PFT-401CE

SERIES

Safety, Operation, and Procedure Instructions for the PFT-401CE AC Hipot

***** Caution- High Voltage *****

This Operator Manual contains instructions for the operation of a High Voltage power source. The operator of this equipment must use good judgement and follow all safety precautions noted in this guide to ensure the protection of himself and others in close proximity to the test area. **Failure to follow the instructions could result in injury or death.** Proper grounding of the test set must be done prior to connecting this unit to a power source.

Operator Manual

31 Route 7A
Copake, N.Y. 12516
Telephone 518/329-3275 • Fax 518/329-3271
http://www.hvinc.com
E-mail: factory@hvinc.com

Table of Contents

About the Operator Manual

Important

This Operator Manual describes the features and safe operation of a High Voltage Test Set. The instructions are intended to be clear and simple, but the operator must be trained and qualified according to established procedures for the use of this type of equipment.

This Operator Manual is organized to provide information on the PFT-401CE in steps that familiarize the new operator with the operation of this test set.

Section 1: Specifications and Controls.

Section 2: Setup and Operation.

Section 3: Performing Special Operations.

The Functions, Features, and Specifications of the PFT Series of AC Hipots are also discussed in the PFT Brochure available from High Voltage, Inc.

SECTION

1

General Information

This section familiarizes the operator with the features and specifications of the

PFT- 401CE AC hipot test set manufactured by HIGH VOLTAGE, INC.

Features and Specifications

The PFT- 401CE AC hipot test set provides continuously adjustable output voltages for the GO/NO-GO testing of high voltage insulation and switch gear.

Features of the PFT- 401CE AC Hipot

- Continuously adjustable output voltage
- Adjustable overload, 10-110% of rated output current
- "Zero Start" and External Interlock provision
- Secondary connected single-range digital voltmeter with Memory at Overload
- Single-range digital current meter with guard/ground return
- One piece portable design

SPECIFICATIONS

	PFT-401CE Part No. PFT-1433S
Input	230 V, 7 amps, 50/60Hz, single phase
HV Output	0-40kVac, 50/60Hz, 1KVA resistive load (25mA max)
Output Termination	1 ½" Aluminum Ball
Duty	1KVA: 1 hour ON, 1 hour OFF 0.8kVA: continuous
Distortion	<5%
Meter Accuracy	1%
Kilovoltmeter	3.5 Digit LED Scaled 0-40.0kVac (RMS)
Current Meter	3.5 Digit LED Scaled 0-25.0 milliamperes
Case Size H.V. TANK	14.5"w x 12.5"d x 23.5" high High Voltage Tank Included
Weight	70 lbs. (32kg)

Table 1 *PFT-401CE Specifications*.

