



# Electrostatic

## Discharge Measurement & Control Instruments

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# ELECTROSTATIC VOLTMETERS

## Non-Contacting Voltmeters

### MODEL 320C High-Sensitivity, DC Stable Electrostatic Voltmeter

Versatile instrument used for a variety of electrostatic applications including contact potential measurements, materials evaluation, and electret studies.



#### FEATURES

- Use over a wide range of probe-to-surface distances
- Rely on response speed control to adjust AC response for speed and noise
- Utilize low impedance probe sensor that assures high accuracy in high humidity and contaminated environments
- Self-locking drift/spacing null adjustment
- 3.5-digit LED display
- High accuracy non-contacting voltage measurement

#### SPECIFICATIONS

##### Measurement

0 to  $\pm 100$  VDC or peak AC

##### Sensitivity

1 mV

##### Speed of Response

Less than 300 ms for a 100 V step

##### Measurement Accuracy

Better than 0.05% of full scale

##### Null Voltage Source

10 volt nulling supply for contact potential measurements

##### Response Speed Control

AC response adjusted for speed/noise

##### Drift Spacing/Null Adjustment

Minimizes variations in voltage values as probe-to-test surface spacing changes

### MODEL 323 Highly Sensitive, Versatile Electrostatic Voltmeter

Highly sensitive versatile instrument used for a variety of electrostatic applications including material evaluation, electret studies, charge accumulation, etc.



#### FEATURES

- Utilize low impedance probe sensor that assures high accuracy in high humidity and contaminated environments
- Drift/spacing null adjustment
- Response speed control
- Additional probes available
- 3.5-digit LED display
- High accurate, non-contacting voltage measurement

#### SPECIFICATIONS

##### Measurement

0 to  $\pm 100$  VDC or peak AC

##### Sensitivity

5 mV

##### Speed of Response

Less than 300 ms for a 100 V step

##### Measurement Accuracy

Better than 0.05% of full scale

##### Null Voltage Source

10 volt nulling supply

##### Response Speed Control

AC response adjusted for speed/noise

##### Drift Spacing/Null Adjustment

Minimizes variations in voltage values as o-test surface spacing changes

# ELECTROSTATIC VOLTMETERS

## MODEL 325 High-Sensitivity, DC Stable Electrostatic Voltmeter

Highly sensitive versatile instrument used for a variety of electrostatic applications including material evaluation, electret studies, charge accumulation, etc.



### FEATURES

- Low impedance probe sensor that assures high accuracy in high humidity and contaminated environments
- Minimize variation in monitored voltage values as the probe-to-test surface spacing changes
- Drift/spacing null adjustment
- Response speed control
- 3.5-digit LED display
- Non-contacting voltage measurement

### SPECIFICATIONS

#### Measurement Range

0 to  $\pm 100$  VDC or peak AC

#### Sensitivity

5 mV

#### Speed of Response

Less than 300 ms for a 100 V step

#### Measurement Accuracy

Better than 0.05% of full scale

#### Null Voltage Source

10 volt nulling supply

#### Response Speed Control

AC response adjusted for speed/noise

#### Drift Spacing/Null Adjustment

Minimizes variations in voltage values as probe-to-test surface spacing changes

## MODEL 341B High-Speed, High-Voltage, Electrostatic Voltmeter

High-speed, high voltage electrostatic voltmeter for non-contact surface voltage measurements using a field-nulling technique for DC stability and high accuracy.



### FEATURES

- Superb noise and drift performance
- Precision voltage monitor output
- Easy-to-read LED display
- Optional probes offer versatility (ordered separately)
- Measure stationary or moving surfaces
- Eliminate the need for fixed spacing
- Eliminates the need for close tolerance components
- Achieve DC stability and high accuracy with field nulling technique

### SPECIFICATIONS

#### Measurement Range

0 to  $\pm 20$  kVDC or peak AC

#### Measurement Accuracy

Better than  $\pm 0.1\%$  of full scale

#### Speed of Response

Less than 200  $\mu$ s for a 1 kV step

# ELECTROSTATIC VOLTMETERS

## MODEL 344 Precision, Non-Contacting Electrostatic Voltmeter

Precision electrostatic voltmeter for non-contacting surface voltage measurements in the range of 0 to  $\pm 2$  kV DC or peak AC.



### FEATURES

- Superb noise and drift performance
- Variety of probes available for different installation requirements
- Precision voltage monitor output
- Easy-to-read LED display
- Suitable for automated or computer-controlled systems

### SPECIFICATIONS

#### Measurement Range

0 to  $\pm 2$  kVDC or peak AC

#### Measurement Accuracy

Better than  $\pm 0.05\%$  of full scale

#### Speed of Response

Less than 3 ms for a 1 kV step

## MODEL 347 Non-Contacting, Economical Electrostatic Voltmeter

Advanced Energy's Trek 347 electrostatic voltmeter uses a field-nulling technique that offers DC stability and high accuracy and eliminates the need for probe-to-surface fixed spacing.



