PHENIX®
TECHNOLOGIES

PORTABLE PRODUCTS for Field Testing

High Voltage • High Current • High Power Test Systems and Components

CABLE | CIRCUIT BREAKER VACUUM INTERRUPTER | GENERATOR | GIS SWITCHGEAR | GROUND | INSULATION MATERIALS | MOTOR | PORTABLE | PROTECTIVE EQUIPMENT | RECLOSER | TRANSFORMER

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PORTABLE PRODUCTS for FIELD TESTING

PHENIX Technologies offers a wide variety of Portable Products (also referred to as Standard Products) which are designed to be utilized for mobile or field testing.

PHENIX Portable Products are durable, easy to transport and set up, and feature user-friendly design interfaces.

Specifications are subject to change without notice.

INTRODUCTION

PHENIX Technologies is a manufacturer of high voltage, high current, high power test systems and components. We have been in business since 1975. Our manufacturing facility is located in Accident, Maryland, USA with additional sales offices located in Basel, Switzerland and Taipei, Taiwan. Additionally, we have sales representative organizations across the U.S. and in over 75 countries.

Our state-of-the-art products have been delivered around the world providing quality assurance testing solutions to:

- Electrical Utilities
- Equipment Manufacturers
- Motor Manufacturers and Repair Industry
- Transformer Manufacturers and Repair Industry
- Cable Manufacturers and Service Contractors
- Personal Protective Equipment Test Laboratories
- Field Service Organizations
- High Voltage Test Laboratories
- Quality Control Areas

PHENIX Technologies offers a full line of standard-design products as well as the expertise to design and build custom test systems.

Our products are divided into two main categories:

➤ Power Products such as AC Dielectric Test Systems, Resonance Test Systems, Transformer Test Systems, Motor Test Systems, and custom made testing solutions

➤ Standard Portable Products which are summarized in this brochure

GENERAL INFORMATION ON HIGH VOLTAGE TESTING

When we are ready to test in a High Voltage environment, general safety precautions should be taken into account as Hipot testers are capable of providing POTENTIALLY LETHAL VOLTAGES!

Improper operation or test practices may result in injury or death to the operator or surrounding personnel.

The operation of High Voltage test equipment should only be performed by personnel familiar with HIGH VOLTAGE testing and safety procedures. The operator of this equipment must be aware of all hazards associated with High Voltage testing. The operator is responsible for himself and others in close proximity of the testing area.

Some General Safety Practices for working with High Voltage test equipment have been listed below for your reference.

- Become familiar with your instrument before performing an actual test.
- Know your work area, check that all circuits are de-energized and locked out.
- Never work alone; always work with another qualified worker.
- Mark off entire work area with barriers and warning tape.
- Make all personnel aware of your testing activities.
- Be aware of dangerous conditions that may arise from energizing a test specimen.
- Never modify test equipment; modifications to equipment could introduce an unknown hazard or hinder a designed-in safety feature.
- DO NOT operate damaged equipment. Remove power, and do not use the equipment until safe operation can be verified by service-trained personnel.

PHENIX Technologies, Inc. assumes no liability for unsafe or improper use of test equipment.

TERMINOLOGY

The following terms relate to testing applications in the Electrical Laboratory or temporary Laboratory Set-up and in Test Stations.

High Voltage (HV):

- Voltages exceeding 1000 V rms AC or 1000 V DC with current exceeding 2 mA AC or 3 mA DC.

Interlock:

- Safety circuit to prevent energizing HV generators until all access doors are closed, and immediately de-energizes HV if door is opened; this function does not necessarily ensure full discharge of stored energy.

Earthing System:

- HV test labs with earthing systems reduce potential increases and overvoltages to avoid danger to operators or control and measuring equipment.

Type of Test System	Buried Earth-electrode System	
	with screening cage R_E (Ohm)	without screening cage R_E (Ohm)
AC and DC Voltage Test Systems	<2	<1

Grounding/Discharge Stick:

- Before touching HV circuit components or leaving unattended and exposed, they must be de-energized and grounded with a grounding/discharge stick.
- Grounding/discharge sticks must remain visible on HV terminal until circuit is re-energized; typically located near entrances to HV test station.
- Automated grounding/discharge systems.

