



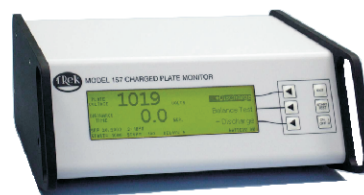
# TREK INC.

## ESD MEASUREMENT and EVALUATION

### ESD MEASUREMENT INSTRUMENTS

#### ESD Measurement Control, Certified ESD Program Management

With increasing industry concern about electrostatic discharge (ESD) and the damage it can cause in highly-sensitive electronics and other high-tech manufacturing, Trek offers products and expertise to assist with the measurement and control of ESD. Our measurement instruments deliver not only high accuracy but also high confidence. Trek **charged-plate monitors** help with ionizer setup, calibration and auditing processes. Our **electrostatic monitors** verify that air ionizers are working correctly, automatically. Trek **hand-held electrostatic voltmeters** and **portable electrostatic voltmeters** are easy-to-use and provide accurate surface voltage measurements throughout manufacturing processes, whether in semiconductor, hard disk drive, flat panel display or other highly sensitive environments.



Model 157 Charged-Plate Monitor



Model 347 Electrostatic Voltmeter

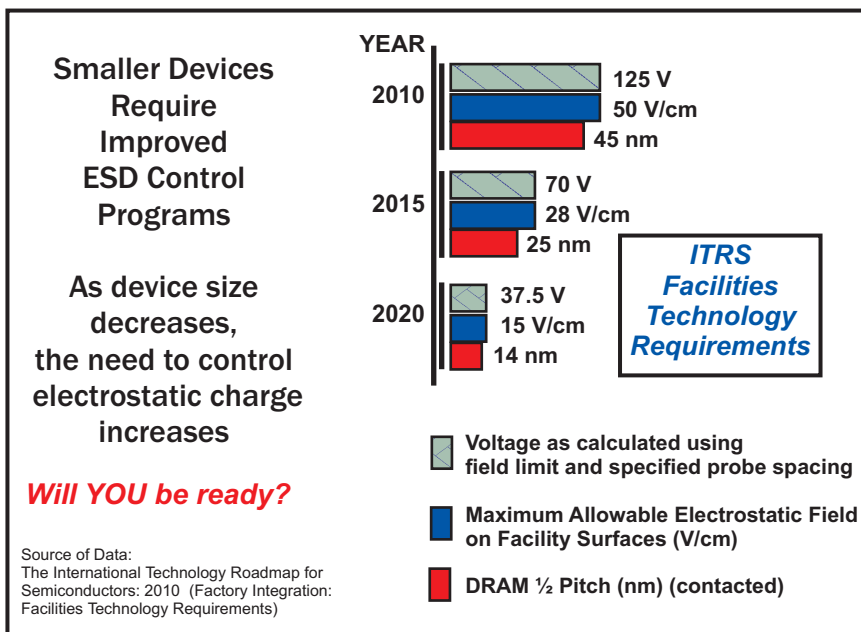
For higher accuracy, Trek's **Model 347 electrostatic voltmeter** is designed for precision surface charge detection and measurement of semiconductor wafers, electronic circuitry and handling devices, in both on-line and off-line applications. Trek's **surface resistance/resistivity meters** deliver precise surface resistance measurements on virtually any conductive, dissipative or insulative material. These instruments enable quick and accurate checks on dissipative floors, work surfaces, table mats, and other static-controlled materials to insure that static charge is safely dissipated to ground.

#### Materials Research

Trek instruments are utilized throughout the research community for charge measurements. For example, our high speed electrostatic voltmeters provide precise measurement of surface voltage, enabling the determination of work potential for various semiconductor materials and guiding design-of-experiment evaluations and other efforts in semiconductor physics.



