HIGH VOLTAGE™ INC.
VLF HIPOT INSTRUMENTS

PTS

SERIES

Safety, Operation, and Procedure Instructions for the PTS Series of dc Hipot/Megohmmeters

Please Refer to Documentation Before Operation

Danger- Lethal Voltages:

Equipment to be used by trained personnel only

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

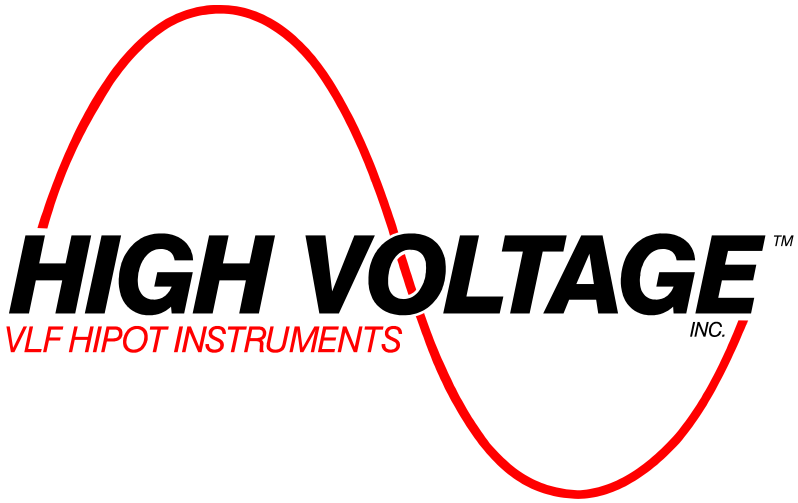

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Table of Contents

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 PTS Series in steps that familiarize the new operator with the entire scope of 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 PTS Series of Hipot/Megohmmeters are also discussed in the PTS Brochure available from High Voltage, Inc.

SECTION

1

General Information

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

PTS Series of Portable dc Test Sets manufactured by HIGH VOLTAGE, INC.

Features and Specifications

The PTS Series of dc hipot test sets provide continuously adjustable output voltages for the test and measurement of leakage current in high voltage insulation. The current meter on the PTS Series also has a Megohmmeter scale to allow for easy resistance measurements while the hipot is in operation.

Standard features of the PTS Series of Hipot/Megohmmeter Test Sets

- Continuously adjustable output voltage
- Fixed overload, factory set to 11 milliamperes of output current
- "Zero Start" and External Interlock provision
- Five- range current meter, low range 0 to 1.0 dc microamperes, readability to 20 nanoamperes
- Dual-range voltmeter
- Ferro-resonant input line regulator to minimize line generated output fluctuations to less than 1% for +/- 10% input voltage change (NOT FOR THE PTS-80, PTS-130, PTS-200, PTS-300, PTS-600)
- Internal Discharge solenoid with series resistor rated for 7.5 kilojoules(PTS-100,130), 5.0 kilojoules(PTS-75,80), and 2.5 kilojoules(PTS-37.5) The PTS-200 has 250 Meg internal bleeder resistor, PTS-300 has an 800 Meg internal bleeder, PTS-600 has 1600 Meg internal bleeder.
- One piece portable design for PTS-37.5, PTS-75, and PTS-80, two piece for PTS-130, PTS-200, PTS-300, and the PTS-600
- Transit protected meters prevent meter damage between test sites
- Ground hook provided for increased operator safety. Can be used to safely connect the unit and load to ground before and after test
- Shielded high voltage output cables included on all models except the PTS-300, and PTS-600. On these units, the HV connection is made at the top toroid/header of the HV cylinder.

PTS MODEL SPECIFICATIONS

See last page of parts list for Specifications

For particular unit

Operating Environment

Indoor/Outdoor-fair weather

Altitude: 100% of rating;Sea-level, up to 5000ft.(approx.1500M). The maximum output voltage is de-rated 5% above 5000 ft. altitude, 10% above 12,000 ft. (approx. 3600M), and 15% above 15,000 ft.(approx. 4500M)

Storage Temperature: -20°C to 70°C(-4°F to 158°F)

Operating Temperature: -10°C to 50°C(14°F to 122°F)

Maximum Relative Humidity: 80% up to 31°C(88°F), decreasing linearly to 50% at 50°C(122°F)

Mains supply fluctuation: +/-10% of rated voltage

Installation: Category II

Pollution: Degree 2

Safety Symbol Identification

Warning! Please refer to documentation before operation

Protective Earth Terminal

Caution: Hot Surface!

Warning: Hazardous Voltage

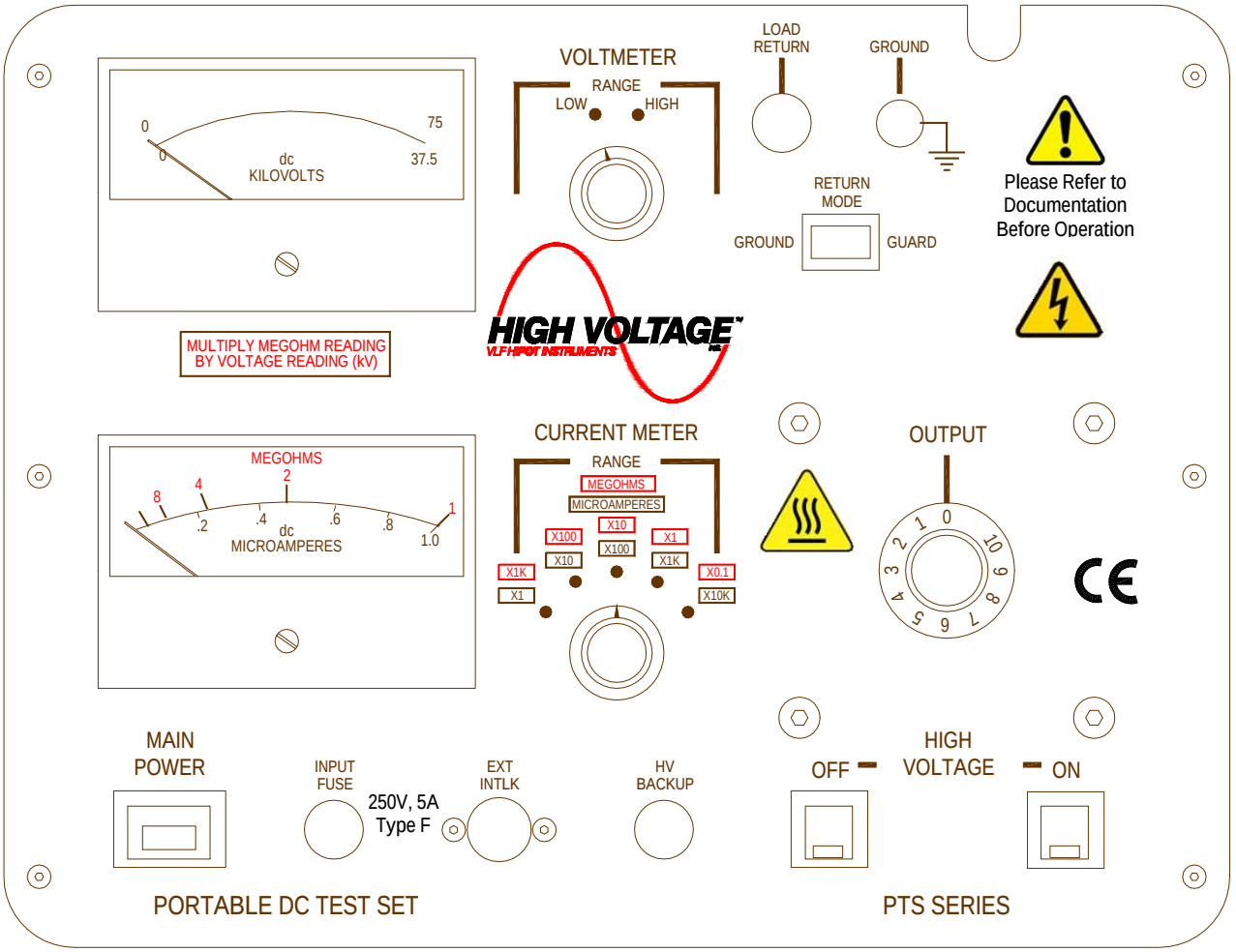

Figure 1 *PTS Series front panel controls.*

MAIN POWER

The MAIN POWER pushbutton switch provides the power to the control and power circuits. The neon lamp in the switch will light when the power is on and voltage is available through input line cord. The INPUT FUSE located electrically before the MAIN POWER switch provides line fault protection for the unit.

EXT.INTLK (EXTERNAL INTERLOCK)

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

HV BACKUP

The HV BACKUP circuit breaker protects the variable transformer output control brush. Its thermal characteristics allow for the short term overload of the variable transformer while still providing proper protection.

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 knob 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 AND RANGE SWITCH

The KILOVOLT METER and associated range switch allows for more 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.

