

AirGradient Manual - Schools

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Product Overview

AirGradient is a powerful system to continuously measure the air quality in classrooms, common areas and outside locations. It consists of a network of sensors that transmit data to a cloud based dashboard providing tailored real time data, alerts and reports for various stakeholders (principals, health and safety officers, teachers, students and parents).

What does the system measure

The system focuses on four important air quality components: PM_{2.5} particles, CO₂, temperature and humidity. These four components have been selected as they tend to be the most dynamic components and also the ones that can be most easily influenced (e.g. particles with purifiers, co2 with ventilation and temperature/humidity with A/Cs). It is recommended that you periodically check also for other pollutants e.g. Formaldehyde.

Setting up of the sensors

Locations

In order to get a comprehensive air quality profile of your whole school, we recommend you set up sensors in all learning spaces and at least two outside locations depending on the size of your campus. Often in larger common areas like libraries, canteens or gyms it is more difficult to maintain a good air quality so it is important that these spaces are covered as well. Additionally all classrooms should be covered as this is where the students spend most of their time.

Placement of Sensors

We recommend to mount the sensor to the wall considering the following factors:

- **Height:** Please do not place the sensor below 100cm or above 300cm on the wall. Ideally it should be placed between 150-250cm.
- **Walls:** Please ensure that the walls are not hot due to outside exposure as this might negatively influence the temperature sensor.

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- **Sunlight:** In order to get accurate temperature readings, please ensure that the sensor unit is not exposed to direct sunlight at any time of the day.
- **Doors/Windows:** In order to have stable readings, we recommend not to put the sensor unit close to doors or windows.
- **Air Conditioner / Ventilation Outlet:** Please do not place the sensors closer than 90cm to any A/C or ventilation outlet.
- **Wifi/Power:** Please note that the sensor needs to be connected to a power outlet and a well working wifi network. Please note that our sensors only work on 2.4 GHz networks.

Connection of Sensors to the Internet

When you power on the sensor for the first time, it does not yet know your wifi networks. Therefore the sensor will open an access point where you can connect directly with your phone or computer to enter your wifi network credentials. Please follow these steps:

- 1) Connect the sensor to the power supply. The green light on the sensor will turn on.
- 2) On your iPhone or Android phone go to wifi settings and search for a wifi network called "AirGradient xxxxxxxx".
- 3) Connect to this wifi network.
- 4) After a few seconds you will see a wifi connection menu. Click on "scan" to search for nearby wifi networks or "manual" if you have a hidden WiFi network.
- 5) Select the network you want to connect the sensor to and enter the credentials
- 6) Once the sensor finds the internet connection, the white LED on the sensor will turn on and you will see the sensor coming up on the AirGradient dashboard. This might take 1-2 minutes.

Application

All sensor data is accessible on the AirGradient website. It offers comprehensive and powerful analytics and real time data to ensure that you have all information available to manage the school air quality well.

Login

To access the website, go to: <https://app.airgradient.com/dashboard>

Please note that all users need to be pre-approved by the school administrator.

Main Navigation

Once you are logged in, you can use the hamburger menu on the top left as main navigation. Opening this menu gives you access to the main areas of the application.

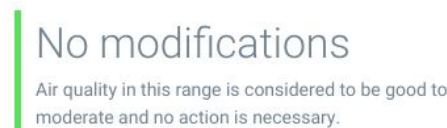
- 1) **Places Selector:** On top of the hamburger menu is the places selector with the name of your school's location. In case you are managing more than one location, you can switch between the different organisations here.
- 2) **Dashboard:** This is the main page where you can see all the important air quality data of your school. The dashboard will be explained in a special section below.
- 3) **All Locations:** This page provides a comprehensive table of air quality data of all locations within your school. It allows easy sorting and searching for specific locations.
- 4) **Export Data:** Easy interface to export CSV data of your sensor for a specific time frame.
- 5) **Help:** Some general information and access to help. This view is currently under development.
- 6) **Place Administration:** Here you can manage your sensors, set alert thresholds, set your school's opening times, etc. These preferences should only be used by the school administrator of the system.
- 7) **User Settings:** Here you can manage some of your personal settings, e.g.: password changes or alarms.
- 8) **Signout:** The normal login will remember you for approximately one year but if you use a public accessible computer please use the signout button to log out.

