

# EOS/ESD Detection Series

## Model 541 Electrostatic Voltmeter



Trek Model 541 electrostatic voltmeters are microprocessor based voltmeters which are 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.

The Model 541 voltmeters utilize a miniature electrostatic field chopper probe which can be remotely located and easily positioned within process equipment to provide highly accurate, noncontacting, DC stable, spacing independent, voltage measurements in either ionized or non-ionized environments.

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. Two specific voltage detection ranges are available. The Model 541-1 has a voltage measurement range of 0 to  $\pm 1$  kV. The Model 541-2 has a measurement range of 0 to  $\pm 100$  V. Both instruments have exceptional 1% accuracy and 0.1% resolution.

The Model 541 series includes independently programmable plus (+) and minus (-) voltage threshold/alarm limits to provide audible, visual, and external warning signals. Audible and visible alarms indicate the detection of programmed surface voltage limits. A relay contact output changes state when alarm thresholds are met or exceeded. This signal can be connected to a process controlling device or other equipment to monitor a particular environment.

A voltage output monitor and the 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

Measurement Ranges:  
Model 541-1

$\pm 1$  kV DC or peak AC

Model 541-2

$\pm 100$  V DC or peak AC

Microprocessor based

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 541 Electrostatic Voltmeter Specifications

## Performance

### Measurement Ranges

#### Model 541-1

0 to  $\pm 1$  kV DC or peak AC.

#### Model 541-2

0 to  $\pm 100$  V DC or peak AC.

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

#### Model 541-1

Less than 50 ms for a 1 kV step.

#### Model 541-2

Less than 50 ms for a 100 V step.

### Accuracy

1% of full scale.

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

2.5 mm  $\pm 1$  mm.

## Features

### Alphanumeric LCD Display

Twenty character by four line (20 x 4) LCD displays present voltage, positive peak, and negative peak voltages.

### Reset

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

### Visual Alarms

LEDs on front panel light when alarm thresholds are reached.

### Audible Alarms

#### (ON/OFF programmable)

A pulsating or continuous tone (selectable) is sounded when the programmed voltage limit is detected. The (+) and (-) alarms have different tone rates for the pulsed tone selection.

### Alarm Relay Output

Form C relay contact with barrier strip terminals. Contacts will change state when voltage thresholds are met or exceeded.

### Ground Receptacle

Banana jack.

### ESVM ZERO

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

## Features (cont.)

### Alarm Output (Digital Alarm)

The alarm output is a logic-level output indicating the alarm status of the Model 541. A TTL low (0 to 0.8 volts) signals an alarm condition. A TTL high (2.5 to 5.0 volts) indicates a normal condition.

### Monitor Output

#### Model 541-1

The voltage output at this connector is 1/100th of the measured voltage.

#### Model 541-2

The voltage output at this connector is 1/10th 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.

### Current Output

Provides a current of 4-20 mA that represents -1 kV to +1 kV (Model 541-1) or -100 V to +100 V (Model 541-2).

### Serial Port

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

### MENU $\updownarrow$ Buttons

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

### Power ON/OFF

Rear panel switch.

### Probe

Miniature electrostatic field chopper probe. End viewing and side viewing probes are available.

*NOTE: The Model 541 is designed to make electrostatic voltage measurements only! For safety, the Model 541 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.*

## Probes

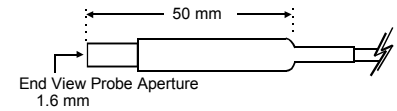
### Probe Model 541PR-E (round body)

END aperture orientation.

1.6 mm (0.06") diameter aperture size.

#### Dimensions

9.7 mm diameter x 50 mm L (0.38" dia. x 2" L, nominal).



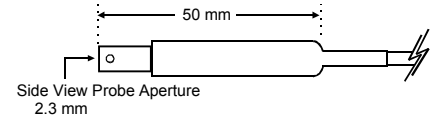
### Probe Model 541PR-S (round body)

SIDE aperture orientation.

2.3 mm (0.09") diameter aperture size.

#### Dimensions

9.7 mm diameter. x 53 mm L (0.38" dia. x 2.1" L, nominal).



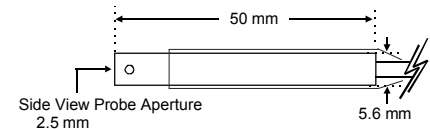
### Probe Model 541P-S (square body)

End aperture orientation.

2.5 mm (0.1") diameter aperture size.

#### Dimensions

5.6 mm square x 50 mm L (0.22" x 2" L, nominal).



### Cable Length

3000 mm  $\pm 75$  mm (118"), nominal.

## General

### Dimensions

152 mm W x 102 mm H x 216 mm D (6" W x 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.

### Operating Conditions

#### Temperature

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

#### Relative Humidity

5% to 85%, noncondensing.

