

Low Resistance Tester Operation and Maintenance



Made in the
United States of America



Figure 1. Vermason 222645 Low Resistance Tester

Description

The Vermason Low Resistance Tester has three selectable test ranges to check resistance paths: <1 ohm, <2 ohms and <10 ohms. Per ANSI/ESD S20.20, the required limit for equipment grounding conductors (such as banana jacks) is <1 ohm tested per ESD TR53. Per ANSI/ESD S20.20, the required limit for solder hand tools is <2 ohms (Product Qualification) and <10 ohms Compliance Verification tested per ESD TR53. The Low Resistance Tester is equipped with pass/fail (go/no go) audio and visual indicators that activate to confirm that the grounding conductor being tested meets the required limit. The low battery indicator lets the operator know when battery needs to be replaced.

ESD Handbook ESD TR20.20 section 5.5.2.2 Electrical Hand Tools

“All electrical tools and equipment used to process ESD sensitive devices require the three prong, grounded-type AC plug. The metal portions of the tool that touch the device should have a low resistance (<2 ohms) to the equipment ground terminal on the plug. In some cases, the user may wish to verify that the metal portions of the tool have acceptable voltage levels and leakage current. The tester defined in ESD STM13.1 provides a means of checking soldering iron tips while being used. Although the document was written to make measurements on soldering and desoldering equipment, the measurement techniques can be used for other electrical hand tools. The working part of AC powered tools should be capable of providing a conductive path to ground. New powered hand tools such as soldering irons typically should have a tip to ground resistance of less than 1.0 ohm.

NOTE: This resistance may increase with use but should be less than 20.0 ohms for verification purposes.”

ANSI/ESD S6.1 – Grounding

“6.4.1 The resistance of the conductor from the groundable point ground of any ESD technical element (e.g. worksurface, floor, chair, wrist strap, etc.) to the common point ground or common connection point shall not be greater than 1 ohm. Where a resistor is used in the grounding conductor, the total resistance shall include the value of the resistor.

6.4.2 The resistance of the conductor from the common point ground to the AC equipment ground shall not be greater than 1 ohm.”

Packaging

- 1 Low Resistance Tester
- 1 Threaded Banana Plug
- 1 Threaded Needle Point
- 1 Alligator Clip
- 1 Banana Jack / 10mm Snap Adapter
- 1 Certificate of Calibration

Features and Components

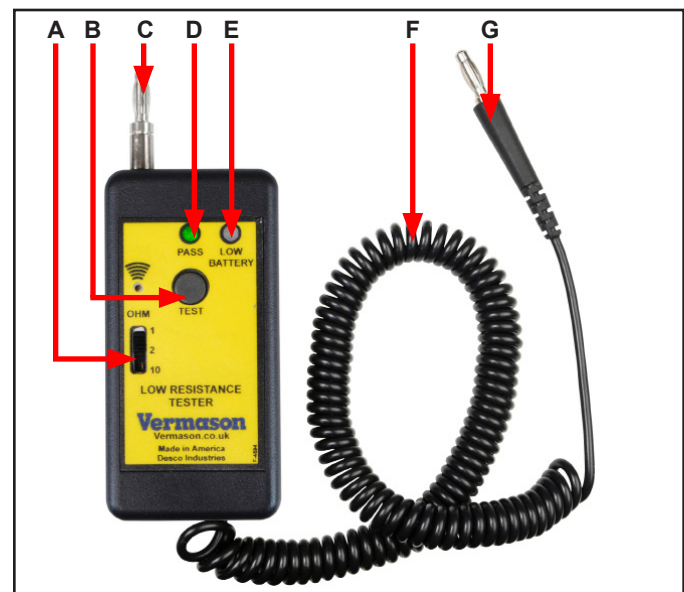


Figure 2. Low Resistance Tester features and components

- A. Selectable Test Ranges:** Select the appropriate range for required test <1 OHM, <2 OHMs, and <10 OHMs.
- B. Test Button:** Press and hold button to activate the tester.
- C. Threaded Banana Plug/Needle Point:** Standard Kit includes a banana plug and needle point adaptor.
- D. Audio and Visual Test Indicators:** LED and buzzer Pass result.