Dashboard

The dashboard is divided into four main areas:

1) **Outside:** On the top left of the dashboard you get information about the outside air quality with the following elements:

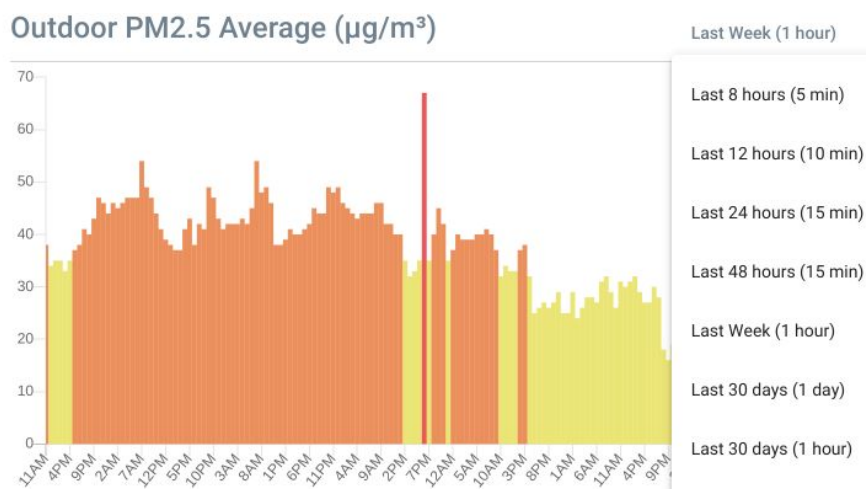
a) **School Policy current AQI Level:** Depending on the current outside air quality the school policy will be presented. The thresholds and wordings for the policy can be updated by the schools administrator.



b) **Overview metrics:** Below the school policy you can find key outside air metrics e.g. PM_{2.5}, temperature, humidity and purification performance.



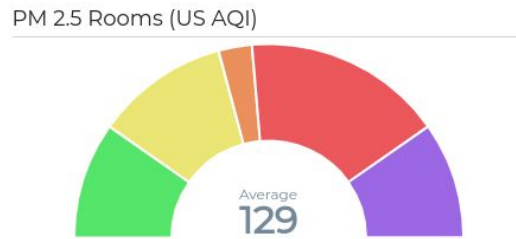
c) **Average PM_{2.5} Outside Chart:** The chart shows the average readings of all outside sensors and by default shows the last 8 hours. This gives you a good idea on the development of the outside air pollution levels. You can change the time range of the chart by clicking on the time label.



2) **Inside:** On the top right you can see an overview of all your indoor locations in regards to PM_{2.5} and CO₂.

a) **Half Doughnut Charts.** The two charts on the top show the number of rooms in the respective air quality levels (green, yellow, red, etc) for PM_{2.5} and CO₂.

This allows you to immediately see how good the air quality is in all your locations.



b) **Tables:** Below the charts are data tables with the inside rooms sorted by decreasing order for $PM_{2.5}$ and CO_2 . This allows you to immediately see which specific rooms have the worst air quality. By clicking on the values you can see a history chart of that specific room.

