Operation Manual and Technical Specifications

RPP-D

Display and USB Radon Probe

1 Meet

Radon probe RPP-D is designed for continuous measuring of radon concentrations in buildings and results are also shown on display.

Portable probe basis is a measuring chamber with a semiconductor detector. Radon enters the chamber by diffusion through the input filter on the bottom of probe. The probe measures in autonomous and time continuous way (continual monitor). The probe saves time records of these radon concentration values including values of humidity and temperature into 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). All results are shown on display as well see paragraph ´Display´.

The probe is random for location in measured place, but generally it is put on the bottom of the probe. Bottom of the probe cannot be covered. The probe can be switched on/off by switch. LEDs „STAT“ and „CHRG“ 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 is downloaded to a PC directly via USB interface.

Basic features:

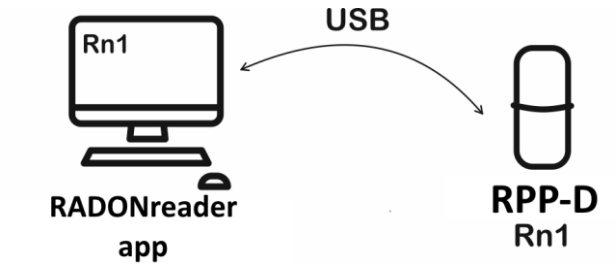
- Standalone measurement with saving data into own internal high capacity memory
- Direct USB connection of probe and a PC; application free
- Internal high-capacity rechargeable accumulator; Accu life after full charging up to 1 year; USB charging or power adapter 230V/50Hz
- Probe measurement possible to turn off by switch while real time in probe keeps on
- Diagnostic LED diodes ‘charging’ and ‘status’
- Display for quick result view

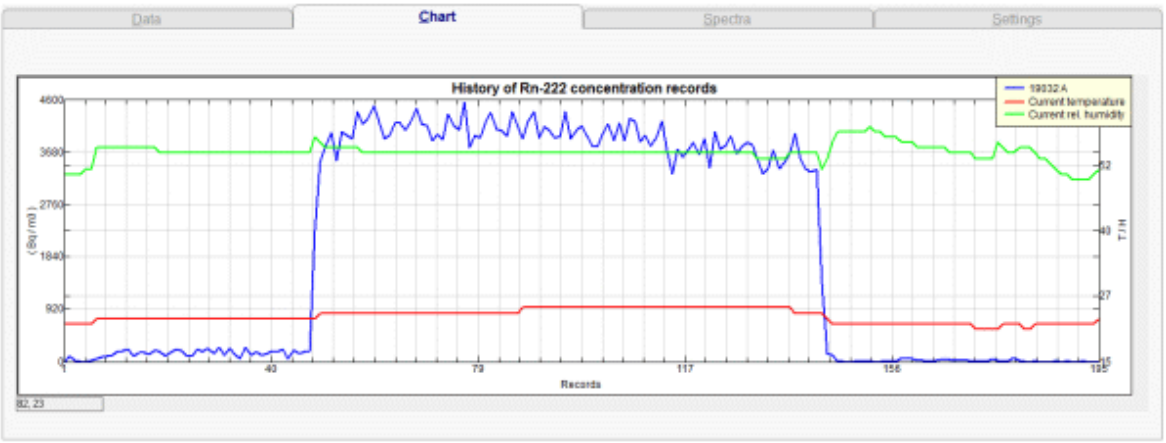
Before using the product, please read this manual carefully and understand all operating and safety precautions. Compliance with operational and safety precaution can prevent from damage to equipment or injuries to personnel. The product may only be used in the specified manner and for its intended purpose.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