### FEATURES

- Superb noise and drift performance
- Precision voltage monitor output
- Digital Enable allows an external device to turn the internal HV power supply on/off
- Well-suited for automated or computer-controlled systems
- Easy-to-read LED display
- Large selection of optional probes offer versatility (order separately)

### SPECIFICATIONS

#### Measurement Range

0 to  $\pm 3$  kVDC or peak AC

#### Measurement Accuracy

Better than 0.05% of full scale (monitor)

#### Speed of Response

Less than 3ms for a 1 kV step (10% to 90%)

# ELECTROSTATIC VOLTMETERS

## MODEL 370 Precision, Non-Contact Electrostatic Voltmeter

Non-contacting electrostatic voltmeter provides precise surface voltage measurements in the range of 0 to  $\pm 3$  kVDC or peak AC.



### FEATURES

- Automatic gain control eliminates manual adjustment
- One step, push-button zero control
- Digital enable allows an external device to turn the internal HV power supply on/off
- Optional data acquisition module available with an IEEE-488 compatible interface, 14-bit resolution, 12-bit accuracy, and a programmable sampling period from 10 ms to 30 minutes

### SPECIFICATIONS

#### Speed of Response

Less than 50  $\mu$ s for a 1 kV step

#### Measurement Range

0 to  $\pm 3$  kVDC or peak AC

#### Measurement Accuracy

Better than  $\pm 0.05\%$  of full scale

#### Recommended Probe-to-Surface Separation

2mm  $\pm$  1mm

## MODEL 520 Hand-Held Non-Contacting Electrostatic Voltmeter

Portable electrostatic voltmeter for accurate, non-contacting measurements of electrostatic surface voltage for ESD applications in ionized or non-ionized environments.



### FEATURES

- Accurately measures surface voltage at a wide range of spacings
- No need to maintain a fixed spacing
- Non-contacting voltage measurement
- Portable (battery operated)
- Good for difficult-to-reach locations
- Drift-free operation in ionized environments

### SPECIFICATIONS

#### Measurement Range

0 to  $\pm 2$  kVDC

#### Measurement Accuracy

Better than  $\pm 5\%$  of full scale over the entire recommended probe-to-surface separation range

#### Voltage Display

0 to  $\pm 1999$  V

#### Voltage Resolution

1V

#### Speed of Response

Less than 25 ms for a 0 to  $\pm 2$  kV input step change

#### Sampling Rate

2.5 reading per second

#### Recommended Spacing

5 to 25mm

# ELECTROSTATIC VOLTMETERS

## MODEL 523 Hand-Held Non-Contacting Electrostatic Voltmeter

Portable electrostatic voltmeter for accurate, non-contacting measurements of electrostatic surface voltage for ESD applications in ionized or non-ionized environments.



### FEATURES

- Accurately measures surface voltage at a wide range of spacings
- No need to maintain a fixed spacing
- Non-contacting voltage measurement
- Portable (battery operated)
- Good for difficult-to-reach locations
- Drift-free operation in ionized environments

### SPECIFICATIONS

**Measurement Range**  
0 to  $\pm 20$ kVDC

**Voltage Display**  
0 to  $\pm 19.99$ kV

**Voltage Resolution**  
10V

**Measurement Accuracy**  
Better than  $\pm 5\%$  of full scale over the entire recommended probe-to-surface separation range

**Speed of Response**  
400ms

**Sampling Rate**  
2.5 readings per second

**Recommended Spacing**  
30 to 60mm

## MODEL 541A Non-Contacting Electrostatic Voltmeter

Electrostatic voltmeter for accurate non-contacting measurements of the electrostatic surface voltage associated with EOS/ESD processes.



### FEATURES

- Chopper probe is DC-stable with or without incident air ion flow
- Drift-free measurements
- LCD screen displays present voltage, the positive/negative peak voltage, and additional menu information
- Visual and audible alarms
- Voltage output monitor for remote monitoring or control
- USB and RS232 serial ports

### SPECIFICATIONS

**Measurement Range**  
Trek 541A-1  
 $\pm 1$  kVDC or peak AC

Trek 541A-2  
 $\pm 100$  VDC or peak AC

**Measurement Accuracy**  
Better than  $\pm 1\%$  of full scale over a probe-to-surface separation of  $2.5 \text{ mm} \pm 1 \text{ mm}$

**Alphanumeric LCD Display**  
20 x 4 characters

**Speed of Response**  
50ms to 1kV step

**Probe-to-Surface Separation**  
Range of 1 to 10mm

# ELECTROSTATIC VOLTMETERS

## MODEL 542A Non-Contacting Electrostatic Voltmeter

Electrostatic voltmeter for accurate non-contacting measurements of the electrostatic surface voltage associated with EOS/ESD processes.



