- Ground Radiological Reconnaissance (GRR) - GRR is the process of detecting radiation and measuring it before a unit moves into or through an area. Normally, the AN/VDR-2 will be mounted and attached to vehicle power.

NOTE

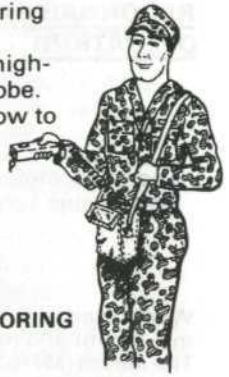
When monitoring for beta radiation, the audible alarm set point should be used. This allows the operator to pay attention to positioning the probe rather than watching the visual display. Performance of all radiologiocal measurements, regardless of mode of operation, shall be in accordance with FM 3-3 and FM 3-5.

a. **SURVEY AND MONITORING MODES**

In the survey or monitoring modes, the operator wears the radiac set in the pouch with the **PWR** switch in the **ON** position. The probe can be carried either in the pouch or held in the hand, as desired.

GAMMA SURVEY

probe cover, located at the end of probe, is closed when measuring mma radiation. Detection is vided by both low-range and high-ge detectors located in the probe. radiac set autoranges from low to h range (0.01 μGy/hr to 100 /hr.) smoothly and without erruption.



GAMMA MONITORING

CAUTION

The window guard may be ruptured by sharp objects. Use extreme care to protect window guard when probe window is open (when monitoring for beta radiation).

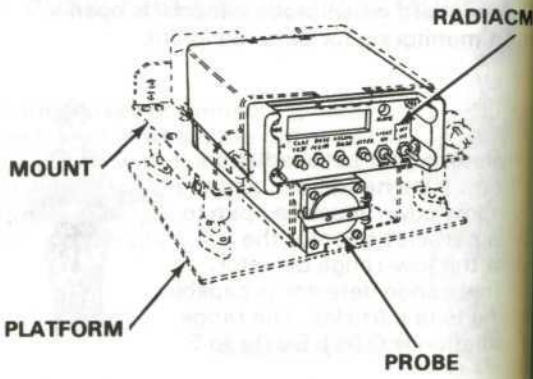
en monitoring for beta radiation, probe must be hand held, and the be window cover must be open to w beta particles to enter the ndow of the low-range detector. ly the low-range detector is capable detecting beta particles. The range beta radiation is 0.01 μGy/hr to 5 y/hr.

b. **GROUND RADIOLOGICAL RECONNAISSANCE (VEHICULAR OPERATION)**

CAUTION

The radiacmeter batteries must be removed when using vehicular power.

When used in a vehicle, the radiac set is placed in a mount and installed using an installation kit. The mount (MT-6123/VDR-2) is not supplied with the AN/VDR-2 or the installation kit. Vehicular power is used to operate the set through a voltage converter (24V to 7.8V).



NOTE

When the unit is mounted in a vehicle and the vehicle is turned off, the power to the unit is lost. If this condition lasts for more than 5 minutes, the unit memory is lost. When memory is lost, the prior accumulated dose cannot be recalled, and the alarm set points set previously by the operator are also lost. Alarm set points will revert to the points set internally in the radiacmeter, until the operator sets new alarm points from the front panel.

If the commander requires that prior accumulated dose be maintained and the vehicle is turned off, batteries must be installed in the radiac set within 5 minutes from the time the vehicle is turned off. See paragraph 2-10c(1) for battery replacement procedure.

2-6. AUTOMATIC TESTING DURING OPERATION

In addition to the pre-operational tests describ in paragraph 2-4c, the radiac set tests itself continuously during operation. These tests ch the main battery condition, counting and timi sequences, internal circuitry, voltage, and detectors.

a. LOW-BATTERY INDICATOR

If a low battery condition is detected during th tests, the /hr sign will be shown flashing on display. Approximately 10 hours of useful batt life remain from the moment the low-battery indicator is first displayed.

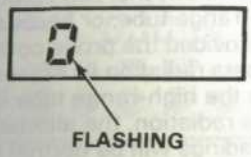
LOW-BATT
INDICAT
/hr
FLASHIN

NOTE

When you see this low-battery display, us the **LIGHT** as little as possible and replac the batteries at the first opportunity (see para 2-4a).