CURRENT METER AND RANGE SWITCH

The CURRENT METER and associated range switch allows for more accurate output current readings. The five current range resistors are precision 1% tolerance and as such reduce the need for adjustments. See Current Meter Re-calibration in

Reading the Megohm Scale

The MEGOHM SCALE on the Current meter can be read once the output has reached a fixed steady level. To read the resistance, the MEGOHM scale must first be read then multiplied by the scale multiplier, then this product is multiplied by the test voltage, e.g. a reading of 2.5 MEGOHMS on the RED x1k multiplier at 60 kVdc = 2.5 x 1000 x 60 =150,000 Megohms.

Note

The resistance can be easily calculated at any voltage, as the test voltage (kilovolts) is always a direct multiplier in calculating the resistance of the test sample.

RETURN MODE (GUARD/GROUND)

The RETURN MODE rocker switch is used to choose the current measuring mode of the test set. The option of guarded or grounded return measurements has application under various testing conditions. A Grounded return will measure the load currents in the test sample plus any stray losses in the air, the unit, and test fixtures used. NOTE: The use of the guarded mode is restricted to the ability to isolate the load or test sample low side from ground. The guarded return mode does enable more accurate load current measurement as the stray currents in the surrounding items are not measured as load current. In the guarded return mode, the currents to ground are diverted around the metering circuit. Further discussion of the application of the GUARD/GROUND circuit is found in SECTION 2: OPERATING THE EQUIPMENT, Using the Guarded Return.

DWELL TIMER (OPTIONAL EXTERNAL BOX)

Operation of the Timer With the PTS Hipot

The Dwell Timer provided in our PTS Series of DC Hipots will function as an end of test alarm only. The timer will start upon initiation of the high voltage. The timing function will count up to the preset value. Upon reaching the dwell time, an alarm will sound indicating the need to return the Output Control to zero, and to turn OFF the high voltage as noted later in the Operating Manual.

To set the timer.

1) Press 'Mode'. When 'Timing Range' appears. Press '1' pushbutton. When desired range appears move to next step.

2) Press 'Mode'. When 'UP/Down Count' appears, press '1' to choose 'UP or 'DOWN'.

3) Press 'Mode''. When 'Output Mode' appears, press '1' until Mode 'A' appears.

This setup should be retained in the timers memory. To change the time in the future see step 1.

List of included components

- Ground stick with 20 ft. of ground wire
- Black test lead with black boot for ground connections
- Red test lead with red boot for return connections
- Ext. Intlk. jumper plug
- Attached 20 ft. RG8/U output cable.(PTS-75), 20 ft. RG58/U (PTS-37.5), 20 ft. shielded X-Ray type (PTS-130& 200)

SECTION 2

SETTING UP THE EQUIPMENT

The setup of this equipment has been minimized by careful consideration of the operator during design. The PTS Series' one-piece construction (two-piece for PTS-130,200) reduces the possibility of misplacing components while continuing to allow for convenient portability.

1. Select a location for the unit that will allow easy viewing of the meters at a safe distance from the test object.

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

3. Secure a Safety Ground test lead to the panel. The Ground post on the front panel should be used for that purpose. A black test lead with black boot has been provided for the ground connection. Place the Return Mode rocker switch in the Ground position.

4. Connect the ground stick to a solid earth ground.

5. Insert the EXT INTLK plug into the socket on the panel. The plug may also be wired to a normally open contact of a safety switch for added protection.

6. Connect the red return lead to the RETURN binding post. The information explaining the use of the GUARD/GROUND return circuit is found in the next part of this section, OPERATING THE EQUIPMENT, Using the Guarded Return.

7. Connect the interconnect cable between the control and high voltage tank (two piece units only).

8. For the PTS-300, the entire HV cylinder must be considered to be at high voltage potential and should be placed in a restricted access area with a minimum of 8ft. all around.

Operating the Equipment

This section provides step-by-step instruction on various test methods and an explanation on when to use and when not to use the guarded return mode. 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.

DC Insulation Testing

1. Ensure that all the steps listed in Setting up the Equipment have been accomplished. Take special note to ground the control panel to a solid earth ground using the supplied black test lead. Then connect the GROUND HOOK to the same earth ground.

2. Set the CURRENT RANGE to the x10k (high range).

3. Select the desired VOLTMETER RANGE for the test voltage level expected.

4. Prior to connecting the output cable to the test sample, ground the test sample using the GROUND HOOK supplied with the PTS unit.

5. Connect the red return lead to the low side of the test specimen. Select the GROUNDED RETURN mode if the low side of the test sample is grounded as in the case of a cable shield. For instruction in the use of the GUARDED RETURN mode see the next section Using the Guarded Return.

6. 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 dc/inch.*

Caution

When testing long lengths of cable, an external series resistor of sufficient size for the voltage test being performed, must be used. Failure of long cables may result in a standing wave that can damage the test set if an external resistor is not used.

Note: On the PTS-300, the output lead is a customer supplied test lead appropriate to the type of testing involved.

7. Connect the input power cord to a grounded power source (see specifications table). For 230V input, a line connector must be wired to the input cord, brown is HOT, blue is Neutral, green/yellow is ground. The input connector must be rated for 5A minimum. Both the 37.5 and 75kV units with the ferro-resonant input regulator, will correct for 10% change in input voltage and not affect the output voltage more than 1%. A generator (frequency stable) is an acceptable power source. If the distance to a power source is greater than the cord provided, a standard grounded extension cord can be used.

8. Depress the MAIN POWER switch to energize the control circuits.

CAUTION

POTENTIALLY LETHAL VOLTAGES MAY BE PRESENT

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

10. Increase the output by rotating the OUTPUT control slowly clockwise until the desired output voltage is reached. Raising the output too fast may trip the output overload relay, so caution should be used not to exceed the full scale rating of 10 mA output current.

11. Maintain the output voltage for the test time specified in your standard procedures. To see leakage current, rotate the CURRENT RANGE to a more sensitive scale. Note: During this time the resistance of the test sample may be measured by the following:

Reading the Megohm Scale

The MEGOHM SCALE on the Current meter can be read once the output has reached a fixed steady level. To read the resistance, the MEGOHM scale must first be read then multiplied by the scale multiplier, then this product is multiplied by the test voltage, e.g. a reading of 2.5 MEGOHMS on the RED x1k multiplier at 60 kV dc = 2.5 x 1000 x 60 =150,000 Megohms.

12. After the test is complete, rotate the OUTPUT control to zero, allowing the load to bleed down prior to depressing the HV OFF pushbutton.

13. If the test sample fails during the test, the internal overload relay will de-energize the high voltage, dropping the internal discharge solenoid and bringing the output to zero in less than 1 second.

14. Prior to removing the output cable from the load, observe that the output voltmeter is at zero, and then use the GROUND HOOK to positively ground the test sample.

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 power supply. This current might include corona, surface tracking, and any shunt resistance. The typical diagram for grounded return operation is shown in Figure 2 below.

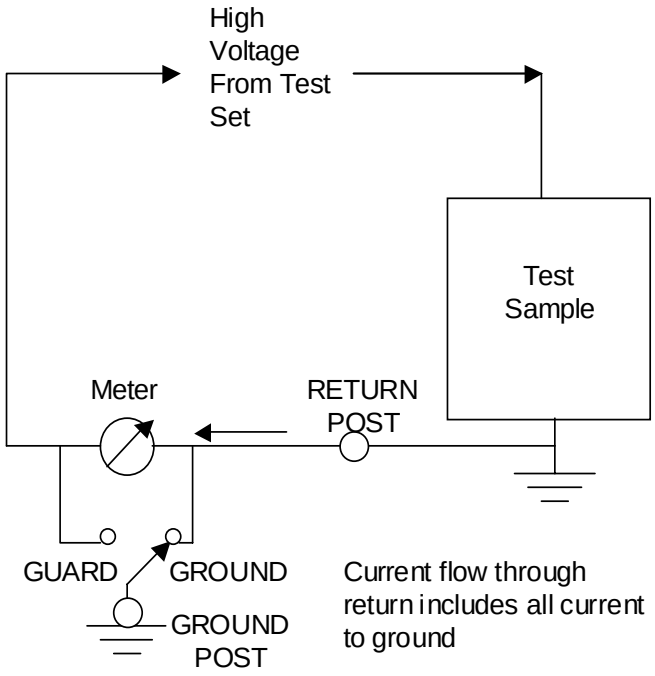

Figure 2, Grounded Return Diagram

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.