### FEATURES

- Chopper probe is DC-stable with or without incident air ion flow
- Drift-free measurements
- LCD screen displays present voltage, the positive/negative peak voltage, and additional menu information.
- Visual and audible alarms
- Analog voltage monitor output
- USB and RS232 serial ports

### SPECIFICATIONS

#### Measurement Range

Trek 542A-1  
 $\pm 10$  kVDC or peak AC

Trek 542A-2  
 $\pm 20$  kVDC or peak AC

#### Measurement Accuracy

Better than  $\pm 1\%$  of full scale over a probe-to-surface separation of:

Trek 542A-1:  
15 to 30mm

Trek 542A-2:  
30 to 60mm

#### Alphanumeric LCD Display

20 x 4 characters

#### Speed of Response

50ms for 1kV step (10 to 90%)

#### Probe-to-Surface Separation

Trek 542A-1: 15 to 30mm

Trek 542A-2: 30 to 60mm

## MODEL 706B Highly Accurate, Non-Contacting, Portable Electrostatic Voltmeter

Portable electrostatic voltmeter designed for highly accurate non-contacting surface electrostatic voltage measurements.



### FEATURES

- Lightweight, battery operated, and packaged in a rugged enclosure with a probe storage area
- 3 ½ digit LCD display
- Battery test switch
- Accurate measurements over a probe-to-test surface spacing of 1 to 5 mm
- DC-stable probe with side viewing aperture
- Switch selectable ranges: 0 to +1 kVDC or 0 to -1 kVDC

### SPECIFICATIONS

#### Measurement Range

0 to +1kV or -1 kVDC (switch selectable)

#### Measurement Accuracy

Better than 0.5% of full scale



# ELECTROSTATIC VOLTMETERS

## MODEL 875 Electrostatic Voltage Sensor

Electrostatic voltage sensor designed for in-line monitoring of electrostatic charge build-up.



### FEATURES

- Accuracy is independent of probe-to-measured surface spacing
- Voltage monitor with an accuracy better than  $\pm 0.5\%$  of full scale
- 4 to 20 mA current monitor
- Enclosure mounts on 35 mm DIN RAIL
- Two probes types available: side view probe and a 45° angle probe
- TTL digital enable input and TTL fault warning flag output

### SPECIFICATIONS

#### Measurement Range

0 to  $\pm 500$  V DC or peak AC

#### Measurement Accuracy

At the Voltage Monitor Output  
Better than  $\pm 0.5\%$  of full scale

At the Current Monitor Output

Better than  $\pm 3\%$  of full scale

#### Speed of Response

Less than 25 ms for a 0 to  $\pm 500$  V step change

## MODEL 876 AND MODEL 884 Non-Contacting, Hand-Held Electrostatic Voltmeter

Electrostatic voltmeters for accurate non-contacting measurements of the electrostatic surface voltage for ESD applications in ionized or non-ionized environments.



### FEATURES

- Accurately measures surface voltage at a wide range of spacings
- No need to maintain a fixed spacing
- Chopper stabilized for drift-free operation in ionized environments
- 3.5-digit, LCD

### SPECIFICATIONS

#### Measurement Range

Trek 876

0 to  $\pm 2$  kVDC

Trek 884

0 to  $\pm 20$  kVDC

#### Measurement Accuracy

Better than  $\pm 5\%$  of full scale over the entire recommended probe-to-surface separation.

#### Recommended Probe-to-Surface separation

Trek 876:

5 to 25mm

Trek 884

30 to 60mm

# ELECTROSTATIC VOLTMETERS

## MODEL P0865 High-Sensitivity, DC Stable, Precision Electrostatic Voltmeter

High-speed, high voltage electrostatic voltmeter for non-contacting surface voltage measurements in the range of 0 to  $\pm 10$  kVDC or peak AC.



### FEATURES

- Zero control for offset nulling
- Easy-to-read LED display
- Precision voltage monitor output
- Utilize patented probe design to eliminate the need for close tolerance components
- Improve noise and drift performance
- Zero control for offset nulling
- High temperature probes available

### SPECIFICATIONS

#### Measurement Range

0 to  $\pm 10$  kVDC or peak AC

#### Measurement Accuracy

Better than  $\pm 0.1\%$  of full scale

#### Speed of Response

Less than 200 ms for a 1 kV step change

Less than 5 ms for a 20 kV step change

#### Full Signal Bandwidth

DC to better than 50 Hz

## Contacting Voltmeters

## MODEL 820 INFINITRON® Contacting or Non-Contacting High Impedance Voltmeter

High impedance voltmeter with contacting or non-contacting modes to acquire precision surface voltage measurements.



### FEATURES

- Use in either contacting or non-contacting mode
- Voltage monitor output scale factor at 1/200
- Probe electrode may be easily replaced with other sensor tips
- Digital Enable allows an external device to turn ON/OFF the internal HV power supply
- Easy-to-read LED display
- Designed to be operated on a bench top
- Quickly and easily transfer data via USB port

### SPECIFICATIONS

#### Measurement Range

0 to  $\pm 2$  kVDC or peak AC

#### Measurement Accuracy

Better than  $\pm 0.1\%$  of full scale  
(voltage monitor output)

#### Speed of Response

Less than 500  $\mu$ s for a 1 kV input step

#### Input Characteristics-Resistance

Greater than  $1 \times 10^{15} \Omega$

#### Input Characteristics-Capacitance

Less than  $1 \times 10^{-15}$  F

# ELECTROSTATIC VOLTMETERS

## MODEL 821HH INFINITRON® Contacting Hand-Held Electrostatic Voltmeter

Hand held electrostatic voltmeter to measure the voltage level of both conductive and insulative objects and surfaces with virtually zero charge transfer.



