

PART ONE
MAINTENANCE

GENERAL

The Simpson 260-4 Tester was carefully designed so that servicing, when required, could be accomplished quickly and easily. Viewing the rear of this instrument select a screwdriver with a 1/4" wide blade and remove four screws. The case may then be removed and all components are readily available.

CASE REMOVAL

Included in this manual is a pictorial view of the printed circuit board with circuit symbols for ease in locating all major components. The few remaining major components that are not a part of the printed circuit board are mounted on the rear of the front panel assembly, directly underneath the printed circuit board as shown in the 2nd pictorial. Removal of the board to inspect these parts is as follows:

1. Function switch on + DC range switch at 2.5V.
2. Remove (pull off) knob on ZERO OHMS control shaft.
3. Remove two hex nuts from the meter studs on the top of the printed circuit board.
4. Remove two small Phillips head self tapping screws located at the lower portion of the printed circuit board.
5. Lift the printed circuit board up and away from the front panel. The entire board, switch wafers in place, will move away as one piece.

NOTE:

Do not rotate knobs on front panel or move rotors on switches until re-assembly has been accomplished as the switch detent shafts are keyed for proper positioning.

CAUTION:

DO NOT lose two lockwashers on the meter terminals.

With the board removed, easy access may be made to the 20.2 and 80 megohm resistors, the 10 ampere meter shunt, and the .1 MF capacitor.

VISUAL INSPECTION

A thorough inspection should be made of the interior of this instrument. Blow out any dust particles, if noticed, and clean the housing interior. Remove the batteries and check each for signs of chemical leakage. Replace with fresh batteries if any signs of deterioration exist. Inspect each battery clip and determine that the clips are not pitted or that the plating is worn off. Should any clip appear unsatisfactory, or cannot be properly cleaned, replace with a new one.

MECHANICAL ZERO CHECK

Before proceeding to check calibration set pointer to "ZERO" with zero adjustment screw, then back off this adjustment screw slightly so that the adjustment pin is not resting against the fork.

Equipment required: Model 2600 Calibrator
Well calibrated source for 5000 volts
AC and DC (Example Simpson ED-357)

50 Microampere Range

- a. Set potentiometer (R27) to extreme clockwise position.
- b. Set range switch to uAmps position.
- c. Set function switch to + DC position.
The 260-4 may now be connected to the Model 2600.
- d. Model 2600 AC power switch -OFF-
- e. Common (-) lead of the 260-4 to the common (-) post of the 2600.
- f. 50 uA jack lead of the 260-4 to the + post of the 2600.
- g. Output controls of the 2600 at minimum, function switch on DC uA, range switch on 80, polarity switch on +.
- h. Turn on AC power switch on the Model 2600 calibrator.
- i. Advance the output control on the calibrator to read 50uAmps DC.
- j. Adjust potentiometer R32, on the 260-4 tester, so that the pointer is exactly "ON" 50, or full-scale, indicating 50 uAmps.
- k. Turn off AC power to the Model 2600 calibrator.
- l. Disconnect lead wires from instruments.

Calibration of Remaining Current Ranges

- a. Set 260-4 tester range switch to 1MA, function switch to + DC.
- b. Model 2600 calibrator, AC power switch OFF, output controls at minimum, function switch on DCMA, range switch on 1.6, polarity on (+).
- c. Common lead (-) of the 260-4 connect to the common post of the Model 2600. The (+) lead of the 260-4 connected to the (+) post of the Model 2600 calibrator.

- d. Turn on AC power switch on the Model 2600 calibrator. Advance the output control to read exactly 1 MA DC.
- e. Adjust R27 on the 260-4 tester to exactly 1 MA DC full scale.
- f. Turn off AC power to the Model 2600 calibrator.
- g. Turn the range switch on the 260-4 tester to the 10 ampere position. Remove the lead wires from the common (-) and (+) jacks and insert the plugs into the (-10A) and (+10A) respectively.
- h. Set the function switch on the Model 2600 calibrator to 0-16 DCA, range switch to 16. Other controls remain as in part (b) above.
- i. Turn on AC power switch and advance output control to read 10 amperes on the Model 2600 calibrator.
- j. Adjust the sliding millivolt tap, which rides on the 10 ampere shunt wire, until the 260-4 tester reads exactly "ON" full scale or 10 amperes.

NOTE:

This may affect the exact setting of 10 amperes delivered from the calibrator; therefore resetting and rechecking these items a few times should "lock in" a 10 ampere reading on both the tester and calibrator simultaneously.

