



**EAGLE PRODUCTS**

**MODEL EP-10K**

**INSTRUCTION BOOKLET**

## MODEL EP-10K MULTI-TESTER

The MODEL EP-10K is a compact-sized, high sensitivity, pocket type instrument designed for use in electrical engineering. It has an extra wide scale meter comparable to those used in larger sized testers. Very thin in construction, it utilizes the slide switch method of range selection to minimize panel space. The ranges have been specially designed to assure minimum manipulation. The resistors for the multipliers and shunts have an accuracy of  $\pm 1\%$  and only the best components are used to insure highest quality and long life.

### FEATURES

1. The meter uses a very sturdy and robust movement of  $80\ \mu\text{A}$  DC sensitivity. The current consumption for DC and AC voltage measurements is only  $100\ \mu\text{A}$ , for negligible circuit loading.
2. The DC and AC voltage sensitivity is  $10,000\ \Omega/\text{V}$ .
3. The  $120\ \mu\text{A}$  ( $0.12\text{mA}$ ) range for the DC current measurements will be found to be convenient for testing and checking the transistorized equipment.
4. The panel, made of high grade molded bakelite, is very attractive in appearance and the case is also made of bakelite.
5. Resistance measurements up to 2 megohms are made with the use of only one 1.5V cell.
6. The long knife-edged pointer makes accurate readings possible.
7. All of the components have been designed to give long trouble-free performance.

## SPECIFICATIONS

- DC Voltage: 0-6-30-120-600-1200 V (10,000  $\Omega$ /V)  
AC Voltage: 0-6-30-120-600-1200 V (10,000  $\Omega$ /V)  
DC Current: 0-120  $\mu$ A, 0-12-300 mA  
Resistance: 0-20 K, 0-2 Meg (150  $\Omega$ , 15 K at center scale)  
Capacitance: 0.005 to 0.15  $\mu$ F (at AC 6 V)  
Decibels: -20 to +63 db (600  $\Omega$ , 1mW 0dbm=0.775 V)  
Dimensions: 3<sup>1</sup>/<sub>4</sub>"  $\times$  4<sup>7</sup>/<sub>16</sub>"  $\times$  1<sup>1</sup>/<sub>8</sub>" (82  $\times$  113  $\times$  28mm)  
Weight: 9.5 oz (260 g) approx.  
Battery: 1 - Penlight cell, 1.5 V  
Accuracy: DC Voltage and Current  $\pm 2\%$  f. s.  
AC Voltage  $\pm 4\%$  f. s.  
Resistance  $\pm 3\%$  of total scale length

## OPERATING INSTRUCTIONS

### A. DC VOLTAGE MEASUREMENTS

1. Insert the black test lead in the  $-V\Omega m$  jack at the lower left and the red test lead in the COM+jack at the lower right, and select the required ranges with the slide switch.
2. Connect the test lead tips across the source or the load under test. Observe the proper polarities, the red lead to the + (plus) and the black lead to the - (minus).
3. The DCV & mA scale marked 0-6, 0-30 and 0-120 is used for reading the voltages with the following multipliers.

| Range    | Black Scale | Multiplier   | Volts/Div. |
|----------|-------------|--------------|------------|
| 0 - 6 V  | 0 - 6       | 1, or direct | 0.1 V      |
| 0 - 30   | 0 - 30      | 1, or direct | 0.5        |
| 0 - 120  | 0 - 120     | 1            | 2.0        |
| 0 - 600  | 0 - 6       | 100          | 10.        |
| 0 - 1200 | 0 - 120     | 10           | 20.        |

4. If the voltage under measurement is not known, start from the highest down to the lowest range to obtain readings fairly up to the scale.