Model 152-1 Resistance Meter with Surface/Volume CR Probe



Let Trek help you manage electrostatic charge: Trek sales personnel are certified by the ESDA with the designation of "ESD Certified Professional - Program Manager"

#### Trek Surface Resistivity Meters

- ◆ to be sure materials are safely dissipating charge to ground

#### Trek Charged-Plate Monitors

- ◆ for ionizer setup, calibration and performance checkups

#### Trek Electrostatic Voltmeters

- ◆ to locate ESD problems and monitor processes in real time

#### Trek Infintron®

- ◆ innovative high impedance contacting voltmeter for site-specific monitoring

# SERVING THE NEEDS FOR ESD MEASUREMENT & EVALUATION



Model 157 Charged Plate Monitor



25 X 25mm Charged Plate



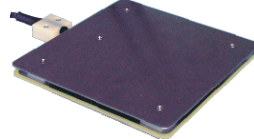
High Temperature  
25 X 25mm Charged Plate



DI [De-ionized Water] Probe



Model PD04002A Charged Plate Monitor



15 X 15cm Charged Plate



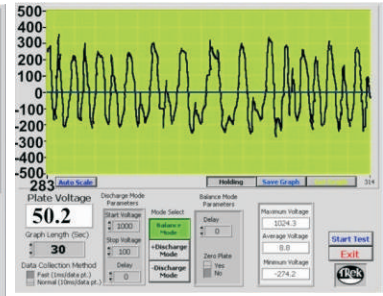
Low Profile Charged Plate

- ◆ Measure and calibrate ionizer balance and discharge time
- ◆ Selectable plate size and capacitance to match ESD sensitive device characteristics

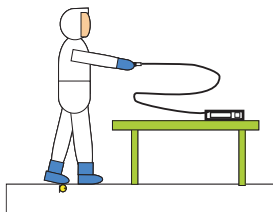
- Determine what type and how many ionizers are needed for a specific location
- Determine optimum location and placement of ionizers
- Perform periodic verification of ionizer performance

Charged-Plate Monitors (CPM) can be used for:

- Decay Measurements of Dissipative Materials
  - Charge Dissipation of Hand-Held Tools
  - Charge Dissipation of Finger Cots and other similar items
  - "Walking Tests" to verify minimal charge generation of floors, foot ware and personnel
- In accordance with official ESD /ANSI STM/IEC International Standard*



Model 157, 541A, 542A  
PC Software Records / Track Tests



**Use a Charged-Plate Monitor to monitor/record electrostatic voltage. Use the Walking Test Adapter kit for the Model 541A/542A Electrostatic Voltmeters to measure, display, monitor and record electrostatic data. Use the Walking Test Adapter for the Model 152-1 Resistance Meter to measure body resistance to ground.**

## ◆ Ensure static charges on materials are dissipated safely to ground potential



Resistance Probes



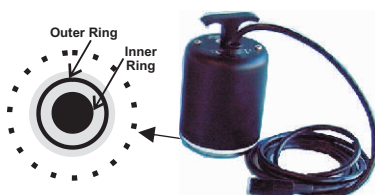
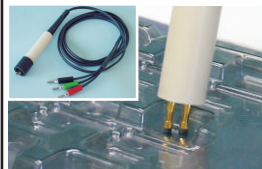
Model 152P-2P  
Two Point Resistance  
Probe



Model 152-1 Resistance Meter



Model  
152AP-5P  
Point-to-Point  
Probes



Resistance Meters can be used to measure and test:

- Automated handling equipment
- Dissipative (Antistatic or ESD safe) Trays
- Flooring Materials
- Footwear
- Garments
- Grounding
- Seating
- Soldering/desoldering hand tools
- Resistivity Measurement of Static Dissipative Planar Materials
- Small Area Measurements
- Work Surfaces
- Wrist straps
- Hand-Held One-Point Probe to verify resistance of floors, foot ware and personnel
- Volume Resistance Measurements
- Walking Test Adapter Available
- Optional TEST PLATE SET [17530] available as described in the ESD STM11.12 and IEC 61340-2-3 standards.

