

# Surface Resistance Checker Operation and Maintenance



Made in America



Figure 1. Desco [19640](#) Surface Resistance Checker

## Description

The Desco [19640](#) Surface Resistance Checker is a portable battery powered checker fitted with built-in parallel electrodes that allow for tests of material surface resistance. This meter is designed for quick checks of surface resistance for ESD control applications in electronics manufacturing or handling environment. The Surface Resistance Checker is equipped with an automatic test voltage selector. The test voltage will switch from 10V to 100V should the measured resistance exceed  $1 \times 10^5$  ohms. Two banana jacks and an electrode toggle switch allow for the connection of two external 5 pound electrodes that measure surface resistance point to point (RTT) or resistance to equipment ground (RTG).

ESD protected area products should be tested:

- A. Prior to installation to qualify for listing in user's ESD control plan. Approved ESD materials (see product qualification table at ANSI/ESD S20.20-2007 Table 3 EPA ESD control items)
- B. During initial installation
- C. For periodic checks of installed products as part of ANSI/ESD S20.20-2007 Compliance Verification testing per ESD TR53.

## Compliance Verification Plan

"A Compliance Verification Plan shall be established to ensure the Organization's fulfillment of the technical requirements of the ESD Control Program Plan. Process monitoring (measurements) shall be conducted in accordance with a Compliance Verification Plan that identifies the technical requirements to be verified, the measurement limits and the frequency at which those verifications shall occur. The Compliance Verification Plan shall document the test methods and equipment used for process monitoring and measurements. If the test methods used by the Organization differ from any of the standards referenced in this document, then there must be a tailoring statement that is documented as part of the ESD Control Program Plan. Compliance verification records shall be established and maintained to provide evidence of conformity to the technical requirements.

The test equipment selected shall be capable of making the measurements defined in the Compliance Verification Plan." (ANSI/ESDS20.20-2007 section 7.3)

## Packaging

- 1 Surface Resistance Checker
- 1 9V Battery
- 1 Certificate of Calibration

The following accessories are available:

Item	Description
<a href="#">19641</a>	Pair of Test Leads
<a href="#">50003</a>	5 Pound Electrodes