- k. Turn off AC power to the Model 2600 Calibrator.
- l. Remove plugs from the (-10A) and (+10A) jacks on the 260-4 tester and insert back into the common (-) and (+) jacks.
- m. Set range switch on the tester to 10MA.
- n. Set function switch on the Model 2600 calibrator to DCMA, and the range switch to 16, polarity switch on (+).
- o. Turn on AC power to calibrator and adjust output control to 10MA. Take a reading on the 260-4. Tolerance $\pm 2.0\%$ of full scale. Turn the range switch on the tester to 100 MA, turn the range switch on the model 2600 calibrator to 160. Adjust the calibrator for 100 MA and take a reading on the tester. Tolerance $\pm 2.0\%$ of full scale. Turn the range switch on the tester to 500 MA, turn the output control down momentarily on the calibrator and set the range switch to 800. Advance the output control on the calibrator to read 500 MA and take a reading on the tester. Tolerance $\pm 2.0\%$ of full scale.
- p. This completes the current ranges. Turn off AC power to the Model 2600 calibrator and disconnect lead wires.

DC Voltage Calibration

NOTE:

To meet tolerances of both the MA ranges and DC voltage ranges it may be necessary to make a compromise adjustment of R27. Accuracy of the DC voltage ranges is dependent upon the close tolerance of the multiplier resistors and the accuracy with which the previous sections I and II were made.

- a. On the 260-4 tester set the range switch to 2.5V and the function switch to +DC.
- b. On the Model 2600 Calibrator, set controls as follows: AC OFF, output controls at minimum, function on DCV range on 4, polarity on +.
- c. Connect test leads from the COM (-) and + jacks on the tester to the COM and + binding posts respectively, on the Model 2600 Calibrator.
- d. Turn on AC power to the Model 2600 Calibrator, advance output control to a reading of 2.5 volts DC on the Calibrator. The reading on the tester should be 2.5V DC (full scale) $\pm 2.0\%$.
- e. With both units still operating, switch the function control on the tester to -DC. Immediately the pointer should swing completely to the left, or reverse. This checks out the proper operation of the DC polarity reversal. Return the function control to +DC. Succeeding DC voltage ranges to be checked as per the chart:

260-4 TESTER

MODEL 2600 CALIBRATOR

Function Range	+DC	Set Function to DCV	Range	Polarity	Output - Start at Min. Then set to 10V DC
	10V	"			" " " 50 "
	50V	"			" " " 250 "
	250V	"			" " " 1000 "
	1000V	"			

Tolerances on all DC voltage readings covered in this table for the tester is $\pm 2.0\%$ of full scale. Turn off AC power, disconnect the 260-4 tester from the Model 2600 Calibrator.

- f. Calibration-5000VDC (CAUTION HIGH VOLTAGE). Connect the tester to a well calibrated power source of 5000 volts DC (for example, Simpson ED-357). On the tester, set the function switch to +DC range to 1000/5000V and test leads to jacks marked Com(-) and DC 5000 V. Turn power on the 5000V DC supply, and note reading on the tester. Tolerance to be held to $\pm 3.0\%$ of full scale. Should the reading be out of tolerance, allow the units to operate a few minutes to leak off any possible static charge. Recheck readings. If readings are still slightly out of tolerance, turn off power to the 5000 volts DC supply, blow breath lightly over meter face. (Do not rub hand or finger across meter face as this will increase the static charge buildup.) Then recheck the 5000 volt reading with power applied once more. Reading should now be within tolerance. If still slightly off, make an accurate check on the 80 megohm resistor R20. Remove AC power and disconnect the tester from the 5000 volt DC supply.

AC Volts Calibration

CAUTION:

HIGH VOLTAGES PRESENT

Required - Model 2600 Calibrator and a well calibrated source of 5000V AC (Example - Simpson ED-357).

- a. On the 260-4 tester, set the function switch to AC, range switch to 250V, connect test leads to jacks marked com (-) and (+).
- b. On the Model 2600 calibrator, set controls as follows: AC off, output controls at minimum, function on AC V, range on 400, polarity on +.
- c. Connect test leads from the tester to the posts, on the Model 2600 calibrator, marked COM (-) and +.
- d. Apply AC power to calibrator, advance output control to read 250 V AC.
- e. Adjust calibration potentiometer R31, on the tester, until meter reads "RIGHT ON" full scale. Remove AC power to the calibrator.
- f. Set the range switch, only, on the tester to 2.5 V.
- g. Set the controls on the Model 2600 calibrator as follows: Output Control at minimum, Function remains on A.C.V., range set to 4, polarity remains set to +.
- h. Apply AC power to the calibrator and advance output control to read exactly 2.5 V AC.
- i. Adjust calibration potentiometer R28 on the tester until meter reads "RIGHT ON" full scale. Remaining AC ranges may now be checked for accuracy in readings with a tolerance of $\pm 3.0\%$ of full scale value.