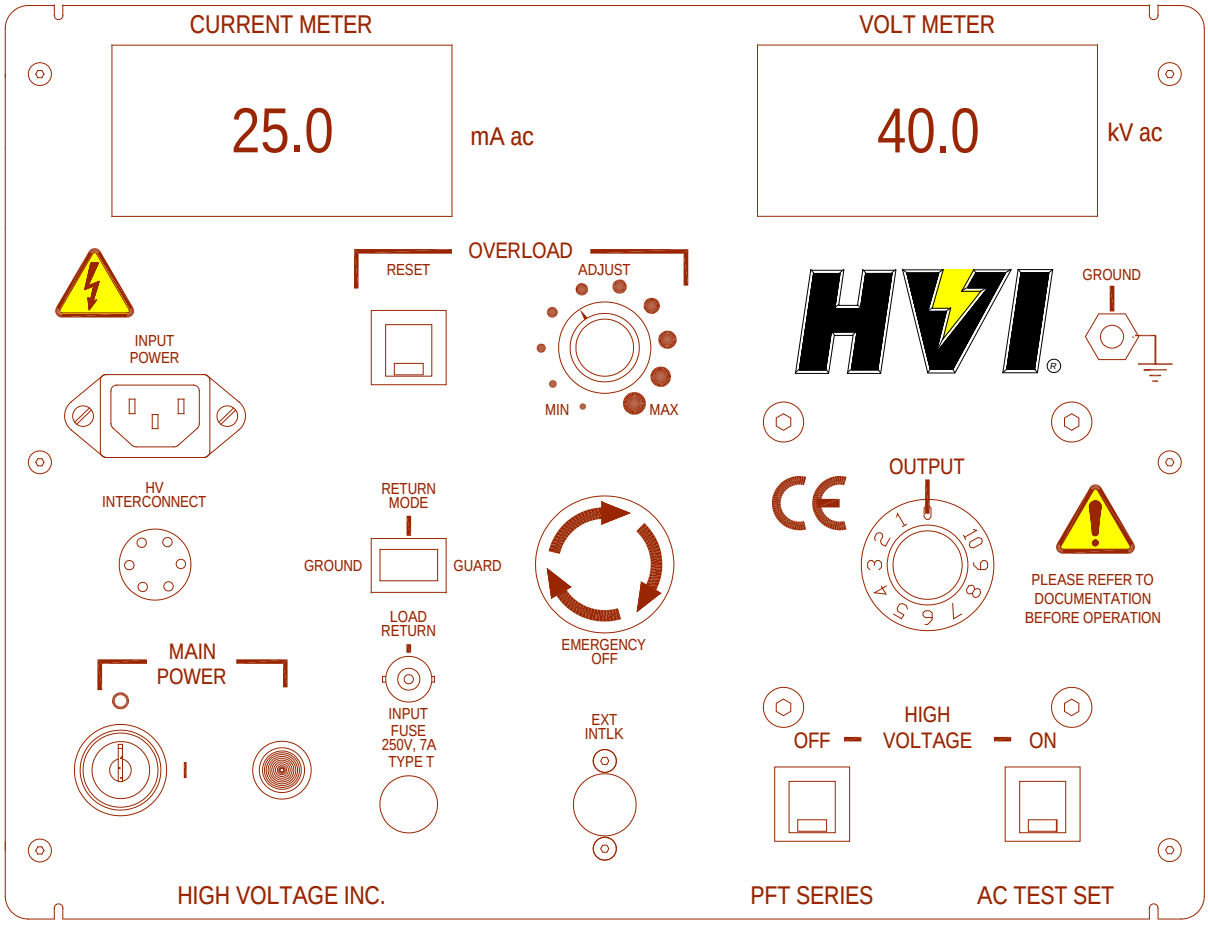


Figure 1 *PFT-401CE front panel controls.*

MAIN POWER

The MAIN POWER key switch provides safety protection and power to the control and High Voltage circuits. The neon lamp will light when the power is on and voltage is available through the input line cord. The input power must be from a grounded source rated to match the input power specifications in Table 1.

INPUT FUSE

The INPUT FUSE provides overload protection in the event of test set failure.

HIGH VOLTAGE ON/OFF

The HIGH VOLTAGE ON (OFF) pushbuttons activate (de-activate) the high voltage power circuits. The LED indicators provide long life positive indication of the circuit status. The RED (ON) LED lights when high voltage is energized, the GREEN (OFF) LED lights when the high voltage is de-energized.

OUTPUT CONTROL

The OUTPUT control variable transformer adjusts the output voltage. The 0-10 markings on the panel indicate the low to high setting. The control must be at ZERO (0) to energize the high voltage circuits. The output control must always be returned to zero at the completion of testing, prior to de-energizing the output

VOLTMETER (WITH MEMORY)

The 3.5 digit LED digital KILOVOLT METER allows for accurate output voltage readings. 1-% precision resistors minimize the need for re-calibration due to aging shift. See Voltmeter Re-calibration in Section 3 for details on calibration. If an OVERLOAD occurs during test, the volt meter will retain the reading at the time of the overload. To reset the memory, push OVERLOAD RESET pushbutton.

CURRENT METER

The 3.5 digit LED digital CURRENT METER is for accurate secondary load current readings.

OVERLOAD ADJUST AND RESET SWITCH

The OVERLOAD trips from a secondary current in excess of the adjusted setpoint. Once tripped, the high voltage is turned off and the OVERLOAD must be RESET to resume testing. To set the Overload, refer to Section 2 in Operating The Equipment, Setting The Overload.

RETURN MODE

The RETURN MODE rocker switch allows for accurate secondary load current readings. In the GUARD position, all ground currents are shunted around the meter. The load must be isolated from ground to use in the GUARD position. In the GROUND position, the return point is grounded and all currents (load and ground losses) are metered.

NOTE: If the test sample low side is grounded, the RETURN MODE must be in the GROUND position.

LOAD RETURN

The LOAD RETURN BNC connector is for connecting the low side of the test sample to the test set. Using the LOAD RETURN allows for accurate secondary load current readings in the GUARD position. The load must be isolated from ground to use in the GUARD position. In the GROUND position, the LOAD RETURN point is grounded and all currents (load and ground losses) are metered.

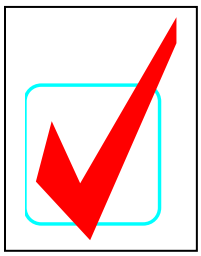
EXT.INTLK (EXTERNAL INTERLOCK)

The Ext. Intlk. connector is provided to allow a normally open safety interlock switch to control the energizing of the high voltage output.

EMERGENCY OFF

The EMERGENCY OFF mushroom head switch is provided to allow fast de-energizing of the high voltage output. Turn clockwise to release from latched condition.

List of included components



- ☐ (2) Green/Yellow lead with Green boot for ground connections.
- ☐ Ext. Intlk. jumper plug
- ☐ 20 ft. RG58/U shielded return lead

SECTION

2

SETTING UP THE EQUIPMENT

The setup of this equipment has been minimized by careful consideration of the operator during design. The PFT-401CE one-piece portable construction allows for convenient portability.

