piketronic

Operation Manual and Technical Specification

RPP-E
Ethernet radon probe

1 Meet

Probe is designed for continuous measuring of radon concentrations in buildings with ethernet data transmission.

IP 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 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). 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. Due to demand of permanent power supply via power adapter 230VAC/5VDC or via PoE the radon probe is mainly determinate for fixed installation and long term monitoring of radon. In case of sudden power outage probe back up running of real time for correct date and time of records for case of switch it on again.


Obr.1 – Types of power supply of probe (power adapter and PoE splitter)

Probe configuration, data viewing and downloading from probe is possible to realize by connected PC (notebook, tablet, smartphone) with installed some internet browser (Google Chrome, Mozilla Firefox, etc.). PC can be connected with probe by cable (UTP cable) or wirelessly (Wi-Fi). PC can be connected with probe directly or via LAN, WLAN networks (router) or via INTERNET network (router + modem). The probe includes internal **web server** which sends web pages with results to your internet browser. Web pages are in English or Czech. So there isn´t necessary to install any special application for control of probe and there is possible to use various operation system (OS) of PC. Three levels of user web access are defined: user,

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.

administrator and expert. Measured results are saved into internal memory of probe during up to 2 years. Saved data in memory is possible to export to files with extension **.CSV, .HTML** and **.TAB** for further processing in any text editor and in any spreadsheets. For easy graphical display and advance analyze of files .TAB can also use the program Radonview see „Accessories".

IP probe also suitable for easy software integration to various and large network systems of third parties (smart house, industrial systems, etc.) due to standard communication protocol **HTTP (GET, POST, PUSH), SNMP v.2, MODBUS** which allows access to current measuring data in probe. Description of protocols, MIB tables and MODBUS regsters are free downloaded on producer website .

IP probe along with IP **actuator** and climatic equipment (e.g. fan) can be use in radon regulating system where probe sends command to actuator for switch fan on in case of crossing of adjusting level of radon concentration in room.
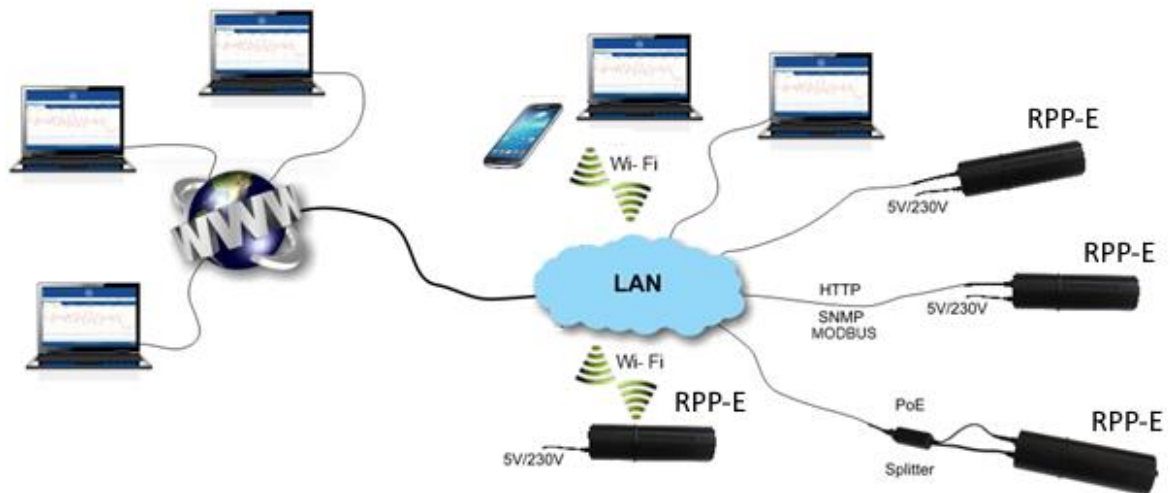
Obr.2 – Types of RPP-E connection into network

LED diode „STAT":
It signalizes status radon probe according to following chart:

Color	Description
Green / **Yellow** **only once**	Radon probe has just been connected to power supply.
Green blinks **every 5 seconds**	Radon probe measures and works correctly. The set radon concentration alarm limit was not exceeded. (Valid for firmware 1.30 and higher.) *Measured value of radon concentration (1 hours moving average – updated every 4 minutes) doesn´t cross adjusted „limit" with 10% hysteresis. By setting the measuring/switching algorithm (method) in the probe, the LED diode "STAT" dynamics of warning can be influenced. Method " RaA ", measured only from RaA (Po218), reacts quickly to changes in concentration, but it is less accurate. On the contrary, the " RaA+RaC " method, measured from RaA (Po218) + RaC (Po214) is more accurate, but has a slower reaction to sharp changes in radon concentration. By default, the "AC" method is set in the probe. Setting the alarm limit and the measuring algorithm can be done over web interface of probe on list "Settings".*
Yellow blinks **every 1 second**	Radon probe measures and works correctly. The set radon concentration limit has been exceeded. See paragraph above. (Valid for firmware 1.30 and higher.)
Green / **Yellow** **after 5s**	Radon probe measures but troubles are occur. – especially low voltage of power supply or error of high voltage in chamber (high humidity in chamber or a few second after turning on of probe)
No light, No blinking	Radon probe doesn´t measure. The power supply isn't connected or device is damaged.

2 You get

- Radon Probe
- Power adapter 230VAC/5VDC
- UTP cable 1m
- Operation Manual

3 Product Specification

Product	Ethernet Radon Probe
Type symbol	RPP-E
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 concentration results display	short-term (1 hour moving average)
	long-term (24 hours moving average)
Measuring algorithm	quicker, less sensitive (calculated from RaA)
	slower, more sensitive (calculated form RaA + RaC)
Measuring relative humidity range	0 – 100 %
Measuring temperature range	- 40 to + 125 °C
Wired interface	Ethernet 10/100 Base-T (RJ45)
Wireless interface	WiFi 802.11 b/g/n 2,4 GHz
Records saving interval	1- 255 minutes, default 1 hour
Results memory capacity in probe	> 2 year (hours records)
Powering	Power adapter 230VAC/5VDC or PoE splitter
Access protocol	HTTP, WEB interface, IPv.4
Advances access protocol	HTTP (GET, POST, PUSH), SNMPv.2, TCP/IP Modbus
Recommended internet browsers	Google Chrome, Mozilla Firefox
Languages	English, Czech
Accounts	User, Administrator, Expert
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
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.

4   I work like this

Quick start:

After connecting the power adapter the probe start measuring automaticaly. The probe measures autonomous continuously.

For viewing data and configuration connect probe and PC directly via (delivered) UTP cable. On PC set its static IP address and its mask in TCP/IP network configuration tools; IP :192.168.172.1 ; Mask: 255.255.0.0. On PC use some web browser and write into web link default start IP adress of probe: **192.168.172.31** . The best browser are Google Chrome or Mozilla Firefox. The recommended Internet browsers are: Google Chrome v.77 and higher, Mozilla Firefox v.68 and higher, Safari v.12.1 and higher. The basic web page should be loaded with only „user" access for data viewing. Look right up on page. For configuration of probe click on "user" and change access to administrator by writing into pop-up table default password „**administrator**". Now it is possible to configurate probe and connection parameters. See to „List options" below.

Probe has two type of wire connection IP addresses:

TYPE	IP ADRESS	DESCRIPTION
Configurable operating IP address	Default: 192.168.172.31 Mask: 255.255.0.0 Default password: administrator	Normal configurable operating IP access for LAN network. In administrator acces you can set new password, LAN, WLAN and probe configuration.
Non – configurable back door IP address	Strictly: 172.31.172.31 Mask: 255.240.0.0 No password, strictly administrator account.	Safety non-configurable back door IP access only for direct cable connection with one computer. You can use this acces in case of forget the IP adress or administrator password.

Probe has three type of access account to data. Login is right up of web pages.

ACCOUNT	PASSWORD	DESCRIPTION
user	Strictly: user	User can only view and export results and paramaters.
administrator	Default: administrator	Administrator can configurate network acces and basic probe paramaters. Administrator can change the administrator password.
expert	Password on request	Expert can configurate calibration parameters of radon probe. For expert access please contact the manufacturer or distributor.

