airvoice

# Indoor Air Quality Monitor

The Airvoice AVI-20 is an advanced indoor air quality monitor designed to provide information about your indoor environment. It accurately measures $CO_2$, PM2.5, TVOCs, temperature, and relative humidity. The device is easy to assemble, fully open-source, and allows extensive personalization.

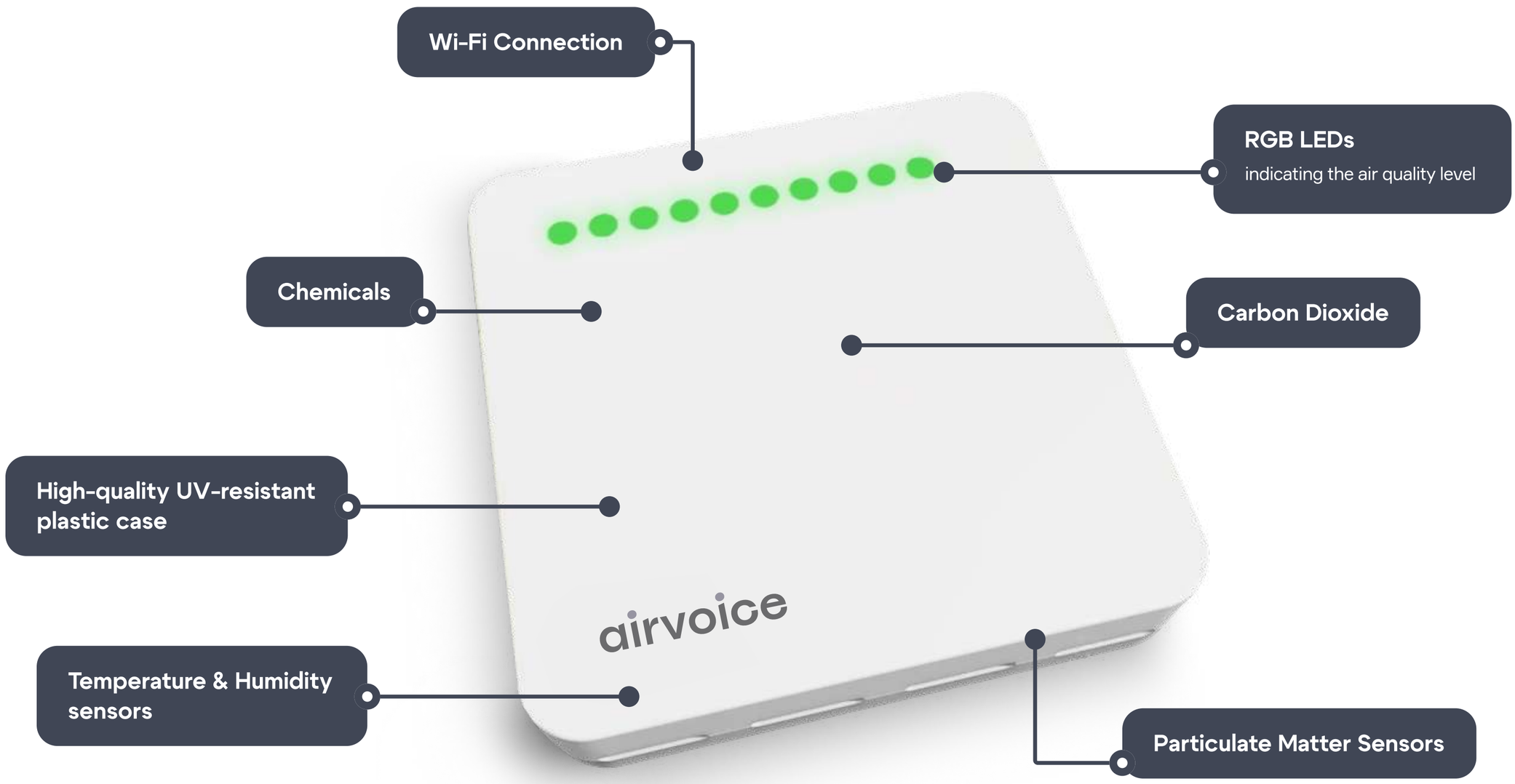

## Technical Data

| Specification | Description |
|---|---|
| Model | Airvoice AVI-20 |
| Microcontroller | ESP32-C3-MINI (32-bit RISC-V single-core processor, up to 160MHz, 384 KB ROM, 400 KB SRAM, 8 KB SRAM in RTC, 4 MB flash in chip package) |
| Wi-Fi | 2.4GHz IEEE 802.11 b/g/n-compliant |
| Bluetooth | Bluetooth LE: Bluetooth 5, Bluetooth mesh |
| Extensions | Broken out on PCB: I2C, 3 GPIO, 2 UART |
| Peripherals | 11 RGB-LEDs, Push button, Reset button, USB C connector |
| External Hardware Watchdog | TPL5010 |
| CO2 Sensor Module | S8 (NDIR). 400 to 10,000ppm. Accuracy: ±40ppm ±3% of reading at 5 to 30°C, 20–70% RH (400–2,000 ppm range) |
| Particle Sensor Module | PMS5003 (laser scattering principle). Accuracy: ±10% at 100~500µg/m³, ±10µg/m³ at 0~100µg/m³ |
| Temperature and Humidity | SHT40. Accuracy: Temperature ±0.2°C at -40 to +125°C; Humidity ±2% RH at 0–100% RH |
| TVOC | SGP41. Accuracy: TVOC <±15 at 0 to 500 VOC Index |
| Enclosure | ASA plastic, UV resistant and weather proof |
| Mounting Options | Wall, pole mounting options, or table placement |
| Cable | 2m USB C cable including data lines for flashing |
| Certifications | CE, RoHS, REACH, FCC ID: 2AC7Z-ESPC3MINI |

airvoice

# Key Characteristics

The Airvoice AVI-20 incorporates high-quality sensor modules from leading manufacturers.




