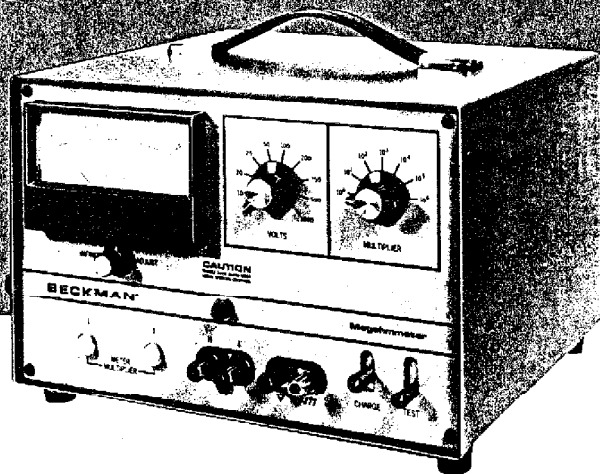


Low Cost Megohmmeter

Model L-10A



description

The new Beckman Industrial Model L-10A Megohmmeter is ideal for use whenever an easy-to-operate, low-cost megohmmeter is needed. Makes insulation measurements on wire and cable, transformers, chokes, connectors, diodes, transistors, piezoelectric elements, circuit breakers and many other components.

Also suited to measurement problems involving voltage and temperature coefficient of resistance and for measuring volume resistivity for a wide range of solid insulation materials.

The Model L-10A meets ASTM Specification D-257 and Federal Specification LP-406 (Method 4041). The National Stock Number assigned to the L 10A is No. 1H6625-00-040-9678.

special features

The Model L-10A utilizes modern solid state circuitry for compactness and reliability. Extra-stiff power supply regulation, normally found only in more expensive instruments, neutralizes the effects of power line transients.

This megohmmeter is simple to operate since test voltages need not be calibrated when selected. Infinity adjustments are set only once before use.

Resistance ranges cover 5×10^4 to 5×10^{13} ohms in 7 ranges. For most ranges accuracy is $\pm 2\%$ of full scale ($0.2 \times$ meter reading, $+1\%$ of reading). This is far more accurate than comparable priced megohmmeters.

The Model L-10A features nine switch-selectable test voltages between 10 and 1000 VDC with an accuracy of $\pm 2\%$ over the operating temperature range. It also includes a rapid "charge/discharge"

feature which pre-charges the sample to eliminate meter "slam" . . . then discharges the sample at the end of the test.

specifications

RESISTANCE RANGES:

- 5×10^4 to 5×10^{13} in seven ranges
- 5×10^4 to 5×10^{12} at 10 to 100 VDC
- 5×10^5 to 5×10^{13} at 200, 250, 500 VDC
- 5×10^6 to 5×10^{13} at 1000 VDC

TEST VOLTAGES:

- Nine switch-selectable voltages at 10, 20, 25, 50, 100, 200, 250, 500 and 1000 VDC. Fixed steps accurate to $\pm 2\%$.

ACCURACY:

- For most ranges the accuracy of the Model L-10A is $\pm 2\%$ of full scale ($0.2 \times$ meter reading $+1\%$ of reading). There is an additional tolerance of $\pm 1\%$ of the 10^5 and $\pm 2\%$ on the 10^6 multiplier ranges.

POWER REQUIREMENTS:

- 120/240 VAC, 50/400 Hz, 34 Watts.

PHYSICAL SIZE AND WEIGHT:

- 7.25" high x 11.25" wide x 12" deep (184mm x 286mm x 305mm); instrument weight — 15 pounds (6.8kg); shipping weight — 18 pounds (8.2kg).

ACCESSORIES:

- Test lead set part number 43081WE included.

Beckman Industrial™

I DESCRIPTION AND PURPOSE

1.1 INTRODUCTION

1.1.1 The instruction manual for Beckman Instruments Model L-10A Megohmmeter is intended to serve as a guide in the proper operation and maintenance of the instrument. Sufficient information has been included to provide a general understanding of the instrument and its many applications. Operation of the Model L-10A Megohmmeter in accordance with instructions contained herein will insure reliable and satisfactory performance.

