



RC22 Wand Radiation Detector Operating Manual

INTRODUCTION

The occurrence of radioactive material in scrap shipments is increasingly becoming a common problem. Radioactive material occurs in many forms, shapes and sizes and is utilized in every application one could possibly think of; level control gauges in a steel making operation, thickness gauges in aluminum plants for measuring the thickness of foil, smoke detectors, medicine, watch dials, etc. There are also applications where radioactive particles commonly found on Earth are transferred as small particles to processing equipment, thereby contaminating parts such as oil pipe, heat exchangers, "I" beams in mines, etc. For the most part the majority of radioactive material is of low intensity and usually does not pose an immediate exposure problem. However, there are millions of radioactive sources that are presently being used in a variety of applications, where VERY SMALL quantities of radioactive material with VERY HIGH intensity levels WILL pose an immediate danger if personnel are exposed. For these reasons any detection should be handled as though it were a HIGH intensity source.

RadComm radiation detection systems have been designed to detect very low radiation intensity levels from material while buried in scrap. These systems will detect GAMMA and NEUTRON radiation. There are other types of radiation that are virtually impossible to detect when buried in scrap because of distance and the shielding effect of intervening scrap material.

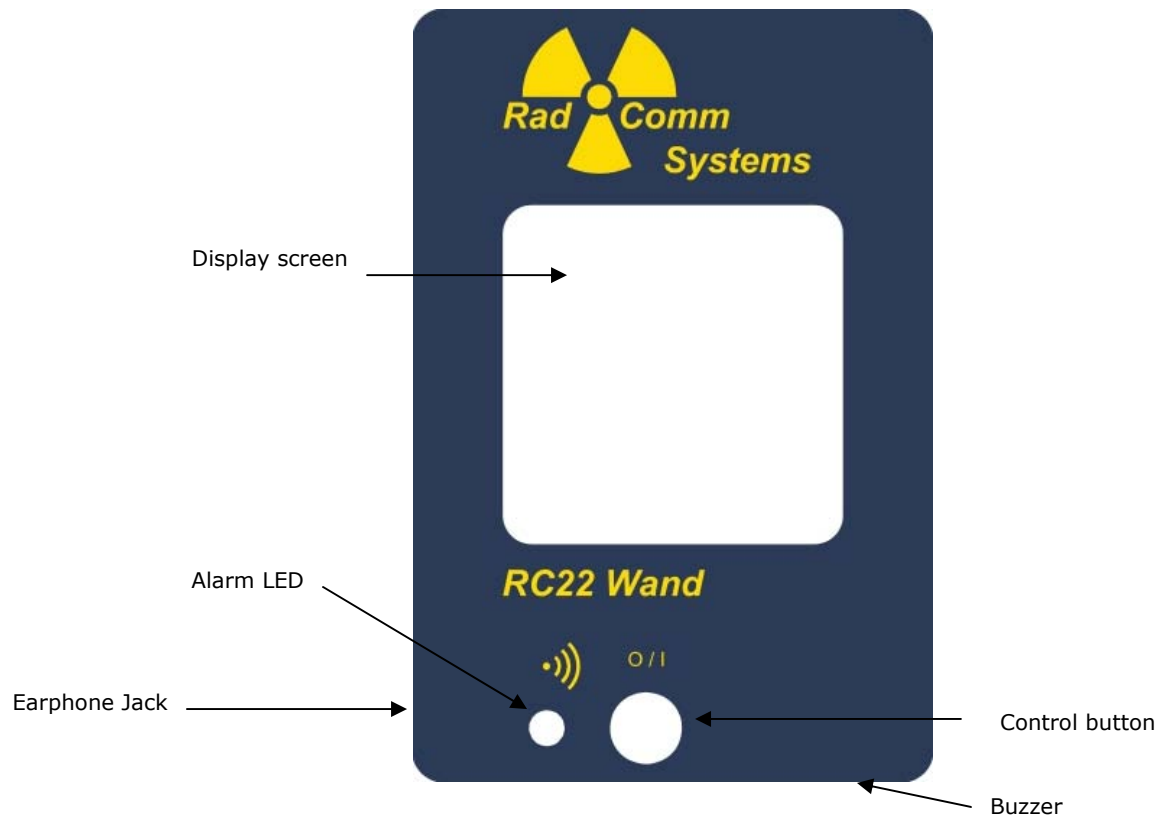
The RC22 Wand series of radiation detectors consists of a family of 3 detectors as detailed in the chart below.

	Part Number	Length(inches)	Detector Size
Standard 2" head	75-75-000	49-68	193 cc
Long 2" head	75-75-100	68-99	193 cc
Standard 3" head	75-75-200	49-68	442 cc

This manual explains the use and features of all three versions.

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RC22 Wand Controller



SYSTEM STARTUP

Press the control button to start the RC22 Wand.

The message "PRESS BUTTON FOR MANUAL SETUP" appears with a three second count down. Press the button to enter manual setup mode.