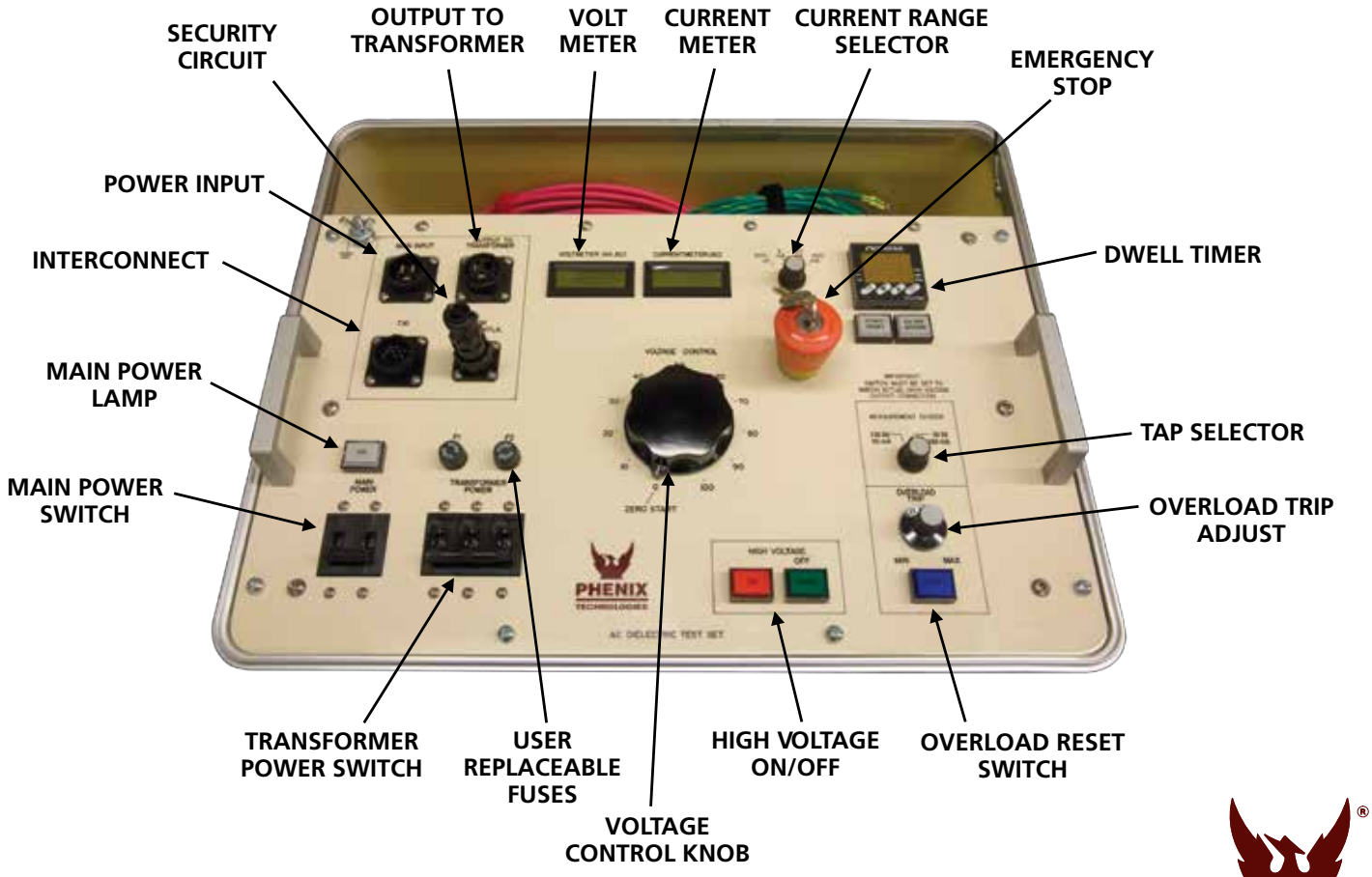
Safe Clearance:

- The minimum distance of HV component electrodes to safety fences.

Security Circuit:

- PHENIX builds in a Security Circuit or auxiliary safety control device on most test sets. This consists of a removable plug that has a shorting jumper installed to complete circuit. The jumper must be removed and cable connected to user supplied device if using this provision. This feature may prevent unauthorized use until the test process has been examined by safety personnel. Optional devices may be ordered including a Gate Switch, Foot Switch, or Deadman Switch to further ensure safety.

CONTROL PANEL for most 6CP and BK Series AC HIPOT TESTERS



FIELD and LAB AC HIPOTS, 6CP Series (15-200 kV)

The 6CP Series is designed for dielectric testing on a wide range of electrical apparatus including Switchgear, Circuit Breakers, Transformers, Rotating Machines, and Protective Equipment for Workers.

Within this product line, PHENIX offers 7 models with different output current/voltage.

These systems are either 2-piece or 3-piece design depending upon the power and voltage requirements.

NOTE: The 6CP Series has a PD specification of <10 pC but can be ordered with a spec of <3 pC when high sensitive PD measurement is needed.

	MODEL	Up to 50 kV & 3 kVA		Up to 120 kV & 7.5 kVA		Up to 120 kV & 10 kVA		
		6CP30/15-3	6CP50/10-3	6CP100/50-7.5	6CP120/60-7.5	6CP100/50-10	6CP120/60-10	6CP200/100-10
INPUT	Voltage/Current	110-120 V, 16 A or 220-240 V, 8 A (Voltage required must be specified)		110-120 V, 30 A or 220-240 V, 15 A (Voltage required must be specified)		220-240 V, 30 A		220-240 V, 25 A
	Frequency	50/60 Hz						
OUTPUT	Voltage/Current	≈ 0-15 kV, 200 mA ≈ 0-30 kV, 100 mA	≈ 0-10 kV, 300 mA ≈ 0-50 kV, 60 mA	≈ 0-50 kV, 150 mA ≈ 0-100 kV, 75 mA	≈ 0-60 kV, 125 mA ≈ 0-120 kV, 62.5 mA	≈ 0-50 kV, 200 mA ≈ 0-100 kV, 100 mA	≈ 0-60 kV, 166 mA ≈ 0-120 kV, 83 mA	≈ 0-100 kV, 100 mA ≈ 0-200 kV, 50 mA
DUTY CYCLES	5 min ON/15 min OFF	3 kVA		7.5 kVA		10 kVA		
	15 min ON/1 hr OFF	2 kVA		5 kVA		7.5 kVA		
	1 hr ON/1 hr OFF	1.5 kVA		3 kVA		5 kVA		
FEATURES	Compensation	50% Inductive Reactive		66% Inductive + Selectable Capacitive Preload		50% Inductive Reactive		
	Metering Accuracy	0.8% Reading +0.2% Full Scale						
	Voltmeter Range(s)	0-15/30 kV	0-10/50 kV	0-50/100 kV	0-60/120 kV	0-50/100 kV	0-60/120 kV	0-100/200 kV
	Currentmeter Range(s)	0-200 µA/2 mA/ 20 mA/200 mA	0-200 µA/2 mA/ 20 mA/300 mA	0-200 µA/2 mA/ 20 mA/ 200 mA				
	Output	HV Electrode						

Model 6CP30/15-3 or 6CP50/10-3

Model 6CP100/50-7.5 6CP120/60-7.5 6CP100/50-10 6CP120/60-10

Model 6CP200/100-10

Refer to brochure no. 60701 for additional information, options, and accessories available for the 6CP Series.

