MAGNASCI

Temperature, Barometric pressure, Relative Humidity, Custom Gas
O_3, O_2, NH_3, H_2S, SO_2, NO_2, CL_2, HF, HCL, H_2, C_6H_6

Features

- 2 high quality sensors tracking 4 air parameters
- Electrochemical sensor
- Open source hardware & software
- Arduino compatible
- Integrated WiFi Internet connectivity
- USB port for power, debug and configuration
- 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, C_6H_6 .

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-GAS is an ultra low cost IOT Environmental detector with a high precision and high stability electrochemical sensor to measure the target gas and the BME280 from Bosch for temperature, pressure, humidity. The device connects to your wireless Internet Router via WiFi, to send the readings online.

Sensor	Parameter	Resolution	Minimum value	Maximum value	Absolute Accuracy
Bosch BM280	Temperature	1 °C	-40 °C	+85 °C	± 1°C
	Pressure	1 Pa	300 hPa	1100 hPa	± 0.25 %
	Humidity	1 %RH	0% RH	100% RH	± 2 %
Electrochemical sensor	H_2S	0.010ppm	0 ppm	10 ppm	± 10 %
	O_3	0.100ppm	0 ppm	20 ppm	
	O_2	1.000ppm	0 ppm	25% VOL	
	NH_3	1.000ppm	0 ppm	100 ppm	
	SO_2	0.100ppm	0 ppm	20 ppm	
	NO_2	0.100ppm	0 ppm	20 ppm	
	CL_2	0.100ppm	0 ppm	10 ppm	
	HF	1.000ppm	0 ppm	10 ppm	
	HCL	0.100ppm	0 ppm	20 ppm	
	H_2	1.000ppm	0 ppm	1000 ppm	
	C_6H_6	1.000ppm	0 ppm	100 ppm	
	CO	1.000ppm	0 ppm	1000 ppm	

Specifications

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 Chip	Espressif esp8266
Modem certifications	CE, FCC
Antenna connector	PCB antenna
Enclosure Protection	IP30
Supply Voltage	micro USB 5V Consumption 80mA (400mW)
Dimensions	47x43x42 mm (excl. sup and enclosure)
Weight	50g
Mounting	fixed
Recommended Use Ratings	Temperature: -20°C to +65°C Humidity: 0RH to 95RH
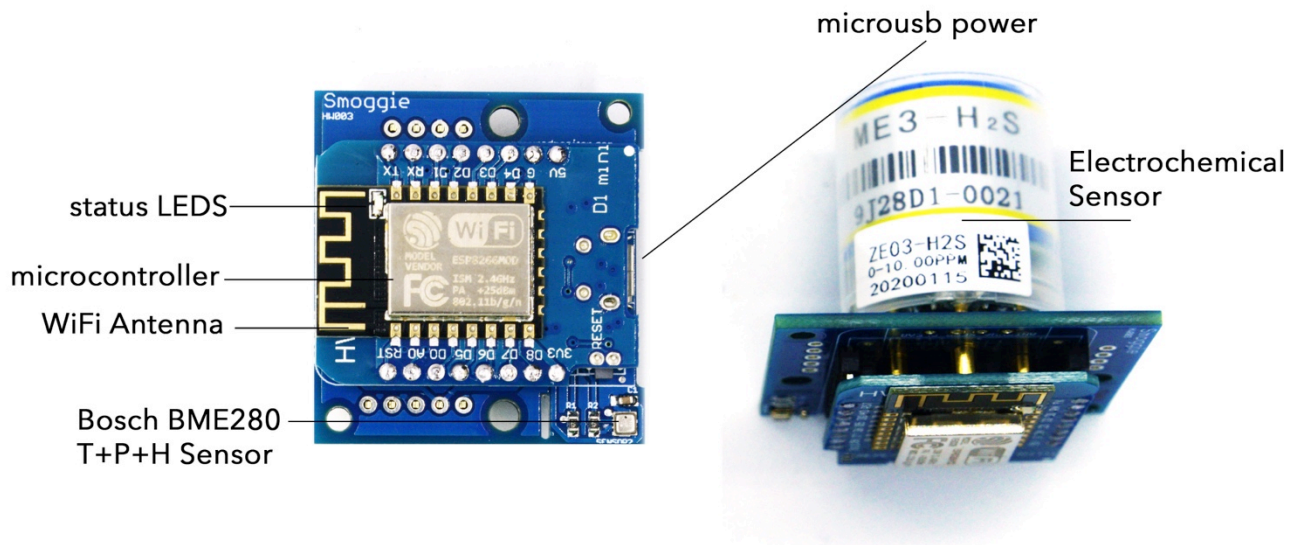
uRADMonitor SMOGGIE-GAS assembled circuit board diagram in hardware version 3

Usage guide

- **Power supply**

The SMOGGIE-GAS 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 the appliance 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. Mount the appliance in a vertical position .

- **Installing the unit**

For mounting, use the hole in the housing bracket. Ensure that you properly connect the power cord and secure it against vibration where necessary.

Warranty

uRADMonitor SMOGGIE-GAS is covered by a 12 months warranty for any defects in material or workmanship.

Data access

uRADMonitor hardware is designed for easy and open data access. 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).

- **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.