### FEATURES

- Battery or line operation
- Easy-to-read LCD display
- Records voltage, temperature and humidity with included sensor
- Data graphing capabilities
- Trek contacting technology enables precise surface voltage measurements
- Measure conductive and insulative objects/surfaces with virtually zero charge transfer to the measurement probe

### SPECIFICATIONS

#### Measurement Range

0 to  $\pm 2$  kVDC or peak AC

#### Voltage Display Accuracy

Better than 1% of full scale,  $\pm 1$  digit

#### Input Characteristics

Resistance greater than  $1 \times 10^{15} \Omega$

Capacitance less than  $1 \times 10^{-14} \text{ F}$

#### Voltage Monitor Output

Scale factor at 1/1000

# ELECTROSTATIC FIELDMETERS

## MODEL 177A Multi-Point Fieldmeter and Alarm System

The Monroe 177A serves as a full-time, plant-wide automatic static build-up monitor, continuous monitoring of the critical points in a facility to detect and warn of electrostatic charge build-up before it becomes a problem.



### FEATURES

- Intrinsically safe sensor operation (with optional barriers) in explosive atmospheres
- Detects static levels in as many as four locations up to 1000 feet away
- Accurate and drift-free measurement including ionized environments
- Provides analog outputs and control via RS232/485 and front panel
- Built-in, fully configurable dual level alarms programmable via front panel, PC, or PLC
- Cascade up to 32 units via RS485 providing 128 sensor locations
- PLC compatible using Modbus protocol
- Password security

### SPECIFICATIONS

#### Analog Outputs (Selectable)

$\pm 10 \text{ V}$ , 0 to 5 V (2.5 V,  $\pm 2.5 \text{ V}$  full scale);  
< 10  $\Omega$  impedance; or simultaneous 4 to 20 mA (optional)

#### Accuracy

$\pm 3\%$  of full scale at analog output

$\pm 3\%$  of full scale,  $\pm 2\%$  counts

+0.3 counts/ $^{\circ}\text{C}$  at front panel meters

#### Displays

Four 3½ digit LEDs, 0.6 in  
(one per input channel)

# ELECTROSTATIC FIELDMETERS

## MODEL 257D Portable Electrostatic Fieldmeter

Portable, battery-operated fieldmeter for performing static surveys or for use as a diagnostic tool when troubleshooting problems caused by static build-up.



### FEATURES

- Battery or line operation - AC power module included
- Remote probe for easy monitoring of hard-to-reach locations up to 1000 feet
- Recorder output for unattended monitoring
- Intrinsically safe sensors approved for use in hazardous locations with approved IS barriers
- Unmatched accuracy, stability and versatility
- Loop control for consistency in electrostatic tacking of materials
- Drift-free measurement with chopper stabilizer in ionized environments

### SPECIFICATIONS

#### Ranges

$\pm 2\text{kV/cm}$  and  $\pm 20\text{kV/cm}$

#### Sensitivity

1 V/m and 10 V/m, respectively

#### Static Accuracy

Better than 5% of reading

#### Drift

<30 V/m/hour, non-cumulative after 30-minutes stabilization, referred to input

#### Noise

<10 V/m rms, 0 to 200 Hz referred to input

#### Respond Speed

250 ms 10 to 90% (typical)

## MODEL 281 Portable Non-Contacting Static Meter

Portable, affordable, battery-operated static locator for avoiding static build-up that causes costly product damage.



### FEATURES

- Perfect for checking effectiveness of work station grounding systems
- Precise, easy-to-read digital display
- Hold button freezes display to capture transients or for hard-to-read locations
- Battery SavR™ turns instrument off when not in use
- Pocket-sized convenience
- RoHS compliant

### SPECIFICATIONS

#### Normal Range

$\pm 20\text{kV}$  at 1 inch with correct range and polarity automatically selected

#### Accuracy

Better than  $\pm 10\%$  of reading  $\pm$  LSD + zero offset

#### Zero Tolerance

$\pm 5$  counts,  $\pm 3$  counts typical

#### Response

Display updates three times per second

# ELECTROSTATIC FIELDMETERS

## MODEL 282 SERIES Hand-Held Fieldmeters

Full-featured, hand-held fieldmeters for performing static surveys and evaluate charge accumulation in electronic manufacturing and in industrial operations.



