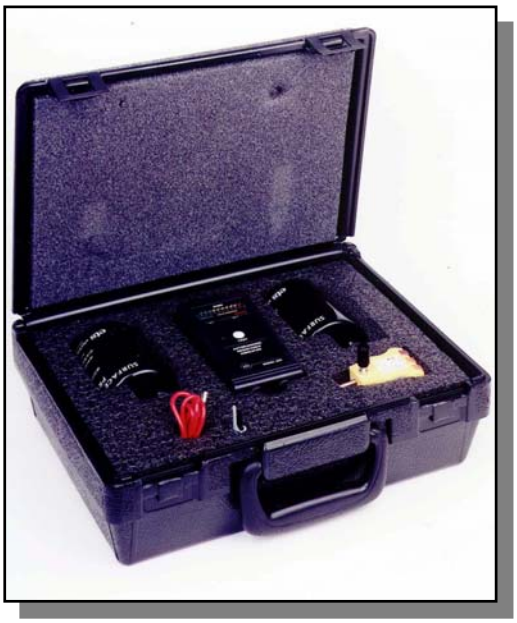
RESISTANCE MEASURING KIT

Model 818



Operating Instructions

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GENERAL

The Model 818 Resistance Measuring Kit shown in Figure 1 is a cost Effective system for measuring the resistance characteristics of material, flooring, work surfaces, seating, garments, etc. in accordance with current ESD Association, DOD and internal corporate standards.

Figure 1: Model 818-1 Resistance Measuring Kit with Utility Wiring Verifier

The Kit comes complete with an ETS Model 880 Autoranging Resistance Indicator, 2 Model 850 Surface Resistance Probes, Model 256 North American 120VAC Utility Wiring Verifier, conductive electrode plus all necessary cables and accessories housed in a hard shell carry case. For locations with 230VAC mains the Verifier is not included (Model 818-2)

EQUIPMENT DESCRIPTION

The Model 880 Autoranging resistance Indicator, shown in Figure 2, is a **CE** certified, precision, easy to use instrument that incorporates features found only in more expensive units. Twelve (12) LEDs indicate the Conductive (Green), Static Dissipative (Yellow) and Insulative (Red) ranges in one (1) decade steps from $<10^3$ to $>10^{12}$ Ohms.

Figure 2: Model 880 Autoranging Resistance Indicator

Accuracy is ±10% of the mean value, with changeover points of ½ decade on a logarithmic scale.

Measurements in the Conductive range (<$5x10^5$ Ohms) are made at 10 Volts. All remaining measurements are made at 100 Volts.

The measurement electrodes, shown in Figure 3, consist of chrome-plated parallel bars 2.5” (6.25 cm) long, spaced 1.56” (4.0 cm) apart. The conversion to surface resistivity is 1.6, however, the measurement resolution of one decade enables the user to convert the indicated resistance in Ohms directly into surface resistivity in Ohms/sq.

Figure 3 Electrode configuration and auxiliary input jacks

Two auxiliary input banana jacks enable the user to plug in virtually any type of resistance measurement electrode to convert the Model 880 to an independent wide range resistance indicator. When the auxiliary probe is plugged in the built-in parallel bar electrodes are automatically disconnected. The supplied ground cable enables resistance-to-ground (RTG) measurements to be made by plugging into one of the auxiliary jacks and using the other parallel bar as the surface electrode for quick checks or plugging in one of the Model 850 Surface Resistance Probes.

Plugging in the Model 850, 5lb, 2.5” diameter, Surface Resistance Probes provides standard point-to-point resistance.

The Model 256 Wiring Verifier can only be used in locations with standard 3-wire 120VAC North American standard outlets. It both checks the wiring of the outlet and provides a solid banana jack connection the third wire electrical ground. For locations having 230VAC mains the Verifier is not included (Model 818-2)

Other measurements, such as volume resistance, seating resistance per ESD STM12.1 can be made using the conductive electrode.

OPERATION

Surface Resistance of Material

The Model 880 is designed to measure samples having a flat surface at least 2.5”x1.75”. The sample being tested should be placed on an insulated surface (>10^{13} Ohms) to avoid parallel measurement paths, especially if the material has any bulk resistance.

Prior to making measurements first check the Indicator by holding it away from any surface and pressing the TEST button. The >10^{12} Red LED should light. Place the Model 880 on the surface to be measured, then depress and hold the TEST button for approximately 3-5 seconds. The illuminated LED indicates the surface resistance of the material in Ohms or Ohms/sq., if desired.

