

H800PL SERIES  
PORTABLE DC INSULATION TESTERS  
MODELS - H815PL, H860PL, H880PL

```
*****  
*  
*          ***  DANGER HIGH VOLTAGE  ***  *  
*  
*  WARNING:  This publication describes a product engineered  *  
*  and designed to supply high voltage.  Accordingly, maximum  *  
*  safeguards have been built into the equipment and the best  *  
*  safety techniques possible are set forth in the unit's  *  
*  operating instructions.  These instructions contain cautions,*  
*  warning the user to exercise great care in the use of certain*  
*  controls and at appropriate points in the operating proced- *  
*  ures.  Despite these written warnings the operator of this  *  
*  equipment is nevertheless strongly advised to maintain a  *  
*  safety consciousness at all times.  The following rules are  *  
*  particularly relevant and must be followed at all times:  *  
*  
*  ..  BEFORE CONNECTING INPUT POWER GROUND CASE...  *  
*  ..  BEFORE UNGROUNDING CASE DISCONNECT INPUT POWER ..  *  
*  
*  
*****
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## GENERAL DESCRIPTION

This section is intended to acquaint the user with the major features of the models in the HIPOTRONICS H800PL Series, and the functions performed by each of the controls and indicators of the control panel.

### Features and Specifications

The HIPOTRONICS H800PL Series consists of three portable dc insulation testers: Model H815PL, Model H860PL and Model H880PL. Designed to be fully instrumented, easy to use, high voltage proof testers, the units feature a rugged construction and conservatively rated components.

These units are particularly suited for use in the utility and wire and cable industries, for testing insulated cables, capacitors and other one-sided grounded specimens.

All models in the H800PL Series are designed for maximum equipment and operator protection. Surge devices built into the equipment preclude injury to any component from repeated short circuits at full output.

Table 1 lists the three H800PL models, along with the specifications unique to each model.

MODEL	OUTPUT		IMPEDANCE	WEIGHT <sup>*)</sup>	SIZE
	VOLTAGE	RIPPLE			
H815PL	0-15 kV	2.5%	0.5 M ohms	46 lbs.	12-3/8"W x 12"H x 16-3/4"D
H860PL	0-60 kV	2.5%	2 M ohms	56 lbs.	12-3/8"W x 12"H x 16-3/4"D
H880PL	0-80 kV	2.5%	3 M ohms	71 lbs.	12-3/8"W x 12"H x 16-3/4"D

Table 1. H800PL Series Portable dc Insulation Testers - Specifications

All models operate from an input of 115 volts ac, 50/60 Hz, 5 Amperes; rated output current is 5 mA. for 15 min. (Capacitor Charging Duty)  
Features include:

- a triple range kV meter
- a four-range current meter
- an adjustable voltage control
- zero start interlock
- insulated return and guard circuits
- HV ON and OFF buttons
- an HV shorting solenoid with a discharge resistor
- provisions for external interlock and a deadman switch
- input and backup overload fuses
- pilot light indicators for ac input and HV ON

Each unit is housed in a rugged Formica cabinet, containing an oil filled, hermetically sealed steel can to ensure long life and trouble free operation. The rear storage section of the cabinet houses two insulated return leads, an auxiliary power plug, a three-pronged input power cord and a shielded HV output cable with a battery clamp.

#### Controls and Indicators

A diagram of the control panel for your particular model in the H800PL Series is contained in the pocket at the back of this publication. The diagram and the control panel should be used as references during installation and operation. The various functions and uses of the controls and indicators are described in the following pages.

\* ± one (1) lb.



## VOLTMETER AND CONTROLS

The voltmeter is located in the left window on the control panel, and indicates the dc output voltage in kilovolts, as indicated on the scale. The numbers above the meter markings indicate the kilovolt output when the VOLTAGE RANGE control is set on HIGH. The numbers below the meter markings indicate the kilovolt output when the VOLTAGE RANGE control is set on MED or LOW, respectively. The voltmeter indicator should be at "0" when unit is OFF. Minor adjustments may be made only when the HV control is OFF via the adjusting screw below the meter window.

The RAISE VOLTAGE control is located in the center of the control panel, and is used to regulate the output voltage. Markings on the RAISE VOLTAGE control indicate a percentage by which the voltage may be increased.

