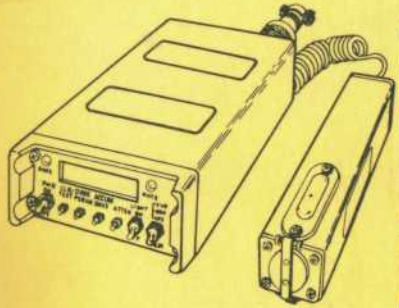
TM 11-6665-251-10

OPERATOR'S MANUAL

RADIAC SET AN/VDR-2

(NSN 6665-01-222-1425)



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HEADQUARTERS, DEPARTMENT OF THE ARMY

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Technical Manual

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HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 1 March 1988

Operator's Manual
Radiac Set
AN/VDR-2
(NSN 6665-01-222-1425)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, New Jersey 07703-5000. In either case, a reply will be sent to you.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

Type of Manual: Operator's Manual

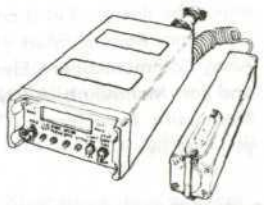
Model Number and Equipment Name:

AN/VDR-2 Radiac Set, herein referred to as radiac set.

Purpose of Equipment:

Used to locate and measure radioactivity in the form of gamma rays and beta particles. Displays dose rates and total accumulated dose resulting from a fallout field.

RADIACMETER



PROBE

1-2. MAINTENANCE FORMS, RECORDS AND REPORTS

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, as contained in Maintenance Management Update.

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) As prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73B/AFR 400-54/MCO 4430.3H.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-3. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, New Jersey 07703-5000. We'll send you a reply.

1-4. ADMINISTRATIVE STORAGE

Administrative storage of equipment issued to

and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. When removing the equipment from administrative storage the PMCS should be performed to assure operational readiness.

1-5. DESTRUCTION OF ARMY ELECTRONICS MATERIEL

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-6. NOMENCLATURE CROSS-REFERENCE LIST

Common names are used when the major components of the radiac set are mentioned in this manual.

Common Name	Official Nomenclature
Radiac Set	Radiac Set AN/VDR-2
Radiacmeter	Radiacmeter IM-243/VDR-2
Probe	Probe, Radiac DT-616/VDR-2
Pouch	Pouch, Radiac Set
Strap	Strap, Radiac Set

1-7. LIST OF ABBREVIATIONS AND ACRONYMS

Acronyms are spelled out the first time they appear in this manual. A list of abbreviations and acronyms follows:

Gy	radiation absorbed dose (gray)
μGy	microgray
cGy	centigray
Gy/hr	grays per hour
μGy/hr	micrograys per hour
cGy/hr	centigrays per hour
NBC	nuclear/biological/chemical

1-8. GLOSSARY

Dose Rate	An amount of radiation given off or absorbed within a given period of time. (μGy/hr, cGy/hr, Gy/hr).
Dose	An accumulative amount of radiation given off or absorbed. (μGy, cGY, GY).
Gamma Ray	Electromagnetic radiation of high energy (high penetration).
Beta Particles	Negatively charged particles moving at high speed (low penetration).
X-rays	Electromagnetic radiation of high energy having wavelength shorter than those in the ultraviolet region (low penetration).
Auto ranging	The AN/VDR-2 display will automatically provide the proper readings and units over its entire operating range without the need for mechanical switching or other operator actions.

Attenuation Factor	A multiplying number assigned to vehicles or shielded enclosures to account for the attenuation of gamma radiation by the vehicle or the enclosure.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-9. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

CHARACTERISTICS

- Lightweight
- Easy to use
- Battery operated
- Self-testing during operation or on demand by operator
- Autoranging

CAPABILITIES

- Detects, measures, and displays level of gamma radiation dose rate from 0.01 μGy/hr. to 100 Gy/hr.
- Detects and displays level of beta particle dose rate from 0.01 μGy/hr. to 5 cGy/hr.
- Measures, stores, and displays accumulated dose from 0.01 μGy to 9.99 Gy.

- Flashes display to indicate reduced-accuracy condition when measuring dose rates from 10 Gy/hr. and above.