### FEATURES

- LED pulsed beam range finder identifies calibrated distance from the surface
- Exclusive Auto-Zero circuit
- Hold button captures transient readings
- Chopper-stabilized measurement technique works in the presence of ionization
- Recorder output and 40-hour battery
- Drift-free accuracy even in ionized environments
- Optional Charge Plate System for testing ionization systems (282CPS)

### SPECIFICATIONS

#### Range

282A-1: 0 to  $\pm 19.99\text{KV}$  @1 in  
282H: 0 to  $\pm 199.9\text{KV}$  @1.0 ft  
282IS: 0 to  $\pm 19.99\text{KV}$  @1 in  
282L: 0 to  $\pm 1999\text{V}$  @1.0 in  
282M: 0 to  $\pm 19.99\text{V}$  @1.0 in

#### Accuracy

282A-1:  $\pm 5\%$  of reading, + zero offset,  $\pm 2$  LSD  
282H:  $\pm 5\%$  of reading, + zero offset,  $\pm 2$  LSD  
282IS:  $\pm 5\%$  of reading, + zero offset,  $\pm 2$  LSD  
282L:  $\pm 5\%$  of reading, + zero offset,  $\pm 2$  LSD  
282M:  $\pm 5\%$  of reading, + zero offset,  $\pm 2$  LSD

#### Respond Time

282A-1: Typical 80 to 100 msec 10 to 90%  
282H: Typical 80 to 100 msec 10 to 90%  
282IS: Typical 80 to 100 msec 10 to 90%  
282L: Typical 10 msec 10 to 90%  
282M: Typical 80 to 100 msec 10 to 90%

## MODEL 284 NanoCoulomb Meter

NanoCoulomb meter offers the ability to make direct measurements of charge on materials via battery operation in two ranges: 200 nC and 20 nC.



### FEATURES

- Portable, self-contained
- Battery-powered
- Easy-to-operate
- Large LCD display
- Two ranges
- Interchangeable cups
- Analog output
- Meets requirements of EIA-541 Standard
- Points contact measurement of small areas

### SPECIFICATIONS

Display:  $\frac{1}{2} \times 3\frac{1}{2}$  in digit LCD  
Range: 200 nC / 20 nC  
Resolution: 0.1 nC / 0.01 nC

#### Optional Ranges Available

Range: 2000 nC / 2.0 nC  
Resolution: 1.0 nC / 0.001 nC

#### Accuracy

2% of reading, + zero offset,  $\pm 1$  lsd

#### Output

0 to  $\pm 2$  V analog

#### Drift

0.1 pC/sec typical

#### Battery

9V Everyday #216 or equivalent NEDA #1604.  
Battery life over 400 hours

# RESISTIVITY METERS

## MODEL 152-1 Surface / Volume Resistance Meter

Resistance meter designed to precisely measure surface or volume resistance on a wide variety of conductive, dissipative, and insulative materials.



### FEATURES

- Complies to ANSI/ESD Association Standards
- Concentric ring probe pre-amplifier eliminates interference and enables reliable operation at high resistance values
- Exceptional accuracy, stability, and repeatability
- Wide measurement range ( $10^3$  to  $10^{13}$   $\Omega$ )
- Elastomer electrodes for excellent surface contact

### SPECIFICATIONS

**Measurement Range**  
 $10^3$  to  $10^{13}$   $\Omega$

**Measurement Accuracy**  
**Point to Point Probe**  
 $10^3$  to  $10^{12}$   $\Omega$  range,  $\pm 5\%$   
(+100 to 200  $\Omega$ )

$10^{13}$   $\Omega$  range,  $\pm 8\%$

**Concentric Ring Probe**  
 $10^3$  to  $10^{13}$   $\Omega$  range,  $\pm 5\%$

**Two Point Resistance Probe**  
 $10^3$  to  $10^{13}$   $\Omega$  range,  $\pm 10\%$

**Prone Electrode Test Voltage**  
User selectable, 10 V or 100 V  $\pm 2\%$

**Test Limit Current**  
Limited to less than 13 mA in 10 V range and 1.7 mA in 100 V range

## MODEL 291 Resistivity Meter

Portable survey instrument for evaluating resistive properties of static control products such as static dissipative packaging, flooring, or work surfaces.



### FEATURES

- Twelve LED color-coded display to accurately and quickly show measured decade values
- Measures both resistivity and resistance-to-ground
- Ranges  $10^3$  thru  $10^{12}$
- Easy-to-use
- Battery powered
- Pocket-sized convenience
- Inexpensive, reliable

### SPECIFICATIONS

**Range**  
 $10^3$  to  $10^{12}$  with LEDs for underrange and over-range

**Accuracy**  
 $\pm 1/2$  decade

**Applied Voltage**  
10 volts @  $10^3$  to  $10^5$   
100 volts @  $10^6$  to  $10^{12}$

# FIELDMETERS

## MODEL 511 Hand-Held Electrostatic Fieldmeter

High-quality, portable, chopper-stabilized, non-contacting electrostatic field meter designed for measuring and auditing electrostatic fields in ESD sensitive areas.



### FEATURES

- Available for use as a field meter and for testing balance and +/- decay capabilities of ionizers (with the optional Ionizer Test Kit)
- Push-button "auto-zero" feature removes any offset voltage
- Compact, pocket size with easy-to-read LED display
- Distance ranging system utilizes LEDs to indicate a 1-inch spacing between the instrument and the test target
- Hold function allows the user to hold a display when a measurement is being taken in a location where reading the display is difficult

### SPECIFICATIONS

#### Measurement Range

Low Range: 0 to  $\pm 2$  kV/in

High Range: 0 to  $\pm 20$  kV/in

#### Measurement Accuracy

##### Voltage Monitor Output:

Better than  $\pm 5\%$  of reading,  $\pm 10$  mV

##### Voltage Display:

Better than  $\pm 5\%$  of reading,  $\pm 2$  counts

# IONIZER

## MODEL 950 Nozzle Ionizer

Trek's Model 950 Nozzle Ionizer provides fast and efficient removal of dust and static charge to help support manufacturing operations requiring a clean room environment.