The user is cautioned to keep the RAISE VOLTAGE control set on "0" when not in use, and to lower the control back to "0" immediately upon completion of a test.

## CURRENT METER AND CONTROLS

The current meter is located in the right window on the control panel, and is used to indicate the dc output current in microamperes, as indicated on the scale.

The meter markings above the scale indicate dc output current from 0-5000 microamperes, the specific range indication depending on the setting of the CURRENT RANGE control.

The CURRENT RANGE control allows for current readings in four ranges when performing dc insulation testing. To obtain the proper dc readings from the current meter, simply multiply the reading on the scale by the value indicated at the range to which the CURRENT RANGE control is set. The values associated with the various range settings are shown in Table 2.

Setting	Value	Setting	Value
X1	1	X100	100
X10	10	X1K	1,000

Table 2. Value Equivalents of Range Settings

Example: In performing a dc insulation test, the current meter indication is "4" on the dc uA scale, with CURRENT RANGE control set at "X1K". The proper reading is therefore 4 x 1,000 or 4,000 uA.

The current meter indicator should be at "0" when the unit is OFF. Minor adjustments may be made only when OFF via the adjusting screw below the meter window.

#### AC POWER CONTROLS

The AC POWER section of the control panel contains a toggle switch (labeled ON at upper position) for the unit, a pilot light that glows when the unit is ON, and two 5 ampere fuses. The fuse may be accessed for replacement by pressing the black cap down while turning it counter-clockwise.

#### GUARD - GROUND - RETURN FRONT PANEL CONNECTIONS

There are three plug-in connection posts on the front panel labeled "GUARD", "GROUND" and "RTN". THE "GUARD" or "RTN" POST IS ALWAYS CONNECTED TO "GROUND" BY A JUMPER LINK WHENEVER TESTING. An explanation of these two connection follows:

##### 1 - Jumper Link connected between "Guard" and "Ground" Post

The sole function of this mode of operation is to separate the paths of the two types of leakage current flowing. These leakage current are: Leakage current flowing along the isolated insulator being tested which we want to monitor and corona leakage current flowing through the air to ground which we do not want to monitor. With a grounded "GUARD" hook-up all corona leakage current flowing directly to ground will be by-passed around the current meter and therefore not observed. Only the leakage current flowing along the insulator will be observed and accurately measured by the current meter.

