OPERATIONS AND APPLICATIONS MANUAL

MODEL NUMBER PAD10-25

10 KV AC/25 KV DC HIGH POTENTIAL TESTER WITH MEGOHMMETER

Version 3.1

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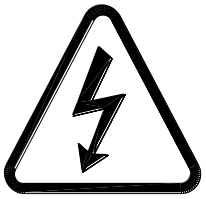
GENERAL SAFETY PRECAUTIONS

CAUTION



HIGH VOLTAGE

This equipment is 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.

PRODUCT INFORMATION

CAUTION: Contact with the test leads on this equipment can cause harmful or fatal electrical shock. Do not touch test leads while a test is in process.

SAFETY AND CAUTION NOTES

1. Contact with the test leads on this equipment can cause harmful or fatal electrical shock. Do not touch test leads while a test is in process.

2. Insure that the tester is properly grounded before proceeding with a test.

3. Turn the tester off before reaching inside. Damage to the tester and hazardous shock to personnel will result if this procedure is not followed.

4. Insure that the equipment to be tested is de-energized and properly isolated.

5. Insure that the equipment to be tested has been properly grounded using a hot stick and rubber gloves.

6. Insure that barriers and warning signs are erected in order that personnel in the test area are protected. Use an assistant operator where appropriate to keep non-essential personnel away from the test site.

7. When testing cables, the conductors at the distant end should be isolated from each other and taped.

8. When testing a faulted cable, it is advisable to first make an insulation resistance measurement before proceeding with the high voltage test.

9. Use care to avoid damaging the tester during disassembly and reassembly procedures.

10. This unit should only be operated by someone familiar with high voltage testing and safety procedures.

PRODUCT INFORMATION

DESCRIPTION

The PAD10-25 is an AC/DC high potential tester with megohmmeter for AC and DC dielectric withstand testing, insulation resistance and leakage testing, and high resistance measurements of unknown resistances. These test capabilities make the PAD10-25 useful in testing a wide variety of electrical apparatus including motors, cables, transformers, and other devices. It is capable of voltages from 0-25 kV DC negative, 0-10 kV AC, and currents up to 5 mA DC and 10 mA AC. Megohm readings from 0.1 to 5000 megohms at 500 VDC, 0.5 to 25000 megohms at 2500 VDC, 1 to 50000 megohms at 5000 VDC and 3 to 150000 megohms at 15000 VDC can be read directly from the scale. Other megohm values can be calculated at different voltages by dividing voltage reading in kilovolts by current reading in microamps and multiplying by 1000.

Examples: 3 kV ÷ 25 μA x 1000 = 120 megohms
10 kV ÷ 2500 μA x 1000 = 4 megohms
25 kV ÷ 1 μA x 1000 = 25,000 megohms

The unit incorporates an adjustable overcurrent trip circuit which will instantly de-energize the high voltage power supply if such a condition is encountered. The level of sensitivity at which trip-out will occur is controlled by the front panel adjustment labeled “Current Trip” - “Low-High”. The trip setting can be as low as 50 μA DC or as high as approximately 110% of rated output current. Overcurrent trip is indicated by an audible alarm and an overcurrent lamp. The audible alarm may be turned off if desired.

Other notable features include zero start interlock, external interlock provision, automatic internal discharge device, guard circuit for stray leakage current bypass of currentmeter, 3-range voltmeter, 2-range AC, 4-range DC currentmeter, and 4-range megohmmeter.

NOTE: Internal discharge device is for emergency situations only and should not be used for rapid specimen discharge. In normal operation, the voltage control should be reduced to zero and the voltage allowed to decay to zero or discharged with a discharge stick before switching high voltage off. The internal discharge device operates automatically when: HV OFF is depressed, when the overcurrent trip circuit is activated, or if incoming power is disconnected.

PRODUCT INFORMATION

SPECIFICATIONS

Input:

120 Volts AC, 50/60 Hz, single phase, 1.2 Amps
or
220 Volts AC, 50/60 Hz, single phase, .6 Amps

Output:

0-10 kV AC, up to 10 mA
0-25 kV DC, negative, up to 5 mA

Output Polarity: (DC)

Negative output, positive ground

Duty Cycle:

1 hour ON/1 hour OFF at full power levels

Voltmeter:

4 ½" analog meter, ±2% of full scale
Three ranges: 0-5/10/25 kV

Currentmeter/Megohmmeter:

4 ½" analog meter, ±2% of full scale
Current: 0-1/10 mA
0-10/100/1000/5000 μA DC
Megohms: .1-5/1-50/10-500/100-5000 megohms at 500 VDC
.5-25/5-250/50-2500/500-25000 megohms at 2500 VDC
1-50/10-500/100-5000/1000-50000 megohms at 5000 VDC
3-150/30-1500/300-15000/3000-150000 megohms at 15000 VDC

Operating Ambient Temperature:

10-38°C, 50-100°F

Termination:

Input: removable modular style 3 wire cord
High Voltage Output: 10' shielded with insulated alligator clip
Return Lead: 10' red lead with insulated alligator clip
Ground Lead: 10' green lead with insulated alligator clip

Dimensions:

16.5" W x 15.25" D x 11.25" H (419 mm W x 388 mm D x 286 mm H)

Weight:

36 lbs. (16.4 kg), add 2 lbs. (1 kg) for 220 V

CONTROLS AND CONNECTIONS

FRONT PANEL CONTROLS AND INDICATORS

Fused Input Module:

Input cord is plugged in here. Module also contains F1 and F2 input fuses. Follow instructions on fuse cover if replacing fuses.

