

RHandy Portable Radiation Detector

Users Manual

Version 3.0



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1.0 Introduction

The RHandy portable battery operated fast response Radiation Detector and Dose Rate Meter will instantly measure any material for the presence of radioactivity whether it is clothing, food, water or even air. The adjustable alarm threshold setting can be set to a predetermined radiation level or the recommended factory default alarm threshold can be used. Operation of the RHandy is completely automatic once the easy-to-set operational parameters have been decided upon. Simply position the unit in close proximity to the object that needs to be scanned and listen for the varying audio alarm to sound and/or the displayed readings to increase. In addition to the units fast response there is a resettable accumulated Dose that can be used for personal absorbed Dose or can be located near the air intake to a home for accumulated Dose tracking of air filters. Tracking of the air intake filter will provide vital information when to switch off the air and when to change the filter. The selectable display readout will show the desired units of measure such as Counts per Second (CPS), or Dose-Rate (nSv/h, or μ R/h). The displayed radiation level is auto-scaling with warning messages.

RadCom has designed an easy to use fast responding portable radiation detector providing early warning of the presence of radiation contamination that anyone can use.

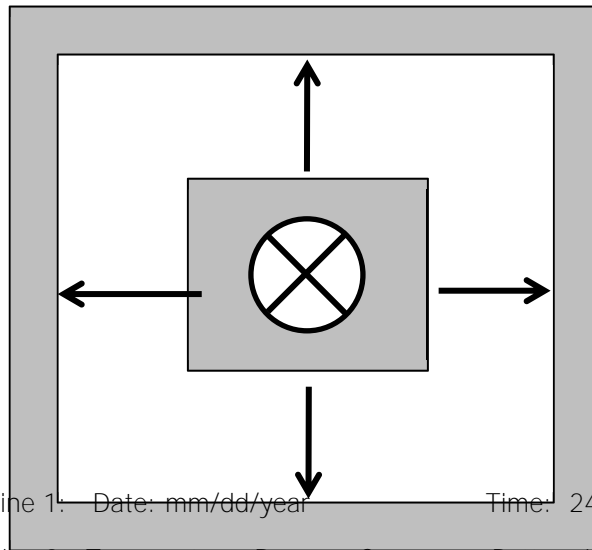
2.0 Layout



3.0 Menus

3.1 Joystick Positions

The joystick has 5 positions: Up, Down, Right, Left and Press Down.



positions: Up, Press Down.

the center then release to On Power up

3.2 Power Off/On

Hold down the Joystick in position for 3 seconds and turn the device ON or OFF. the Initialization Screen will appear for a 60 second periods before the device can be used.

3.3 Initializing Screen



This is the first screen that is displayed after the device is powered ON. Once the Initialization has been completed the Screen will automatically change to the Main Screen.

Line 1: Date: mm/dd/year Time: 24 Hour Clock
Line 2: Temperature Degrees C Battery Level

Line 3: Device Operating Mode

Line 4: Count down time of Initialization

Line 5: Device is Initializing

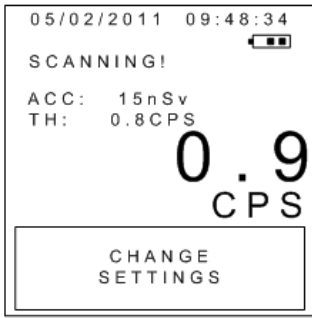
Line 6: Change Settings

Line 1: Date: mm/dd/year Time: 24 Hour Clock

Line 2: Temperature Degrees C Battery Level

Line 3: Operating Condition

3.3 Main Screen



- Line 4: Accumulated Dose
- Line 5: Audio Alarm Threshold Setting
- Line 6: Actual Radiation Level Being Measured
- Line 7: Units of Measure
- Line 8: Change Settings

The Main Screen will be continuously displayed after the initialization of the Dosimeter has been completed. To change the device operational parameters, push and hold down the joystick for 1 second.

3.4 Main Menu Screen



- Line 1: Sensitivity Adjustment Date and Time Set
- Line 2: Units of Measure Setting Language
- Line 3: Update Reading Setting User Level
- Line 4: Accumulation Time Return to Main Screen

The Main Menu Screen provides the operator with various system parameters that can be configured to the Users requirements. To make a selection move the joystick up, down, Right or Left. The Selected Option wording will flash. To select the Option press the joystick down for 1 second. The screen will change to the selected Option Screen.

