

GROUND RESISTANCE TESTERS

For all of your Ground Integrity® Testing needs...

An array of Ground Resistance Testers to choose from...



Whether you perform a simple point-to-point test, a clamp-on ground resistance test, or a more complete 3- or 4-Point Fall-of-Potential test, AEMC® Instruments manufactures the right instrument to fit your application. Our revolutionary Clamp-On Ground Resistance Tester will save you both time and money.

Whichever AEMC® ground tester you choose, you can count on it to be the highest quality, the most complete package and the simplest to learn to use.



Our products are backed by over 130 years of experience in test and measurement equipment, and encompass the latest international standards for quality and safety.

Technical Hotline: (800) 343-1391
www.aemc.com

 **AEMC**
INSTRUMENTS
CHAUVIN ARNOUX GROUP

Understanding Ground Resistance Testing

The term **ground** is defined as a conducting connection by which a circuit or equipment is connected to the earth. The connection is used to establish and maintain, as closely as possible, the potential of the earth on the circuit or equipment connected to it. A **ground** consists of a grounding conductor, a bonding connector, its grounding electrode(s) and the soil in contact with the electrode.



Model 4630 performing a 3-Point ground resistance test on an individual rod.

To measure:

- ▶ Soil Resistivity — use a 4-Point tester
- ▶ Touch Potential — use a 4-Point tester
- ▶ Low Ground Resistance ($5\ \Omega$ or less)
Grids or Mats — use a dual 3- / 4-Point tester
- ▶ Individual Ground Rods — use a 3-Point tester
- ▶ Ground Resistance testing without the need for auxiliary electrodes or disconnecting neutrals — use a clamp-on tester or instrument using clamp-on features
- ▶ Bonding Resistance — use a Micro-Ohmmeter



Model 6255 conducting bond verification on a grounding system.

Grounding electrode systems have several protection applications:

For **natural phenomena**, such as lightning, grounds are used to discharge current from the system to protect people from possible injury or system components from possible damage.

For **faults in electric power systems** with ground returns, grounds help ensure rapid operation of the protection relays by providing low resistance fault current paths. This provides for the removal of the foreign potential as quickly as possible. The ground should drain the foreign potential before people are injured and the power or communications system is damaged.

For **maintaining a reference potential** for instrument safety, protect against static electricity, and limit the system to frame voltage for operator safety, a ground resistance should be zero ohms. In reality, this value is difficult to obtain.

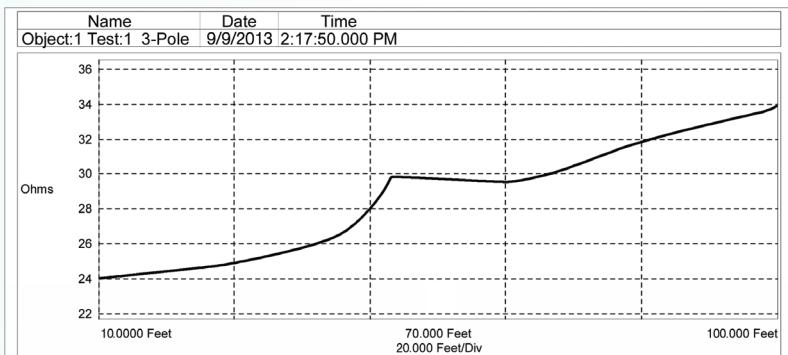
Lastly, for **low ground resistance**, it is essential to meet NEC®, OSHA and other electrical safety standards.