See Table below:

260-4 TESTER

MODEL 2600 CALIBRATOR

Set function on AC	Set function to	Range	Polarity	Output start at min
Set range on 10V	ACV	16	+	Then set to 10 V.A.C.
50V	"	80	+	50 "
1000V	"	1600	+	1000 "

- j. Remove AC power to the Model 2600 calibrator, disconnect test leads from the calibrator.
- k. 5000 volt AC calibration (use extreme care) on the 260-4 tester, set the function switch to A.C., range switch to 1000/5000V. Connect test leads to jacks marked COM (-) and AC 5000V supply. Connect opposite ends of test leads to a well calibrated 5000 volt AC source. Apply

AC power to the 5000 volt AC supply and check accuracy of reading on the tester. Tolerance on this range is held to $\pm 4.0\%$ of full scale value.

NOTE:

If calibration does not fall in on the 5000 V AC range, or the other AC ranges, it may be necessary to set the calibration of the 250 volt range off slightly. This will require a change in the setting of R31, calibration potentiometer; however, any change made on R31 will affect the 2.5 V AC range, therefore this range will have to be recalibrated by readjusting R28 before making finalized readings.

With final reading taken, remove AC power to the 5000 volt AC supply. Disconnect test leads from the supply.

AC Output Calibration Check

Test Leads Connected to Common (-) and Output Jacks of 260-4 Tester. Model 2600 Calibrator; start all readings with output at min.

Function Switch on AC	Function on ACV	Range	Polarity	Set To
Range set to 2.5V		4	+	2.5 VAC
10V		16	+	10 "
50V		80	+	50 "
250V		400	+	250 "

With 2.5 volts applied to the 260-4 tester, read for .85 to 1.4 VAC.
 " 10V " " " " " " " " 8 to 10 VAC.
 " 50V " " " " " " " " FULL SCALE.
 " 250V " " " " " " " " FULL SCALE.

These readings will assure proper operation of the .1MFD capacitor in the output circuit. After tests remove AC power to the Model 2600 calibrator, and remove test leads.

Ohmmeter Calibration Test

Required: Model 2600 calibrator - NO AC power applied

- a. On the 260-4 tester set the range switch to RX1, function switch to +DC, connect test leads to jacks marked Com (-) and (+).

