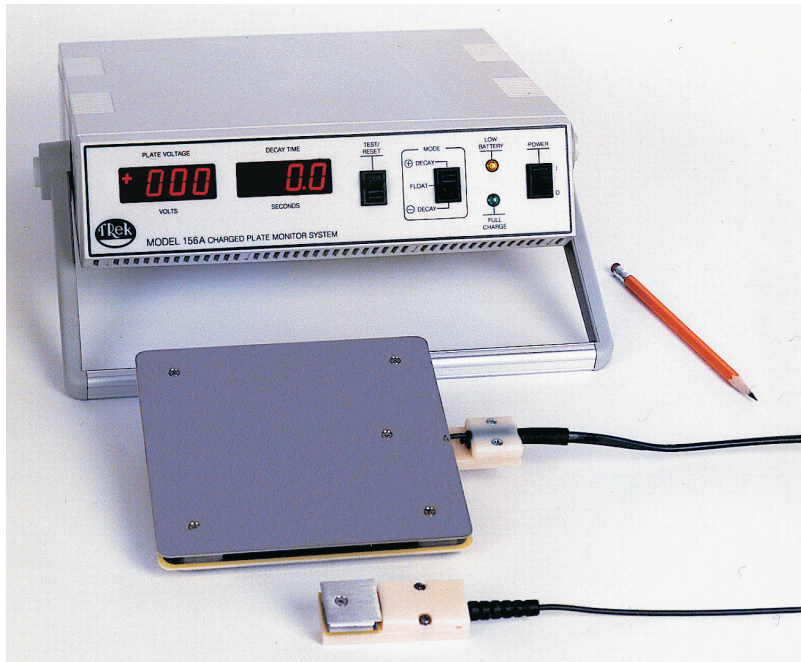


Model 156A

Charged-Plate Monitor



Is your ionizer neutralizing charges as quickly and completely as needed?

Is the ion output balanced?

Can you evaluate your ionizers while they are installed in production?

Is the recording of your ionizer test data efficient and cost effective?

Importance of Ionization Monitoring

The Trek Model 156A Charged-Plate Monitor will enable you to confidently answer the above questions so that you can effectively monitor and maintain your ionization program.

- Use the Model 156A to verify that new ionizers meet your selection criteria.
- When evaluating newly setup or active ionizer installations, use the Model 156A to determine if the decay times and ion balance performance are satisfactory for your application.
- Use the compact and portable Model 156A to determine when an ionizer needs maintenance.

The Model 156A Charged-Plate Monitor is an important tool for evaluating the performance of the air ionizers used to neutralize static charges.

Trek offers the Model 156A/1 with a computer interface option. This option adds both a serial communications port and an applications software program to operate, analyze, and save data from the charged-plate monitor to a computer.

The Model 156A tests the efficiency of your ionizer's ion production by timing how long it takes air ions produced to discharge a floating plate that has been pre-charged to either a positive or negative value. The Model 156A also tests the balance between positive and negative air ions by measuring the offset voltage generated on a floating plate due to an imbalance of positive and negative air ions impinging on the plate from your ionizer.

Typically, as the ionizer ages, the rates of positive and negative air ion production decline. Consequently, the time required for the ionizer to neutralize static charges increases, and the balance of positive and negative air ions changes.

The neutralization (decay) time may become too long for the ionizer to fully neutralize charges that are generated at a work location, or the ionizer may begin to charge objects that were initially uncharged.

By using the Model 156A to periodically measure the decay times and the ion balance, the need for, and frequency of, ionizer preventative maintenance can be easily determined.

Model 156A Specifications

Performance

Monitored Voltage Range

0 to ± 1100 V DC or peak AC.

Small Signal Bandwidth (-3 dB)

DC to 1 kHz (measured at 20 V p-p).

Large Signal Bandwidth

DC to 10 Hz (measured at 2000 V p-p).

Zero Stability (referred to plate voltage)

Drift with Time (no incident ion flow)

Less than 6 V/minute.

Drift with Temperature

Less than 10 mV/ $^{\circ}$ C, noncumulative.

Decay Mode Thresholds

Start Voltage

Unit and software programmable from 1 to ± 1000 V in 1 V increments.

Start Accuracy

Unit and Software within ± 1 V of programmed start voltage.

Stop Voltage

Unit and software programmable from 0 to ± 999 V in 1 V increments.

Stop Accuracy

Unit and Software within ± 1 V of programmed stop voltage.

Plate Self-Discharge (unpolarized)

Less than 12 V/minute.

Features

Mode Select

A three-position toggle switch selects the +Decay, -Decay, or Float mode of operation. This switch is also used in combination with the Test/Reset Control switch to program the START and STOP voltages.

Test/Reset Control

A momentary toggle switch used in conjunction with the Mode Select switch to program the START and STOP voltages.

Features (cont.)

Test/Reset Control (cont.)

+Decay and -Decay Modes

Sets the plate voltage to a value greater than the programmed start voltage and resets the decay timer to zero.

Float Mode

Sets the plate voltage to 0 V ± 2 V.

Voltage Monitor Output

A BNC providing a low voltage replica of the plate voltage.

Scale Factor

1/200th of the plate voltage.

DC Accuracy

Better than 0.1% of full scale.

