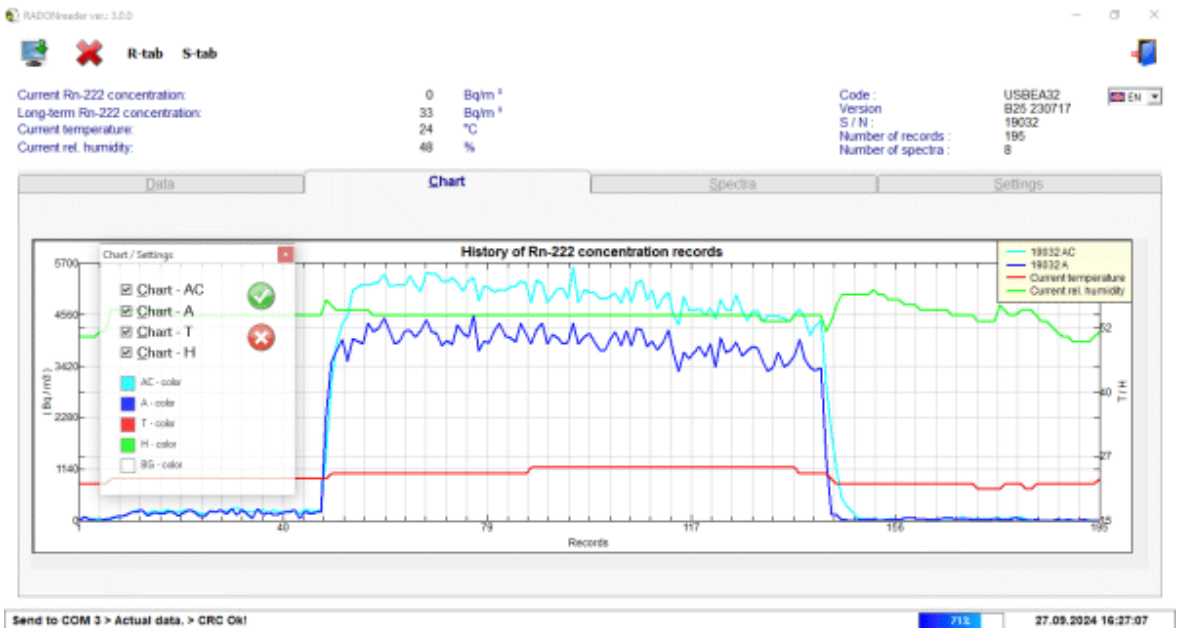
RADONreader application

User Manual



1. Description and use

RADONreader program is designed for configuration, downloading, viewing, and exporting data from USB Radon Probe via USB interface. The results can be downloaded continuously during the measurement or at once at the end of the measurement.

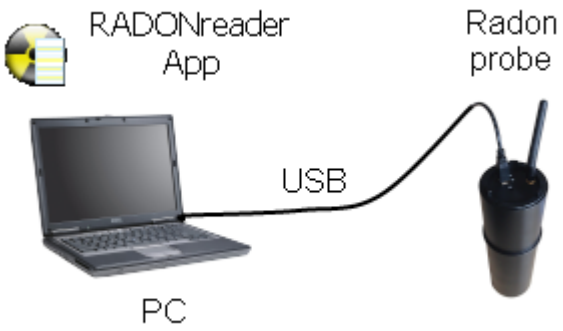


Figure 1 - Radon Probe connected via USB

Before connecting the Radon Probe to your PC you will need to download and install correct USB drivers and the RADONreader program (see chapter Installation). The correct USB cable should be included with Radon Probe.