► APPLICATIONS

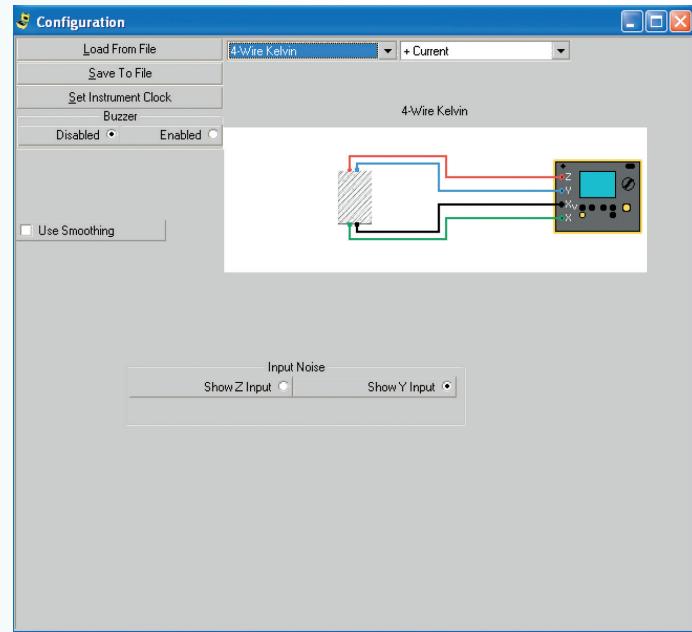
- ▶ Measure ground rod and grid resistance
- ▶ Use in multi-grounded systems without disconnecting the ground under test
- ▶ Measure resistance and continuity of grounding loops around transformer pads and buildings
- ▶ Measure leakage current flowing to ground or circulating in ground loops
- ▶ Conduct quick field checks
- ▶ Conduct field surveys and retrieve and analyze readings from stored data
- ▶ Measure earth resistance of the type of single rod or small ground grids often found in remote telecommunication switching stations
- ▶ Measure ground electrode resistance on lightning protection equipment
- ▶ Measure the earth electrode resistance of equipment in recreational areas, especially public swimming pools
- ▶ Test electrode resistance of installed ground rods and grids at new construction sites before utility power is supplied
- ▶ Test earth electrode resistance of grounded towers and counterpoises at cellular phone remote installations and power transmission towers
- ▶ Three-Point measurement of large grounding grids, counterpoises, ground mats, and grounded equipment
- ▶ Locate areas of lowest soil resistivity which is essential for achieving an economical grounding installation

DataView®

Data Analysis and Reporting Software for Ground Testers



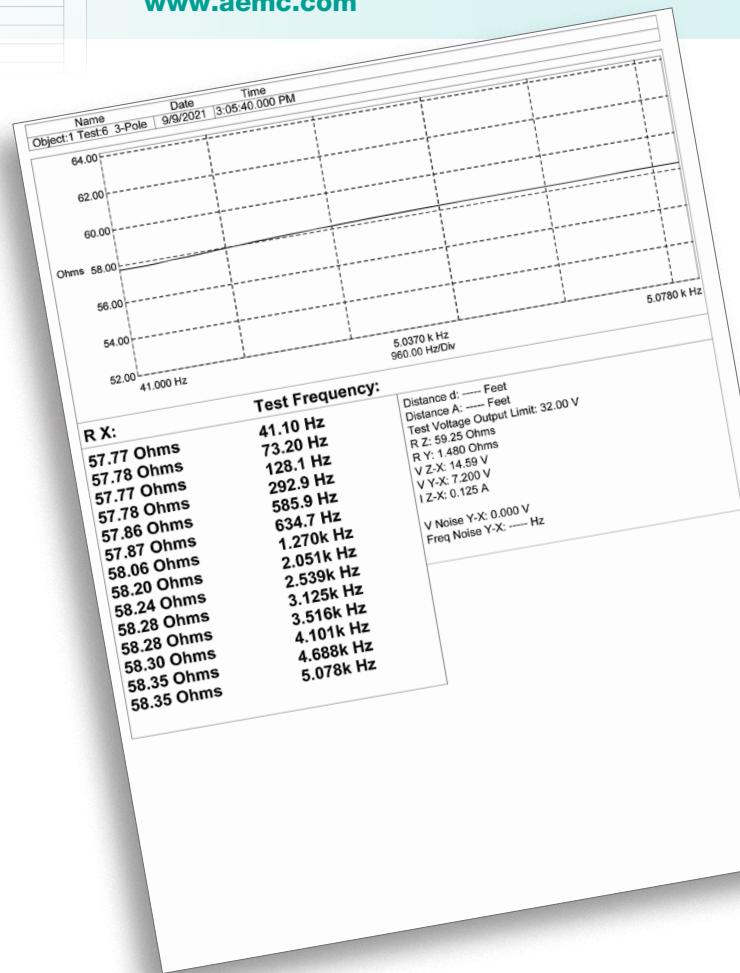
Distance d (Feet)	R X (Ohms)	V Y-X (V)
10	24.1	3.27
20	25	3.37
30	26.1	3.49
40	29.3	3.63
50	30.0	3.84
60	30.1	3.96
70	30.3	3.98
80	30.9	4.05
90	32.1	4.19



DataView® software provides a convenient way to configure and control ground resistance tests from your computer. Through the use of clear and easy-to-use tabbed dialog boxes, all ground tester functions can be configured and tests can be initiated. Results can be displayed in real-time and stored in your PC. Reports may be printed along with the operator's comments and analysis.