### FEATURES

- Ultra-Small, Compact Body
- Corona-Based Discharge
- Variety of Air Flow Profiles
- Optional Nozzle Tips
- Ion Air Transfer Via Optional Tubes
- Automatic Alarm Protection for Critical Production Line Processes
- Easy Maintenance
- Removable Power Supply & Emitter Needle Eases Cleaning and Parts Replacement

### SPECIFICATIONS

#### Output Voltage

3.0 kV AC

#### Air Purge - Fluid

Clean Air

#### Air Purge - operating pressure

0.05 to 0.6MPa

#### Ion Balance

$\pm 15V$  or less at the work surface

# CHARGE PLATE MONITORS

## MODEL 156A Charge Plate Monitor

Charged plate monitor for evaluating the performance of air ionizers used to neutralize static charges.



### FEATURES

- Extremely low offset and drift ensures high accuracy
- Compact and lightweight, for easy portability within a facility
- Set custom measurement capacitance for assurance that ESD process needs are met in manufacturing
- Easily transport within a facility with the compact and lightweight design

### SPECIFICATIONS

**Monitored Voltage Range**  
0 to  $\pm 1100$  VDC or peak AC

**Accuracy**  
 $\pm 0.1\%$  of reading  $\pm 3$  V

**Large Signal Bandwidth**  
DC to 10 Hz

**Decay Mode Thresholds**  
**Start/Stop Voltages**  
Programmable from 1 to  $\pm 1000$  V in 1 V increments

**Start/Stop Accuracy**  
Within  $\pm 1$  V of programmed voltage

## MODEL 157 Charge Plate Monitor

Charged plate monitor that offers better accuracy, stability, and bandwidth than conventional designs.



### FEATURES

- Extremely low offset and drift ensures high accuracy
- Compact and lightweight, for easy portability within a facility
- Set custom measurement capacitance for assurance that ESD process needs are met in manufacturing
- Greater bandwidth enables "true" responses to be observed by avoiding the masking of results

### SPECIFICATIONS

**Measurement Range**  
0 to  $\pm 1020$  V DC or peak AC

**Accuracy**  
Better than 0.1% of full scale

**Decay Mode Thresholds**  
**Start Voltage**  
Programmable from 1 to  $\pm 1000$  V in 1 V increments

**Stop Voltage**  
Programmable from 0 to  $\pm 999$  V in 1 V increments

**Start Accuracy**  
Within  $\pm 1$  V of programmed start voltage

**Stop Accuracy**  
Within  $\pm 1$  V of programmed stop voltage or  $\pm 0.2$  V if set less than or equal to 90 V



# CHARGE PLATE MONITORS

## ION COLLECTING PLATES (can be used with Model 156A and 157)

Standard Charged Plate, 6" x 6"



Standard Charged Plate, 1" x 1"



High Temperature Charged Plate, 6" x 6"



High Temperature Charged Plate, 1" x 1"



Deionized Water Probe



## MODEL 158A Charge Plate Monitor

Charged plate monitor for evaluating the performance of air ionization systems with a compact design for superior data collection and storage capability.



### FEATURES

- Touch screen or function key control
- User-friendly compact design with superior data collection and storage capability
- Unique color graphics chart display
- PC memory card port for ample data storage and easy data transfer
- Programmable start and stop voltage for (+) and (-) decay time ionizer tests
- 0.1 V plate voltage resolution

### SPECIFICATIONS

**Monitored Voltage Range**  
0 to  $\pm 1100$  VDC or peak AC

**Bandwidth (-3 dB)**  
DC to 80 Hz

**Decay Mode Thresholds**  
**Start Voltage**  
Programmable from 1 to  $\pm 1000$  V in 1 V increments

**Stop Voltage**  
Programmable from 0 to  $\pm 999$  V in 1 V increments

**Start Accuracy**  
Within  $\pm 1$  V of programmed start voltage

**Stop Accuracy**  
Within  $\pm 1$  V of programmed stop voltage or  $\pm 0.2$  V if set less than or equal to 90 V

**Discharge Time Resolution**  
0.1 sec, from 0.1 sec to 999.9 sec, resolution 0.1 sec

# CHARGE PLATE MONITORS

## MODEL 282CPS Charge Plate System Accessory for Monroe 282

Charge plate system accessory for Monroe 282 fieldmeters and charging source the plate attachment.