## Features and Components

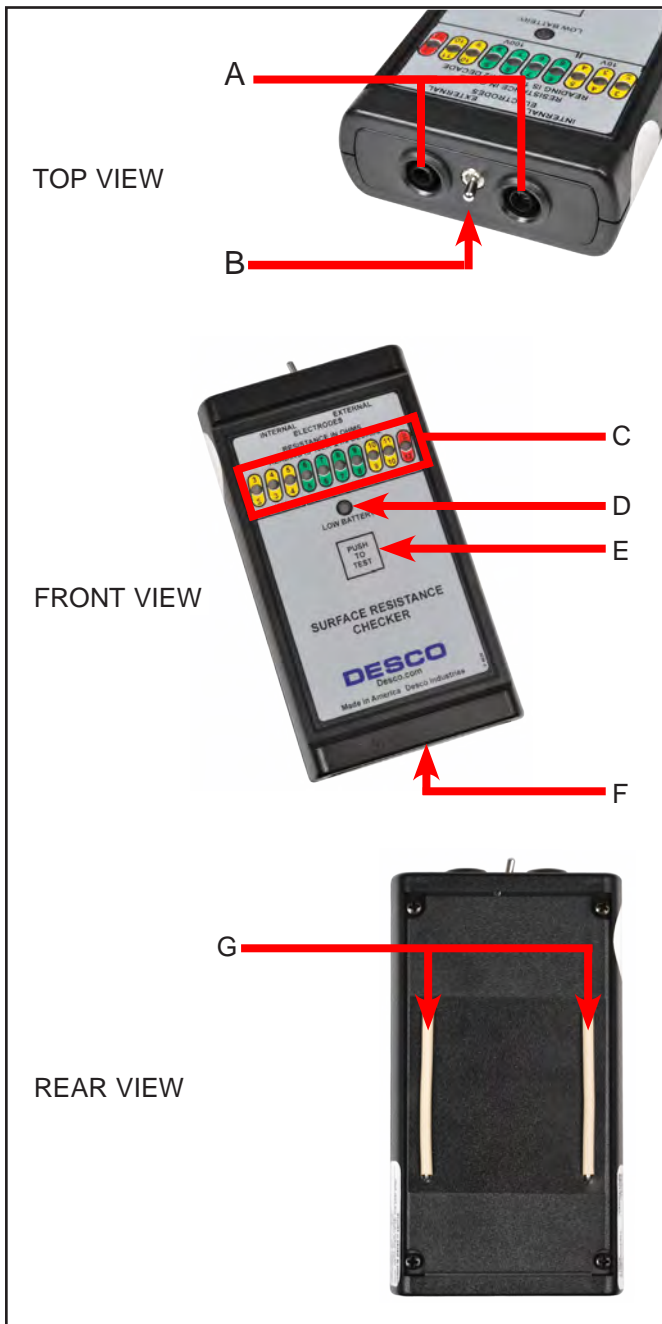


Figure 2. Surface Resistance Checker features and components

**A. Electrode Banana Jacks:** Insert the test leads from the optional 5 pound electrodes here.

**B. Electrode Toggle Switch:** Position the switch to the left ("INTERNAL") to measure using the built-in parallel electrodes on the back of the Surface Resistance Checker. Position the switch to the right ("EXTERNAL") to measure using one or two of the optional 5 pound electrodes.

**C. Resistance Measurement LEDs:** The resistance is measured in ohms and read as  $10EX \pm 1/2$  decade where X is the range illuminated on the checker.

**D. Low Battery LED:** When illuminated, this LED indicates when the battery needs to be replaced. Do not use the Surface Resistance Checker when this LED is illuminated.

**E. Test Contact:** Use this contact area to make a surface resistance measurement. Press and hold until one of the Resistance Measurement LEDs remains illuminated.

**F. Battery Compartment:** Remove the cover to allow access to the 9V battery compartment.

**G. Parallel Electrodes:** Be sure to position the Electrode Toggle Switch to "INTERNAL" when choosing to make a measurement using the parallel electrodes built-in on the back of the Surface Resistance Checker.

## Operation

### USING THE INTERNAL PARALLEL ELECTRODES

#### MEASURE RESISTANCE POINT-TO-POINT (RTT) ON THE SURFACE

- Do not clean the surface prior to testing
- Remove all items from the surface that may interfere with the test
- ESD sensitive devices should also be removed
- Place the Surface Resistance Checker on the most commonly used portion of the surface (2" from any edge, 3" from any groundable point)
- Toggle the Electrode Switch located at the top of the Surface Resistance Checker to "INTERNAL"
- Press and hold the test contact until the measurement is displayed
- If the measurement is outside acceptable limits, clean the surface and re-test to determine if the cause of failure is an insulative dirt layer or the surface material.

NOTE: For worksurfaces, use Desco Item# [10435](#) Reztore™ Antistatic Surface and Mat Cleaner or other silicone-free ESD cleaner. Be sure the surface is dry before testing.



Figure 3. Using the internal parallel electrodes to measure surface resistance

## USING THE OPTIONAL TEST LEADS AND ONE OR TWO 5 POUND ELECTRODES

### GENERAL GUIDELINES

- Use both 5 pound electrodes for RTT
- Use one 5 pound electrode and one lead to groundable point for RTG (note: groundable points are usually snaps installed on the material or workstation common point ground)
- Ensure that the item being measured is electrically isolated (i.e. placed on an insulative surface) as the checker will measure the lowest resistance path
- Ensure that the test leads are separated as a best practice
- When using the 5 pound electrodes:
  - Place no closer than 2" from the edge of the surface being measured
  - Place no closer than 3" to any groundable point
  - Place the 5 pound electrodes about 10" apart for RTT of worksurface and 3' for floor
  - Preferred placements include: most commonly used surface portion, most worn, center, and furthest from groundable point.
  - For RTG, connect the banana plug to groundable point
- If surface has sections (floor tiles, garment panels), for RTT place the 5 pound electrodes on different sections

### Recommended Frequency of Periodic Checks of Installed Products

The ESD Association lists test procedures and troubleshooting tips in Compliance Verification ESD TR53.

Note: "The frequency of periodic testing is normally specified in corporate operating procedures. ...The frequency of testing is driven by the amount of risk exposure that can occur between tests. For, example, what is the quantity of product handled between test periods?" (See ESD Handbook ESD TR20.20)

### A GUIDE FOR PERIODIC TESTING

- Worksurface, Carts, Shelves - at least quarterly (see ESD TR20.20 section 5.3.1.13 Periodic Tests)
- Footwear - "Incoming inspection on a lot sampling basis should be performed for all static control footwear." (see ESD TR20.20 section 5.3.3.4 Testing)
- Floor - "The types of monitoring and type of equipment are considerations. In some cases, a simple electrical resistance test with a megohmmeter may suffice. In others, a static charge generation test may be required." (see ESD TR20.20 section 5.3.4.13 Performance Monitoring)
- Seating - "The recommended electrical resistance range for seating is less than  $1 \times 10^9$  ohms as tested in accordance with ANSI/ESD STM 12.1. This value should be during acceptance testing, installation and periodically thereafter." (see ESD TR20.20 section 5.3.5.3 Testing)

