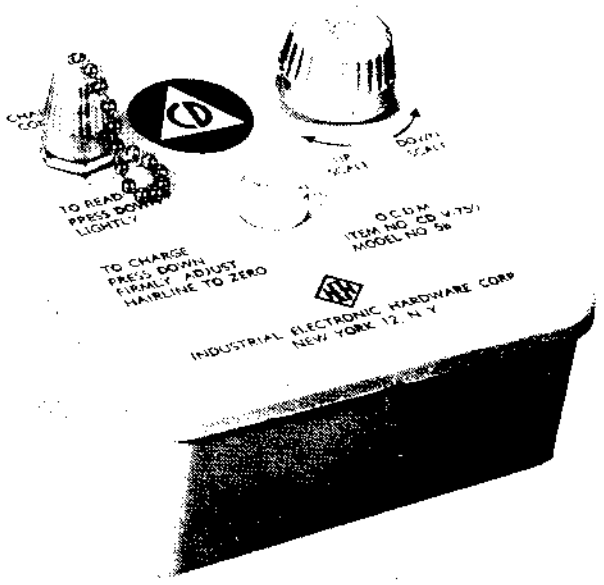
operating and maintenance INSTRUCTIONS



Radiological Dosimeter Charger

I.E.H. Model 750-5b

OCDM Item No. CD V-750 — Model No. 5b

Industrial Electronic Hardware Corp.

NEW YORK 12, N. Y.

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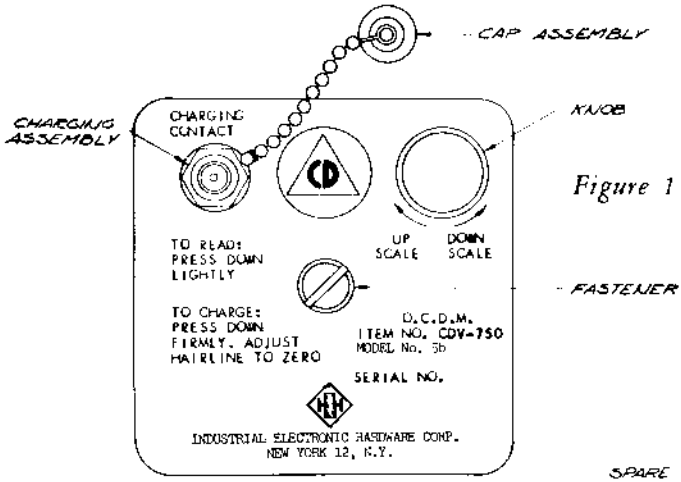

Figure 1 — Top View

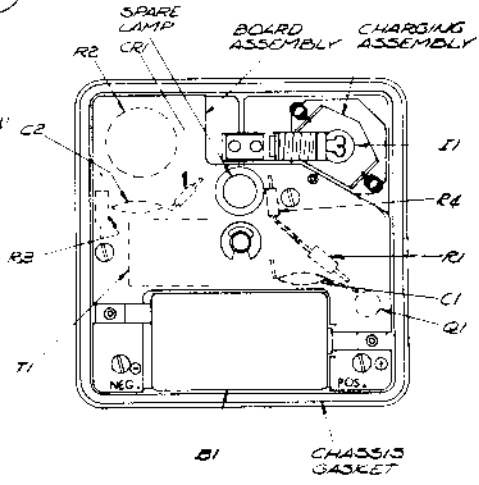

Figure 1 — Bottom View

1.0 GENERAL DESCRIPTION

The V-750 Radiological Dosimeter Charger supplies the voltage required to charge or "ZERO" quartz fibre dosimeters.

A transistor oscillator converts the direct current from a flashlight battery to alternating current so that the transformer can "step up" the battery voltage (1.5 volts) to the 220 volts required by the dosimeter. A voltage control is used to adjust the output voltage to the exact value required to bring the dosimeter to zero.

2.0 THEORY OF OPERATION

The circuit is powered by a 1.5-volt battery (2). Pressure applied to the charging contact closes the switch and the bulb lights (1). Also the transistor (Q-1) sets up an oscillating signal which is amplified by the transformer (T-1) and rectified by the diode (CR-1). Thus a potential of 220 volts maximum is available at the charging pin. The dosimeter to be charged must be pressed down so that it closes the circuit between the charging pin and ground. Resistor (R-2) varies the potential of the charging pin.

