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 ±10 kV. The Model 542-2 has a voltage detection and measurement range of 0 to ±20 kV. These models have an exceptional 5% reading accuracy, ±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
±10 kV DC or peak AC
Model 542-2
±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 ±10 kV DC or peak AC.
Model 542-2
0 to ±20 kV DC or peak AC.

Speed of Response (10% to 90%)
Less than 50 ms for a 1 kV step.

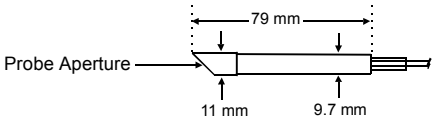
Accuracy
Model 542-1
Better than ±5% of reading, ±0.2% of full scale over a probe-to-surface separation of 15 mm to 30 mm.
Model 542-2
Better than ±5% of reading, ±0.2% of full scale over a probe-to-surface separation of 30 mm to 60 mm.

Drift with Time
Less than ±1% of full scale, noncumulative.

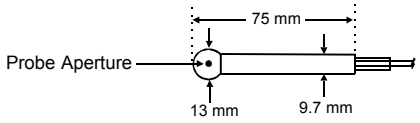
Probes

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 ↑↓ Buttons
Used for selecting and programming menu options. ↑↓ 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 ±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.

TREK, INC. 11601 Maple Ridge Road • Medina, NY 14103 • 800-FOR TREK
585-798-3140 • 585-798-3106 (fax) • www.trekinc.com • sales@trekinc.com

ISO 9001:2000 FM 56910