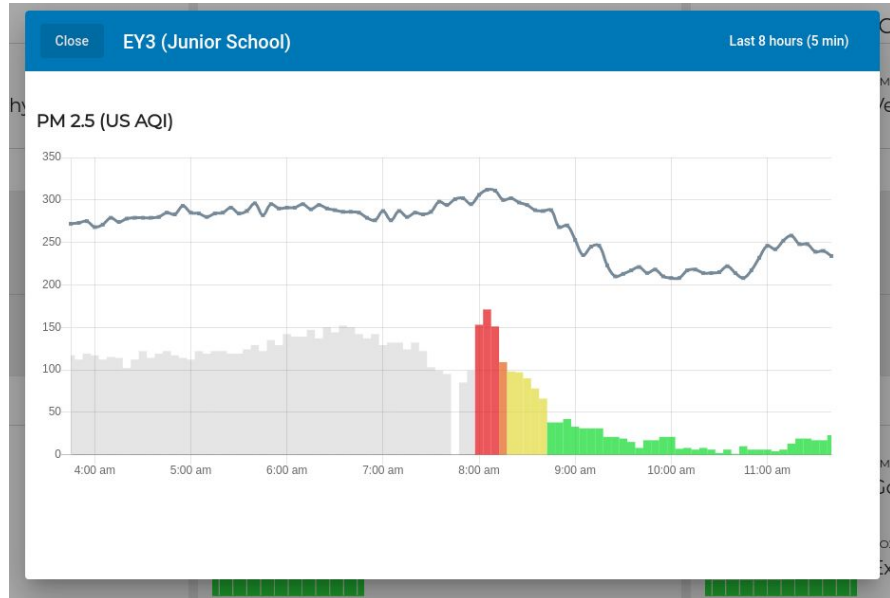
3) **Locations:** Below these two overview sections, you will see all your indoor and outdoor locations:

a) **Sorting:** By clicking on the column headers, you can sort the locations by Name, $PM_{2.5}$, CO_2 , temperature, humidity or last update.

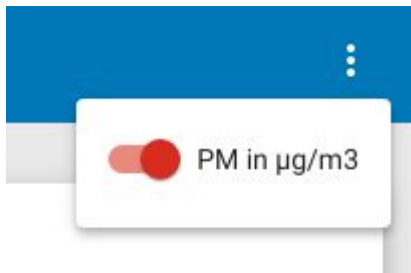
PM2.5 ($\mu\text{g}/\text{m}^3$)	Reduction %	CO2 (ppm)	Temp. ($^{\circ}\text{C}$)	R. Hum. (%)	Last Update
7	-17	547	31.9	58	10:23:47

b) **Charts:**

By clicking on the $PM_{2.5}$ or CO_2 values, a popup will open with more detailed historical data of this location. The same can be done for temperature and humidity.



Dashboard Settings: In the navigation bar on the right hand side you can open the dashboard preferences.



PM_{2.5} unit: Here you can set whether the dashboard should show PM_{2.5} as US AQI or µg/m³.

All Locations

With the hamburger menu on the top left you can navigate to the **All Locations** screen. This is a table of all locations and gives you additional information:

All Locations										
Search Locations										
Grade <input type="text"/>										
Location ↑	Outdoor	PM2.5 (µg/m3)	Reduction %	CO2 (ppm)	Temp. (°C)	R. Hum. (%)	Active	Open	Wifi	Last Update
Grade 1	<input type="checkbox"/>	0	100	456	29.3	51	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-65	10:29:01
Grade 2	<input type="checkbox"/>	2	67	432	30.7	62	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-67	10:29:20
Grade 3	<input type="checkbox"/>	0	100	433	31.2	60	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-73	10:28:28

You can use the filter on the top left to search for a specific location or use the sort by clicking on the column headers.

Besides the air quality metrics that you also have on the dashboard you have additional information, e.g.

Outdoor: Indicates whether the location is an indoor or outdoor location.

Active: Indicates whether the location is currently displayed in the dashboard.

Open: Indicates whether the location is currently open (you can set the opening hours in the admin section).

Wifi: The wifi icon will show you the wifi strength in this location. Move your mouse over it to see the strength in db.

Last Update: The last time that AirGradient received data from that location.

Reports, Notifications and Alerts

AirGradient offers a variety of different reports and notifications.

