USER'S MANUAL

AC/DC KILO-VOLTMETER

Model Number
KVM 100A/200A

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3/12/20

KVM100A/200A

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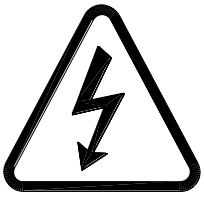
DANGER / WARNINGS

DANGER

Complete Grounding of this unit is necessary for the safe operation of this equipment. Disconnect inputs before ungrounding this equipment

GENERAL SAFETY PRECAUTIONS

CAUTION



HIGH VOLTAGE

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.

SECTION 2: TECHNICAL SPECIFICATIONS

AC/DC KILOVOLTMETER

		KVM100A DIVIDER	**KVM200A DIVIDER**
HIGH VOLTAGE AC INPUT:		100kVAC maximum	200kVAC maximum
HIGH VOLTAGE DC INPUT:		100kVDC maximum	200kVDC maximum
HIGH VOLTAGE PK INPUT:		100kV PEAK (AC)	200kV PEAK (AC)
DIVIDER CAPACITANCE:		≤ 200 pF	≤ 100 pF
DIVIDER RESISTANCE:		380MΩ	760MΩ
DIVIDER RATIO:		10,000:1	10,000:1
INSTRUMENTATION:		AC / BATTERY POWERED	
POWER ADAPTOR:		INPUT: 85-264 VAC, 0.6 A, 47-63 HZ OUTPUT: +15 VDC, 1.66 A	
INPUT JACK:		+15 VDC, 1 AMP	
BATTERY PACK:		9.6 Volt Ni-MH 3800 mAh	
METER MEASUREMENT RANGES:		Low Range: 0-20kV High Range: 0-200kV	
ACCURACY:		1% of Reading from 10% -100% of Range	
FUNCTION SELECTIONS:		1. AC AVERAGE (Average absolute value, **not** RMS equivalent) 2. AC RMS (True AC RMS) 3. AC PEAK (Average of the positive and negative peak values) 4. AC PEAK / √2 (“AC PEAK” / √2) 5. DC AVERAGE (Average DC value) 6. DC PEAK (Peak responding including ripple peak) 7. DC RIPPLE (Peak to peak AC ripple on DC voltage / 2)	
FREQUENCY RESPONSE: (SINUSOIDAL WAVEFORM)		AC and Ripple voltage measurement functions in the range of 20-1000Hz.	
SETTLING TIME:		AC Peak, AC Peak / √2, DC Peak, DC Ripple --Up to 30 seconds AC AVG, AC RMS, DC AVG --Up to 5 seconds	
ENVIRONMENTAL CONDITIONS:		10-40°C, Indoor/Outdoor in fair weather Humidity <95%, non-condensing Altitude <3000 ft (1000 meters)	
		KVM100A	**KVM200A**
DIMENSIONS:	Hight	30.5 (775)	43.5 (1105)
	Width	9.5 (241)	9.5 (241)
Inches (mm)	Depth	9.5 (241)	9.5 (241)
*WEIGHT:		30.5 LBS. 13.8 kg	43 LBS. 19.5 kg

*WEIGHT INCLUDES ALL CABLES

SECTION 3: UNCRATING/MECHANICAL SET-UP

Exercise care in removing shipping materials so as not to damage the unit.

Perform a visual inspection to determine if the unit was damaged in shipment. If there are any signs of physical damage such as dents, scratches, or oil leaks, contact the Service Department at Phenix Technologies before proceeding.

Read and understand all setup and operating instructions before use of the unit. Failure to do so may cause damage to the unit and possibly void the warranty.

SECTION 4: ELECTRICAL SET-UP / OPERATIONAL NOTES

WARNING!

THIS UNIT SHOULD ONLY BE OPERATED BY PERSONS KNOWLEDGEABLE OF HIGH VOLTAGE TESTING AND SAFETY PROCEDURES. IMPROPER OPERATION MAY RESULT IN INJURY OR DEATH.

ENSURE THAT UNIT TO BE TESTED IS DE-ENERGIZED AND DISCHARGED! ENSURE THAT WORKING ENVIRONMENT IS SAFE AND FREE OF HAZARDS.

Reference figure 1.

1. Place test set in desired location.

2. Connect a ground of sufficient size from source ground to grounding post located at base of the divider (10' lead is supplied with unit).

3. Connect supplied coaxial cable between low voltage arm, located at the base of the divider, and metering module (25' lead is supplied with unit).

