

OPERATING AND MAINTENANCE  
**INSTRUCTIONS**

UAC Model 750  
Dosimeter Charger

FCDA ITEM NO. CD V-750

UNIVERSAL ATOMICS®  
A DIVISION OF  
UNIVERSAL TRANSISTOR PRODUCTS CORP.



Westbury, L. I.  
New York

## 1.0 GENERAL DESCRIPTION

The *Universal Atomic's*<sup>®</sup> 750 Dosimeter Charger is used to charge or "Zero" pocket type quartz fibre dosimeters. A standard 1.5 volt, "D" size flashlight cell is used in conjunction with a transistor, step-up transformer and rectifier to obtain the approximately 200 volts required to charge a dosimeter.

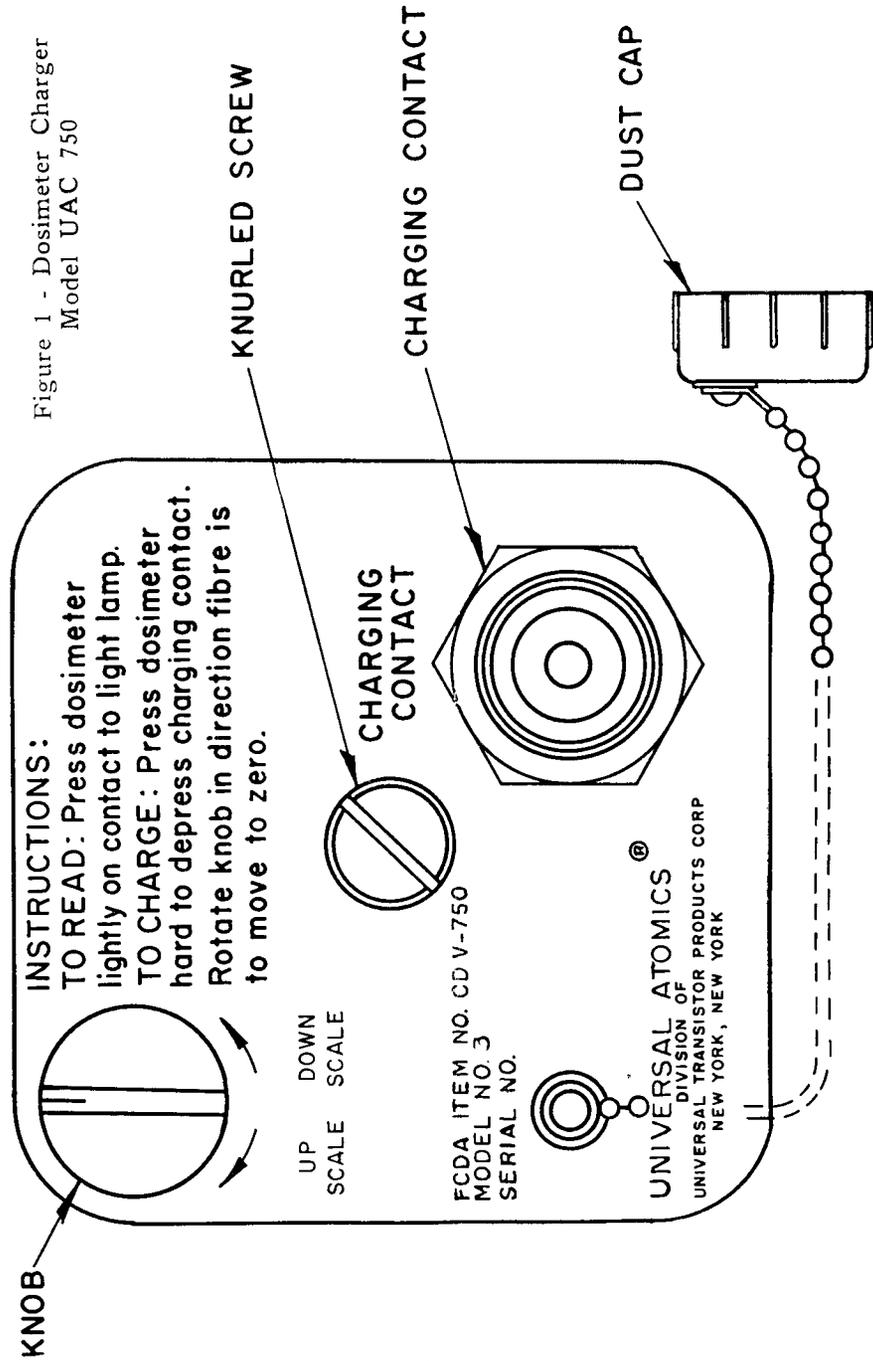
## 2.0 THEORY OF OPERATION

The circuit of the dosimeter charger is shown in Figure 2, Page 8.

