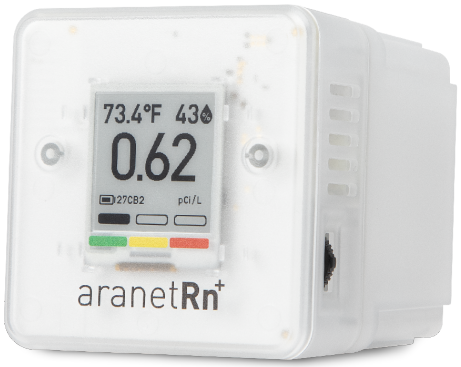
Radon Plus PRO

Provides real-time measurements of radon gas concentration, temperature, and relative humidity. With its portability and extended multi-year battery life, this device ensures convenience and reliability in continuous indoor air quality monitoring. 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
TDSPSR02	EU868	European Union
TDSPSRU2	US920	United States of America, Canada, South America, Australia, New Zealand
TDSPSRU2	AS923	BRN, KHM, HKG, IDN, LAO, TWN, THA, VNM, MYS, SGP
Not available	JP923	Japan
Not available	KR923	South Korea

Calibration service

Aranet offers the following pre-calibrated Radon Plus Pro sensors:

Product number	Sensor to be calibrated	To be used in	Calibration
TDSPSR02RAD	TDSPSR02	Europe	Radonova Laboratories AB
TDSPSRU2KSU	TDSPSRU2	United States of America	NRPP-Certified Radon Chamber

- TDSPSRU2 is a radon measurement device approved by the National Radon Proficiency Program (NRPP) in the United States.
- Calibration certificate valid for one year. Contact your sales representative for annual re-calibration.

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Radon detector characteristics

Type	α-decay event detection using ionization chamber	
Filling mechanism	Air diffusion	
Radon progeny filtering	Spunbound polyester	
Radon/Thoron discrimination	None	
Volume	137 cm^3	8.4 in^3
Efficiency	1 count/min at 84 Bq/m^3	1 count/min at 2.3 pCi/L

Sensor performance

General notes

- 95 % of the sensors measure within these typical limits in equilibrium state at the time of sale. For evaluation of the total measurement error, long-term drift has to be taken into account.
- Measurement time constant τ 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.

Radon concentration

Range	0–7900 Bq/m^3	0–214 pCi/L
Resolution	1 Bq/m^3	0.02 pCi/L
First reliable measurement in	1 h	(See notes below)
Accuracy of 24 h, 7 d, 30 d averages	±8%	
Accuracy of current concentration	Dependent on radon concentration	(See graph below)
Long term drift	None	(See notes below)
Time constant τ	30 min	

- The device exhibits sensitivity to static electricity. Exercise caution when handling it, as activities like rubbing may temporarily introduce false measurements of increased radon concentration.
- The accuracy figure provided is applicable after the device has been operational for a minimum of one hour. Prior to this duration, precision may be compromised due to the limited averaging window for the α-decay event count.
- While the device shows no long-term drift in its radon detection accuracy, as with all ionization chamber radon detectors, it is subject to the gradual accumulation of long-lived radon progeny within the chamber. Over time, elements such as Pb-210, which has a 22-year half-life, will deposit inside the ionization chamber, generating additional α-decay events even in the absence of radon. This effect cannot be precisely predicted, as it depends on the cumulative radon exposure. We estimate a zero-shift of approximately 3 Bq/m^3 per 1 $(MBq \cdot h)/m^3$ of radon exposure. For example, if the device were continuously exposed to 1000 Bq/m^3 of radon for five years, the indicated measurement could shift upward by around 150 Bq/m^3.

