

Digital Surface Resistance/Resistivity Test Kit Operation and Maintenance



Made in America

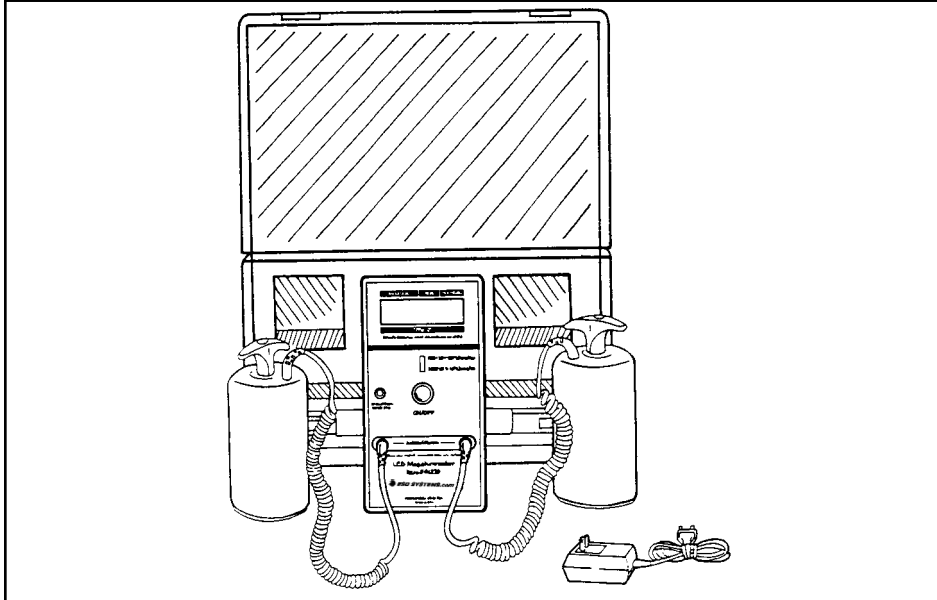


Figure 1. ESD Systems.com Item 41273

Description

The Digital Surface Resistance/Resistivity Test Kit is a portable instrument designed to measure resistance between two points (RTT), surface to ground (RTG), and surface resistivity in accordance with ANSI EOS/ESD Association Standard S 4.1. This unit is suitable for evaluating the electrical properties of ESD protective work surfaces and flooring products.

The LCD Surface Resistance/Resistivity Test Kit is calibrated to NIST traceable standards and is available in three models.

Model	Description	Voltage/Hz
41273	Test Kit	120V/50-60
41274	Test Kit	220V/50-60
41276	Tester Only	120V/50-60
41275	Replacement Electrode 5lb	
41280	Replacement Cord Lead for 5lb Electrode	

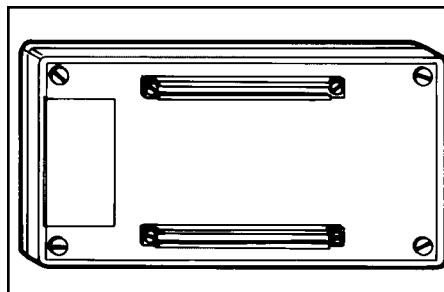


Figure 2. Parallel Resistivity Electrodes on bottom of meter.

The meter has two parallel probes on the bottom of the case which measure surface resistivity. These parallel electrodes allow for quick and easy testing of a variety of surfaces and materials without the use of external probes. The 5-pound electrodes (item 41275), and test leads (item 41280) can be purchased separately.

The Test Kit displays a measurement per ESD S4.1-1997 proving the proper electrification period of 15 seconds during which numerous readings and calculations are executed. **NOTE:** Testing in accordance with ESD S4.1-

1997 requires 15 seconds of electrification; in contrast, most analog type meters display measurements instantaneously.

Recommended Literature

ESD Systems.com recommends that you read the following standards from the ESD Association:

ANSI/ESD S20.20 - Development of ESD Control Program

ESD ADV1.0 - Glossary of Terms

ESD S4.1 - Worksurfaces

ANSI EOS/ESD S6.1 - Grounding

ANSI ESD S7.1 - Floor Materials

ANSI EOS/ESD S11.11 - Surface Resistivity

These documents can be obtained directly from the ESD Association, 7902 Turin Rd., Suite 4, Rome, NY 13440-2069, (315) 339-6937.

In addition to the Association Standards listed previously, anyone testing the electrical properties of ESD protective surfaces should also obtain copies of:

MIL-HDBK 263A
ASTM-F-150
EN 100015

EIA-IS-5-A
ASTM-D257

These standards are available from the agencies who produce them. If you need help in obtaining these documents contact our customer service department.