GENERAL FAULT INDICATOR

To indicate problems other than low batteries discovered during automatic testing, the general fault indicator (flashing 0) is displayed.

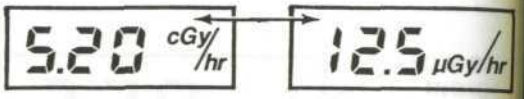


If your radiac set displays the general fault indicator during operation or testing, immediately turn the unit **OFF** and send to organizational maintenance for repair.

c. DELAYED GENERAL FAULT INDICATOR

If the high-range detector becomes defective, the general fault indicator (flashing 0) is not displayed immediately, as in the case of all other electrical faults. The fault indicator has been delayed 3 minutes so that the operator has time to observe the display and perform additional tests.

If the display alternates between a high and low reading, as shown below, this can be due to a defect in the high-range tube, or because the low-range tube (provided the probe cover is open) is responding to beta radiation in excess of 5cGy/hr. Because the high-range tube is insensitive to beta radiation, the alternating high and low-range readings will be normal in this case.



ALTERNATES

While the alternating indication is displayed, the operator should close the probe cover to shield the low-range tube from beta radiation. If the alternating indication no longer occurs, no fault exists. If it continues, the high-range tube is defective and the radiac set should be referred to organizational maintenance.

2-7. NORMAL OPERATING PROCEDURES

a. READ DOSE RATE

NOTE

All you have to do to read dose rate is turn the unit **ON**. After any operation, the display always returns to dose rate.

Set **PWR** switch to **ON**.

Display shows three zeroes (000/hr) then reads dose, rate.

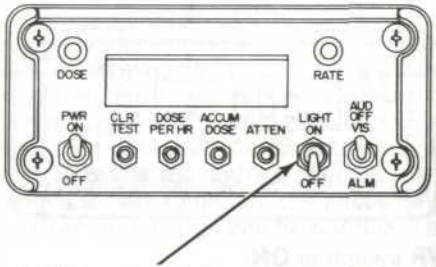
NOTE

Emission from radioactive materials is random; it does not occur at a uniform rate. This causes fluctuations in the readings displayed by the radiac set.

b. ILLUMINATE OR DARKEN DISPLAY

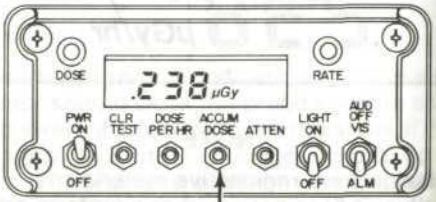
CAUTION

Over-use of the display light will drain the batteries.



With **PWR** switch **ON**, turn light **ON** (up) or **OFF** (down).

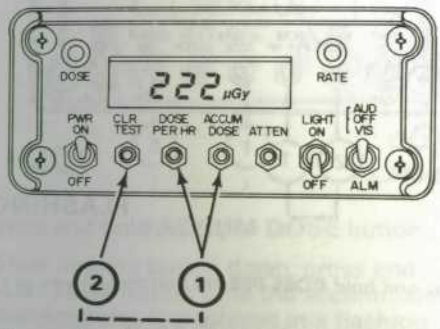
c. READ ACCUMULATED DOSE



With **PWR** switch **ON**, press and hold **ACCUM DOSE** button to read accumulated dose, then release button.

While button is pressed, display shows accumulated dose; when released display shows dose rate.

d. CLEAR ACCUMULATED DOSE



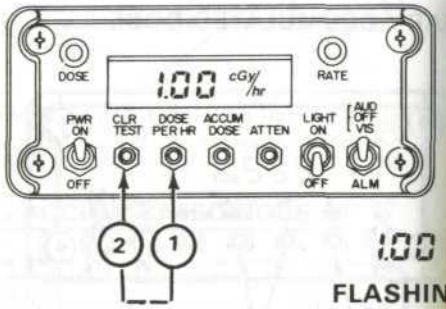
1) Press and hold **ACCUM DOSE** and **DOSE PER HR** buttons (1)

2) With both these buttons down, press and hold **CLR/TEST** button (2)

While all three buttons are down, the previous accumulated dose clears. All three buttons must be held until display reads:

When the three buttons are released the display will show dose rate.

e. DISPLAY DOSE RATE ALARM SET POINT



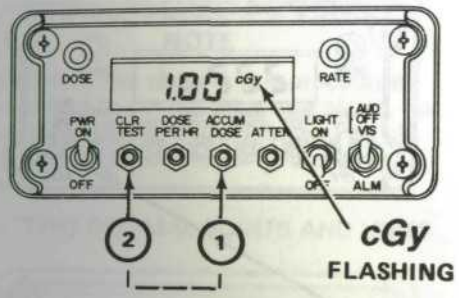
(1) Press and hold **DOSE PER HR** button ① .

(2) With button pressed, press and hold **CLR/TEST** button ② until alarm set point for dose rate is displayed in a flashing mode.

(3) Release both buttons.

While both buttons are released, display flashes the dose rate alarm set point shown above for 10 seconds, then reverts to normal operation and displays dose rate.

DISPLAY ACCUMULATED DOSE ALARM SET POINT



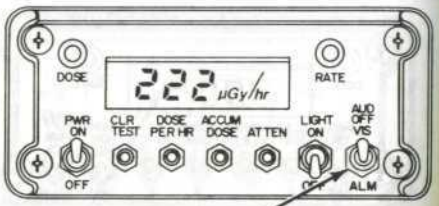
1) Press and hold **ACCUM DOSE** button.

2) While holding button down, press and hold **CLR/TEST** button until the accumulated dose set point is displayed in a flashing mode.

3) Release both buttons.

The display flashes the accumulated dose alarm set point shown above for 10 seconds, then reverts to dose rate.

g. TO SET ALARM MODE



(1) Set **ALM** switch to **AUD** (up) for audio alarm.

Alarm sounds when the dose rate or accumulated dose points are exceeded, or when a fault occurs.

(2) Set **ALM** switch to **VIS** (down) for visual alarm.

Appropriate **RATE** or **DOSE** light flashes when the alarm set point is exceeded or when a fault occurs.

(3) Set **ALM** switch to **OFF** (center) for no alarm.

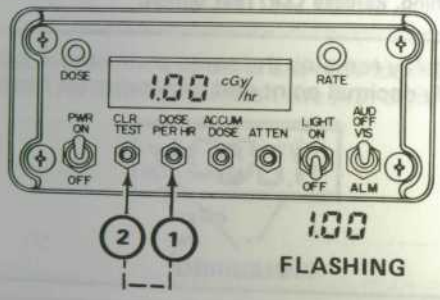
SET DOSE RATE ALARM

Setting the dose rate alarm set point involves entering the proper decimal point, range unit, (µGy/hr, cGy/hr, or Gy/hr), and first, second, and third digits into the radiacmeter memory.

NOTE

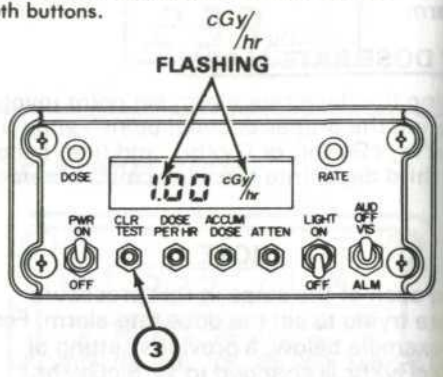
Read each of the steps in this procedure before trying to set the dose rate alarm. For the example below, a previous setting of 1.00 cGy/hr is changed to 12.5 cGy/hr.

(1) SETTING DECIMAL POINTS AND UNITS



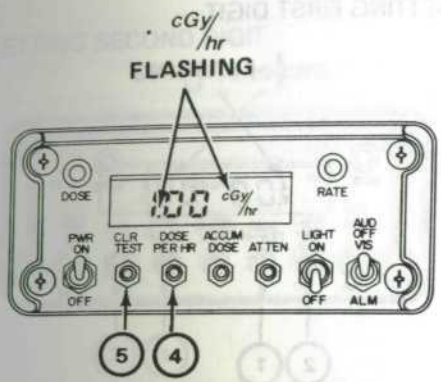
(a) Press and hold **DOSE PER HR** button (1)

(b) While still holding the **DOSE PER HR** button, press and hold **CLR/TEST** (1) until previous dose rate alarm set point is displayed in a flashing mode, then release both buttons.