FEATURES

- Liquid crystal display (LCD) shows three digits, decimal point, and unit of measure for dose rate or accumulated dose; also indicates low batteries and faults
- Can be vehicle mounted with vehicle power actuating alarms and intercoms; computes and displays dose rates external to vehicle
- Audible or visual alarm independently preset for dose rate and accumulated dose

1-10. DESCRIPTION OF COMPONENTS

The radiac set is made up of four separate pieces of equipment:

- Radiacmeter
- Probe
- Pouch
- Strap

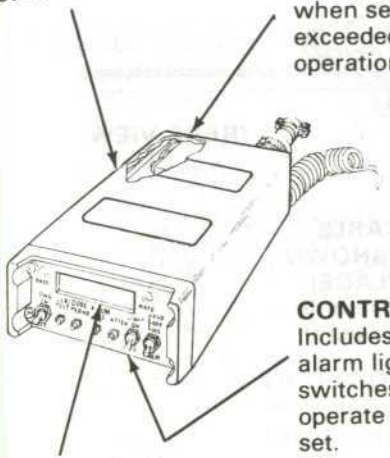
NOTE

Radiacmeter and probe are serialized and must be kept together as a set.

The functions of the major components of this equipment are:

RADIACMETER - Contains batteries, controls, indicators, and electronics needed to measure and display dose rate, dose, and other indications.

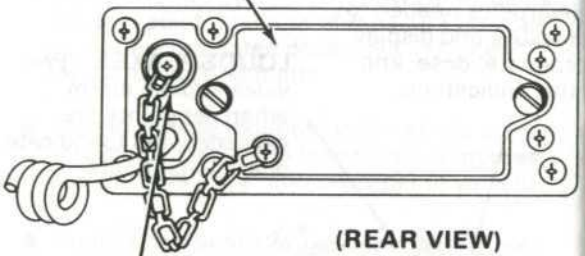
LOUDSPEAKER - Provides audible alarm when set points are exceeded and to indicate operational faults.



CONTROL PANEL - Includes digital display, alarm lights, and switches used to operate and test radiac set.

DISPLAY - Shows dose/hr or accumulated dose, low batteries, alarm set points, and test and fault indicators.

BATTERY WELL COVER
Encloses battery well containing three dry cell batteries providing power to the radiac set.



(REAR VIEW)

CONVERTER CABLE RECEPTACLE (SHOWN WITH CAP IN PLACE)
Connects radiacmeter to vehicle power converter cable.

CAUTION

The radiac set will not operate with probe detached and can be damaged if probe is attached or detached with **PWR** switch in **ON** position.

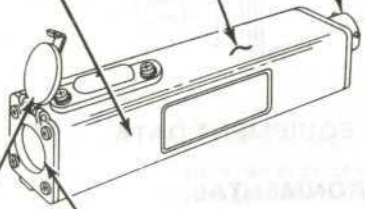
PROBE - Attaches to radiacmeter with coil cord and connector; contains two detectors, high-voltage power supply, and other circuits.

PROBE RECEPTACLE - Accepts plug from radiacmeter cable.

WARNING

The high range detector contains 1 nanocurie of Thorium 232, controlled disposal required in accordance with AR 385-11.

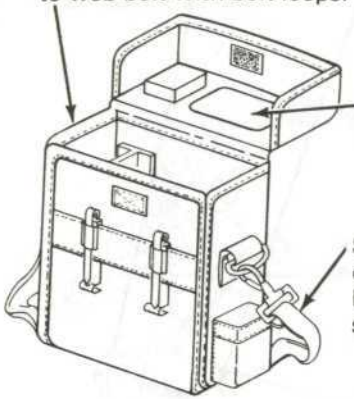
HOUSING - Contains low-range detector and electronic circuitry.



DETECTOR GUARD - Protects low-range detector, keeps moisture out of probe.

COVER - Protects detector against damage; can be used closed to detect gamma radiation, must be opened to detect beta particles.

POUCH - Holds radiacmeter and probe during operation or transport and stores spare set of batteries. May be attached to web belt with belt loops.



CLEAR WINDOW Allows display to be observed with pouch cover closed.

STRAP - Used by operator instead of belt loops to shoulder carry set for field use.