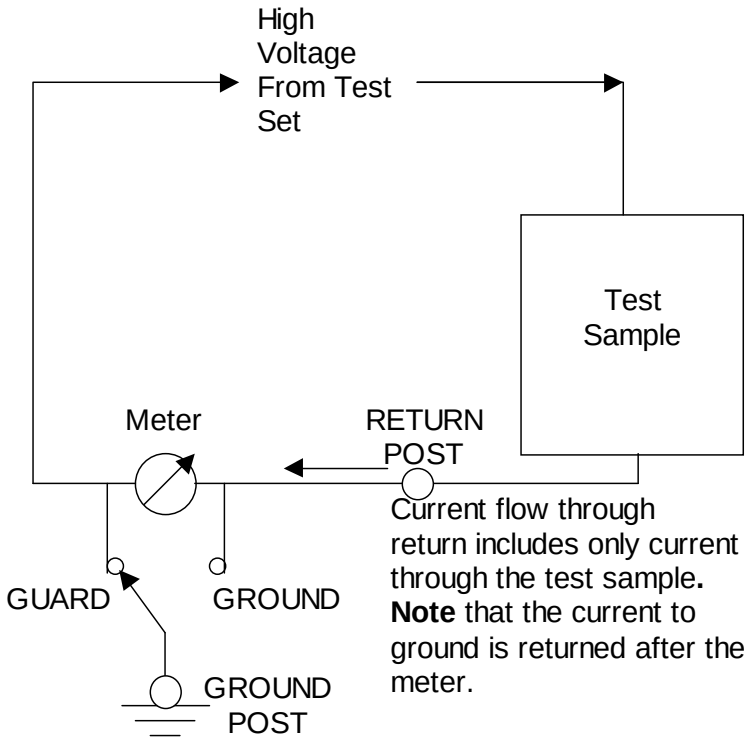

Figure 3, Guarded Return Diagram

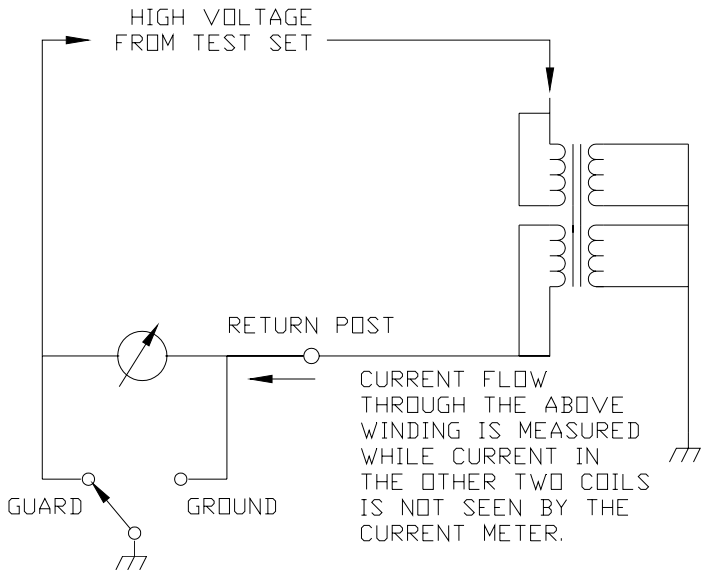

Figure 4, Using the Guarded Return to Test Windings

DC Testing of High Voltage Cables

When testing cables, either single or three phase, there are certain extra steps that must be observed to ensure safe operation.

1. Make sure that all insulators, stress cones, and pot heads 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.

5. The discharge solenoid in the oil filled high voltage tank will support a discharge of up to 5.0 kJ(PTS-75) or 2.5 kJ(PTS-37.5) of energy. But, the recommended turn off procedure at the completion of the test is return the OUTPUT control to zero and allow the output voltage to bleed to zero before turning off the high voltage.

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.

6. Always use the GROUND HOOK to ground the cable(s) prior to disconnecting the RED booted output cable.

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SECTION 3

PERFORMING SPECIAL OPERATIONS

The following section contains information on the care and upkeep of your new PTS SERIES Portable dc 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 PTS SERIES of hipots use precision metal film resistors for measurement and calibration of the voltmeter and the current meter. The use of these resistors in both the high voltage tank and the metering circuits has minimized circuit drift due to aging and temperature. But, a potentiometer (R4) on the voltmeter PCB can be used to correct for movement changes from the aging of the meter.

The current meter and associated amplifier circuit is designed for calibration on two range levels. The x1 and x10 ranges are calibrated using one adjustment, and the x100, x1k, x10k ranges are adjusted using another calibration point. If the current meter will not calibrate, the meter should be replaced once it has been determined the amplifier is not the cause.

The certification of meters on a yearly basis is recommended to ensure accurate test results. It is recommended to use a Certified Calibration House or return the unit to the High Voltage Inc. factory when calibration is needed.

Voltmeter Re-calibration

1. Locate the unit in a position that will allow easy reading of the meters.
2. Remove the panel screws and support the panel vertically to gain access to the calibration pot on the back of the voltmeter.
3. Zero the meter movement using the zero adjustment below the scale window.

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

5. Set the VOLTMETER RANGE to LOW position.

6. 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.

7. Place the RETURN MODE in GROUND position.

8. Raise the output to one half scale on the unit meter. Adjust R4 as required.

9. Check calibration at full scale and on the high range at both half and full scale. If the customer facility calibration certification requires more points of reference, follow those procedures instead of these.

Current Meter Re-calibration

1. The low range of 1 μA requires that the current meter be calibrated using an external voltage source and reference meter. Once the two lower ranges are calibrated, it may be desirable to continue with the external source since the setup is done.

2. To properly calibrate the current meter, a reference meter with an accuracy of 0.25% on the 1-microampere range will be required. A dc power supply with 0-30 volts dc, 10 milliamperes output will also be needed.

3. Locate the unit in a position that allows for easy viewing of the meters.

4. Remove the panel screws and support the panel vertically to gain access to the calibration pots on the back of the current meter.

5. Zero the meter movement using the zero adjustment below the scale window.

6. Locate J6 on the Power Protection PCB (PCB-003). Remove the white wire (pin 2) from the cable connector. A small screwdriver will be needed to release the terminal from the connector shell.

7. Connect the external 30 volt power supply to this white wire and the return post. Place the reference meter in series with the power supply. The reference meter must be able to read 1 microampere with accuracy.

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

9. Set the CURRENT METER RANGE to x1 position.

10. Raise the output of the external power supply to 1.25 volts. The current meter should deflect to one-half scale. To adjust the meter on this range, locate R14 potentiometer and, using a small blade

screwdriver, rotate the adjustment screw as needed. Check linearity at full-scale, make any further adjustments needed.

11. Return the external power supply to zero. Rotate the CURRENT METER RANGE to x10(10-microamperes). Change the reference meter range appropriately.

12. Raise the external power supply to 1.25 volts and check the x10 range the same as the x1 range. The 1% precision divider resistors should maintain the relationship between the x1 and x10 ranges, but if any variation exists the R14 calibration pot can be used to split any deviations to maintain the accuracy needed. Check the full-scale reading prior to moving on to the next range.

13. Next, to check the higher ranges, rotate the CURRENT METER RANGE switch to x100. Change the reference meter range as required.

14. Raise the external power supply output to approximately 12.5 volts while reading the reference meter. To adjust this range, rotate the screw adjustment on R4 to correct any inaccuracy. Then check the full-scale reading before moving on to the next range.

15. Do the rest of the higher ranges as necessary. The R4 adjustment is for these ranges and the 1% precision resistors should maintain the relationship between the ranges. Split any calibration deviation across all these ranges with R14.

Miscellaneous

Transport of PTS Series

All PTS Series test sets should be transported in the upright position. Two piece units should have the tank positioned with the output cable well on top. This will preclude structural damage to internal components from forces associated with general transport and handling of freight.

The only operator serviceable part on this test set is the input fuse. Should an input fuse fail, replace it with a 250Volt, 5Amp, Type F fuse.

Maintenance Cleaning

Cleaning of the PTS Series of hipots should be accomplished on a semi-annual basis. The control panel should be cleaned with a mild soap or detergent and dried with a clean cloth.

The output cable, return lead, and ground leads should be regularly inspected for fraying and excessive dirt buildup. If the return or ground test leads show signs of insulation damage or fraying, they should be replaced immediately.

Should the output cable arc along the insulation at the 'live' end of the cable, it should be cleaned using WD40 or LPS oils to cut the grease and carbon. The excess oil should then be removed with a clean, lint free cloth.

Oil Insulated High Voltage Tanks

The oil-filled tanks in all the PTS SERIES of hipots are field serviceable. The only requirement is that the tank must be oil filled under vacuum at re-assembly if left out of the oil for longer than 3 hours. The parts to service the tank are available from HIGH VOLTAGE, INC. at the address noted on the inside front cover of this manual.

The oil level in the tank should be .5 inches from the lid when the oil temperature is 20°C.

Packing the lid for transit

The design of the PTS series requires that the output cable, ground stick, return leads, and input line cord be packed into the lid compartment for transit. There is a sequence that works best. Please take time to read this and practice re-packing cables to avoid frustration each time you use the unit.

Note: The PTS-130 H V tank has a storage compartment on the side for the output cable and ground stick. All other cables and test leads store in the control lid.

1) Coil the output cable into the compartment starting with the end from the panel, keeping the coil to the outside edges. Avoid coiling the cable into the space required for the hinged panel.

2) Next, coil the remaining cables to place them into the center of the output cable coil.

3) Finally, neatly coil the ground stick braid into a 3 inch coil and place the ground stick snugly into the lid corner to corner with the coil of braid behind it. The ground stick will hold all the cables behind it.

4) Close the lid and turn the latch to secure it.

   This procedure can obviously be modified to your own experience if desired, but as a starting point we hope you find this helpful.

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.