External Interlock:

Jumper can be removed from provided plug and plug can then be wired to external interlock devices that will supply non-energized closed contacts during testing.

Some examples include: footswitch, dead-man switch, panic button, gate interlock, etc. High voltage output is disabled if external interlock circuit is open.

AC HV Bushing Well:

Output cable **must** be connected here for **AC** output; and currentmeter range switch **must** be in one of the AC positions for correct metering. 0-10 kV AC at up to 10 mA will be available here.

DC HV Bushing Well:

Output cable **must** be connected here for **DC** output; and currentmeter range switch **must** be in one of the DC current or megohm settings for correct metering. 0-25 kV DC at up to 5 mA will be available here.

HV Bushing Cover:

Place this cap on whichever HV bushing is not being used for operator and unit safety.

Voltmeter, VM Range SW:

Voltmeter indicates output voltage in kilovolts AC or DC. Scale is numbered in three different ranges corresponding to L, M, or H (Low, Medium, or High) on range switch, SW7, directly below voltmeter.

L: Low Range, 0-5 kV (bottom scale). This range has the 500 Volt designation for the direct reading megohmmeter function.

M: Medium Range, 0-10 kV (middle scale).

H: High Range, 0-25 kV (top scale).

Power On:

When depressed, this illuminated pushbutton latching switch (white lens) supplies control power to unit, and lamp is on.

HV Off:

This momentary illuminated pushbutton switch (green lens) lights when high voltage is off. Depressing switch turns high voltage off if on. It also silences audible alarm if on.

CONTROLS AND CONNECTIONS

FRONT PANEL CONTROLS AND INDICATORS (continued)

HV On:

Depressing this illuminated momentary pushbutton (red lens) will activate high voltage if **all** the following conditions are met: Unit plugged in and power on switch depressed; voltage control at zero start; interlock circuit not open; and overcurrent lamp not on. Lamp is on if high voltage is on.

Voltage Control:

Control must be on zero start position before high voltage can be activated. Rotating control allows voltage to be adjusted from 0 to 100% or full output in a clockwise direction when high voltage lamp is on. 0-25 kV DC or 0-10 kV AC.

Reset: (Overcurrent)

Lamp lights if overcurrent circuit is tripped by a current value above that which is preset on the overcurrent trip setting. Audible alarm will also sound if turned on. High voltage will be disabled. Depress RESET to reset circuit.

Current Trip Adjust:

Turning knob toward low causes unit to trip at lower current levels, towards high will increase current trip levels. Range is from approximately 50 μA DC to approximately 110% of rated output. When circuit is tripped, high voltage is disabled.

Current Trip Alarm:

If switch is on, audible alarm will sound when overcurrent circuit is tripped and overcurrent lamp is on. High voltage will be disabled. To reset circuit, depress RESET switch. Placing Current Trip Alarm switch to Off disables audible alarm.

Currentmeter/Megohmmeter, Currentmeter/Megohmmeter Range Switch:

The meter is scaled to read megohms on the top scales and mA AC or μA DC on the bottom scale.

To use megohm scales, the HV output lead **must** be in the **DC** bushing well and the output voltage **must** be adjusted to 500, 2500, 5000 or 15000 V.

The megohm multiplier is selected by the same six position switch as the currentmeter range. This allows direct megohm readings at 500V, 2.5, 5 and 15 kV. In order to read megohms directly, the kilovolt meter must be set to one of these voltages. The megohms are then read from the right hand meter, megohms at 15 kV on the top scale, 5 kV on the next to top scale, 2.5 kV on the third to top scale and megohms at 500V on the fourth to top scale. The table below shows the megohm range for each switch setting and voltage.

Switch Setting	500 V	2.5 kV	5 kV	15 kV
x100	100-5000	500-25000	1000-50000	3000-150000
x10	10-5000	50-2500	100-5000	300-15000
x1	1-50	5-250	10-500	30-1500
x.1	.1-5	.5 - 25	1-50	3-150

To read DC μAmps, high voltage output lead **must** be in **DC** bushing well. Range switch **must** be on one of the "DC CUR" settings. Always start reading with range switch on highest setting (DC CUR X1K) and then switch to range that will display largest meter movement without over ranging. Read lower scale of meter (0-10 μA) and multiply by "DC CUR" multiplier of range which is selected.

CONTROLS AND CONNECTIONS

FRONT PANEL CONTROLS AND INDICATORS (continued)

To read the meter in AC milliamps, the high voltage output cable **must** be in the **AC** bushing well. The currentmeter range switch **must** be set in one of the "AC CUR" settings. Read the bottom currentmeter scale (0-10 mA) and multiply by the selected "AC CUR" range switch multiplier.