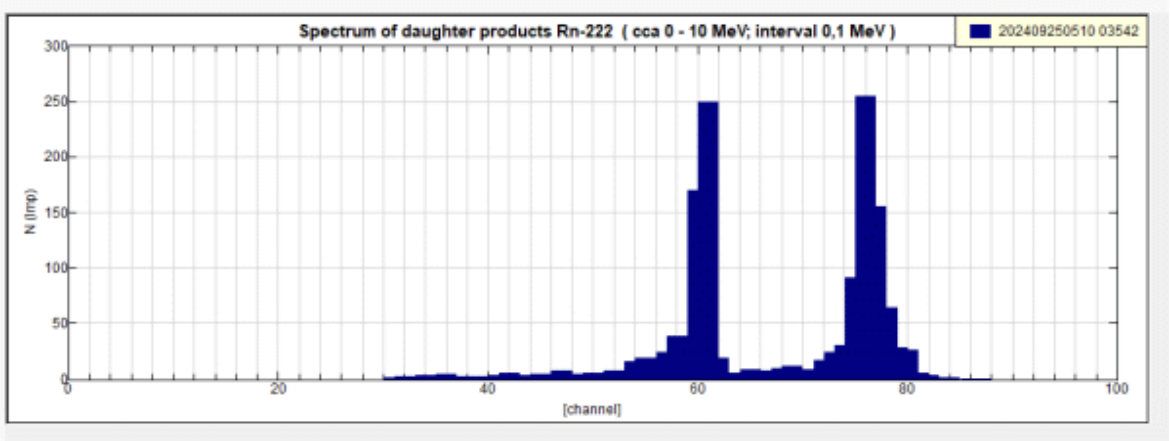
Radon Probe can be operated by these ways:

A) **Standalone probe** - Thanks to its independent battery power, portable radon measuring probe supports flexible placing options within monitored structures. Accumulator will last for more than 1 year after full charging. After switching on probe immediately starts measuring and saving results into internal memory. The resulting values are downloaded after end of the measurement by B) way.

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 on producer website: **http://www.piketronic.cz**







2 You get

- Radon Probe
- Power adapter 230VAC/5VDC
- USB cable A-B
- Operation Manual

3 My parameters

Product	Display and USB Radon Probe
Type symbol	RPP-D
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^3 ; in peak up to 10 MBq/m^3 MDA = 100 Bq/m^3 per 1 hour or 20 Bq/m^3 per 24 hours
Measurement uncertainty	< 13% at 300 Bq/m^3 per 1 hour; < 3% at 300 Bq/m^3 per 24 hour
Measuring chamber capacity	0,176 dm3
Response rate	< 30 minutes (RaA); < 3 hours (RaA + RaC)
Radon records	calculated from RaA (quicker, less sensitive) calculated form RaA + RaC (slower, more sensitive)
Measuring relative humidity range	0 – 100 %
Measuring temperature range	-40 to + 125 °C
Records saving interval	1- 255 minutes, default 1 hour
Results memory capacity	29 999 985 records; 9 927 040 spectra
Powering	internal rechargeble accumulator; charging via USB
Accu life after full charging	>1 year (also depens on operating conditions)
Built-in display	graphical, 128 x 64 pixels, orange
Current radon concentration results	short-term (0,5 hour running average from RaA) long-term (24 hours running average from RaA + RaC)
Dimension	Ø 80 x 175 mm
Operating conditions	Temperature: -10 ° C to +40 ° C Recommended relative humidity: 10% - 75% 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 / m3 -> 12 years; 10 000 Bq / m3 -> 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 signalized 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 signalized 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 4x	Radon probe has just been turned off.
Green / Yellow blink after 8s	Radon probe measures but troubles are occur. – especially low capacity of accumulator. Warnings and errors are shown in PC application.
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 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.

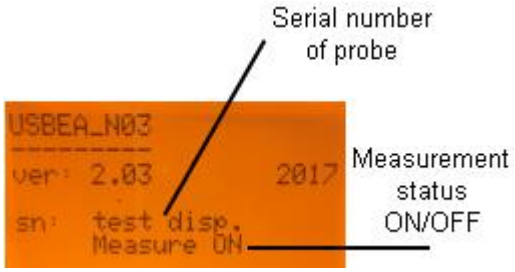
Configuration:

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

5 Display

Built-in display can continuous show measured result and basic parameters of probe. By reason of power saving the display isnt switched on permanently but it is switched on by pushing of button below display. By next pushing of button is changed screen on another in cyclic order. Approximately after 1 minute without pushing of the button the display is automatically switched off.