### FEATURES

- Correlates closely to charged-plate monitor test results
- Performs go/no-go, balance, and decay tests
- Includes dual polarity charger, adapter, and carrying case
- Attaches to Monroe 282 fieldmeter and also works with Monroe 281

### SPECIFICATIONS

#### Plate Capacitance

13 picofarads  $\pm$  2 picofarads

#### Range

0 to  $\pm$ 2 kV

#### Weight

1.5oz

#### Output

1100 VDC nominal,  $<1 \mu\text{A}$  max

## MODEL 287B Ionizer Performance Analyzer

Performs manual or automatic decay and balance tests for periodic verification of ionization equipment.



### FEATURES

- All-in-one instrument: measures, displays and stores voltage, decay time, temperature and humidity
- Test AC or DC room ionizers, laminar flow, overhead or benchtop ionizers or ionized compressed gas systems as simply as pushing a button
- Test balance and decay
- Hand held, battery operated
- Microprocessor driven
- Built-in self test include battery check and tests for functional errors

### SPECIFICATIONS

#### Charger

$\pm$ 1100 volts, selectable polarity

#### Fieldmeter Range

$\pm$ 1250 V, 1 V resolution

#### Accuracy

$\pm$ 5% of reading,  $\pm$ 2% typical

#### Zero Drift

$<\pm$ 4V in 90s,  $\pm$ 2V typical

#### Trip Points

Fixed 1000V and 100V

#### Charge Plate Size

43 x 102 mm (1.7 x 4 in)

# CHARGE PLATE MONITORS

## MODEL 288C Charge Plate Monitor

Easy-to-use charge plate monitor for manual and automated testing with internal data storage.



### FEATURES

- Fully configurable operating parameters
- Manual and automated testing of decay and balance
- Internal storage for up to 1500 tests, 500 locations, and 4 test protocols
- Internal battery for portable operation (also line operated)
- Large, easy-to-read, high contrast LCD display
- Detachable 6 x 6 in plate (optional plate 1 X 1 in plate available)
- RS232 interface
- Built-in temperature and humidity sensors
- Auto-ranging to 0.1V resolution below 100V
- Compatible with optional 288B graphing software

### SPECIFICATIONS

**Electrometer Dynamic Range**  
±1200 V

**Charge Plate Size**  
15 x 15 cm (6 x 6 in)

**Data Storage**  
1500 Readings

**Interface Type**  
USB

## MODEL PD04002A Charge Plate Monitor Controller

Versatile microprocessor-based charged plate monitor ideally suited to monitor the performance of air ionizers that are used in critical wide temperature operations.



### FEATURES

- Utilizes standard, custom, and wide temperature range charged plates
- High temperature charged plate (Trek PD04002AP) 25 x 25 mm (1 x 1 in)
- Voltage monitor output for remote monitoring
- Exceptional accuracy and stability
- Remotely monitor the charged plate voltage using a rear panel connection

### SPECIFICATIONS

**Charged Plate Voltage Range**  
0 to ±55 VDC or peak AC, nominal

**Measurement Accuracy**  
0.2% of full scale

**Charged Plate Self-Discharge Rate  
(no incident ion flow)**  
Less than 2 V per minute at 55 V for relative humidity up to 85%

**Charged Plate Capacitance**  
20pF ± 4pF. (The capacitance is independent of charged plate connecting cable length.)

**Large Signal Bandwidth (-3 dB)**  
DC to greater than 200 Hz

**Small Signal Bandwidth (-3 dB)**  
DC to 2.5 kHz

# HIGH VOLTAGE AMPLIFIERS



**Model 10/10B-HS**

High Speed, High Voltage Amplifier, Output Voltage 0 to  $\pm 10$  kV DC or Peak AC



**Model 10/40-HS**

High-Speed, Non-Inverting High Voltage Amplifier, Output Voltage 0 to  $\pm 10$  kV DC or Peak AC



**Model 20/20C**

Non-Inverting High Voltage Amplifier, Output Voltage 0 to  $\pm 20$  kV DC or Peak AC



**Model 20/20C-HS**

High-Speed, High Voltage Amplifier, Output Voltage 0 to  $\pm 20$  kV DC or Peak AC



**Model 2100HF**

High Frequency, High Voltage Amplifier, Output Voltage 0 to  $\pm 150$  VDC or Peak AC



**Model 2200 Series**

Cost-Effective, High Performance, Piezo Drivers and High Voltage Amplifiers, 40 W



**Model 30/20A**

Non-Inverting High Voltage Amplifier, Output Voltage 0 to  $\pm 30$  kV DC or Peak AC



**Model 40/15**

Non-Inverting High Voltage Amplifier, Output Voltage 0 to  $\pm 40$  kV DC or Peak AC