NOTE: It is not possible to test installed cables in this mode of operation as the cable shields are always grounded, thus making it impossible to see leakage current.

##### 2 - Jumper Link connected between the "Ground" and "RTN" Post (See drawing on following page and page 9)

This front panel hook-up will only be used when total leakage is to be monitored.

## GUARD - GROUND - RETURN CONNECTION

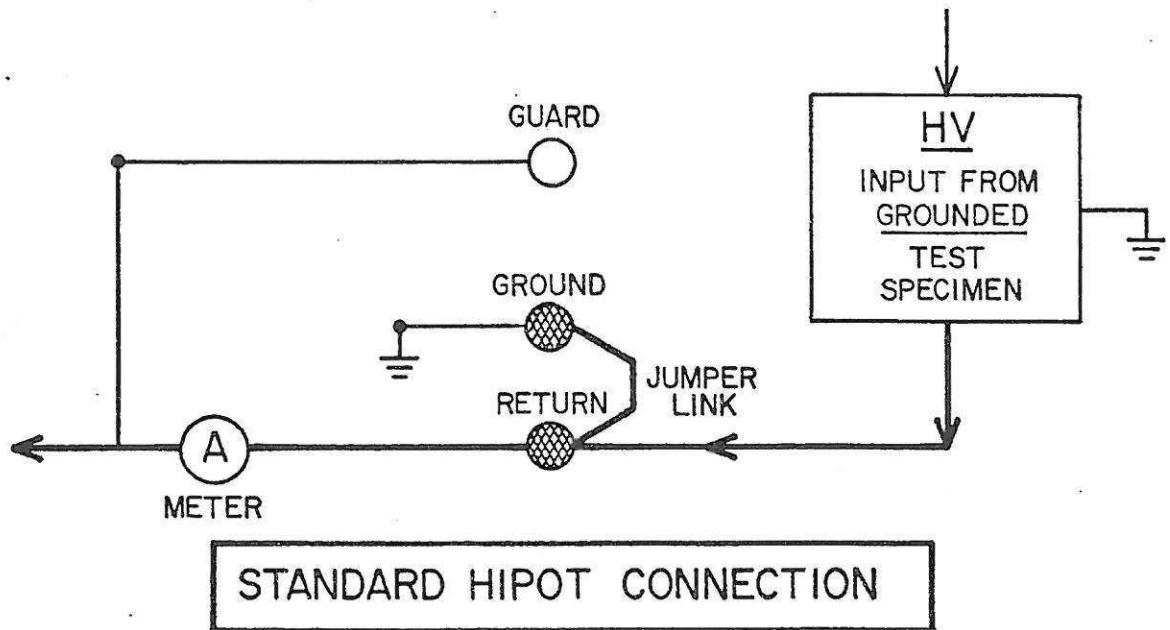
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*****  
*  
* There are three plug-in connection posts on the test set *  
* labeled GROUND GUARD and RETURN. The GROUND connection will *  
* always be utilized with either the GUARD or RETURN connection. *  
* A factory-supplied jumper link connects the applicable posts. *  
* *  
* A simplified explanation of the two connections appears on *  
* the following page. For easy reference, the GUARD to GROUND *  
* connection is for extremely sensitive measurements while the *  
* GROUND to RETURN connection is for non-sensitive measurements. *  
* *  
*****
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1 - Jumper link connected between GROUND and RETURN post

When GROUND and RETURN posts are connected all current is presented to the currentmeter. This mode of operation should be used only when extremely sensitive measurements are unnecessary.

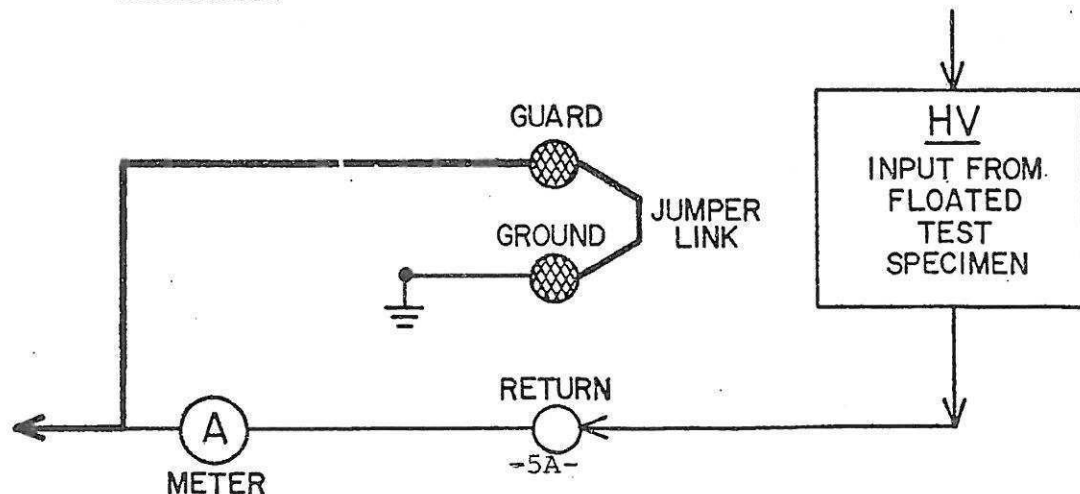
Figure 2.



2 - Jumper link connected between GUARD and GROUND post

When GUARD and GROUND posts are connected all leakage currents are bypassed around the current meter and only specimen load current being returned on the RETURN post will be monitored. This mode of operation is used only when extremely sensitive measurements are desired.

Figure 1.





## HIGH VOLTAGE CONTROLS

The HIGH VOLTAGE controls, located at the lower right of the control panel, consist of the ON button with a zero start interlock; a pilot light which glows when the ON button is depressed and goes out when the OFF button is depressed or when the high voltage application is terminated by other means, e.g. overload circuit trips.

## INTLK & AUX POWER SOCKET

The INTLK & AUX POWER socket provides the facility for an external interlock or deadman switch, which must be connected to the interlock and auxiliary power plug provided with the unit. Whether or not this facility is used, the power plug must be plugged into the socket in order for the unit to operate.

## HV FUSE

Located beneath the INTLK & AUX POWER socket is a 5 ampere (5 A) backup overload fuse, labeled "HV FUSE". It is accessed in the same manner as the AC POWER fuse described earlier in this section, and serves as current surge protection in addition to the overload tripping facility.