## Technical Specification

The S8 $CO_2$ sensor utilizes NDIR technology for very accurate measurements. It auto-calibrates with an automatic baseline calibration (ABC) every 7 days. High levels of $CO_2$ can indicate insufficient ventilation and cause headaches, tiredness, and lower cognitive performance.

For PM2.5 measurements, the Airvoice AVI-20 uses the PMS5003 sensor with laser scattering technology. Elevated levels of fine particles — especially below 2.5 microns — have been linked to a broad range of health issues including premature mortality, heart or lung problems, acute and chronic bronchitis, asthma attacks, and respiratory symptoms. The sensor module is factory calibrated.

TVOCs are measured with the SGP41 TVOC sensor. TVOCs are organic chemicals that can easily vaporize and enter the air we breathe. These often have indoor sources like off-gassing furniture or aggressive cleaning liquids.

Temperature and Humidity are measured with the SHT3x/4x sensors, which are among the most accurate ones on the market. These two air quality parameters can give you good information about indoor comfort levels and also indicate, e.g., the risk of mold due to high humidity levels.

airvoice

# Airvoice Quick Start Manual

## Model: AVI-20

## Product Overview

Airvoice AVI-20 is a powerful air quality monitor measuring particulate matter (PM2.5), carbon dioxide (CO2), volatile organic compounds (TVOC), temperature, and humidity, including a customizable coloured LED bar.

## Package Contents

The Airvoice AVI-20 package contains the following:

- Airvoice AVI-20 monitor
- USB power supply adapter
- USB-C cable
- MODBUS plug
- Fitting accessories
- Quick start manual

## Mounting Instructions

The monitor should be placed away from doors, windows ventilation, or HVAC registers, and avoid direct sunlight.

Please ensure that the monitor is mounted on the wall or table in the correct orientation and with unobstructed air flow at the bottom and top of the monitor.