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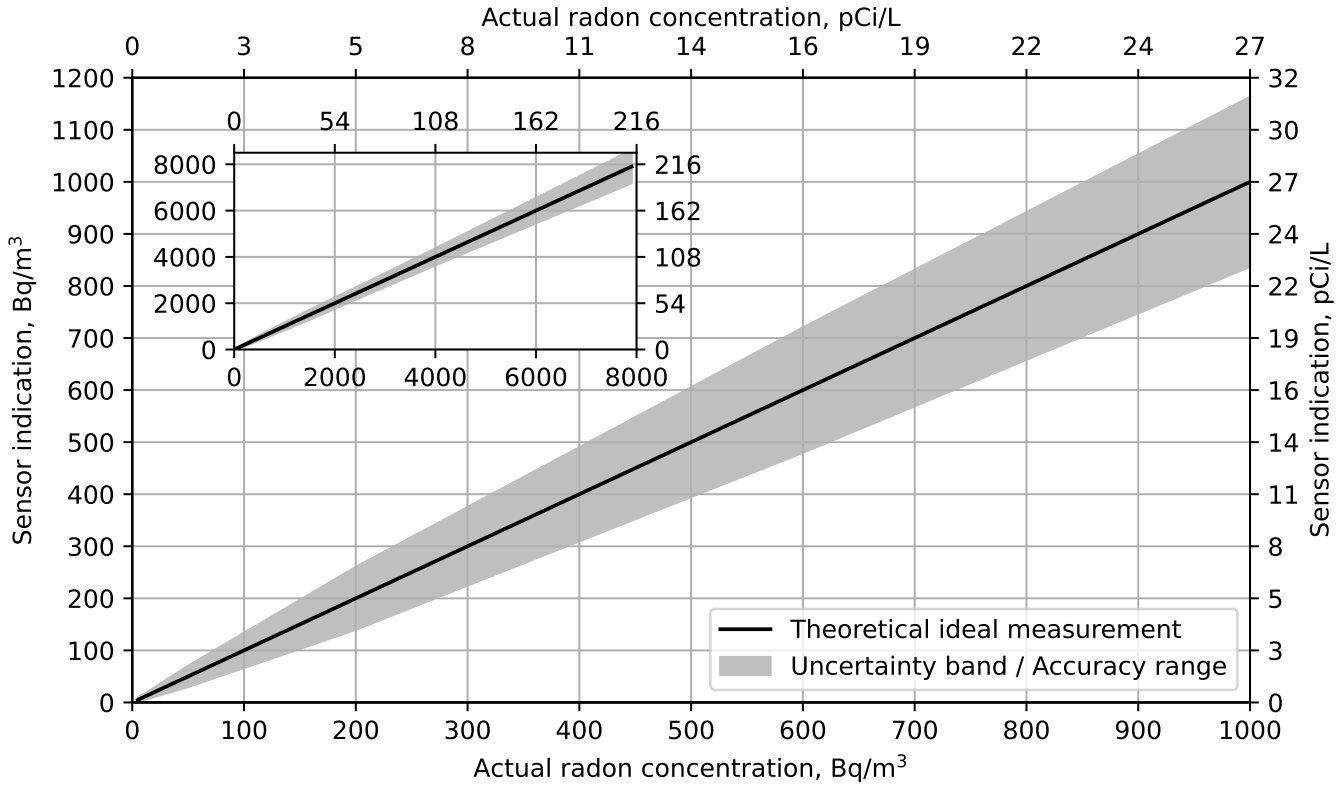

Temperature

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 τ	17 min	

- Temperature measurement time constant τ determined at 1 m/s air flow.

Relative humidity

Range	0–99 %
Resolution	1 %
Accuracy	±3 %
Long term drift	0.5 %/year
Time constant τ	7 min

Atmospheric pressure

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

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- Atmospheric pressure measurements are exclusively accessible through the *Aranet Home* mobile application and are not displayed on the device screen.
- Device measures absolute atmospheric 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	0–85 %, non-condensing	
Dimensions	71×71×77 mm	2.80×2.80×3.03 in
Weight (incl. batteries)	220 g	7.8 oz
Enclosure material	Polycarbonate	
Packaging includes	2 pcs AA alkaline batteries	

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.

Bluetooth transmit power

Normal range (Default)	-12 dBm
Extended range	4 dBm

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- Bluetooth transmitter power can be adjusted through the settings in the *Aranet Home* mobile application. Enable the extended range feature only if the sensor experiences poor connectivity with the mobile application during typical use, such as in large rooms or through walls. Note that enabling this feature will reduce the expected battery lifetime listed below.
- Radon Plus PRO is compatible with smart devices conforming to Bluetooth specification 4.1 and up.
- Bluetooth is utilized to enable the functionality of the *Aranet Home* mobile application. When transferring data to *Aranet Home*, device memory provides **30 days historic data availability**.

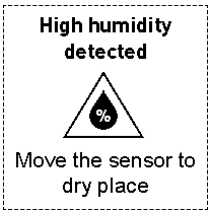
Battery lifetime

Battery type	Bluetooth Off	Bluetooth On
Alkaline	5.1 years	3.3 years
Lithium	7.1 years	4.5 years

- Data provided for a device with an active Bluetooth connection considers it being paired with the *Aranet Home* mobile application. Battery life may vary depending on Bluetooth activity and data transmission frequency.
- 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).

Important notes

- Do not leave the device in direct sunlight! Exposure to intense sunlight can adversely affect the performance and longevity of the e-ink display, potentially leading to issues like reduced contrast, diminished readability, or even permanent damage to the display pixels or electronic components. Moreover, sun exposure can also adversely impact accuracy of sensor readings.
- Avoid placing the device in a high humidity environment outside its specified operating range. Doing so will prevent the device from accurately detecting radon presence. In such conditions, the sensor will recognize a fault and display a warning screen. If you encounter this warning, move the sensor to a location with lower humidity. It may take up to an hour for the device to clear the fault condition and resume normal operation.



- Condensation or direct contact with liquid water may degrade measurement accuracy, affect sensor performance, and reduce sensor lifetime.
- If the *Lock Device* feature on the sensor is enabled to hide measurement data on the sensor screen and prevent new Bluetooth pairings, and you experience difficulties unlocking the device, contact support@aranet.com for instructions.

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Compliance information

CE	Conformité Européenne
FC	Federal Communications Commission (USA)
IC	Innovation, Science and Economic Development Canada

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