

SECTION III

MAINTENANCE

HOW TO OPEN THE CASE

The case of the Simpson Volt-Ohm-Milliammeter 260[®], Series 4, has been designed to provide easy and quick access to the inside for all necessary adjustment and replacement of parts. Use a 1/4-inch screwdriver to remove the four screws through the bottom of the case. Then slip the entire front panel straight forward out of the case. The meter, the front panel, the printed circuit, and the batteries are all attached together and will come out as a unit.

BATTERY REPLACEMENT

There are five batteries inside the case of the 260[®], Series 4. They are used to supply power for resistance measurements. One is a large size (#2, Size D) flashlight cell, and the other four are smaller (#Z) flashlight cells. When it is no longer possible to bring the pointer to 0 for the R x 1 and R x 100 ranges (see ZERO OHMS ADJUST, page 17), replace the large cell with a fresh one. When it is no longer possible to bring the pointer to 0 on the R x 10,000 range, replace the four smaller cells with fresh ones. This will restore operation of the ohmmeter circuit.

NOTE: When batteries reach the end of their useful life, they should be replaced promptly. Failure to do so may result in extensive damage to your 260[®], Series 4 due to battery leakage, even though the battery may be advertised as "Leakproof."

OBSERVE POLARITY

When you replace the cells, be sure to observe the polarity of the battery circuit. The cells are held each in place with specially designed spring clips which also act as battery contacts. Battery polarity is shown on the panel.

SUB-PANEL PARTS PLACEMENT

Beneath each resistor on the printed circuit is its part number, as it is shown on the schematic diagram and in the parts list. This mark will eliminate any doubt which may arise as to the location of any of the resistors.

RECTIFIER REPLACEMENT AND RECALIBRATION

There are two small rectifiers which are located at the top of the printed circuit, near the large 1.5 volt cell. These are used to rectify the A.C. voltages for measurement. They are shown as D-1 and D-2 in the overall schematic diagram, Fig. 2.

Both rectifiers act in the meter circuit to effectively create a full wave rectifying action. If either or both should fail, the meter will show incorrect indications.

In case of rectifier failure, replace the defective rectifier with another 1N87G, and be sure to observe polarity when you connect it into the circuit. If a type 1N87G is not available use any good quality small crystal rectifier as a replacement.

After you replace either or both rectifiers, test the accuracy of A.C. voltage indications. If necessary, recalibrate the circuit by adjusting rheostats R-28 and R-31 as follows:

1. Set the function switch at A.C. and the range switch at 250 V.
2. Connect the red test lead in the + jack and the black test lead in the COMMON - jack.
3. From a standard voltage source, apply 250 volts A.C. to the red and black test leads. Adjust rheostat R-31 (which is next to the + meter stud on the printed circuit board) so the meter reads full scale. Turn power off.
4. Set the range switch to 2.5 V. Apply 2.5 volts A.C. to the red and black test leads. Adjust rheostat R-28 (which is next to R-31) so the meter reads full scale. Turn power off.

If no standard voltage supply is available for the above procedure, use this alternate method:

1. Set the function switch at A.C., and the range switch at 2.5 V.
2. Connect the red test lead in the + jack and the black test lead in the COMMON - jack.
3. Connect the test leads to a fresh 1.5 volt flashlight cell. Connect the red test lead to the positive post of the battery and the black test lead to the negative post.
4. Adjust rheostat R-28 fully clockwise. It is located in the extreme upper left hand corner of the printed circuit board, next to the "+6 V" mark.
5. Rheostat R-31 is located next to R-28, toward the center of the printed circuit board. Adjust it so the meter reads 1.8 volts on the 2.5 V. A.C. ONLY arc.
6. Adjust R-28 so the meter pointer moves back to 1.71 volts on the same arc (the pointer will indicate 6 on the OHMS scale when it is in this position).

RESISTOR REPLACEMENT

Almost all of the resistors for the Simpson 260[®], Series 4, are mounted on the rear of the printed circuit. This makes them easily accessible for trouble-shooting and repair.

When it is necessary to replace any of the resistors in the circuit, first obtain an exact equivalent resistor. Order it from your nearest Simpson Parts Depot (see page 37) and specify the Simpson part number as it is shown in the parts list. Then clip the defective resistor off the printed circuit board, leaving the leads in the board to use as connections for the replacement.

Carefully twist the leads for the new resistor around the leads left from the defective resistor, and solder each connection. Trim away all excess and see that you have not caused any short circuit to any other part nearby.