E. Low Battery LED: LED illuminates when the battery needs to be replaced.

F. 1.8 m Coiled Cord: Insulation black colour PVC.

G. Banana Plug: Industrial Standard 4.4 mm Banana Plug, fits banana jack ≥ 4.0 mm.

Operation

USING THE TESTER

1. Use the slide switch to select a test range.
2. Connect the coil cord banana plug end to known ground. Use adapters where needed. NOTE: The Vermason Low Resistance Tester may be used with an outlet polarity checker such as the Vermason [222606](#) to determine a known ground.
3. Connect or touch the tester end to a banana jack or other equipment that is being tested for resistance to ground.
4. Press and hold the test button.
5. An audio and visual indication will activate for a PASS condition.
6. A FAIL condition is indicated when the buzzer does not sound and the PASS does not illuminate.

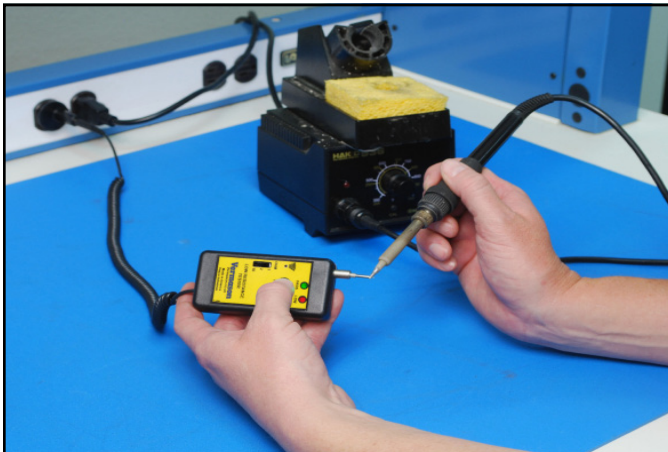


Figure 3. Testing a soldering iron with the [222645](#) tester

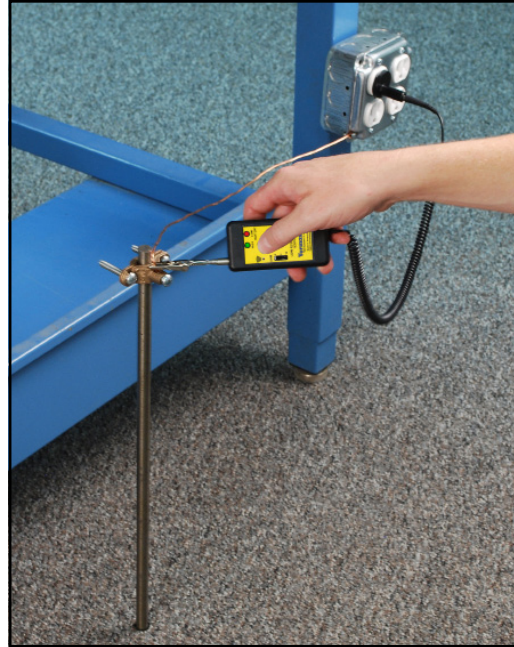


Figure 4. Testing auxiliary ground with the [222645](#) tester

Example of Test Range Uses

<1 OHM Range

ESD Technical element Grounding Conductors:
Banana Jacks, Grounding Blocks, Mat Ground Cords
ANSI/ESD S6.1 Grounding, sections 6.4 Technical Elements, 6.4.1, 6.4.2 and 6.4.3

New AC Powered Hand Tools
ESD Handbook ESD TR20.20 section 5.5.2.2 Electrical Hand Tools

<2 OHM

Soldering Irons
ESD Handbook ESD TR20.20 section 5.5.2.2 Electrical Hand Tools

Other AC Powered Hand Tools
ESD Handbook ESD TR20.20 section 5.5.2.2 Electrical Hand Tools

<10 OHM

Soldering iron verification
ESD Handbook ESD TR20.20 section 5.5.2.2 Electrical Hand Tools

Auxiliary grounds (ground rods)
*ANSI/ESD S20.20**

*ANSI/ESD S20.20 requires <25 ohms from the Auxiliary Ground to the Equipment Grounding Conductor. The Vermason Low Resistance Tester only tests to <10 ohms. In cases of a no pass result with the Low Resistance Tester when testing an Auxiliary Ground, an Ohm meter should be used to determine the actual resistance from the Auxiliary Ground to the Equipment Grounding Conductor.