## INSTALLATION INSTRUCTIONS

The HIPOTRONICS H800PL Series is designed to perform dc insulation testing with a minimum of effort in the installation or set-up of the units as well as during the actual testing. The step-by-step procedure for installation of the units is described below:

1. Select a location for the unit that will place the meters at a level to allow maximum accuracy in readings.
2. Set the RAISE VOLTAGE control to "O", and check to ensure that the AC POWER toggle switch is in OFF (down) position.
3. Ground the unit before connecting the input power. The GROUND post on the front panel may be used for this purpose. The "GROUND" bar jumper should be tied to the "RETURN" post for most cable tests.
4. Insert the five-pronged shorting plug provided with the unit into the INTLK & AUX POWER socket on the control panel. (Plug may also be used as connector to the external interlock or capacitor discharge unit.) See schematic for pin connections.
5. Connect the insulated return leads supplied with the unit as described on page 4.

## OPERATION INSTRUCTIONS

This section provides step-by-step instructions for performing dc insulation testing of one-side grounded and ungrounded specimens. It includes a special section for the testing of high voltage cables, and a section containing additional safety hints. The procedures for performing dc insulation testing using HIPOTRONICS H800PL units are as follows:

1. Ensure that the steps described in the previous section, "Installation Instructions", have been performed.
2. Set the CURRENT RANGE control to the appropriate range setting. (To locate the appropriate range, it is suggested that the user start at the "X1K" range setting).
3. Set the VOLTAGE RANGE control to the desired setting (LOW, MED or HIGH) for voltmeter readings.
4. Connect the HV output lead to the test specimen.
5. Plug the line cord of the unit into a 115 volt, 50/60 Hz outlet. If a two-prong adapter is used, be sure to ground the third wire.
6. Turn the AC POWER switch ON (up position).
7. Depress the HIGH VOLTAGE ON switch. (The HIGH VOLTAGE pilot light should glow).