If the button is not pressed, the default settings are displayed followed by the system self-test (if enabled). The messages, "SYSTEM IS TESTING" appears while the self-test is active. If the system tests OK, the message "SYSTEM IS OK" appears. If the system needs calibration, the message "CALIBRATION IS REQUIRED" appears.

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LIST OF EQUIPMENT SUPPLIED

Wand Carrying Case
NiMH Battery Charger with cord
2 Spare High Capacity "D" Batteries
1 Spare Rubber End Cap Protector
Ear Phone
RC22 Wand Radiation Detector
1 Rubber End Cap Protector installed
2 Installed High Capacity "D" Batteries
Operating Manual

WAND HEIGHT ADJUSTMENT

The RC22 Wand radiation detection system features an adjustable length rod that allows the user to adjust the length of the detector. The detector can be incremented in steps of 15 cm (6 inches) each, providing the user with a length ranging from

124 cm (49 inches) to 173 cm (68 inches) - Standard

173 cm (68 inches) to 251 cm (99 inches) - Long

To adjust the length of the detector the operator needs only to press the button on the adjuster and slide the unit to the appropriate height. The length will automatically lock into place when the length meets one the preset hole settings.

MANUAL SETUP

Manual setup mode allows the operator to change the sensitivity level, the backlight, the display units, earphone volume, and if system startup test is required. To change the setting as it appears, press the button when the desired setting is displayed. The system provides three seconds for each option.

When the message "PLEASE SET WORK MODE" NORMAL" appears, press the control button for the desired setting, Normal or Beep, as it appears.

When the message "PLEASE SET SENSITIVITY HIGH" appears, press the control button for the desired setting, High, Medium, or Low as it appears. If Beep mode is enabled options are 10, 20, 40, and 60.

When the message "PLEASE SET BACKLIGHT DEFAULT=ON" appears, press the control button for the desired setting, on or off as it appears.

When the message "PLEASE SELECT DETECTOR SIZE SMALL" appears, press the control button for the desired setting Small or Large as it appears.

When the message "PLEASE SELECT UNIT DEFAULT=CPS" appears, press the control button for the desired setting CPS, $\mu\text{R/hr}$, or nSv/hr as it appears.

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When the message "TEST SYSTEM ON STARTUP DEFAULT=YES" appears, press the control button for the desired setting, yes or no as it appears.

When the message "LED CURRENT YES?" appears, press the control button for the desired setting, yes or no as it appears. **WARNING!** The test LED current setting should not be normally changed in the field.

When the message "EARPHONE VOLUME HIGH/5" appears, press the control button for the desired setting, High, Medium, or Low as it appears.

When the message "WISH TO SAVE THE SETTINGS DEFAULT=YES" appears, press the control button for the desired setting, yes or no as it appears.

OPERATION

The display screen shows the software release number in the upper left corner. The upper right corner of the screen shows the remaining battery power. The bottom two rows of the display show the Background Setting, B.SET and the Alarm Setting, A.SET.

The Background setting is a system calculated background average.

The alarm setting is the reading at which the RC22 Wand will alarm. In Normal mode this is controlled by the sensitivity level of high, medium, or low. In the Beep mode this is set to an absolute value of 10,20,40, or 60 cps.

The centre of the screen shows the measured reading. Press the control button to scroll through the three units settings, CPS: counts per second; μ R/hr: microRads per hour; and nSv/hr: nanoSeiverts per hour.

If the radiation level exceeds the display range, the message "SYSTEM IS OUT OF RANGE" appears indicating that the radiation level is very extreme. Move the RC22 Wand further away from the source to return to the screen to normal.

Press and hold the control button to turn off the RC22 Wand. The message "RELEASE THE BUTTON FOR POWERDOWN" appears.

If the unit is operated in "BEEP" mode the detector will beep continuously. As the counts rise the frequency of the beeping will rise accordingly. The sensitivity setting in "BEEP" mode sets the absolute alarm threshold the system will trigger from.

RADIATION SAFETY PROCEDURE

A qualified radiation safety professional should be consulted and a formal response to radioactive sources should be developed. The following section, Reacting to High Counts, is provided as a guideline only in helping develop this procedure. RadComm is not responsible for any use or misuse of the RC22 Wand.

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REACTING TO HIGH COUNTS

Table one shows the action to take relative to the counts displayed on the RC22 screen. When approaching a suspected source the RC22 Wand must always be held between the operator and the suspected source. When sources are to be isolated, an appropriate container for radioactive sources must be used.

Low indicates that the source may be safely approached and removed from the area. Under no circumstances should an enclosed source be further exposed or opened. Caution indicates that the source may be hot and should only be handled by a qualified radiation professional. Isolate indicates that the entire load should be isolated with no attempt to remove the source. Only qualified radiation professionals should attempt to isolate and remove the actual source.

