:45:10.500+0000 (or 2020-12-31T20:45:10.500Z or 2020-12-31T20:45:10.500UTC. Time zone abbreviations such as CET, CEST, UTC, GMT are not supported in the API, yet).

The routes of the API:

- /  
Check if the server is online and has a database connection
- **/weather**  
Get the last 20 measurements

- **/weather/:begin**  
Get the 20 next measurements after begin  
:begin has to be replaced by the time in ms since 1970-01-01 00:00:00 UTC
- **/weather/:begin/:end**  
Get all measurements between begin and end  
:begin and :end in ms since 1970-01-01 00:00:00 UTC
  - do not misuse this route
- **/weather/:begin/:end/:n**
  - Get every nth measurement between begin and end
  - :begin and :end have to be replaced by the time in ms since 01.01.1970 00:00:00 UTC
  - :n has to be replaced with a number (ex.: get every 3rd measurement)

Example to retrieve every 5th data set between 627650252438 ms and 1627650855553 ms since 1970-01-01, i.e. from the Fri Jul 30 2021 15:04:12 GMT+0200 to Fri Jul 30 2021 15:14:15 GMT+0200:  
<https://weather.eolab.de/api/weather/1627650252438/1627650855553/5>

## MQTT to subscribe to Real-Time Online Data

We also publish our data on our own MQTT Server which doesn't need any authentication for receiving that kind of data.

URL: eolab.de  
PORT: 1883

TOPIC: weather/hsrw-kali

From:  
<https://student-wiki.eolab.de/> - **HSRW EOLab Students Wiki**

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Last update: **2023/01/05 14:38**