WARRANTY

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High Voltage, Inc. warrants to the original purchaser of any new product, purchased from High Voltage, Inc., that the product is free from defects in material and workmanship under normal use and service for a period of one year from the date of shipment. The obligation of High Voltage, Inc. under this warranty is limited and High Voltage, Inc. has the exclusive option to replace, repair, or issue credit for any materials that prove to be defective. Purchaser must comply with the stated Warranty Claim Procedure of High Voltage, Inc. in order for the Warranty to be in force.

The Warranty is valid for normal use of the equipment. Any use outside of the stated standards of operation will void the warranty. In addition, any one of the following events will serve to void the Warranty: (a) any defects due to negligence, alteration, modification, accidental or intended physical abuse, faulty installation, and/or misuse: (b) attempted or actual dismantling, service or repair by any person or firm not officially authorized in writing by High Voltage, Inc: (c) defects caused due to handling or transit, either by carrier or customer.

This Warranty only covers those parts deemed defective by High Voltage, Inc. The liability of High Voltage, Inc. is limited to only the repair, replacement, or issuance of credit for those parts deemed defective within the scope of this Warranty. Any additional costs incurred by the purchaser for labor and/or materials incidental to the inspection, repair, replacement or issuance of credit for product or materials under Warranty is the sole responsibility of the purchaser. This Warranty applies solely to products manufactured by High Voltage, Inc. It does not apply to parts, accessories, or materials not manufactured by High Voltage, Inc. If Purchaser's claim relates to materials manufactured by a supplier to High Voltage, Inc., The High Voltage, Inc. reserves the right to disclaim responsibility and liability under this Warranty and may direct the Purchaser to deal directly with the other supplier of the defective part. High Voltage, Inc. may elect to assist the Purchaser in settling and such claim against another supplier without prejudicing its position as to its own liability.

WARRANTY CLAIM PROCEDURE

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

a) Purchaser must notify High Voltage, Inc. as soon as is reasonably possible of any alleged defect in material, workmanship, or operation of any product covered under this Warranty. Any notification must be received by High Voltage, Inc within twelve months after the shipment date of the equipment in question. Such notice must describe in detail the defect, any and all defective parts, and the alleged cause of the defect.

b) At the exclusive option of High Voltage, Inc., Purchaser may be directed to dismantle the equipment at the Purchaser's cost and expense and ship the equipment prepaid to High Voltage, Inc. Refer to the Returned Material section for instructions regarding the return of any material to High Voltage, Inc. If High Voltage, Inc. elects to inspect the equipment at the Purchaser's site, and possibly repair, replace, or ship to factory the defective equipment, Purchaser, at its own cost and expense, shall provide the facilities for such work as needed to inspect and evaluate and possibly repair/replace subject equipment. If inspection discloses that the defect is not one for which High Voltage, Inc. is liable, that is, is outside the stated terms of the Warranty provided by High Voltage, Inc., then the Purchaser agrees to reimburse High Voltage, Inc. for all expenses incurred.

c) Upon receipt of the defective material or product, or following access to the same, High Voltage, Inc. shall inspect and evaluate the material or product and determine the validity of the Purchaser's claim.

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

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OF IMPLIED ON THE PART OF HIGH VOLTAGE, INC., INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE, AND CONSEQUENTIAL DAMAGES ARISING FROM ANY BREACH THEREOF AND HIGH VOLTAGE, INC. NEITHER ASSUMES NOR AUTHORIZES AND OTHER PERSON, FIRM , OR CORPORATION TO ASSUME ANY LIABILITY OR OBLIGATION IN CONNECTION WITH THIS SALE ON ITS BEHALF AND PURCHASER ACKNOWLEDGES THAT NO REPRESENTATIONS EXCEPT THOSE MADE HEREIN HAVE BEEN MADE TO PURCHASER.

Parts List PTS-300 (120V 50/60 Hz)

SCHEMATIC # PTS-1236S Rev B

REF.	QTY	HVI #	DESCRIPTION
C1	1	03-070	CAPACITOR, ELECTRYLITIC, RADIAL LEADS, 1000µF, 50V
CAB	1	32-038	CABINET, PORTABLE TRANSIT ENCLOSURE. CHARCOAL GRAY, 14W x 11D x 14.5H.
	1	34-211	CABINET, INNER LID STORAGE, HVI # PTS-1032D
	1	06-111	CABINET, INNER LID STORAGE, HVI# PTS-1032D
CB1	1	06-103	CIRCUIT BREAKER, THERMAL, 10A , 250Vac , P&B # W58XB1A4A-10
D1	1	04-415	DIODE, FULL WAVE BRIDGE, 1.5A, 1kVdc, MOUSER # 583-RB157
D2,3	2	04-025	DIODE, 1N4007A
F1	1	06-043	FUSE, 15A, 250V, ABC-15
	1	06-015	FUSE HOLDER, LITTELFUSE # 342004A
J2	1		PART OF PANEL WIRING HARNESS, # PTS-1021W (MODIFIED)
K1	1	11-150	CONTACTOR, 3PDT , 15A, 120 Vac COIL, MAGNECRAFT # W389ACX-14
M1	1	13-032	METER, ANALOG, 100 µA MOVEMENT, SCALED 0-120/300 kVdc
M2	1	13-035	METER, ANALOG, 100 µA MOVEMENT, SCALED 0-1.00 µAdc/100-1 MEGOHMS
MOV1-5	5	06-210	METAL OXIDE VARISTOR, #V250LA10A
P1	1	22-205	CABLE, INPUT POWER, 16/3, 12ft.
P2	1	07-442	CONNECTOR, CABLE, 2 CIRCUIT, CINCH# P302CCT
P3	1	07-054	CONNECTOR, CABLE, 8 CIRCUIT, # 97-3108B-20-7S
	1	07-084	CONNECTOR, CLAMP, REDUCING, AN-3057-12-6
PCB-001	1	82-161	PRINTED CIRCUIT BOARD, VOLTMETER
PCB-002	1	82-116	PRINTED CIRCUIT BOARD, CURRENT METER
PCB-003	1	82-117	PRINTED CIRCUIT BOARD, POWER PROTECTION
S1	1	10-214	SWITCH, PB, MAINT'D, 250 Vac, 15A, DPST, NO , NEON LAMP, MICROSWITCH #AML32FBB4AD
	1	10-250	SWITCH, PB COVER, BLACK, MICROSWITCH # AML52-N10K
S2	1	10-222	SWITCH, PB, MOM., 125 Vac, 15A, SPDT, GRN LED, MICROSWITCH # AML22CBS2AA
S3	1	10-218	SWITCH, PB, MOM., 125 Vac, 15A, SPDT, RED LED, MICROSWITCH # AML22CBC2AA
	2	10-252	SWITCH, PB COVER, BLACK, MICROSWITCH # AML52-C10K
S4	1	10-106	SWITCH, SNAP ACTION, SHORT ARM, OMRON #A-20GV22-B7-K
S5	1		PART OF PANEL WIRING HARNESS # PTS-1021W
S6	1		PART OF PANEL WIRING HARNESS # PTS-1021W
S7	1	10-402	SWITCH, ROCKER, DPDT, CARLINGSWITCH 62115929-0-0-V
SG1	1	06-205	SPARK GAP, 90 V, C.P. CLARE # CG90L
T1	1	25-114	TRANSFORMER, VARIABLE, SUPERIOR TYPE 116

