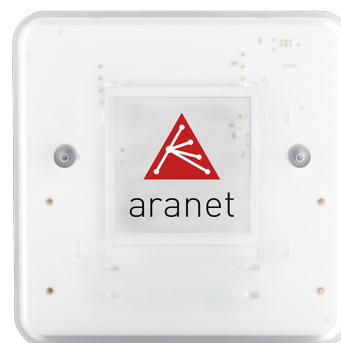


# Aranet4 without Display

Wireless, portable device for measuring air quality. Measures carbon dioxide (CO<sub>2</sub>) concentration, temperature, relative humidity, and atmospheric pressure. This device, belonging to the PRO sensor series, includes Aranet Sub-GHz ISM band radio which wirelessly transmits sensor measurements to the Aranet PRO base station.



## Product numbers

| Product number | Radio band | To be used in   |
|----------------|------------|---|
| TDSPC205       | EU868      | European Union  |
| TDSPC2U5       | US920      | United States of America, Canada, South America, Australia, New Zealand |
| TDSPC2U5       | AS923      | BRN, KHM, HKG, IDN, LAO, TWN, THA, VNM, MYS, SGP                        |
| Not available  | JP923      | Japan   |
| Not available  | KR923      | South Korea   |

## Sensor performance

### General notes

- Sensors perform within the specified accuracy limits at the time of purchase, assuming they are in an equilibrium state. For evaluation of the total measurement error, long-term drift has to be taken into account.
- Measurement time constant  $\tau$  refers to the time it takes for the sensor reading to reach 63 % of a new steady-state value in response to a step change in the environment. It essentially represents the speed at which the sensor adjusts to changes in the measured quantity.

### CO<sub>2</sub> concentration

|                      |   |
|----------------------|---|
| Range                | 0–9999 ppm                                      |
| Resolution           | 1 ppm   |
| Accuracy             | $\pm(30 \text{ ppm} + 3 \% \text{ of reading})$ |
| Long term drift      | Not available                                   |
| Time constant $\tau$ | 100 s   |

- CO<sub>2</sub> sensor of the device is calibrated at standard atmospheric pressure. CO<sub>2</sub> readings are pressure compensated and comply with the specifications down to 750 hPa. If the device has to be used at high altitude for a prolonged

period of time, manual calibration of the unit should be performed for optimal performance. It is not intended to use the device higher than 4000 m (13'000 ft) above the sea level.

- CO<sub>2</sub> measurement accuracy is provided for a range 0–5000 ppm, temperature 15–35 °C (59–95 °F) and relative humidity 0–80 %. Accuracy above 5000 ppm is 10 % of reading, but not guaranteed since it is extrapolated from the calibrated range.
- If a drift of the CO<sub>2</sub> measurements occurs, calibration feature of the device should be used. Auto calibration mode is utilizing *automatic baseline calibration* (ABC) algorithm whereas manual calibration mode demands sensor to be exposed to fresh air (see section *CO<sub>2</sub> measurement calibration procedure*).

## Temperature

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|                      |              |              |
|----------------------|--------------|--------------|
| Range                | 0–50 °C      | 32–122 °F    |
| Resolution           | 0.1 °C       | 0.1 °F       |
| Accuracy             | ±0.3 °C      | ±0.5 °F      |
| Long term drift      | 0.03 °C/year | 0.05 °F/year |
| Time constant $\tau$ | 10 min       |              |

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## Relative humidity

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|                      |            |
|----------------------|------------|
| Range                | 0–99 %     |
| Resolution           | 1 %        |
| Accuracy             | ±3 %       |
| Long term drift      | 0.5 %/year |
| Time constant $\tau$ | 6 min      |

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## Atmospheric pressure

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|                      |                     |
|----------------------|---------------------|
| Range                | 600–1100 hPa        |
| Resolution           | 1 hPa               |
| Accuracy             | +3 hPa / -2 hPa     |
| Long term drift      | 1 hPa/year          |
| Time constant $\tau$ | 0 s (instantaneous) |

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- Device measures absolute pressure, i.e., readings are not compensated for an elevation above the sea level.