Resistance-to-Ground (RTG)

To measure the RTG of a table top, mat or flooring plug the RTG cable supplied into one of the auxiliary banana jacks. This will disconnect the corresponding bar electrode. Clip the cable to the common point ground and place the Indicator on the surface to be measured to obtain a quick indication. Depress and hold the TEST button for approximately 3-5 seconds. The illuminated LED indicates the RTG in Ohms. For conformance testing plug one of the Model 850 Probes into the other auxiliary jack.

To measure the resistance-to-electrical ground plug the supplied Model 256 Utility Ground Verifier into a standard North American 120 VAC/60 Hz outlet and connect the RTG cable into the black banana jack located on the bottom. Check the correct wiring of the outlet by observing the 3 LED’s and the chart on the unit.

WARNING: Do not plug the Model 256 into 220-240VAC circuits.

Volume Resistance/Resistivity

Plug the appropriate electrodes into the auxiliary jacks. The bar electrodes will now be disconnected. Place the probe(s) on the surfaces being measured. Follow the above test procedure. The illuminated LED indicates the measurement resistance in Ohms.

For volume resistance plug the RTG cable into either the supplied conductive electrode or a optional standard Volume Resistance/Resistivity test bed. Place the sample on the electrode (test bed) and the “live” electrode of the Model 880 on the sample. The resulting measurement will be an indication of the volume resistance in Ohms. To obtain volume resistivity, place the Model 850 Probe (2.5” (6.35cm) diameter electrode) on top of the sample. The volume resistivity can then be calculated as follows:

$$\rho_v = A/t\ R_m$$
$$= 31.7/t\ R_m \quad \text{Ohms-cm}$$

Where A is the area of the electrode in cm^2 and t is the thickness of the sample in cm.

Seating

Place one of the seating casters or legs on the supplied electrode plate. Connect the cable to one of the auxiliary Model 880 jacks. Plug a Model 850 Probe into the other jack. Follow the test procedure described in ESD S12.1. For quick indications use the “live” electrode of the Model 880 as the probing electrode.

MAINTENANCE

The Model 880 operates from a standard 9 Volt battery. The momentary nature of the measurements allows for a very long battery life. When the LED’s appear dim and/or the measurements are unstable, change the battery.

Remove the four (4) Phillips head screws and carefully remove the bottom cover. Replace the battery and reinstall the cover.

To clean the instrument, wipe with a clean, damp cloth. Do not use any solvents as these make react with the plastic case and damage it.

The Model 850 Surface Resistance Probes are precision instruments that are calibrated to ensure even contact with the surface being measured. With extensive use the surface can become uneven resulting in measurements that are higher. The probes should be returned to ETS for periodic recalibration, or if the conductive rubber is damaged or shows excessive wear.

The Model 256 Wiring Verifier is not serviceable and can only be replaced.

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WARRANTY

Electro-Tech Systems, Inc. warrants its equipment, accessories and parts of its manufacture to be and remain free from defects in material and workmanship for a period of one (1) year from date of invoice and will, at the discretion of Seller, either replace or repair without charge, F.O.B. Glenside, similar equipment or a similar part to replace any equipment or part of its manufacture which, within the above stated time, is proved to have been defective at the time it was sold. All equipment claimed defective must be returned properly identified to the Seller (or presented to one of its agents for inspection). This warranty only applies to equipment operated in accordance with Seller's operating instructions.

Seller's warranty with respect to those parts of the equipment which are purchased from other manufacturers shall be subject only to that manufacturer's warranty.

The Seller's liability hereunder is expressly limited to repairing or replacing any parts of the equipment manufactured by the manufacturer and found to have been defective. The Seller shall not be liable for damage resulting or claimed to result from any cause whatsoever.

This warranty becomes null and void should the equipment, or any part thereof, be abused or modified by the customer of if used in any application other than that for which it was intended. This warranty to replace or repair is the only warranty, either expressed or implied or provided by law, and is in lieu of all other warranties and the Seller denies any other promise, guarantee, or warranty with respect to the equipment or accessories and, in particular, as to its or their suitability for the purposes of the buyer or its or their performance, either quantitatively or qualitatively or as to the products which it may produce and the buyer is expected to expressly waive rights to any warranty other than that stated herein.

ETS must be notified before any equipment is returned for repair. ETS will issue an RMA (Return Material Authorization) number for return of equipment.

Equipment should be shipped prepaid and insured in the original packaging. If the original packaging is not available, the equipment must be packed in a sufficiently large box (or boxes if applicable) of double wall construction with substantial packing around all sides. The RMA number, description of the problem along with the contact name and telephone number must be included in formal paperwork and enclosed with the instrument. Round trip freight and related charges are the owner’s responsibility.