SMALL(2 inch diameter)	LARGE(3 inch diameter)	Distance From Contact Of The Source Of Radiation Measured In Meters				
		On Contact	< 1m	< 2m	< 5m	> 5m
Readings in CPS Approximately 7,150CPS = 10microSv/hr	Readings in CPS Approximately 15,730CPS = 10microSv/hr					
1 to 1,800	1 to 3,960	LOW	LOW	CAUTION	UNUSUAL	ISOLATE
1,801 TO 3,600	3,961 TO 7,900	LOW	CAUTION	UNUSUAL	ISOLATE	ISOLATE
3,601 TO 10,750	7,901 TO 26,650	CAUTION	CAUTION	ISOLATE	ACTION	ACTION
10,751 TO 28,750	23,651 TO 63,250	ISOLATE	ISOLATE	ACTION	ACTION	ACTION
>28,751	>63,251	ACTION	ACTION	ACTION	ACTION	ACTION

Table 1: CPS and Action to Take

Battery Recharging

The battery symbol shows three blocks indicating the approximate remaining power. When the battery power is at approximately one hour left, the RC22 Wand will issue a short beep once every 10 seconds and the last battery block will flash. Remove the two high capacity "D" cells from the RC22 Wand by unscrewing the bottom cap. Place in two fully charged "D" cells into the unit and screw the cap tightly in place. Place the discharged batteries into the charger and plug in the charger. The batteries supplied with the unit usually take about 10-14 hours to charge fully and last for about 40 hrs on a full charge. Two sets of batteries are supplied with the unit so that one set can be ready charged or charging, allowing the Wand to be used continuously.

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WARRANTY

RadComm RC22 Wand is warranted to be free of defects in material and workmanship for a period of one year from date of shipping. This warranty covers parts and labour only. RC22 Wand must be returned to RadComm for repair at the customer's expense. This warranty covers system malfunctions that fail under normal operating conditions and does not include failures caused by negligence, abuse or accidental damage. This warranty is void if factory applied serial numbers have been removed or altered. Use of the RC22 Wand or components for purposes for which they were not intended voids the warranty. This warranty is limited to repair or replacement of RadComm components only and does not cover business losses resulting from the use of RadComm systems howsoever caused. The rechargeable batteries are not covered by this warranty.

Guide for Using Rechargeable NiMH Battery (Standard Safety Precautions Must Be Followed)

NiMH Battery Charging Precautions

- When you reach the early last battery indicator, it is telling you to charge the battery soon. When the low battery flashing and audio warning beeping is heard, you **MUST TURN OFF** the wand and charge the battery. Do not wait until the wand shuts itself off because battery damage may occur.
- It is recommended to check the battery indicator on the screen regularly.
- Never charge the battery in an environment greater than 35°C or less than 0°C. The battery will not charge properly if the environment temperature is above 35°C or below 0°C.
- Charge the battery in an open ventilated area and far away from combustible items. Always charge the batteries on surfaces that are not flammable. Do not charge a full battery again.
- Never use an electrical outlet whose voltage is outside the rating marked on the AC adaptor. Doing so can create the danger of fire or electrical shock.
- Never try to modify the AC adaptor power cord, or subject it to sever bending, twisting, or pulling. Doing so creates the risk of fire and electrical shock.
- Never touch the AC adaptor while your hands are wet. Doing so creates the risk of electrical shock.
- For indoor use only. Keep the charger away from water and other liquids and never let them get wet. Moisture creates the danger of fire and electrical shock.
- Should you ever notice smoke or a strange odor coming out of the charger, immediately unplug the charger from the power outlet. Using the charger under these conditions creates the danger of fire and electrical shock.
- To reduce the risk of electrical shock, unplug the charger from the outlet before attempting cleaning or when not in use.
- Do not use solvents to clean the unit. It may damage the surface and the plastic parts of the unit. Clean the unit gently with soft dry cloth only.
- Never try to open the case of the charger or attempt your own repairs. High voltage internal components create the risk of electrical shock when exposed.
- Charge NiMH rechargeable batteries only. Do not charge any other kind of batteries not specified as they may burst and cause personal injury and damage.

NiMH Battery Handling Precautions

Incorrect use or handling of batteries can cause them to leak or burst or cause serious damage to your charger. Be sure to note the following important precautions to avoid problems with batteries.

- Never, under ANY circumstances, let the positive and negative battery leads touch. It can lead to cell damage or fire.
- Always make sure that the battery polarity is correct. The + and – as marked on the batteries should match the markings on the charger itself. Improper loading of batteries, creating the danger of personal injury property damage.
- Do not expose batteries to direct heat or dispose of them by burning. Doing so can create the danger of explosion.
- It is normal for batteries to become warm as they charge or discharge.
- If electrolyte from the battery enters eyes, immediately wash eyes with running cold water and get medical attention.
- Please recycle the batteries when they reach the end of their life cycle.
- Charging time: 10~14 hours.

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FACTORY INFORMATION

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