3.5 Sense Adj Screen



The "Sense Adj" will adjust the audio alarm threshold. Setting the number to "1" provides the highest level of sensitivity, whereas, setting the parameter to "20" is the lowest sensitivity level. To change the setting to higher number, move the joystick up, and to lower the number, move the joystick down. Once the desired number is selected, moving the joystick to the right or left will select the "Save and Return". When it is flashing, press the joystick down to select, the parameter will be saved in and the unit

will return to the Main Menu Screen.

3.6 Date and Time



The "Date and Time" will adjust the Calendar and Time in a 24 hour format. Each parameter can be selected by moving the joystick in the desired direction and when the option is flashing it can be selected by pressing down the joystick (see Sub Menu 1 below). When all of the options have been setup as required select "Save and Return". When it is flashing, press the joystick down to select, the parameters will be saved and the unit will return to the Main Menu Screen.



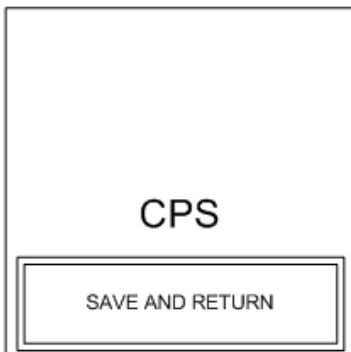
Sub Menu 1: This option has two digits displayed that can be changed separately. Each digit can be selected in turn by moving the joystick either right or left. Once the digit is selected, move the joystick up or down to change the number. When the digits have been setup as required select "Save and Return". When it is flashing, press the joystick down to select. The parameters will be saved and the unit will return to the Date and Time Screen.

3.7 Units Screen

The "Units Screen" allows the user to select between three different units of measure.

SELECTING THE CPS OPTION IS FOR FAST (1 SECOND) OR SLOW (60 SECOND) AVERAGING, EVERY 1 SECOND THE DISPLAY WILL UPDATE. SELECTING THE Sv/hr and R/hr WILL USE A FIXED 60 SECOND AVERAGE WITH A 1 SECOND DISPLAYED UPDATE. Displayed units Update means how fast the numbers will change on the Main Screen. The selectable units of measure are as follows:

CPS (counts Per Second) - SELECTING THE CPS OPTION IS FOR FAST (1 SECOND) OR SLOW (60 SECOND) AVERAGING, EVERY 1 SECOND THE DISPLAY WILL UPDATE. (selectable in the "Update" in Main Menu Screen



Counts Per Second (CPS) gives the user information about how many pulses or events are created ever one second from the interaction of radiation with the GM Tube.

Sv/hr (Sieverts/hour) -



SELECTING THE Sv/hr and R/hr WILL USE A FIXED 60 SECOND AVERAGE WITH A 1 SECOND DISPLAYED UPDATE.

Sv/hr is the System International units for equivalent Dose Rate. The device will display the dose rate in accordance with the radiation level in either nSv/hr, μ Sv/hr, or Sv/hr.

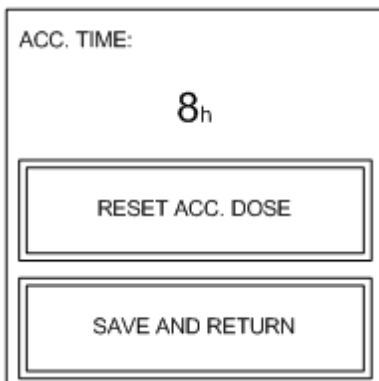
R/hr (Roentgen/hour) -



SELECTING THE Sv/hr and R/hr WILL USE A FIXED 60 SECOND AVERAGE WITH A 1 SECOND DISPLAYED UPDATE.

R/hr is the System International units for Radiation Exposure Rate. The device will display the exposure rate in accordance with the radiation level in either μ R/hr/, mR/hr, or R/hr.