The monitor’s enclosure design allows for cable management, accommodating use of a wall socket above or below the monitor. The monitor must remain plugged in with power at all times to ensure uninterrupted operation of the device.

## Wi-Fi Connection

When the monitor is powered on for the first time, it requires an initial connection to your Wi-Fi network. Therefore the monitor will open an access point where you can connect directly with your phone to enter your Wi-Fi network credentials. Please follow these steps:

1. Connect the monitor to the power supply.
2. The monitor will enter Wi-Fi Configuration mode if it does not find any known Wi-Fi network to which it was previously connected. A blue LED lights up.
3. Scan the QR code on the back labeled ‘Add to WiFi’.
4. After a few seconds, you will see a Wi-Fi connection menu and all monitor LEDs will turn blue. Click on 'Configure Wi-Fi' to search for nearby Wi-Fi networks or ‘Configure Wi-Fi (manual)’ if you have a hidden Wi-Fi network. Please note that the monitor only supports 2.4GHz networks.
5. Select the network you want to connect the monitor to and enter the credentials.
6. Once the monitor connects successfully to the internet, all LEDs will turn green. If not, all will turn red. In the later case please ensure you have entered the correct Wi-Fi password and repeat the steps.

## Wi-Fi Infrastructure Requirements

Please note the following:

- Airvoice AVI-20 only supports 2.4GHz WiFi.
- Airvoice AVI-20 does not support WPA 2 Enterprise authentication.
- Airvoice AVI-20 does not support Wi-Fi authentication through captive portals. It needs a regular SSID with a password.
- In case you need to whitelist the MAC address of the monitor, the serial number printed on the back of the device corresponds to the MAC address.

airvoice

## Specifications

Name: Airvoice AVI-20
Dimensions: 130 x 130 x 36 mm
Weight: 300 g
Wireless Connectivity: Wi-Fi 2.4 GHz
Input: 100-240V AC, 50/60HZ USB-C
Output: 5V/2.0A
Color-LED bar (configurable)
Certifications: RESET™ Air, FCC, CE, RoHS, WEEE

## Sensor Modules Accuracy

PM2.5 (laser scattering principle):
±10% at 100~500μ g/m3,
±10 μg/m3 at 0~100μ g/m3
CO2 (NDIR): Range 0—10,000 ppm, ±40 ppm ±3%, automatic baseline calibration
TVOC (multi-pixel gas sensor): 0—1,000 ppm of ethanol equivalents, accuracy: 15%
Temperature: Range: -40 to 125℃, ±0.3℃ at 0-90 ℃
Relative Humidity: Range 0—100% RH, ±2% at 0—100% RH

## Test Report

The test report of the monitor can be accessed through the ‘show sensor information' screen on the dashboard's admin shortcuts.

## CE Declaration of Conformity

Hereby, AirGradient Ltd. declares that the radio equipment type Wireless Local Area Network Device is in compliance with Directive 2014/53/EU.

## WEEE Statement

All products bearing this symbol are waste electrical and electronic equipment (WEEE as in Directive 2012/19/EU) which should not be mixed with unsorted household waste. Instead, you should protect human health and the environment by handing over your waste equipment to a designated collection point for the recycling of waste electrical and electronic equipment, appointed by the government or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health.

Please contact the installer or local authorities for more information about the location as well as terms and conditions of such collection points.

## FCC Statement

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

this device may not cause harmful interference, and
this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

FCC 20 cm Statement: This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Contains: FCC ID: 2AC7Z-ESP32WROVER

## Safety Information

- Only use the provided charger and cable
- For indoor use only
- Unplug the monitor from the outlet before servicing
- DO NOT clean with liquid
- DO NOT use in wet or damp areas
- DO NOT exceed the recommended electrical ratings
- Operating ambient temperature: 0° to 50° Celsius

## Support

In case you have any problems, please contact **support@airvoice.global**