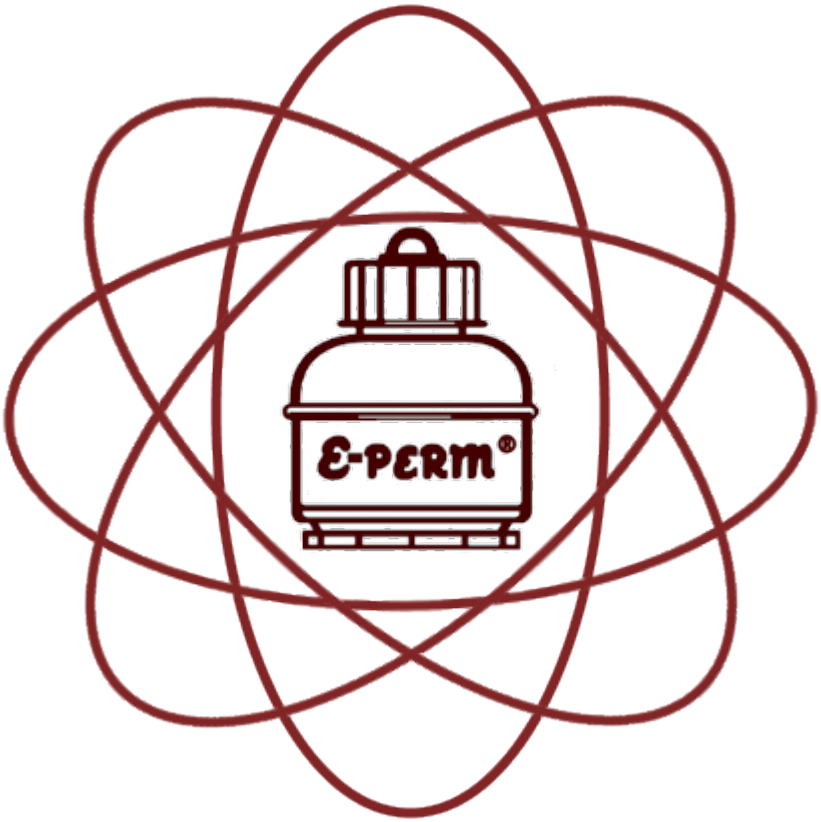

RAD ELEC INC.

E-RPISU®

Operator's Manual

Version 1.2
26 September 2022

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Introduction

The E-RPISU® (Electret Radon Progeny Integrating Sampling Unit) is powered by a low-flow-rate air sampling pump that causes radon progeny to be deposited on a specialized filter paper. This filter paper is integrated into an S chamber in such a way that the collected progeny ionizes the air inside the chamber. These negative ions are collected by a positively charged electret loaded into the S chamber, causing the electret's voltage to drop; this reduction in voltage is proportional to the time-integrated radon progeny concentration.

E-RPISU® is an acronym that stands for **E**lectret **R**adon **P**rogeny **I**ntegrating **S**ampling **U**nit.