## B. DC CURRENT MEASUREMENTS

1. Insert the black test lead in the  $-V\Omega m$  jack and the red test lead in the COM+, and select the range required with the slide switch. It is good practice to start with the 300mA range.
2. Turn off the power of the circuit under test. Open the circuit and connect the test leads in series, making certain that the current is less than 300 mA. The test lead polarities in the circuit must be correct. Turn on the power. Read the scale marked DCV & mA.

| Range      | Black Scale | Multiplier | mA/Div.            |
|------------|-------------|------------|--------------------|
| 0 - 300 mA | 0 - 30      | 10         | 5.0 mA             |
| 0 - 12     | 0 - 120     | 0.1        | 0.2                |
| 0 - 0.12   | 0 - 120     | 0.001      | 0.002, or $2\mu A$ |

3. Whenever the current charge is to be changed, turn the power off as a safety measure as well as to avoid damage to the instrument.
4. When using the  $120\mu A$  range (0.12mA), extreme care must be taken to prevent meter burnout.

### C. AC VOLTAGE MEASUREMENTS

1. Insert the black test lead in the ACV jack and the red test lead in the COM+ jack, and select the range required with the slide switch.
2. Connect the test leads across the source or the load under test. The polarities are not important but it is good practice to connect the black test lead to "ground" if possible.
3. There are two red marked scales on the dial for the AC voltages. One is for maximum AC 6 volts only and the other is for AC 30 volts and higher.

| Range    | Red Scale | Multiplier | Volts/Div. |
|----------|-----------|------------|------------|
| 0 - 6 V  | 0 - 6     | 1          | 0.1 V      |
| 0 - 30   | 0 - 30    | 1          | 0.5        |
| 0 - 120  | 0 - 120   | 1          | 2.0        |
| 0 - 600  | 0 - 6     | 100        | 10.        |
| 0 - 1200 | 0 - 120   | 10         | 20.        |

4. If the voltage under measurement is not known, start from the highest range down to the lowest to obtain readings fairly up on the scale.

**CAUTION!! EXTREME CARE MUST BE TAKEN WHEN MEASURING THE VOLTAGES AND CURRENTS IN THE HIGH TENSION CIRCUITS.**

### D. RESISTANCE MEASUREMENTS

1. Insert the black test lead in the  $-V\Omega m$  jack at the lower left of the panel and the red test lead in the COM+ jack, and select the range required with the slide switch.
2. Check the ZERO OHMS setting by shorting the test leads at the tips. Adjust the  $\Omega$  ADJ knob at the center right of the panel so that the meter pointer deflects to the 0 (ZERO) which is the full scale position.

**CAUTION !!**

- a. Make certain that the power is cut off when measuring the resistor, choke, etc., in radios, amplifiers, etc.
  - b. Check the schematic of the equipment to make sure that other resistors, chokes, transformers, etc., are not connected in parallel with the device under test.
3. Connect the test leads across the resistor under test and read the OHM scale.
  4. For resistors less than  $1.5\text{K}\Omega$  (1,500), set the slide switch on the  $20\text{K}\Omega$  range. Check the ZERO OHM setting for every change in the resistance range.

| Range | Scale Multiplier | OHMS at Center scale    |
|-------|------------------|-------------------------|
| 20 K  | 10               | 150 $\Omega$            |
| 2 Mg  | 1000             | 15 K (15,000 $\Omega$ ) |