# HIGH VOLTAGE AMPLIFIERS



**Model 5/80**

**Non-Inverting High Voltage Amplifier, Output Voltage 0 to  $\pm 5$  kV DC or Peak AC**



**Model 50/12**

**High Voltage Amplifier that Provides Precise Control of Output Voltage 0 to  $\pm 50$  kV DC or Peak AC**



**Model 601C**

**DC-Stable High Voltage Amplifier**



**Model 603**

**Power Amplifier and Piezo Driver, Output Voltage Range 0 to +250 VDC or Peak AC**



**Model 609B-3**

**High Voltage Power Amplifier for Industrial and Research Applications**



**Model 609E-6**

**High Voltage Amplifier for Industrial and Research Applications, Output Voltage 0 to  $\pm 4$  kV DC or Peak AC**



**Model 610E**

**High Voltage Amplifier, Controller, and Supply, Output Voltage 0 to  $\pm 1$  kV or 0 to  $\pm 10$  kV**



**Model 615-10**

**High Voltage AC/DC Generator and Amplifier System for R&D and Production Applications**

# HIGH VOLTAGE AMPLIFIERS



**Model 623B**

High Voltage Amplifier for Precise Control of Bi-Polar Output Voltages, 0 to  $\pm 2$  kV DC or Peak AC



**Model 677B**

High Voltage Power Supply and Amplifier, Output Voltage 0 to  $\pm 2$  kV DC or Peak AC



**Model PD05034**

Non-Inverting High Voltage Power Amplifier, Output Voltage 0 to  $\pm 7.5$  kV DC or Peak AC



**Model PD07016**

Non-Inverting High Voltage Power Amplifier, Output Voltage 0 to  $\pm 10$  kV DC or Peak AC



**Model PZD2000A**

High-Bandwidth, High Voltage Amplifier, Output Voltage 0 to  $\pm 2$  kV DC or Peak A



**Model PZD350A**

Non-Inverting High Voltage Amplifier with Variable DC Gain, Output Voltage 0 to  $\pm 350$  VDC or Peak AC



**Model PZD350A M/S**

High Voltage Amplifier and Piezo Driver, Output Voltage 0 to  $\pm 350$  VDC or Peak AC



**Model PZD700A M/S Piezo Driver and Amplifier**

Precise Control, High Voltage Piezo Driver and Amplifier, Output Voltage 0 to  $\pm 700$  VDC or Peak AC



**Model PZD700A Piezo Driver and Amplifier**

DC-Stable, High Voltage Piezo Driver and Amplifier, Output Voltage 0 to  $\pm 700$  VDC or Peak AC

# ADVANCED ENERGY PRODUCT PORTFOLIO

## EMBEDDED POWER PRODUCTS

Provide stable and efficient power for mission critical applications

**Power System**



**Power Shelves**



**Configurable**



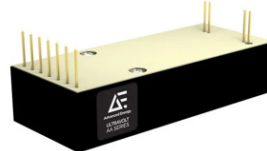
**AC-DC**



**DC-DC**



**HVDC**



## GAS SENSORS

Advanced Energy delivers innovative gas sensing instruments for numerous markets, including global energy, industrial materials, and advanced technologies. Our gas portfolio consists of gas modules and instruments that provide superior sensitivity over other gas detection techniques.

**OEM Gas Analyzers**



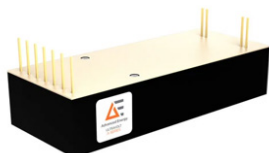
**Power System**



## HIGH VOLTAGE PRODUCTS

Advanced Energy's high voltage products feature high-performance power supplies and amplifiers. Each product line features hundreds of units, options, and accessories to meet your application needs.

**High Voltage Power Supplies**



**High Voltage Amplifiers**



# ADVANCED ENERGY PRODUCT PORTFOLIO

## LOW VOLTAGE POWER SUPPLIES

High-end engineering applications require unmatched efficiency, reliability, and performance. Advanced Energy's Excelsys low voltage power solutions offer high power density, unrivaled flexibility, and extreme efficiency to meet any system specifications.

Coolx1000 Series



Coolx1800 Series



Coolx600 Series



UltiMod Series



XF Series



Xgen Series



Xsolo Series



## PLASMA POWER GENERATORS

Advanced Energy's Precision Power™ solutions offer extreme control, peerless arc handling, and cutting-edge match technology. Unlock new fabrication processes and benefit from our power generators' comprehensive capabilities.

DC Power System



Low & Mid-Frequency Power



Pulsed-DC Systems



RF Plasma Generators



RF Match Networks



## REMOTE PLASMA GENERATORS

Equip your manufacturing and abatement processes with high functionality and exceptional reliability. Customize your chemistry. Expand your operating range. Deliver higher process rates. Advanced Energy's remote plasma sources offer sophisticated options in streamlined designs.

Litmas RPS | PFC Abatement



Rapid OX



Xstream





# ADVANCED ENERGY PRODUCT PORTFOLIO

## SCR POWER CONTROLLERS

Flexibility and performance unite with Advanced Energy's Thyro SCR power controllers. From simple to complex, ensure product quality with proven SCR operation, control modes, digital mains load optimization, and voltage sequence control.

Thyro-S



Thyro-AX Series



Thyro-A Series 3



Thyro-PX Series



## TEMPERATURE MEASUREMENT PRODUCTS

Built for precision and performance, Advanced Energy's temperature measurement products deliver extreme reliability in temperature critical environments. Benefit from proprietary technologies that enable remarkable process uniformity, repeatability, and accuracy.

Pyrometer



Thermal Imagers & Systems



Fiber Optic Temperature Sensors



Calibration Sources









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