(c) Within 10 seconds, press and hold **CLR/TEST** (3) button again until only decimal point and unit indicator are flashing. Release **CLR/TEST** button.

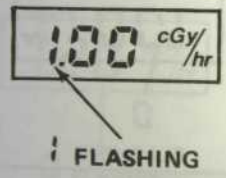
Display remains the same as in step 2, but only decimal point and unit indicator flash:



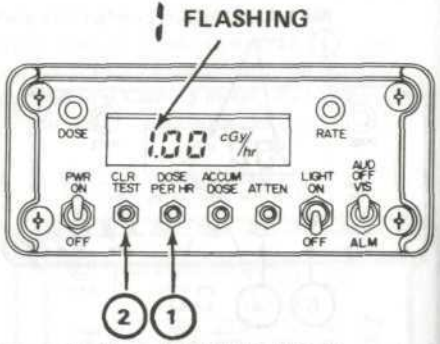
(d) While decimal point and unit indicator are flashing, press and release the **DOSE PER HR** button (4). Repeat this until the desired decimal point setting and units appear.

(e) When certain that the desired combination of decimal point location and unit (μG/hr, cGy/hr, or G/hr) are shown, press and release **CLR/TEST** (5) button.

Decimal point and units are now locked into set. The display will flash the first digit:



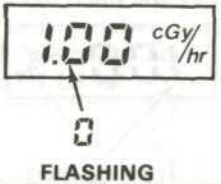
(2) SETTING FIRST DIGIT



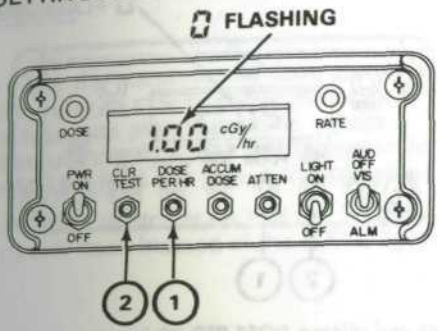
(a) Press and release **DOSE PER HR** button (1) until desired first digit appears. (The first digit in the example is the same as the previous setting, so go to step b.)

(b) When desired first digit appears, press and release **CLR/TEST** button (2) . The first digit is locked into set.

When the first digit has been locked into the set, the display will flash the second digit:



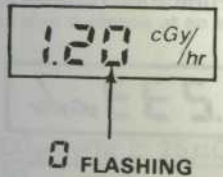
(3) SETTING SECOND DIGIT



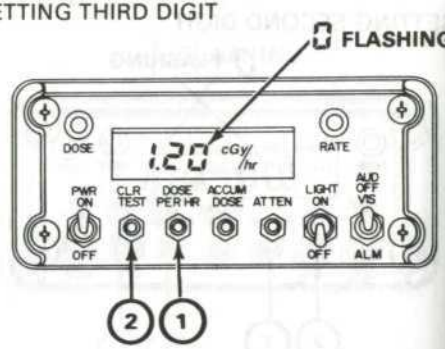
(a) Press and release the **DOSE PER HR** button (1) . Continue pressing and releasing until the desired second digit appears (2 in the example).

(b) When the desired digit appears, press and release **CLR/TEST** button (2)

The second digit is set and the display flashes the third digit.

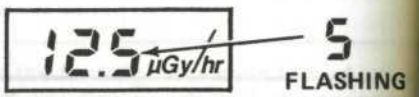


(4) SETTING THIRD DIGIT



(a) Press and release **DOSE PER HR** button ① . Repeat until desired third digit appears (5 in the example).

(b) Press and hold **CLR/TEST** button ② . The third digit has been set and the new dose rate alarm set point is displayed.



← When **CLR/TEST** button is released, the unit then returns to dose rate.

SET ACCUMULATED DOSE ALARM SET POINT

To enter the accumulated dose alarm set point, refer to step h, above, for setting the dose rate alarm set point, except substitute the **ACCUM DOSE** button for the **DOSE PER HR** button in each step.

If the **ALM** switch is on **VIS** the **DOSE** light will flash instead of the **RATE** light.