HV TANK	1		PTS-300 HIGH VOLTAGE TANK, SCHEMATIC # PTS-1238S, PTS-1226A ASSEMBLY
CR1-4	8	04-220	DIODE, HIGH VOLTAGE X-RAY STRING, 168 kVdc, 220 mA, EDAL # B1553
C1-8	16	03-235	CAPACITOR, HIGH VOLTAGE, .006Uf, 35kVdc, MOTOR CAPACITOR, # HR602-35M
J1	1	07-022	CONNECTOR, CIRCULAR, 8 PIN, AMPHENOL # 97-3102E-20-7P
MOV1,2	2	06-210	METAL OXIDE VARISTOR, #V250LA10A
R1-8	8	01-415	RESISTOR, METAL FILM, 11.7W, 100M, 1%, EBG # SSX52-60M
R9-13	5	01-452	RESISTOR, METAL FILM, 15.5W, 150M, 1%, EBG # SSX124-150M
T1,2	2	T214	TRANSFORMER, HIGH VOLTAGE, HVI # 214
X1-4	4	09-132	LUNDEY BUSHINGS, ¼-20 FEED- THROUGH, LUNDEY # 4780-25
	1	40-621	CYLINDER, FRP, HVI # CYL-0004D
	1	34-0370	BASE TRI-POD, HVI # TNK-0087A
	1	34-036	TOP PLATE, HVI # TNK-0071D
PCB-001		**82-161**	**VOLT METER PCB**
C1	1	03-065	CAPACITOR, ELECTROLYTIC, RADIAL LEADS, 470µF, 50 Vdc, MOUSER # 140-XRL50V470
D1	1	04-025	DIODE, 1N4007A
J1	1	07-134	CONNECTOR, HEADER, 7 PIN, .1” SPACING, MOLEX # 22-23-2071
PCB	1	14-001	PRINTED CIRCUIT BOARD, HVI # PCB-001
R1	1	01-152	RESISTOR, METAL FILM, 0.25W, 165K, 1%
R2	1	01-156	RESISTOR, METAL FILM, 0.25W, 249K, 1%
R3	1	01-080	RESISTOR, METAL FILM, 0.25W, 2.49K, 1%
R4	1	02-012	RESISTOR, POTENTIOMETER, 0.25W, 1K, MOUSER # 569-25PR-1K
R5,6	2	01-310	RESISTOR, CARBON FILM, 1W, 1K, 5%
RY3	1	11-110	RELAY, PCB MOUNT, SPDT, 24 Vdc COIL, P&B # T70L5D131-24
PCB-002		**82-116**	**CURRENT METER PCB REV A**
C1-3,5	4	03-092	CAPACITOR, CERAMIC DISC, 0.1µF, 50Vdc, MOUSER # 140-CD50Q9-104Z
C4,6	2	03-045	CAPACITOR, ELECTROLYTIC, RADIAL LEADS, 4.7µF, 50Vdc, MOUSER # 140-NPRL50V4.7
C7	1	03-100	CAPACITOR, METALLIZED POLYPROPELENE, 0.1 µF, 250 Vdc, MOUSER #1429-2104
D1,2	2	04-025	DIODE, 1N4007A
D3,4	2	04-010	DIODE, 1N4148
J1	1	07-140	CONNECTOR, HEADER, 14 PIN, .1” SPACING, MOLEX # 22-23-2141
PCB	1	14-002	PRINTED CIRCUIT BOARD, HVI # PCB-002
R1,9,13	3	01-168	RESISTOR, METAL FILM, 0.25W, 1M, 1%
R2	1	01-080	RESISTOR, METAL FILM, 0.25W, 2.49K, 1%
R3	1	01-090	RESISTOR, METAL FILM, 0.25W, 4.99K, 1%
R4	1	02-114	RESISTOR, POTENTIOMETER, 0. 5W, 50K, MOUSER #72-T93YB-50K
R5,12	2	01-170	RESISTOR, METAL FILM, 0.25W, 1.5M, 1%
R6	1	01-150	RESISTOR, METAL FILM, 0.25W, 100K, 1%
R7,8	2	01-264	RESISTOR, METAL FILM, 0.5W, 4.64K, 1%
R10	1	01-126	RESISTOR, METAL FILM, 0.25W, 25.5K, 1%
R11	1	01-160	RESISTOR, METAL FILM, 0.25W, 280K, 1%
R14	1	02-106	RESISTOR, POTENTIOMETER, 0. 5W, 5K, MOUSER #72-T93YB-5K
RY2,4	2	11-110	RELAY, PCB MOUNT, SPDT, 24 Vdc COIL, P&B # T70L5D131-24
U1	1	05-235	AMPLIFIER, CMOS, CA3140E
VR1	1	05-345	VOLTAGE REGULATOR, 15V, 0.5 A, MOUSER # 511-L78M15CV
PCB-003		**82-117**	**POWER PROTECTION PCB**
C1,2	2	03-060	CAPACITOR, ELECTROLYTIC, RADIAL LEADS, 100µF, 50Vdc, MOUSER # 140-XRL50V100
C3	1	03-150	CAPACITOR, METALLIZED POLYPROPELENE, 0.22µF, 630Vdc, CDE #DME6P22K
C4	1	03-100	CAPACITOR, METALLIZED POLYPROPELENE, 0.1µF, 250Vdc, MOUSER # 1429-2104
D1,2	2	04-415	DIODE, FULL WAVE BRIDGE, 1.5A, 1kVdc, MOUSER # 583-RB157
D3	1	04-025	DIODE, 1N4007A
J1	1	07-138	CONNECTOR, HEADER, 9 PIN, .156” SPACING, MOLEX # 26-60-1090
J2	1	07-452	CONNECTOR, HEADER, 0.25 QUICK-DISC, 2 PIN, KEYSTONE # 7832
J3	1	07-454	CONNECTOR, HEADER, 0.25 QUICK-DISC, 5 PIN, KEYSTONE # 7835

J4	1	07-456	CONNECTOR, HEADER, 0.25 QUICK-DISC, 6 PIN, KEYSTONE # 7836
J5	1	07-132	CONNECTOR, HEADER, 6 PIN, .156” SPACING, MOLEX # 26-60-1060
J6	1	07-130	CONNECTOR, HEADER, 5 PIN, .1” SPACING, MOLEX # 22-23-2051
MOV1	1	06-207	METAL OXIDE VARISTOR, # V130LA10A
M0V2-4	3	06-210	METAL OXIDE VARISTOR, # V250LA20A
NE1	2	15-114	NEON LAMP, # NE2
P1	1	07-122	CONNECTOR, CABLE, DISPLACEMENT, 9 PIN, .156” SPACING, MOLEX # 09-06-2095
PCB	1	14-003	PRINTED CIRCUIT BOARD, HVI # PCB-003
R1	1	01-270	RESISTOR, METAL FILM, 0.5W, 10K, 1%
RY1	1	11-140	RELAY, PCB MOUNT, SPDT, 48 Vdc COIL, P&B # T70L5D131-48
SG1	1	06-205	SPARK GAP, 90 V, C.P. CLARE # CG90L
T1	1	25-315	TRANSFORMER, PC BOARD MOUNT, STEP-DOWN, 115/18/18 @ 350 Ma, 50/60 Hz
PTS-1021W			WIRE HARNESS, PANEL TO PCB-003
J1	1	07-124	CONNECTOR, CABLE, 14 PIN, .1” SPACING, MOLEX # 22-01-2147
	14	07-104	CONNECTOR PINS, .1” SPACING, MOLEX # 08-50-0114
J2	1	07-118	CONNECTOR, CABLE, 7 PIN, .1” SPACING, MOLEX # 22-01-2077
	7	07-104	CONNECTOR PINS, .1” SPACING, MOLEX # 08-50-0114
J3	1	07-440	CONNECTOR, BULKHEAD, 2 SOCKET, CINCH #S302AB
J4	1	07-116	CONNECTOR, CABLE, DISPLACEMENT, 6 PIN, .156” SPACING, MOLEX # 09-06-2065
J5	1	07-114	CONNECTOR, CABLE, 5 PIN, .1” SPACING, MOLEX # 22-01-2057
	5	07-104	CONNECTOR PINS, .1” SPACING, MOLEX # 08-50-0114
S1	1	10-514	SWITCH, ROTARY, 6 POL, 2 POS, MOUSER # 10YX062
S2	1	10-512	SWITCH, ROTARY, 4 POL, 5 POS, MOUSER # 10WR045
MISC.			
	2	23-101	KNOB, SKIRTED, POINTER , ALCO # PKD-70B-1/4
	1	23-105	KNOB, SKIRTED, DIAL, MOUSER # 45KN021
	1	08-854	TERMINAL, BINDING POST, NICKEL PLTD BRASS, CONCORD # 01-1008-1-0210
	1	08-859	TERMINAL, BINDING POST, BLACK, HH SMITH # 799-103
	1		HOLE PLUG, 0.375 IN.
	4		SCREW, SOCKET HEAD, STAINLESS, ¼-20 X ¾ IN. LONG
	6		SCREW, SOCKET HEAD, STAINLESS, 6-32 X 1/2 IN. LONG
	1	34-315	BRACKET, ZERO START, HV # BKT-1001D
	2		TEST LEAD, GROUND, BLACK, 20 FT. WITH CLIP AND BOOT
	1		TEST LEAD, RETURN, RED, 20 FT. WITH CLIP AND BOOT
	1		TERMINAL BLOCK, 5 POS,, CINCH # 5-141
	20 ft.		CABLE, COMPOSITE, 2-16 AWG, 6 -18 AWG, BELDEN # 9405
GND STK	1	88-150	GROUND HOOK ASSEMBLY, HV # GST-1001D
	1	34-205	U-WRAP, HV # PTS-1016D
	1		SCHEMATIC, WIRING, HV # PTS-1236S REV B
	1	34-100	PANEL, CONTROL, HV # PTS-1003D

SPECIFICATIONS

	PTS-300 Part No. PTS-1236S (120V)
Input	120 V, 50/60 Hz, 15 amps
Output	0-300kVdc, 5 mA
Polarity	Negative output, Positive ground.
Duty	Continuous, capacitive charging
Ripple	N/A capacitive load
Regulation	N/A (no ferro-resonant regulator)
Kilovoltmeter	0-120/300 kVdc, +/-2% FS Accuracy
Current Meter (Megohm Scale)	0-1.0 dc microamperes, w/x1,x10, x100, x1k, x10k, +/- 2% FS 100-1 Megohms, w/ x.1, x1, x10, x100, x1k
Control Case HV Tank	14w x 11d x 14 h 36 'X' base x 43.5 h (15" FRP Cylinder)
Control Weight Tank Weight	34 lbs. (15kg) 250 lbs.(68kg)

Table 1 *PTS-300 Specifications.*

Parts List PTS-300F (230V 50/60 Hz)

