

### Operation Manual and Technical Specifications

## RPP-P

### USB Radon Continuous Probe for humid environment



#### 1 Meet



*Before using the product, please read this manual carefully and understand all operating and safety precautions. Compliance with operational and safety precaution can prevent from damage to equipment or injuries to personnel. The product may only be used in the specified manner and for its intended purpose. The product may be provided to third persons along with this documentation only.*

Portable Radon Probe is designed for operation in places with increased humidity as are damp cellar, bore holes, caves and mines. One probe chambers is filled with replaceable special dehumidifier for decreasing of humidity in measuring chamber and thus prevent water condensation in the chamber when the temperature drops to dew point and ensure the correct conditions for measurement. The dehumidifier needs to be changed regularly and dried depending on the ambient conditions. For example, with a relative humidity above 90% and a temperature around 10°C, the dehumidifier replacement interval is 8 weeks. The battery lasts up to 1 year after one full charge, which ensures autonomous operation of the probe within the borehole. Of course, it also depends on the humidity conditions in the chamber.

The probe is functional even without an inserted dehumidifier, as long as there is no risk of extreme humidity and temperature fluctuations and water condensation in the chamber.

The Radon Probe can be use for continually measure radon volume activity in soil. Soil radon concentration changes may precede certain behavior of Earth's crust and various elements in the bedrock. For example, long-term monitoring of the soil gas radon concentration can be used to predict seismic activity or earthquakes.

Portable probe basis is a measuring chamber with a semiconductor photodetector. Radon enters the chamber by diffusion through the input filter on the bottom of probe. The probe measures in autonomous and time continuous way. The probe saves time records of these radon concentration values including values of humidity and temperature within its internal memory (typically at an interval of 1 hour). Next saved value is time record of measuring energy spectrum (typically at an interval of 12 hours). Bottom of the probe cannot be covered. The probe permanently measures and saves data into internal memory if accumulator is charged. LEDs „STAT“ indicate current status of probe see ' I work like this ' below.

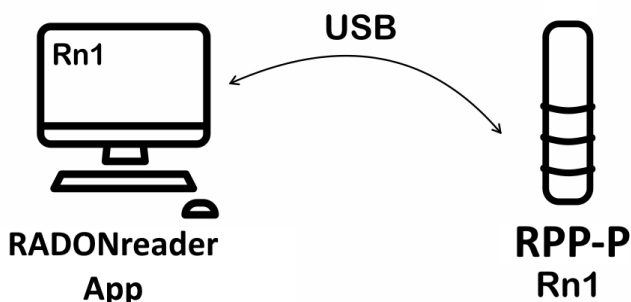
The resulting values can be downloaded continuously during measurement or at once at the end of measurement. Data from the radon probe can be downloaded to a PC directly via USB interface.

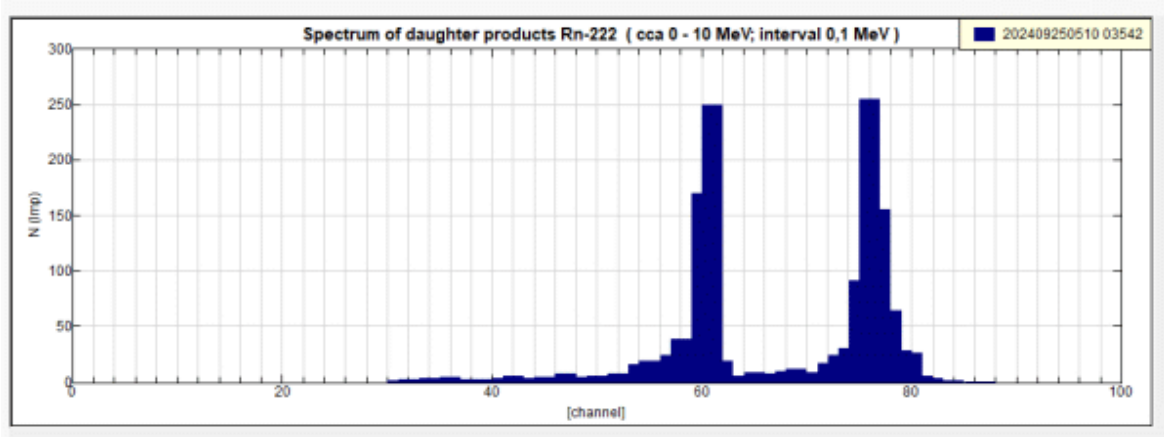
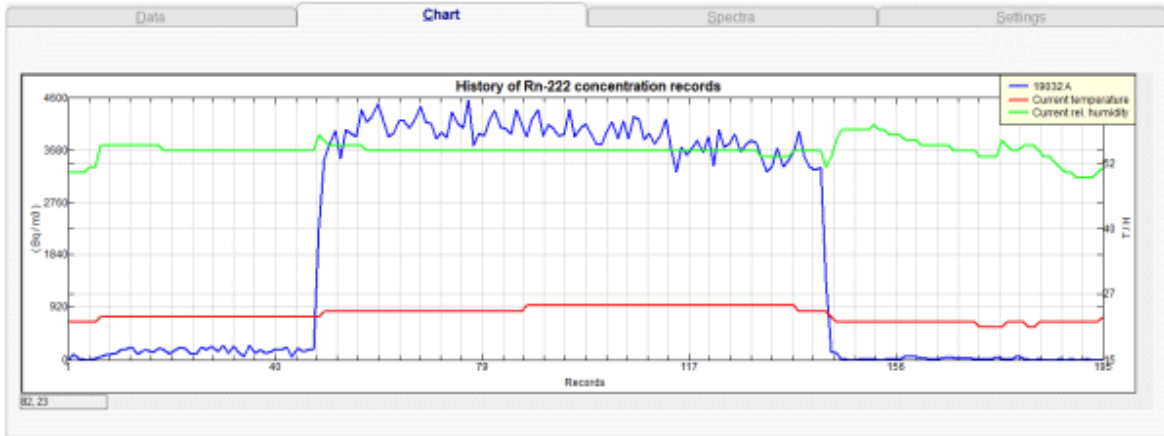
**Radon Probe can be operated by these ways:**