AERIAL LIFT, ELEVATED PLATFORM, INSULATED BOOM TESTING, BK Series (36-300 kV)

The BK Series is an ideal testing kit for Aerial Lift Devices, Elevated Platforms, Double and Horseshoe Liners and complies with ANSI and IEC standards (A92.2-2015 and IEC 61813). The BK Series can also be used for common dielectric and insulation testing requirements.

	MODEL	BK130/36	BK300
INPUT	Voltage/Current	110-120 V, 30 A 220-240 V, 15 A	208-240 V, 60 A
	Frequency	50/60 Hz	50/60 Hz
OUTPUT	Voltage/Current	≈ 0-36 kV, 180 mA ≈ 0-130 kV, 50 mA	0-300 kV, 60 mA
DUTY CYCLES		5 min ON/15 min OFF, 50 mA/180 mA	5 min ON/30 min OFF, 60 mA
		1 hr ON/1 hr OFF, 33.3 mA/120 mA	
		Continuous, 25 mA/90 mA	
DIGITAL METERING	Metering Accuracy	0.8% Reading + 0.2% of range	0.8% Reading + 0.2% of range
	Voltmeter Range(s)	36/130 kV	0-300.0kV
	Currentmeter Range(s)	0-200 µA/2 mA/ 20 mA/200 mA	0-60 mA, 0-300 µA

Refer to brochure no. 60209 for additional information, options, and accessories available for the BK Series.

Model BK130/36

QUICK REFERENCE CAPABILITIES per ANSI A92.2-2015 standard (IEC/ISO similar)

Category A&B Devices Periodic Test	
46 kV & Below Voltage Class	BK130/36, BK300
69 kV Voltage Class	BK130/36, BK300
138 kV Voltage Class	BK130/36, BK300
230 kV Voltage Class	BK300
345 kV Voltage Class	BK300

Category C, D, & E Devices Periodic Test	
46 kV & Below Voltage Class	BK130/36, BK300

Insulating Aerial Ladders & Insulating Aerial Vertical Towers Periodic Test	
46 kV & Below	BK130/36, BK300
20 kV & Below	BK130/36, BK300

Category A&B Devices 50/60 Hz Qualification Test	
46 kV & Below Voltage Class	BK130/36, BK300
69 kV Voltage Class	BK130/36, BK300
138 kV Voltage Class	BK130/36, BK300
230 kV Voltage Class	BK130/36, BK300
345 kV Voltage Class	BK300

Category A&B Devices 50/60 Hz 2 Second Withstand Test	
46 kV & Below Voltage Class	BK130/36, BK300
69 kV Voltage Class	BK130/36, BK300
138 kV Voltage Class	BK300

Category A&B Double Rated Voltage Test	
46 kV & Below Voltage Class	BK130/36, BK300
69 kV Voltage Class	BK130/36, BK300
138 kV Voltage Class	BK300
230 kV Voltage Class	BK300

Category C Qualification Test	
46 kV & Below Voltage Class	BK130/36, BK300

Insulating Aerial Ladders & Insulating Aerial Vertical Towers Qualification Test	
46 kV & Below	BK130/36, BK300
20 kV & Below	BK130/36, BK300

AC VACUUM INTERRUPTER TEST SETS (40-60 kV)

These AC Hipots are designed primarily for Vacuum Interrupter Testing in accordance with ANSI/IEEE C37.60 and IEC 62271 standards. They can also be used to test Circuit Breakers, Switchgear and other apparatus keeping in mind the current generated.

	MODEL	Up to 40 kV & 10 mA 640-0.4P	Up to 60 kV & 10 mA 660-10PA
INPUT	Voltage/Current	110-120 V, 5 A or 220-240 V, 3 A (Voltage required must be specified)	110-120 V, 6 A or 220-240 V, 3 A
	Frequency	50/60 Hz	
OUTPUT	Voltage/Current	≈ 0-40 kV, 10 mA	±30 kV, total of 60 kV, 10 mA
DUTY CYCLES	Duty Cycles	120 V input 20 min ON/30 min OFF @ 10 mA	5 min ON/15 min OFF @ 10 mA
		220 V input 15 min ON/45 min OFF @ 10 mA	
DIGITAL METERING	Metering Accuracy	0.8% Reading +0.2% Full Scale	0.8% Reading +0.2% Full Scale
	Voltmeter Range(s)	0-40 kV	0-60 kV
	Currentmeter Range(s)	0-10 mA	0-10 mA

Model 640-0.4P

Model 660-10PA

Refer to brochure no. 60107 for additional information, options, and accessories available for the Vacuum Interrupter Testers.

LIQUID DIELECTRIC TEST SETS, LD Series (60-100 kV)

The LD Series is used to measure the breakdown voltage of Insulation Fluids used in Transformers, Capacitors, Bushings and related high voltage equipment. With the selection of an oil vessel test cell, these test sets are designed to perform tests in accordance with many different standards.

	MODEL	LD60 and LD60A	LD75	LD100
INPUT	Voltage / Current	120 V, 5 A or 230 V, 2.5 A		
	Frequency	50 or 60 Hz (Voltage and Frequency required must be specified)		
OUTPUT	Voltage	0-60 kV at 500 VA	0-75 kV at 500 VA	0-100 kV at 500 VA
	Maximum Voltage to Earth	30,000 V	37,500 V	50,000 V
RATE OF RISE	selectable	500/2000/3000 Volts per Second	2000 Volts per Second, Variable	2000 Volts per Second, Variable
DUTY CYCLE	Duty Cycle	continuous breakdown testing		
DIGITAL MEMORY VOLTMETER	Accuracy	+/-1% of Full Scale		
	Range	~0-60 kV	~0-75 kV	~0-100 kV

LIQUID DIELECTRIC TEST SETS (continued)

Model LD60

Model LD60A

Model LD75 or LD100

Test Cells

TYPE	TEST STANDARD	TEST ELECTRODES	GAP SETTING	RATE OF RISE
TC/DE (flat electrodes)	ASTM D877	Polished brass disc 1″ (25 mm) diameter	.1″ +/-0.0005″	3000 Volts per Second
TC/VDE (motorized with stirrer)	ASTM D1816	Spherical dome 1.4″ (36 mm) diameter	.04″ or .08″ +/-0.001″	500 Volts per Second
TC/IEC	IEC 60156	Spherical dome 36 mm (1.4″) diameter	2.5 mm +/-0.1 mm	2000 Volts per Second
TC/BS	BS 148	Spherical cap 12.5 mm (.5″) diameter	2.5 mm +/-0.1 mm	2000 Volts per Second

Type TC/DE

Type TC/VDE

Type TC/IEC

Type TC/BS

Refer to brochure no. 10105 for additional information, options, and accessories available for the LD Series.