SCHEMATIC # PTS-1237S Rev 0

REF.	QTY	HVI #	DESCRIPTION
C1	1	03-070	CAPACITOR, ELECTRYLITIC, RADIAL LEADS, 1000µF, 50V
CAB	1	32-038	CABINET, PORTABLE TRANSIT ENCLOSURE. CHARCOAL GRAY, 14W x 11D x 14.5H.
	1	34-211	CABINET, INNER LID STORAGE, HVI # PTS-1032D
	1	06-111	CABINET, INNER LID STORAGE, HVI# PTS-1032D
CB1	1	06-103	CIRCUIT BREAKER, THERMAL, 10A , 250Vac , P&B # W58XB1A4A-10
D1	1	04-415	DIODE, FULL WAVE BRIDGE, 1.5A, 1kVdc, MOUSER # 583-RB157
D2,3	2	04-025	DIODE, 1N4007A
F1	1	06-038	FUSE, 10A, 250V, AGC-10
	1	06-015	FUSE HOLDER, LITTELFUSE # 342004A
J2	1		PART OF PANEL WIRING HARNESS, # PTS-1021W (MODIFIED)
K1	1	11-150	CONTACTOR, 3PDT , 15A, 120 Vac COIL, MAGNECRAFT # W389ACX-14
M1	1	13-032	METER, ANALOG, 100 µA MOVEMENT, SCALED 0-120/300 kVdc
M2	1	13-035	METER, ANALOG, 100 µA MOVEMENT, SCALED 0-1.00 µAdc/100-1 MEGOHMS
MOV1-3	3	06-210	METAL OXIDE VARISTOR, #V250LA10A
P1	1	22-205	CABLE, INPUT POWER, 16/3, 12ft.
P2	1	07-442	CONNECTOR, CABLE, 2 CIRCUIT, CINCH# P302CCT
P3	1	07-054	CONNECTOR, CABLE, 8 CIRCUIT, # 97-3108B-20-7S
	1	07-084	CONNECTOR, CLAMP, REDUCING, AN-3057-12-6
PCB-001	1	82-161	PRINTED CIRCUIT BOARD, VOLTMETER
PCB-002	1	82-116	PRINTED CIRCUIT BOARD, CURRENT METER
PCB-003	1	82-117	PRINTED CIRCUIT BOARD, POWER PROTECTION
S1	1	10-214	SWITCH, PB, MAINT'D, 250 Vac, 15A, DPST, NO , NEON LAMP, MICROSWITCH #AML32FBB4AD
	1	10-250	SWITCH, PB COVER, BLACK, MICROSWITCH # AML52-N10K
S2	1	10-222	SWITCH, PB, MOM., 125 Vac, 15A, SPDT, GRN LED, MICROSWITCH # AML22CBS2AA
S3	1	10-218	SWITCH, PB, MOM., 125 Vac, 15A, SPDT, RED LED, MICROSWITCH # AML22CBC2AA
	2	10-252	SWITCH, PB COVER, BLACK, MICROSWITCH # AML52-C10K
S4	1	10-106	SWITCH, SNAP ACTION, SHORT ARM, OMRON #A-20GV22-B7-K
S5	1		PART OF PANEL WIRING HARNESS # PTS-1021W
S6	1		PART OF PANEL WIRING HARNESS # PTS-1021W
S7	1	10-402	SWITCH, ROCKER, DPDT, CARLINGSWITCH 62115929-0-0-V
SG1	1	06-205	SPARK GAP, 90 V, C.P. CLARE # CG90L
T1	1	25-114	TRANSFORMER, VARIABLE, SUPERIOR TYPE 116
T2	1	T139	TRANSFORMER, AUTO STEP-DOWN, 230/115, 1.5kVA, HVI # 139

HV TANK	1		PTS-300 HIGH VOLTAGE TANK, SCHEMATIC # PTS-1238S, PTS-1226A ASSEMBLY
CR1-4	8	04-220	DIODE, HIGH VOLTAGE X-RAY STRING, 168 kVdc, 220 mA, EDAL # B1553
C1-8	16	03-235	CAPACITOR, HIGH VOLTAGE, .006Uf, 35kVdc, MOTOR CAPACITOR, # HR602-35M
J1	1	07-022	CONNECTOR, CIRCULAR, 8 PIN, AMPHENOL # 97-3102E-20-7P
R1-8	8	01-415	RESISTOR, METAL FILM, 11.7W, 100M, 1%, EBG # SSX52-60M
R9-13	5	01-452	RESISTOR, METAL FILM, 15.5W, 150M, 1%, EBG # SSX124-150M
T1,2	2	T214	TRANSFORMER, HIGH VOLTAGE, HVI # 182-B
X1-4	4	09-132	LUNDEY BUSHINGS, ¼-20 FEED- THROUGH, LUNDEY # 4780-25
	1	40-621	CYLINDER, FRP, HVI # CYL-0004D
	1	34-0370	BASE TRI-POD, HVI # TNK-0087A
	1	34-036	TOP PLATE, HVI # TNK-0071D
PCB-001		**82-161**	**VOLT METER PCB**
C1	1	03-065	CAPACITOR, ELECTROLYTIC, RADIAL LEADS, 470µF, 50 Vdc, MOUSER # 140-XRL50V470
D1	1	04-025	DIODE, 1N4007A
J1	1	07-134	CONNECTOR, HEADER, 7 PIN, .1” SPACING, MOLEX # 22-23-2071
PCB	1	14-001	PRINTED CIRCUIT BOARD, HVI # PCB-001
R1	1	01-152	RESISTOR, METAL FILM, 0.25W, 165K, 1%
R2	1	01-156	RESISTOR, METAL FILM, 0.25W, 249K, 1%
R3	1	01-080	RESISTOR, METAL FILM, 0.25W, 2.49K, 1%
R4	1	02-012	RESISTOR, POTENTIOMETER, 0.25W, 1K, MOUSER # 569-25PR-1K
R5,6	2	01-310	RESISTOR, CARBON FILM, 1W, 1K, 5%
RY3	1	11-110	RELAY, PCB MOUNT, SPDT, 24 Vdc COIL, P&B # T70L5D131-24
PCB-002		**82-116**	**CURRENT METER PCB REV A**
C1-3,5	4	03-092	CAPACITOR, CERAMIC DISC, 0.1µF, 50Vdc, MOUSER # 140-CD50Q9-104Z
C4,6	2	03-045	CAPACITOR, ELECTROLYTIC, RADIAL LEADS, 4.7µF, 50Vdc, MOUSER # 140-NPRL50V4.7
C7	1	03-100	CAPACITOR, METALLIZED POLYPROPELENE, 0.1 µF, 250 Vdc, MOUSER #1429-2104
D1,2	2	04-025	DIODE, 1N4007A
D3,4	2	04-010	DIODE, 1N4148
J1	1	07-140	CONNECTOR, HEADER, 14 PIN, .1” SPACING, MOLEX # 22-23-2141
PCB	1	14-002	PRINTED CIRCUIT BOARD, HVI # PCB-002
R1,9,13	3	01-168	RESISTOR, METAL FILM, 0.25W, 1M, 1%
R2	1	01-080	RESISTOR, METAL FILM, 0.25W, 2.49K, 1%
R3	1	01-090	RESISTOR, METAL FILM, 0.25W, 4.99K, 1%
R4	1	02-114	RESISTOR, POTENTIOMETER, 0. 5W, 50K, MOUSER #72-T93YB-50K
R5,12	2	01-170	RESISTOR, METAL FILM, 0.25W, 1.5M, 1%
R6	1	01-150	RESISTOR, METAL FILM, 0.25W, 100K, 1%
R7,8	2	01-264	RESISTOR, METAL FILM, 0.5W, 4.64K, 1%
R10	1	01-126	RESISTOR, METAL FILM, 0.25W, 25.5K, 1%
R11	1	01-160	RESISTOR, METAL FILM, 0.25W, 280K, 1%
R14	1	02-106	RESISTOR, POTENTIOMETER, 0. 5W, 5K, MOUSER #72-T93YB-5K
RY2,4	2	11-110	RELAY, PCB MOUNT, SPDT, 24 Vdc COIL, P&B # T70L5D131-24
U1	1	05-235	AMPLIFIER, CMOS, CA3140E
VR1	1	05-345	VOLTAGE REGULATOR, 15V, 0.5 A, MOUSER # 511-L78M15CV
PCB-003		**82-117**	**POWER PROTECTION PCB**
C1,2	2	03-060	CAPACITOR, ELECTROLYTIC, RADIAL LEADS, 100µF, 50Vdc, MOUSER # 140-XRL50V100
C3	1	03-150	CAPACITOR, METALLIZED POLYPROPELENE, 0.22µF, 630Vdc, CDE #DME6P22K
C4	1	03-100	CAPACITOR, METALLIZED POLYPROPELENE, 0.1µF, 250Vdc, MOUSER # 1429-2104
D1,2	2	04-415	DIODE, FULL WAVE BRIDGE, 1.5A, 1kVdc, MOUSER # 583-RB157
D3	1	04-025	DIODE, 1N4007A
J1	1	07-138	CONNECTOR, HEADER, 9 PIN, .156” SPACING, MOLEX # 26-60-1090
J2	1	07-452	CONNECTOR, HEADER, 0.25 QUICK-DISC, 2 PIN, KEYSTONE # 7832
J3	1	07-454	CONNECTOR, HEADER, 0.25 QUICK-DISC, 5 PIN, KEYSTONE # 7835
J4	1	07-456	CONNECTOR, HEADER, 0.25 QUICK-DISC, 6 PIN, KEYSTONE # 7836