8. Increase the output voltage to the desired level via the RAISE VOLTAGE control. Note that the current meter readings will increase along with voltage.
9. Maintain the output voltage at the desired level for the required amount of the test time. At a steady voltage only, leakage and not charging current will be read.
10. Reduce the RAISE VOLTAGE control back to "0" and await the return of the voltmeter reading to "0" before you depress the "OFF" button.
11. If the test specimen fails, the overload circuit will trip the HIGH VOLTAGE OFF, and the internal HV shorting solenoid with the discharge resistor will bleed off the remaining charge in the specimen.



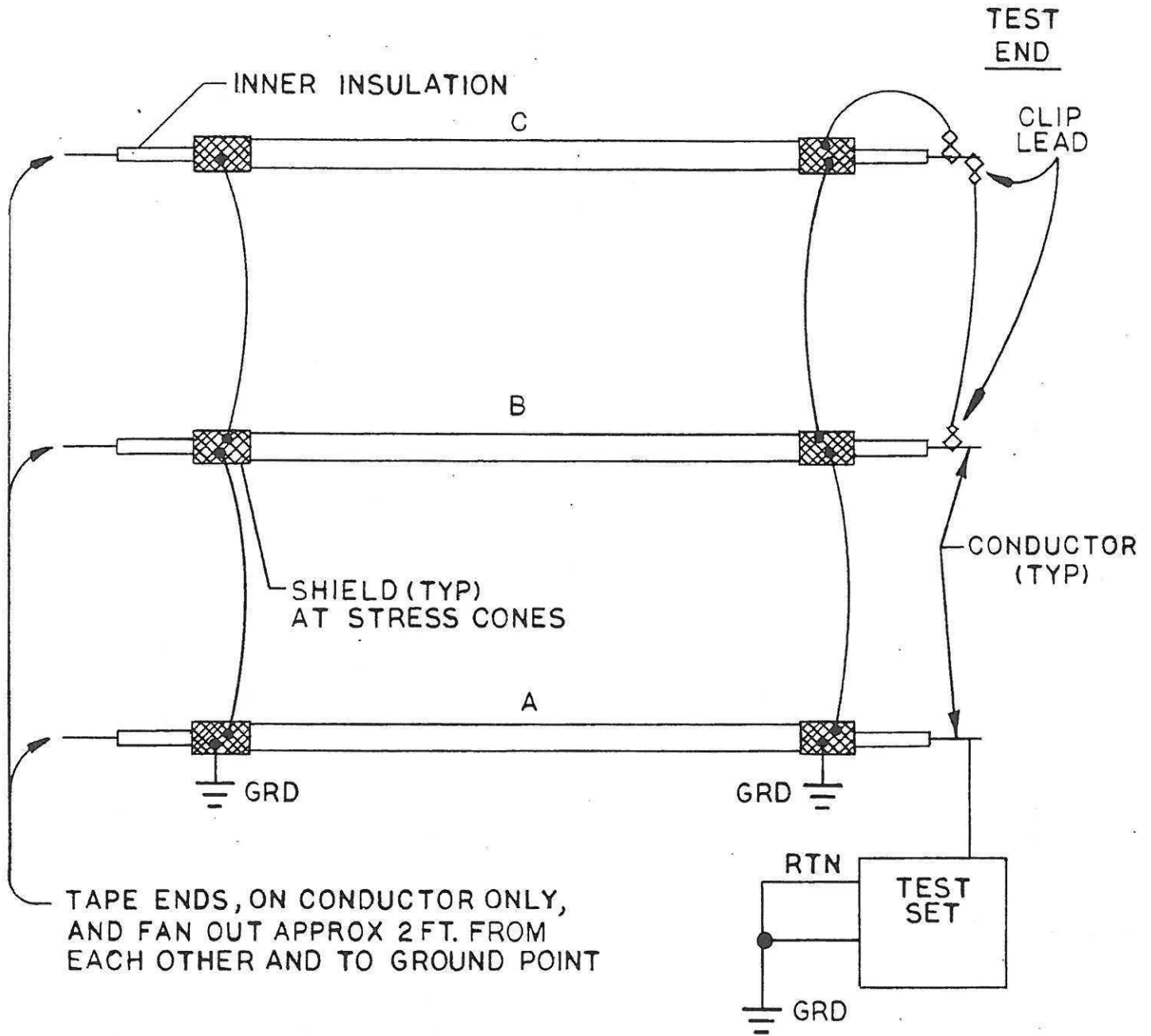
## Testing High Voltage Cables

A number of additional steps and/or precautions must be taken when performing dc insulation tests on any three-phase or single phase cables.

1. Ensure that all insulators, pot heads and stress cones are clean and free of dust or moisture.
2. Ensure that the shields of all three cables are grounded and tied together at the near end of the cable.
3. Isolate the far end of the cable conductors under test from each other and from all ground points. They must also be free of all other potential sources of leakage such as sharp points.
4. When testing each of three conductors separately, the other two must be grounded to protect against dangerous charge build-up, as must other de-energized cables in the vicinity of the test.
5. Voltage should be increased slowly, following the test specifications outlined by the cable manufacturer or any relevant standards. (Charging current will depend on rate of rise of voltage).
6. In an average test of a three-conductor, three-phase circuit, the current meter readings should be approximately the same on all three conductors. Higher than expected readings or flashover are indicative of a faulty cable, poor splice, dirty pot head or insulator and leaky cable end.
7. Upon completion of the test, follow the proper Turn-OFF procedures described in the next section, "Additional Safety Hints".