Return Post:

The return or low potential side of the test specimen should always connect to the Return Post. Current through this post is measured by the currentmeter.

Ground Post:

This post is tied to the unit ground and is to be connected to a good earth ground where unit is being operated. There is also a jumper clip on this post that **must** be connected to either the Return post or the Guard post. When the clip is connected to Return and Ground, the unit is considered to be in "Return Mode" or "Grounded Return Mode". In "Return Mode" all currents to Return or Ground, will pass through currentmeter, including stray leakage currents. When the clip is connected to Guard, the unit is considered to be in "Guard Mode".

Note: If the test specimen return or low potential side is already at ground potential and will be left that way for the test, then only the "Return Mode" or "Grounded Return Mode" can be used for the test. If "Guard Mode" operation is attempted, the Currentmeter/ Megohmmeter will not function properly. See connection diagram at end of Operation section.

Guard Post:

When this post is connected to ground with the jumper clip, it is in "Guard Mode". Any stray leakage currents to ground will not be measured by the meter. The low potential side of the test specimen must be isolated from ground in this mode. Connect current paths that need to bypass currentmeter to this point. Any currents connected to Guard will bypass the currentmeter.

If the low potential side of the test specimen cannot or will not be isolated from ground, "Guard Mode" **must not** be used.

OPERATING INSTRUCTIONS

CAUTION: This unit produces high voltages that can cause harmful or fatal electrical shock. Only persons familiar with high voltage testing and safety procedures should operate this equipment. Review safety and caution notes, page 1-1, before proceeding. Review or know <u>all</u> operating instructions before applying power to test unit.

1. Prepare a safe and secure area where test is being conducted.

2. Review Description in Section 1 and Controls and Connections in Section 2 if needed to become familiar with unit.

3. Remove input cord and test leads from cable storage area in case cover. Plug input cord into input module on unit but do not plug into power source until test specimen is properly connected.

4. Do not connect any test leads to any test specimen until certain that it is de-energized and discharged.

5. Set the jumper clip on the Ground Post for either "Grounded Return Mode" or "Guard Mode" as desired for test to be conducted (See connection illustration at end of this section).

   The standard mode for testing is the "Grounded Return Mode" where the Ground Post and Return Post are connected together with the jumper clip. Normally, the Guard Post will not be used in this mode and all output currents including all stray leakage currents to ground will be measured. The provided green lead will be connected to the Ground Post and to a good earth ground or station ground near test unit or test sample. The provided red lead will be connected to the Return Post and the low potential side of the test specimen. If any stray currents are to be "guarded" from return or bypassed in this mode, the current source must be isolated from ground and specimen return. If the source connected to Guard is grounded or not isolated from return, the Currentmeter/Megohmmeter will be inaccurate or disabled.

   If Guard Mode is desired, connect the jumper clip from Ground Post to Guard Post. Red lead will connect to Return Post and low potential or return side of test specimen. Green lead will connect to Ground Post and to good earth or station ground at test area. When using Guard Mode, any stray leakage currents to ground and any current sources connected to Guard will be "guarded" from return and will bypass the Currentmeter/Megohmmeter. The Currentmeter/Megohmmeter will read only the test specimen current. In this mode, the test specimen low potential side must be isolated from ground or the Currentmeter/Megohmmeter will be defeated. **<u>If the test specimen return cannot be isolated from ground,</u>** the "Guard Mode" of operation **cannot** be used.

   The jumper clip must always be connected from Ground Post to either the Guard Post or Return Post. DO NOT OPERATE UNIT WITHOUT JUMPER CLIP PROPERLY INSTALLED!

OPERATING INSTRUCTIONS

6. With unit still disconnected from power source, and after verifying that test specimen is de-energized and discharged, connect output leads for the selected mode of operation (Guard Mode or Grounded Return Mode). See diagram at end of this section.

   Assure that external interlock circuit is connected and operational if being used or that jumpered plug is installed in jack, Power On button is in raised or off position, and Voltage Control is set to Zero Start.

   Set Current Trip Alarm switch to On or Off as desired. When on, an audible alarm will sound when current trip circuit is activated. Pressing RESET will silence alarm and reset current trip circuit.

   Set voltage range switch for desired scale corresponding to anticipated output voltage needed.

7. Set up for one of the following modes:

   AC Output Mode 0-10 kV AC, up to 10 mA output.
   High Voltage output lead **must** be placed in the **AC** output bushing well. Place protective cap on DC bushing well. Current range switch **must** be set to one of the "AC CUR" settings usually starting at AC CUR X1 setting (highest AC setting). This is the mode to be used for all AC testing such as AC Dielectric, AC Withstand, AC Leakage, and AC Hipotting. Output voltage is read directly in kilovolts on one of the three selected scales of the voltmeter (Low-5kV, Medium-10kV, High-25kV). L = 0-5 kV AC, M = 0-10 kV AC, H = 0-25 kV AC. (Unit will only put out slightly over 10 kV AC on 25 kV scale.) AC current is read directly off the lower scale of the currentmeter (0-10) in milliamps and multiplied by the multiplier of the range switch setting for AC, either times .1 or times 1. "AC CUR" X1 = 0-10 mA AC. "AC CUR X.1 = 0-1 mA AC. Voltage is adjusted with Voltage Control. Always (except for an emergency) return voltage control to zero and allow voltmeter to decay to zero before switching high voltage off.