3.0 INSTALLATION

Preparation of the dosimeter charger for operation is quite simple. Remove the case by loosening the case fastener. The knurled head can be turned with the fingers or, if it is too tight, with a coin inserted in the slot.

Install the "D" cell in the opening provided for it in the printed circuit board. Observe the polarity markings on the battery and the printed circuit. The battery will fit in the holder only one way. DO NOT attempt to force it into position.

Replace the case and tighten fastening screw with fingers.
Unscrew the dust cap from the charging contact and the charger is ready for use.

4.0 OPERATION

4.1 Dosimeter Reading

To read a dosimeter, place it on the charging contact and press down lightly

to switch on the light. Do not press harder than necessary or the reading will be lost.

4.2 Dosimeter Charging

To charge a dosimeter, press it down on the charging contact with sufficient force to bring the dosimeter body in contact with the threaded portion of the charging assembly.

This will provide sufficient force to actuate the charging switch in the dosimeter. Now read the dosimeter and adjust the control knob until the dosimeter indicates ZERO.

Remove the dosimeter from the charging contact.

4.3 Emergency Operation

When the 'D' cell is nearly discharged and a new one is not available, the dosimeter charger can still be made to operate. Two steps can be taken:

a. Open the case and, with a small screwdriver, adjust the core in T1 in a clockwise direction. This will increase the charging voltage to compensate for the lost battery voltage.

b. If step "a" still does not provide sufficient voltage to bring the dosimeter to zero, remove the lamp I1. The lamp requires much more current than the charging circuit. The battery may have enough energy to operate the charging circuit, but not the lamp.

   Without the lamp it will be necessary to make adjustments in small steps while reading the dosimeter each time with another source of illumination.

5.0 OPERATOR'S MAINTENANCE

Operator's maintenance should be limited to replacing the battery, cleaning the contacts and inspecting for visible faults. If the lamp appears dim or does not light, replace the battery. If operation is intermittent, clean the battery contacts.

If the lamp is bright, but the dosimeter cannot be brought to ZERO, try another dosimeter. If none of the dosimeters can be charged, check for contamination on the charging contact insulator or for a short circuit on the charging contact wire inside the charger.

6.0 PREVENTIVE MAINTENANCE

The only preventive maintenance required is removal of the battery when the dosimeter charger is to be stored, and cleaning the battery contacts if they appear corroded.

7.0 CORRECTIVE MAINTENANCE

When a malfunction cannot be corrected by the steps outlined in Section 5, further steps can be taken by a competent electronic technician.

Reference should be made to the schematic diagram, Figure 2 and the wiring diagram, Figure 4 on page 7.

Improper adjustment of core in transformer T1 can result in voltage being too high or too low at divider network consisting of R2 and R3. This adjustment is a factory adjustment and should not be touched in the field unless the technician is trying to compensate for a weak battery and only resorted to in the case of an emergency when a fresh battery is not available. In making this voltage adjustment by turning core in transformer T1, bear in mind, as the core moves out of the coil the voltage decreases and as it moves into the coil the voltage increases.

The change in voltage as this adjustment is made can be observed on a Simpson model 260 or equivalent just so it is a 20,000 ohm/volt multimeter. Connect meter across voltage divider network from R3 arm to ground and press on pedestal assembly in order to actuate switch SW1 to initiate oscillator. Multimeter should read approximately 57 volts on the 250 volt range.

If no voltage is obtained, replace the transistor. Almost any small PNP transistor will probably work.

If a new transistor doesn't work, remove both C1 and C2 and check for shorts with an ohmmeter. Check the rectifier diode CR1 with an ohmmeter. Set the meter to the RX10 scale. With the meter leads connected one way, it should show a short, and the other way an open. If it shows a short or open both ways, replace it.

Check R1 and R2 with an ohmmeter. Check the transformer windings for continuity and interwinding shorts with an ohmmeter.

Inspect the printed circuit for damage and check all connections to it. Across winding N3 the waveform should look like the sketch in figure 3, and may be observed on an oscilloscope.