1. **Select a location** for the unit that will allow easy connection of the HV output to the test object.

2. **Separate the base from the top control section** move within 10 feet of the HV section while allowing viewing of the meters at a safe distance from the test object. Open the top case lid for viewing the control panel.

3. **Install the interconnect cable between the control and HV section** by connecting to the front panel connector and uncoiling the cable towards the HV section and making connection to the HV connector next to the yellow bonnet.

4. **Be sure that all the controls are off**, in their de-energized or fully counterclockwise position.

5. **Secure ground leads to the test set.** The brass **Ground** studs on the control panel and the HV section should be used for that purpose. Two green/yellow leads with green boot have been provided for the safety ground connections.

6. **Insert the EXT INTLK plug into the socket on the rear panel.** The plug may also be wired to a normally open contact of a safety switch for added protection. Hand-held or foot operated safety switches are available from High Voltage Inc. to plug directly into the **EXT INTLK** socket.

Operating the Equipment

This section provides step-by-step instruction on various test methods. Many facilities have their own in-house test procedures, and this manual is not to supercede these. The purpose of this section is to explain the capabilities of this test set in real-world applications.

Setting the Overload

1. Ensure that all the steps listed in **Setting up the Equipment** have been accomplished. Take special note to ground the cabinet to a solid earth ground.

2. Short the output cable to the **GROUND** stud on the front panel.

3. Connect the input power cord to a grounded source (See the specification table for unit input requirements). Rotate the **OVERLOAD ADJUST** to the **MAX** (approx 32mA) setting.

4. Operate the **MAIN POWER** circuit breaker to energize the control circuits.

CAUTION

POTENTIALLY LETHAL VOLTAGES MAY BE PRESENT

5. With the **OUTPUT** control at zero (zero start interlock engaged); depress the **HV ON** pushbutton. The **HV ON** light will glow.

6. Increase the output slowly by rotating the **OUTPUT** control clockwise until the desired output (overload) current is reached. Adjust the **OVERLOAD ADJUST** towards **MIN** until the **OVERLOAD** trips.

7. Re-energize High Voltage and raise the output current once more to verify the desired setting. At the completion of setting the overload, go to the next section for testing instructions.

AC Insulation Testing

1. Ensure that all the steps listed in Setting up the Equipment have been accomplished. Take special note to ground the test set to a solid earth ground using the supplied green/yellow lead.

2. *Prior* to connecting an output cable to the test sample, be sure that the test sample is de-energized.

3. Connect the output lead to the test sample. ***Be sure that there is enough clearance to grounded objects for the expected test voltage. The minimum clearance in air is 10 kV ac/inch.***

4. ***Connect the low side of the test sample*** to the shielded return lead

5. Connect the input power cord to a grounded source (See the specification table for unit input requirements).

6. Operate the MAIN POWER circuit breaker to energize the control circuits.

CAUTION

POTENTIALLY LETHAL VOLTAGES MAY BE PRESENT

7. With the OUTPUT control at zero (zero start interlock engaged); depress the HV ON pushbutton. The HV ON light will glow.

8. Increase the output by rotating the OUTPUT control slowly clockwise until the desired output voltage is reached.

9. Maintain the output voltage for the test time specified in your standard procedures.

10. After the test is complete, rotate the OUTPUT control to zero, prior to depressing the HV OFF pushbutton.

11. If the test sample fails during the test, the overload relay will de-energize the high voltage and the volt meter will retain the voltage reading. To reset the memory volt meter, depress the OVERLOAD RESET.

Following the procedure outlined in Setting the Overload sets the overload.

12. Prior to removing the output cable from the load, observe that the output voltmeter is at zero and short the output cable to ground.

Using the Guarded Return

The use of the GUARD/GROUND return feature of this test set provides for very accurate leakage current measurements if certain conditions exist allowing for the GUARD circuit to be employed. The following explanation will detail different test samples and methods that lend themselves to the use of this circuit. The same setup precautions such as proper grounding still apply to the test but the grounds will be manipulated to accomplish the test requirements.

1. Grounded Return- With the output return in the grounded mode, the current meter reads all current to ground, internal and external to the test set. This current might include corona, surface tracking, and any shunt resistance. The typical diagram for grounded return operation is shown in Figure 2 below.