REMOVING THE PRINTED CIRCUIT

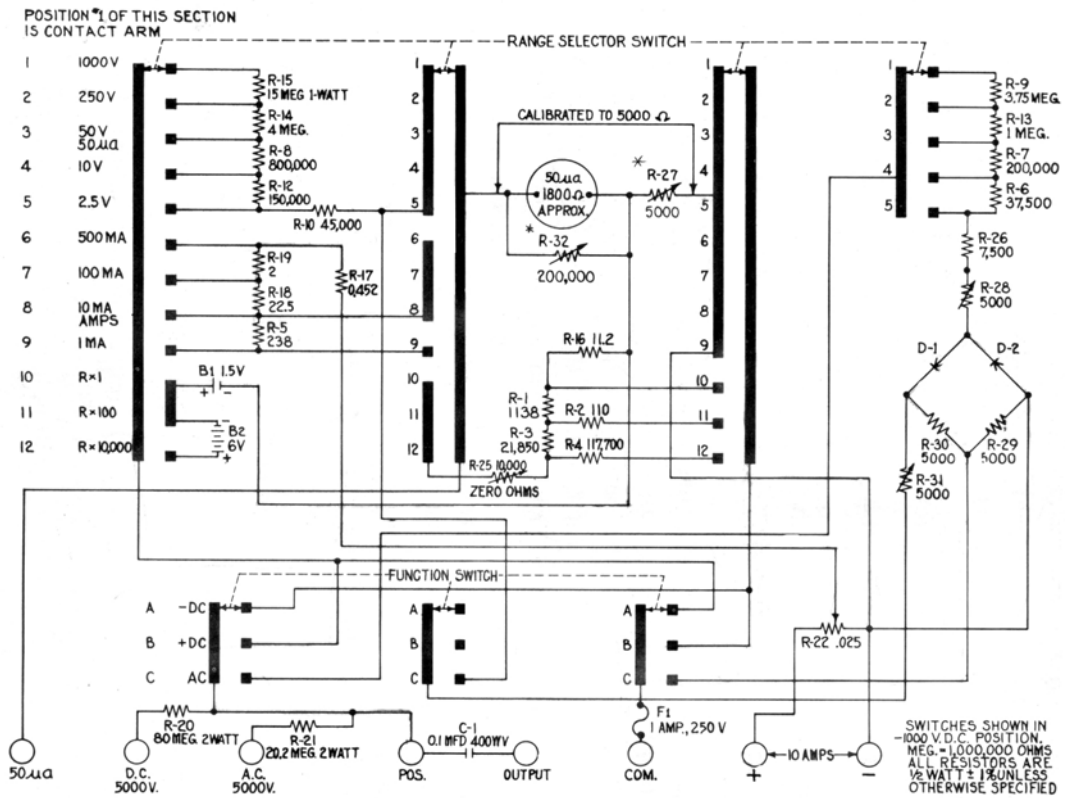
When you require access to the under-side of the printed circuit, or to the parts which are located between it and the front panel, remove the printed circuit.

To remove the printed circuit, use the following procedure:

1. Set the function switch at +D.C. and the range switch at 2.5 V.
2. Remove the knob for the ZERO OHMS control.
3. Remove the two screws through the lower part of the printed circuit board.
4. Remove the two hex nuts from the meter studs on the top of the printed circuit board.
5. Carefully pry out the battery contact at the + terminal for the small 1.5 volt cells. This is connected to the upper left hand corner of the printed circuit board with an orange lead.
6. Lift the printed circuit board away from the front panel. The entire board, with the switch wafers in place, will come up in one piece.
7. After removal, do not turn knobs on front panel or move any rotors on switches until reassembled.

FUSE REPLACEMENT

Remove the front panel from the case and disconnect the burned-out fuse, using a small (60-watt or less) soldering iron. Replace with a 1 amp, 250 volt pigtail fuse, type 3AG or equivalent only.



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

FIGURE 2. OVERALL SCHEMATIC. SIMPSON VOLT-OHM-MILLIAMMETER 260 SERIES 4 & SERIES 4M

Reference Symbol	Description	Simpson Part No.
R1	Resistor, 1138 ohms	1-113372
R2	Resistor, 110 ohms	1-113373
R3	Resistor, 21,850 ohms	1-113369
R4	Resistor, 117,700 ohms	1-113367
R5	Resistor, 238 ohms	1-115897
R6	Resistor, 37,500 ohms	1-113393
R7	Resistor, 200,000 ohms	1-113365
R8	Resistor, 800,000 ohms	1-113363
R9	Resistor, 3.75 megohms	1-115765
R10	Resistor, 45,000 ohms	1-114192
R12	Resistor, 150,000 ohms	1-113366
R13	Resistor, 1 megohm	1-113392
R14	Resistor, 4 megohms	1-113362
R15	Resistor, 15 megohms	1-115763
R16	Resistor, 11.2 ohms (bobbin)	10-805073
R17	Resistor, 0.452 ohm (bobbin)	10-805027
R18	Resistor, 22.5 ohms (bobbin)	0-008133
R19	Resistor, 2 ohms (bobbin)	0-008060
R20	Resistor, 80 megohms	1-113353
R21	Resistor, 20.2 megohms	1-116491
R22	Resistor, .025 Shunt Assy. 10 amp	0-007093
R25	Potentiometer, 10,000 ohms $\pm 30\%$	1-115764
R26	Resistor, 7500 ohms	1-113370
R27	Rheostat, 5K ohms $\pm 10\%$	1-116254
R28	Rheostat, 5K ohms $\pm 10\%$	1-116254
R29	Resistor, 5000 ohms	1-113425
R30	Resistor, 5000 ohms	1-113425
R31	Rheostat, 5K ohms $\pm 10\%$	1-116254
R32	Potentiometer, 200K $\Omega \pm 20\%$	1-110193
C1	Capacitor, 0.1 μf , 400 v.	1-113733
D1	Diode, Germanium	1-115970
D2	Diode, Germanium	1-115970
	Test lead set (one red and one black)	7500
	Pheonlic case	3-320141
	Carrying handle	1-115316
	Knobs	
	For Function switch	1-115790
	For Range switch (less set screw)	3-260180
	For Zero Ohms Adjust	1-115789
F1	Fuse, 1 amp, 250 volt, pigtail type 3AG or equivalent	1-117702
260-4M	Meter Assembly	15-302260-4M
260-4	Meter Assembly	15-302260-4
	Set Screw (for knob 3-260180)	1-114178