8.0 PARTS LIST

8.1 Electrical Parts

Circuit Symbol	Description and Function	Mfgr. and Part No.	I.E.H. Part No.	Recommended Spares
B_1	Battery D Cell	Everready 950	40-25	10
C_1	Capacitor Disc. .005mf 500V	Aerovox	40-26	1
C_2	Capacitor Disc. .005mf 500V	Aerovox	40-27	1
CR_1	Diode (High Voltage Rect.)	G.I.	40-15	1
I_1	Lamp I-131	Chic. Min. Cm131	40-34	2
Q_1	Transistor (Oscillator)	G.E.	40-16	1
R_1	Resistor Carbon 10 ohms ½W ±20%	Stackpole	40-17-y	2
R_2	Potentiometer Control ¼W ±20%	CTS-UP 45	40-19	2
R_3	4.7 megohms ½W ±20%	Stackpole	40-17-x	2
R_4	330 ohms ½W ±20%	Stackpole	40-18	2
T_1	Transformer (Oscillator)	Raypar	40-20	1

8.2 Mechanical Parts (Replaceable)

I.E.H. Part No.		Recommended Spares
40-21	Switch and Lamp Socket Assembly	1
40-9	Charging Pedestal Sub Assembly	1
40-33	Grommet, Spare Bulb	1
40-29	'O' ring, Charging Pedestal	1
40-30	Gasket, Case Fastener	2
40-31	Gasket, Charging Assembly	1
40-32	'O' ring, Potentiometer Shaft	1
40-7	Gasket, Chassis	2
40-6	Lockwasher, Charging Assembly	1
40-5	Washer, 'C' Case Fastener Retaining	5
40-4	Set Screw 10-32x¼ Cup, Slotted	5
40-3	Screw, 4-40x¼ Self Tapping	10
40-2	Nut, Charging Assembly	5
40-1	Board, Printed Circuit	2
40-28	Cover	1
40-8	Knob, Control	1
40-22-6	Guide, Charging Pedestal	1
40-10	Fastener, Case	1
40-13	Holder, Coil Spring	1
40-12	Spring, Coil Pedestal Return	5

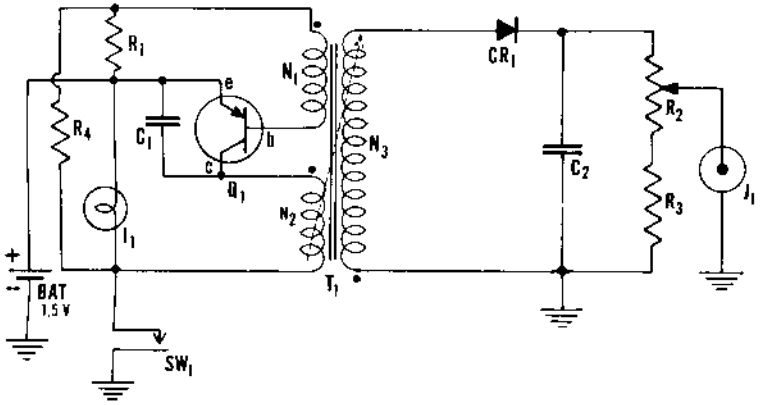

Figure 2 — Schematic

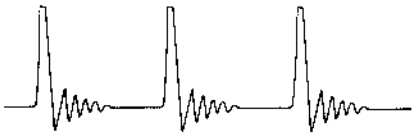

Figure 3 — Voltage Waveshape

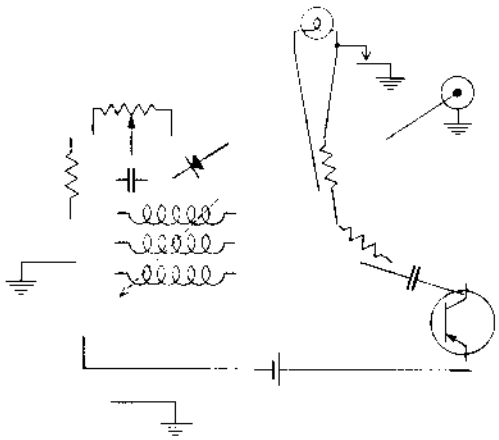

Figure 4 — Wiring Diagram

8.3 Names and Addresses of Manufacturers

Eveready
UNION CARBIDE
270 Park Ave.
New York, New York

G.I.
GENERAL INSTRUMENT
Hicksville, L. I., New York

CM
CHICAGO MINIATURE LAMP
Chicago, Ill.

G.E.
GENERAL ELEC. CORP.
Nela Park, Ohio

Aerovox
AEROVOX MFG. CO.
HI Q. Div.
Myrtle Beach, So. Carolina

CTS
CHICAGO TELEPHONE SUPPLY
1142 W. Beardsley Ave.
Elkhart, Ind.

Stackpole
STACKPOLE RESISTANCE CORP.
St. Mary's, Pa.

Raypar
RAYPAR ELECTRONICS INC.
Chicago, Ill.