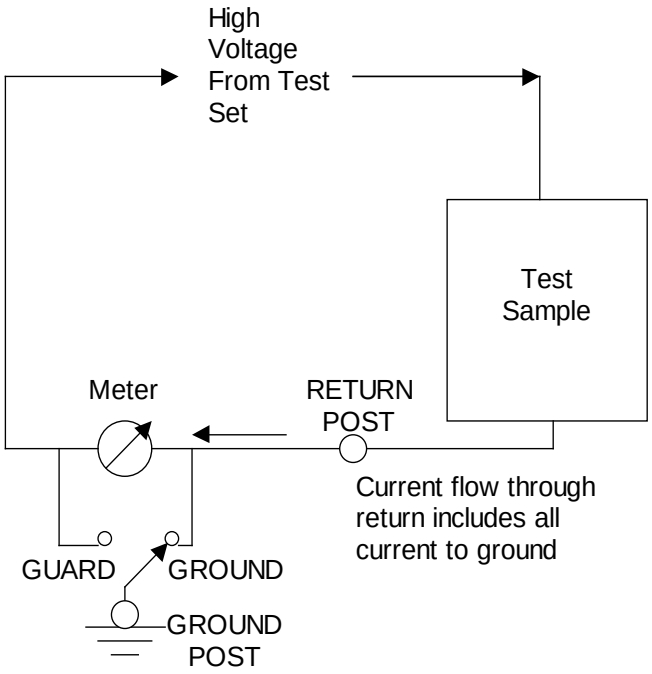


Figure 2, Grounded Return Diagram

2. Guarded Return- With the output return in the guarded mode, the current meter will only read currents through the test sample. The test sample must be isolated from ground on the low side as shown in Figure 3 below.

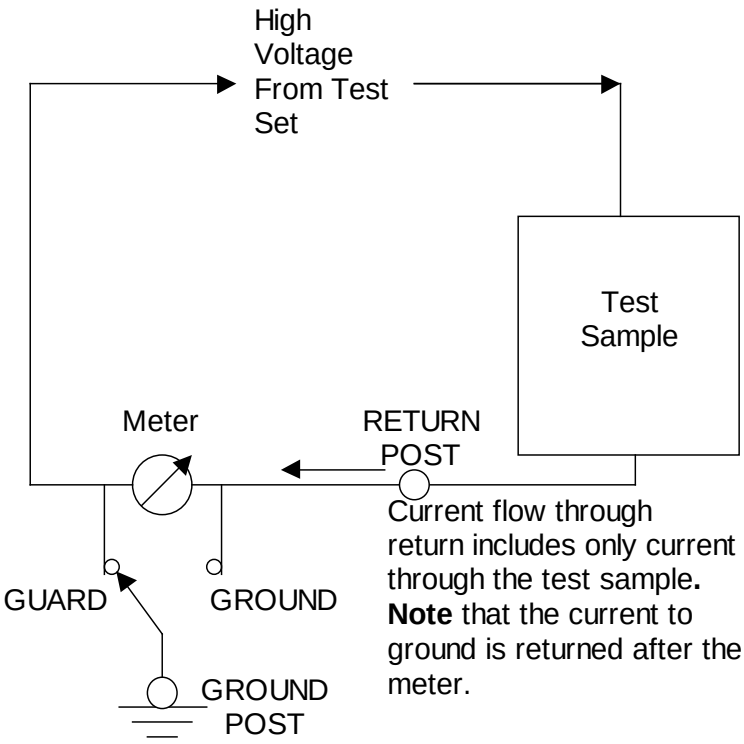


Figure 3, Guarded Return Diagram

AC Testing of High Voltage Cables or Switch Gear

When testing cables, either single or three phases, certain extra steps must be observed to ensure safe operation.

1. Make sure that all insulators, stress cones, and potheads are clean and free of moisture. This will prevent flashover and minimize leakage.

The shields of all cables must be securely tied to ground at the nearest end of the cable.

2. Isolate the far end of the conductors under test for the test voltage; that may mean separating some of the conductors in a multi-conductor cable from each other and their shields.

3. Any conductors or wires in the cable or the vicinity not being tested must be grounded to avoid a buildup of charge and possible shock hazard.

4. Voltage must be applied according to specifications from the cable manufacturer or any other applicable test standards.

CAUTION

POTENTIALLY LETHAL VOLTAGES MAY BE PRESENT

STORED ENERGY LEVELS IN THE CABLE GREATLY INCREASE THE RISK OF FATAL INJURY IF CONTACT IS MADE WITH THE LOAD WHILE AT ANY VOLTAGE.

5. Always ground the test cable(s) prior to disconnecting the output cable.

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SECTION

3

PERFORMING SPECIAL OPERATIONS

The following section contains information on the care and upkeep of your new PFT SERIES Power Frequency AC Test Set. There are some notes on troubleshooting and service, which will save much time and money over the life of the unit.

Meter Re-calibration

The PFT-302CE hipot uses precision metal film resistors for measurement and calibration of the voltmeter. The use of these resistors in both the high voltage tank and the metering circuits has minimized circuit drift due to aging and temperature. However, a potentiometer (R4) on PCB-041 on the kilovolt meter can be used to correct for circuit changes from the aging of the meter.

The certification of meters on a yearly basis is recommended to ensure accurate test results.

