MAGNASCI

Temperature, Relative Humidity, Custom Gas
O_3, O_2, NH_3, H_2S, SO_2, NO_2, CL_2, HF, HCL, H_2

Features

- 2 high quality sensors tracking 3 air parameters
- Particulate Matter laser scattering counter
- Open source hardware & software
- Arduino compatible
- Integrated WiFi Internet connectivity
- USB port for power, debug and configuration
- Built-in air pump for active flow
- Direct and Cloud data access via API
- IOT / Internet of Things
- Low power consumption
- Ultra low cost

Applications

- Low cost Automated Monitoring
- Home monitoring
- Citizen science
- Smart Cities

Description

With the built-in Wifi Connectivity, SMOGGIE-GAS will measure and report the gas concentration automatically. By default it comes with one gas sensor preinstalled, of your choosing when ordering the SMOGGIE-GAS sensor. The following gases are currently supported: O_3, O_2, NH_3, H_2S, SO_2, NO_2, CL_2, HF, HCL, H_2/

The design is open source, with complete hardware and software details publicly available on Github. It comes pre-programmed, but further modifications on its software are possible using Arduino. By default, all measurements are sent to the uRADMonitor servers, and are accessible with the API or can be viewed online. This makes it convenient for the classroom, for workshops or citizen science projects.

The uRADMonitor network is a global array of interconnected monitoring stations, focused on continuous Environmental Surveillance. Its purpose is to generate fully transparent open data, used to assert the quality of our environment. The uRADMonitor SMOGGIE-GAS data is accessible in real time via an API interface directly from the uRADMonitor cloud.

Sensors

The uRADMonitor SMOGGIE is designed as an ultra low cost IOT Environmental detector with a high precision Particulate Matter PM2.5 laser scattering sensor and a MEMs sensor for temperature and humidity. A built in fan assures an active air flow stream across the sensing elements. The device connects to your wireless Internet Router via WiFi, to send the readings online.

Sensor	Parameter	Resolution	Minimum value	Maximum value *	Absolute Accuracy
MEMs	Temperature	1 °C	-40 °C	+85 °C	± 1°C
	Humidity	1 %RH	0% RH	100% RH	± 2 %
Electrochemical sensor	H_2S	0.1ppm	0 ppm	100 ppm	± 10 %
	O_3	0.1ppm	0 ppm	10 ppm	
	SO_2	0.1ppm	0 ppm	20 ppm	
	NO_2	0.1ppm	0 ppm	10 ppm	
	CO	1ppm	0 ppm	200 ppm	

* In some cases we can provide custom detection intervals (eg. CO 0 - 1000 ppm instead of the 0 - 200ppm interval). Contact us for details!

Additional gases supported

The electrochemical cell can be replaced with any of the following gases and ranges:

Symbol	Gas	Detection interval
CO	Carbon monoxide	0 - 200ppm
O2	Oxygen	0 - 25%VOL
NH3	Ammonia gas	0 - 100ppm
H2S	Hydrogen sulfide	0 - 100ppm
NO2	Nitrogen dioxide	0 - 10ppm
HF	Hydrogen fluoride	0 - 10ppm
SO2	Sulfur dioxide	0 - 20ppm
Cl2	Chlorine gas	0 - 20ppm
O3	Ozone	0 - 10ppm
H2	Hydrogen gas	0 - 10ppm
HCl	Hydrogen chloride	0 - 10ppm

Parameter	uRADMonitor SMOGGIE-GAS
Internet connection	WLAN connectivity to WiFi Internet Router
Standards	WLAN 2.4GHz IEEE 802.11 b/g/n
Wireless frequencies	2.400–2.4835 GHz ISM band
Modem certifications	CE, FCC
Antenna connector	PCB antenna
Enclosure Protection	IP65
Supply Voltage	micro USB 5V
Recommended Use Ratings	Temperature: -20°C to +65°C Humidity: 0RH to 95RH