Refer to brochure no. 10800 for additional information on the Fully Automated test set.

AC HIPOTS (5-15 kV)

Suitable for AC dielectric and insulation testing up to 15 kV on all types of electrical products such as motors, cables, switchgear, bushings, capacitors, fuses, and arrestors.

Complies with UL, CSA, OSHA, NEMA, IEC, AEIC, EPCEA, IEEE, ASTM and other applicable testing standards.

	MODEL	605-2P	605-5P	605-10P	610-2P	610-5P
INPUT	Voltage	115/120 V, 60 Hz or 220/240 V, 50 Hz	220/240 V	220/240 V	115/120 V, 60 Hz or 220/240 V, 50 Hz	220/240 V 50/60 Hz
	Frequency		50/60 Hz	50/60 Hz		
OUTPUT	Voltage	≈ 0-5 kV	≈ 0-5 kV	≈ 0-5 kV	≈ 0-10 kV	≈ 0-10 kV
	Current	0-400 mA	0-1 A	0-2 A	0-200 mA	0-500 mA
DUTY CYCLES	5 min ON/15 min OFF	2 kVA	5 kVA	10 kVA	2 kVA	5 kVA
OPTION BURN	Rating	1 kVA	3 kVA	3 kVA	1 kVA	3 kVA

	MODEL	610-10P	610-20P	615-10P	615-15P	615-20P
INPUT	Voltage	220/240 V	220/240 V	220/240 V	220/240 V	220/240 V
	Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
OUTPUT	Voltage	≈ 0-10 kV	≈ 0-10 kV	≈ 0-15 kV	≈ 0-15 kV	≈ 0-15 kV
	Current	0-1 A	0-2 A	0-667 mA	0-1 mA	0-1.33 A
DUTY CYCLES	5 min ON/15 min OFF	10 kVA	20 kVA	10 kVA	15 kVA	20 kVA
OPTION BURN	Rating	3 kVA	3 kVA	3 kVA	3 kVA	3 kVA

Refer to brochure no. 60306 for additional information, options, and accessories available for AC Hipots.

Model 605-2P

Model 615-20P

DC HIPOTS (40-200 kV)

This product line is used for accurate DC Hipot testing of electrical Switchgear, Cables, Motors, Generators, and Protective Equipment for Workers.

Each unit contains an internal discharge device for safe operation, as well as over current protection for both the operator and test specimen.

	MODEL	440-20	475-20	4100-10	4120-10	4160-5	4200-5
INPUT	Voltage / Current	110-120 V, 5 A or 220-240 V, 3A	110-120 V, 10 A or 220-240 V, 5 A				
		(Voltage required must be specified)					
	Frequency	50/60 Hz					
DC OUTPUT	Voltage / Current	0-40 kV, 20 mA	0-75 kV, 20 mA	0-100 kV, 10 mA	0-120 kV, 10 mA	0-160 kV, 5 mA	0-200 kV, 5 mA
	Ripple	<2%					
	Polarity	negative output, positive ground					
DUTY CYCLE	Continuous Capacitive Charging	20 mA	20 mA	10 mA	10 mA	5 mA	5 mA
INTERNAL DISCHARGE DEVICE	Internal Discharge Device	3 kJ	6 kJ	6 kJ	12 kJ	12 kJ	12 kJ
DIGITAL METERING	Accuracy	0.5% of Full Scale					
	Voltmeter Range(s)	0-19.99/40 kV	0-19.99/75 kV	0-19.99/100 kV	0-19.99/120 kV	0-19.99/160 kV	0-19.99/200 kV
	Currentmeter Range(s)	0-19.99 µA/ 199.9 µA/ 1.999 mA/ 19.99 mA					
	Output Charging Indicator	1.5" Analog 0-100% of selected range indication					

Model 440-20 or 475-20

Model 4100-10

Model 4120-10, 4160-5, 4200-5

Refer to brochure no. 40107 for additional information, options, and accessories available for DC Hipots.

Ammeter Clear Test Set, Model AC-5

- Used to determine if a feeder has any shorts or grounds applied
- Underground cable network/substation testing

Safety Spark Gap System, Model SG-6

- Can be used in conjunction with Ammeter Clear Test Set
- SG-6 is used when potential for back feed exists and to protect equipment but more importantly protect the worker
- Underground cable network/substation testing

Tracing Current Transmitter Test Set, Model TCT-30

- Used to perform continuity tests which prove the electrical path between two points on a feeder
- Underground cable network/substation testing

Combination unit also available

- Tracing Current Transmitter/ Ammeter Clear/Safety Spark Gap Test System, Model TCT/AC-30SG

Pick Method Tester, Model PMT-1

- Used to read sheath current (both magnitude and polarity)
- Used for fault locating as well as pinpointing HV faults
- Underground cable network/substation testing

Galvanometer, Model GALV-1B

- Used for measuring current by the deflection of a movable coil or a movable magnet
- Used to locate fault locating tracing current on HV feeders
- Used to positively ID feeders and phase markings (AØ, BØ, and CØ)
- Underground cable network/substation testing

AC/DC and DC HIPOT/MEGOHMMETERS

Typical applications for these units are Dielectric Withstand Testing, Insulation Resistance and Leakage Current Measurement. All models measure either leakage current flow through or insulation resistance levels of the ground insulation of the test object. These testers are used for Switchgear, Cables, Motors, Generators and many other devices.