4. Connect ground post on metering module to source ground (10' lead is supplied with the unit).

5. Connect source voltage to be measured to top of divider by an appropriate and safe method. High voltage should enter divider from above at an angle of no greater than forty-five degrees from vertical for highest accuracy readings.

CAUTION: Metering module and divider base must be grounded for safe and proper operation. Damage to unit mat result if left ungrounded.

NOTE: Unit is designed to measure voltage in reference to ground. Source voltage and divider ground post must be ground referenced for unit to operate properly.

NOTE: Coaxial lead is part of calibration. Significantly changing length of meter lead will affect AC calibration.

ELECTRICAL SET-UP / OPERATIONAL NOTES

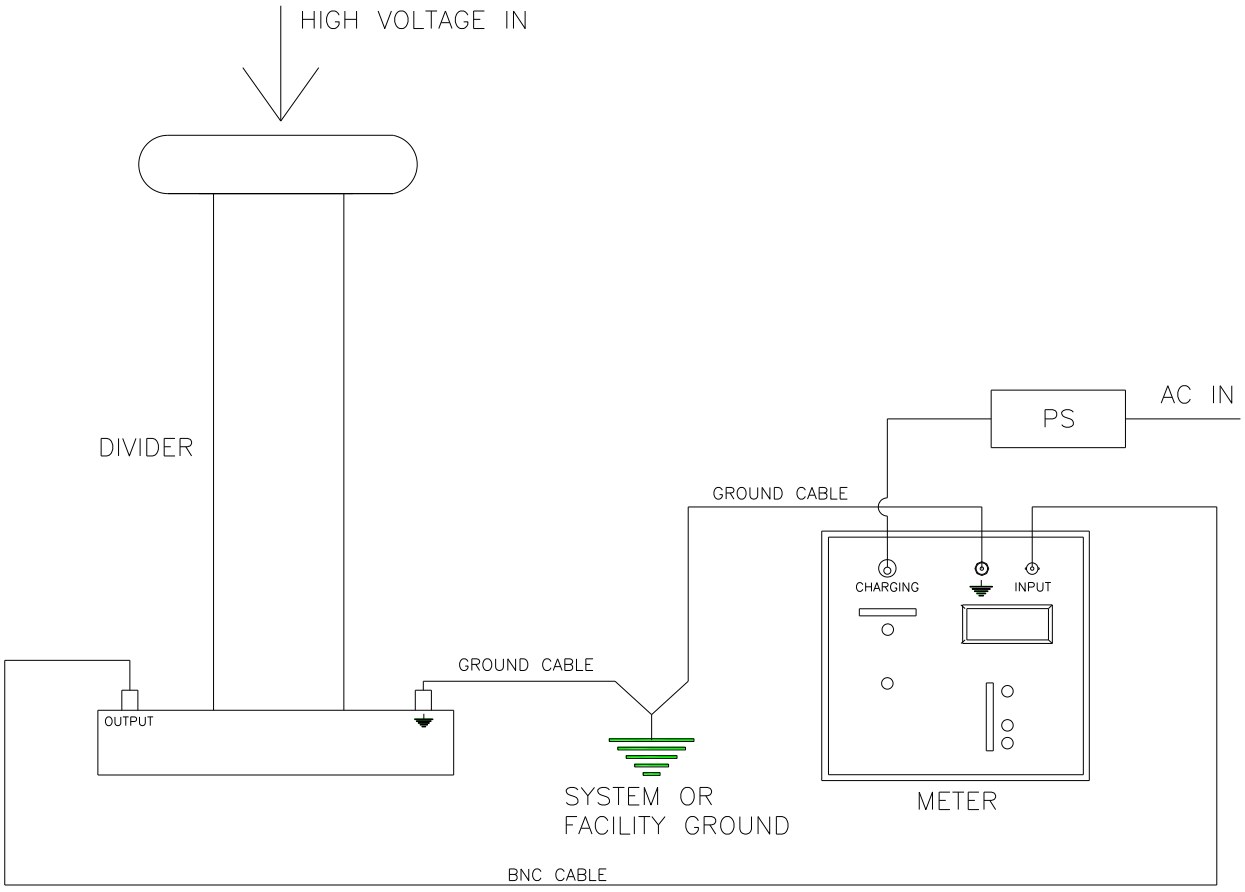
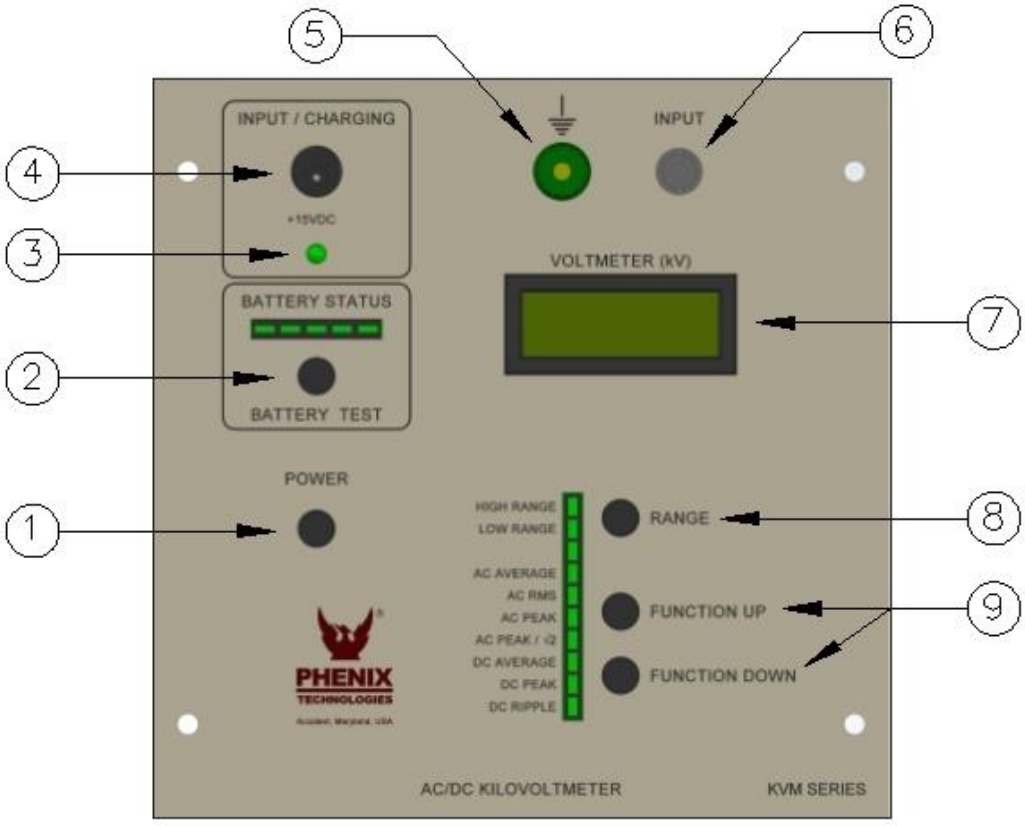