   DC Output Mode: 0-25 kV DC, negative output, 0-5000 μA (0-5 mA).
   High Voltage output lead **must** be placed in the **DC** output bushing well. Place protective cap over AC bushing well. Current range switch **must** be set to one of the "DC CUR" settings usually starting at "DC CUR" X1K (highest DC setting). This is the mode to be used for DC testing such as DC Dielectric, DC Withstand, DC Leakage, DC Hipotting, and Megohm calculations for values above those that can be read directly in the megohmmeter mode. Output voltage is read directly in kilovolts DC on one of the selected scales of the voltmeter (Low-5kV, Medium-10kV, High-25kV). L = 0-5 kV DC, M = 0-10 kV DC, H = 0-25 kV DC. DC current is read directly off the lower scale of the currentmeter in microamps and multiplied by the selected "DC CUR" range multiplier value (X1K, X100, X10, X1).

"DC CUR"	X1K	=	0-10,000 μA DC (unit only rated at 5,000 μA DC)
	X100	=	0-1,000 μA DC
	X10	=	0-100 μA DC
	X1	=	0-10 μA DC

   Voltage is controlled by Voltage Control. Always (except for an emergency) return voltage control to zero and allow output voltage to decay to zero or discharged with a discharge stick before turning high voltage off.

OPERATING INSTRUCTIONS

Megohmmeter Mode: .1-150,000 megohms direct reading scale.
High voltage output lead **must** be placed in the **DC** output bushing well. Place protective cap over AC bushing well. Start with Currentmeter/Megohmmeter range switch in "Megohms" - X.1 position. Voltmeter range switch must be set at "5kV". Connection of output leads to test specimen is to be either "Grounded Return Mode" or Guard Mode as described in Step 5 previously and shown in diagram at end of this section. The Currentmeter/Megohmmeter megohms scale is only accurate with at output voltages of 500 Volts, 2.5kV, 5kV or 15kV. Megohms are determined by reading the megohm scale corresponding to the voltage applied and multiplying by megohm range multiplier (X.1, X1, X10, X100). The range that produces the largest meter deflection without over-ranging is usually the most accurate and easy to read.

The table below shows the megohm range for each switch setting and voltage.

Switch Setting	500 V	2.5 kV	5 kV	15 kV
x100	100-5000	500-25000	1000-50000	3000-150000
x10	10-5000	50-2500	100-5000	300-15000
x1	1-50	5-250	10-500	30-1500
x.1	.1-5	.5 - 25	1-50	3-150

Megohm values at other voltages or higher megohm readings than those that can be obtained directly on the megohm scale can be calculated by dividing the output voltage in kilovolts by the current in microamps and multiplying the result by 1,000. (Megohms = kV ÷ μA x 1000).

Examples: 6 kV ÷ 2 μA x 1,000 = 3,000 megohms
16 kV ÷ .8 μA x 1,000 = 20,000 megohms
20 kV ÷ 4 μA x 1,000 = 5,000 megohms
25 kV ÷ .5 μA x 1,000 = 50,000 megohms

Note: When using this method, be careful to not overvoltage or overwattage the test specimen. Additionally, at 5 kV output voltage, the megohm scale can be read directly, multiplied by the megohm range multiplier value and that result multiplied by 10 for the megohm value of specimen.

(Megohm scale reading X megohm range multiplier X10 = specimen megohms at 5 kV.)

When megohm test is complete, always (except for an emergency) return voltage control to zero and allow voltmeter to decay to zero or discharge with a discharge stick before turning off the high voltage.

8. Current Trip Circuit

If full output of unit is desired before current trip activates, set "Min"-"Max" knob fully clockwise to "Max". Trip circuit will not activate until current rises above rated output.

Other trip levels can be set by using an appropriate value resistor between high voltage and return and adjusting voltage to obtain desired trip current. Rotate "Min"-"Max" knob toward "Min" (CCW) slowly until trip circuit activates. Reset by depressing RESET. Turn voltage control to zero and depress HV ON. Raise voltage control slowly to verify trip setting. Some trial and error fine tuning may be necessary if level is very specific. Resistances of several megohms may be needed to set very small current trip levels.

OPERATING INSTRUCTIONS

After current trip circuit has been activated, RESET switch will need to be depressed and Voltage Control returned to Zero Start before high voltage can be re-activated. When current trip activates, high voltage is automatically turned off and internal discharge circuit is applied to output.

Flashovers will normally activate trip circuit.

9. When all test leads of the unit and test specimen are properly connected and all the controls are set to the proper presets (main power switch off), the input power cord can be plugged in to a properly grounded receptacle having the rated input voltage for unit. If the test area is now secure and safe, the “POWER ON” switch can be turned on. If everything is still okay, HV ON can be activated and testing can be started. If using as megohmmeter, remember that scale is calibrated at 500 V output only.