**NEW!** 152P-CR-1 Concentric Ring Probe for Surface/Volume resistance measurements.

**Custom Designs Available**

# SERVING THE NEEDS FOR ESD MEASUREMENT & EVALUATION

## ◆ Measurements to Protect Sensitive Devices



The Trek Model 821 HH Infitron<sup>®</sup> high impedance voltmeter performs accurate contacting (or non contacting) measurements from 0 to  $\pm 2$  kV

- Easily measures voltage levels of both conductive and insulative objects and surfaces with zero charge transfer
- Highly stable, highly accurate measurement capability for ESD sensitive components, including semiconductors, LCDs and MR head sensors
- Probe tips assume voltage level of the measured object surface, virtually ensuring that no ESD event will occur upon contact
- A record/hold feature captures data measurements and allows them to be stored for review at a later time

## ◆ Other NEW Products from Trek



Model 920

The Model 920 simultaneously tests the integrity of an operator's wrist strap, footwear and the presence of an inline current limiting resistor to determine proper operator grounding without the necessity of separate testing

Trek's Model 900A is able to detect and alert electrostatic discharge events related to CDM (Charge Device Model)



Model 900A



Model 159HH

Trek Model 159HH is a lightweight hand-held charged plate monitor offering highly accurate measurements that can be used to evaluate ionizer performance



Model 930

The compact 930 benchtop ionizer provides efficient ion balance to enable the quick neutralization of charge



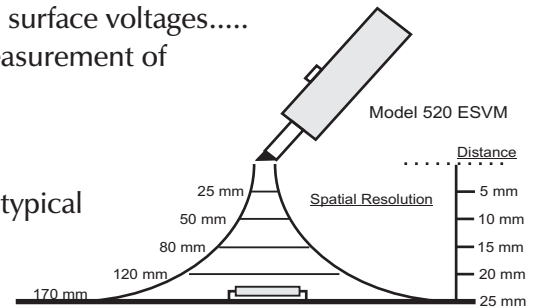
Model 950A

The Model 950 ionizer neutralizes charged surfaces by emitting an ion-rich, direct air flow

## ◆ Electrostatic measurements locate and measure static charge levels for compliance with SEMI E78

Electrostatic Voltmeters are necessary to accurately measure surface voltages.....

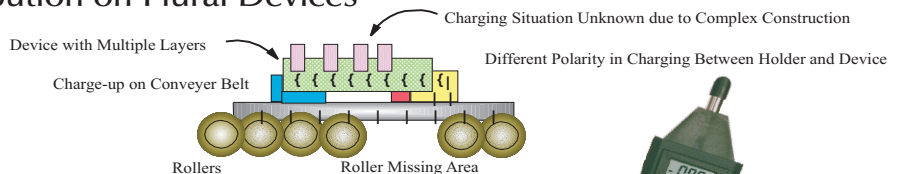
- High Speed Measurement capability which enables measurement of moving devices in processes
- High Accuracy Measurements with a wide range of spacings between probe and surface areas
- Small Surface Area Resolution (For example: 3 mm for typical Trek Electrostatic Voltmeters)
- High Speed, High Resolution, and High Temperature Probes
- DC Feedback provides no field distortion
- Walking Test Adapter kits are available for Trek Models 541A and 542A Electrostatic Voltmeters



## Charge Distribution on Plural Devices



Model 541A



Model 520

## About Trek

### Founded on Technology

TREK, INC. was established in 1968 to serve the needs of the electrophotography industry for highly accurate, stable, cost-effective measurement instrumentation and devices. Novel probe design technology provided the foundation for the company's first electrostatic voltmeter, which quickly became the industry standard. Trek's design ensures highly accurate measurements under extreme conditions.

### Growth through Innovation

In the decades that followed, Trek established itself as a designer and manufacturer of high quality instrumentation.

### Established Technical Expertise and Application Knowledge

Our scientifically based measurement expertise, coupled with our application knowledge, has enabled us to establish an enviable position in the markets we serve.

### Dedicated to Excellence

Trek has a well-respected reputation for excellence. We are the premier resource for electrostatic measurement and high-voltage solutions due to our product leadership and engineering excellence.