## General specifications

|                                   |  |                   |
|-----------------------------------|--|-------------------|
| Ingress protection rating         | IP20   |                   |
| Operating temperature range       | 0–50 °C  | 32–122 °F         |
| Operating relative humidity range | 0–99 %   |                   |
| Dimensions                        | 71×71×24 mm                                    | 2.80×2.80×0.94 in |
| Weight (incl. batteries)          | 104 g  | 3.7 oz            |
| Enclosure material                | Polycarbonate                                  |                   |
| Power supply                      | 2 pcs AA batteries                             |                   |
| Packaging includes                | 2 pcs AA alkaline batteries, configuration pin |                   |

## Aranet radio parameters

|                            |                   |        |
|----------------------------|-------------------|--------|
| Line of sight range        | 3 km              | 1.9 mi |
| Transmitter power          | 14 dBm            | 25 mW  |
| Data transmission interval | 1, 2, 5 or 10 min |        |
| Data protection            | XXTEA encryption  |        |

- Specifically for JP923 radio band, reduced transmitter power of 13 dBm (20 mW) is used.

## Aranet radio bands and channels

| Radio band | Channel 1           | Channel 2           | Channel 3           | Channel 4           |
|------------|---------------------|---------------------|---------------------|---------------------|
| EU868      | 868.1 MHz           | 868.3 MHz           | 868.5 MHz           | —                   |
| US920      | 917.3 and 922.9 MHz | 917.5 and 923.1 MHz | 917.7 and 923.3 MHz | 917.9 and 923.5 MHz |
| AS923      | 923.1 MHz           | 923.3 MHz           | —                   | —                   |
| JP923      | 923.0 MHz           | 923.4 MHz           | —                   | —                   |
| KR923      | 923.1 MHz           | 923.3 MHz           | —                   | —                   |

- This table outlines the radio channels utilized by Aranet Sub-GHz radio technology for transmitting sensor data to the base station, complying with the legislation in various regions. To determine availability of this product in your region and the corresponding channels used, refer to the *Product numbers* table at the beginning of this document.

## Battery lifetime

| Measurement interval | Alkaline battery lifetime | Lithium battery lifetime |
|----------------------|---------------------------|--------------------------|
| 1 min                | 2.1 years                 | 2.8 years                |
| 2 min                | 3.8 years                 | 5.2 years                |
| 5 min                | 8.0 years                 | >10 years                |
| 10 min               | >10 years                 | >10 years                |

- Battery lifetime data has been obtained by mathematical extrapolation and is provided for descriptive purposes only

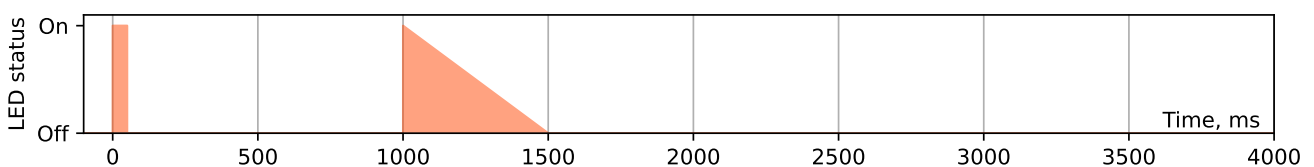
and is not intended to make or imply any guarantee or warranty.

- Battery lifetime tests and calculations performed assuming device is at 20 °C (68 °F) and using *Fujitsu Premium LR6G07* (alkaline) and *Energizer Ultimate Lithium L91* (lithium) AA batteries as reference.
- The operating temperature range may vary based on the battery type used. Generally, the range for alkaline batteries is between -20–50 °C (-4–122 °F), whereas for lithium batteries, it is -40–60 °C (-40–140 °F).