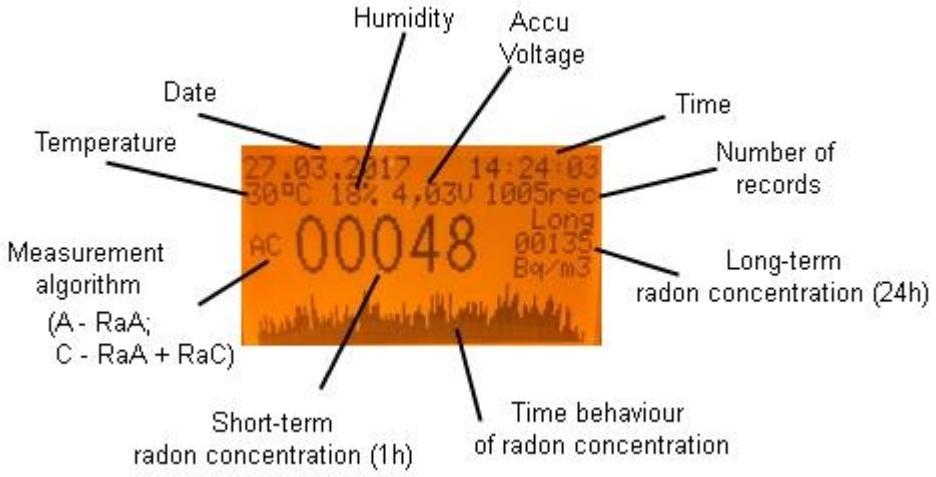
After first pushing of button from switched off display status is shown intro screen. There is shown basic information about probe as is version of firmware, serial number and status measurement running ON/OFF.



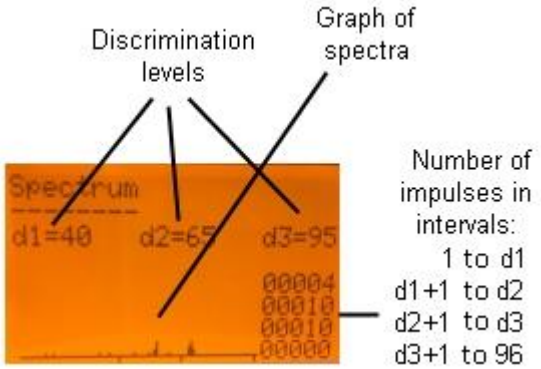
Go on basic data screen is possible by three ways:

- by next pushing of button on intro screen
- automatically after 5 seconds from intro screen
- directly from switched off display by pushing of button for longer than 1 second

Changing of three data screens is cyclic without intro screen and is possible to make by pushing of button. Data screens are on following pictures.

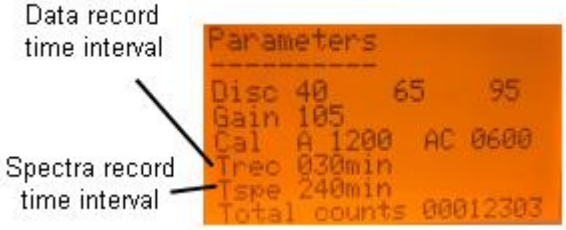


Basic data screen always mainly shows by bigger numerals the value of short-term 1 hour moving average of radon concentration in Bq/m3 counted from RaA. Long-term 24 hours moving average of radon concentration in Bq/m3 counted from RaA+ RaC is labelled “LONG”. Time behaviour of radon concentration is graphical shows in array of 128 x 24 pixels. It is always the graph of concentration records in memory calculated from RaA. In older version of probe the graph shows concentration records calculated according to setting „Measurement algorithm“ AC or A in probe (on display then also see AC or A). Every columm means single data record. So for example if data record time interval (Trec) is 30 minutes the graph shows time behaviour of radon concentration for last 64 hours.



Second graph shows current energy spectrum in array of 96 x 24 pixels and its parameters. Energy spectrum is divide into 96 interval and radon concentration is calculated from intervals d1-d2 (RaA) or from d1-d3 (RaA+RaC). Discriminations d1, d2, d3 are shows below graphs as well.

Numbers of impulses in discrimination intervals are counted during spectra record time interval (Trec) or till then if one of particular intervals reaches 255 impulses.



Parameters on third data screen are especially service data but record time intervals are useful.

Notice: By display and button isnt possible to setup of probe. For setting of probe parameters is neccessary to used the PC software application RADONreader.

6 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 over 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 "I work like this / LED diode "STAT"")

2) In 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.

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.

7 Repairs

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

8 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.

9 Accessories

Radon Probe accessories are available at producer or at distributor.

Probe holder

Transport waterproof case for 4 probes

Outdoor cover with solar powering

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)