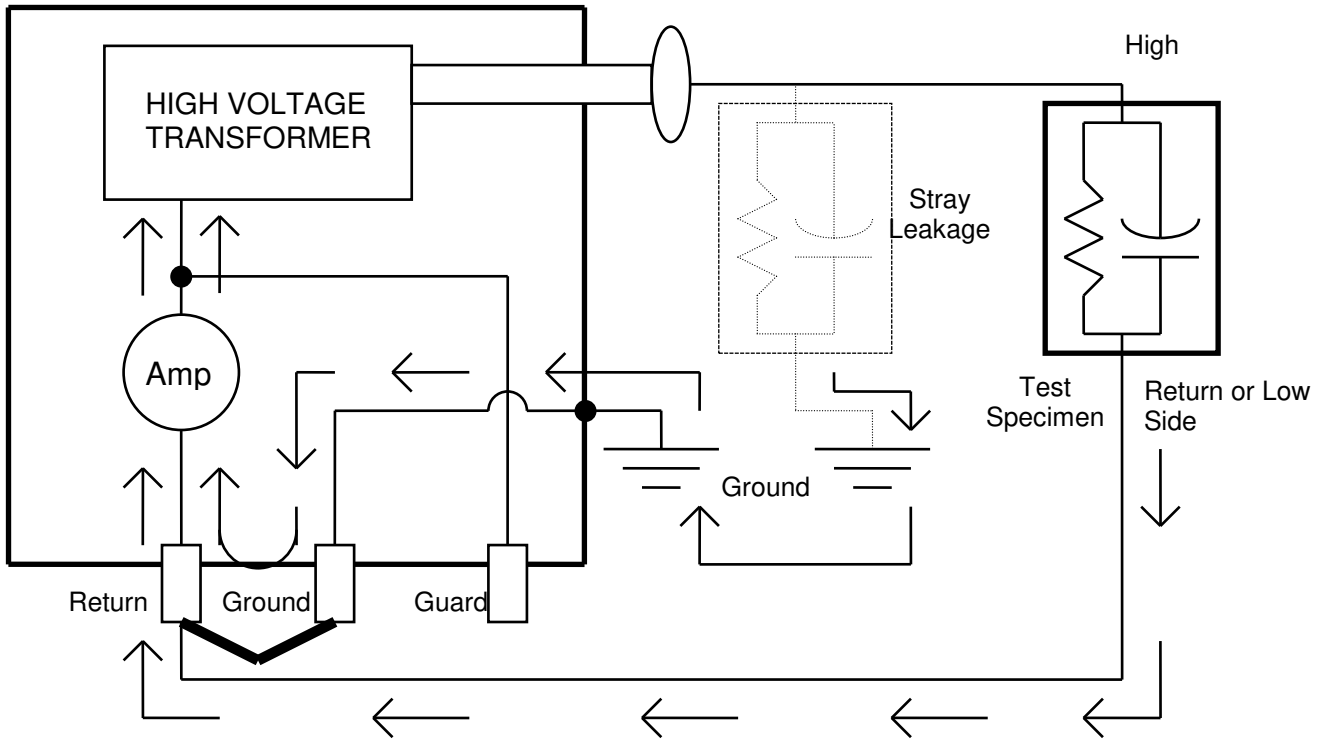
10. When testing is completed on test specimen, turn Voltage Control to Zero Start and allow voltmeter to decay to zero. When voltmeter has reached zero, depress HV OFF. Turn main power off. Unplug unit. Use hot stick or high voltage discharge stick on specimen before disconnecting test leads. Set up for next test or secure and store unit until needed again.