Figure 1: KVM Testing Setup

ELECTRICAL SET-UP / OPERATIONAL NOTES



1. CONTROL POWER BUTTON: Press button and hold for short period to turn meter on or turn off.

2. BATTERY STATUS: Press button to indicate show level of battery.

3. INPUT / CHARGING LAMP: Illuminates when external input / charging power is present.

4. INPUT JACK: External input / charging jack provides for battery charging or AC operation with included power adapter.

5. GROUND STUD: Ground stud for connecting metering module to source ground.

6. BNC INPUT CONNECTOR: BNC connector to connect the metering module to divider. This is the input signal connector for the meter.

7. METER: 4 1/2 digit meter displays measured value of input voltage.

8. MEASUREMENT RANGE SELECTOR: Pressing range button will changes between the low and high range of the meter.

9. MEASURING FUNCTION SELECTOR: Pressing function up/function down will allow for selecting measurement function.

SECTION 5: OPERATING INSTRUCTIONS

WARNING

THIS UNIT SHOULD ONLY BE OPERATED BY PERSONS KNOWLEDGEABLE OF HIGH VOLTAGE TESTING AND SAFETY PROCEDURES. IMPROPER OPERATION MAY RESULT IN INJURY OR DEATH.

1. DIVIDER WITH METER MODULE OPERATION:

1. Make sure connections have been made as described in Section 4.

2. Press and hold power button to turn metering module on.

3. Select the desired range for voltmeter based on the expected input signal level.

4. Select desired mode for voltmeter with function buttons.

NOTE: If the Ripple voltage measurement mode is to be selected, the Range selector must be set for the required input voltage level. If ripple voltage is to be read on input voltage over 20kV, the range selector has to be on high range, regardless of the expected ripple voltage level. To avoid damage to the unit, ascertain that the unit will not over-range on the AVG or the DC modes before attempting to read the ripple voltages. DO NOT attempt to read ripple voltage on a range lower than required to measure the full input voltage.

5. Activate high voltage source.

6. Measure voltage as required.

7. De-activate high voltage source and assure, as appropriate, high voltage source is de-energized and discharged.

8. After ensuring high voltage source and divider are de-energized and discharged, all leads and connections may be disconnected and unit.