Daily Report

The daily report is automatically sent at the end of the opening times defined in the admin interface. It contains a summary section on the top and then PM_{2.5} and CO₂ data for each location for the current day and the two previous days (that were open). Days that are not "open" e.g. holidays or weekends can be defined in the admin interface section opening hours.

In the AirGradient admin interface under user/permissions you can select for each user if he/she should get that report.

AQI Notification

AQI notifications about the current outdoor air pollution can be sent at specific times of the day. This can give valuable information to users for example whether it is safe to do outdoor exercise. The times of these notifications can be set up in the admin interface section AQI notifications.

In the AirGradient admin interface under user/permissions you can select for each user if he/she should get these notifications.

Offline Sensor Notification

If a sensor is offline for more than 30 minutes an automatic email is sent. This email includes the location of the offline sensor(s).

In the AirGradient admin interface under user/permissions you can select for each user if he/she should get these notifications.

Individual AQI and CO₂ Alerts

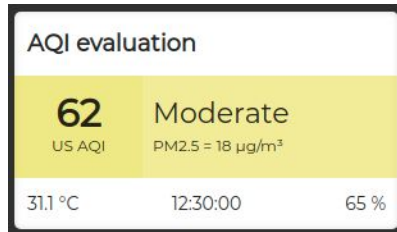
Administrators can set standard alerts for the respective organisations in the Place Administration dashboard. Then individual users can subscribe to these alerts in their User Settings page.

AQI Widget (iFrame)

If you want to make your outside AQI values public, you can add the AirGradient widget to your website via an iFrame.

The widget takes the rolling average of the last 30 minutes and updates every 10 minutes.

If you have several outside locations, it will display the average.



Please contact AirGradient Support to get the code for the widget.

Daily Report (iFrame)

AirGradient also allows you to add an iFrame which displays the average of the day by location. This can be used if you want to make some of your inside location data publicly available (e.g. in a parent's portal in a school).

Please contact AirGradient Support to get the code for the widget.

User Settings

All user of AirGradient can do some user specific settings. The menu is available on the side menu.

Alarms

Each user can subscribe to standard alarms set by the administrator of the school. You can also select if you want to be notified if an alarm has ceased.

If you need specific alarms not available in the list, please contact your administrator.

Please subscribe to the notifications that you would like to receive. In case you need additional alarms that are not listed here, please contact your local admin.

Title	Description	Location	Subscribed	Notify when returned to normal
Elementary School PM indoor issue	One or multiple locations have a PM issue		<input type="checkbox"/>	<input type="checkbox"/>
Senior School CO2 issue	One or multiple locations have a CO2 issue		<input type="checkbox"/>	<input type="checkbox"/>
There is some hotspot somewhere	All school alarm		<input type="checkbox"/>	<input type="checkbox"/>

Items per page: **5** 1 - 3 of 3 < >

My Locations

This feature will let you filter for which specific locations you would like to receive alarms. It is currently under implementation.

Change Password

If you have your own AirGradient password and do not use the Google login, you can change your password here.

PWA Update

If you have installed the AirGradient dashboard on your homescreen of your mobile device, sometimes new updates will not be immediately available. Here you can force the latest version to be used.

Place Administration

In the AirGradient admin section you can do the following set up work. You can reach the Place Administration with the hamburger menu. Please note that this administration menu is **ONLY** available for administrators.

Locations

Here you can add, edit and delete locations. A location can be a room, common area or an outside location.

You can attach a sensor to a location. This allows you to e.g. change a sensor if you need to replace an existing one.

You also need to indicate whether the location is an outside location and whether it should be included in the reporting and the averages calculations in the reports.

If you want to temporarily hide a location from the dashboard and the reports you can uncheck the Active checkbox.

Indoor sensors can also be optionally assigned to a specific group (see below).