INSTALLATION AND OPERATION INSTRUCTIONS

NOTES CONCERNING THE USE GUARD AND GROUND

NORMAL MODE CONFIGURATION

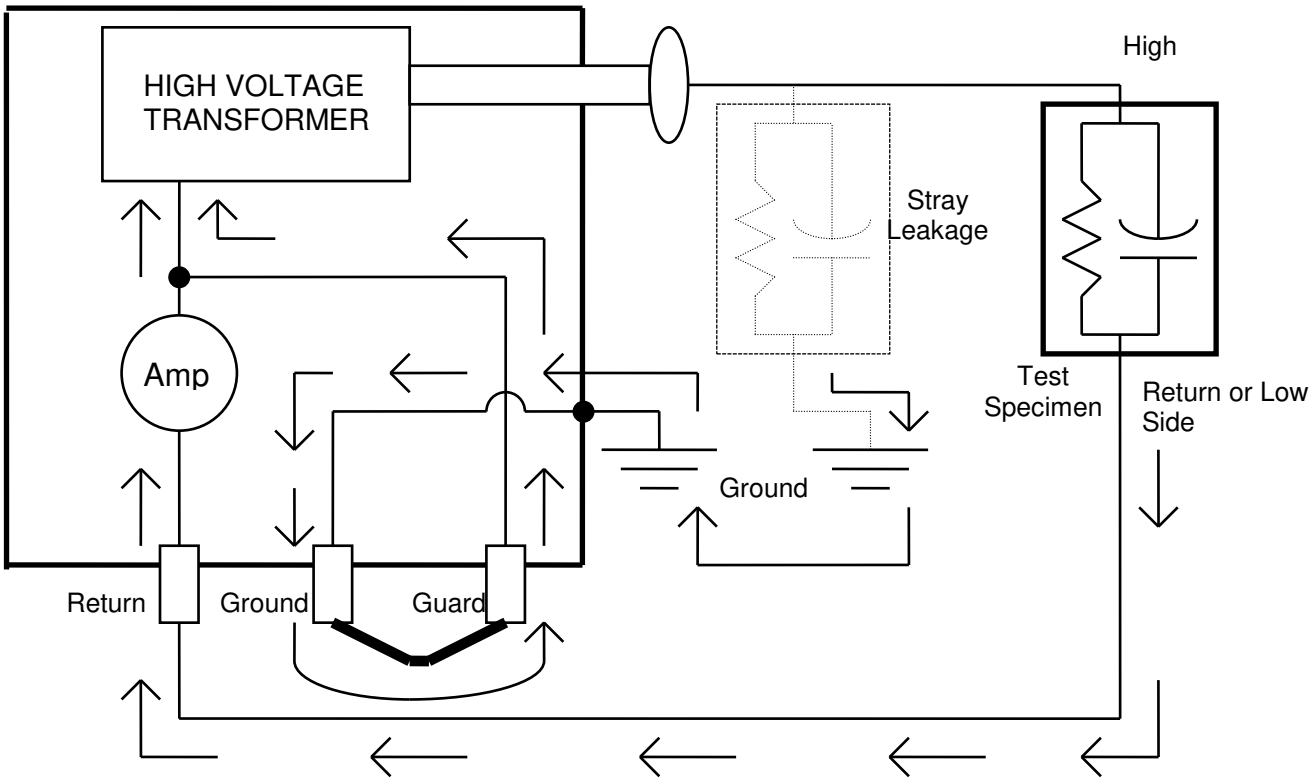
In this configuration the **Return** and **Ground** is connected together with an external jumper or a switch internal to the Test Set, depending on the design. Nothing is connected to the **Guard**. Both stray leakage to earth ground and leakage through the Test Specimen is indicated on the current meter. This configuration should be used if it is not possible to isolate the return side of the Test Specimen from earth ground.



INSTALLATION AND OPERATION INSTRUCTIONS

GUARD MODE CONFIGURATION

In this configuration the **Guard** and **Ground** is connected together with an external jumper or a switch internal to the Test Set, depending on the design. Any current associated with the **Return** is indicated on the current meter. Any current associated with the **Guard** bypasses the current meter. Leakage current through the test specimen is indicated on the current meter. Stray leakage to earth ground is not indicated on the current meter. This configuration can not be used if it is not possible to isolate the return side of the Test Specimen from earth ground.



CALIBRATION

All calibrations have been done at the factory. Periodic calibration of the output voltmeter and output currentmeter should be done approximately every 12 months.

Calibration should only be performed by individuals qualified and knowledgeable in high voltage calibration using highly accurate calibration equipment.

Location of Calibration Adjustments

The calibration potentiometers are located on the printed circuit board inside the unit. If recalibration is necessary, the unit must be removed from the case by removing the front panel perimeter screws and the two nuts on case bottom. Next, carefully lift unit out of case. Check that re-calibration is necessary before removing from case.

The voltmeter has calibration for each range for both, AC and DC, labeled 5kV, 10kV, and 25kV.

The currentmeter has two calibrations for AC current, AC-X.1 and X1, and three calibrations for DC current, DC-X1K, X100, and X10.

Electrical references to these potentiometers are shown on the schematic diagram.

Overcurrent limits are factory set and not adjustable for calibration.

Calibration Procedure

The Ground jumper clip should be between Ground and Guard. Assure that HV output cable and currentmeter range switches are both in either the AC Mode or DC Mode being checked.

1. **Output Voltmeter**

   Configure unit for DC Mode and perform calibration for DC ranges. Reconfigure unit for AC Mode and repeat procedure with AC calibration.

   Connect a precision high voltage voltmeter between high voltage output and Return binding post on front panel. Place voltmeter range switch to the LOW range position (5kV). Energize test set and raise output voltage to approximately 80% of the full scale deflection. Compare panel meter on test set to standard voltmeter. If recalibration is necessary, adjust the panel meter reading by turning the LOW (L) calibration potentiometer. Check linearity and calibration at various points on scale (i.e. 20%, 40%, 60%, and 100% of full scale).

   Repeat the above procedure for medium and high voltmeter ranges. If recalibration is necessary, adjust the proper calibration potentiometers MEDIUM (M) or HIGH (H). Assure that the proper potentiometer for the range and mode is being adjusted.

