TREK 152-1

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



The Trek® 152-1 surface/volume resistance meter is designed to precisely measure surface or volume resistance on a wide variety of conductive, dissipative, and insulative materials. It features exceptional measurement accuracy and wide measurement ranges. When used with Advanced Energy's uniquely-designed 152P-CR-1 concentric ring probe, the instrument provides consistent ease of operation even at very high resistance values. The Trek 152-1 is lightweight, portable and operable via batteries or an AC line power source with battery eliminator.

PRODUCT HIGHLIGHTS

- 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} Ω)
- Elastomer electrodes for excellent surface contact
- Optional accessories include a Walking Test Adapter and Test Plate set
- NIST-traceable Certificate of Calibration provided with each unit
- CE compliant

TYPICAL APPLICATIONS

- Measuring surface or volume resistance on materials (Conductive, dissipative, insulative)
- Measuring in accordance with ANSI/ESD Standards for [Garments (STM2.1), Work surfaces (S4.1), Flooring (S7.1), Footwear (STM9.1), Planar materials (STM11.11), · Volume resistance (STM11.12 and IEC 61340-2-3), Seating (STM12.1), Two point resistance measurements (STM11.13), Floor materials/footwear (STM97.1)]

AT A GLANCE

Measurement Range

10^3 to 10^{13} Ω

Measurement Accuracy

Point to Point Probe
10^3 to 10^{12} Ω range, ±5%
(+100 to 200 Ω)

10^{13} Ω range, ±8%

Concentric Ring Probe
10^3 to 10^{13} Ω range, ±5%

Two Point Resistance Probe
10^3 to 10^{13} Ω range, ±10%

Probe Electrode Test Voltage

User selectable, 10 V or 100 V ±2%

Test Limit Current

Limited to less than 13 mA in 10 V range and 1.7 mA in 100 V range

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TECHNICAL DATA

Performance Specifications		
Resistance Measurement Range	10^3 to 10^{13} Ω	
Resistivity	Resistance X Factor 10 = Resistivity	
Measurement Accuracy (of the reading) at 25°C and 20% to 70% RH	Point-to-point 5 lb probe (152BP-5P)	10^3 to 10^{12} Ω range, ±5%
		10^{13} Ω range, ±8%
	Concentric ring probe (152P-CR)	10^3 to 10^{12} Ω range, ±5%
		10^{13} Ω range, ±8%
	Two point resistance probe (152P-2P)	10^3 to 10^{11} range, ±5%
Probe Electrode Test Voltage	User selectable 10 V or 100 V, ±2%	
Test Current Limit	Limited to less than 13 mA in the 10 V range and less than 1.7 mA in the 100 V range	

Mechanical Specifications	
Dimensions (H x W x D)	180 x 100 x 44 mm (7 x 4 x 1.75 in)
Weight	Approximately 0.5 kg (1 lb) with battery

Electrical Specifications	
Battery Operation	Two 9-Volt batteries (NEDA 1605 Alkaline, or equivalent) provide approx 6 hrs of power
AC Line Operation	The use of an AC battery eliminator allows for AC line operation. The eliminator output connector is a female type 2.1 mm, DC power plug

Environmental Specifications	
Temperature	15 to 35°C (59 to 95°F)
Relative Humidity	5 to 80%, noncondensing
Altitude	To 2000 m (6561.68 ft)

Test Probes/Accessories		
Trek 152BP-5P Test Probes	Set of 2 (2.27 kg / 5 lb). Available for performing resistance measurements including ANSI/ESD STM 4.1 standards (point-to-point or resistance to ground measurement)	
Trek 152P-2P Two-Point Resistance Probe	Performs measurements on surface areas too small to be measured with conventional probes	
Trek 152P-CR-1 Surface/ Volume Concentric Ring Probe[1]	Measures surface and volume resistance of materials as per IEC or ESDA standards. A three (3) position switch on the probe selects either SURFACE distance or VOLUME resistance measurements with either a GUARDED or UNGUARDED outer electrode. Uses an exclusive built-in pre-amplifier design.	
Test Plate Set (consists of two separate plates)	The use of these plates is described in the ESD STM 11.12 (IEC 61340-2-3) standard	
	Conductive Plate	127 x 127 mm (5 x5 in) A stainless steel conductive plate with a mini banana plug
	Insulative Plate	137 x 137 mm (5.4 x5.4 in) Acts as an insulative surface
Walking Test Adapter Kit	The Walking Test Adapter allows the analysis of resistance levels on the human body (STM 97.1)	

[1] The Trek 152-CR-1 will operate with the previous Trek 152 resistivity meter in “surface” mode, just as the Trek152-CR probe did. The 152-CR will operate with the Trek152-1 Resistance Meter with the measurement being in “ohms,” not “ohms/sq.”