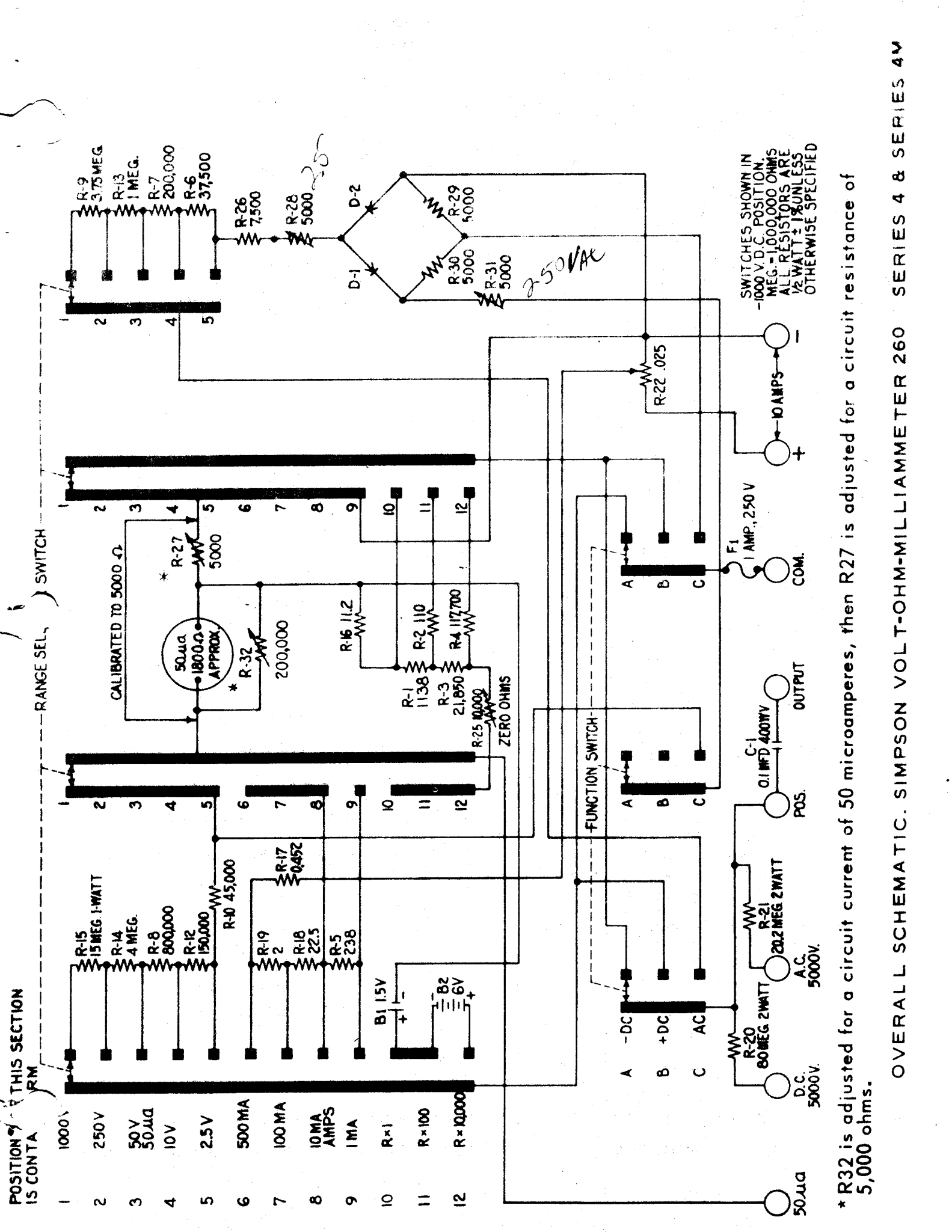
- b. On the Model 2600 calibrator connect free end of test leads from the tester to the posts marked Com (-) and (+) respectively. Set function control to RES. (Range switch is not used), polarity switch will be used between 1 ohm and 1M ohm.
- c. Turn polarity switch on Model 2600 calibrator to short position. Ohmmeter circuit in the tester should cause meter to read full scale on the RX1, and RX100, and RX10K positions. Adjusting the zero ohms control should allow the pointer to be adjusted both below and above full scale on any ohmmeter range. If full scale cannot be reached on the RX1 or RX100 ranges, replace the large 1.5 volt "D" cell. If full scale cannot be reached on the RX10K range, replace the 4 small 1½ volt dry cells, size Z.
- d. For ohmmeter checks, set controls as follows:

260-4 TESTER

MODEL 2600 CALIBRATOR

Function Switch set on +DC	Polarity Switch set on +
Range switch set to	Resistance control to
RX1 read for 1-10-100 ohm	1 ohm-10 ohm-100 ohm
RX100 read for 100-1K-10K ohm	100 ohm-1K ohm-10K ohm
RX10K read for 10K-100K-1M ohm	10K ohm-100K ohm-1M ohm

- e. Calibration RX1 within 2.5% of DC Scale Arc.
 RX100 " " " " " "
 RX10K " " " " " "



POSITION 10 THIS SECTION IS CONTACT RM

RANGE SEL. SWITCH

1 1000V
2 250V
3 50V
4 10V
5 2.5V
6 500 MA
7 100 MA
8 10 MA
9 1 MA
10 R x 1
11 R x 100
12 R x 10,000

R-9 3.75 MEG
R-13 1 MEG.
R-7 200,000
R-6 37,500
R-26 7,500
R-28 5,000

CALIBRATED TO 5000 Ω
* R-27 5000

R-15 15 MEG. 1-WATT
R-14 4 MEG.
R-8 800,000
R-12 150,000
R-10 45,000
R-19 2
R-18 22.5
R-5 238
R-17 0.452
R-1 11.38
R-3 21,850
R-25 10,000
R-2 110
R-4 117,700
R-16 11.2