DC Voltage	Range	AC Voltage	Range
L - R24	0-5 kV	L - R18	0-5 kV
M - R26	0-10 kV	M - R20	0-10 kV
H - R28	0-25 kV	H - R22	0-10 kV (not full scale)

CALIBRATION

2. **Output Currentmeter**

Configure unit for DC Mode and perform DC calibration. Reconfigure unit for AC Mode and repeat procedure for AC calibration. AC calibration will be at X.1 and X1 only.

Connect a precision ammeter between high voltage output lead and Return binding post on front panel. NOTE: To ensure precise control over output current, it may be necessary to insert a 200 K Ohm, 10 Watt resistor in series with the high voltage output lead. Place currentmeter range switch to X1 position. Energize test set and CAREFULLY raise output current to approximately 80% of the full scale deflection. Compare panel meter to standard currentmeter. No recalibration should be necessary in DC-X1 as the currentmeter is a 10 micro ampere full scale movement. If recalibration is required, the meter should be replaced. Check linearity and calibration at various points on scale (i.e. 20%, 40%, 60%, and 100% of full scale).

Place meter range switch in the X10 position. Raise output current to 80% of full scale. If recalibration is necessary, adjust calibration potentiometer labeled X10. Check linearity at various points on the scale.

Repeat procedure for X100 and X1K currentmeter ranges. If recalibration is necessary, adjust the proper calibration potentiometers X100 and X1K.

DC Current	Range	AC Current	Range
X1 - No calibration	0-10 μA	X.1 - R7	0-1 mA
X10 - R15	0-100 μA	X1 - R9	0-10 mA
X100 - R13	0-1000 μA		
X1K - R11	0-5000 μA (half scale)		

PARTS LIST
PAD10-25
Assembly No. 9109090

ITEM	DESCRIPTION	QTY	PART NO.
	CONTROL PANEL		
CONTROL PANEL			
INPUT CORD	RIGHT ANGLE MODULAR POWER CORD	1	1077170
INPUT CON.	CORCOM 6VM1 FUSED POWER MODULE	1	1152590
F1,F2 (120V)	2 AMP GDC 250 V FUSE	2	1603702
F1,F2 (220V)	1 AMP GDC 250 V FUSE	2	1603701
EXT. INTLK.	CHASSIS CONNECTOR	1	1151152
EXT. INTLK.	CRIMP PINS-FEMALE (CHASSIS CONNECTOR)	2	1151174
EXT. INTLK.	CABLE CONNECTOR	1	1151162
EXT. INTLK.	CABLE CLAMP	1	1151186
EXT. INTLK.	SOLDER PINS-MALE	2	1151176
GUARD	WHITE BINDING POST	1	1351104
GROUND	GREEN BINDING POST	1	1351103
RETURN	RED BINDING POST	1	1351102
HV OUTPUT JACK	UG1094/U, BNC PNLMT STD	2	1153065
JACK COVER	31-026 MALE CAP, BNC	1	1150510
HANDLE	ALUMINUM HANDLE	2	2101710
KNOB SW6,7,R9	RANGE SW, CURRENT TRIP ADJ. KNOBS	3	1355310
M1	CURRENTMETER/MEGOHMMETER-BEEDE	1	1500210
M2	VOLTMETER-MODUTEC	1	1501010
PL1-LENS	POWER ON-CLEAR LENS 31-903.7	1	1422153
PL2-LENS	OVERCURRENT-BLUE LENS 31903.6	1	1422148
PL3-LENS	HV ON-RED LENS 31-903.2	1	1422150
PL4-LENS	HV OFF/RESET-GREEN LENS 31-903.5	1	1422151
PL1-4 LAMP	28 VOLT EAO LAMP 31-963.2	4	1420145
R4	OVERCURRENT ADJ. POT 100 KOHMS	1	1761954
SHORTING BAR	GROUND-GUARD/RETURN JUMPER CLIP	1	1351110
SG1,2	90 VOLT SPARK GAP	2	1605110
SW1,PL1	POWER ON-EAO 2 POLE LATCH SW. W/LAMP	1	1860265
SW2,3,4/PL2,3,4	EAO 1 POLE MOM. SW. W/LAMP	3	1860120
MICRO SW	ZERO START SWITCH ON T1	1	1866015
SW6	CURRENTMETER/MEGOHMMETER RANGE SW.	1	1863046
SW7	VOLTMETER RANGE SW.	1	1863047
SW8	BUZZER ON-OFF SW.	1	1865010
T1	VOLTAGE ADJ. TRANSFORMER-VARIABLE	1	1890100
PLUG	15 PIN MOLEX PLUG	1	1153912
RECEPTACLE	15 PIN MOLEX RECEPTACLE	1	1153932
PINS-MALE	MOLEX PINS-MALE	9	1153935
PINS-FEMALE	MOLEX PINS-FEMALE	9	1153915