Sensors

Here you see all sensors that are assigned to your organisation. AirGradient sensors will be auto assigned to your organisation but you can add some 3rd party sensors here e.g. AirVisual or Gaia sensors.

Displays

We have small display units that can be used inside rooms to show the current air quality. Here these display units can be assigned to a specific location. This feature is currently in prototype status.

PPS

Future functionality of AirGradient will allow the control of purifiers and positive pressure systems. This feature is currently in prototype status.

Users & Permission

Here the users and their permissions to the AirGradient dashboard can be defined. Users can be added, deleted or existing users edited.

- **Email:** Please enter the users email address.
- **Daily Reports:** User gets the standard daily report which is sent at the end of the opening period and contains an overview of the air quality in all locations.
- **AQI Notifications:** User will receive the AQI notifications sent at specific times defined in the AQI notifications section (see below).
- **Offline Sensor Notification:** User will receive an email if any of the sensors is offline for <30 minutes.
- **Data Export:** The user has access to the data export section on the dashboard.
- **Administration:** The user has access to this administration section.
- **Send Invitation Email:** The user will receive an invitation email that allows the user to create his password or login with his/her Google account.

Groups

Larger organisations e.g. schools or companies might have different sections that they want to see separated in the AirGradient dashboard and reports. For these Groups can be set up here. Then under Locations above, a location can be assigned to a specific group.

Opening Hours

The opening times of the organisation should be set up here, e.g. Mon-Fri 08:00 - 18:00. If you want a 24/7 monitoring please define Mon-Fri 00:00-24:00.

Here you can also set up holiday periods to avoid reports being sent during these times.

It is important to set this up as reports are only taking values into consideration that happened during opening hours. Also the charts on the dashboard shows times outside opening hours in grey or lighter colored colors.

AQI Levels

If your organisation e.g. school has an air quality policy, this should be added here so that it is displayed on the dashboard and also used in the AQI notification emails.

You need to define the minimum and maximum AQI for each level and can then define the color, icon, title and description.

See below example for a typical school policy.

AQI Min	AQI Max	Color	Title	Description	Icon	Actions
0	50	green	Good	No risk to students' health and therefore no action needs to be taken.	😊	Edit Delete
51	100	yellow	Moderate	Air purifiers on (auto setting). Otherwise no restrictions.	😊	Edit Delete
101	150	orange	Unhealthy for Sensitive Groups	Air purifiers on (medium setting). Masks recommended for sensitive children. Make indoor spaces available for children with respiratory problems. Events - Individuals with respiratory issues will be monitored, and rest periods given where needed.	😊	Edit Delete
				Air purifiers on (max setting). Masks required for Junior School & Boarders. Masks highly		--

This information is then used e.g. on the dashboard to show the users the current policy level with the current outdoor air quality:

Good

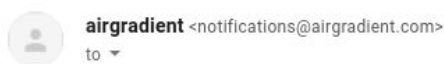
No risk to students' health and therefore no action needs to be taken.

AQI Notifications

Here you can define the times that the AQI notification email should be sent to the users. As pointed out above you can set for each AirGradient user if he/she should get this email.

The AQI notification contains the outside AQI (average last 30 minutes) and the current AQI level that applies.

Here is an example:



Mon, Feb 24th 14:00:00

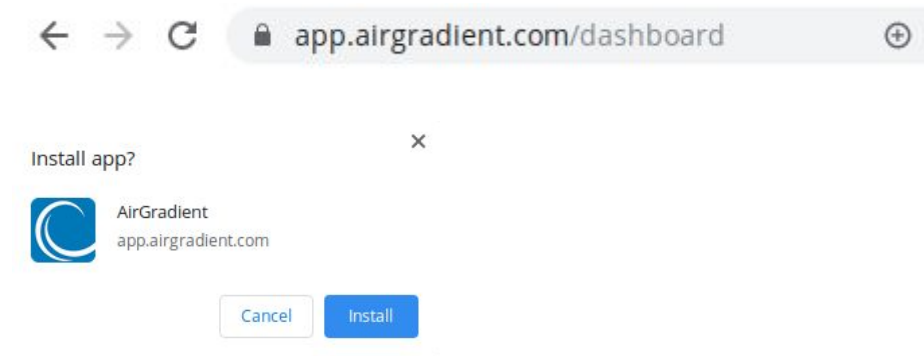
Measure	Average (30M)	Description
PM2.5 (AQI US)	153 151 / 200	Unhealthy Air purifiers on (max setting). Masks required for Junior School & Boarders. Masks highly recommended for all others; All children supervised for indoor break. PE classes held indoors Any child with respiratory issues will be withdrawn from sports. Training will be held inside or cancelled. Coaches will be mindful not to over-exert students.

Install as App

The dashboard can be installed as an app on your homescreen. This is recommended for better and faster access to the date. Please follow the instructions below based on your operating system.


1) Google **Chrome** on **Windows, Mac** or **Linux**

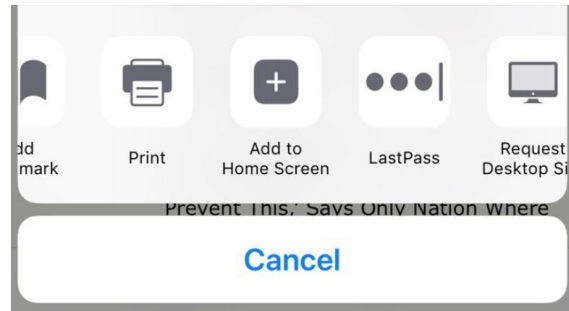
- a) Open the website at <https://app.airgradient.com/dashboard> in Google Chrome
- b) Click on the small + sign in the address bar and then install.



- c) After a short moment, AirGradient will run as an App and can be launched like a standard desktop program.

2) **Safari** on **iOS**

- a) Open the website at <https://app.airgradient.com/dashboard> in iOS Safari on your iPhone or iPad
- b) Click on this icon in the Safari bottom bar: 
- c) Click on "Add to Home Screen":



- d) AirGradient will then be added to your home screen and you can launch it directly. Kindly note that iOS does not support browser alerts so this feature is not available on iOS.

3) Chrome on Android

- a) Open the website at <https://app.airgradient.com/dashboard> in Google Chrome on Android
- b) After using the website a while, you will see a message asking you to add it to the homescreen. Alternatively you can go to the Chrome Menu and select "Add to Homescreen":

Technical Specifications AirGradient Sensors

- **Power supply**
 - 3A, USB C
- **Accuracy**
 - PM_{2.5} Sensor:
 - $\pm 10\%$ @100~500 μ g/m³
 - $\pm 10\mu$ g/m³@0~100 μ g/m³
 - CO₂ Sensor:
 - ± 40 ppm $\pm 3\%$
 - Temperature and Humidity:
 - $\pm 0.3^\circ$ Celsius
 - $\pm 3\%$ relative humidity
- **Dimensions**
 - 12cm x 12cm x 2.5cm
- **Weight**
 - Approx. 300grams
- **Wifi**
 - 2.4 GHz Wi-Fi and Bluetooth
 - Data transfer through encrypted connection

Troubleshooting and FAQs

- **The CO₂ sensor seems to be inaccurate**
 - The CO₂ sensor self-calibrates every two weeks and assumes the lowest levels observed is the outside CO₂ amount of approx. 400ppm. So if you experience too high readings, please wait for this time for the self-calibration to work.

- **What is the maximum size of the classroom that the sensor can cover?**
 - Air constantly flows within enclosed spaces and thus normally one sensor is accurate enough for classrooms and even auditoriums. If you are unsure about your specific requirements, please contact us.

- **Are the sensors waterproof?**
 - The sensors are not waterproof because there needs to be an active air circulation. We recommend putting the outdoor sensors under an overhanging roof, a porch or covered balcony.