

How to set-up your Atmotube Pro



Introduction

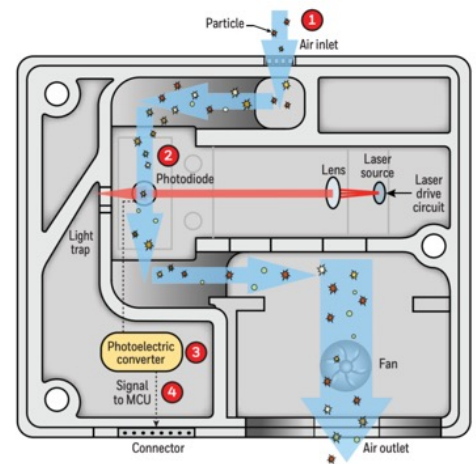
The Atmotube Pro is a wearable, portable device that measures PM1, PM2.5, PM10 and Volatile Organic Compounds (VOCs), combining these into an Air Quality Score (AQS) which can be shown on the Air Quality Map. In addition to pollutants the Atmotube Pro measures meteorological information such as atmospheric pressure, temperature and humidity. This data is compiled into an interface on the free Atmotube app where it can then be exported manually or via a cloud API to a csv format.



How the Sensor Works

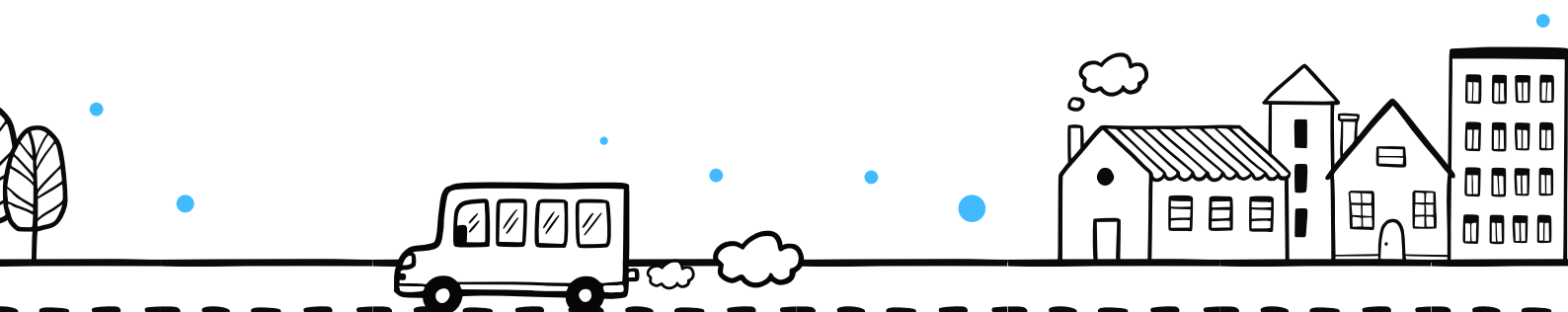
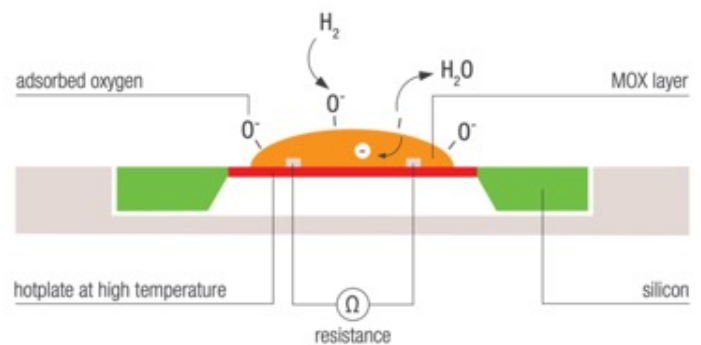
Particulate Matter (PM)

The PM sensor uses a laser scattering principle. Once the fan has drawn air into the Atmotube, that air passes through a laser which is reflected and scattered and then picked up by a photodiode. From the photodiode the air is then transferred to a photoelectric converter which processes the information into density. From there a signal is transmitted to a micro control unit which uses a proprietary algorithm to create an output for the density of the PM in $\mu\text{g}/\text{m}^3$.