1.2 GENERAL INFORMATION

1.2.1 The Beckman Instruments Model L-10A Megohmmeter measures d.c. resistance between 50K ohms and 5×10^{13} ohms. The test voltage can be selected for 9 specified voltages between 10 and 1000 Volts d.c. The instrument can be used to measure grounded and ungrounded two or three terminal resistors as well as to measure surface or volume resistivity of insulating materials. The insulation resistance of rotating machinery, transformers, cables, wire, and other electrical equipment can also be easily measured. Excellent power supply regulation and convenient charge and discharge circuitry permit rapid and accurate measurement of the leakage resistance of capacitors. Instrument precision makes it suitable for laboratory service; operation simplicity, convenience and ruggedness makes it ideal for production use.

1.2.2 The operation of the Model L-10A Megohmmeter can be understood with the aid of Fig. 1. The instrument contains a regulated variable test voltage power supply with a range of 10 to 1000 Volts d.c. The test voltage is connected in series with the unknown resistor R_X and a standard resistor R_S , the value of which is selected by the MULTIPLIER switch. These two resistors form a voltage divider across the regulated power supply. The output of this divider, which is inversely proportional to the value of R_X , is applied to an amplifier having a high input resistance. The amplifier in turn drives a meter calibrated in megohms.

1.3 SPECIFICATIONS

<u>1.3.1</u>	<u>Resistance</u>	<u>Test Voltage</u>
	50K - 5×10^{12} ohms	10, 20, 25, 50, 100 Volts d.c.
	500K - 5×10^{13} ohms	200, 250, 500 Volts d.c.
	5MEG - 5×10^{13} ohms	1000 Volts d.c.

1.3.2 Test Voltages

Switch selectable at 10, 20, 25, 50, 100, 200, 250, 500 and 1000 Volts. Switch selectable voltages are accurate to $\pm 2\%$ of setting. Available current is limited to approximately 10 milliamperes.

1.3.3 Accuracy (25°C)

± 2 (Meter reading + 1)%. . . . + 1% on the 10^5 and + 2% on the 10^6 range.

1.3.4 Input Resistance

The input resistance used to scale the external unknown is based on a series of dividers using 1/4% resistors for all ranges except the two highest ranges. 1% resistors are used for these two ranges. Resistance values are as follows:

1.3.4 Input Resistance (Cont'd)

556.0 ohms — 10^0 range

5,546.0 ohms — 10^1 range

55,446.0 ohms — 10^2 range

554,446.0 ohms — 10^3 range

5,544,446.0 ohms — 10^4 range

55,444,446.0 ohms — 10^5 range

55,444,446.0 ohms — 10^6 range

1.3.5 Amplifier Sensitivity

The maximum amplifier sensitivity to drive the meter to full scale is approximately 100 milli-volts d.c.

1.3.6 Operating Conditions

Ambient Temperature Range: 0°C to 50°C

Maximum Relative Humidity: 65%

1.3.7 Power Requirements

120/240 Volts a.c., 50/60/400 Hz, 34 Volt — Amperes

1.3.8 Physical Size

11-1/4 (286 mm) wide x 7-1/4 (184 mm) high x 12" (305 mm) deep

1.3.9 Weight

15 Lbs. Net

18 Lbs. Shipping

II INSTALLATION

2.1 INSTALLATION PROCEDURE

2.1.1 The Model L-10A Megohmmeter is fully enclosed and can be used on the bench as supplied. If it is desired to raise the front of the instrument, a tilt ball can be swung out from under the instrument. Ventilating holes are provided at the rear of the instrument. Insure that these air passages are not blocked.

2.2 ELECTRICAL CONNECTIONS

2.2.1 An internal 120/240 Volts switch allows the megohmmeter to be operated from either 120 or 240 Volt power, at 50/60/400 Hz, without the necessity of rewiring the power transformer primary connection. This switch is located on the rear panel of the instrument. As supplied from the factory, the switch is normally