When switch SW 1 is closed, collector current starts to flow, since the emitter is at ground potential. The transformer windings between the base and collector are so phased that when the collector current starts to flow the voltage in the base goes in the negative direction. As the base goes negative, the collector current will increase still further, causing the base to go more negative. The collector current increases until the transistor goes into saturation. At this point the collector cannot supply the current demanded by the signal on the base. Since there is no change in the rate of current flow in the transformer, there is no negative signal induced in the base winding and the emitter current decreases. When the emitter current decreases, the collector current decreases, and the signal induced in the base of the transistor is in the positive direction. This action is cumulative until the transistor cuts off and the collector current stops. The collector current stops abruptly. The consequent large rate of change of current in the transformer makes the base go in the negative direction. This in turn starts collector current flowing and the cycle starts all over again.

A step-up turns ratio between the collector winding and the secondary winding of the transformer produces the required high voltage of approximately 200 volts. This voltage is then rectified through the selenium rectifier SE 1, to give the required DC

Figure 1 - Dosimeter Charger  
Model UAC 750



voltage. Resistor R 3 and capacitor C 1 act as a filter to smooth out ripple in the DC voltage.

To vary the voltage at the output, R 2 is inserted between the collector and the base turns of the transformer. This variable resistor limits the bias on the base, thus limiting the voltage swing of the collector and the output of the secondary of the transformer. When switch SW 1 is closer, lamp I 1 lights because it is directly across the 1½ volt battery.

### 3.0 INSTALLATION

#### 3.1 Inspection

Inspect the instrument carefully for any signs of damage in shipment. If any damage is apparent, the battery should not be installed until an electrical check is made.

#### 3.2 Battery

Remove the cover from the instrument by loosening the knurled thumb screw in the center of the top of the lid.

Insert the 1½ volt "D" cell with the positive terminal toward the outside of the instrument. Depress the charging contact and see that the lamp is lit. Depress the charging contact all the way using a dosimeter. Turn the knob first in one direction, then all the way in the other direction. The quartz fibre in the dosimeter should swing completely across the face of the scale. If not, see section 5 or 7 for maintenance procedure.

### 4.0 OPERATION

#### 4.1 To read dosimeters

- a. Remove the dust cap from the charging contact.

- b. Place dosimeter on charging contact and press *lightly* to light lamp.
- c. Read dosimeter.
- d. Replace dust cap.

#### 4.2 To charge dosimeters

- a. Remove dust cap from the charging contact.
- b. Place dosimeter on charging contact and press *firmly* until the dosimeter touches the bottom of the charging well.
- c. Turn knob in zero direction until quartz fibre is aligned at zero.
- d. Replace dust cap.

### 5.0 OPERATOR'S MAINTENANCE

#### 5.1 Battery replacement

The "D" cell should be replaced when the lamp dims noticeably while the charging switch is actuated. Remove the cover and replace the cell as outlined in section 3.2.

#### 5.2 Lamp replacement

A spare lamp is installed inside the instrument. If the lamp refuses to light, replace it with the spare. Check the lamp with an ohmmeter before discarding.

### 6.0 PREVENTIVE MAINTENANCE

Preventive maintenance is advisable once every six months of storage, or prior to any period of use after storage.

Check the operation of the instrument and follow the procedures in section 5 if any difficulty is noted. Check the "D" cell if these conditions are found, or if unable to zero instrument.

Whenever the instrument is stored for more than a few weeks, the "D" cell should be removed to prevent possible damage.

### 7.0 CORRECTIVE MAINTENANCE

If the instrument will not charge any of the several dosimeters, and the steps in section 5 do not correct the difficulty, the following steps are suggested:

- a. Inspect the instrument for any shorts, broken or loose connections.
- b. Depress the charging contact switch firmly and hold instrument so the transformer is close to your ear. Listen for a buzzing sound (transformer "ringing"). To make sure you are listening to the transformer, rotate knob and note the change in pitch of the buzzing.
- c. If the transformer is buzzing, the difficulty will be in the high voltage section. If the transformer does not buzz, then the difficulty will be found in the low voltage section.
- d. If the transformer is buzzing —
  - (1) Check across capacitor C 1 (using a 20,000 ohm/volt meter, such as the Simpson Model 260, on scale 0 to 250 volts). If there is voltage, but it is less than 120 volts, replace C 1.
  - (2) If this does not help, replace selenium rectifier SE 1.
- e. If transformer is not buzzing —
  - (1) Check voltage from collector to ground (using a voltmeter, such as Simpson Model 260, on scale 0 to 2.5 volts). This voltage should be more than 1.0 volt. If it is less, replace transistor.
  - (2) If the voltage from collector to ground is more than one volt, rotate knob from one side to another. There should be a change in voltage of approximately 0.2 volts. If no change occurs, replace transistor.