Offset Voltage

Less than ± 10 mV.

Output Noise

Less than 10 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital multimeter).

Output Impedance

Less than 0.1 Ω .

Plate Voltage Digital Panel Meter

3 $\frac{1}{2}$ digit red LED display.

Range

0 to ± 1100 V.

Resolution

1 volt.

Accuracy

Better than 0.1% of full scale ± 1 count.

Decay Time Digital Panel Meter

4-digit red LED display.

Range

0 to 9999 seconds.

Resolution

0.1 seconds, from 0.1 to 999.9 seconds; 1 second, from 1000 to 9999 seconds. (The display will indicate "----" when the decay time exceeds 9999 seconds.)

Features (cont.)

Ion Collecting Plate (standard option)

Dimensions

15 cm x 15 cm square, (6" x 6" square).

Capacitance

20 pF ± 2 pF.

(Other capacitance options available)

General

Power Requirements

Battery Eliminator/Charger

(ordered separately)

Specifications

Output Connector

2.1 mm DC power plug.

Output Voltage

12 to 14 V DC.

Output Current

1 A.

Battery Operation

Rechargeable battery, supplied.

Operating Time

8 hours from a full charge (156A).

Recharge Time

3 hours to full charge.

Other

Low battery indicator.

Full charge indicator.

Operating Conditions

Temperature

5 $^{\circ}$ C to 35 $^{\circ}$ C.

Relative Humidity

To 80%, noncondensing.

Instrument Dimensions

83 mm H x 318 mm W x 280 mm D, (3.25" H x 12.5" W x 11" D).

Instrument Weight

Approx. 2 kg (4.4 lb).

The Model 156A and 156A/1 are CE Compliant

Copyright © 2011 TREK, INC. 1123/DEC All specifications are subject to change.

Model 156A and 156A/1 Ordering Information

Model 156A

<u>Item</u>	<u>Part No.</u>
Charge Plate Monitor	Model 156A
Charge Plate Monitor with serial interface	Model 156A/1
Computer Requirements: Windows 9X or later, NT4, PC compatible computer, 486DX66 or better, 16 Mb of RAM, and high speed serial port with 16550 or equivalent UART.	

Ion Collecting Plates

Standard Plates (ordered separately)	
15 cm x 15 cm (6" x 6") plate	17397
25 mm x 25 mm (1" x 1") plate	17375

Special Plates (ordered separately)
Custom plate sizes are available by special order.

Included Accessories

<u>Item</u>	<u>Part No.</u>
Operator's Manual	23126
PC Compatible Computer Software (156A/1 only)	43267
Banana to Banana Stackable Cord (9 ft.)	N9044

Optional Accessories

Battery Eliminator/Charger (115 V AC)	L5111
Universal AC Adapter Kit (100 to 240 V AC)	1K010
Ion Collecting Plate Tripod	DK142
Carrying Case	43433

New Accessories for Charged Plate Monitors

Trek Models 156A, 157, and 158

DI Water Probe



Trek's Model PM08035 probes can be used for electrostatic measurement of de-ionized water. The probe can be used during critical wafer sawing processes to monitor for charge accumulation. This probe can be used with other applications or processes involving de-ionized water.

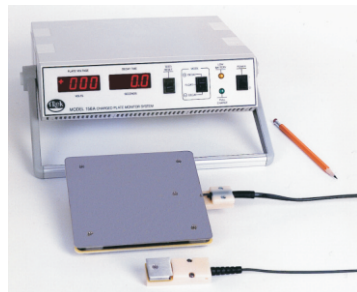
Two probe models are available for user defined or application specific purposes. The Model PM08035A probe has a 0.25 inch sensor. The Model PM08035B probe has an independent wire sensor.

Low Profile Charged Plate

Trek's Model 156P-LP Low Profile Charged Plate provides a design used for ESD monitoring of sensitive manufacturing processes in tight spacing situations. The thin plate is under 7 mm in height, light-weight and can be hand-held for easy transport.



Model 156P-LP



Model 156A



Model 157

Trek Charged Plate Monitors

Model 156A and 157

- Ideal for monitoring static charge in a manufacturing facility
- Suitable for dissipative testing of materials

Model 157

- Store & retrieve data as data points or graphs
- Record operator comments for reference

Technology

Trek's **charged plate monitors** employ a revolutionary charged-plate monitor design that utilizes an ultrahigh-impedance high-voltage follower to monitor the ion collecting plate. This technique provides high accuracy and virtually infinite impedance loading of the plate, while allowing the ion collecting plate to be charged and monitored through the same small-diameter cable connection.

Flexibility

Trek's technology makes the measurement capacitance independent of the physical size and shape of the ion collecting plate, thereby, the size and shape, as well as the measurement capacitance, to be customized to match a particular ESD-sensitive device within a manufacturing process, or be made to conform to the ANSI/ESD-STM3.1 standard test method.

Greater Bandwidth

Trek's technology also provides greater bandwidth enabling "true" responses to be observed, avoiding the masking of results which can occur with lower bandwidth systems.

Balance Tests/Discharge Tests

All models resolve 0.1 volts and feature high accuracy with extremely low offset and drift, which is ideal for testing ionizers in facilities requiring critical ion balance such as in GMR and TMR manufacturing areas.