2. Installation

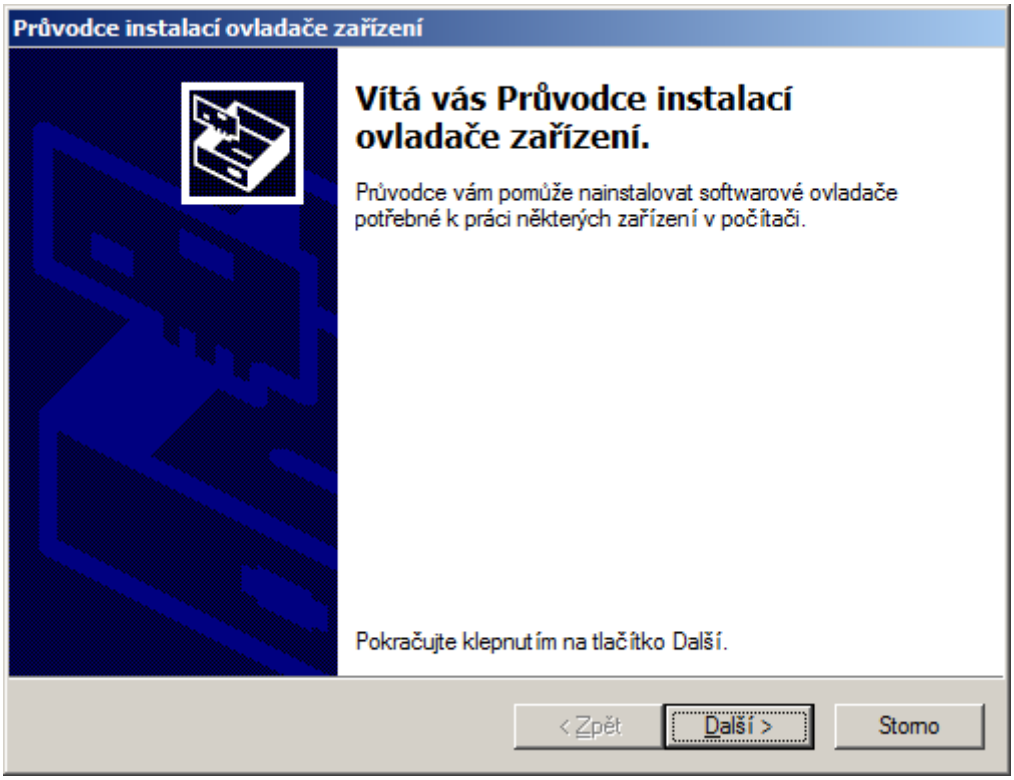
Software and hardware requirements for PC:

- Operating system (OS) Windows 7 and later versions

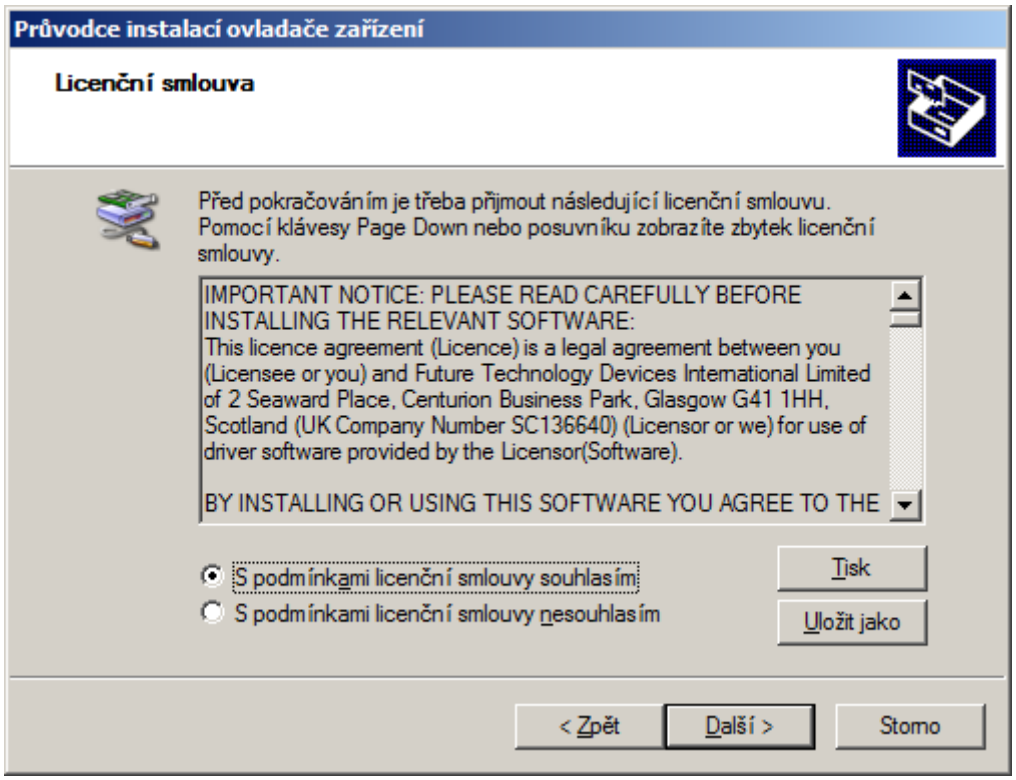
- USB interface

To successfully install USB drivers and RADONreader program installation follow these instructions:

1) Do **not** connect the Probe to your PC.
2) From website: http://www.piketronic.cz download the current driver and the RADONreader program:
   RADONreader_usb_driver_win.zip
   RADONreader_install_vXXXX.zip
3) Extract compressed the files to any directory.
4) Run the USB driver installation: ... **CDMXXXXX_Setup.exe**
5) Follow the installation instruction. Press “Next”.