9. Press and hold power button to turn metering module off.

NOTE: Do not subject unit to Flashovers. Damage may occur. If meter becomes disabled from Flashover or Transient condition, refer to Troubleshooting section.

OPERATING INSTRUCTIONS

2. STAND ALONE DIVIDER OPERATION:

1. Make sure connections have been made as described in “Set-Up” section, except that metering module will not be used or connected.

2. Connect a voltmeter to the BNC output on base of divider with 25’ coaxial cable.

NOTE: Divider has a 10,000 to 1 ratio. At 100kV input, the output voltage will be 10V. The meter impedance needs to be 10MΩ DC, and 1 MΩ, ≤ 200pF AC for the highest possible accuracy. Readings will correspond to the type of meter used. AVG will show AVG, RMS will show RMS etc. Use DC range for DC signals (10 meg input meter).

3. Select desired mode for voltmeter.

4. Activate high voltage source.

5. Measure voltage as required.

6. De-activate high voltage source and ensure, as appropriate, high voltage source is de-energized and discharged.

7. After ensuring that high voltage source and divider are de-energized and discharged, all leads, and connections may be disconnected and unit packaged.

3. STAND ALONE METER MODULE OPERATION:

It is not recommended to operate the metering module without the divider. The metering module is **not** a stand-alone voltmeter.

SECTION 6: CALIBRATION

CALIBRATION PROCEDURES

It is recommended calibration be performed on yearly basis.

Due to the complexity and the standards required to calibrate this instrument, Phenix Technologies does not recommend customer calibration. For further information please contact our Service Department.

SECTION 7: MECHANICAL MAINTENANCE

SURFACE

All surfaces will provide adequate protection against the elements in normal use. It is recommended that finish be wiped down with nothing stronger than ordinary household cleaner for longer life and for proper electrical operation of the unit. Also inspect all fabrication joints for oil leakage. If leak is found, consult Service Department at Phenix Technologies.

SECTION 8: STORAGE OF EQUIPMENT

If equipment will be stored for a prolonged period, the following precautions are recommended.

- Equipment should be covered and kept in warm, dry environment (95% maximum humidity, 5 to 50 degrees C).

- Prior to placing equipment back into operation, all aspects of the maintenance schedule should be strictly adhered to.

SECTION 9: TROUBLESHOOTING

METERING MODULE

- **Unit will not turn on:** Battery may be discharged. Recharge battery
- **Unit blanked out during testing because of transient discharge occurrence and won't come back on by cycling the power switch:** Carefully remove front panel, and unplug the battery pack for approximately 30 seconds, then retry power switch.

SECTION 10: KVM200A PARTS LIST

QTY.	ITEM	PART #	DESCRIPTION
METERING MODULE			
1	BATTERY	1590051	BATTERY PACK
1	BNC	1153068	BNC CON
1	CABLE	30080007	10’ GND CABLE
1	CASE-GND	1351103	BINDING POST
1	DC JK	1351215	POWER JACK
1	M1	1506405	DIGITAL LCD PANEL
1	NE1	1609990	NEON LAMP
1	PCB 1372	31137200	BATTERY POWER MANAGER
1	PCB 1405	31140500	INTERFACE BRD
1	PCB 1417	31141700	METERING BRD
1	PS1	1590050	POWER SUPPLY
1	PS1	1077167	POWER CABLE
DIVIDER BASE			
1	BNC	1153068	BNC CON
1	GROUND CABLE	30080007	10’ GND CABLE
1	GROUND TERMINAL	1351103	BINDING POST
1	METERING CABLE	30050003	CABLE, COAXIAL, 25’
1	NE2	1609990	NEON LAMP
1	PCB1282 (KVM100A)	31128201	DVD100 LOW ARM
1	PCB1282 (KVM200A)	31128202	DVD200 LOW ARM

SECTION 11: RECOMMENDED SPARE PARTS

Phenix Technologies recommends that the customer purchase and stock the following parts for normal maintenance of the unit. The recommended quantity should be sufficient to support the unit during normal operation.

If the unit will be operated at an isolated site for an extended period or will be subjected to unusual stresses, a larger quantity of parts should be stocked as spares. In such a case, contact your Phenix Technologies' sales representative for a recommendation.

Current prices may be obtained by contacting the Service Department at Phenix Technologies.

Part Number	Description	Quantity
30080007	10' GND CABLE	1
1077167	MODULAR POWER CORD	1

SECTION 12: PARTS ORDERING INFORMATION

Replacement parts are available from Phenix Technologies, Inc.