	MODEL	PAD56	PM15-2
INPUT	Voltage/Current	120 VAC, .3 A or 230 VAC, .15 A	120 VAC, 1 A or 230 VAC, .5 A
		(Voltage required must be specified)	
	Frequency	50/60 Hz	
OUTPUT	Testing Capability	5 kV AC and 6 kV DC	15 kV DC
	Leakage Current Measurements	.01 to 5,000 microamps DC .1 to 5 milliamps AC	.01 to 2,000 microamps DC
	Insulation Resistance Measurements	Values up to 1,000,000 Megohms at test voltages of 2.5 or 5 kV DC	Values up to 3,000,000 Megohms at test voltages of 5 /10 or 15 kV DC
	Polarity	Negative output, positive ground	

	MODEL	PM5	PM20
INPUT	Voltage/Current	100-240 VAC	
		Internal Rechargable Battery or Input Power Cord	
	Frequency	50/60 Hz	
OUTPUT	Testing Capability	5 kV DC	20 kV DC
	Insulation Resistance Measurements	Values up to 10,000,000 MΩ At test voltages of 0.5 kV, 1 kV, 2.5 kV, 5 kV DC	Values up to 4,000,000 MΩ At test voltages of 5 kV, 10 kV, 15 kV, 20 kV DC

Refer to brochure no. 10206 for additional information, options, and accessories available for the Hipot/Megohmmeters.

INSULATION ANALYZERS

Perform multiple testing functions including:

- Insulation Resistance test
- Dielectric Absorption Ratio test
- Polarization Index test
- Capacitance test
- Leakage Current test
- Guarded Current Measurements
- Step Voltage test
- Pass/Fail test
- Low Resistance and Continuity Measurement
- AC/DC Voltmeter up to 600 V True RMS

Four models are available from 1 kV DC to 15 kV DC and include:

- Automated testing with microprocessor controller
- Auto-range
- External noise rejection
- Rechargeable battery
- IEC compliant

MODEL	PM1A	PM5A2	PM10A	PM15-4A
TEST VOLTAGES	250 V - 500 V - 1000 V DC, negative	500 V – 1 kV - 2.5 kV – 5 kV directly, one button selectable 500 V to 5 kV in 25 V, 100 V or 500 V steps DC, negative	500 V – 1 kV - 5 kV – 10 kV directly, one button selectable 500 V to 10 kV in 25 V, 100 V or 500 V steps DC, negative	0-15 kV, keypad, operator selectable 100 V to 15 kV in 10 V steps DC, negative
Accuracy	-0 /+15% for resistances between 10 MΩ and open circuit	±3% of nominal test voltages on 10 GΩ	±3% of nominal test voltages on 10 GΩ	±0.8% of Reading, ±0.2% of range, > 100 VDC
LEAKAGE CURRENT MEASUREMENT	maximum 1.5 mA	maximum 3 mA	maximum 1.5 mA	maximum 4 mA
Accuracy	±0.3 mA	±(10% of reading + 3 digits)	±(10% of reading + 3 digits)	±0.8% of reading, ±0.2% of range
EXTERNAL VOLTAGE METERING	0-600 V AC/DC	10-1000 V AC/DC	15-600 V AC/DC	N/A
Accuracy	±3% of reading ±2 digits	±(5% of reading +3 digits)	±(5% of reading +3 digits)	
Protection	CAT. III - 600 V	CAT. III - 600 V	CAT. III - 600 V	
INPUT	Internal Rechargable Battery	Internal Rechargable Battery	Internal Rechargable Battery	Internal Rechargable Battery or Input Power Cord 100-240 VAC, 50/60 Hz

Refer to brochure no. 10306 for additional information, options, and accessories available for Insulation Analyzers.

HIGH CURRENT TEST SETS, HC Series (1000-5000 A)

The HC Series is ideal for testing Thermal, Magnetic, and Solid State Motor Overload Relays, as well as Molded-Case Circuit Breakers and Ground Fault Trip Devices.

The smaller of the HC Series High Current Test Sets are available in 4 different output ranges from 1000 A to 5000 A.

NOTE: The output current indicated in the table is subject to change depending on the impedance of the test circuit.

	MODEL	HC1	HC2	HC3	HC5
INPUT	Voltage/Current	120 VAC, 20 A or 230 VAC, 10 A	120 VAC, 20 A or 230 VAC, 12 A	230 VAC, 25 A	230 VAC, 50 A
	Frequency	50 or 60 Hz (Voltage and Frequency required must be specified)			
OUTPUT	Voltage/Current	0-120 VAC, 5 A 0-24 VAC, 25 A 0-6 VAC, 120 A 0-3 VAC, 240 A	0-70 VAC, 25 A 0-14 VAC, 125 A 0-7 VAC, 250 A 0-3.5 VAC, 500 A	0-15 VAC, 0-200 A 0-7.5 VAC, 0-400 A 0-3.75 VAC, 0-800 A	0-15 VAC, 0-333 A 0-10 VAC, 0-500 A 0-5 VAC, 0-1000 A
OVER-LOAD	Overload	1000 A	2000 A	3000 A	5000 A
DUTY CYCLES	Duty Cycles	Continuous @ 100%		Continuous @ 100%	
		5 min ON/15 min OFF @ 200%		5 min ON/15 min OFF @ 200%	
		1 min ON/5 min OFF @ 300%		1 min ON/10 min OFF @ 300%	
		30 sec ON/5 min OFF @400%		10 sec ON/5 min OFF @400%	
		3 sec ON/5 min OFF @ 500%		3 sec ON/5 min OFF @ 500%	
DIGITAL METERING	Currentmeter	3 1/2 digit LCD		4 1/2 digit LCD	
	Ranges	0-1.999/19.99/199.9/1999 A		0-1.9999/19.999/199.99/5000 A	
	Accuracy	±1% Full Scale up to 2 A		±1% Full Scale 0-2 A; 2000-5000 A	
		±0.5% Full Scale 2-2000 A		±0.5% Full Scale 2-2000 A	
	Timer	6 digit LCD, in cycles or seconds		6 digit LCD, in cycles or seconds	
	Range	0-999999 cycles or 0-9999.99 seconds		0-999999 cycles or 0-9999.99 seconds	
	Accuracy	±0.1% of reading ± least significant digit		±0.1% of reading ± least significant digit	

Model HC1 or HC2

Model HC3 or HC5

Refer to brochure no. 30403 for additional information on the HC Series.

