Ruuvi Air product spec sheet

Overview

Ruuvi Air is an air quality sensor that measures CO_2, PM1, PM2.5, PM4, PM10, VOC, NOx, 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 (CO_2)
- Particulate matter (PM1, PM2.5, PM4 and PM10)
- Volatile Organic Compounds (VOC index)
- Nitrogen oxides (NOx 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 CO_2 (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

            - ±(5 ppm + 0,5 % of the measured value)
        - Repeatability
            - Typically ±5 ppm
        - Response time
            - Typically 60 seconds, for a step from 400 to 2 000 ppm, τ63%
        - Unit: ppm
    - Particulate matter PM1, PM2.5, PM4 and PM10 (measured by Sensirion SEN66)
        - Output range
            - 0 to 1 000 µg/m³
        - Resolution
            - 0,1 µg/m³
        - Mass concentration precision for PM1 and PM2.5
            - From 0 to 100 µg/m³
                - ±5 µg/m³ + 5 % of the measured value
            - From 100 to 1 000 µg/m³
                - ±10 % of the measured value
        - Mass concentration precision for PM4 and PM10
            - From 0 to 100 µg/m³
                - ±25 µg/m³
            - From 100 to 1 000 µg/m³
                - ±25 % of the measured value
        - Maximum long-term mass concentration precision limit drift
            - From 0 to 100 µg/m³
                - ±2 µg/m³ / year
            - From 100 to 1 000 µg/m³
                - ±2 µg/m³ / year
        - Unit: µg/m³
    - VOC (measured by Sensirion SEN66)
        - Output range
            - 1 - 500 VOC index points
        - Resolution
            - 1 VOC index point
        - Device-to-device variation
            - Typically <±15 VOC index points or <±15 % of the measured VOC index value (the larger)
        - Repeatability
            - Typically <±5 VOC index points or <±5 % 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 <±50 NOx index points or <±50 % of the measured NOx index value (the larger)
        - Repeatability
            - Typically <±10 NOx index points or <±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 ±0,45 °C @ 25 °C, 50 % RH
            - Maximum ±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, τ63%
        - 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 ±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, τ63%
        - 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
            - ±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 (CO_2).

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.