TECHNICAL DATA (CONTINUED)

Features	
LCD Display	Three digits plus two digit exponent (scientific notation)
Low Battery Indicator	LCD message for low battery
Test Voltage Range Indicator	Indicates the test voltage selected, either 10 V or 100 V
Automatic Shutoff	If the unit is left idle for longer than 10 minutes, the unit automatically turns off
ANSI / ESD Association Standards	The Trek 152-1 conforms to ANSI / ESD Association Standards for measuring surface resistance and surface resistivity. Please refer to the Applications section on page 1 of this data sheet for more information

REFERENCE NUMBERS

Included Accessories	
23426	Operator's Manual
N9044	Ground Cord
F5054R	Universal AC Adapter

Optional Accessories	
17530	Test Plate Set
43378	Carrying Case
1K039	Walking Test Adapter Kit

ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than three decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

AE's power solutions enable customer innovation in complex semiconductor and industrial thin film plasma manufacturing processes, demanding high and low voltage applications, and temperature-critical thermal processes.

With deep applications know-how and responsive service and support across the globe, AE builds collaborative partnerships to meet rapid technological developments, propel growth for its customers and power the future of technology.

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SURFACE/VOLUME CONCENTRIC RING PROBE

Trek 152P-1



The Trek 152P-CR-1 Concentric Ring Probe is capable of measuring surface and volume resistance in materials as per IEC or ESDA standards. A three (3) position switch on the probe selects surface resistance or volume resistance measurements with either a guarded or unguarded outer electrode. (See page 2.)

An optional Test Plate Set [CN 17530] consists of two separate plates. A stainless steel conductive plate can act as a second electrode to apply the test voltage to the sample under test and also provides a mini-banana plug connection for a secure ground connection. An insulative plate is utilized as needed. The use of these plates are described in the ESD STM11.12 and in IEC 61340-2-3 standards.

The Trek Model 152-1 Resistance Meter used with the 152P-CR-1 system, is designed to precisely measure surface resistance on a wide variety of conductive, dissipative, and insulative materials.

The Model 152-1 Resistance Meter employs a measurement technique which conforms to ANSI/ESD Association standards for measuring surface resistance, resistivity, and volume resistance and features exceptional measurement accuracy and wide measurement ranges of 10^3 to 10^{13} ohms using either a point-to-point probe or the two-point probe. Measured resistance values are clearly displayed on a high-contrast LCD display. Various probes are available and accessory options include a Walking Test Adapter which allows analysis of resistance levels on the human body [STM 97.1].

Trek 152-1 Resistance Meter

Measurement Range

10^3 to 10^{13} ohms

Probe Electrode Test Voltage

User selectable for 10 V or 100 V, ±2%.

Test Current Limit

Limited to less than 13 mA in the 10 V range and less than 1.7 mA in the 100 V range.

Trek 152P-CR-1 Surface / Volume Resistance Probe

A three (3) position switch on the probe selects performance options.

Optional Test Plate Set

These plates provide additional ESD STM standard options for guarded and unguarded resistance and volume measurements.

Optional Probe Calibration Fixture

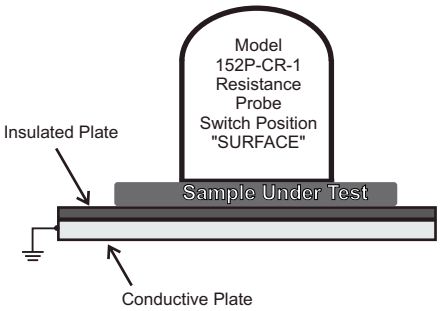
Provides measurement accuracy verification of resistance/resistivity probes.

The Trek 152P-CR-1 Concentric Ring Probe, when used with the Trek Model 152-1 Resistance Meter, is capable of measuring surface and volume resistance in materials as per IEC or ESDA standards. A three (3) position switch on the probe selects for SURFACE resistance measurements or VOLUME resistance measurements either with a GUARDED or UNGUARDED outer electrode.

In addition to the Model 152P-CR-1 Concentric Ring Probe [CN 17529], Trek offers a Test Plate Set [CN 17530] that consist of two separate plates, each approximately 5 inches square. A stainless steel conductive plate acts as a second electrode for the application of the test voltage to the sample under test. An insulative plate is utilized as needed. The use of the plates are described in the ESD STM11.12 and IEC 61340-2-3 standards.