Configure all functions of the Models 6417, 6470-B, 6471 & 6472

- Run tests and analyze real-time data from your PC
- Configure all test functions and parameters from your PC
- Customize views, templates and reports to your exact needs
- Display Fall-of-Potential plots, tabular listings of test results, resistance vs. frequency plots, soil resistivity and bonding tests
- Print reports using standard or custom templates you design
- Free updates are available on our website www.aemc.com



GROUND TESTER SELECTION GUIDE



Clamp-On Ground Resistance Testers

The Clamp-On Ground Resistance Testers measure ground rod and grid resistance without the use of auxiliary ground rods. They offer accurate readings from (0.01 to 1500) Ω , as well as ground leakage current from 0.2 mA to 40 A, without disconnecting the ground system under test.



3-Point Ground Resistance Testers

The new 3-Point Ground Resistance Testers are affordable and feature-rich. Their innovative design simplifies the process and provides reliable results. A single button operation, users can easily connect, press, and read measurements. The Model 6424 stores and calculates measurements using the simplified 62 % test method, displaying average and % deviation for accurate pole spacing determination. Complete kits available.



4-Point Ground Resistance Testers

The 4-Point Ground Resistance Testers are ideal for both soil resistivity and Fall-of-Potential testing. Models are available as battery powered or with AC power cord. All models are available in complete kit form which includes leads, auxiliary electrodes, 100 ft tape measure, carrying bag and cable.



Bond Testers

Micro-Ohmmeter Models 6240 and 6255 perform reliable low resistance measurements with test current to 10 A and resolution to 1 $\mu\Omega$. Both models also use a four-wire Kelvin Bridge method, which eliminates test lead resistance for best measurement accuracy.

Now you can test energized

GroundFlex® Field Kit Tower Ground Resistance Testing

Test active towers safely without disconnecting any cables



The Model 6472 with companion Model 6474 GroundFlex® Adapter unit comprise a powerful high end ground resistance testing system.



Flexible sensors measure leakage current and resistance on tower legs

This new and innovative system provides a cost effective method of accurately measuring the grounding resistance of power transmission, cellular and other towers without disconnecting or isolating the tower from other structures. This feature alone will save enough time and money to pay for itself in just a few months. Any monopole up to four legged tower can be tested, measuring the resistance of each leg, total resistance to ground and leakage current on each leg. Flexible sensors wrapped around each leg of the tower provide an accurate high sensitivity measurement capable of determining these values that other measuring techniques can not. This

system can also measure all traditional ground testing measurements including three pole fall-of-potential, four pole soil resistivity, bonding and earth coupling. Tests can be conducted at selected frequencies from (41 to 5078) Hz or swept across the full frequency range, ideal for profiling impedance needed to analyze the effects of a lightning strike.

The system includes all necessary sensors, wires and reels, auxiliary electrodes and cables needed to conduct all tests.

Up to 512 complete measurements can be stored in internal memory for later downloading to a PC for analysis and reporting using the full featured DataView® software package included FREE.

Each instrument in the system is packaged in a rugged water resistant polycarbonate case and the full kit is additionally packaged in a field travel case which serves as a field work station. The system can be operated off batteries, AC power or 12 volt DC.

Model 6472 comes with a large display!

MODEL	6472
3-Point Measurement	✓
4-Point Measurement	Direct soil resistivity measurement
Bond Test (2- and 4-wire)	✓
2 Clamp Measurement	✓
Soil Resistivity 4-Pole Measurement	✓
Earth Potential Measurement	✓
External Voltage Measurement	(0.1 to 65.0) V
External Current Measurement	(0.01 to 40.0) A
Measurement Range	99,000 Ω
Ranging	Auto-Ranging
Test Current	Up to 250 mA
Test Frequency	Selectable from (40 to 5078) Hz
Power Source	9.6 V rechargeable battery pack
Display	Digital/backlight
Dimensions	(10.7 x 9.76 x 5.1) in
Weight	7.5 lb
Catalog No.	2135.54

MODEL	6474
Tower Measurement with GroundFlex®	(0.001 to 99.99) k Ω
Current Measurement with GroundFlex®	0.1 mA to 99.9 A
Catalog No.	2136.03



Ground Tester Model 6472 Kit-500 ft

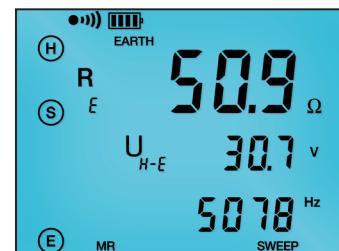
Includes meter, rechargeable NiMH batteries, optical USB cable, power adapter (110/240) V with power cord 115 V US, (2) 500 ft color-coded leads on spools (red/blue), (2) 100 ft color-coded leads (hand-tied, green/black), (1) 30 ft lead (green), (4) T-shaped auxiliary ground electrodes, (1) 100 ft AEMC® tape measure, DataView® software with ground tester workbook on USB, carrying bag for meter and carrying bag for kit. Catalog #2135.54