- Garments - "To maintain process control, it is imperative that the garment be tested per ANSI/ESD STM 2.1. The point-to-point and sleeve-to-sleeve resistance test should be made." (see ESD TR20.20 section 5.3.13.3.1.8 Periodic Testing)

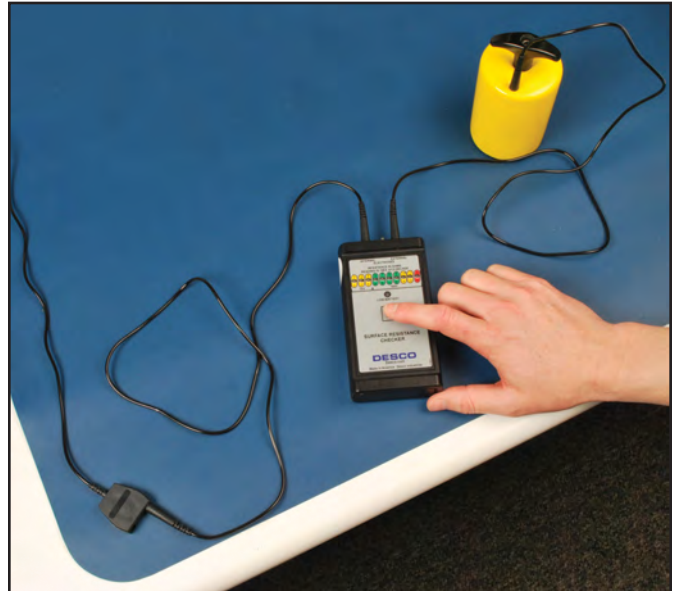


Figure 4. Using the test leads and one 5 pound electrode to measure RTG



Figure 5. Using the test leads and two 5 pound electrodes to measure RTT



## Specifications

Accuracy	±1/2 decade
Weight	0.4 lbs
Size	5.2" x 2.9" x 1.1"
Power Supply	9V alkaline battery

## Maintenance

The area surrounding the cable jacks at the top end of the meter should be wiped with a clean cloth moistened with alcohol to remove skin oils that will accumulate and affect the accuracy at high resistances. The frequency of cleaning will depend on usage; once a month would be a good starting point.

Per ANSI/ESD S4.1 "Clean the electrodes with a minimum 70% isopropanol-water solution." Make sure conductive pads are dry prior to use.

See specific product test standard for test lab specimen cleaning instructions. Per ANSI/ESD S4.1 Worksurfaces "The test specimens and electrodes shall be cleaned twice with a minimum 70% isopropanol-water solution using a clean, low-linting cloth each time." (then conditioned for a minimum of 72 hours).

For compliance verification testing, do not clean surfaces. However, if any measurements lie outside acceptable range, then clean the material's surface and re-test.

NOTE: For worksurfaces, use Desco Item# 10435 Reztore™ Antistatic Surface and Mat Cleaner or other silicone-free ESD cleaner. Be sure the surface is dry before testing.

The Surface Resistance Checker requires little maintenance, and there are no user serviceable parts. If your unit requires service beyond cleaning the electrodes or replacing the batteries, please contact Desco Customer Service.

## Limited Warranty

Desco expressly warrants that for a period of one (1) year from the date of purchase Desco Surface Resistance Checkers will be free of defects in material (parts) and workmanship (labor). Within the warranty period, a credit for purchase of replacement Desco Surface Resistance Checkers, or, at Desco's option, the Surface Resistance Checker will be repaired or replaced free of charge. If product credit is issued, the amount will be calculated by multiplying the unused portion of the expected one year life times the original unit purchase price. Call our Customer Service Department at 909-627-8178 (Chino, CA) or 781-821-8370 (Canton, MA) for a Return Material Authorization (RMA) and proper shipping instructions and address. Please include a copy of your original packing slip, invoice, or other proof of date of purchase. Any unit under warranty should be shipped prepaid to the Desco factory. Warranty replacements will take approximately two weeks.

If your unit is out of warranty, call our Customer Service Department at 909-627-8178 (Chino, CA) or 781-821-8370 (Canton, MA) for a Return Material Authorization (RMA) and proper shipping instructions and address. Desco will quote repair charges necessary to bring your unit up to factory standards.

## 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 Desco 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.