6) The "End User License Agreement" is shown. Check "I accept" and press "Next".


Průvodce instalací ovladače zařízení
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Uložit jako
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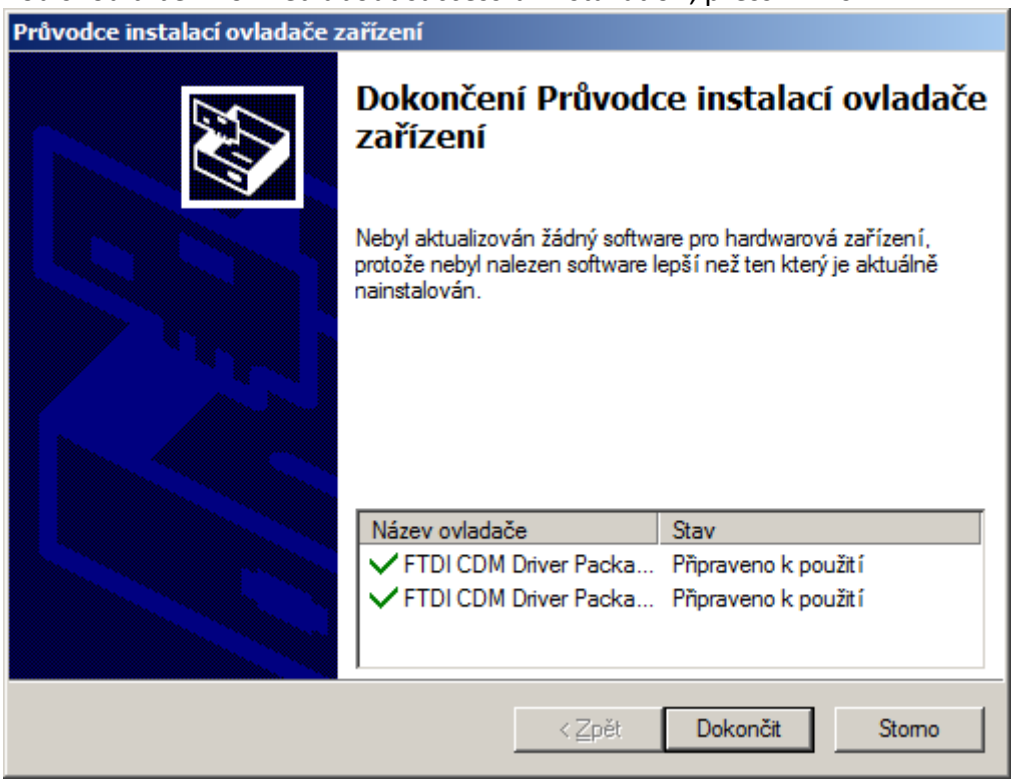
Storno

7) You should be informed about successful installation, press “Finish”.



8) Run the RADONreader program installation:
... \ SETUP**setup.exe**

9) Installation wizard opens, follow instructions on screen. Press “OK”.

10) Change the installation directory or keep the default one. Continue by pressing “Install Now”.

11) Choose the Windows Start Menu directory or keep the default one. Press “Continue”.

12) Message about a version conflict of the library may open (multiple times) in newer operating systems. In every instance press “Yes”.
If you are using Windows XP, the installation might request a restart of the computer after the library installation. Restart your PC and run the installation again from point 8).

13) Window informing you of successful installation opens. Press “OK”.

14) Connect the Probe to PC via USB cable. You don’t need to turn the probe on.
15) Wait for successful device installation. The information about the device installation shows in the bottom right corner of your screen.

16) After successful device installation run the RADONreader program from the
17) installation directory or your Windows Start Menu.

3. Running the application

To run the RADONreader application run the RADONreader_WIN_ver_XXX, which is located inside the installation folder.

Once turned on you will be shown a window with the manufactures' logo and the application will initialize in the background. The window with the manufacturers' logo will disappear once a working probe is connected to your PC and successfully communicates with the application.

This window can also be hidden by double-clicking on the Hide the window by double-clicking here text.

Now you see the user interface of the RADONreader program.

Note:
If an option in the application starts with the underlined letter you can access it through a keyboard shortcut (left) Alt + underlined letter. For instance, the Chart tab can be accessed using the (left) Alt + C shortcut.

4. The basic user interface

The application opens in one primary window. Secondary windows with additional options may open when pressing some options, for example when pressing the *Exit* button (called *Termination of the program* in the tooltip), a pop-up window will appear asking you if you really want to quit the application. To explain each section of the user interface (UI), it was separated into 3 sections, see picture above.