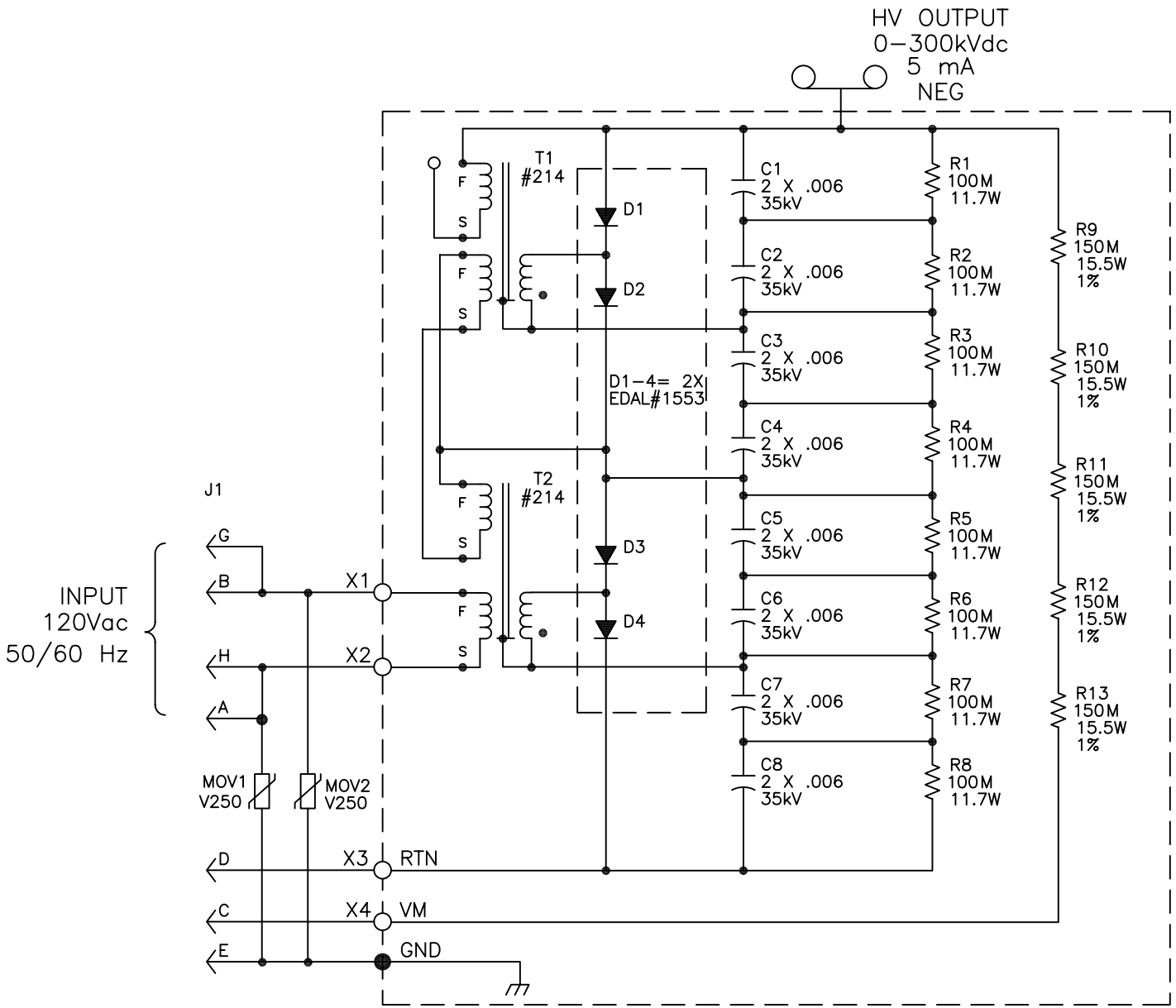
J5	1	07-132	CONNECTOR, HEADER, 6 PIN, .156” SPACING, MOLEX # 26-60-1060
J6	1	07-130	CONNECTOR, HEADER, 5 PIN, .1” SPACING, MOLEX # 22-23-2051
MOV1	1	06-207	METAL OXIDE VARISTOR, # V130LA10A
M0V2-4	3	06-210	METAL OXIDE VARISTOR, # V250LA20A
NE1	2	15-114	NEON LAMP, # NE2
P1	1	07-122	CONNECTOR, CABLE, DISPLACEMENT, 9 PIN, .156” SPACING, MOLEX # 09-06-2095
PCB	1	14-003	PRINTED CIRCUIT BOARD, HVI # PCB-003
R1	1	01-270	RESISTOR, METAL FILM, 0.5W, 10K, 1%
RY1	1	11-140	RELAY, PCB MOUNT, SPDT, 48 Vdc COIL, P&B # T70L5D131-48
SG1	1	06-205	SPARK GAP, 90 V, C.P. CLARE # CG90L
T1	1	25-315	TRANSFORMER, PC BOARD MOUNT, STEP-DOWN, 115/18/18 @ 350 Ma, 50/60 Hz
PTS-1021W			WIRE HARNESS, PANEL TO PCB-003
J1	1	07-124	CONNECTOR, CABLE, 14 PIN, .1” SPACING, MOLEX # 22-01-2147
	14	07-104	CONNECTOR PINS, .1” SPACING, MOLEX # 08-50-0114
J2	1	07-118	CONNECTOR, CABLE, 7 PIN, .1” SPACING, MOLEX # 22-01-2077
	7	07-104	CONNECTOR PINS, .1” SPACING, MOLEX # 08-50-0114
J3	1	07-440	CONNECTOR, BULKHEAD, 2 SOCKET, CINCH #S302AB
J4	1	07-116	CONNECTOR, CABLE, DISPLACEMENT, 6 PIN, .156” SPACING, MOLEX # 09-06-2065
J5	1	07-114	CONNECTOR, CABLE, 5 PIN, .1” SPACING, MOLEX # 22-01-2057
	5	07-104	CONNECTOR PINS, .1” SPACING, MOLEX # 08-50-0114
S1	1	10-514	SWITCH, ROTARY, 6 POL, 2 POS, MOUSER # 10YX062
S2	1	10-512	SWITCH, ROTARY, 4 POL, 5 POS, MOUSER # 10WR045
MISC.			
	2	23-101	KNOB, SKIRTED, POINTER , ALCO # PKD-70B-1/4
	1	23-105	KNOB, SKIRTED, DIAL, MOUSER # 45KN021
	1	08-854	TERMINAL, BINDING POST, NICKEL PLTD BRASS, CONCORD # 01-1008-1-0210
	1	08-859	TERMINAL, BINDING POST, BLACK, HH SMITH # 799-103
	1		HOLE PLUG, 0.375 IN.
	4		SCREW, SOCKET HEAD, STAINLESS, ¼-20 X ¾ IN. LONG
	6		SCREW, SOCKET HEAD, STAINLESS, 6-32 X 1/2 IN. LONG
	1	34-315	BRACKET, ZERO START, HV # BKT-1001D
	2		TEST LEAD, GROUND, BLACK, 20 FT. WITH CLIP AND BOOT
	1		TEST LEAD, RETURN, RED, 20 FT. WITH CLIP AND BOOT
	1		TERMINAL BLOCK, 5 POS,, CINCH # 5-141
	20 ft.		CABLE, COMPOSITE, 2-16 AWG, 6 -18 AWG, BELDEN # 9405
GND STK	1	88-150	GROUND HOOK ASSEMBLY, HV # GST-1001D
	1	34-205	U-WRAP, HV # PTS-1016D
	1		SCHEMATIC, WIRING, HV # PTS-1237S REV 0
	1	34-100	PANEL, CONTROL, HV # PTS-1003D

SPECIFICATIONS

	PTS-300 Part No. PTS-1236S (120V)
Input	120 V, 50/60 Hz, 15 amps
Output	0-300kVdc, 5 mA
Polarity	Negative output, Positive ground.
Duty	Continuous, capacitive charging
Ripple	N/A capacitive load
Regulation	N/A (no ferro-resonant regulator)
Kilovoltmeter	0-120/300 kVdc, +/-2% FS Accuracy
Current Meter (Megohm Scale)	0-1.0 dc microamperes, w/x1,x10, x100, x1k, x10k, +/- 2% FS 100-1 Megohms, w/ x.1, x1, x10, x100, x1k
Control Case HV Tank	14w x 11d x 14 h 36 'X' base x 43.5 h (15" FRP Cylinder)
Control Weight Tank Weight	34 lbs. (15kg) 250 lbs.(68kg)

Table 1 *PTS-300 Specifications.*

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



QTY	DESCRIPTION	PART NO.	MAT'L OR NOTE	ITEM
	SCHEMATIC PTS-300 HV TANK			

MAT'L	–		PTS-300	
	–	UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES DO NOT SCALE DWG TOLERANCES	DWG NO. PST-1238S	REV. A
FINISH	–		SCALE NA	SHT 1 OF 1