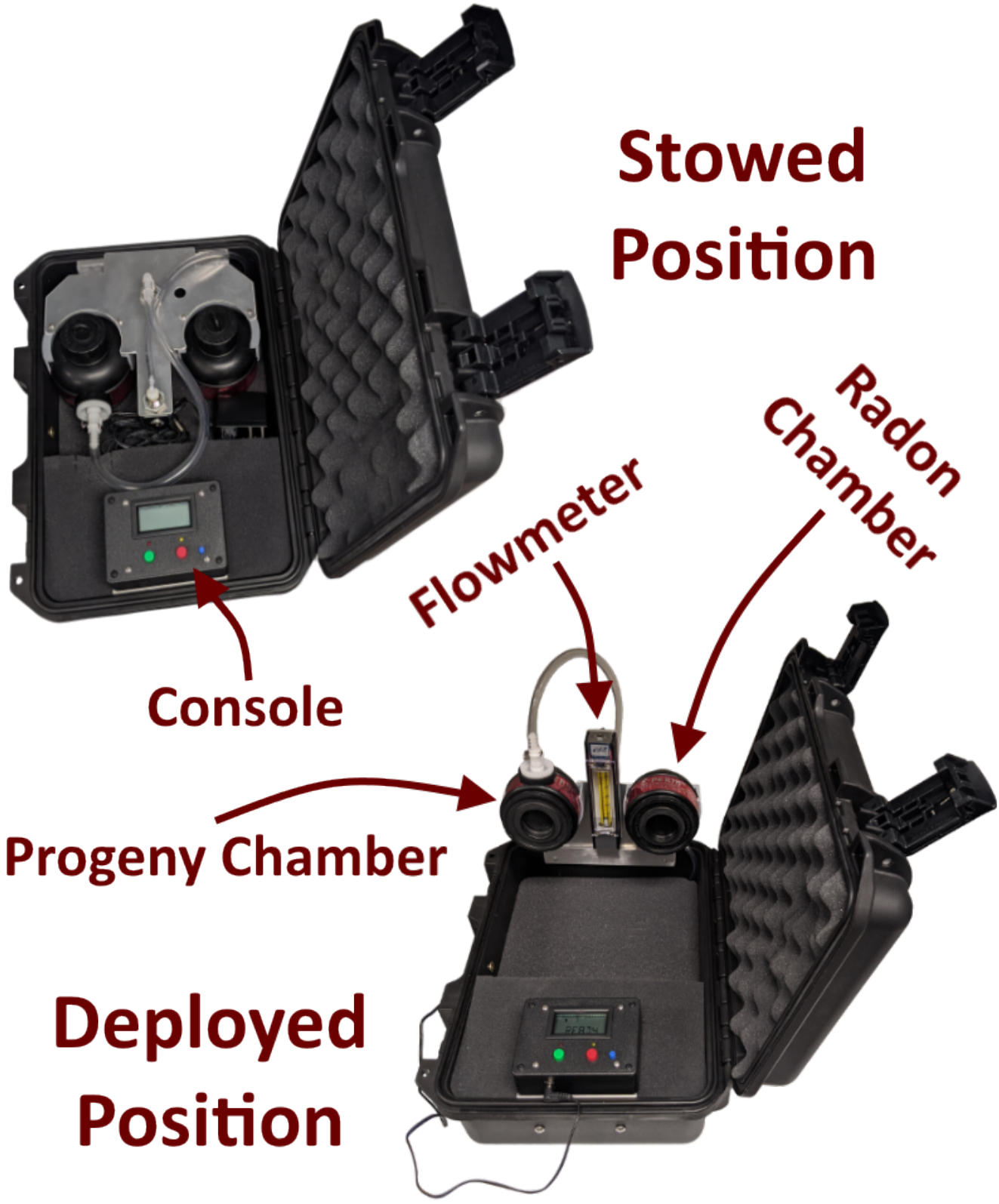
E-RPISU® Components

Each E-RPISU® includes the following:

- **E-RPISU® Sampling Unit**
- **Filter Case** (with 25 filters)
- **Tweezers**
- **Power Adapter**
- **E-RPISU® Operator's Manual**
- **Flash Drive with Spreadsheet, Deployment Form, and Report Template**

In addition to the included spreadsheets, E-RPISU® results can be calculated using the Radon Report Manager software.

E-RPISU® Diagram



Overview

This section will discuss the procedures required to conduct radon progeny measurements, and presume a working familiarity with the E-PERM® System (such as taking accurate voltage readings with electrets). If you are unfamiliar with electret ion chambers, please read through the E-PERM® System User's Manual. Unlike standard radon tests with electret ion chambers, the E-RPISU® will provide working level (WL) results and an equilibrium ratio (ER) in addition to the radon concentration, to better characterize the environmental ionizing radiation due to radon decay products.

The E-RPISU® radon progeny monitor will report results in net working levels (WL), equilibrium ratio (ER), and radon concentration.

Why Measure Progeny?

An equilibrium ratio of 50% means that half of the progeny is attached to particulate or aerosol in the environment, while the rest is “plating out” in the environment and will not be inhaled.

The USEPA originally set a public threshold for radon progeny exposure at 0.02 WL (working levels), with a corresponding limit of 4.0 pCi/L for radon gas. This is important because the action limit of 4.0 pCi/L is *fundamentally derived* from the 0.02 WL threshold, and assumed to be at an equilibrium ratio of 50%. It is very plausible that the 50% equilibrium ratio assumption may not be accurate in many environments, especially in buildings with high air circulation. An equilibrium ratio of 50% means that half of the progeny is attached to particulate or suspended as aerosol in the air, while the other 50% is "plating out" (attaching to walls, furniture, etc.) and unavailable to be inhaled into the lungs.

The decay products are of significant importance because they exist as particulate (solid) radioactive elements, and are easily deposited in the lungs. In short, the primary health risk from radon is not from radon itself (which is easily inhaled and exhaled), but rather from its radioactive progeny such as Polonium-218, Bismuth-214, and Polonium-214. By utilizing the E-RPISU® radon progeny monitor, you will be able to measure the prevalence of these decay products in an environment.

If the measured radon concentration is 8.0 pCi/L and the Equilibrium Ratio (ER) is 25%, the health risk would be equivalent to a radon concentration of 4.0 pCi/L. This is because the remaining 75% of the progeny is “plating out” onto the environment, reducing the overall dose.

Using the E-RPISU® for Working Level Measurements

The following steps will guide you on using the E-RPISU® to characterize the radon gas and progeny concentration, along with the corresponding equilibrium ratio, of a given environment. A working knowledge of the E-PERM® System is required, as it goes beyond the scope of this manual to instruct the user how to use electret ion chambers.

The E-RPISU® filter papers can be re-used for another exposure if they show no (or minimal) signs of dirt after a sampling period. If re-using the same filter paper, please allow at least four hours between exposure periods to allow the polonium to decay.

1

Prepare the **progeny chamber assembly** by carefully unscrewing the **filter head**, and then installing an E-RPISU® **filter paper**. The **gasket** should rest directly on the **intake flange**, with the **filter paper** above it (touching the **filter head**). It is recommended to use the included pair of tweezers to prevent dirty hands from clogging the filter. The **filter paper** is bi-directional, so it doesn't matter which side faces toward the **filter head**. However, it is extremely important to make sure that the grooves in the **intake shroud** allow clear air flow into the **intake flange**. If you look carefully, you can see the air entry holes on the **intake flange**; they should be positioned on the progeny chamber as shown in the diagram below.

The grooves on the **intake shroud** must be aligned to allow unrestricted air flow into the **intake flange**!