NOTE

If the unit is installed in a vehicle and it is required to set the dose rate and/or dose alarms for radiation outside the vehicle, follow the procedures given in paragraphs 2-7h and 2-7i except that the alarm set point values you set to must be divided by the attenuation factor assigned to the vehicle in which the radiac set is installed. For example, if the radiac set is installed in an M-1 tank which has an attenuation factor of 20.0 and you wish to set the dose rate alarm so that it alarms at an external

$$\frac{500\,\mu Gy/hr}{20} = \frac{25\,\mu Gy/hr}$$

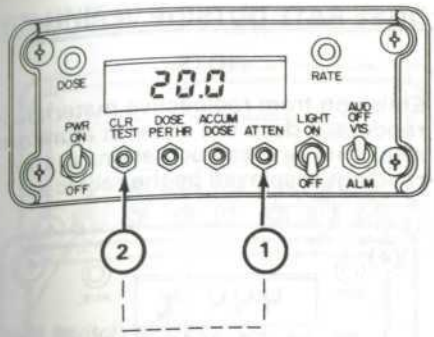
j. READ ATTENUATION FACTOR

NOTE

The attenuation factor is different for different vehicles.

M-1	20.0
M2/M3	9.10
M-60	23.0
M-113	3.60
M-151	1.30
M-577	4.02
M-880	2.00
M-1008	2.00
M-998	1.70

These factors are set by organizational maintenance. If the factor displayed on the set in your vehicle in the following operation does not agree with the factor listed for that type of vehicle, inform immediate supervisor.



(1) Press and hold **ATTEN** button.

(2) While holding **ATTEN** button, press **CLR/TEST** button.

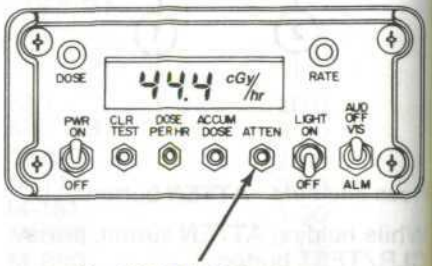
So long as both **ATTEN** (1) and **CLR/TEST** (2) buttons are pressed, the display indicates the attentuation factor that has been set by organizational maintenance.

When button is released, unit returns to dose rate measured at the probe.

k. READ DOSE RATE OUTSIDE VEHICLE

NOTE

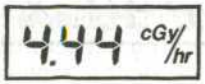
Emission from radioactive materials is random; it does not occur at a uniform rate. This causes fluctuations in the readings displayed by the radiac set.



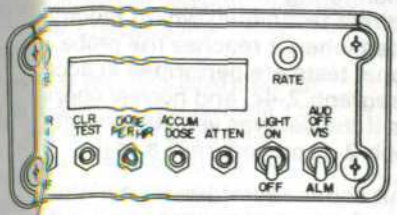
(1) Press and hold **ATTEN** button.

(2) Release **ATTEN** button.

While button is pressed, display shows do sensed at the probe mutiplied by the attenuation factor, as shown above. When the buttons are released, the displa returns to dose rate at the probe.



l. TURN [SET] OFF



Set PWR switch to **OFF**.

Power to set is turned off, but stored information such as accumulated dose and alarm settings, is retained.

NOTE

When batteries are removed from the radiac memory is retained for only 5 minutes.

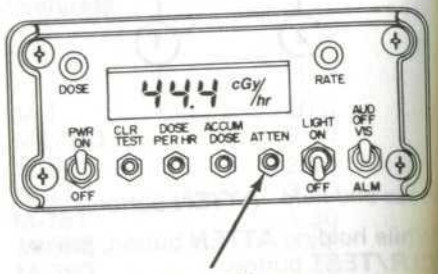
2-8. OPERATION IN UNUSUAL WEATHER

At temperatures below - 22°F (-30°C) it takes somewhat longer for characters to form on the display. The radiac set automatically corrects for this delay by sensing temperatures below -22°F (-30°C) and increasing the display time from every 2 seconds to every 5 seconds. Operation of the set is not otherwise.

k. READ DOSE RATE OUTSIDE VEHICLE

NOTE

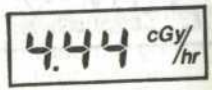
Emission from radioactive materials is random; it does not occur at a uniform rate. This causes fluctuations in the readings displayed by the radiac set.