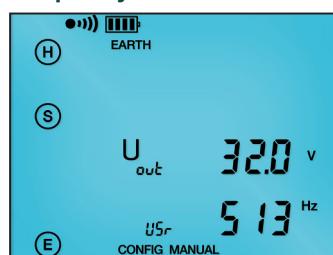
2-Point Bond Test



3-Point Ground Resistance



Frequency Selection



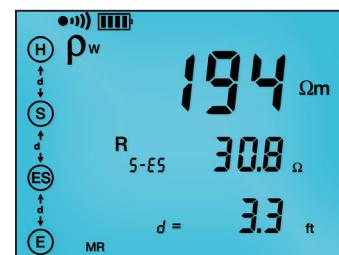
Data Storage



Schlumberger Test



Wenner Test



Digital Ground Resistance Tester Models 6422 & 6424



MODELS	6422	6424
Voltage Range	-	(0.1 to 600) VAC/DC
Voltage Resolution	-	0.1 V
Current Range	-	(0.5 to 60) AAC (requires optional MN72 probe)
Measurement Range (2P Mode)		(0.05 to 50,000) Ω
Resolution (2P Mode)		(0.01, 0.1, 1, 10) Ω
Measurement Range (3P Mode)	(0.05 to 2,000) Ω	(0.05 to 50,000) Ω
Range (3P Mode)	(0.01 to 1.0) Ω (varies by range)	(.01 to 10) Ω (varies by range)
Power Source	(6) AA Alkaline batteries	(6) NiMH rechargeable batteries, charging time approx. 6 hrs
Display	Backlit LCD	
Dimensions	(8.78 x 4.96 x 2.7) in (223 x 126 x 70) mm	
Weight	2.2 lb (1 kg)	
Catalog No.	2135.55	2135.57

Also available as complete Test Kits

Digital 10 A Micro-Ohmmeter Model 6255



4-Point, Kelvin Bridge	✓
Measurement Range	1 μΩ to 2500.0 Ω
Test Current	1 mA to 10 A selectable
Measurement Mode	Inductive/Resistive/Auto
Metal Alpha	Adjustable to 99.9
Temperature Correction	Manual or Auto
Power Source	Rechargeable 6 V NiMH battery pack
Display	Digital/backlight
Dimensions	(10.7 x 9.76 x 7.17) in
Weight	8 lb
Catalog No.	2129.84

Accessory 1 A and 10 A Kelvin Probes available

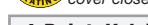
Digital Ground Resistance Tester Models 4620 & 4630



MODELS	4620	4630
2-Point Test	✓	
3-Point Test	✓	
4-Point Test	✓	
Measurement Range	(0.00 to 1999) Ω	
Ranging	Automatic	
Test Current	Auto up to 10 mA	
Noise Protection	Enhanced filtering with LED indication	
Power Source	(8) C cell Rechargeable 9.6 V	Alkaline batteries NiMH battery pack
Display	Digital/backlight	
Dimensions	(10.7 x 9.76 x 5.12) in	
Weight	7.75 lb	
Catalog No.	2130.43	2130.44

Also available as complete Test Kits

Digital 10 A Micro-Ohmmeter Model 6240



4-Point, Kelvin Bridge	✓
Measurement Range	5 μΩ to 400 Ω
Test Current	10 mA to 10 A selectable
Resolution	1 μΩ to 100 mΩ
Temperature Correction	Manual
Power Source	Rechargeable 6 V NiMH battery pack
Display	Digital/backlight
Dimensions	(10.7 x 9.76 x 7.17) in
Weight	9.9 lb
Catalog No.	2129.80

Accessory 1 A and 10 A Kelvin Probes available

Clamp-On Ground Resistance Tester Models 6416 & 6417



MODELS	6416	6417
Clamp-On Test	✓	
Measurement Range	(0.01 to 1500) Ω	
Ranging	Automatic	
Current Ranging	0.2 mA to 40 Arms	
Test Current	Automatic	
Selective Test Frequency	✓	✓
Voltage Detection	✓	✓
Data Storage	✓	✓
Report Generation	—	✓
Noise Protection	Enhanced filtering	
Other Features	Hold function	Alarm & memory
Power Source	(4) 1.5 V LR6 (AA) Alkaline batteries or (4) NiMH batteries	
Display	Digital	
Dimensions	(10.31 x 3.74 x 2.17) in	
Weight	2.06 lb	
Catalog No.	2141.01	2141.02