3.8 ACC Screen



Line 1: Accumulation Time

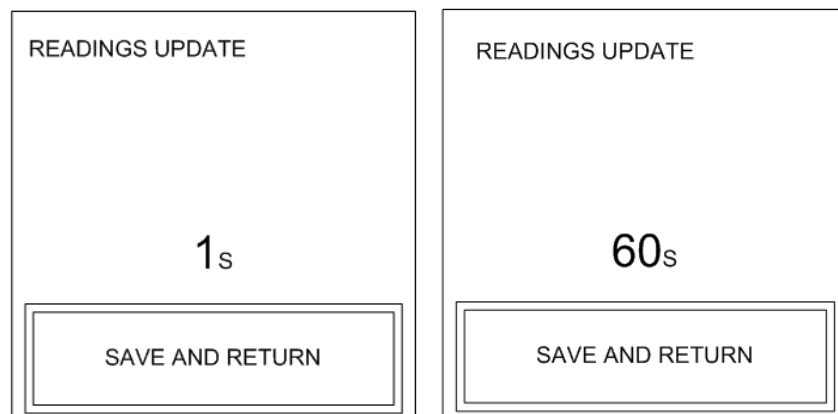
Line 2: Accumulation Period in Hours

Line 3: Reset Accumulated Dose on the Main Screen

Line 4: Save and Return

The "ACC. Time" is used for accumulating the total amount equivalent Dose for the preset time in hours (0 to 24 hours). Selecting "0" means continuous accumulation. The parameter in Line 2 will be flashing when the ACC. Time screen is first displayed. The parameter can be changed by moving the joystick UP for changing the numbers higher and DOWN for lower. When the hour is set, select the "Reset Acc. Dose" by moving the joystick to the right until it is flashing. Press the joystick down for 1 second to select and reset the accumulated Dose on the Main Screen Line 4. When all of the options have been setup as required select "Save and Return". When it is flashing, press the joystick down to select. The parameters will be saved and the unit will return to the Main Menu Screen.

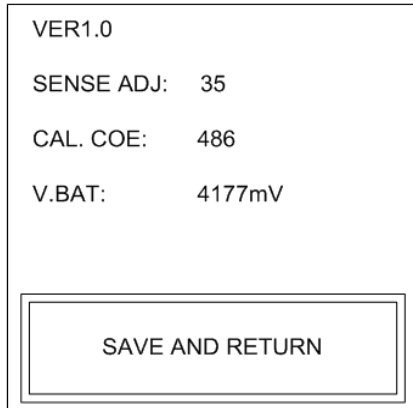
3.9 Readings Update Screen (CPS ONLY)



The "Update" screen is used for setting the averaging time of the displayed readings in CPS only. There are two settings, the fast averaging setting of "1" which is a one second averaging time and a slow averaging setting of "60" which is a 60 second averaging time. The Fast averaging would be primarily used for "Search and Find" applications where material must be scanned very quickly. The slow response averaging would be used for taking readings that require a higher degree of accuracy. The two options can be selected by moving the joystick up or down. When options have been setup as required select "Save and Return". When it is flashing, press the joystick down to select. The parameters will be saved and the unit will return to the Main Menu Screen.

3.10 Info Screen

The Info Screen provides the user with the critical information about the unit and is primarily used for servicing.



Line 1: VER1.0 - Software version number

Line 2: SENSE ADJ. - Factory use only

Line 3: CAL. COE: - Factory use only

Line 4: V.Bat - Battery voltage in milli Volts (mV)

Line 4: Save and Return

3.11 Language Screen



There are three languages that are available English, Japanese and Chinese. Each language can be selected by moving the joystick up or down. Once the desired language is selected move the joystick to the right and select "Save and Return". When it is flashing, press the joystick down to select. The language selection will be saved and the unit will return to the Main Menu Screen.

4.0 Recommended Modes of Operations

4.1 Dynamic Mode

The unit should be used as a fast scanning/instant response device in the Dynamic Mode. Typical situations will involve scanning material/objects such as bottles of water, food, car doors, and any other material that is suspect of being exposed to radioactive fallout. The unit should be placed as close as possible WITHOUT touching

the object/material that is being scanned. If there is any radioactive material present there will be an increase in the displayed readings and/or the audio will sound. The readings and number of audio beeps will increase as the amount of radioactive material increases in concentration. It is strongly recommend that objects that cause the displayed readings to increase should not be touched or handled but rejected. Also, increases in the measured radiation levels displayed on the unit from materials such as door handles, cloths, shoes, etc., should be thoroughly cleaned while wearing latex gloves, with a cloth that does not leave particles and alcohol. The cloth should be put into a tightly sealed plastic bag and disposed of.