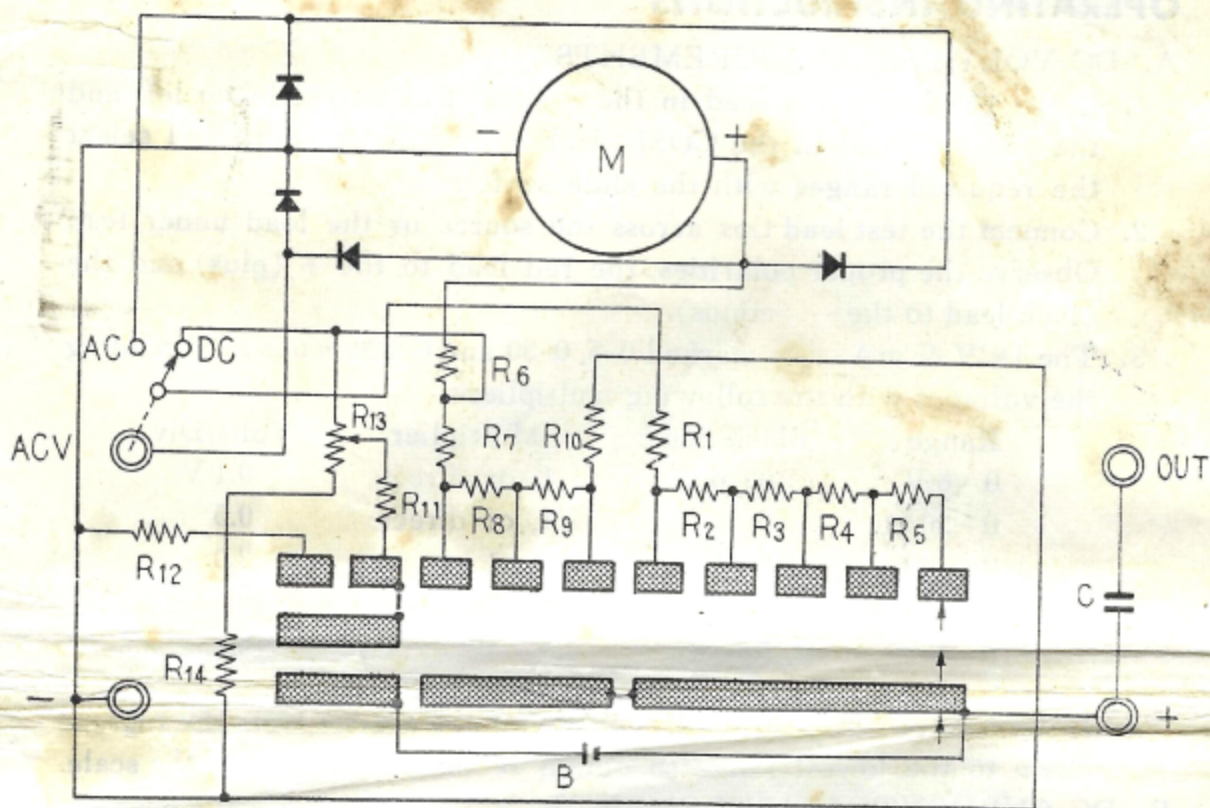
5. The internal cell should be replaced when the ADJ knob is impossible to bring the pointer to ZERO,
- E. CAPACITANCE MEASUREMENTS (0.005 to 0.15 $\mu\text{F}$ )**

1. An AC source of 6 volts (50 or 60 cps.) is required.
2. Insert the black test lead in the ACV jack and the red test lead in the COM+ jack, and set the slide switch to the 6V range,  
6 volt jack.
3. Connect the unknown condenser, the 6 volt AC supply and the test leads in series.
4. Read the capacitance on the CAPACITY scale which is marked for 50 or 60 cycles to match the frequency of the local mains.

## F. DECIBELS

The inner scale is calibrated in Decibels for audio output level measurements. The reference is 0 db = 1 milliwatt (0.775 V) in a 600 ohm line. Measurements are made in the same manner as for the AC voltages. Add the proper number of decibels referring to the table at the upper left of the dial plate for each change in the voltage range. For impedances other than 600 ohms, the instrument can be used for comparative measurements on the decibel basis. Always isolate the meter with a condenser, 0.1 to 0.5  $\mu$ F, when making tests across the loads where the DC voltages exist.

# SCHEMATIC DIAGRAM



RANGE SELECTOR SHOWN IN "1200 V" POSITION

## PARTS LIST

|      |        |         |       |      |                    |
|------|--------|---------|-------|------|--------------------|
| R 1  | 57     | K ohms  | R 11  | 11   | K                  |
| R 2  | 240    | K       | R 12  | 134  | ohms               |
| R 2  | 900    | K       | R 13  | 3    | K Pot              |
| R 4  | 4.8    | K       | R 14  | 17.5 | K                  |
| R 5  | 6      | K       | C     | 0.05 | $\mu$ F            |
| R 6  | 1.7    | K       | B     | 1.5V | (UM-3)             |
| R 7  | 2.3    | K       | M     |      | Meter 80 $\mu$ A   |
| R 8  | 12.37  | K       | Rect. |      | All wave rectifier |
| R 9  | 119.50 | ohms    | WW =  |      | wire wound         |
| R 10 | 4.2    | ohms WW | K =   |      | kilo = 1,000       |
|      |        |         | M =   |      | meg = 1,000,000    |