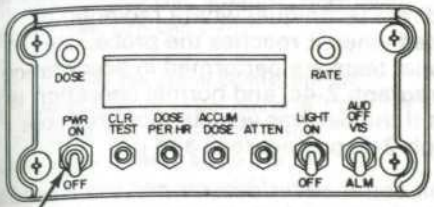
(1) Press and hold **ATTEN** button.

(2) Release **ATTEN** button.

While button is pressed, display shows do
sensed at the probe mutiplied by the
attenuation factor, as shown above.
When the buttons are released, the displa
returns to dose rate at the probe.



l. TURN UNIT OFF



Set **PWR** switch to **OFF**.

Power to the set is turned off, but stored information, such as accumulated dose and alarm set points, is retained.

NOTE

When batteries are removed from the radiac set memory is retained for only 5 minutes.

2-8. OPERATION IN UNUSUAL WEATHER

At temperatures below - 22°F (-30°C) it takes somewhat longer for characters to form on the display. The radiac set automatically corrects for this delay by sensing temperatures below -22°F (-30°C) and increasing the display time from every 2 seconds to every 5 seconds. Operation of the set is normal otherwise.

2-9. OPERATION INSIDE SHELTERS

When monitoring inside shelters, fortifications, etc., (indirect technique) where radiation is attenuated when it reaches the probe, pre-operational tests are performed in accordance with paragraph 2-4c, and normal operation is the same as if the set was vehicle mounted (see paragraph 2-7, procedures i and j).

Your unit commander determines the attenuating factor for the type of shelter in accordance with FM 3-3 and organizational maintenance sets the factor.

2-10. EMERGENCY PROCEDURES

a. MISSING MAIN POWER BATTERIES

If the low-battery indicator comes on and three fresh batteries are not available, the set will operate on two or a single battery, if necessary. However, operation with less than three batteries considerably shortens battery life. If operating on less than three batteries, use the **LIGHT** as little as possible and replace batteries at the first opportunity (see paragraph 2-4a).

b. MEMORY LOSS

Memory may be lost due to depleted batteries or when batteries are removed from the radiac set for more than 5 minutes. When this occurs and fresh batteries are installed, the number 8 will appear on the display during turn-on for about 2 seconds and the alarm will sound if the **ALM** switch is set to **AUD**.

When this condition occurs accumulated dose and alarm set points will be lost and cannot be recalled. The operator can, however, reset new alarm points (see 2-7h and 2-7i).

If you do not reset the alarm points, the set reponds with audible or visual alarm at 1.00 cGy/hr. for dose rate and 1.20 cGy. for accumulated dose. (These points are set internally and cannot be changed by the operator.)

c. LOSS OF VEHICLE POWER

During vehicle-mounted operations, the batteries are removed from the set and power is derived from the vehicle-power supply (see paragraph 2-4a). If this supply does not operate or fails for any reason, the radiac set will not function.

If you are certain that any apparent failure of the radiac set is caused by loss of vehicle power, operation can be partially restored to the set by disconnecting it from vehicle power and installing batteries. Under this condition the set works properly except for the intercom alarm and NBC (Nuclear/Biological/Chemical) system alarm, which do not function without vehicle power.

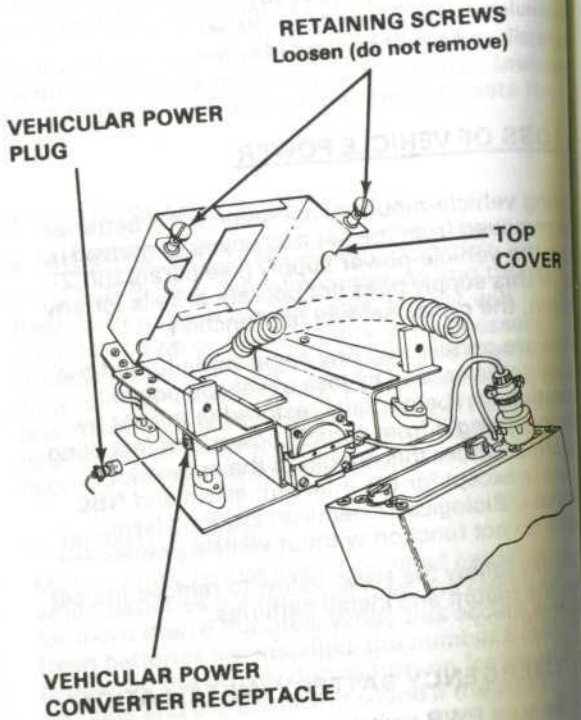
Carefully follow the steps below to remove the set from the mount and install batteries.