Section 1

In the top section of the UI basic information about the connected probe and program are shown. Also there are buttons allowing you to control the application.

Read records from the probe – Collects the records from the probe into the program memory. The basic records and energy spectra records download separately, each time you will be asked to confirm the download. Once confirmed a window will pop-up to show you the download progress.

Delete records from the probe – Deletes records and energy spectra records from the internal memory of the probe. Before deleting the records you will be asked if you want to delete the basic records/energy spectra records. To confirm press YES, to abort press NO.

R-tab

Export measurement records – Exports data displayed in the sheet "Data" from the application into .TAB format file for further processing in any text editor or in any spreadsheet. For easy graphical display and advanced analysis of files .TAB can also use the program RadonView, see chapter „Accessories". The exported file is downloaded into the selected folder on your PC.

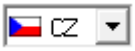
S-tab

Export measured spectra - Export of energy spectra in the interval of data displayed in sheet "Data" from the application into .TAB format file for further processing in any text editor and in any spreadsheets. For easy graphical display and advanced analysis of files .TAB can also use the program RadonView, see „Accessories".
The exported file is downloaded into the selected folder on your PC.

Left collumn

RADONreader ver.: x.x.xx - Name and version of the application.
Current Rn-222 concentration: ... Bq/m3 - Immediate value of radon concentration (0.5h moving average of radon concentration, calculated from RaA (^{218}Po)).
Long time concetration Rn-222: ... Bq/m3 - Immediate value of long time radon concentration (24h moving average of radon concentration calculate from RaA + RaC (^{218}Po + ^{214}Po).
Current temperature: ... °C - Immediate temperature measured inside the chamber of radon probe
Current rel.humidity: ... % - Immediate relative humidity measured inside the chamber of radon probe

Right collumn

Code:	The type of the product (probe)
Version:	The version of the probes' firmware
S/N:	The serial number of the probe
Number of records:	An amount of records in internal memory of probe.
Number of spectra:	An amount of energy spectra data collected in the internal memory of the probe during measurements.
	Change language of the application.

Section 2

In Section 2 there are 4 tabs that you can choose from – Data, Chart, Spectra, and Settings. If the entire subwindow does not fit imide the dedicated size, there will be 2 scroll bars, on the bottom (for horizontal scrolling) and on the left side (for vertical scrolling). Individual tabs will be explained below.

Section 3

On the bottom side of the UI are additional information.

Current charge status of probe accumulator (Mouse over for current voltage of accumulater)
13.06.2016 07:07:44 Current time in radon probe.

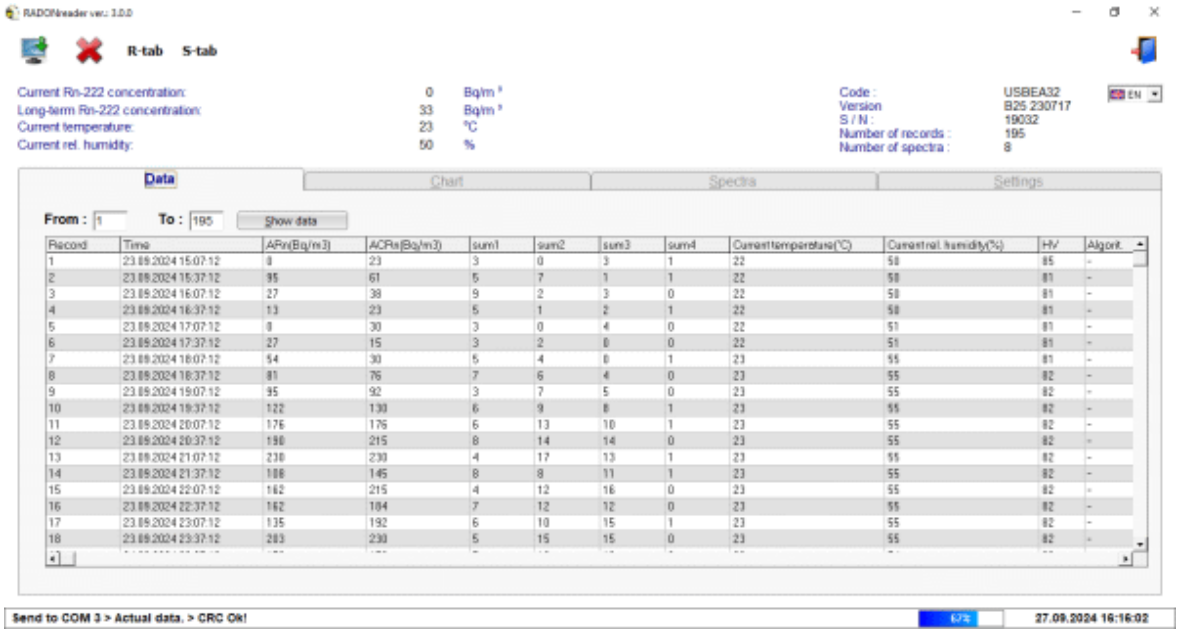

Exit program – Once clicked, you will be asked if you want to quit. Confirm to exit the application.