1-11. EQUIPMENT DATA

ENVIRONMENTAL

Altitude operating range:	To 15,000 feet (4,572 m) above sea level
Humidity:	95 percent
Temperature operating range:	-51 to 120°F (-46 to +49°C)

Storage temperature range:	-60 to 160°F (-51 to + 71°C)
Water resistance:	Immersion proof to a depth of 3 feet (914.4 mm) of water for 2 hours

WEIGHTS AND DIMENSIONS

Radiac set in pouch:

Weight:	4.6 pounds (2.08 kg)
Length:	9.125 inches (232 mm)
Width:	6.875 inches (175 mm)
Depth:	3.125 inches (79 mm)

POWER

Main power, all weather	Three BA-3090 dry batteries in parallel (9 V dc) (Item 1, Appx C)
Vehicle power (when vehicle mounted):	24 V dc
Main Power battery life:	100 hours (minimum)

OPERATIONAL

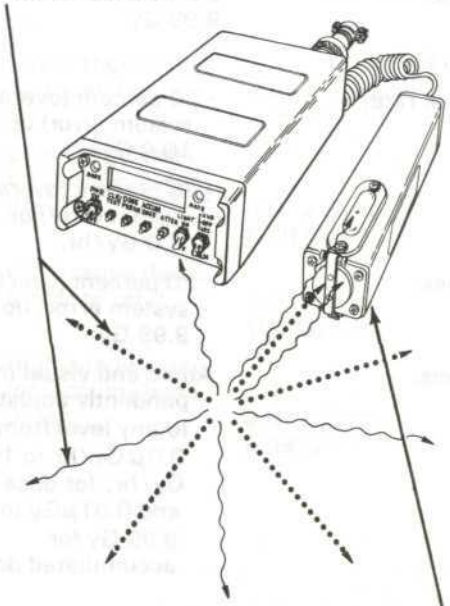
Detectors:	Two detectors (low-range for gamma and beta radiation, high-range for gamma radiation), both located in probe at approximately the same location.
Range:	
a) Low-range detector (dose rate):	0.01 μGy/hr to 5C Gy/hr.
b) Low-range detector (accumulated dose):	0.01 μGy to 9.99 Gy.
c) High-range detector (dose rate):	3 cGy/h to 100 Gy/Hr.
d) High-range detector (accumulated dose):	0.01 μGy to 9.99 Gy.

Overall detecting range:	
Dose rate:	0.01 μGy/hr. to 100. Gy/hr for gamma rays and 0.01 μGy/hr. to 5 C Gy/hr for beta radiation
Accumulated dose:	0.01 μGy to 9.99 Gy.
Accuracy:	
Dose rate:	± 20 percent (overall system error) up to 10.0 Gy/hr.
	± 25 percent (overall system error) up to 100 Gy/hr.
Dose:	± 20 percent (overall system error) up to 9.99 Gy.
Alarms:	Audio and visual independently adjustable to any level from 0.0 μGy/hr. to 100 Gy/hr. for dose rate and 0.01 μGy to 9.99 Gy for accumulated dose.

Section III. TECHNICAL PRINCIPLES OF OPERATION

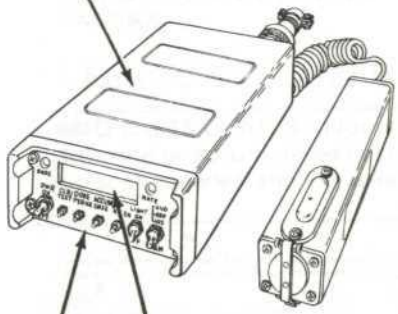
1-12. EQUIPMENT FUNCTION

1 Gamma rays and beta particles from radioactive source travel in all directions.



2 Two detectors in probe produce electrical signals on contact with gamma rays and beta particles.

3 Radiacmeter converts signals from probe into dose rates and accumulated dose; activates alarm when preset alarm levels ae exceeded.



4 Display shows dose rate and accumulated dose values, alarm set levels, battery conditions, and test and fault indicators.

5 Control panel switches and indicators permit operator to set alarm levels for audible or visual display, select display readings, and perform equipment tests.