## Probe Selection Table for the Model 152-1

Probe Model*	Measurement Range	Feature
152BP-5P Point-to-Point Probe	$10^3$ to $10^{13}$ ohms	ANSI/ESD-STM4.1 standards Point-to-point or resistance to ground measurements
152P-CR-1 Concentric Ring Probe	$10^3$ to $10^{13}$ ohms	Surface/Volume Resistance Measurements
152P-2P Two-Point Resistance Probe	$10^3$ to $10^{13}$ ohms	Performs measurements on surface areas too small to be measured with conventional probes
152AP 3mm x 25.4mm	$10^3$ to $10^{13}$ ohms	Performs point to point measurement on small surfaces with parallel electrodes.

Model 152-1 Resistance Meter Walking Test Adapter available now!

## Charged-Plate Monitor Selection Table

Charged-Plate Monitor Model	Voltage Range (DC or Peak AC)	Plates Available	Feature
156A	0 to $\pm 1100$ V	EOS/ESD Standard 15 cm x 15 cm, 25 mm x 25 mm also Custom Sizes & Custom Capacitances	Ion Balance/Decay Measurements
157	0 to $\pm 1100$ V		Data Storage/ Transfer, Software Waveform Display.
540	0 to $\pm 100$ V	25 mm x 25 mm	Ion Balance Monitoring

Go to [www.trekinc.com](http://www.trekinc.com) for additional information.

## Sensors, Monitors, and Electrostatic Voltmeter Selection Table (partial list)

Model	Measurement Range (DC or Peak AC)	Measurement Accuracy (full scale)	Probe -to-Surface Separation Distance	Cable Length	Features / Applications
884	0 to $\pm 20$ kV	$\pm 5\%$	45 mm $\pm 15$ mm	1.8 meter (6 ft)	Charge Accumulation in LCD Manufacturing, Static Charge in Semiconductor Manufacturing
523-1	0 to $\pm 20$ kV	$\pm 5\%$	45 mm $\pm 15$ mm	probe tip on unit	
542A-2	0 to $\pm 20$ kV	$\pm 5\%$	30 mm to 60 mm	5 meter (16 ft)	Static Charge Evaluation Semiconductor, LCD, Electronic Assembly
542A-1	0 to $\pm 10$ kV	$\pm 5\%$	15 mm to 30 mm	5 meter (16 ft)	
347	0 to $\pm 3$ kV	$\pm 0.05\%$	2 mm $\pm 1$ mm	3 meter (10 ft)	Electrostatic Potential Measurement
820	0 to $\pm 2$ kV	$\pm 0.1\%$	Contacting*	3 meter (10 ft)	Measurement of ESD-sensitive components and circuitry
821HH (Hand-held)	0 to $\pm 2$ kV	$\pm 1\%$	2 mm $\pm 1$ mm	Less than 0.33m (< 1 ft)	Measurements in difficult-to-reach areas Battery or line operation Records temperature and humidity
520	0 to $\pm 2$ kV	$\pm 5\%$	15 mm $\pm 10$ mm	probe tip on unit	Charge Accumulation in LCD Manufacturing, Static Charge in Semiconductor Manufacturing
876	0 to $\pm 2$ kV	$\pm 5\%$	15 mm $\pm 10$ mm	1.8 meter (6 ft)	
706B	0 to +1 kV or -1 kV	$\pm 0.5\%$	3.2 mm $\pm 1$	1.8 meter (6 ft)	Measures photoreceptor surfaces in copiers and laser printers
541A-1	0 to $\pm 1$ kV	$\pm 1\%$	2.5 mm $\pm 1$ mm	3 meter (10 ft)	Static Charge Evaluation Semiconductor, LCD, Electronic Assembly
541A-2	0 to $\pm 100$ V	$\pm 1\%$	2.5 mm $\pm 1$ mm	3 meter (10 ft)	

\*Infinitron Technology - zero charge transfer upon contact

◆ **NEW! Model 875 enclosure mounts on a 35mm DIN rail and measures  $\pm 500$  V**

## High-Voltage Power Amplifiers / Piezo Drivers Electrostatic Measurement Instruments



TREK, INC. 11601 Maple Ridge Road • Medina, NY 14103 • USA • 800-FOR TREK  
1-585-798-3140 • 1-585-798-3106 (fax) • [www.trekinc.com](http://www.trekinc.com) • [sales@trekinc.com](mailto:sales@trekinc.com)



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