In the bottom left corner, there is a text indicating the status of the communication between the application and the probe:

Send to USB > Actual data. > Read Ok. > CRC Ok! This text indicates that the probe and the application are communicating correctly.

Probe s / n: This text indicates that a probe is disconnected or the application hasn't found it.
Other texts may appear, typically while connecting or disconnecting a probe. These should be temporary. If problems occur, try to disconnect and reconnect the probe or restart the application.

5. Tab "Data" – Default tab

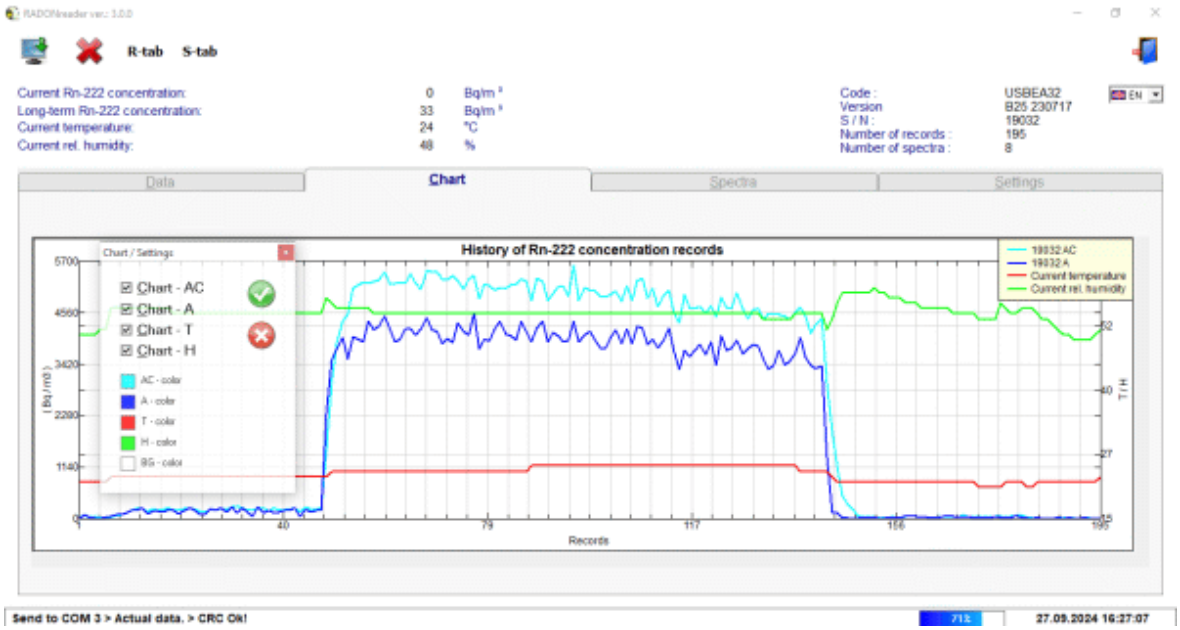


This tab shows a sheet of values of downloaded basic records from probe internal memory. Records are downloaded from internal memory in the probe by clicking the *Read records from the probe* button. Displayed data can be changed by filling in fields „From:" and „To:" in the top left corner of the tab. Chosen numbers indicate the number of the first (last) shown record. This display affects the range of the figure in the „Chart" tab and the *Export measured records* / *Export measured spectra* options (Only shown records and corresponding spectra are exported). Particular columns are:

Record	Number of individual record
Time	Time of individual record
ARn (Bq/m3)	Radon concentration calculate from RaA (^{218}Po); suitable for measurement where quick changes of radon occur
ACRn (Bq/m3)	Radon concentration calculated from RaA+RaC (^{218}Po+ ^{214}Po); suitable for long-term measurement with higher sensitivity
sum1,sum2, sum3,sum4	The number of impulses (alpha-particles) in the energy window (expert, service); sum2=(RaA(^{218}Po)); sum3=(RaC(^{214}Po))

