

# EOS/ESD Detection Series

## Model 542 Electrostatic Voltmeter



The Trek Model 542 Electrostatic Voltmeter provides accurate noncontacting measurements of electrostatic surface voltage associated with EOS/ESD sensitive processes. The microprocessor based Model 542 is ideally suited to monitor critical operations associated with semiconductor, LCD, electronic assembly, and other processes where static charge accumulation poses a threat to production yields or product quality.

A twenty by four (20 x 4) alphanumeric LCD screen displays the present measured voltage, the positive peak voltage value, the negative peak voltage value, and additional menu information. The Model 542 includes independently programmable plus (+) and minus (-) voltage threshold/alarm limits. Audible and visible alarms indicate the detection of surface voltages which meet or exceed the programmed limits.

The Model 542-1 has a voltage detection and measurement range of 0 to  $\pm 10$  kV. The Model 542-2 has a voltage detection and measurement range of 0 to  $\pm 20$  kV. These models have an exceptional 5% reading accuracy,  $\pm 0.2\%$  of full scale, over the probe to surface separation distance of 15 to 30 mm for the Model 542-1 and 30 to 60 mm for the Model 542-2.

The Model 542 utilizes a DC stable electrostatic field chopper probe which can be remotely located and easily positioned within process equipment to provide drift-free, highly accurate, noncontacting, spacing independent, voltage measurements in either ionized or non-ionized environments. Two probe types are currently available with the 542-1 and the 542-2: a side viewing probe and probe with a 45 degree angle.

In addition, a relay contact output changes state upon threshold detection. This signal can be connected to a process controlling device or other external equipment. A voltage output monitor and an 4-20 mA current loop output can provide additional signal interfacing to facility monitoring equipment. An RS-232 serial port can provide computer based control and monitoring.

Chopper probe is DC stable with or without incident air ion flow

Drift-Free Measurements

Measurement Ranges:

Model 542-1

$\pm 10$  kV DC or peak AC

Model 542-2

$\pm 20$  kV DC or peak AC

LCD screen displays the present voltage, and holds the most positive and the most negative measured values

Visual and audible alarms

Voltage output monitor for remote monitoring or control

RS-232 serial port

4-20 mA current output

20 x 4 alphanumeric LCD display screen

CE compliant

**CONTROL WITHOUT COMPROMISE**



# Model 542 Electrostatic Voltmeter Specifications

## Performance

### Measurement Ranges

#### Model 542-1

0 to  $\pm 10$  kV DC or peak AC.

#### Model 542-2

0 to  $\pm 20$  kV DC or peak AC.

### Speed of Response (10% to 90%)

Less than 50 ms for a 1 kV step.

### Accuracy

#### Model 542-1

Better than  $\pm 5\%$  of reading,  
 $\pm 0.2\%$  of full scale over a  
probe-to-surface separation of  
15 mm to 30 mm.

#### Model 542-2

Better than  $\pm 5\%$  of reading,  
 $\pm 0.2\%$  of full scale over a  
probe-to-surface separation of  
30 mm to 60 mm.

### Drift with Time

Less than  $\pm 1\%$  of full scale,  
noncumulative.

## Probes

The probes are chopper stabilized for drift-free operation.

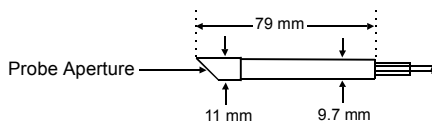
### Available Probes

#### 45° Orientation (Model 542P-45D)

Aperture size of 3.8 mm (0.15") diameter.

##### Dimensions

11 mm dia. x 79 mm L  
(0.43" dia. x 3.1" L).

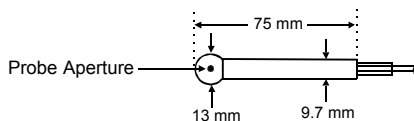


#### Side Orientation (Model 542P-S)

Aperture size of 4 mm (0.156") diameter.

##### Dimensions

13 mm dia. x 75 mm L  
(0.51" dia. x 3" L).



### Probe Cable Length

3 meters (10 ft), nominal.

## Probes (cont.)

### Probe-to-Surface Separation (recommended)

#### Model 542-1

15 mm to 30 mm.

#### Model 542-2

30 mm to 60 mm.

## Features

### Alphanumeric LCD Display

Twenty character by four line (20 x 4) LCD displays present voltage, and holds the most positive and the most negative measured values.

### Alarms

Various alarms (listed below) are activated when the measured voltage exceeds the adjustable threshold limits. Individual threshold limits for positive and negative voltages are independently programmed.

### Visual Alarms

LEDs on front panel are illuminated when programmed thresholds are reached.

### Audible Alarms

A programmable pulsating or continuous tone. The (+) and (-) alarms have different tone rates for the pulsed tone selection.

### Alarm Relay Output

Form C relay contact rated at 175 V, maximum, at 5 watts.

### Alarm Digital Output

A TTL output with a TTL low as the alarm "ON" status.

### Monitor Output

#### Model 542-1

1/1000th of the measured voltage.

#### Model 542-2

1/2000th of the measured voltage.

### Output Noise

Less than 30 mV rms (measured using the true rms feature of the Hewlett Packard Model 34401A digital voltmeter).

### Output Impedance

47 ohms.

## Features (cont.)

### RESET Push Button

Resets the alarms (manual mode) and the Peak Hold display to zero.

### ZERO Control

Control to produce zero volts when probe is coupled to a known zero source.

### MENU $\uparrow\downarrow$ Buttons

Used for selecting and programming menu options.  $\uparrow\downarrow$  buttons are used to set alarm threshold voltages, alarm conditions, and alarm reset type.

### Current Output

Provides a current of 4-20 mA that represents -10 kV to +10 kV (542-1) or -20 kV to +20 kV (542-2).

### Serial Port

RS-232 controls functions and acquires sensor data through standard computer serial port.

### Ground Receptacle

Banana jack.

### Power ON/OFF

Rear panel switch.

## General

### Dimensions

152 mm W x 87 mm H x  
216 mm D  
(6" W x 3.4" H x 8.5" D).

### Weight

0.77 kg (1.7 lb).

### Power

15 V DC  $\pm 20\%$ , 800 mA, power bus or AC/DC adapter with a 2.1 mm DC plug. Positive polarity connected to the center contact.

### Operating Conditions

#### Temperature

15 °C to 35 °C.

#### Relative Humidity

5% to 85%, noncondensing.

*NOTE: This instrument is designed to make electrostatic voltage measurements only! For safety, this instrument should never be used to perform measurements of "hard" voltage sources or voltage sources which can deliver currents high enough to cause harmful shocks or personal injury.*

