

Ruuvi Air quick start operation manual

Ruuvi Air is a wireless Bluetooth air quality monitor that can measure CO₂, PM, temperature, air humidity, and air pressure. You can start using the device by following these easy steps:

1. Connect a USB-C power source to the device.
2. Place the device on a flat surface and wait 1min for it to start up.
3. Download Ruuvi Station mobile application from Google or Apple app store.
4. Launch the application and follow its easy on-screen instructions.

For in-depth instructions on how the device can be used, see ruuvi.com/support

FCC Statement

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

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: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RF Exposure Warning Statements

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment shall be installed and operated with a minimum distance 20cm between the radiator & body. This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions: (1) This device may not cause interference. (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) L'appareil ne doit pas produire de brouillage; (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radio Frequency Exposure Statement for ISED

This equipment complies with ISED exposure limits set forth for an uncontrolled environment. The device can be used in portable exposure conditions. This equipment shall be installed and operated with a minimum distance 20cm between the radiator & body.

Cet équipement est conforme aux limites d'exposition ISED établies pour un environnement non contrôlé. L'appareil peut être utilisé dans des conditions d'exposition portables. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et le corps.

Ruuvi Air product spec sheet

Overview

Ruuvi Air is an air quality sensor that measures CO₂, PM₁, PM_{2.5}, PM₄, PM₁₀, VOC, NO_x, temperature, air humidity and air pressure. Measurement results are continuously broadcasted via Bluetooth Low Energy advertisements. The measurement results can be received using commonly available mobile devices such as Android and iOS phones and tablets, Ruuvi Gateway Wi-Fi/Ethernet router, or other Bluetooth Low Energy compatible third party receivers.

Main features

- Continuous measurement of the environmental air quality parameters
- Internal 10-day history storage at a 5 minute logging interval
- Free multilingual Android and iOS mobile applications for real-time measurements, history browsing, and alerts
- Multi-color light indicator for air quality score visualisation
- Open source design (firmware, applications, and electronics schematic)
- USB-C powered

Measured parameters

When powered on, Ruuvi Air continuously measures environmental parameters. In addition, an easy to understand Ruuvi Air Quality Score is calculated. All the results are refreshed every second.

The measurements include:

- Carbon dioxide (CO₂)
- Particulate matter (PM₁, PM_{2.5}, PM₄ and PM₁₀)
- Volatile Organic Compounds (VOC index)
- Nitrogen oxides (NO_x index)
- Temperature:
- Air humidity
- Air pressure
- Ruuvi Indoor Air Quality Score (IAQS)

Technical Details

- Dimensions

- 62,5 x 62,5 x 72 mm (bare device)
 - 62,5 x 62,5 x 72 mm (bare device, wall-mount installed)
- Weight
 - 70 grams (bare device)
 - 75 grams (wall-mount installed)
- Connectivity (chipset Nordic Semiconductor nRF52840)
 - Bluetooth Low Energy
 - Range
 - Typically 10-200 meters depending on the environment
 - Transmitting power
 - +8 dBm
 - NFC™-A tag
- Power source
 - USB-C power input connector
 - 5V=1A USB-A Europlug 110-230V wall adapter (included)
 - USB-A to USB-C power cord (included)
- Operating conditions
 - Storage (recommended)
 - Temperature 10 °C to 30 °C
 - Relative humidity 20 % to 60 % (non-condensing)
 - Short term storage (ie. transport)
 - Temperature -40 °C to 70 °C
 - Relative humidity 0 % to 80 % (non-condensing)
 - Operation (recommended)
 - Temperature 10 °C to 40 °C
 - Relative humidity 20 % to 80 % (non-condensing)
 - Short term operation (absolute maximum)
 - Temperature -10 °C to 50 °C
 - Relative humidity 0 % to 90 % (non-condensing)
- Measurement ranges, resolutions, accuracies, response times and units
 - Carbon dioxide CO₂ (measured by Sensirion SEN66)
 - Output range
 - 0 to 40 000 ppm
 - Resolution
 - 1 ppm
 - Accuracy
 - From 400 to 1 000 ppm
 - ±(50 ppm + 2,5 % of the measured value)
 - From 1 001 to 2 000 ppm
 - ±(50 ppm + 3 % of the measured value)
 - From 2 001 to 5 000 ppm
 - ±(40 ppm + 5 % of the measured value)
 - Typical additional drift per year, starting after five years from 400 to 5 000 ppm