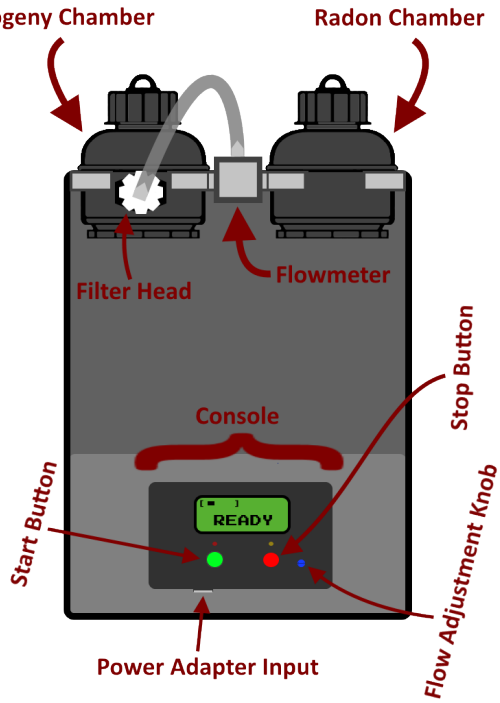
2. Prepare two electrets (either ST or LT) by measuring their initial voltages, making sure to note which will be loaded into the **progeny chamber** and which will be loaded into the **radon chamber**. It is recommended to use a deployment sheet; a template is included in the appendix of this manual.

Both the **radon chamber** and the **progeny chamber** are S Chambers. If you are using a short-term (ST) electret, the resulting configuration is SST. If you are using a long-term (LT) electret, the configuration is SLT.

3. Load the electrets into the **progeny chamber** and **radon chamber**, but keep the chambers closed.

4. Safely stow the E-RPISU® unit, and travel to your measurement site.

5. When ready to begin measuring, open the E-RPISU® case and assemble the chamber assembly plate in the **deployed position** as shown in the diagram on Page 4. This process is simple, but you must be careful not to dislodge the flow tube running between the **progeny chamber** and the **flowmeter**. The chamber manifold will click into a receptacle that sits near the edge of the E-RPISU® case.



6. Connect the **power adapter** to the **console** (the **power adapter input** is located on the wall of the **console**), then plug it into an outlet or similar power source. The E-RPISU® requires external power in order to operate the pump, which will flow air through the **filter head**.

7. Unscrew the caps on both the **progeny chamber** and the **radon chamber**, so they are in the open position. Both chambers should have the electrets (that you had previously read in Step #2) already loaded into them.

8 The pump must now be calibrated. Press the red **stop button** until "READY" appears on the **console**. As soon as you see "0.0" on the **console**, press the green **start button**. The word "ADJUST" should appear on the **console**, and you will be able to adjust the pump rate on the **flowmeter** by turning the blue **flow adjustment knob**. Turning the knob counter-clockwise reduces the flow, and turning it clockwise increases the flow. You can check the current flow rate by looking at the **flowmeter**, which has a range of 0.0 to 1.0 liters per minute. Rad Elec recommends a rate of approximately ***0.8 liters per minute***.

If you mess up during the pump calibration phase, don't worry! Simply press the red **stop button** until "READY" appears on the **console**, and restart from Step #8.

9 After you are satisfied with the flow rate, press the red **stop button** again to set this value. The LCD screen will display "WAIT" for a few moments while the new flow rate is being internally set.

Rad Elec recommends setting a flow rate of 0.8 liters per minute.

10 You're almost ready! Press the green **start button** to initiate the pump and begin the test.

Elevation corrections will only affect results when above 4000 feet (1219 meters)!

11 Write down the start date and time, along with the initial flow reading. This is important! If the elevation is greater than 4000 feet (1219 meters), make a note of the current elevation. If there are any other important details to collect about the measurement location, now is a good time to do so. Background gamma should also be estimated (use the chart included in the appendix of this manual for a reference) or measured.

Background gamma for US states and Canadian provinces can be estimated using the chart located in the appendix.

12 The E-RPISU® is now acquiring data. Throughout the exposure period, the E-RPISU® must remain connected to a power source (which will keep the pump in operation). If power is interrupted during the acquisition, a yellow warning light will appear to inform the technician.

It is vital to record the start and end dates/times, along with the initial and final flow rates!

13 When the desired sampling period is concluded (at least 48 hours is recommended), write down the final flow reading. Also, write down the end date and time.

A minimum of **48 hours** is recommended for the sampling period.

14 Press the red **stop button** to halt the pump. Immediately close both the **progeny chamber** and the **radon chamber**. Make sure to securely screw the tops of the chambers in the closed positions.

15 Dissassemble the chamber assembly plate and gently place it back in the E-RPISU® case.

16 After returning to the laboratory, unload the electrets from the **progeny chamber** and **radon chamber**, then read their final voltages.

17 Using the spreadsheet (or Radon Report Manager software), input the following data fields:

- Start Date & Time
- End Date & Time
- Progeny Electret Initial / Final Voltages
- Radon Electret Initial / Final Voltages
- Initial & Final Flow Rates
- Elevation
- Background Gamma

Your results will include the **net working level** (in WL, which represent the progeny concentration), the **radon concentration** (in pCi/L or Bq/m³), and the resulting **equilibrium ratio** (%).

The **net working level** represents the radioactive decay product concentration after all other "noise" (such as background gamma and radon) has been filtered out.