TRANSFORMER TURNS RATIO TESTER

The PATTR-03D is designed to measure turn ratios, phase displacements, and excitation currents of transformers in compliance with IEEE C57.12.90 and IEC 60076 standards.

Ratio range	0.6 to 50000
Ratio accuracy	0.03% from 0.8 to 1000:1 at 275 V 0.05% from 0.6 to 1000:1 with 8 V, 40 V & 100 V 0.1% from 1000 to 5000:1 0.2% from 5000 to 10000:1 0.3% from 10000 to 50000:1
Test voltages	8 V, 40 V, 100 V, 275 V
Power input	100 V to 265 V, 45-65 Hz

Refer to brochure no. 20900 for additional information on Model PATTR-03D.

TRANSFORMER WINDING RESISTANCE TESTER

The WRM-10N provides valuable information about the condition of the transformer windings by measuring its DC resistance. The winding resistance test also validates the condition of the tap changer connections.

Power input	120 VAC or 230 VAC, 50/60 Hz, 550 VA max (Voltage required must be specified)
Fuse rating	5 A , 250 VAC, Type T
Test current	0.01, 0.1, 1 & 10 ADC
Test voltage	30 VDC
Resistance measurements	2 auto-ranging channels
Resistance range	0.1 µΩ to 2000 Ω
Protection	• Against overvoltage transients and substation noise • High speed current interruption detector • Audible warning during testing and discharging • Emergency off button
Accuracy	± 0.1% reading ± 0.025% Full Scale

Refer to brochure no. 20701 for additional information on Model WRM-10N.

CURRENT TRANSFORMER TESTER

The CTT-5 is designed to test ratio, phase angle, polarity, excitation, saturation, winding resistance, and insulation resistance of current transformers using the voltage method in compliance with ANSI/IEEE C57.13.1 and IEC 60044-1 standards. It will also test the burden (load) of the current transformers secondary.

Power input	115 VAC or 230 VAC, 50/60 Hz (Voltage required must be specified)
Fuse rating	15 A or 8 A , 250 VAC, Type F
Voltage output	0-50 V / 0-200 V / 0-600 V @ 2 A 0-1200 V @ 1.5 A, 0-2000 V@ 1.2 A
Voltage reading	In three ranges, up to 1999.9 V ± 0.1%
Current reading	0 to 1.9999 A RMS ± 0.5%
Ratio and accuracy	0.80 to 1000:1 ± 0.5% 1000 to 2000:1 ± 0.5% 2000 to 5000:1 ±1% 5000 to 10000:1 ±1%
Phase angle	±180°/ 0.0 to 359.9° ±1°
Winding resistance	0-1.9999 ohms ± 1%, 2-19.999 ohms ± 1%
Insulation resistance	2 M to 1 G-ohms ±3%

Refer to brochure no. 20800 for additional information on Model CTT-5.

MICRO-OHM METERS (10-200 A)

Using the 4-wire Kelvin measurement method, the MRM Series will accurately measure very low contact resistances of switches and circuit breaker contacts, transformer and motor windings, wire and cable samples, joints in busbars, or any application where low resistance current is required.

MODEL	MRM-10-V2	MRM-10E-V2	MRM-100A	MRM-200
TEST CURRENT	1 mA - 10 A		up to 100 A (True DC)	5 A - 200 A (True DC)
RESISTANCE RANGES	0-200 mΩ @ 10 A 0-1000 mΩ @ 5 A 0-200 mΩ @ 1 A 0-2000 mΩ @ 100 mA 0-20 Ω @ 10 mA 0-2000 Ω @ 1 mA		0.1 µΩ to 300 mΩ	0.1 µΩ to 2 mΩ, with 0.1 µΩ resolution 2 mΩ to 200 mΩ, with 10 µΩ resolution 200 mΩ to 1 Ω, with 1 mΩ resolution
RESOLUTION	1 µΩ @ 10 A	0.1 µΩ @ 10A	up to 0.1 µΩ	up to 0.1 µΩ
INPUT	100-240 V, 50/60 Hz			
BASIC ACCURACY	±(0.2% of reading ± 2 digits)	±(0.0% of reading + 3 LSD)	±(1% of reading ±1 digit)	±1% of measured value
ADVANCED FEATURES	• Remote control via Android device • Built-in memory for up to 30,000 measured values • When measuring inductive loads, the bar graph display makes it easy to verify that the current has stabilized • Built-in rechargeable battery • Built-in printer • Temperature compensation (**MRM-10E-V2** only)		• Programmable set-up test time 5-120 seconds • Built-in memory with capacity to store 50 registers with 80 readings each • Built-in Printer (**MRM-100A** only)	

Refer to brochure no. 110104 for additional information on the MRM Series.

Model MRM-10-V2
10 Amps

Model MRM-10E-V2
10 Amps with enhanced accuracy

Model MRM-100A
100 Amps

Model MRM-200
200 Amps

GROUND JUMPER TESTER

Perform in-service testing of temporary grounding jumper assemblies used on de-energized electric power lines and equipment as specified by ASTM Standard 2249-03.