Test Position SURFACE

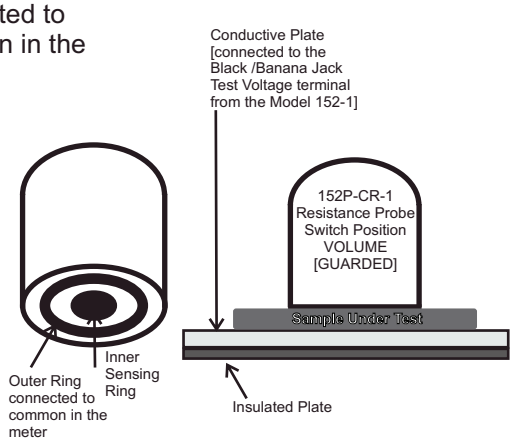
The test voltage is applied to the outer ring during surface measurements. Model 152P-CR-1 switch is positioned at SURFACE designation.



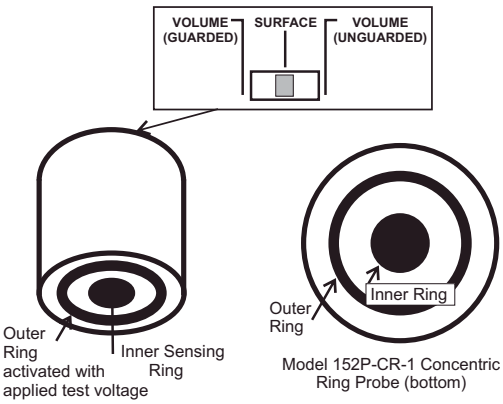
Resistivity - Resistance X Factor 10 = Resistivity

Test Position VOLUME [GUARDED]

The outer ring is connected to common in the 152-1 meter (guarded) during volume measurements. As per IEC 61340-2 standard, when performing volume measurements the outer ring is guarded (connected to common in the meter).



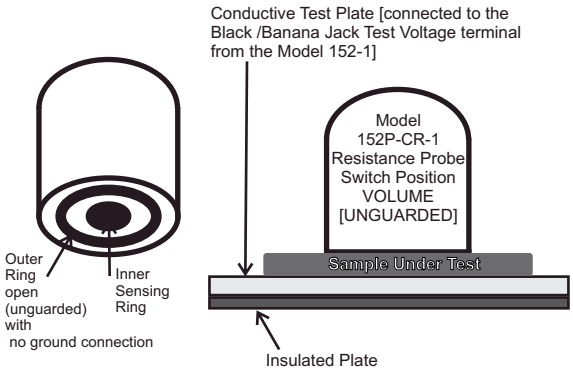
Model 152P-CR-1 [3 Position Switch]



Model 152P-CR-1 Concentric Ring Probe (bottom)

Test Position VOLUME [UNGUARDED]

The test voltage is removed and outer ring is open (unguarded) during volume measurements. Model 152P-CR-1 switch is positioned at VOLUME [UNGUARDED] designation. As per ESD STM11.12 standard, the outer ring is unguarded with no ground connection.



Optional Accessories

CR Probe Calibration Fixture [CN 16160]



Surface Resistance Calibration Test Fixture

This surface resistance calibration test fixture is designed to check the electrode alignment of resistance/resistivity probes, the electrification time of the probe/cable meter test setup and verify overall measurent accuracy of the test setup at both ends of the static dissipative measurement range. It consists of a 502K ohm test surface and a teraohm test surface.

Test Plate Set [CN 17530]

Includes two separate plates, approx. 5” X 5”:
- Stainless Steel Conductive Plate
- Insulative Test Plate

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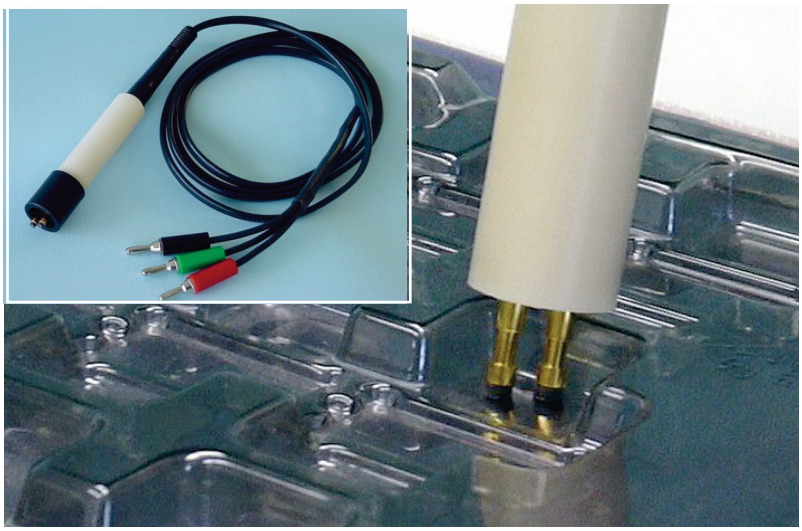
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TWO POINT RESISTANCE PROBE

Trek 152P-2P



The Trek 152P-2P probe is used to perform accurate two point resistance measurements in the range of 10^3 to 10^{13} ohms.

