I DESCRIPTION AND PURPOSE

1.1 INTRODUCTION

1.1.1 The instruction manual for Beckman Instruments Model L-8 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-8 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-8 Megohmmeter measures dc resistance between 0.1 megohms and 10^{10} megohms. The test voltage can be selected for any value between 10 and 1000 volts dc. 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-8 Megohmmeter can be understood with the aid of Fig. 2. The instrument contains a regulated variable test voltage power supply with a range of 10 to 1000 volts dc. 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. The unit is calibrated by depressing the CAL switch, thereby applying a fraction of the test voltage to the amplifier's input. The gain of the amplifier is then adjusted to give full scale deflection. The value of R_C and R_I is selected automatically by the MULTIPLIER switch.

1.3 SPECIFICATIONS

1.3.1

Resistance	Test Voltage
10^6 - 10^{16} ohms	1000 volts dc
10^6 - 10^{15} ohms	100 - 1000 volts dc
10^6 - 10^{14} ohms	10 - 1000 volts dc
10^5 - 10^{14} ohms	10 - 100 volts dc
* 10^5 - 10^{13} ohms	1 - 10 volts dc

* External power source required

1.3.2 Test Voltages

10 to 1000 volts dc continuously variable. Switch selectable at 10, 100, 200, 300, 400, 500, 600, 700, 800 and 900 volts. A vernier control permits continuous adjustment over a 100 volt span. Switch selectable voltages are accurate to ± 2% of setting. The vernier calibration is accurate to ± 3 volts. Available current is limited to approximately 10 milliamperes.

1.3.3 Accuracy

The accuracy of the instrument is a direct function of the scale indication. For a reading of 1, the accuracy of that reading is ± 1%; for a reading of 2, the accuracy is ± 2%, etc. There is a possible additional error of ± 1% of reading on the 10^0 through 10^4 megohm range increasing to ± 2% on the 10^5 through 10^8 megohm range.

1.3.4 Limit Control

A contact closure and a light are provided to indicate that a previously chosen meter deflection has been exceeded. Accuracy is ± 2% of setting for meter deflections between 1 and 10. Contact rating of the limit circuit:

DC resistive load - 15 watts
AC resistive load - 15 VA
Maximum current - 1 amp
AC Breakdown - 300 volts rms

1.3.5 Remote Test Switch

A barrier strip has been provided at the rear of the instrument for connecting a foot activated TEST switch. If Beckman's Model FSW-1 foot switch is not used, a SPDT switch rated for at least 12 volts dc and .2 amps should be connected as shown in the main schematic.

1.3.6 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:

111.1 ohms - 10^0 range
1,111.0 ohms - 10^1 range
11,111.0 ohms - 10^2 range
111,111.0 ohms - 10^3 range
1,111,111.0 ohms - 10^4 range
11,111,111.0 ohms - 10^5 range
111,111,111.0 ohms - 10^6 range
111,111,111.0 ohms - 10^7 range
111,111,111.0 ohms - 10^8 range

1.3.7 Amplifier Sensitivity

The maximum amplifier sensitivity to drive the meter to full scale is 1 millivolt dc.

1.3.8 Operating Conditions

Ambient temperature range - 0^oC to 40^oC
Maximum relative humidity - 90%

1.3.9 Power Requirements

120/240 volts ac, 50/60 Hz, 39 volt amperes

1.3.10 Physical Size

7 1/2" High x 11" Wide x 13" Deep

1.3.11 Weight

17 lbs. net
21 lbs. shipping

II INSTALLATION

2.1 INSTALLATION PROCEDURE

2.1.1 The Model L-8 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 bail can be swung out from under the instrument. Ventilating holes are provided on the underside and 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 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 set for 120 volt operation. To convert to 240 volt operation, place a small screw-driver blade into the slot and slide switch until 240 appears on the switch face. Replace existing slow blow fuse with one rated for 240 volts and 1/4 amperes slow blow. If it is required to replace line cord, connect the black wire to the high side of the line, white wire to the neutral side and green wire to the ground terminal.

2.2.2 Plug the power connector into any convenient grounding outlet. When using the adapter, connect the ground clip to a good electrical ground system such as a cold water pipe or equivalent. (as approved by the National Electrical Code.)

2.2.3 The test voltage power supply cannot be damaged by shorting its output terminals. However, the power supply can be damaged by allowing the output voltage to develop into an arc. Although an arcing condition will not immediately harm the power supply, prolonging this condition longer than absolutely necessary may cause serious damage to the instrument.