Voltmeter Re-calibration

1. Locate the unit in a position that will allow easy reading of the meters.
2. Remove the front panel screws and support the panel vertically to gain access to the calibration pot (R4).
3. Perform the steps in Setting up the Equipment at the start of SECTION 2. Be sure to ground the test set to a solid earth ground using the supplied black ground test lead prior to connecting the unit to input power.
4. Connect the output cable to a calibrated reference meter with ability to read to the full output voltage of the unit. Be sure to ground the low side of the meter.
5. Raise the output to 15kV on the unit meter. Adjust R4 as required.

6. Check calibration at 30.0kV if the customer facility calibration certification requires more points of reference; follow those procedures instead of these.

Current Meter Re-calibration

1. Locate the unit in a position that will allow easy reading of the meters.

2. Remove the front panel screws and support the panel vertically to gain access to the calibration pot (R21).

3. Perform the steps in Setting up the Equipment at the start of SECTION 2. Be sure to ground the test set to a solid earth ground using the supplied black ground test lead prior to connecting the unit to input power.

4. Connect the output cable to a calibrated reference meter with ability to read 68mA ac. Use a series resistance or capacitance to allow for precise resolution when calibrating. Be sure to connect the low side of the reference current meter to LOAD RETURN and place the RETURN MODE switch in GUARD position.

5. Raise the output to 30 mA on the unit meter. Adjust R4 as required.

6. Check calibration at 10, 25, 50, mA. If the customer facility calibration certification requires more points of reference, follow those procedures instead of these.

7. Check to verify accuracy.

RETURNED MATERIAL

If for any reason it becomes necessary to return any equipment or materials to High Voltage, Inc., the Service Department of High Voltage, Inc. must be notified, and authorization received, prior to the shipment of the equipment. When notified, the following information must be provided:

MODEL:
SERIAL NO:
PART NO:
REASON FOR RETURN:
SUSPECTED DEFECT:
CAUSE OF DEFECT:

With the above information provided, High Voltage, Inc. will determine if the return of the equipment is appropriate. If deemed appropriate, a Return Authorization Number will be issued. At that time, the Purchaser will be instructed how to mark and return the equipment.

The above procedure must be adhered to in order to ensure prompt service. No equipment should be returned without the prior knowledge and authorization of High Voltage, Inc.

REPLACEMENT PARTS ORDERING

To order replacement parts, first refer to the Parts List for the product in question. Every part is issued a part number. It will be necessary for this part number and the product model and serial number to be provided. When calling High Voltage, Inc. request the Service Department.

TERMS AND CONDITIONS AND LIMITED WARRANTY Rev. 102113

High Voltage, Inc., 31 County Route 7A, Copake, NY USA 12516
Phone: (518) 329-3275 Fax (518) 329-3271 E-mail: factory@hvinc.com

THESE TERMS AND CONDITIONS OF SALE AND LIMITED WARRANTY OF HIGH VOLTAGE, INC. ("High Voltage") SHALL BE GOVERNED BY AND CONSTRUED ACCORDING TO THE INTERNAL LAWS OF THE STATE OF NEW YORK, USA, WITHOUT GIVING EFFECT TO ITS CONFLICT OF LAWS PROVISIONS. THE RIGHTS AND OBLIGATIONS OF ALL PARTIES AND ALL PERSONS OR ENTITIES CLAIMING HEREUNDER SHALL NOT BE GOVERNED BY THE PROVISIONS OF THE 1980 U.N. CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS.

1. **ACCEPTANCE.** All orders become effective only when accepted by High Voltage's written order acknowledgment at Copake, New York, USA. Unless modified in writing by an authorized representative of High Voltage, or modified in High Voltage's Quotation or order Acknowledgment, these Terms and Conditions and Limited Warranty shall solely control Purchaser's order. High Voltage expressly rejects any additional or different provisions, terms or conditions proposed by Purchaser at any time.

2. **SCHEDULING.** High Voltage's shipping date specified in High Voltage's quotation or purchase order acknowledgment is approximate and High Voltage shall use reasonable commercial efforts to effect timely shipment. Furthermore, High Voltage shall not be liable for any delay in the performance of orders or contracts or in the delivery or shipment of goods or for any damages suffered by Purchaser by reason of such delay when such delay is, directly or indirectly, caused by, or in any manner arising from Purchaser's fault, fires, floods, accidents, riots, acts of God, war, governmental interference or, embargoes, strikes, labor difficulties, shortage of labor, fuel, power, materials or supplies, transportation delays, or any other cause or causes (whether or not similar in nature to any of these hereinbefore specified) beyond the control of High Voltage.

3. **CANCELLATIONS.** Prior to shipment, Purchaser may request cancellation or delayed delivery of an order or part thereof, but such shall be conditioned upon written consent of High Voltage and upon payment to High Voltage of cancellation or delayed delivery charges to be determined by High Voltage.