DRAWN	JHW	8/02	
CHECKED	JHW	8/02	
APPROVED	JHW	8/02	

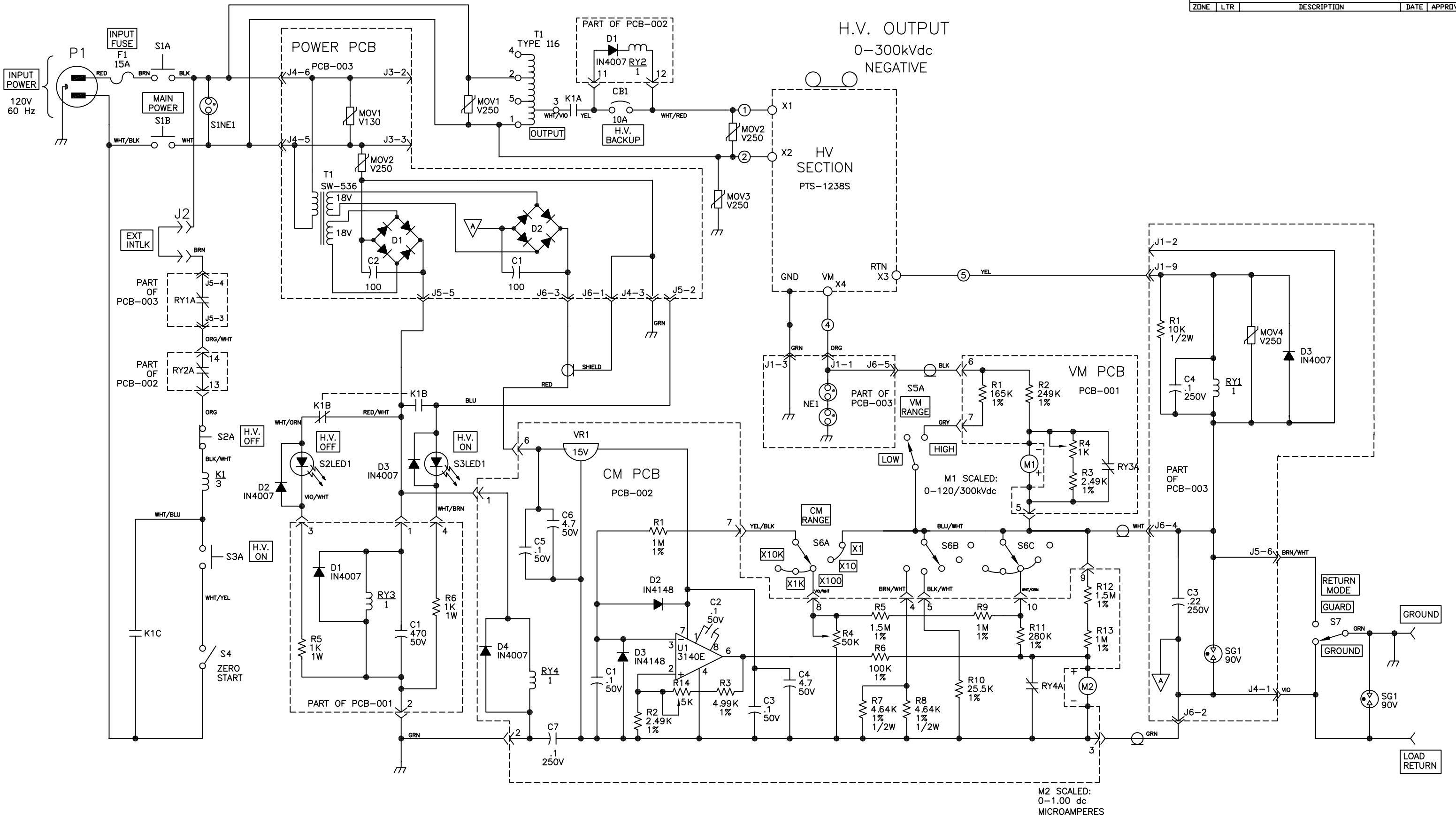
FRACTIONS ±1/64 | DECIMALS ±.010 | ANGLES 30'

HIGH VOLTAGE

pts1238s0a

09/26/06

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



NOTES; 1) VM CAL POT IS R4 ON PCB–001
2) CM CAL, X1 and X10 IS R14, X100,X1K,X10K IS R4 ON PCB–002

QTY	DESCRIPTION	PART NO.	MAT'L OR NOTE	ITEM
	SCHEMATIC PORTABLE DC TEST SET			

MAT'L	NEXT ASSY		MODEL NO. PTS-300		
–	UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES DO NOT SCALE DWG TOLERANCES		DRAWN JHW	DATE 8/02	DWG NO. PTS-1236S REV. B
FINISH			CHECKED JHW	8/02	
–	FRACTIONS ±1/64	DECIMALS ±.010	ANGLES 30'	APPROVED JHW	8/02	SCALE NA	SHT 1 OF 1

pts1236sRb
08/14/06

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

H.V. OUTPUT
0–300kVdc
NEGATIVE

INPUT POWER
230V
50/60 Hz
P1
INPUT FUSE
F1
10A
T2
#139
S1A
MAIN POWER
S1B
S1NE1
RED
BRN
BLK
WHT/BLK
WHT

POWER PCB
PCB–003
J4–6
J4–5
J3–2
J3–3
MOV1
V130
MOV2
V250

T1
SW–536
18V
18V
D1
C2
100
D2
C1
100
J5–5
J6–3
J6–1
J4–3
J5–2
GRN

T1
TYPE 116
4
2
5
3
1
MOV1
V250
K1A
WHT/VIO
YEL
OUTPUT

PART OF PCB–002
D1
IN4007
RY2
11
1
12
CB1
10A
H.V.
BACKUP
WHT/RED

P3
G
B
H
A
MOV2
V250
MOV3
V250
HV
SECTION
PTS–1238S
GND
E
VM
C
RTN
D
YEL
MOV5
V250
MOV4
V250

J2
EXT
INTLK
BRN
PART
OF
PCB–003
RY1A
J5–4
J5–3
ORG/WHT
PART
OF
PCB–002
RY2A
14
13
ORG
S2A
BLK/WHT
K1
3
WHT/BLU
S3A
H.V.
ON
WHT/YEL
K1C
S4
ZERO
START

K1B
RED/WHT
BLU
SHIELD
RED
H.V.
OFF
WHT/GRN
S2LED1
D2
IN4007
VIO/WHT
H.V.
ON
D3
IN4007
S3LED1
WHT/BRN
D1
IN4007
RY3
1
C1
470
50V
R5
1K
1W
R6
1K
1W
PART OF PCB–001
2
GRN
D4
IN4007
RY4
1
C7
.1
250V

VR1
15V
CM PCB
PCB–002
6
1
C6
4.7
50V
C5
.1
50V
R1
1M
1%
D2
IN4148
C2
.1
50V
D3
IN4148
U1
3140E
C1
.1
50V
R14
5K
R3
4.99K
1%
C3
.1
50V
C4
4.7
50V
R2
2.49K
1%

J1–3
J1–1
J6–5
NE1
PART OF
PCB–003
S5A
VM
RANGE
BLK
6
GRY
7
LOW
HIGH
R1
165K
1%
R2
249K
1%
VM PCB
PCB–001
R4
1K
R3
2.49K
1%
RY3A
M1
M1 SCALED:
0–120/300kVdc

CM
RANGE
YEL/BLK
S6A
X10K
X1K
X1
X10
X100
S6B
S6C
BLU/WHT
WHT
J6–4
BRN/WHT
BLK/WHT
WHT/GRN
8
4
5
10
9
R5
1.5M
1%
R4
50K
R6
100K
1%
R9
1M
1%
R11
280K
1%
R12
1.5M
1%
R13
1M
1%
R7
4.64K
1%
1/2W
R8
4.64K
1%
1/2W
R10
25.5K
1%
RY4A
M2
GRN
3
M2 SCALED:
0–1.00 dc
MICROAMPERES

J1–2
J1–9
R1
10K
1/2W
C4
.1
250V
RY1
1
MOV4
V250
D3
IN4007
PART
OF
PCB–003
C3
.22
250V
SG1
90V
J4–1
VIO
J6–2
J5–6
BRN/WHT
RETURN
MODE
GUARD
S7
GRN
GROUND
GROUND
SG1
90V
LOAD
RETURN

NOTES; 1) VM CAL POT IS R4 ON PCB–001
2) CM CAL, X1 and X10 IS R14, X100,X1K,X10K IS R4 ON PCB–002

QTY	DESCRIPTION	PART NO.	MAT'L OR NOTE	ITEM
	SCHEMATIC PORTABLE DC TEST SET			

HIGH VOLTAGE DC HIPOT INSTRUMENTS

MAT'L –
–
FINISH –
–

NEXT ASSY

MODEL NO. PTS-300F

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES DO NOT SCALE DWG TOLERANCES

FRACTIONS ±1/64 | DECIMALS ±.010 | ANGLES 30'

DRAWN	JHW	DATE	04/06
CHECKED	JHW		04/06
APPROVED	JHW		04/06

DWG NO. PTS-1237S REV. A

SCALE NA SHT 1 OF 1

pts1237sRa

09/26/06