Volatile Organic Compounds

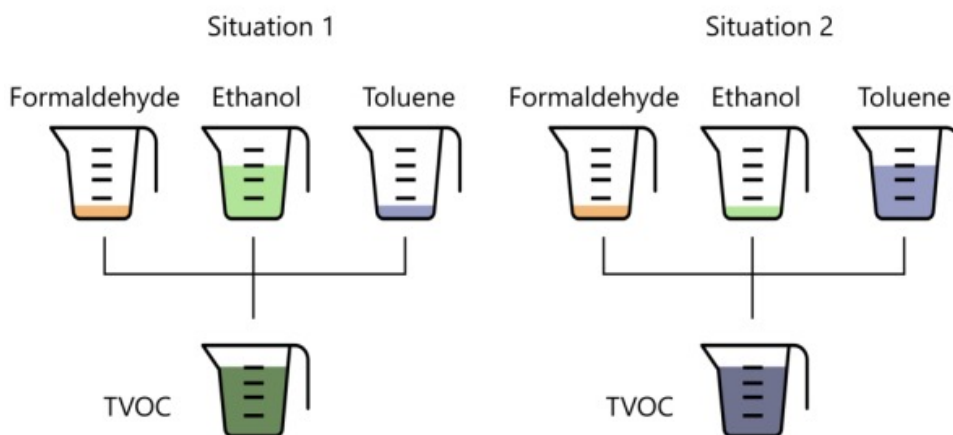
A wide range of VOCs are measured using a MOx-based (metal-oxide) sensor. Oxygen is absorbed onto the MOx film which reacts with the target gas and releases electrons which causes the electrical resistance to change which is measured by a sensor.



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- Different VOCs react differently with the MOx sensor due to their chemical compositions and volatility. As a result, some VOCs created stronger signals than others (See example situations below).
- In the picture, we have two situations with the same TVOC concentration (partial pressure). However, the composition of TVOCs differs between the two situations.
- **Situation 1:** The TVOC value is primarily influenced by less-toxic ethanol.
- **Situation 2:** The main contributor to the same TVOC value is the harmful toluene



- Due to this, VOC concentrations cannot be ascertained easily without knowledge of the particular chemical in question. Therefore, the VOC graph should only be used to identify trends and is not directly correlated to health impacts.

Usage Instructions / Issues, Warnings and Recommendations

What's in the Box

- The Atmotube box contains the Atmotube, which is CE rated, a USB Type-C cable, a carabiner and the Quick Start Guide.



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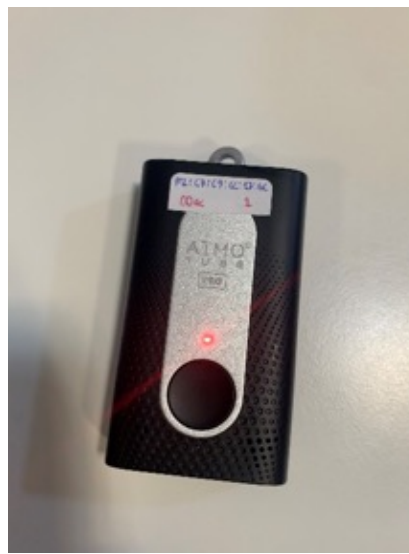
Turning the Atmotube On/Off

- To turn on the Atmotube, connect it to a power supply with the USB Type-C cable after prolonged disuse. If it is being used frequently in a day, hold the button for 4 seconds until the LED lights up. After a prolonged period being off, when you turn the Atmotube on, the VOC sensor needs around 3 minutes to preheat. Whilst doing so the LED on the front of the Atmotube will blink orange and no data will be recorded.
- To turn the Atmotube off, hold the button for 4 seconds until the LED blinks red.