- $\pm(5 \text{ ppm} + 0,5 \% \text{ of the measured value})$
- Repeatability
 - Typically $\pm 5 \text{ ppm}$
- Response time
 - Typically 60 seconds, for a step from 400 to 2 000 ppm, $\tau_{63\%}$
- Unit: ppm
- Particulate matter PM1, PM2.5, PM4 and PM10 (measured by Sensirion SEN66)
 - Output range
 - 0 to 1 000 $\mu\text{g}/\text{m}^3$
 - Resolution
 - 0,1 $\mu\text{g}/\text{m}^3$
 - Mass concentration precision for PM1 and PM2.5
 - From 0 to 100 $\mu\text{g}/\text{m}^3$
 - $\pm 5 \mu\text{g}/\text{m}^3 + 5 \% \text{ of the measured value}$
 - From 100 to 1 000 $\mu\text{g}/\text{m}^3$
 - $\pm 10 \% \text{ of the measured value}$
 - Mass concentration precision for PM4 and PM10
 - From 0 to 100 $\mu\text{g}/\text{m}^3$
 - $\pm 25 \mu\text{g}/\text{m}^3$
 - From 100 to 1 000 $\mu\text{g}/\text{m}^3$
 - $\pm 25 \% \text{ of the measured value}$
 - Maximum long-term mass concentration precision limit drift
 - From 0 to 100 $\mu\text{g}/\text{m}^3$
 - $\pm 2 \mu\text{g}/\text{m}^3 / \text{year}$
 - From 100 to 1 000 $\mu\text{g}/\text{m}^3$
 - $\pm 2 \mu\text{g}/\text{m}^3 / \text{year}$
 - Unit: $\mu\text{g}/\text{m}^3$
- VOC (measured by Sensirion SEN66)
 - Output range
 - 1 - 500 VOC index points
 - Resolution
 - 1 VOC index point
 - Device-to-device variation
 - Typically $<\pm 15 \text{ VOC index points}$ or $<\pm 15 \% \text{ of the measured VOC index value (the larger)}$
 - Repeatability
 - Typically $<\pm 5 \text{ VOC index points}$ or $<\pm 5 \% \text{ of the measured VOC index value (the larger)}$
 - Time until reliably detecting events
 - Typically less than 60 seconds
 - Time until above accuracy specifications are met
 - Typically less than 1 hour

- Unit: index point that has been defined by Sensirion
- NOx (measured by Sensirion SEN66)
 - Output range
 - 1 - 500 NOx index points
 - Resolution
 - 1 NOx index point
 - Device-to-device variation
 - Typically $\leq \pm 50$ NOx index points or $\leq \pm 50$ % of the measured NOx index value (the larger)
 - Repeatability
 - Typically $\leq \pm 10$ NOx index points or $\leq \pm 10$ % of the measured NOx index value (the larger)
 - Time until reliably detecting events
 - Typically less than 60 seconds
 - Time until above accuracy specifications are met
 - Typically less than 6 hours
 - Unit: index point that has been defined by Sensirion
- Temperature (measured by Sensirion SEN66)
 - Resolution
 - 0,01 °C
 - Accuracy (in optimal conditions)
 - Typical $\pm 0,45$ °C @ 25 °C, 50 % RH
 - Maximum $\pm 0,7$ °C @ 25 °C, 50 % RH
 - Repeatability
 - Typical 0,1 °C @ 25 °C, 50 % RH
 - Response time
 - Typically less than 60 seconds for a step from 15 °C to 25 °C @ 25 °C, 50 % RH, $\tau_{63\%}$
 - Units: Celsius °C, Fahrenheit °F and Kelvin K
- Air humidity (measured by Sensirion SEN66)
 - Resolution
 - 0,01 % RH
 - Accuracy (of the relative air humidity)
 - Typical $\pm 4,5$ @ 25 °C, 30-70 % RH
 - Maximum ± 6 @ 25 °C, 30-70 % RH
 - Repeatability
 - Typical ± 1 % @ 25 °C, 50 % RH
 - Response time
 - Typically less than 20 seconds for a step from 75 % to 25 % @ 25 °C, 50 % RH, $\tau_{63\%}$
 - Units: relative humidity %, absolute humidity g/m³, dew point in °C, °F or K
- Air pressure (measured by Infineon DPS368)
 - Output range

- 300 - 1200 hPa (limited to 500 - 1155 hPa on the firmware)
- Resolution
 - 1 Pa
- Relative accuracy
 - $\pm 0,06$ hPa
- Absolute accuracy
 - ± 1 hPa
- Units: pascal Pa, hectopascal hPa, millimetre of mercury mmHg, inch of mercury inHg
- Fan noise emission
 - In normal operation (measured from 20cm distance)
 - Typically <24 dB(A)
 - Long term acoustic emission level drift
 - Typically <+1dB(A) / year
- Power consumption
 - Typically in normal operation 150-250 mA
 - Peak 500 mA
 - Minimum of 1A capable power source is recommended

About the Ruuvi Indoor Air Quality Score (IAQS)

Air quality is expressed with a single index-like number that indicates how good or bad the indoor air is. The number is based on two factors: fine particles (PM2.5), and carbon dioxide (CO₂).

The air quality score takes both factors into account, but if either rises faster than the other one, the overall value quickly declines. For example, if the amount of fine particles increases during cooking, the score drops even if carbon dioxide levels are still at a good level. The higher the score, the healthier the air is to breathe. Good indoor air supports alertness, concentration, and also sleep quality.

Notes

Sensor accuracy information is based on manufacturers' datasheets and information provided directly by the sensor manufacturers. It cannot be guaranteed that the specified typical or absolute accuracy values will always be achieved in user applications.

According to the manufacturers, most sensors perform within the typical values stated, but some units may exhibit accuracy up to three times worse. All sensors are factory-calibrated prior to assembly. At Ruuvi's production line, sensors used by the firmware are tested, but not individually recalibrated. Stressing the device above the specified absolute maximum storage or operating temperatures may cause permanent damage to its internal components.