Inspection

Remove the meter from the carton and inspect for damage. Each unit should include the following:

- 1 Protective carrying case
- 1 LCD display meter
- 2 Test leads
- 2 5-pound weighted electrodes
- 1 Grounding clip
- 1 AC adapter/charger
- 1 Rechargeable battery

Properly store the meter and component assemblies when not in use. Do not charge battery unless it is fully discharged. Doing so will reduce the life of the battery.

Features

A. Scale: 1/2" high digital LCD display provides easy to read resistivity/resistance measurements. Values are expressed with a mantissa and exponent power. For example, if the display reads "2.9 E 9", 2.9 is the mantissa, 9 is the exponent power; the reading is 2.9×10^9 ohms.

B. Test Button: This button turns on the power to the meter. The operator needs to hold the button down for 10-20 seconds for the unit to make numerous readings and calculations. When released the measured reading will remain illuminated for at least 10 seconds.

C. Test Range Voltage Switch:
10 Volts for $10^3 - 10^{11}$ ohms
100 Volts for $10^5 - 10^{12}$ ohms

D. Jacks: 2.5mm plugs will fit the megohmmeter jacks. Banana plugs will fit 5 lb. electrodes.

E. AC-Battery Charger Jack:
12 volts DC - 200mA.

F. 9 Volt Battery Compartment.

G. Parallel Electrodes: For surface resistivity measurements only.

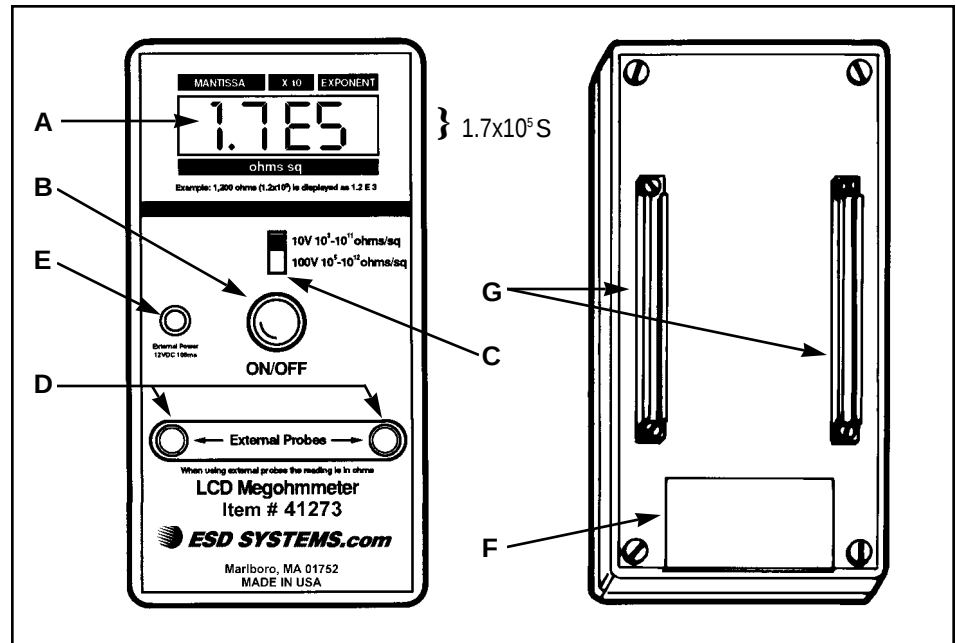


Figure 3. Features of the Digital Surface Resistance/Resistivity Meter

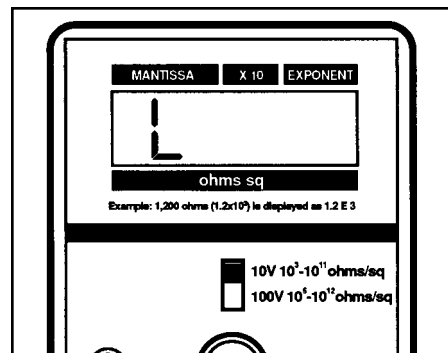


Figure 4.

If the value of the measurement is below 1000 ohms on the 10 volt scale or 1×10^6 on the 100 volt scale an "L" will appear on the LCD display.

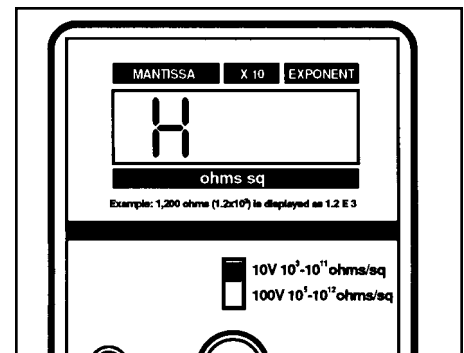


Figure 5.

If the value of the measurement is over 5×10^{12} ohms an "H" will appear on the LCD display.