The Trek 152P-2P probe is designed to perform resistance measurements on objects too small to be measured using the concentric ring probe specified in ANSI/ESD Association standard STM11.11, or too small to be measured using the point-to-point probes specified in other ANSI/ESD Association standards.

Items such as thermo-formed trays, tape and reel carriers, and similar objects can now be accurately measured for their resistance characteristics. The Trek 152P-2P probe housing is made from a dissipative, low-sloughing material for optimum performance in ESD areas. Additional features include Elastomer electrodes, which provide excellent surface contact, a compact probe design which is lightweight and portable, and probe electrode pins which can be removed for easy replacement.

A removable probe cap permits tests to be quickly performed using a precise 90° angle on flat surfaces. With the probe cap removed, the two independent probe electrodes can be placed in extremely small or recessed spaces. Independent spring action of each probe electrode allows measurements of uneven surfaces.

The Trek 152P-2P operates with the Trek 152 Surface Resistance Meter and most other brands of resistance meters with banana plug inputs.

- Performs measurements on areas too small to measure with other standard probes
- Exceptional accuracy, stability, and repeatability
- Wide measurement range of 10^3 to 10^{13} ohms
- Elastomer electrodes for excellent surface contact
- Efficient and compact probe design
- Six (6) ft. cable length
- Operates with most resistance meters including the Trek 152
- Independent spring probe action for uneven surfaces
- Probe cap can ensure rapid, 90° right angle measurements

Trek 152P-2P Probe Specifications

Probe Dimensions
6.4″ length x 0.75″ diameter
(163 mm x 19 mm)

Cable Length
6 ft (1829 mm)

Distance Between Probe Contacts
(center to center)
0.25″ (6.4 mm)

Contact Travel
0.170 ″ (4.3 mm)

Probe Contacts
0.125″ (3.2 mm) diameter
conductive silicon elastomer.

Contact Force
16 oz (454 g), nominal at 0.170″
(4.3 mm) contact in-travel

Trek 152 Resistance Meter Using Trek 152P-2P Probe

Performance

Resistance/Resistivity Measurement Ranges

10^{3} to 10^{13} ohms
(extends to 10^{14} ohms using the Concentric Ring probe).

Measurement Accuracy (of reading)

At 25 °C ±10°C at 20% to 70% RH:

10^{3} to 10^{11} Ω range, ±5 %,
10^{12} to 10^{13} Ω range, ±10 %.

General

ANSI/ESD Association Standards
The Model 152 conforms to the following ANSI/ESD Association Standards for measuring surface resistance and surface resistivity:

STM2.1	Garments.
STM4.1	Work surfaces - resistive characterization.
STM7.1	Flooring materials.
STM9.1	Footwear resistive characteristics.
STM11.11	Surface resistance measurements of static dissipative planar materials.
STM12.1	Seating - resistive measurements.
STM11.13	Two-point resistance measurement.
STM97.1	Floor materials/footwear-resistance measurements in combination with active user.

General (cont.)

Battery Operation
Two (2) 9 Volt batteries (NEDA 1604 Alkaline, or equivalent) provide 6 hours of power for portable operation.

AC Line Operation
Use the AC battery eliminator. The eliminator output connector is a female type 2.1 mm DC power plug.

Instrument Dimensions
180 mm H x 100 mm W x
44 mm D
(7″ H x 4″ W x 1.75″ D)

Instrument Weight
Approximately 0.5 kg (1 lb) with batteries.

Environmental Operating Range
Temperature
15 °C to 35 °C.
Relative Humidity
5% to 80%, noncondensing.

Probes Available

Trek 2.27 kg (5 lb.) Concentric Ring Probe, (2) 2.27 kg. (5 lb.) point-to-point probes, and the two-point resistance 152P-2P probe.

Features

Test current Limit
Limited to less than 13 mA in the 10 V range and less than 1.7 mA in the 100 V range.

Probe Electrode Test Voltage
User selectable for 10 V or 100 V, ±2%.

LCD Display
Three digits plus two digit exponent (scientific notation).

Low Battery Indicator
LCD message for low battery.

Test Voltage Range Indicator
User selectable, either 10 V or 100 V.

Automatic Shutoff
If the unit is left idle for longer than 10 minutes, the unit automatically turns off.

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