Selected access is only valid during time when web page is open on particular PC.
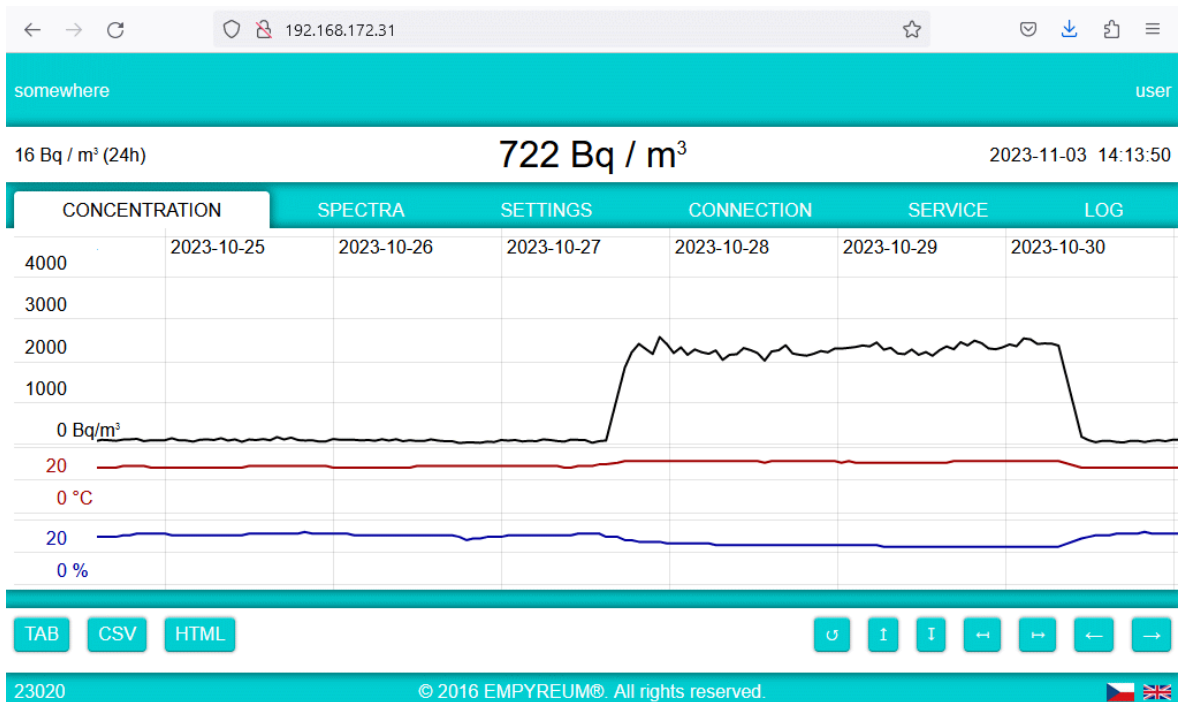
List options:

List „CONCENTRATION" – basic page

Basic web page shows black graph of radon concentratin records in 1 hour moving average in time. Red graph shows time behavior of temperature in measuring chamber and blue graph shows time behavior of relative humidity in measuring chamber. Time interval in minutes between two records of radon concentration is possible to set in list "SETTINGS". The default value is 60 minutes.

somewhere – Description and location of particular probe. Setting of this is possible in list „CONNECTION"

user (administrator, expert) – Type of access and link for change of access by writing password.

TAB – Export of actual displayed data in graphs into .TAB format file for further processing in any text editor and in any spreadsheets. For easy graphical display and advance analyze of files .TAB can also use the program Radonview see „Accessories". Exported file is downloaded into target directory in PC according your internet browser setting.

CSV - Export of actual displayed data in graphs into .CSV format file for further processing in any text editor and in any spreadsheets. Exported file is downloaded into target directory in PC according your internet browser setting.

HTML - Export of actual displayed data in graphs into .HTML web page format file. Exported file is downloaded into target directory in PC according your internet browser setting.

 - Return to default 7 days view

 - Zoom in of concentration

 - Zoom out of concentration

 - Zoom in of time

 - Zoom out of time

 - Shift to left

 - Shift to right

23020 – Serial number of radon probe.

 - Change language English/Czech.

List „SPECTRA"

List is dedicated for experts. It shows time behavioral of energy spectrum of paticles. Spectrum records is made default every 12 hours. Time interval in minutes between two records of energy spectrum is possible to set in list "SETTINGS". The default value is 720 minutes.

TAB – Export of previous 5 and following 5 records of spectrum from graph of view into .TAB format file for further processing in any text editor and in any spreadsheets. For easy graphical display and advance analyze of files .TAB can also use the program Radonview see „Accessories".Exported file is downloaded into target directory in PC according your internet browser setting.

 - Shift to next records of energy spectrum.

2023-01-22 12:11:10 – Date and time of beginning of energy spectrum record interval.

List „SETTINGS"

It is a list for setting of basic parameters of measurement. This settings can be changed only under administrator accesss.

Concentration Record - Time interval in minutes between two records of radon concentration. The default value is 60, ie. the record is created every hour.

Spectra Record - Time interval in minutes between two recordsof energy spectra. The default value is 720 min, i.e. the spectrum is taken and saved every 12 hours.