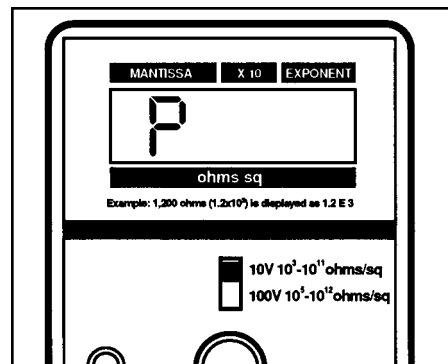


Figure 6.

A "P" will appear on the LCD display if there is too much electrical 60Hz noise in the area or if a test is performed on a high open resistance.

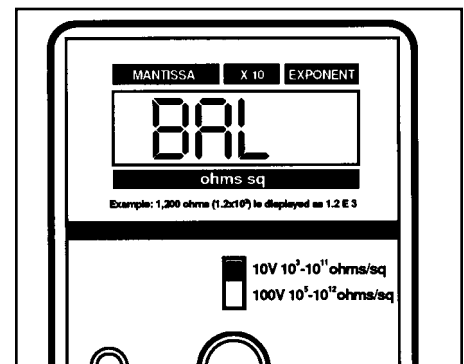


Figure 7.

When the unit's batteries need recharging a "BAL" will appear on the LCD display as the meter is being operated. To maximize the life of the battery do not recharge until a low battery "BAL" is displayed.

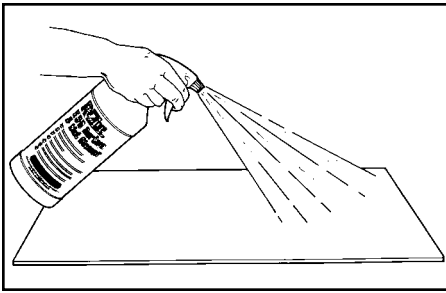


Figure 8. Clean before testing.

Cleaning

Work surfaces or materials to be tested should be cleaned prior to testing to ensure that surface dirt and contamination do not affect the test results. Periodically clean the built-in parallel electrodes and the two 5 lb. conductive rubber probe electrode surfaces. Use solvent-free rubber cleaners. We recommend using ESD Systems.com Reztore™ Surface and Mat Cleaner, Item #16030. Be sure the surface is dry before testing.

Power Requirements

The unit is powered by a rechargeable 9 volt DC Nickel/Cadmium battery, an alkaline battery, or a special 12 volt DC, 200mA adapter. The AC to DC adapter is also used to recharge the 9 volt battery.

Surface Resistance Measurements (RTT) Complies with ESD S4.1

Point to point surface resistance measurements are made using the meter along with both of the 5 pound weight electrodes. This test will determine the resistance between two points, independent of a groundable point. The charge dissipation rate of all ESD protective materials is related directly to electrical resistance to ground. To perform surface resistance tests you must first determine what test procedure you will be using. The test procedure will help you to determine proper preparation of the

material to be tested and the spacing of the weights. Once testing parameters are determined you can proceed with the following instructions:

A. Connect the test leads to the meter by inserting the banana termination end of a test lead into the weighted electrode and the mini phone plug end into the meter.

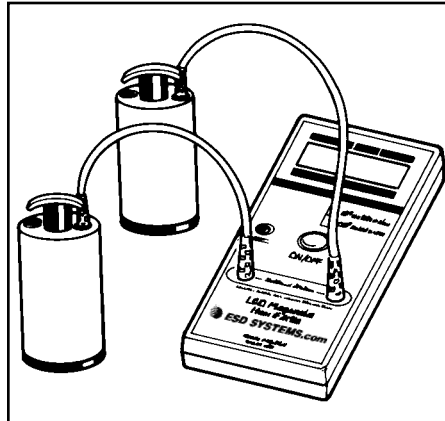


Figure 9. Setting up for RTT testing.

B. Place both electrodes on the material at positions determined by the procedure selected. Set the meter to the required test voltage determined by the test procedure and the resistance of the material.

C. Press and hold the red test button for 10-20 seconds (the unit will be making numerous measurements and calculations.) The measured resistance value will appear on the display. This reading is expressed in ohms. You may want to record the temperature, humidity and test voltage.

Surface-to-Ground Measurements (RTG) Complies with ESD S4.1

The Surface-to-Ground measurements will indicate the surface resistance between selected locations on a work surface and a groundable point or points. Ground points are usually in the form of snaps installed on the

material so that the material can be grounded via ground cords. When making Surface-to-Ground measurements, follow this procedure:

A. Connect one of the 5 pound electrodes to the meter using one of the test leads.

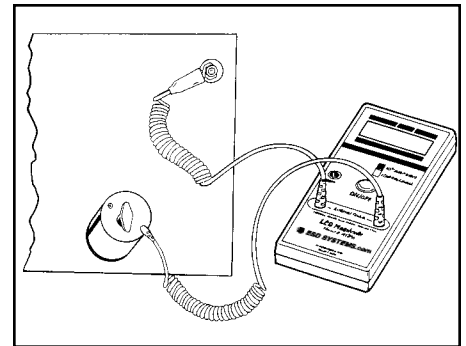


Figure 10. Setting up for RTG testing.