- A) **Standalone probe** - Thanks to its independent accumulator power, portable radon measuring probe supports flexible placing options within monitored structures. Accumulator will last for more than 1 year after full charging. The resulting values are downloaded after end of the measurement by B).



- B) **Probe connected via USB** – Using RADONreader app and USB cable is possible to download results to PC continuously during measurement or at once at the end of measurement. RADONreader application, drivers and user manual is free available on producer website: <http://www.piketronic.cz>.





## 2 You get

- USB Radon Continuous Probe for humid environment
- Power adapter 230VAC/5VDC
- USB cable
- 2 pcs of dehumidifiers
- Operation Manual

## 3 My parameters

Product	USB Radon Continuous Probe for humid environment
Type symbol	RPP-P
Average measurement sensitivity	0,25 count/hour/Bq.m-3 (method RaA+RaC; 15°C ÷ 30°C; rel. hum. 20% ÷ 40%)
Measuring range	MDA – 100 000 Bq/m <sup>3</sup> ; in peak up to 10 MBq/m <sup>3</sup> MDA = 100 Bq/m <sup>3</sup> per 1 hour or 20 Bq/m <sup>3</sup> per 24 hours
Measurement uncertainty	< 13% at 300 Bq/m <sup>3</sup> per 1 hour; < 3% at 300 Bq/m <sup>3</sup> per 24 hour
Measuring chamber capacity	0,176 dm <sup>3</sup>
Response rate	< 30 minutes (RaA); < 3 hours (RaA + RaC)
Radon records	calculated from RaA (quicker, less sensitive) calculated from RaA + RaC (slower, more sensitive)
Measuring relative humidity range	0 – 100 %
Measuring temperature range	-40 to + 125 °C
Records saving interval (probe)	1- 255 minutes, default 1 hour
Results memory capacity	29 999 985 records; 9 927 040 spectra
Powering	internal rechargeable accumulator; charging via USB
Accu life after full charging	>1 year (also depends on operating conditions)
Current radon concentration results	short-term (0,5 hour running average from RaA) long-term (24 hours running average from RaA + RaC)
Data interface	USB B; (Option- Probe can be adjusted for data transfer via local wireless network, contact the manufacturer or distributor)
Dimension	Ø 80 x 265 mm
Operating conditions	Temperature: -10 ° C to +40 ° C Recommended relative humidity: 10% - 99% Maximum working relative humidity: 0% - 99% * Increased humidity reduces the life of a charged battery. * There must be no condensation of water in the chamber - erroneous results
Detector life	50-100 million pulses; that means at an average concentration of 1000 Bq / m <sup>3</sup> -> 12 years; 10 000 Bq / m <sup>3</sup> -> 1 year

## 4 I work like this

### Switching on and off:

The probe measures radon concentration autonomously only if the switch is in position „ON“. The switching on is signaled by LED diode „STAT“ according chart below.

If the switch is in position „OFF“ the probe doesn't measure radon concentration. In switching off mode the probe only keeps running real time for correct date and time of records in case of switch it on again. By switching off the probe doesn't lose previous records of measurement. The switching on is signaled by LED diode „STAT“ according chart below.

Download data from probe over USB is possible only if switch is in position „ON“!

### LED diode „STAT“:

It signalizes status radon probe according to following chart:

Color	Description
Green blink 3x	Radon probe has just been turned on.
Green blink after 5s	Radon probe measures and works correctly
Yellow blink 3x	Radon probe has just been turned off.
Green / Yellow blink after 5s	Radon probe measures but troubles are occur. – especially low capacity of accumulator.
No light, No blinking	Radon probe doesn't measure or accumulator is empty or device is damaged. Charging process of accumulator is described in chapter „Basic Maintenance/ Accumulator charging“

### Power supply:

According to operation method the radon probe can be supplied:

- 1) By internal accumulator for portable use – Radon probe includes internal accumulator which is able to ensure autonomous operation of probe for more than 12 months without charging. Depends also on climatic condition of probe use. Accumulator is charged with USB port and provided USB cable. The USB cable is possible to connect to PC or to delivered power adapter. Status of accumulator and charging process are described in paragraph 'Basic Maintenance/Accumulator charging'
- 2) By mains power supply 230V/50Hz for stationary use – Radon probe is permanently supplied by delivered power adapter. Power adapter is connected to probe via provided USB cable. In case of blackout internal accumulator ensures UPS function.