Changes to Phenix Technologies' products are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest technical improvements developed in our Engineering Department. It is, therefore, important when ordering parts to include the serial number of the unit as well as the part number of the replacement part.

When your purchase order is received at our office, a representative of Phenix Technologies will contact you to confirm the current price of the part being ordered. If a part you order has been replaced with a new or improved part, an Applications Engineer will contact you concerning any change in part number.

Send orders for replacement parts to:

Service Department
Phenix Technologies, Inc.
75 Speicher Drive
Accident, Maryland 21520

PH: 1 (301) 746-8118
Fax: 1 (301) 895-5570
E-mail: info@phenixtech.com

SECTION 13: RETURNED MATERIAL

If for any reason it should become necessary to return this equipment to the factory, the Service Department of Phenix Technologies, Inc. must be given the following information:

Name Plate Information
Model Number
Serial Number
Reason for Return
Cause of Defect

If Phenix Technologies, Inc. deems return of the part appropriate; it will then issue an "Authorization for Return."

If return is not deemed advisable, other inspection arrangements will be made.

NOTE: Material received at this plant without the proper authorization shall be held as "Customer's Property" with no service until such time as the proper steps have been taken.

Your cooperation is requested in order to ensure prompt service.

SECTION 14: CIRCUIT DIAGRAM SYMBOLS

CIRCUIT DIAGRAM SYMBOLS
SYMBOLES POUR SCHEMA DE CIRCUIT
SYMBOLE ZU SCHEMA

REF	SYMBOL	DESCRIPTION	DESCRIPTION	BEMENKUNG
A		Amplifier	Unite d'amplificateur	Verstärker
ARSR		Surge Arrestor	Parafoudre	Ueberspannungsableiter
C		Capacitor	Condensateur	Kondensator
BSHG		Bushing	Tranversée	Durchfuehoung
C		Electrolytic Capacitor	Condensateur électrol	Eleckrolytik kondensator
F		Fuse	Fusible	Sicherung
CT		Current Transfomer	Transformateur de Courant	Stromtransformer
CB		Circuit Breaker	Interrupteur	Unterbrecher
K		Relay, Contactor	Relais, Contacteur	Relais, Schütz
L		Inductor	Self	Drossel, Spule
MOT		Motor	Moteur	Motor
MOV		Movistor	Parafoudre	Movistor
NE		Neon	Parafoudre	Ueberspannungsableiter
LP		Lamp, Indicator	Lampe	Meldeleuchte
R		Resistor	Resistance	Widerstand
R		Variable Resisitor	Resistance Variable	Widerstand
T		Transformer	Transformateur	Transformer
TB		Terminal Block	Borne	Lösbare Klemme
X		Connector	Prise de Courant	Steckverbindung
K		Relay Contact Normally Open	Contact Normalement Ouvert	Schlierskontakt
K		Relay Contact Normally Closed	Contact Normalement Fermé	Oeffnungskontakt
K		Changeover Contact	Contact de Changement	Umschaltkontakt
		Shielded Wire	Cable blindé	Abgeschirmetes Kabel
TR		Transistor	Transisteur	Transistor
M		Analog Meter	Insrument Analogue	Analog Meter
D		Diode	Diode	Diode
Z		Zener	Diode Zener	Zener
SCR		Thyristor	Thyristor	Thyristor
SW		Normally Open Maintained Switch	Interrupteur Normalement Maintenu Ouvert	Schrittschalter (Schliesser)
SW		Normally Closed Maintained Switch	Interrupteur Normalement Maintenu Fermé	Schrittshalter (Oeffner)
SW		Normally Closed Momentary Switch	Interrupteur Normalement Fermé Momentanement	Druckschalter (Oeffner)
SW		Normally Open Momentary Switch	Interrupteur Normalement Ouvert Momentanement	Druckschalter (Schliesser)
DP		Current Overload Device	Dispositif De Sûr Intensité	UeberstromschutzEinheit

SECTION 15: SCHEMATICS AND DRAWINGS

Drawing Number	Description
1. 7916005	KVM100A/200A SCHEMATIC

SECTION 15: CUSTOMER COMMENTS/SUGGESTIONS

Phenix Technologies made significant efforts to ensure that the materials in this Operator's Manual are correct. If there are concerns or comments as you have used this information, Phenix Technologies appreciates any feedback.

Unit Serial Number:

Sect	Page(s)	Comment

Please return to Phenix Technologies, Engineering Department, 75 Speicher Drive, Accident, MD 21520 USA.

Phone: (301) 746-8118, Fax (301) 895-5570 or E-mail info@phenixtech.com