Measurement Method -

RaA	concentration is calculated only from Ra A pulses	quicker, less sensitive
RaA + RaC	concentration is calculated from Ra A + Ra C pulses	slower, more sensitive

SNMP Manager – IP address of equipment with SNMP manager in net where the probe is sending of alarm (TRAP) every 1 minute when radon concentration cross Alarm Limit SNMP. Setting of highest IP address in subnet is dedicated for broadcasting of alarm to all equipment in subnet.

Alarm Limit SNMP - Limit of radon concentration when the probe is sending SNMP alarm (TRAP) and diagnostic LED diode „STAT" blinks orange.

HTTP push server – IP address of the server where the probe will regularly send the measured data by methods PUSH

HTTP push port – Port number of the server where the probe will regularly send the measured data by methods PUSH

HTTP push interval – Interval how often the probe will send the measured data to the server by methods PUSH in minutes

Clock – Manual setting of real time.

SYNCHRONIZE TIME - Setting of real time according to PC.

CLEAR:

MEASUREMENT	Erases the the actual buffers for calculate concentration.
SPECTRA	Erases records of spectra in internal memory
DATA	Erases records of concentration in internal memory
ALL	Erases measuring buffers, spectra records and concentration records

List „CONNECTION"

It is a list for setting of connection parameters. This settings can be changed only under administrator accesss. For saving changes is necessary to press **„APPLY CHANGES"** at the end of list. After saving changes the probe is automatically restarted. It can takes up to 1 minute.

Password - Setting of new administrator password.

Location Name - Setting of probe name or location.

Latitude – Manually setting of probe latitude

Longtitude – Manually setting of probe longtitude

Ethernet Connection Address - Setting of probe IP address for cable net connection. After automatically restart behind this window is shown actual IP adresss of probe.

Ethernet Connection Mask – Setting of subnet mask for cable net connection.

Ethernet Connection Gateway – Setting of gateway for cable net connection.
(If the Ethernet Connection setting is empty the probe get IP address from router **DHCP** server. In this case you have to find IP adress of probe in router setting or in item Ethernet Connection Address if the probe will be connected by wireless connection).

Wireless Connection SSID - Setting of wi-fi net name.
Wireless Connection PSK – Setting of wi-fi net password.
Wireless Connection Address – Setting of probe IP address for wireless net connection. This option is not currently supported. After automatically restart behind this window is shown actual IP adresss of probe and signal strenght of wireless net.
Wireless Connection Mask – Setting of subnet mask for wireless net connection. This option is not currently supported.
Wireless Connection Gateway – Setting of gateway for wireless net connection. This option is not currently supported.
(If the „Wireless Connection – Address, Mask, Gateway" setting is empty the probe get IP address from WLAN access point **DHCP** server. In this case you have to find IP adress of probe in access point setting or in item Wireless Connection Address if the probe will be connected by cable connection).

The probe can be connection either by cable or wiressly or both in same time but only one gateway has to be set.

DNS - Setting of IP adress of DNS servers. For common use of probe it isnt necessary to fill in.
Direct Connection - Only shows safety non-configurable back door IP adress and mask of probe only for direct cable connection with one computer. This acces is necessary to use in case of forget the IP adress or administrator password.

List „SERVICE"
It is a list for updating of software and and reading of probe hardware parameters. New version of software can be uploaded only under administrator accesss. Setting of probe hardware parameters can be changed only under expert access.
Software Update – Software is updated by dragging of software update file into blue row. After dragging the probe is automatically restarted. It can takes up to 1 minute. The latest update file is available on producer website. Version of probe software is on list „LOG".
Discrimination - The whole measured energy spectrum is divided into 96 channels and three adjustable discrimination levels divide the whole area into four parts. The levels are set that way, that there are Ra A pulses in the part 2 and Ra C pulses in the part 3. The energy of pulses generated due to radon decay is precisely known so that the appropriate setting of discrimination levels separate the useful pulses from artifacts generated by noise etc.
Calibration - These numbers are parameters for the calculation of the radon concentration from the number of pulses by the measurement according to the measurement method Ra A + Ra C or Ra A. It is determined individually during the probe calibration.
Gain - This value determines the position of the energy spectrum and its change moves the spectrum to the left or right. It is determined individually during the probe calibration.
Serial Number – Only shows serial number of probe.
Ethernet HW Address - Only shows ethernet MAC address.
Wireless HW Address – Only shows wireless MAC address.

List „LOG"
It is a list of reading actual values and events mainly for service use. At the end of the list is shown versions of firmware and software in probe.

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

6 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.

7 Accessories

Radon Probe accessories are available at producer or at distributor.

Probe holder   **PoE splitter**

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)