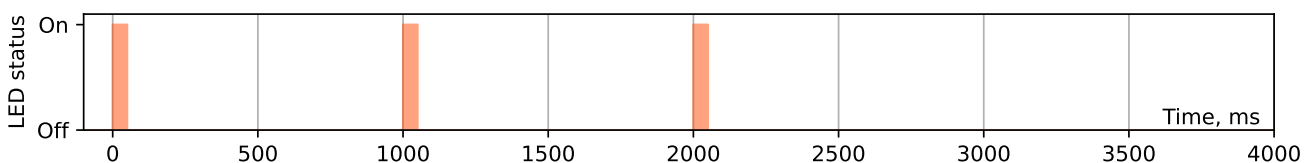
## Pairing process description

As part of the Aranet PRO product series, this device enables wireless sensor reading transmission to the Aranet PRO and PRO Plus base station. Here's how to pair the sensor with the base station:

- **Preparing for pairing:** Place the sensor within 20 m (60 ft) of the base station during pairing. Once paired, it can communicate over a much greater distance (up to 3 km / 1.9 mi line of sight).
- **Power off the sensor:** If the sensor comes with a battery-disconnect pull tab, leave it in place for now. For battery-powered sensors that are already on, open the casing and remove the battery for at least 20 seconds. If the sensor uses a power supply, unplug it. For newer hardware versions, locate the PAIRING button on the sensor PCB which can be used to initiate pairing without the removal of battery.
- **Start the pairing process:** Access the SENSORS menu in the base station Web GUI. Set the measurement interval and select PAIR SENSOR to start the pairing process.
- **Power on the sensor:** Within 2 minutes, pull the battery tab, reinsert the battery, connect the power supply, or press the PAIRING button to initiate pairing.
- **Confirm successful pairing:** A successful pairing is indicated by the sensor appearing in the Web GUI and a specific LED blink sequence on the sensor PCB (one to three short blinks followed by a longer fade-out blink of the LED):



- **Troubleshooting:** If pairing fails, the sensor won't appear in the Web GUI, and the LED blink sequence will consist only of three short blinks. In this case, repeat the process closer to the base station.

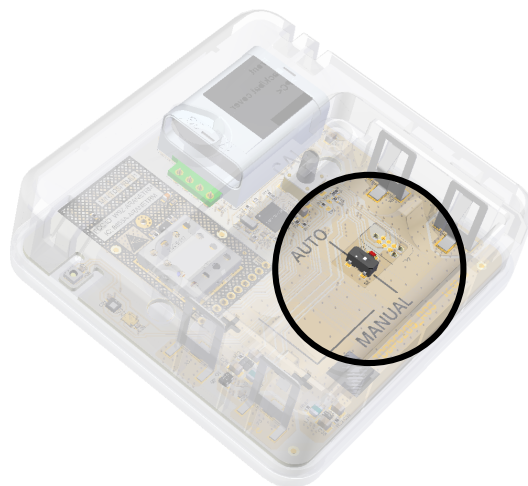


- **Final setup:** After successful pairing, customize parameters like name and tags in the Web GUI. Close the sensor casing and install it in the desired location.

## CO<sub>2</sub> measurement calibration procedure

The sensor arrives factory-calibrated and includes an auto-calibration feature. However, should measurement drift occur or any discrepancy between the sensor reading and the actual environment become apparent, manual recalibration in an ambient CO<sub>2</sub> level environment is possible. The steps for manual calibration are outlined below:

- Open the battery compartment, remove the batteries, and locate a two-position DIP switch on the circuit board. Ensure it is set to the “MANUAL” position.
- Locate a small button labeled “CALIBR.”. This will be used later to initiate the manual calibration procedure.
- Reinstall the batteries to power the device back on.
- By using a thin tool, reach between the batteries to press and hold the button labeled “CALIBR.” until a red LED begins blinking. This initiates the manual calibration procedure. Reinstall the battery compartment lid.
- Allow the sensor to sit for 30 minutes in an environment with ambient CO<sub>2</sub> concentration levels, such as fresh outdoor air, ensuring no one is close enough for breathed-out air to reach the sensor.
- Once the time has elapsed, the calibration process is complete. Reinstall the sensor in its usual location and resume normal use.



## Important notes

- Device is qualified to work properly within ambient clean air. Qualification for use in harsh environment is the duty of the user of the sensor. Exposure to volatile organic compounds, acids or bases, etching substances such as H<sub>2</sub>O<sub>2</sub>, NH<sub>3</sub>, shall be avoided.

## Compliance information

**CE** Conformité Européenne

**FC** Federal Communications Commission (USA)

**IC** Innovation, Science and Economic Development Canada