4. **SALE AND DELIVERY.** Unless otherwise agreed in writing, sale and delivery of the goods hereunder shall be made EXW or FCA (Incoterms® 2010) at High Voltage's option, High Voltage's dock at Copake, New York, USA, at which time all risk of loss or damage shall pass to Purchaser. All shipments and packaging shall be made in the manner determined by High Voltage, unless otherwise requested by Purchaser, in which case any resultant additional changes and expenses shall be paid by Purchaser.

5. **TAXES.** Any and all sales, use, excise and similar taxes, and duty and all other charges levied or imposed by governmental authority, foreign and domestic, upon any goods sold or contracted to be sold shall be paid by Purchaser and added to the purchase price unless appropriate tax exemption certificates are supplied to High Voltage in form satisfactory to High Voltage.

6. **PAYMENTS.**

a. All payments shall be in US Dollars without discount unless otherwise specified in High Voltage's order acknowledgment. Credit card payments are accepted only if specified in High Voltage's order acknowledgment.

b. Terms of payment are net thirty (30) days from date of invoice, unless otherwise agreed by High Voltage in its order acknowledgment. Delinquent payments are subject to a service charge on the unpaid balance from invoice date equal to the lower of 1-1/2% per month or the maximum rate permitted by law until all amounts are paid in full. If the financial responsibility of Purchaser becomes unsatisfactory to High Voltage for any reason, or if Purchaser has been in default to High Voltage under any order, High Voltage may require full payment in cash before shipment of goods.

c. If Purchaser so requests and makes arrangements prior to shipment which meet High Voltage's full satisfaction, High Voltage in its discretion may accept irrevocable letters of credit in its favor issued by a United States bank which is satisfactory to High Voltage.

7. **INFRINGEMENT, ETC.** On goods manufactured to Purchaser's specifications, Purchaser shall and does indemnify and hold High Voltage harmless against any claims, damages, liabilities, costs and expenses (including attorneys' fees) arising out of or resulting from actual or alleged infringement of patent, copyright, trademark or other proprietary rights, or claim of unfair trade or unfair competition arising from or occasioned by the use, possession, sale or delivery of any such goods sold by High Voltage.

8. **REPRODUCTION RIGHTS.** Drawings, specifications, reports, photographs and other data relating to all orders and all proprietary rights and interests therein and the subject matter thereof shall be and remain the property of High Voltage. Purchaser agrees that it shall not use High Voltage's drawings, specifications or other materials covered by this order, or any similar article from any other source, or reproduce the same or otherwise appropriate them, without the prior written authorization of High Voltage.

9. **LIMITED WARRANTY.**

a. High Voltage warrants to the original Purchaser of any new goods that the goods are free from defects in material and workmanship under normal use and service for a period of one (1) year from the date of shipment by High Voltage. The obligation of High Voltage under this Limited Warranty is limited, in High Voltage's exclusive option, to repair, replace with new or reconditioned parts or issue credit for goods, parts or materials which prove to be defective. Costs incurred by Purchaser for labor or other expenses to repair or replace such goods, parts and/or materials shall be the sole responsibility of Purchaser. High Voltage shall not be responsible for any damage or lack of performance resulting from: (i) defects due to accident, negligence, alteration, modification, faulty installation, abuse or misuse, whether by Purchaser, Purchaser's agents or employees, or by others than High Voltage (ii) attempted or actual dismantling, disassembly, service or repair by any person, firm or corporation not specifically authorized in writing by High Voltage, or (iii) defects caused by or due to handling by carrier, or incurred during shipment, transshipment or other move.

b. High Voltage expressly disclaims any warranty whatsoever of (i) consumables, and of (ii) parts, components, software (including but not limited to object code and source code and software user instructions), accessories, and materials not prepared, compiled or manufactured by High Voltage, and Purchaser must deal directly with such other supplier. High Voltage may elect to assist Purchaser in settling such claim against such other supplier, but any such assistance shall not prejudice High Voltage's position as to its own liability.

c. Compliance with the following Limited Warranty Claim Procedure is a condition precedent to the obligation of High Voltage under this Limited Warranty:

i. Purchaser must notify High Voltage in writing as soon as is reasonably possible, but within the applicable warranty period, of any alleged defect in material, workmanship, or operation of any goods covered under this Limited Warranty. Such notice must describe in detail the defect, any and all defective parts, and the alleged cause of the defect. No goods may be returned to High Voltage without High Voltage's prior written permission, which permission may be withheld by High Voltage in its sole discretion.

ii. At the exclusive option of High Voltage, Purchaser may be directed in writing to dismantle the goods at the Purchaser's cost and expense and ship the goods prepaid to High Voltage (refer to "Returns" Section 10 for provisions regarding the return of any goods to High Voltage). If High Voltage elects to inspect the goods at Purchaser's site, and to repair, replace,