Current temperature (°C)	Temperature measured in the chamber of the radon probe
Humidity (%)	Relative humidity measured in the chamber of the radon probe
HV	Number of pulses of a High Voltage generator ; norma l is value of 7-12; in higher humidity it increase; max is 200- HV generator is out of limit (for service purposes)
Algorit.	Radon concentration measurement algorithm (set in „Settings“) 0 – Ra A measurement (quicker changes, less sensitive) 1– RaA + RaC measurement (slower changes, more sensitive) X - Both RaA and RaA+RaC measurement

6. Tab “Chart”

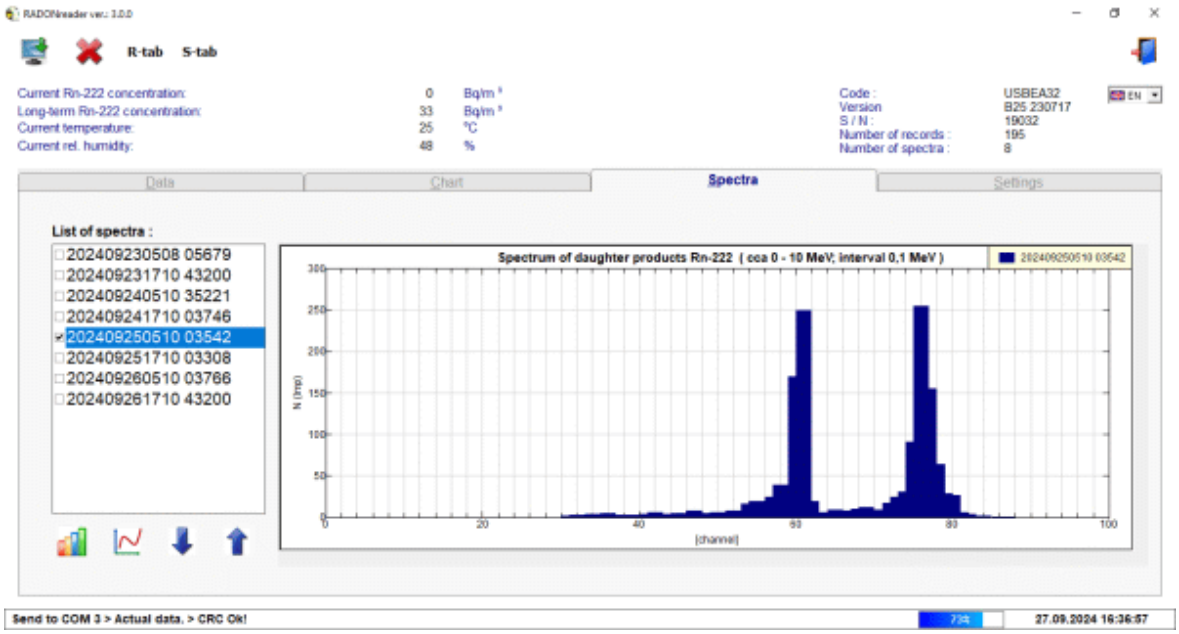


The tab “Chart” shows a figure of radon concentration in time based on the records of short-term/long-term radon concentration (y-axis – radon conc., x-axis – number of measurement). The figure also shows temperature and relative humidity records. The graphs show the same that’s displayed in tab „Data“. For finer control of data plots, we advise to export records and use different plotting software, for example see RadonView in chapter Acessories.

Plot controls

Zoom in – To zoom on an area of interest click and drag over the desired area.
Return to original view – Right-click on the graph to return to the default view.
Selection of graphs RaA/RaA+RaC/Temperature/Humidity and colors – Double-click on the graph to get the options window. To hide/show uncheck/check the box next to the name of the desired variable.You can choose which values you wish to plot and the line color. To change the color of the lines (or background) double-click on the default color of the curve and choose a different color in the menu. For changes to take effect you need to click the green ***Do*** button.