Because many factors can affect WL measurements, it is critical to maintain a detailed record of the testing conditions by utilizing the Deployment Form (i.e. whether the sampling site is occupied or unoccupied, furnished or unfurnished, the status of closed building conditions, the operation of HVAC or other ventilation systems, air filtration systems).

Determining the Unattached Fraction

When radon decays, the immediate progeny is a charged metallic ion of polonium. Being very tiny – of an atomic size – it travels through the environment with high diffusivity. Many of these polonium ions will attach to fine particulate in the environment and become "attached" – the likelihood of attachment depends upon several variables (such as the amount of dust) in a given location.

If the progeny does not encounter an object to attach itself, it will remain "unattached." This unattached fraction is composed of small clusters of molecules, although its primary composition is polonium-218. If measuring the unattached fraction with the E-RPISU®, it is recommended to run two units simultaneously, side-by-side. Prepare the first unit with the "normal" filter paper; this will measure the total progeny (attached and unattached). Prepare the second unit ***without*** any **filter paper**, using only the integrated wire mesh filter (located on the **filter head**), which will attract the unattached progeny while simultaneously allowing the attached progeny to pass through.

Prepare both E-RPISU® units as described in the previous section, and calculate the results for each unit normally – being sure to differentiate the electrets loaded into the wire mesh unit (for the unattached fraction) from the normal filter unit (for the total fraction).

Once you have net working levels for both units, divide the wire mesh net working level by the normal filter mesh working level, and then multiply by 100. This will provide you with the unattached fraction as a percent. To determine the attached fraction as a percent, simply subtract the unattached fraction percentage from 100.

$$\text{Unattached Fraction (\%)} = \frac{\text{Wire Mesh Net WL}}{\text{Filter Paper Net WL}} \times 100$$

$$\text{Attached Fraction (\%)} = 100 - \text{Unattached Fraction (\%)}$$

For ease of use, it is recommended to use the included E-RPISU® spreadsheet (which has a sheet dedicated for measuring the attached and unattached fractions). When all of the required data fields for each instrument have been entered, the attached and unattached fractions will be calculated, as shown in the example below.

Normal Filter

Electret Serial Number	Start Date/Time	End Date/Time	Total Days Exposure	Chamber Measurement	Initial Voltage	Final Voltage	EIC Config	Elevation Meters	Elevation CF	γ nGy/hr	Radon in Air Bq/m³	± Bq/m³	Error %
SAA001	2020-01-02 09:06	2020-01-05 10:13	3.05	**Radon**	491	463	SST	290	1.00	50.0	**157.2**	**±11.1**	**7%**

Electret Serial Number	Start Date/Time	End Date/Time	Total Days Exposure	Chamber Measurement	Initial Voltage	Final Voltage	EIC Config	Elevation Meters	Elevation CF	γ nGy/hr	Gross Working Level	± GWL	Error %
SAA002	2020-01-02 09:06	2020-01-05 10:13	3.05	**Progeny**	639	409	SST	290	1.00	50.0	**0.016**	**±0.00171**	**10%**

Pump Flow Rate (LPM)		Net	Equilibrium
Initial	Final	Working Level	Ratio
0.60	0.50	**0.014**	**33.67**

Attached Fraction: 81.04%

Wire Mesh Only

Electret Serial Number	Start Date/Time	End Date/Time	Total Days Exposure	Chamber Measurement	Initial Voltage	Final Voltage	EIC Config	Elevation Meters	Elevation CF	γ nGy/hr	Radon in Air Bq/m³	± Bq/m³	Error %
SAA003	2020-01-02 09:06	2020-01-05 10:13	3.05	**Radon**	703	674	SST	290	1.00	50.0	**154.8**	**±10.8**	**7%**

Electret Serial Number	Start Date/Time	End Date/Time	Total Days Exposure	Chamber Measurement	Initial Voltage	Final Voltage	EIC Config	Elevation Meters	Elevation CF	γ nGy/hr	Gross Working Level	± GWL	Error %
SAA004	2020-01-02 09:06	2020-01-05 10:13	3.05	**Progeny**	300	244	SST	290	1.00	50.0	**0.005**	**±0.00070**	**15%**

Pump Flow Rate (LPM)		Net	Equilibrium
Initial	Final	Working Level	Ratio
0.55	0.50	**0.003**	**6.48**