(1) EMERGENCY BATTERY INSTALLATION

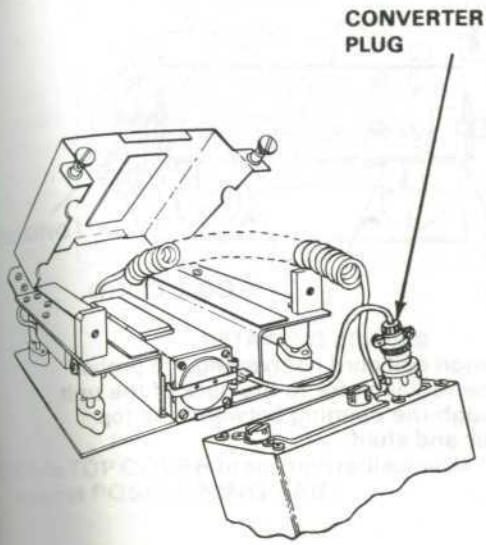
(a) Be sure **PWR** switch is set to **OFF**.

(b) Disconnect **VEHICLE POWER PLUG** from **VEHICLE POWER CONVERTER RECEPTACLE.**

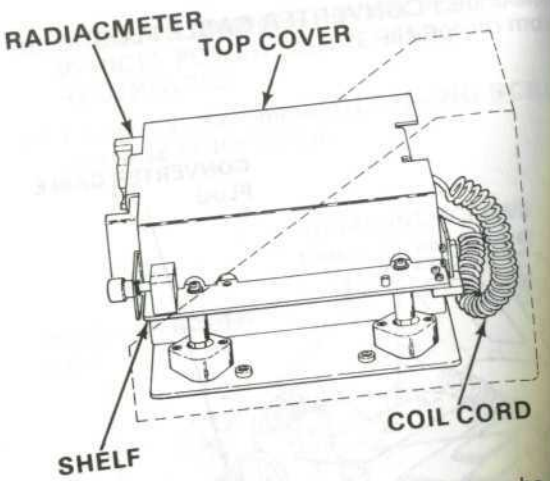
(c) Loosen (do not remove) **RETAINING SCREWS** and raise **TOP COVER.**



(d) Disconnect **CONVERTER CABLE PLUG** from receptacle.

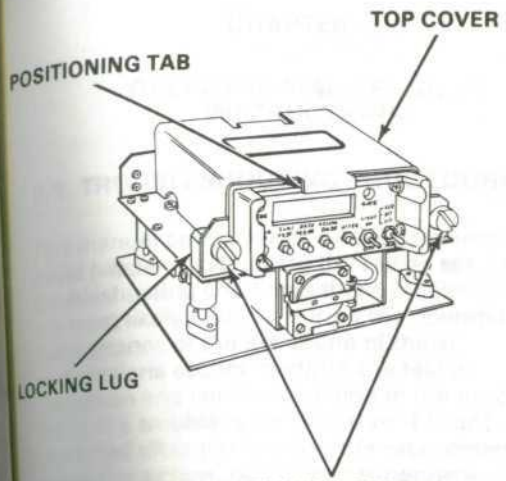


(e) Install batteries (see paragraph 2-4a, and connect receptacle cap.



(f) Position coil cord connecting the probe to the radiacmeter to the back of the unit through the opening between the top cover and shelf.

(g) Position radiacmeter squarely on shelf above probe and center between **LOCKING LUGS**.



(h) Close **TOP COVER** to position radiacmeter against **POSITIONING TAB**.

(i) Tighten the two **RETAINING SCREWS**.

(j) Perform operating tests (para 2-4d).

(k) At completion of mission, notify organizational maintenance of the loss of vehicle power to radiacmeter.