7. Tab „Spectra“

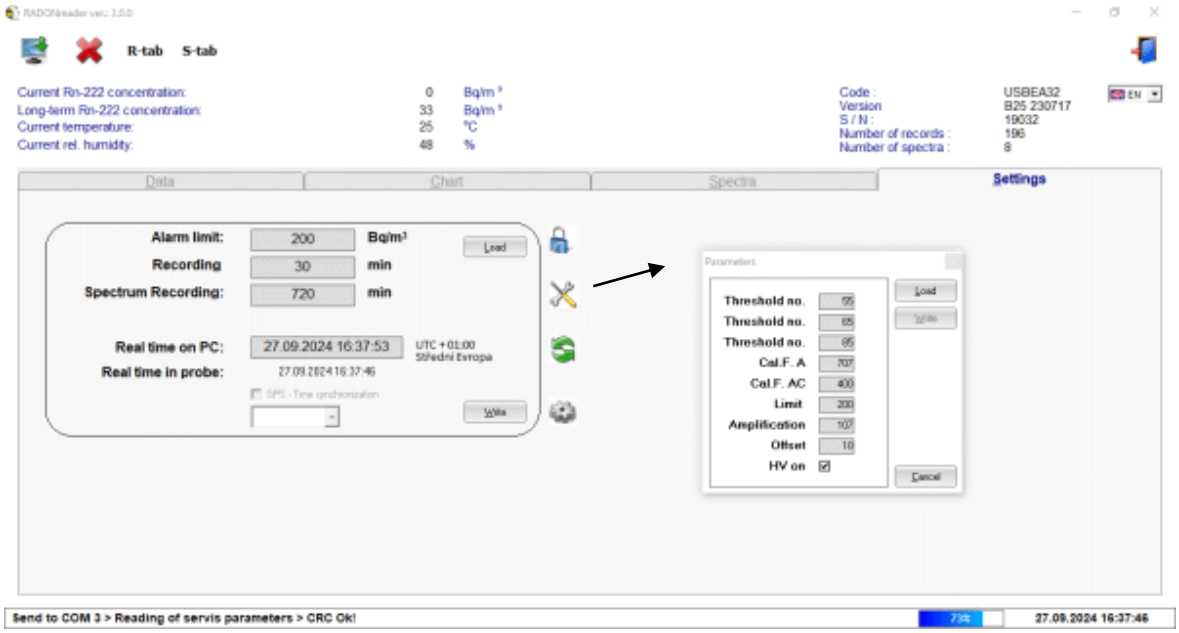


This tab shows the list of collected energy spectra in the interval of displayed data defined in the tab “Data“. The length of the time interval used to collect a single energy spectrum is defined in tab „Settings“ and the default interval length is 12h (720 min.). The name of each recorded spectrum is identified by the time of the beginning of recording in the format yyyymmddhhmm. To view a particular spectrum it is necessary to tick a box next to the name of the desired spectrum in the record list on the left side of the tab. You can use the arrows underneath the list to show the previous or next spectrum. To view multiple data in one plot, tick multiple boxes and click the ***Display selected spectra***  . At one time you can view up to 14 spectra. To (un)select all recordings in the list right-click the record list. You can view the currently measured spectrum by clicking the ***Display the current spectrum***  . In the legend of the plot, you can see how much time passed since the measurement started.

The energy spectrum shows the number of impulses generated due to radon decay. Every detected impulse has definite energy which is measured and evaluated into 96 discrete energy levels (channels). One discrete level presents energy interval 0,1 MeV and the whole energy graph is approximately ranging 0 - 10 MeV. If the number of impulses in some energy levels crosses 255 the record of the spectrum is stopped earlier before reaching the end of the measurement. Then the real-time of measurement in seconds is written as a 5 digit number after the name of recorded spectra in the record list.

The expected energy peak for Po-218 is in 60-61 channel as 6,00MeV. The expected energy peak for Po-214 is in 77-78 channel as 7,69MeV.

8. Tab “Settings”



In this tab it is possible to read and change the basic parameters of measurements. To load to settings of the connected probe press **„Load“**. To upload the current settings from the application into the probe press **“Write“**. The options in this tab are:

Alarm limit – Crossing value of radon concentration in Bq/m3 the connected air-conditioning unit is turned on. To use this function the probe needs to be connected to a wireless radon regulating system (max. Value is 65535).

Recording – How long is the measurement of the radon concentration, longer intervals reach higher accuracy (default 60 minutes; max. 255 minutes – 4:15 hours). Unless specifically needed, for regular function don’t use intervals shorter than 60 min (in case of high radon concentrations 30 minutes might be also useful).

Spectra Recording – Time interval used as a length of the measurement of the energy spectra into probe internal memory in minutes (default. 720 minutes and max. 12 hours).

Measurement method – Selection of algorithm „Measurement method“ is only available for older types of the probes which aren't able to measure both methods at once.

A – Radon concentration is evaluated only from Ra A (quicker, less sensitive)

AC – Radon concentration is evaluated from Ra A + Ra C (slower, more sensitive)

Real time in PC – Shows your PC system time and time zone. By clicking on the button „Write“ this real-time is written into the probe.

Real time in probe – It shows the current time saved in the probe. It defines a time stamp for recordings. If you want to change this value to your system time press “Write”.

GPS - Time synchronization - This box is active only for TSR4S type probes which have a GPS module in it. It is possible to turn on automatic synchronization of the probe real time according to the GPS signal. When you check the box, the real time of the probe is synchronized every day after midnight only if a GPS signal is available at the location of

the probe. Then you also need to set the time zone of the location of the probe to manage the time correction from GPS.