Ground Resistance Tester Model 6471



2 Clamp Measurement	✓
3-Point Test	✓
4-Point Test	Direct soil resistivity measurement
Bond Test (2- and 4-wire)	✓
Earth Coupling Test	✓
External Voltage Measurement	(0.1 to 65.0) V
Measurement Range	99,000 Ω
Ranging	Auto-Ranging
Test Current	Up to 250 mA
Test Frequency	Selectable from (41 to 513) Hz
Power Source	Rechargeable 9.6 V NiMH battery pack
Display	Digital/backlight
Dimensions	(10.7 x 9.76 x 5.12) in
Weight	7.5 lb
Catalog No.	2135.49

Also available as complete Test Kits
AC Current Probes Model SR182 included



Ground Resistance Tester Kit 150 ft

Test Kit for 3-Point testing includes meter, (2) 150 ft color-coded leads on spools (red and blue), (1) 30 ft lead (green), (2) 14.5 in T-shaped auxiliary ground electrodes, (1) set of five spaded lugs, 100 ft tape measure and carrying bag. **Catalog #2135.35**

- Model 3640 Kit: Catalog #2135.13
- Model 4620 Kit: Catalog #2135.19
- Model 4630 Kit: Catalog #2135.22



Ground Resistance Tester Kit 300 ft

Test Kit for 4-Point testing includes meter, (2) 300 ft color-coded leads on spools (red and blue), (2) 100 ft color-coded leads (green and black), (4) 14.5 in T-shaped auxiliary ground electrodes, (1) set of five spaded lugs, 100 ft tape measure and carrying bag. **Catalog #2135.36**

- Model 3640 Kit: Catalog #2135.14
- Model 4620 Kit: Catalog #2135.20
- Model 4630 Kit: Catalog #2135.23
- Model 6471 Kit: Catalog #2135.50
- Model 6472 Kit: Catalog #2135.53
- Model 6471 Kit no probes: Catalog #2135.60



Ground Resistance Tester Kit 500 ft

Test Kit for 4-Point testing includes meter, (2) 500 ft color-coded leads on spools (red and blue), (2) 100 ft color-coded leads (green and black), (1) 30 ft lead (green), (4) 14.5 in T-shaped auxiliary ground electrodes, (1) set of five spaded lugs, 100 ft tape measure and carrying bag. **Catalog #2135.37**

- Model 4620 Kit: Catalog #2135.21
- Model 4630 Kit: Catalog #2135.24
- Model 6472 Kit: Catalog #2135.54
- Model 6471 Kit: no probes Catalog #2135.61



Since its creation in 1893, Chauvin Arnoux® has continued to innovate and develop new products in response to customer needs and applications. Over the years, Chauvin Arnoux® has developed extensive expertise and knowledge in many product lines, including: current probes, multimeters (they invented the first multimeter in 1937!), ground testers, insulation testers, environmental testers and many others in the portable test instrument realm.

One product line that stands out is Earth/Ground Testers.

The ground tester line finds its roots in the early 1930s. Limited technology was available, so a null balance galvanometer, a decade resistance box and a DC power source combined to make one of the first ground testers. Years later hand-cranked technology, first using a generator, provided the test voltage. Electronics set in the 1950s and 60s gave birth to electronic ground testers with electronic amplifiers. Eventually, digital displays came to the scene, though analog meters remained due to customer habits and taste. Over 20 years ago, AEMC® revolutionized the ground testing market by offering clamp-on ground testers. After several generations, the AEMC® clamp-on ground tester (Models 6416 and 6417) remains the industry standard.

Today, ground testers are digital and incorporate many intelligent features. Timers, alarms and variable test voltages are becoming common. AEMC® recently introduced a unique line of professional ground testers built into field cases. The Model 6472 is the latest product in this new line. These units simplify the measurement by automatically selecting the right test voltage, range and frequency. These new meters also indicate circuit noise and connection faults to ensure reliable measurements. Earth coupling along with 2- and 4-wire bond tests can also be performed. Data can be stored and downloaded to a PC for automatic report generation. All AEMC® manufactured ground testers are designed to the latest international safety and testing standards and are CE marked.



*First Ground Tester
introduced 1935*



Family of Products

To learn more, visit www.aemc.com

Call the AEMC® Instruments Technical Assistance Hotline for immediate consultation with an applications engineer: (800) 343-1391

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