4.2 Static Mode

The unit should be used as a slow scanning device that collects readings for a preselected period of time. The period of time (Accumulated Dose) can be set as per section 2.8 of this manual. Using this instrument in this mode is ideal for monitoring the air intake to the home. Locate the instrument directly in the path of the airflow. Let the unit sit in this position for an extended period of time (ie. overnight). This will give a good indication as to whether any radioactive particles were present during the scanning period. If any increased levels of radiation have been measured, the air filter should be change immediately with latex gloves and put inside a tightly sealed plastic bag and disposed of. The unit can also be used in other situations such as, at work monitoring the quality of the air during the daytime hours or in the car near the air intake. Regardless of the situation, any increase in measured radiation levels should result in the changing of air filters whenever possible.

Note: Any questions regarding health and safety should be directed to the local government office for Public Health and Safety.

5.0 Troubleshooting

5.1 "Waiting for Calibration": This message is for factory use only. This message is shown when the system first turns on and the joystick is pressed down for more than three seconds. The device will look like it is frozen. To reset the system, press the joystick down for 1 second. The device will restart.

- 5.2 System Turn ON:** Ensure that the joystick is held down for 1 second. The display will then show characters 1 second after the joystick has been pressed.
- 5.3 Joystick Usage:** When using the joystick, make sure there is a pressing down motion when making an entry and/or selection.
-

6.0 Specifications

6.1 Mechanical

- Rugged Case 12.7L x 8.3W x 4.5H cms (**5.0" L x 3.25" W x 0.75" H**)
- Display Window 6.4L x 6.4W cms (**2.5" L x 2.5" W**)
- Five Position Joystick with Cap
- Mini USB Connector for Internal Battery Charging
- Thru-hole Arrangement for Maximum Radiation Energy Penetration
- Thru-hole for Audio Alarm
- Weight 0.25 lbs (200g)

6.2 Electronics

- Micro-Controller Based Architecture
- 6.4L x 6.4W cms (**2.5" L x 2.5" W**) LCD with Backlight
- Backlight Auto-Off (180 seconds) with Joystick Touch Auto-On
- **1.5" L x 0.5" Mica**-Window GM Tube
- Stable Low Noise H.V. Power Supply
- Internal 100 KByte Flash Ram
- Internal Rechargeable Li Ion Battery with Charging Circuit
- Battery Life: 20 hours continuous with Backlight
- Battery Recharge Time: 4.5 hours based on 2200mAh Battery

6.3 Software

- Menu Driven User Interface
- Menu Feature Selection Controlled by a Five Position Joystick
- Selectable Features: Sensitivity, Date and Time, Units of Measure, Readings Update, Accumulation Time, Language
- Up to 6 Digit Auto-Scaling Displayed Radiation Level
- Selectable Displayed Units - CPS, Sv/hr, R/hr, (with auto scaling readout)
- Base Sampling Rate is 200 mSec, Screen Updates Every 1/Second
- Battery Level Indicator: Three Bars for Full Battery, Low Battery Warning Message with the battery bar flashing, 10% Battery Capacity Remaining Audio Beep Every One Minute, System will Turn Off at 5% Battery Capacity
- Device Messages: Scanning, Charge Battery, Initializing, Alarming, High Level Alarm, System Error, Calibration Required (contact Factory)

6.4 Response/Sensitivity

- Energy Range: 30 KeV – 1.5 MeV
- Dose Rate Range: 0.03 μ Sv/hr to 1.0 Sv/hr (3.0 μ R/hr to 100.0 R/hr)
- Gamma Sensitivity: ⁶⁰Co 18 (cps/mR/hr)
- Beta Sensitivity: I-131 (max. 606 KeV) Efficiency on contact is 96.5%
- Fast Scanning Response: 30.0 nSv/hr (3.0 μ R/hr) Change Over Ambient Background.
- Operating Temperature Range: -20 - +70 °C
- Accumulated Dose: 4000mSv (resettable)
- Radiation Warning Level: 5.0 μ Sv/hr (0.5 mR/hr)