PARTS LIST

ITEM	DESCRIPTION	QTY	PART NO.
	CASE/CONTROLS/OVLD		
CASE/CHASSIS			
CASE	CASE- GEMINI 01100531 (Modified)	1	2100505
LOGO	PHENIX LOGO	1	2980265
T4 (220V)	230V-115V AUTO TRANSFORMER	1	1894427
PCB1218 ASSY.	**VOLTMETER/CURRENTMETER/OVERCURRENT BD.**	1	31121800
PCB	PCB 1218 PAD10-25 CKT. BD.	1	1112180
BZ1	24V, 35MA BUZZER	1	1424015
C1	1000 μf, 50 V	1	1098940
C2	.1μf, 20V	1	1093020
C3	.47 μf 250V	1	1093365
C4	.22 μf, 100V	1	1093150
C7	1μf, 25V	1	1094025
C9	10 μf 20V	1	1095800
D1-7	1N4007 (1000VR, 1.0A)	7	1780025
D8	TYPE 1.5KE12A TRANZORB (1N6273A 10V)	1	1780063
K1	27E046 KUP 3P, 24VDC RELAY	1	1700615
K1	RELAY SOCKET	1	1157600
K2	24VOLT 2POLE RELAY (#NF2EB-24V)	1	1701366
NE2,3	NE-2 NEON	2	1609990
R1	.5W, 5.1K	1	1712110
R2	.25W, 49.9K, 1%, MF	1	1734050
R3,16	.25W, 499K, 1% MF	2	1734499
R5	.5W, 250 OHM, 1%	1	1720250
R6	12K, 1/4W, 1% MF RES.	1	1722605
R7	5K, TYPE 43P	1	1761052
R8	.25W, 909 OHM, 1%, MF	1	1733093
R9,XR2	500 OHMS, TYPE 43P	2	1760500
R10	.25W, 402 OHM, 1% MF	1	1733040
R11	200 OHMS, TYPE 43P	1	1760200
R12	.5W, 4K, 1%	1	1722093
R13	2K, TYPE 43P	1	1761020
R14	RESISTOR 45.3K, 1/4W, 1%	1	1722620
R15	20K, TYPE 43P	1	1761110
R17	180K, 1/4W, 1% MF RES.	1	1722635
R18,26	100K, TYPE 43P	2	1761950
R19,27	69.8K, 1/4W, 1% MF RES.	2	1722625
R20,28	50K, TYPE 43P	2	1761502
R21	24.9K, 1/4W, 1% MF RES.	1	1722617
R22	10K, TYPE 43P	1	1761090
R23A	.25W, 1M, 1%, MF	1	1735000
R23B	300K, 1/4W, 1% MF RES.	1	1722645

PARTS LIST

ITEM	DESCRIPTION	QTY	PART NO.
PCB 1218 ASSY.	(Continued)		
R24	500K, TYPE 43P	1	1762075
R25	.25W, 249K, 1% MF	1	1731252
R30	.5W, 500K, 1%	1	1725000
SCR1	C106M1	1	1803101
T3	LP34-170	1	1894395
SPACERS	SPCR ¾ X 6-32	4	1350310
CON1	CONN. & PLUG 20 PIN	1	1152620
CON2	HDR 8CKT.1	1	1152286
CON2	CON 8CKT.1	1	1152285
CON3	HDR 10CKT.1	1	1152211
CON3	CON 10CKT.1	1	1152210
CON4	CON 2 CKT.1	1	1152200
CON4	CON 2 CKT.1	1	1152201
C8-A	CAP. (20WVDC, 15 μf)	1	1096100
C8-B	10 μf 20V	1	1095800
C8-C	CAP. (25WVDC, 2. μf)	1	1094430
CABLES/CLIPS			
HV CABLE	COMPLETE HIGH VOLTAGE CABLE	1	30070014
RETURN CABLE	COMPLETE RETURN CABLE	1	30080004
GROUND CABLE	COMPLETE GROUND CABLE	1	30080005
	BNC CONN.	1	1153075
RED BOOT	RED ALLIGATOR BOOT	2	1353000
BLACK BOOT	BLACK ALLIGATOR BOOT	1	1353001
CLIP	ALLIGATOR CLIP	3	1353002
	HV UNIT		
SOL1	4X239 SOLENOID	1	1704205
R34-R36	10W, 20K	3	1742400
D9,10	#SL1200 (12KV-40MA)	8	1782000
R37	6W,75MEG, 1% ROX4	1	1748200
R33,32	RES. 1W, 50 MEG, 5%	8	1716197
INPUT	250-S LUNDEY	7	2410050
C5,6	CAPACITOR, .006 uF, 35kV	6	1091600
T2	1 PHASE-HV GO-59	1	38340059
MOV1	MOVISTOR V130LA10A	1	1606100

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.

Your order for replacement parts should be sent to:

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

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 Parts Ordering Department at Phenix Technologies.

Part Name	Computer Number	Recommended Quantity
Fuses for F1 and F2		
2AGDC-250V (120 V)	1603702	4
1AGDC-250V (220 V)	1603701	4
Indicator Lamps		
EAO, 28 V, 31-963.2	1420145	4
Lens Puller Tool	142210	1
Lamp Extractor	142010	1
HV Output Cable	30070014	1
Return Cable	30080004	1
Ground Cable	30080005	1

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.

SCHEMATIC

1. 9109090 AC-DC Hipot/Megger PAD10-25
   Sheet 1