Enter the password – Advanced parameters can't be changed without having the "expert" password. For the expert password contact manufacturer or distributor of the probe.

Service parameters – Hardware parameters of the probe. To change these you need the insert the "expert" password. For expert access please contact the manufacturer or the distributor.

Meassurment initialization – The reset of the calculation of moving averages of radon concentration in the probe. This action is recommended before new measurement with the probe.

Firmware upgrade – To upgrade the probes firmware using a .hex file. New firmware upgrade file is available at the manufacturer or the distributor.

9. Warranty and Licensing

RADONreader application can be freely used at www.piketronic.cz.

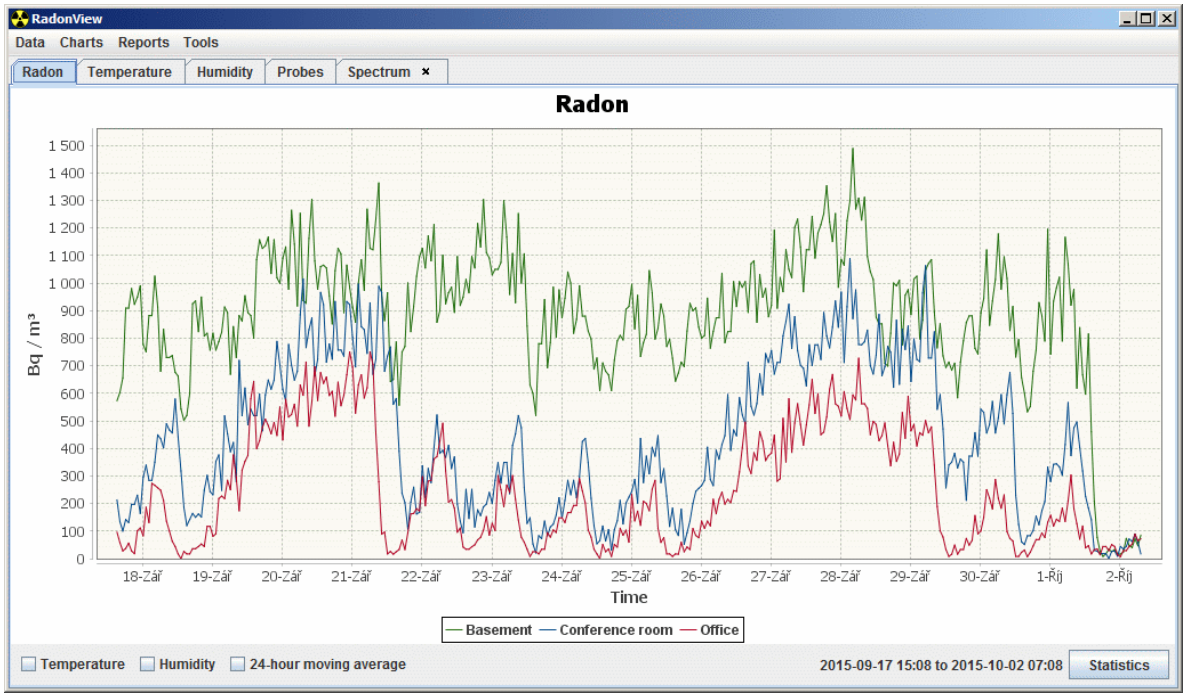
RADONreader downloading of an application and then running it you agree with the conditions of the end user license agreement which is included in the download package RADONreader. You agree that you will not give permission, copy, sell, rent, transfer, distribute, publish, offer to third parties or otherwise commercially exploit application RADONreader without the prior written consent of producer.

Producer assumes no responsibility for errors, omissions and damages resulting from the use of applications RADONreader.

Other versions and modifications can be created without prior notice to users of the current version.

10. Accessories

RadonView - Computer application for easy viewing records and spectra measurement of radon concentration exported from the RADONreader (files .tab). It can be downloaded from the SÚRO website (National Radiation Protection Institute).
(https://www.suro.cz/en/prirodnioz/suro-software-data-processing-from-continuous-rn-monitors)


RadonView
Data Charts Reports Tools
Radon Temperature Humidity Probes Spectrum
Radon
Bq / m³
1 500
1 400
1 300
1 200
1 100
1 000
900
800
700
600
500
400
300
200
100
0
18-Zář 19-Zář 20-Zář 21-Zář 22-Zář 23-Zář 24-Zář 25-Zář 26-Zář 27-Zář 28-Zář 29-Zář 30-Zář 1-Říj 2-Říj
Time
Basement Conference room Office
Temperature Humidity 24-hour moving average
2015-09-17 15:08 to 2015-10-02 07:08
Statistics