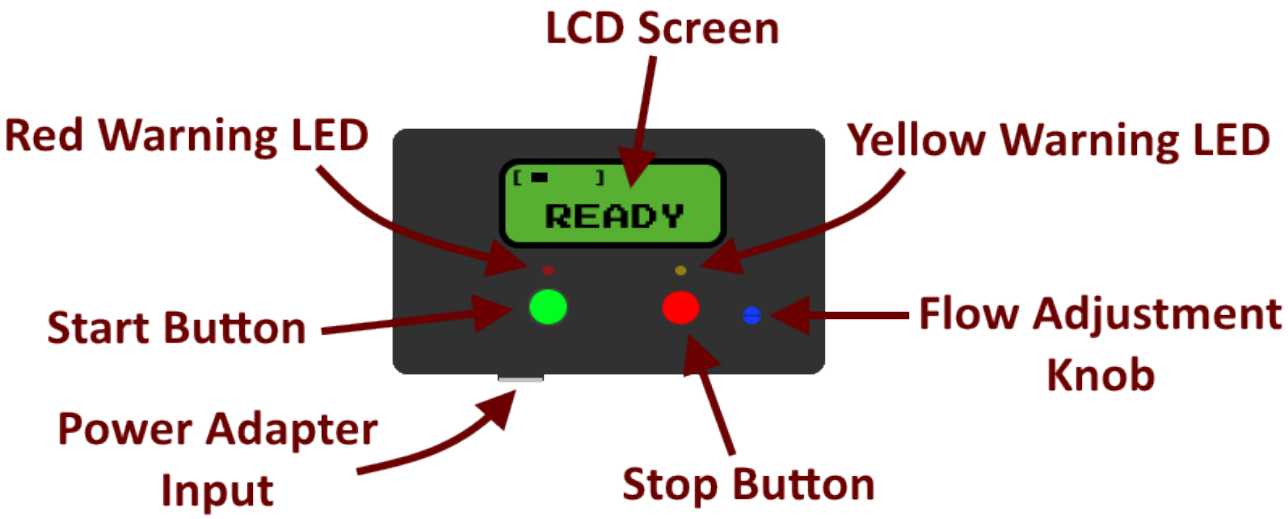
Unattached Fraction: 18.96%

We recommend exploring the current (and past) research into the unattached fraction, as our understanding continues to evolve with each new paper published.

Console Operations

The console on the E-RPISU® unit has an LCD screen, two buttons, two warning LEDs, a flow adjustment knob (potentiometer), a power supply input jack, and a pump with two barbed hose connections (located inside the console, which ultimately controls the air flow rate to the progeny chamber). The console allows the operator to define the flow rate (between 0.0 and 1.0 liters per minute), displays the elapsed time of a given measurement period, and alsoalerts the operator to any warnings. The power supply can be any positive-tip DC voltage from 8V to 16V (at 0.66A).

Rad Elec recommends using the included E-RPISU® power supply.



Starting the Pump

When the unit is powered up, a short diagnostic is performed while the firmware version is displayed on the LCD screen. After a few moments, the unit display the "READY" message. To start the progeny air pump, simply press the green **start button**. While the pump is running the LCD screen will display a moving pattern in the upper left corner (showing that the pump is moving air), and the central portion of the LCD screen will display the elapsed time in hours (accurate to one-tenth of an hour).

Stopping the Pump

If the E-RPISU® is currently running, pressing the red **stop button** will halt the pump operation, and display the elapsed time (in hours) on the LCD screen. If you press the **stop button** again, the display will return to its READY state.

Displaying Elapsed Time

Any time the READY message is displayed on the LCD screen, you can press the **stop button** to show the elapsed time for a few moments. After a number of seconds, the E-RPISU® will return to the READY state.

Displaying Accumulated Pump Run Time

The accumulated time is useful for maintenance purposes and in determining the life expectancy of the pump. It is **not** used in calculations.

Pressing and holding the **stop button** will display the total accumulated run time for the pump, marked with a "**T**" at the left side of the LCD screen. Press the **stop button** once more to return to the READY state.

Resetting the Elapsed Time / Warning LEDs

1. When READY is displayed on the LCD screen, press the **stop button**. The elapsed time will be displayed for a few moments.
2. While the elapsed time is displayed, press the **stop button** again. This will reset the elapsed time to 0.0 hours, and also clear any warning LEDs.
3. After a few moments, the LCD screen will return to the READY state.

The pump must be stopped in order to reset the elapsed time or warning LEDs.

Setting the Flow Rate

1. When READY is displayed on the LCD screen, press the **stop button**. The elapsed time will be displayed for a few moments (it will be "0.0" when beginning a new measurement period).

2. While the elapsed time is displayed, press the **start button**. This will start the pump under control of the potentiometer, and allow you to adjust the flow rate by turning the blue **flow adjustment knob**. Turning the knob clockwise will increase the flow rate, whereas turning the knob counter-clockwise will decrease the flow rate.

3. Once the desired flow rate is set, press the **stop button**. The E-RPISU® will calibrate the pump to this new value. Throughout this brief calibration process, "WAIT" will be displayed on the LCD screen.

4. After the new flow rate has been set, the E-RPISU® will return to its READY state.

Understanding Warning LEDs

The console has two warning lights: a red LED located above the **start button** and a yellow LED located above the **stop button**. If something unexpected happens during operation, the warning LEDs are activated to alert the operator. These warning LEDs may indicate any or all of the following:

U

Yellow LED
Improper sequencing. If the operation is terminated and restarted without resetting the elapsed time, the yellow LED is activated. At the upper right of the LCD screen a '**U**' is displayed to identify this error.

Red LED
If the operating current suddenly changes due to a pinched hose (or reduction in the air flow rate), the red LED activates.

Red LED
If the operating current exceeds normal bounds (e.g. from a clogged filter or broken wire), the red LED activates.

P

Yellow LED
Power was interrupted. The E-RPISU® is designed so that when power is restored, it will turn on the LED and resume its pump operation, while still alerting the operator that power was interrupted. At the upper right of the LCD screen a '**P**' is displayed to identify this error.