[Section 9.c.ii. continued on page 2]

or ship the defective goods to High Voltage's factory, Purchaser, at its own cost and expense, shall provide the facilities for such work as needed to inspect and evaluate and possibly repair/replace the goods. If inspection discloses that the defect is not one for which High Voltage is liable, then Purchaser shall promptly reimburse High Voltage for all expenses incurred.

iii. Upon receipt of the defective goods, or following access to the same, High Voltage shall inspect and evaluate the goods and determine the validity of Purchaser's claim.

iv. The validity of any warranty claim, Purchaser's compliance with the Limited Warranty and Limited Warranty Claim Procedure, and the obligation to replace, repair, or issue credit for any goods are solely and exclusively to be determined by High Voltage and any determination shall be final and binding.

d. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, STATUTORY OR EXPRESSED OR IMPLIED ON THE PART OF HIGH VOLTAGE, INCLUDING THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT; FURTHERMORE, HIGH VOLTAGE MAKES NO WARRANTY REGARDING NON-INTERRUPTION OF USE OR SOFTWARE FREEDOM FROM BUGS. HIGH VOLTAGE NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON, FIRM, OR CORPORATION TO ASSUME ANY LIABILITY OR OBLIGATION IN CONNECTION WITH THIS SALE OR LIMITED WARRANTY ON HIGH VOLTAGE'S BEHALF AND PURCHASER ACKNOWLEDGES THAT NO REPRESENTATION EXCEPT THOSE MADE HEREIN HAS BEEN MADE TO PURCHASER.

10. **RETURNS.** No goods may be returned to High Voltage without High Voltage's prior written permission, which permission may be withheld by High Voltage in its sole discretion. Any request for return authorization must be in writing and include, as applicable, model number, serial number, part number, reason for return, alleged defect, and apparent cause of alleged defect. Except as specifically provided in Section 9 Limited Warranty, if High Voltage consents to return of goods: (a) all return shipments are to be via prepaid freight and with all other charges prepaid, (b) if goods are returned to High Voltage within sixty (60) days from the date of original shipment for reasons other than an error by High Voltage in filling the Purchaser's order, Purchaser shall only be entitled to receive a credit in an amount equal to the payment received by High Voltage for the goods minus (i) handling charges, and (ii) a restocking fee determined solely by High Voltage which shall not exceed twenty five percent (25%) of the invoiced amount, and (c) if goods are returned to High Voltage after sixty (60) days from the date of original shipment for reasons other than an error by High Voltage in filling the Purchaser's order, Purchaser shall only be entitled to receive a credit in the amount equal to the payment received by High Voltage for the goods minus (x) a handling fee, and (y) a restocking fee in excess of twenty five percent (25%) which shall be determined by High Voltage.

11. **SECURITY INTEREST.** In order to induce High Voltage to ship goods without full payment, Purchaser grants a security interest to High Voltage in any and all of Purchaser's right, title and interest in the goods, and Purchaser agrees to comply with any reasonable request of High Voltage to perfect such security interest. Purchaser hereby further authorizes High Voltage to perfect High Voltage's security interest in said goods and consents to filing one or more financing statements without the signature of Purchaser.

12. **ARBITRATION.** Any controversy arising out of or relating to this document, or any breach thereof, including, without limitation, any claim that this document is voidable or void, shall be submitted to final and binding arbitration before, and in accordance with, the Commercial Rules of the American Arbitration Association then in effect, and judgment upon the award may be entered in any court have jurisdiction thereof; provided, however, that this clause shall not be construed to limit any rights which High Voltage may have to apply to any court of competent jurisdiction for equitable, injunctive or provisional relief. This arbitration provision shall be deemed self-executing, and in the event that either party fails to appear at any properly noticed arbitration proceeding, an award may be entered against such party notwithstanding said failure to appear. Such arbitration shall be conducted before a single arbitrator under the aegis of the American Arbitration Association in Columbia County, State of New York. The arbitrator shall have the authority to award expenses to the successful party.

13. **LIMITATION OF LIABILITY.** TO THE MAXIMUM EXTENT PERMITTED UNDER APPLICABLE LAW, AND NOTWITHSTANDING ANYTHING ELSE IN THIS DOCUMENT OR OTHERWISE, INCLUDING THAT HIGH VOLTAGE WAS WARNED THAT DAMAGES WOULD OCCUR OR WERE LIKELY TO OCCUR, HIGH VOLTAGE SHALL NOT BE LIABLE WITH RESPECT TO ANY SUBJECT MATTER OF THIS DOCUMENT UNDER ANY CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHER LEGAL OR EQUITABLE THEORY FOR (i) ANY AMOUNTS IN EXCESS IN THE AMOUNT PAID TO HIGH VOLTAGE FOR THE PARTICULAR GOODS OR PART THEREOF WHICH GAVE RISE TO THE APPLICABLE CAUSE OF ACTION OR CLAIM, OR (ii) ANY INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOST PROFITS OR LOST OR CORRUPTED DATA, OR (iii) COST OF PROCUREMENT OF SUBSTITUTE GOODS, SOFTWARE, TECHNOLOGY OR SERVICES. HIGH VOLTAGE SHALL HAVE NO LIABILITY FOR ANY FAILURE OR DELAY DUE TO MATTERS BEYOND ITS REASONABLE CONTROL.