INPUT	Voltage/Current	120 VAC, 60 Hz, Single Phase 5 Amps
OUTPUT	Voltage/Current	0-3 VAC, 200 Amps
DIGITAL METERING	Type / Accuracy	3 ½ digit, 1% of reading ± 5 counts
	Voltmeter Range	0-3 VAC
	Currentmeter Range	0-200 AAC

Refer to brochure no. 110300 for additional information on the Model JT-200.

EARTH RESISTANCE TESTERS

MODEL ER25	**OPERATION FREQUENCY**	During R measurement, operator should select the following test frequencies: 270 Hz ± 1 Hz or 1470 Hz ± 1 Hz
	VOLTMETER	In the voltmeter function, the equipment operates as a CA conventional voltmeter, making it possible to measure voltages generated by parasitic currents.
	MEASUREMENTS RANGES	Resistance: 0 - 20 kΩ (autoranging); Resistivity: 0 - 50 kΩm (autoranging); Voltage: 0 - 60 V
	ACCURACY	Resistance and Resistivity measurements: R ≤ 2 kΩ: ± (2% of the measured value ± 2 digits) R > 2 kΩ: ± (5% of the measured value ± 2 digits) Voltage measurement: ± (3% of the measured value ± 2 digits)
	READING RESOLUTION	0.01 Ω in the resistance measurement; 0.01 Ωm in the resistivity measurement; 0.1 V in the voltage measurement
	OUTPUT CURRENT	The short-circuit current is limited to less than 3.5 mA RMS (according to IEC 61557-5 - 4.5)
	IMMUNITY TO SPURIOUS VOLTAGE INTERFERENCE	During the R measurement, it allows the presence of spurious voltage up to 7 V.
	POWER SUPPLY	Internal rechargeable battery

MODEL ER25K	**MEASUREMENT RANGES**	0 – 300 Ω
	OPERATION FREQUENCY	25,000 Hz
	TEST CURRENT	20mA automatic
	INDUCTIVE COMPONENT COMPENSATION	Through a bank of capacitors integrated into the equipment Maximum capacity 4.2µF, Resolution 10 nF
	MEASUREMENT ACCURACY	±2.5% of reading ±1 digit
	POWER SUPPLY	Internal rechargeable battery

Refer to brochure no. 901300 and 901400 for additional information on the Earth Resistance Testers.

Used to measure the earth resistance in power substations, industries, distribution networks, transmission towers/electrical pylons.

AC/DC KILOVOLTMETERS, KVM Series (50-300 kV)

The KVM Series can be used for calibration and general high voltage measurements. Precise and accurate voltage measurement functions include AC AVERAGE, AC RMS, AC PEAK, AC PEAK/√2, DC AVERAGE, DC PEAK, DC RIPPLE.

SPECIFICATIONS

MODEL	KVM50A	KVM100A	KVM200A	KVM300A
INPUT POWER	100-240 VAC, 0.4 A, 47-63 Hz, Single Phase			
BATTERY POWER	9.6 V, Ni-MH, 3200 mA hr			
INPUT CHARGING JACK	+15 VDC, 1.5 A			
RESOLUTION	RANGE	RANGE	RANGE	RANGE
1 VOLT	0-20 kV	0-20 kV	0-20 kV	n/a
10 VOLT	0-50 kV	0-100 kV	0-200 kV	0-30 kV
100 VOLT	n/a	n/a	n/a	0-300 kV
HIGH VOLTAGE INPUT				
LOW RANGE	0-30 kV AC/DC	0-20 kV AC/DC	0-20 kV AC/DC	0-30 kV AC/DC
HIGH RANGE	0-50 kV AC/DC	0-100 kV AC/DC	0-200 kV AC/DC	0-300 kV AC/DC
PEAK AC	0-71 kV	0-141 kV	0-200 kV	0-424 kV
DIVIDER IMPEDANCE				
RESISTANCE	300 M Ohms	380 M Ohms	760 M Ohms	1200 M Ohms
CAPACITANCE	15 pF	200 pF	100 pF	200 pF
RATIO	10,000:1	10,000:1	10,000:1	10,000:1

Refer to brochure no. 90605 for additional information on the KVM Series.

Model KVM200A

Model KVM300A

VARIABLE VOLTAGE POWER SUPPLY

These units can be used to check contactors, test run small motors and to energize power circuits and are also useful for DC fields voltage drop testing and other applications which require a variable voltage supply.
Units are available in AC, DC, or AC/DC.

These power supplies are a necessity for all in-shop and field-service electrical technicians.

MODEL		VMS-1	VMS-2	VMS-3	VMS-4	VMS-5	VMS-8
Input		110-120 VAC, 10 A, 1-phase	220-240 VAC, 25 A, 1-phase	120 or 240 VAC, 10 A, 1-phase	220-240 VAC, 25 A, 1-phase	120 or 240 VAC, 50 A, 1-phase	120 VAC, 30 A or 240 VAC, 15 A, 1-phase
		50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Output	AC	≈ 0-120 VAC, 10 AAC max	≈ 0-220/240 VAC*, 25 AAC max	≈ 0-120 VAC*, 10 AAC max	n/a	≈ 0-240 VAC*, 50 AAC max	≈ 0-240 VAC*, 10 AAC max
	DC	n/a	≈ 0-300 VDC, 10 ADC max	≈ 0-150 VDC, 5 ADC max	≈ 0-100 VDC, 40 ADC max	≈ 0-100 VDC, 100 ADC max	≈ 0-300 VDC, 10 ADC max
		*Maximum AC output voltage depends on input voltage of the test set					
Duty Cycle		continuous					

Refer to brochure no. 70303 for additional information on the Variable Voltage Power Supplies.

Model VMS-2

Model VMS-3

CORONA DETECTOR

"Hear" corona/partial discharge.

The applications of the UD-1 are countless and make it a global leak detection tool: a must for any prevention and maintenance department.