Specification
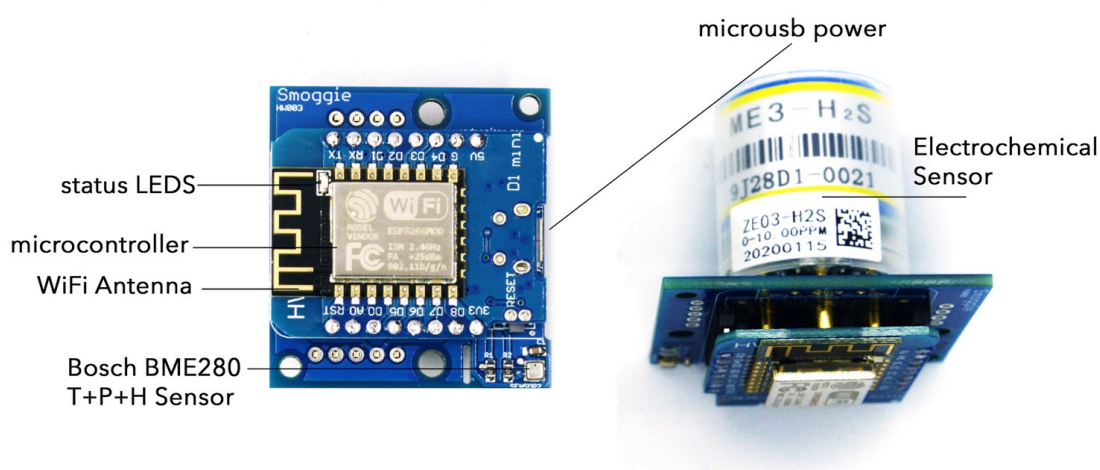
uRADMonitor SMOGGIE assembled circuit board diagram in hardware version 5

Usage guide

- **Power supply**

The SMOGGIE uses a standard micro USB connector that is used to power the unit with a regular phone charger. The unit takes 5V to run.

- **Outdoor use and exposure to elements**

The unit comes in a plastic enclosure that protects the sensitive electronics from the elements. It can be directly installed outdoors. Make sure the USB connector faces down, so no rain can get inside. Do not cover the air circulation holes.

- **Precautions**

Do not expose the device to a large amount of dust such as in the woodworking centers. Do not expose theappliance to solvents or to a large amount of concentrated vapors of chemicals (acetone, paints, alcohol, butane, propane, etc.), because the sensors can wear out, or the measurements may become inconclusive. Do not expose

the apparatus to mechanical shocks. Wherever possible, mount the appliance in a vertical position to extend the life of the built-in fan mechanisms.

- **Installing the unit**

For mounting, use the two holes in the housing bracket. Ensure that you properly connect the power cord and secure it against vibration where necessary. If your SMOGGIE has a transparent resin case, screw carefully because the case is brittle.
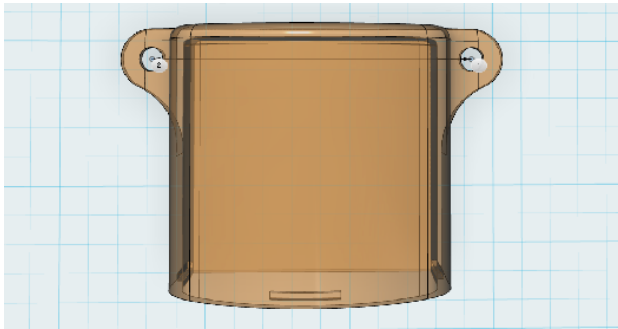

Dimensions 43 (width without ears) x 40 (height) x 27 (thickness)
Distance between the centers of the holes 53mm.

Warranty

uRADMonitor SMOGGIE is covered by a 12 months warranty for any defects in material or workmanship, under normal use.