Calibration

The Low Resistance Tester is calibrated to standards traceable to NIST. Frequency of recalibration should be based on the critical nature of those ESD sensitive items handled and the risk of failure for the ESD protective equipment and materials. In general, we recommend that calibration be performed annually.

1. Calibration is performed by placing various resistors between the probe tip and the lead wire.
2. Attach the alligator clip to the lead wire.
3. Set the Low Resistance Tester to the 1 ohm test setting.
4. Attach the lead of a 1 ohm resistor to the alligator clip.
5. Firmly place the tester's probe tip on the opposite resistor lead.
6. Press and hold the test button. The PASS LED should illuminate.
7. Repeat the procedure with a 1.2 ohm resistor. The PASS LED should not illuminate.
8. Repeat this process with the ranges listed in the table below. If the unit fails calibration, check and replace the battery.

Test Range Setting	PASS	FAIL
1 ohm	0 to 1 ohm	≥ 1.2 ohms
2 ohms	0 to 2 ohms	≥ 2.2 ohms
10 ohms	0 to 10 ohms	≥ 11 ohms

Maintenance

Battery Replacement

1. Properly ground yourself using a wrist strap.
2. Remove the 2 screws located at the back of the tester.

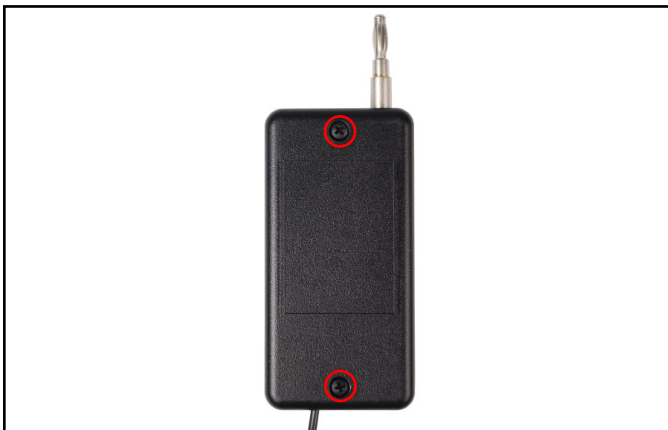


Figure 5. Locating the enclosure screws



Figure 6. Removing the back cover

3. Remove and turn over the circuit board.
4. Locate and replace the battery (3 Volt; Model CR2032).

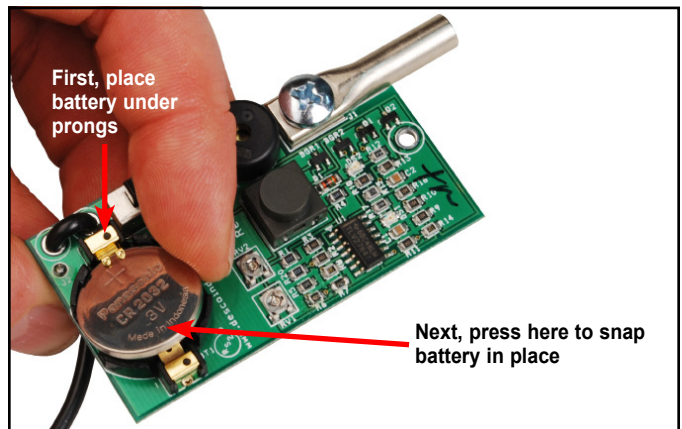


Figure 7. Replacing the battery

5. Re-assemble the tester.

Specifications

Output Voltage: 2.5 VDC @ 10mA

Dimensions: 12 cm x 5 cm x 2 cm

Operating Temperature: 0° to 40°C

Limited Warranty, Warranty Exclusions, Limit of Liability and RMA Request Instructions

See Vermason's Warranty -

<http://www.vermason.co.uk/Warranty.aspx>