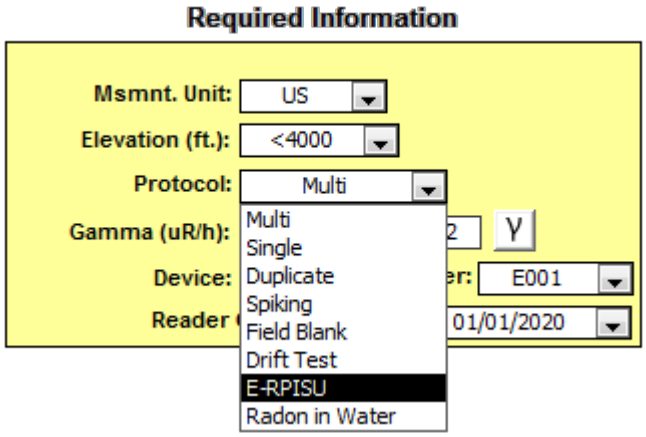
Radon Report Manager Integration

E-RPISU® results can also be calculated with the Radon Report Manager software. A working familiarity with this software is assumed, as it is beyond the scope of this manual to instruct the user in its operation. Provided you have the Radon Report Manager installed on your system, simply follow these steps to create an E-RPISU® report.

The Radon Report Manager can also generate an E-RPISU® Deployment Sheet.

1. Create a new record. If you are at the Main Menu, this is accomplished by clicking the **Test Data** button and selecting the appropriate option to create a new test record.

2. This will load the Record Database window. In the **Required Information** section (with a yellow background), select "**E-RPISU**" from the **Protocol** dropdown menu. The E-RPISU® template will be loaded in the data entry portion of the window.



3. Enter the appropriate elevation and background gamma information in the **Required Information** section.

4. In the data entry portion of the Record Database window, type in the E-RPISU® serial number, electret serial numbers (making sure to select the appropriate configuration, either SST or SLT) and read their initial voltages. Make sure to select which electret gets loaded into the **progeny chamber** and which electret is loaded into the **radon chamber**.

5. You are ready to deploy the instrument! Print out a Deployment Form (by selecting it from the **Report Type** dropdown located near the top of the Record Database window) and carry it with you to the measurement site. Set up the E-RPISU® normally, as explained earlier in the manual.

6 After the measurement period is concluded, load up the record in the Radon Report Manager and fill in the remaining data fields (such as the dates and times, initial and final flow rates, and the electrets' final voltages).

7 The radon concentration, net working levels (WL), and Equilibrium Ratio (ER) will be calculated as soon as the data fields have been entered.

8 Optionally, you can fill out any additional deployment information by clicking on the "**E-RPISU Deployment**" tab.

9 Select the report format you would like to create, and then print it or generate it as a PDF.

Appendix

This appendix provides a glossary, charts, diagrams, and templates meant to assist in E-RPISU® operation. By no means is it a substitute for a more thorough exploration into the effects of radon progeny, nor is it intended to replace instructions on using electret ion chambers. Rather, it is meant to serve as a helpful reference to this manual by defining commonly-used terms, illustrating specific components of the E-RPISU®, and to provide a handful of charts and tables to assist in operation.