EXAMPLE: One thousand feet of cable rated at 15 kV ac is to be tested for five minutes at a voltage level of approximately 50 kV dc, in accordance with manufacturer's specifications. Using a HIPOTRONICS H860PL or H880PL, and following the INSTALLATION INSTRUCTIONS and OPERATION INSTRUCTIONS described previously, it will be noted that current meter readings in the order of magnitude of 100 uA will exist until voltage has been increased to 50 kV dc. Current meter readings will then drop off to approximately 10 uA for the duration of the test on a good cable. Current meter reading can vary significantly according to the length and size of the cable under test. Readings can also

# CABLES



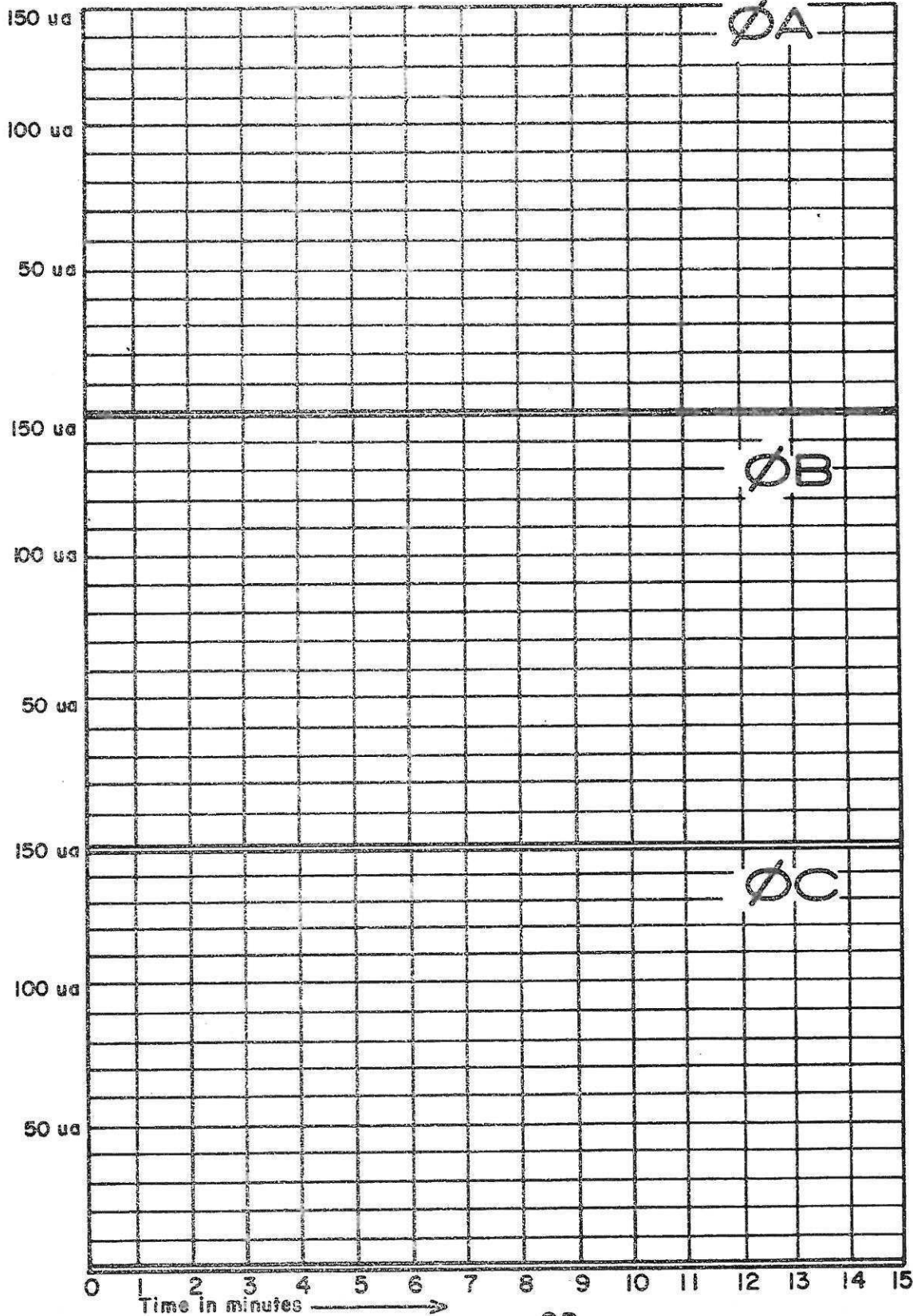
TAPE ENDS, ON CONDUCTOR ONLY,  
AND FAN OUT APPROX 2 FT. FROM  
EACH OTHER AND TO GROUND POINT

NOTE: GROUND RETURN ON HV TEST  
SET WILL READ ALL CHARGING  
AND LEAKAGE CURRENT

FIGURE I

WHEN USING GUARD POST THIS  
WILL BYPASS ALL CURRENT TO  
METER.





1000 V/sec.  
rise

Voltage

Size

Footage

Weather

Customer

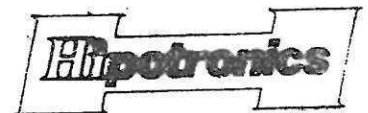
98

Cable Ident.

Date

---

Tester



A-3472



be affected by damp weather, cable splices, switchgear in the circuit, and voltage change in the input source.