14. **SEVERABILITY.** These Terms and Conditions and Limited Warranty are the entire understanding between Purchaser and High Voltage with respect to the subect matter hereof and supersede all prior agreements, dealings and negotiations. No modification, alteration or amendment shall be effective unless made in writing and signed by a duly authorized representative of High Voltage. No waiver of any breach hereof shall be held to be a waiver of any other or subsequent breach. Nothing contained in this document shall be construed as requiring the commission of any act contrary to law. Whenever there is any conflict between any provision of this document and any present or future statute, ordinance or regulation contrary to which the parties have no legal right to contract, the latter shall prevail, but in such event the provision of this document thus affected shall be curtailed and limited only to the extent necessary to bring it within the requirements of the law. In the event that any part, article, section, paragraph, sentence or clause of this document shall be held to be indefinite, invalid or otherwise unenforceable, the entire document shall not fail on account thereof, and the balance of the document shall continue in full force and effect. If any arbitration tribunal or court of competent jurisdiction deems any provision hereof (other than for the payment of money) unreasonable, said arbitration tribunal or court may declare a reasonable modification thereof, and this document shall be valid and enforceable, and the parties hereto agree to be bound by and perform the same as thus modified.

15. **BASIS OF BARGAIN**. Each party recognizes and agrees that the warranty disclaimers and liability and remedy limitations in this document are material, bargained for bases of their agreement and that they have been taken into account and reflected in determining the respective obligations of the parties.

[End]

THE WORLD'S SOURCE FOR HIGH VOLTAGE TEST EQUIPMENT

ADVANCED TEST EQUIPMENT FOR HIGH VOLTAGE PROOF AND PREVENTIVE MAINTENANCE TESTING OF ELECTRICAL APPARATUS

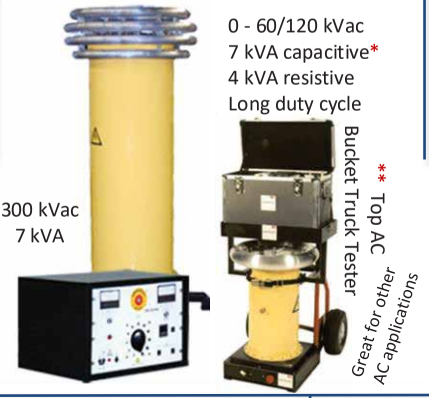
DC Hipot/Megohmmeter Test Sets

Two Testers in One

AC Hipots - Field Portable

Built for Field Use
Portable
Affordable
Rugged & Reliable
Easily Serviceable

Aerial Lift Test Sets - AC



Oil Dielectric Testing

Standard & Micro Controlled

60 kVac & 100 kVac models

60 kVac
.5/2/3 kV/sec
Digital Display

60 kVac
Fully Programmable
Panel Printer

Very Low Frequency AC Technology

Cables & Motors/Generators

0.1 – 0.01 Hz up to 200 kVac

VLF Withstand
VLF TD & VLF PD

200 kVac peak - sine wave
0.1 – 0.02 Hz to 3.75 uF

90 kVac peak - sine wave
0.1 – 0.02 Hz to 2.75 uF

30 kVac
0.4 uF

Many more models avail.

62 kVac peak - sine wave
0.1 – 0.01 Hz to 5.5 uF
Wind Farm Model

** **New Solid State Design**
34 kV peak - sine wave
0.1 – 0.01 Hz to 7 uF

50/60 Hz AC Dielectric Test Equipment: 5 kVA – 50 kVA

AC Testing of High Capacitance Loads – up to 300 kVac

100 kVac
10 kVA
PD <10 pc

5 kVac @ 1 A
Motor Testing

10 kVac @ 10 kVA
Low PD < 10 pc

Concentric Neutral Resistance Tester

Ω-CHECK™

HV Dividers

150 kV AC/DC
300 kV AC/DC

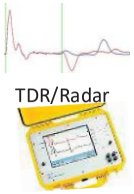
VLF Diagnostic Cable Testing

Tan Delta & Partial Discharge

Capacitor Discharge Systems – Thumpers

Three Full Joule Outputs – VLF/Thumper Combo

Models for URD & Network Systems



HVI Products 10/2015

31 COUNTY RT. 7A, COPAKE, NY 12516 | 518.329.3275 | FAX 518.329.3271 | SALES@HVINC.COM | WWW.HVINC.COM