- Electrical Inspections: corona effect localization, arcs on shields
- General Mechanical Inspections: motors, compressors, gears, bearing monitoring
- Gas, air, pressure leaks, leak detection without pressure or vacuum
- Aerospace Sector: airplane doors and windows, air tightness

Refer to brochure no. 901500 for additional information on the Model UD-1.

GROUND and DISCHARGE STICKS

Ground and discharge sticks are a vital part of high voltage safety practices and have been specifically designed for high voltage testing in the field or laboratory. Depending upon the application, only a ground stick may be needed or both the discharge stick and ground stick.

GROUND STICKS

MODEL	AC RATING	DC RATING	CABLE LENGTH	LENGTH (assembled)	LENGTH (transportation)	WEIGHT
GS30	30 kVAC	30 kVDC	25′ (7 m)	N/A	41″ (1041 mm)	3 lbs (1.4 kg)
GS100-2	100 kVAC	100 kVDC	25′ (7 m)	77″ (1955 mm)	35″ (889 mm)	4 lbs (1.8 kg)
GS160-2	100 kVAC	160 kVDC	25′ (7 m)	91″ (2311 mm)	46″ (1168 mm)	5 lbs (2.2 kg)

GS100-2 Ground Stick

DISCHARGE STICK

MODEL	DC RATING	MAXIMUM INSTANANEOUS ENERGY ABSORPTION	RESISTANCE	MAXIMUM DISCHARGE CAPACITANCE AT RATED VOLTAGE	MAXIMUM STEADY STATE POWER DISSIPATION
DS100-2	100 kVDC	40 kJ	100 kOHM	8.6 µF @ 100 kVDC	100 W

CABLE LENGTH	LENGTH (assembled)	LENGTH (transportation)	WEIGHT
25′ (7 m)	77″ (1955 mm)	35″ (889 mm)	5 lbs (2.2 kg)

DS100-2 Discharge Stick

COMBINATION GROUND/DISCHARGE STICK

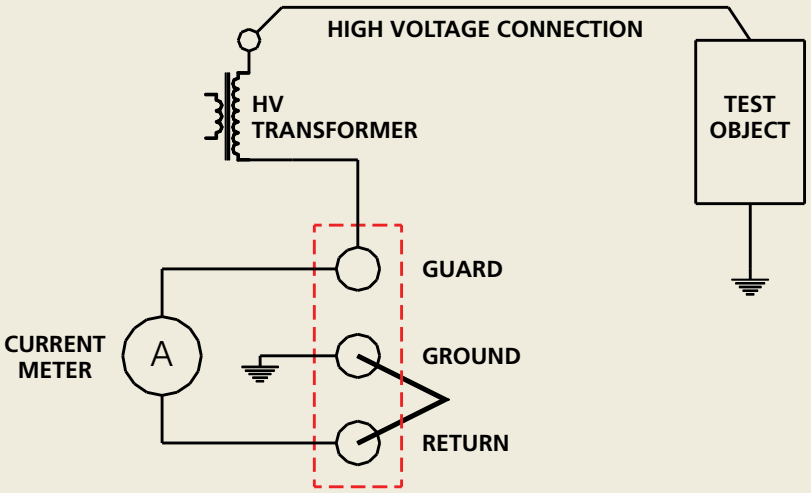
MODEL	AC/DC GROUND RATING	DC DISCHARGE RATING	MAXIMUM INSTANANEOUS ENERGY ABSORPTION	RESISTANCE	MAXIMUM DISCHARGE CAPACITANCE AT RATED VOLTAGE	MAXIMUM STEADY STATE POWER DISSIPATION
GSDS-30	30 kV	30 kVDC	10.8 kJ	25 kOHM	24 µF @ 30 kVDC	30 W

CABLE LENGTH	LENGTH	WEIGHT
25′ (7 m)	39″ (991 mm)	3 lbs (1.4 kg)

GSDS-30 Ground/Discharge Stick

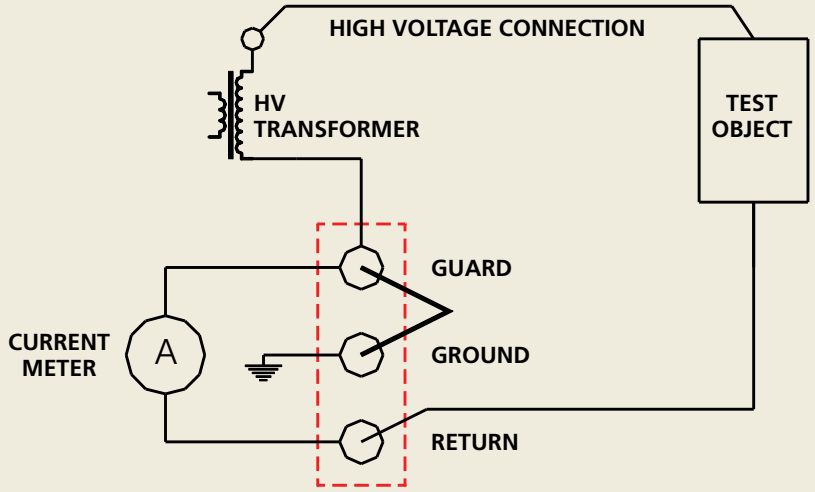
Refer to brochure no. 40402 for additional information on Ground and Discharge Sticks.

GUARD & NON GUARD MEASUREMENT of LEAKAGE CURRENT



STANDARD MODE

In this configuration the current meter measures all leakage current from the high voltage electrode. Measured current includes specimen leakage and stray leakage.



GUARD MODE

In this configuration only the leakage current from the high voltage electrode through the test specimen to the RTN terminal is measured by the current meter. Any stray leakage current to ground is guarded out (bypasses the meter) and is not measured. Stray leakage current to ground can be from several sources. The high voltage transformer has some capacitive leakage to ground. The high voltage connection might have some leakage due to partial discharge (corona). The test specimen might have some leakage current to ground and your application requires that this "stray" leakage not be measured.

ISO 9001:2008 Compliant

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