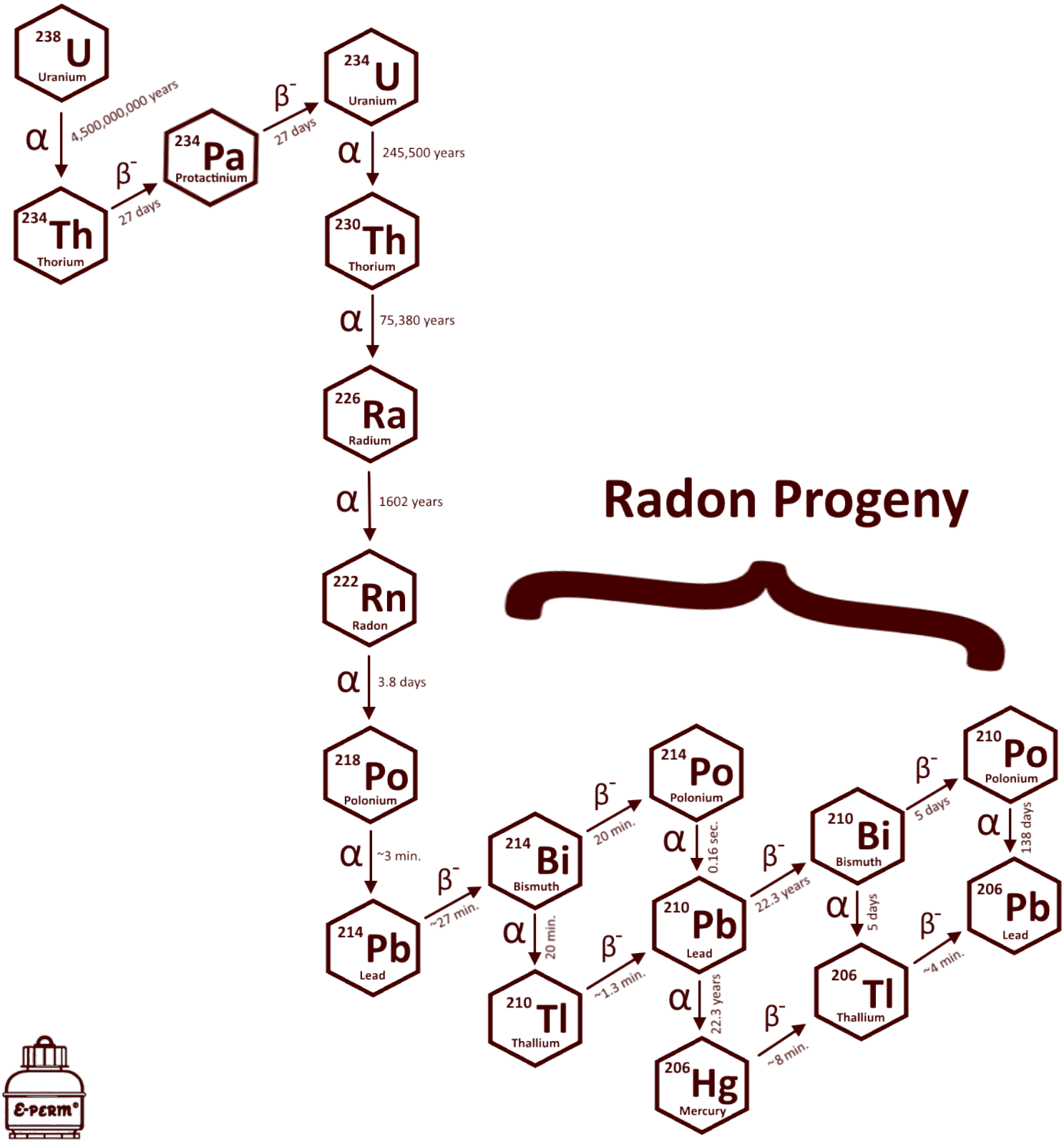
Glossary

Term	Definition
Action Level	The environmental concentration threshold at which mitigation (or other appropriate remediatory action) is recommended. In the United States, the USEPA has set an action level of 4.0 pCi/L for radon gas and 0.016 WL for progeny. The USEPA recommends considering mitigation if the environmental concentration is between 2.0 and 4.0 pCi/L, and estimates that the average indoor radon concentration is approximately 1.3 pCi/L.
Attached Fraction	The amount of progeny that has attached to large particulate (such as dust) in the environment. Although the attached fraction is easily inhaled, there is a good chance that it will also be exhaled (and not become attached/embedded into the lungs).
Electret	A Teflon® disk that has been electrically charged and processed so that it remains stable at a wide range of humidities and temperatures. When loaded into an ion chamber, it will attract ions and lose voltage (which will allow the concentration of an environment to be measured).Both short-term (ST) and long-term (LT) electrets can be used with the E-RPISU®.
Electret Ion Chamber	A passive integrating ionization monitor consisting of a stable electret mounted inside a small chamber that is constructed of electrically conducting plastic. As soon as you load an electret into a chamber, it becomes an electret ion chamber. Synonymous with E-PERM.
E-PERM®	Electret Passive Environmental Radon Monitor. Synonymous with Electret Ion Chamber.
E-RPISU®	Electret Radon Progeny Integrating Sampling Unit. It is an instrument that is used to measure the radon concentration, radon progeny, and equilibrium ratio of a given environment. (This is the thing that you bought.)

Equilibrium Ratio (ER)	The ratio of progeny in an environment that can be inhaled. If the Equilibrium Ratio is 15%, this means that 15% of the environmental progeny is effectively "aerosolized" (attached to particulate in the air) and can be inhaled, whereas the remaining 85% has "plated out" in the environment by attaching to walls, furniture, filters, etc. Equilibrium Ratio is conveyed as a percentage; usually assumed to be between 40-50%.
Gamma	Background gamma (γ) is a highly penetrating form of electromagnetic, ionizing radiation that needs to be estimated or measured for electret ion chamber measurements.
Gross Working Level	In context of the E-RPISU®, the gross working level includes the extra ionizing radiation measured from the radon concentration and the background gamma. This value **should not be used**, as it includes radioactive signals that are not associated with progeny!
LT	Long-Term Electret (denoted with a red label). These electrets are approximately 10x less sensitive than the short-term electrets, making them ideal for longer-term exposures and/or environments with large concentrations of ionizing radiation.
Net Working Level	The net working level represents the radioactive decay product concentration after the background noise (such as from gamma and radon) has been subtracted out. This is the value that most accurately represents the progeny concentration in a given environment.
Plating Out	Radon progeny (which, unlike radon, are solids) can attach to physical objects in the environment. If the progeny attaches itself to walls, floors, furniture, or filters it is effectively "plated out" (and is no longer considered a health risk, as there is no chance of inhaling it into the lungs).
Potentiometer	The potentiometer controls the pump's air flow rate (between 0.0 to 1.0 liters per minute), and is controlled by the flow adjustment knob.
Progeny	The natural decay products of radon; unlike radon, they are all solids. If they are inhaled, there is a significant chance they will become embedded in the lungs. The primary short-term health risks from radon progeny are Polonium-218 (with a half-life of approximately 3 minutes) and Polonium-214 (with a half-life of less than one second).
Radon Concentration	The amount of radon present in an environment. In the United States it is usually measured in pCi/L (picoCuries per Liter), while the rest of the world measures it in Bq/m³ (Becquerels per cubic meter). Although the amount of progeny in a specific environment is a function of radon concentration, there are several factors that can significantly change the progeny concentration.