Data access

uRADMonitor is designed for easy and open data access. The SMOGGIE device only needs to be connected to the power supply and to the WIFI network and the data will be immediately available - here's dashboard-04:
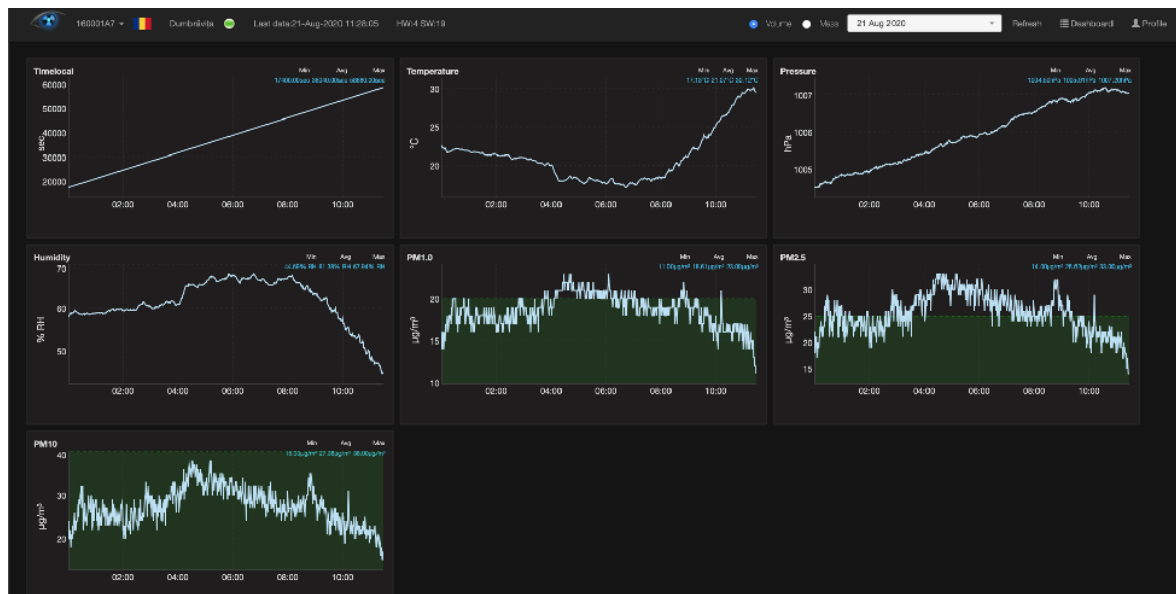
The data sets can be accessed directly, for display in third-party software applications, for integration with other systems (Home Assistant, Alexa, etc.) or for display on information panels - uRADMonitor unit installed in Bucharest:

The data can be accessed in two ways:

- **Local access**

Applies where the uRADMonitor unit is part of a LAN network. The uRADMonitor unit serves an internal webpage accessible via port 80. To access the content open the unit's IP in your LAN network on a computer or a phone. The webpage served is as follows:

The JSON link points to a JSON formatted data source, that can be polled periodically to access the uRADMonitor unit readings. As this is done directly by connecting to the uRADMonitor unit, the server compensation layer is not used, so you would receive the raw readings. This is not the preferred way, and additional compensation must be implemented (eg. Temperature offset to compensate for internal heating, other corrections, etc). This functionality is offered rather for debugging and decentralized operation in critical situations such as server failure or malfunction.

- **Data access via the Server RESTful API**

This is the preferred data access method. REST API does not require the client to know anything about the structure of the API. Rather, the server needs to provide whatever information the client needs to interact with the service. An HTML form is an example of this: The server specifies the location of the resource, and the required fields. The browser doesn't know in advance where to submit the information, and it doesn't know in advance what information to submit. Both forms of information are entirely supplied by the server. Lookups should use GET requests. PUT, POST, and DELETE requests should be used for creation, mutation, and deletion.

The API is called for both directions of data transfer (upload and download). The uRADMonitor devices use the API to upload their measurements to the server, for further processing and storage in the database. The API is then used to access data by the frontend, the mobile app or third party systems that need the uRADMonitor data.

To use the API, please refer to the dedicated manual:

https://www.uradmonitor.com/api

https://www.uradmonitor.com/dashboard/

For questions regarding the use of the API you can contact us at support@uradmonitor.com

The use of uRADMonitor devices and the data sets generated by them can only be done in compliance with the general terms of use (TOS) presented on our website.