D-1
R-29 5,000
R-30 5,000
R-31 5,000

50 μA
1800 Ω
APPROX.
* R-32
200,000

B1 1.5V
B2 6V

A -DC
B +DC
C AC

D-2

R-22 .025

R-20 60 MEG 2 WATT
R-21 20.2 MEG 2 WATT
C-1 0.1 MFD 400 WV
F1 1 AMP., 250 V

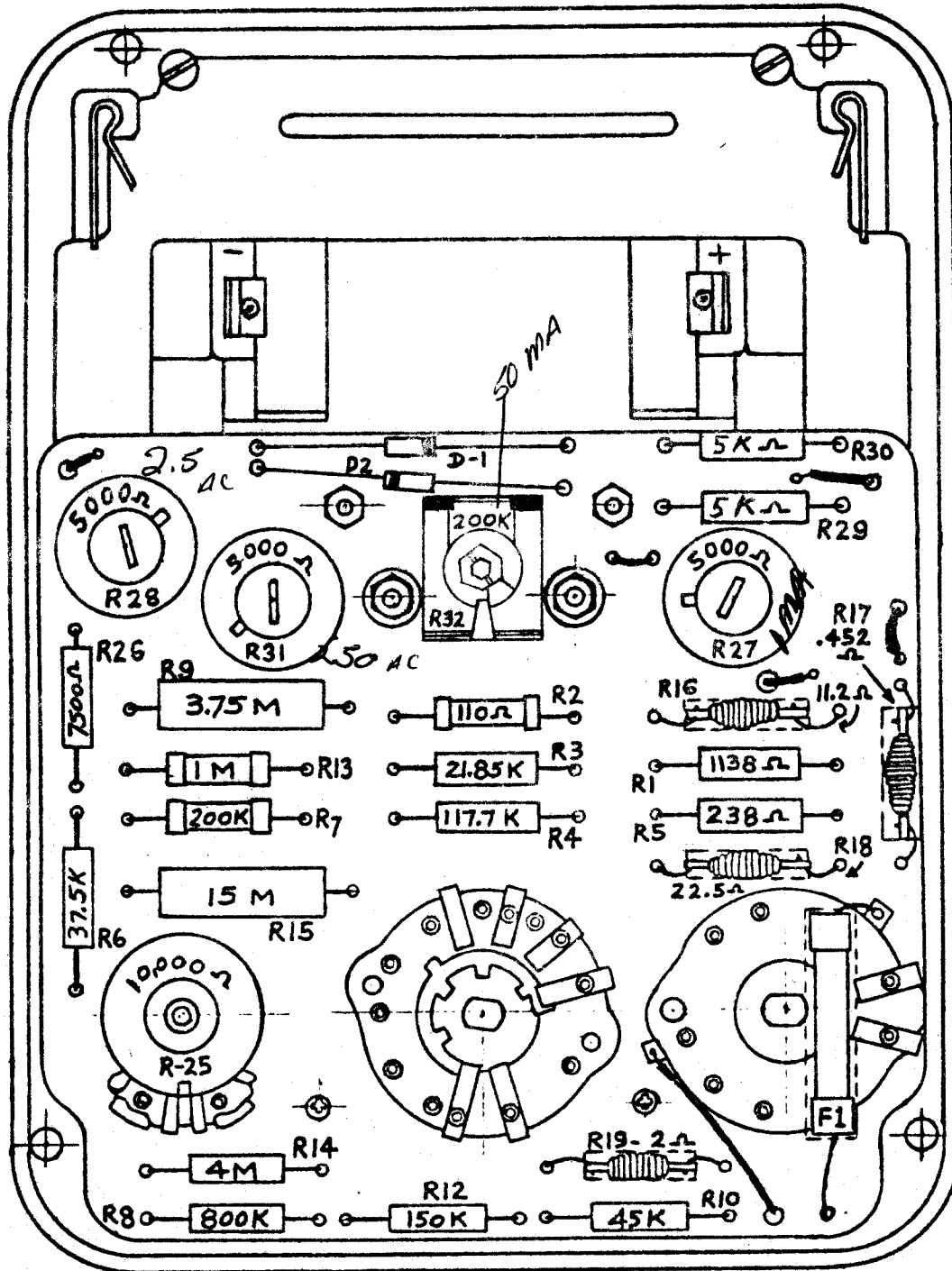
50 μA
D.C. 5000V.
A.C. 5000V.
POS.
OUTPUT
COM.
10 AMPS
+

250VAC

FUNCTION SWITCH

SWITCHES SHOWN IN -1000V D.C. POSITION
MEG. = 1,000,000 OHMS
ALL RESISTORS ARE 1/2 WATT ± 1% UNLESS OTHERWISE SPECIFIED

* R32 is adjusted for a circuit current of 50 microamperes, then R27 is adjusted for a circuit resistance of 5,000 ohms.



MODEL 260-4

REAR VIEW - CASE REMOVED

FOR REPLACING PC BOARD WITH NEW.
BOARD SEE 260-5

USE PN 10-861119