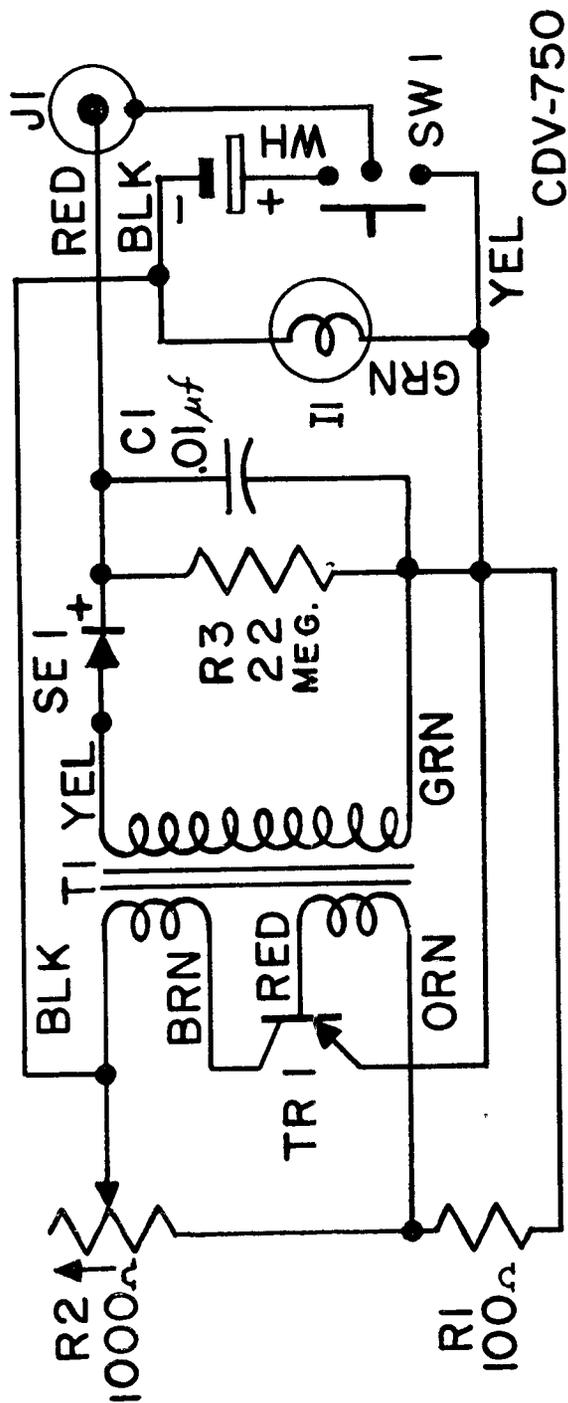


Figure 2—Circuit Diagram

- (3) If steps e(1) or e(2) do not correct fault, replace transformer.

## 8.0 REPLACEABLE PARTS

### 8.1 Mechanical Components

No. Required	Description and Function	Universal Atomics® Part No.	Recommended Maintenance Spares
1	Contact, Switch Assembly	1-1v	None
1	Case	1-2	None
1	Lid	1-3	None
1	Knob	1-3i	One
1	Battery Bracket	1-1a-3	None
1	Captive Screw	1-3g	One
1	Cap, dust (with chain)	1-3b	One

### 8.2 Electrical Components

Circuit Symbol	Description & Function	Manufacturer	Manufacturer Part No.	Universal Atomics® Part No.	Recommended Maintenance Spares
R 1	Resistor, timing 100 ohms 10% 1/2w	S.C. Co.	A-101-K	1-1j	None
R 2	Potentiometer, variable voltage, 100 ohms 20% 1w	S.C. Co.	304734	1-1c	One
R 3	Resistor, filter 22 meg ohms 10% 1/2w	S.C. Co.	A-226K	1-1h	None
T 1	Transformer - Charging voltage	U.T.P.		1-1b	One
V 1	Transistor, semiconductor	U.T.P.		1-1k	One
SE 1	Rectifier, rectifies AC to DC	I.R.C.	5U1	1-1g	One
C 1	Capacitor, filter .01 ufd - 400 volt	S.E. Co.	SK 01	1-1f	None
I 1	Lamp, dosimeter scale, illumination	T-S Co.	131	1-1d-1	None

### 8.3 Vendors

<i>Name</i>	<i>Address</i>
International Rectifier Corp.	El Segundo, California
Scottie Electronic Co.	Peckville, Pa.
Stackpole Carbon Co.	St. Marys, Pa.
Tung-Sol Electric Co.	Newark, N. J.
Universal Transistor Products Corp.	Westbury, L. I., N. Y.