B. Using the other lead connect one end to the meter. Insert the grounding clip included with the test clip onto the banana plug on the other end of the lead. Now connect the grounding clip to the groundable point on the surface to be tested.

C. Position the electrode on the material at the position specified by the procedure selected. Set the meter to the desired test voltage range. Be sure to keep the cords separated in order to prevent false readings especially when testing high resistance materials.

D. Press the red test button for 10-20 seconds. The measured resistance value will appear on the display. This reading is expressed in ohms. You may want to record the reading, humidity, temperature, and test voltage.

Repeat procedure on the other points on the material under test.

Surface Resistivity Measurements - Quick Reference

Complies with ANSI EOS/ESD S11.11

A. Firmly place the megohmmeter's parallel probes on the surface of the material to be tested, at the position specified by the procedure selected.

B. Press and hold the test button for 10-20 seconds. The measured resistivity value will appear on the display. This reading will be in ohms/sq. You may want to record ambient temperature and humidity.

Maintenance

Your Surface Resistance Test Kit will require little maintenance, and there are no user serviceable parts. If your meter requires service beyond cleaning the probes or replacing or recharging the battery, please contact the factory.

Calibration

The 41273 Digital Surface Resistance Test Kit is calibrated to NIST traceable standards. Please call or fax our Customer Service Department for details.

In-house calibration can be performed by using 1% resistors in each of the meter ranges. Simply attach the resistors to the enclosed cords using grounding clips and recording the meter display. Keep the cords separated. adjustments to the internal resistance pots can be done quite easily. Request this procedure from the ESD Systems.com Customer Service Department.

Specifications

Ranges:

10^3 - 10^{11} ohms @ 10 Volts
 10^6 - 10^{12} ohms @ 100 Volts

Power Supply:

9 volt rechargeable nickel/cadmium battery and charger/adaptor included. alkaline battery optional.

Battery Life:

Ni-Cad - 1 hour
Alkaline - 8 hours

Charge Time :

12 hours

Adapter Output:

12 volt DC - 200mA
Use only with rechargeable battery

Current Electrodes:

Internal - Two parallel conductive silicone rubber replaceable electrodes
External - Two 5-pound weight electrodes, 2.5" in diameter, complies with ESD S4.1

Operating Conditions:

60°F - 80°F, 10-50% RH

Display:

One six character .500" LCD display

Accuracy:

10^3 - 10^9 = $\pm 15\%$ at 10-90% RH
 10^9 - 10^{11} = $\pm 20\%$ at 10-60% RH
 10^{11} - 10^{12} = $\pm 30\%$ at 10-50% RH

Meter Weight:

13 oz.

Charger Weight:

11 oz.

Dimensions:

7.5"L x 4"W x 1.75"H

Power Switch:

Momentary on. Releasing the switch will hold and display for >15 seconds, per ESD S4.1.

Limited Warranty

ESD Systems.com expressly warrants that for a period of one (1) year from the date of purchase, our 41273 Test Kits will be free of defects in material (parts) and workmanship (labor). Within the warranty period, a unit will be tested, repaired or replaced at our option, free of charge. Call Customer Service at 508-485-7390 for a Return Material Authorization (RMA) and proper shipping instructions. You should include a copy of your original packing slip, invoice, or other proof of purchase date. Any unit under warranty should be shipped prepaid to the ESD Systems.com factory. Warranty repairs will take approximately two weeks.

If your unit is out of warranty, ESD Systems.com will quote repair charges necessary to bring your unit to factory standards. Call Customer Service at 508-485-7390 for a Return Material Authorization (RMA) and proper shipping instructions and address.

Warranty Exclusions

THE FOREGOING EXPRESS WARRANTY IS MADE IN LIEU OF ALL OTHER PRODUCT WARRANTIES, EXPRESSED AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH ARE SPECIFICALLY DISCLAIMED. The express warranty will not apply to defects or damage due to accidents, neglect, misuse, alterations, operator error, or failure to properly maintain, clean or repair products.

Limit of Liability

In no event will ESD Systems.com or any seller be responsible or liable for any injury, loss or damage, direct or consequential, arising out of the use of or the inability to use the product. Before using, users shall determine the suitability of the product for their intended use, and users assume all risk and liability whatsoever in connection therewith.

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