SLT	An E-PERM configuration comprising a long-term (LT) electret loaded into an S chamber.
SST	An E-PERM configuration comprising a short-term (ST) electret loaded into an S chamber.
ST	Short-Term Electret (denoted with a blue label). These electrets are very sensitive, and can produce high-resolution characterization of an environment's ionizing radiation in a short exposure period.
Unattached Fraction	The amount of progeny (usually polonium-218) that has not attached to large particulate (such as dust) in the environment. It is highly diffusive, and has properties that make it distinct from the attached fraction.
USEPA Guidance	The USEPA originally set a public threshold for radon progeny exposure at 0.02 WL (working levels), with a corresponding limit of 4.0 pCi/L for radon gas. This threshold assumed an equilibrium ratio fo 50%. The USEPA later revised the guidance level to 0.016 WL (which assumes an equilibrium ratio of 40%) to more accurately reflect current models regarding the health effects attributable to radon gas.
Wire Mesh	The wire mesh filter (integrated into the progeny chamber filter head) is used when measuring the unattached fraction. When conducting a test of the unattached fraction, it is recommended to deploy a standard E-RPISU® (with the normal filter paper) alongside the wire mesh E-RPISU®.
Working Level (WL)	The unit used to show the concentration of radioactive decay products of radon in a given environment. This is distinct from the radon concentration!

Radon Decay Chain



Estimated Background Gamma Table

State	µR/hr	nGy/hr		State	µR/hr	nGy/hr
Alabama	**6.5**	56.6		Montana	**8.6**	74.8
Alaska	**7.3**	63.5		Nebraska	**7.7**	67.0
Arizona	**8.0**	69.6		Nevada	**7.6**	66.1
Arkansas	**6.5**	56.6		New Hampshire	**7.4**	64.4
California	**6.6**	57.4		New Jersey	**7.1**	61.8
Colorado	**11.8**	102.7		New Mexico	**10.4**	90.5
Connecticut	**7.8**	67.9		New York	**7.3**	63.5
District of Columbia	**6.4**	55.7		North Carolina	**6.9**	60.0
Delaware	**6.1**	53.1		North Dakota	**7.8**	67.9
Florida	**5.3**	46.1		Ohio	**7.3**	63.5
Georgia	**7.0**	60.9		Oklahoma	**7.6**	66.1
Hawaii	**7.3**	63.5		Oregon	**7.4**	64.4
Idaho	**8.7**	75.7		Pennsylvania	**6.6**	57.4
Illinois	**7.1**	61.8		Rhode Island	**7.0**	60.9
Indiana	**7.4**	64.4		South Carolina	**6.7**	58.3
Iowa	**7.5**	65.3		South Dakota	**7.8**	67.9
Kansas	**7.7**	67.0		Tennessee	**6.9**	60.0
Kentucky	**7.3**	63.5		Texas	**6.1**	53.1
Louisiana	**5.4**	47.0		Utah	**9.3**	80.9
Maine	**7.5**	65.3		Vermont	**7.4**	64.4
Maryland	**6.2**	53.9		Virginia	**6.4**	55.7
Massachusetts	**7.3**	63.5		Washington	**7.4**	64.4
Michigan	**7.4**	64.4		West Virginia	**7.7**	67.0
Minnesota	**7.4**	64.4		Wisconsin	**7.5**	65.3
Mississippi	**5.4**	47.0		Wyoming	**10.4**	90.5
Missouri	**7.4**	64.4				

Province / Territory	µR/hr	nGy/hr		Province / Territory	µR/hr	nGy/hr
Alberta	8.6	**74.8**		Nunavut	7.6	**66.1**
British Columbia	8.0	**69.6**		Ontario	7.4	**64.4**
Manitoba	7.6	**66.1**		Prince Edward Island	7.5	**65.3**
New Brunswick	7.5	**65.3**		Quebec	7.5	**65.3**
Newfoundland & Labrador	7.5	**65.3**		Saskatchewan	8.2	**71.3**
Nova Scotia	7.5	**65.3**		Yukon	8.0	**69.6**
Northwest Territories	8.4	**73.1**				

E-RPISU DEPLOYMENT FORM

Test Site Address:	**Test Type** ☐ **Pre-Mitigation** ☐ **Post-Mitigation**
Instrument Case Serial:	**Model:** Rad Elec E-RPISU® Mark 2
Progeny Electret Type ☐ **ST** ☐ **LT**	**Radon Electret Type** ☐ **ST** ☐ **LT**
Progeny Electret Serial:	**Radon Electret Serial:**
Progeny Initial Voltage:	**Radon Initial Voltage:**
Progeny Final Voltage:	**Radon Final Voltage:**
Filter Type ☐ **Filter Paper** ☐ **Wire Mesh**	**Elevation:**
Background Gamma Units ☐ **µR/hr** ☐ **nGy/hr**	**Background Gamma Value:**
Start Date:	**Start Time:**
End Date:	**End Time:**
Initial Flow Reading:	**Final Flow Reading:**
Site Information	
Instrument Location:	**Mitigation System Type:**
Building Occupied? ☐ **Yes** ☐ **No**	**Closed Building?** ☐ **Yes** ☐ **No**
Furniture in Building? ☐ **Yes** ☐ **No**	**Air Filtration System?** ☐ **Yes** ☐ **No**
Air Filtration System Notes:	
Miscellaneous Notes:	

Afterword

If you've made it this far, thanks for reading the E-RPISU® Operator's Manual. We at Rad Elec are dedicated to listening to our customers' suggestions, so please let us know if you have any feedback to improve our instruments or this document.

Please contact us (using the information below) if you have any questions, concerns, or bright ideas!

Rad Elec Inc.

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