Charging

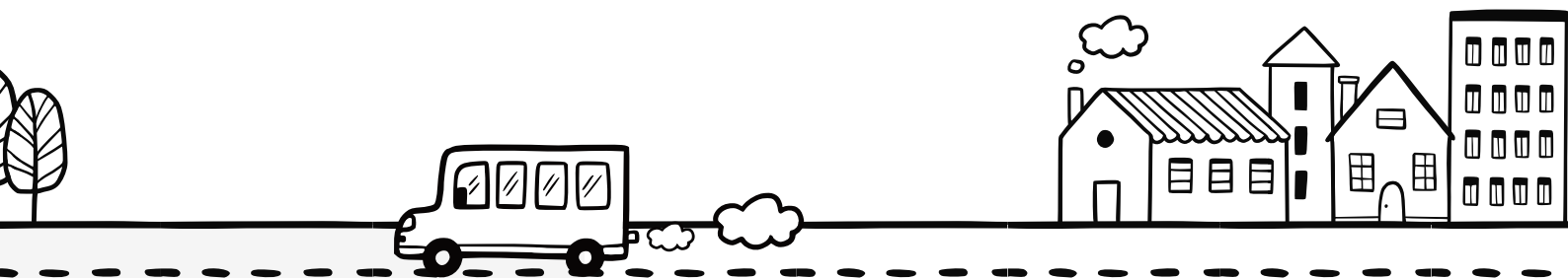


Turn off red light



Battery Life and Charging

- How long the battery lasts will depend on the 'Particulate Matter' mode. When on 'Always on' the battery should last 24 hours, on '5 mins' it should last 4 days, on '10 mins' it should last 8 days and on '15 mins' it should last 10 days. From 0% battery the Atmotube should take around 2.5 hours to charge.
- To charge the Atmotube connect it to a power supply using the USB Type-C cable.



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Pairing

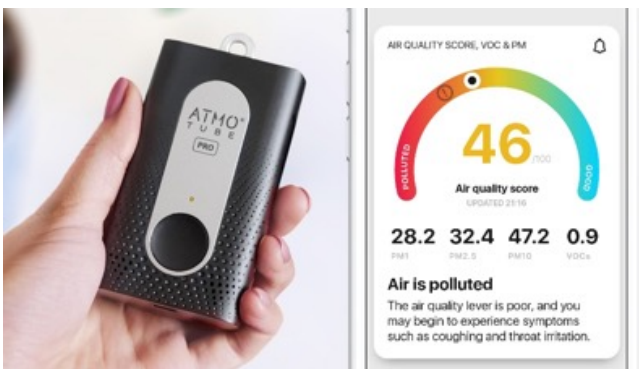
- To pair the Atmotube, open the Atmotube app and click the 'Connect' button and choose which device you would like to pair. To pair more than one device to your app click on the 'Atmotube Pro' icon on the interface and once the Atmotube is turned it will appear in the 'Available Devices' section at the bottom of the page and you can click on it to pair. Once an Atmotube has been paired once, it will be saved in 'Your Devices' when you click on the 'Atmotube Pro' icon on the interface.
- To unpair the Atmotube quickly press the button on the front of the Atmotube 5 times. If this was successful, the LED should blink blue 10 times.

Settings

- To find the settings page, click on the 'menu' icon in the top left of the interface, then click on settings. Some recommended settings are set out below.
- 'Device' – Choose from either 'Always on' (data saved every minute), '5 mins', '10 mins' or '15 mins' in the 'Mode' line of the 'Particulate Matter' section to select how often you want PM averages to be taken and saved in the cloud to export as the CSV. All other data will still be taken every minute no matter what 'Particulate Matter' mode the device is in.
- 'Data synchronization' – Turn off 'Contribute to global map' in the 'Your Data' section to avoid students' locations being published to the public. Turn on 'Upload historical data to the cloud' in the 'Data Upload' section to allow data to be stored in the cloud and APIs to be used to download data. There is an option to turn on the 'High accuracy GPS mode' in the 'Data Upload' section however, from testing we have found that this does not make much of an improvement to the GPS readings.

Data collection

- PM, VOCs, the AQS and Meteorological measurements are collected automatically by turning on the device (VOCs take 3 minutes to begin measurements) or by pressing the button on the front of the monitor to take another full set of readings at that time to be uploaded to the cloud.



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- All of the data is then stored in the cloud if 'Upload historical data' is turned on.
- The frequency of PM data being saved in the cloud depends on the 'Particulate Matter' mode explained in the 'settings' section. For example, when the 'Particulate Matter' mode is set to the '5 mins', the PM sensor will turn on every 5 minutes for 1 minute and the average of the readings over that minute will be saved to the cloud. VOCs, the AQS and meteorological data are saved every minute as an average of that minute.
- The user interface on the connected mobile device is updated every second for PM and meteorological data and every 2 seconds for VOCs.
- Location data is recorded to create the air quality map and as longitudes and latitudes when a set of recordings are taken and saved to the cloud.



Data Exportation

- Data is exported as a CSV file showing all measurements taken in a chronological order. The file includes the date and time, VOCs, temperature, humidity, pressure, PM1, PM2.5, PM10 and latitude and longitude. There are two ways to export this file.
- Through the mobile app - Open the 'Data Synchronization' section in settings and click 'Export data to file', click 'Share' and then select how you would like to share the CSV file.
- Using an application programming interface (API) - use the following link to create your API: <https://atmotube.com/atmotube-support/atmotube-cloud-api>. This will enable you to instantly access up to 2000 lines of specified data from a device's full history.