### Configuration:

Setting and configuration are realized by RADONreader application. RADONreader application, drivers and user manual with detail configuration description are free available on producer website: <http://www.piketronic.cz>.

### Installation

Generally probe is possible to place in random position but it is necessary not to cover of botom of probe and bottom of probe prevent from drops of water. Therefore vertical position is the best.

## 5 Basic Maintenance

### Accumulator charging:

During portable use of radon probe is essential to monitor state of internal accumulator and recharge it if necessary. If accumulator is discharged the probe automatically turns off. The probe is switched on again powering USB port.

Current state of accumulator can be determined by these ways:

- 1) By LED diode 'STAT' - If LED starts blinking in green-yellow color it indicates that system is working incorrectly and one of main case is low voltage of accumulator. (see paragraph "Operation Manual / LED diode "STAT"")
- 2) RADONreader application - where you can check current accumulator voltage. Voltage should not fall below 3.5 V, in limit conditions falls below 3.3V.

Accumulator is charged via USB port using supplied USB cable. USB cable can be connected to PC or to supplied power adapter. Connect USB cable with power to USB port of probe. LED diode 'CHRG' next to USB port of probe indicates charging status according to following chart:

### LED diode 'CHRG'

Color	Description
Green	Accumulator is fully charged
Yellow	Accumulator is being charged
Green - Yellow alternate blinking	Accumulator is damaged, contact Service Center
No light, No blinking	It is not connected to an external power supply or device is damaged.

Accumulator is fully charged when LED diode 'CHRG' is green. You can disconnect USB cable.

### Drying chamber

The part is designed to reduce the humidity of air diffusing into the measuring chamber of the radon probe when measuring in rooms with very high humidity. Lowering the humidity primarily prevents water condensation in the chamber when the temperature drops to the dew point and thus ensures safe conditions for correct measurements. Using this part, it is possible to operate the radon probe even outside the recommended range of relative humidity of the probe environment, i.e. up to 100%. (The recommended relative humidity for common probes is 75%). It also prolongs the life of the battery in a humid environment because there is no increased conductivity in the measuring chamber at the high voltage electrodes.

The part consists of a drying chamber and 2 pieces of drying cartridges (supplied in hermetically sealed containers). The basic package of 2 pieces of desiccant cartridges is used for the possible quick mutual exchange of wet desiccant cartridges with dried ones. The dehumidifier needs to be changed regularly and dried. The necessary interval for replacing the desiccant is mainly determined by the current external conditions of the environment (absolute humidity) where the probe is located. When operating the probe and part in an environment with relative humidity above 90% and a temperature of around 10°C, the minimum replacement interval is around 8 weeks of operation. The current value of relative humidity in the measuring chamber is recorded by a radon probe and can be read/monitored via the communication interface USB.

The probe is also functional without an inserted desiccant, as long as there is no risk of extreme humidity, temperature fluctuations and therefore water condensation in the chamber.

The wet dehumidifier can be used again after drying. For example, in an oven at a temperature of 200-210°C for 2 hours. The wet dehumidifier has a pink/purple color, the dried dehumidifier has a light blue color. Dry dehumidifiers must be stored in hermetically sealed containers. Gloves are recommended when changing the dehumidifier, due to the possible sharp edges from the cartridge. For inserting dehumidifier to probe is necessary to screw and disassemble bottom chamber of probe in place of sticker "Dehumidifier insert here" and insert dehumidifier into internal smaller chamber and cover it by cap.



### Recalibration:

We recommend regular recalibration of the device at the manufacturer within 1-2 years. Within the warranty period, one recalibration is free from the manufacturer.

## 6 Repairs

Any repairs and non basic maintenance must be performed exclusively by Piketronic s.r.o.

## 7 Warranty

- This product is covered by warranty of 24 months from purchase date.
- In case of warranty claim, please contact our Service Department.
- Warranty covers any defects in materials or workmanship and excludes any damage resulting from or caused by transport or handling or by any misuse.
- Warranty ceases if product has been used improperly or its seal is broken.
- In case of warranty claim, warranty period is prolonged by number of days product was undergoing warranty repairs.
- After the end of its life, product must be handled as e-waste.

**RadonView** - Computer application for easy viewing records and spectra measurement of radon concentration (files .tab) to download on the website of the SÚRO (National Radiation Protection Institute) (<https://www.suro.cz/en/prirodnioz/suro-software-data-processing-from-continuous-rn-monitors>)