### Additional Safety Hints

Considerable effort has been expended to build maximum safeguards into the HIPOTRONICS H800PL Series for the protection of the user as well as the equipment. Safety precautions have also been emphasized in the instructions contained in this manual for operating the units. This section includes additional safety measure for reference upon completion of testing.

### TURN -OFF PROCEDURE

The user is cautioned to never depress the HIGH VOLTAGE OFF button or turn off the main power switch immediately upon completion of a high voltage test. When stored energy is greater than 1 kJ, the energy should be allowed to bleed down until the voltmeter reading is "0". The following steps are recommended:

1. Turn back the RAISE VOLTAGE control to "0" reading.
2. Allow the charged cable to bleed down to approximately 10 kV reading on voltmeter, or proceed to Step 3.
3. Completely discharge the cable through a resistive grounding (shorting) stick.
4. Attach a solid ground connection before touching the sample.

### TESTING LARGE CAPACITIVE LOADS

Upon completion of a dc insulation test of large capacitive loads, the following steps are recommended for the protection of both the user and the equipment:

1. Secure a tested hand-held resistive grounding (shorting) stick.
2. Using the hand-held grounding stick, bleed down the charged cable or other capacitive load. This eliminates the unnecessary discharge of a highly capacitance cable back into the high voltage section of the H800PL unit when the HIGH VOLTAGE OFF button is depressed.
3. Place a solid earth connection on the Test set.

This eliminates the unnecessary discharge of a highly capacitive cable back into the high voltage section of the H800PL unit when the HIGH VOLTAGE OFF button is depressed. This type of abuse can result in costly repairs.

## SPECIAL OPERATIONS

This section describes the step-by-step procedures required to perform special operations incidental to the major functions described in the preceding sections. These special operations are Voltmeter Recalibration and Trouble Shooting. (The current meter is pre-calibrated with fixed precision resistors and cannot be recalibrated through simple adjustment.

### Voltmeter Recalibration

1. Ensure that voltmeter is set at "0". Adjust with setting screw if necessary.
2. Select a location for the unit that will place the voltmeter at a level to allow maximum accuracy in calibration.
3. Set the RAISE VOLTAGE control to "0", and check to ensure that the AC POWER toggle switch is in the OFF (down) position.
4. Ground the case before connecting the input power. The GROUND post on the front panel may be used for this purpose.
5. Ensure that the five-pronged shorting plug provided with the unit is inserted into INTLK & AUX POWER socket on control panel.
6. Set VOLTAGE RANGE control to the LOW position.
7. Connect the RETURN post to the GROUND post on the control panel with the jumper clip.
8. Select calibrated external voltmeter with the meter range appropriate for the unit to be calibrated.
9. Connect the low side (ground) of the external voltmeter to the RETURN post of the unit, using the insulated return lead supplied with the unit.
10. Connect the HV output lead of the unit to the high side of the external voltmeter, using the H.V. insulated lead supplied with the unit.
11. Unscrew the control panel from the cabinet, tipping the control panel into the vertical position, and locate kV calibration potentiometer (pot) in the corner of the circuit board attached to the back of the voltmeter.



12. Secure control panel in vertical position, allowing ease of access to kV calibration pot, as well as accurate meter readings.
13. Turn high voltage on and raise voltage to approximately 70% of the full scale of the kV meter on the control panel.
14. Calibrate the control panel meter against the external meter using the calibration pot. (2% accuracy is recommended.)
15. Calibration of the LOW range should automatically calibrate the MED and HIGH ranges.
16. Return the RAISE VOLTAGE control to zero and turn high voltage off.

## Trouble-Shooting

All products shipped by HIPOTRONICS are thoroughly tested against a rigid set of standards by the firm's Quality Control Department. In the event a unit appears not to function upon delivery, the user is referred to the section, "Returned Material".

This section of the publication is intended to aid the user in locating the source of a problem when a unit is either not functioning or functioning improperly.

Use of these procedures is at the user's own risk. It is not recommended that these procedures be used while the equipment is under Warranty, as some of the recommended steps involve the removal, testing or disconnecting of components, which could result in voiding the Warranty.

These procedures are intended for use only by a trained repair technician, and are not recommended for use by individuals trained only to operate the equipment, except under strict supervision.

An attempt has been made to provide information to aid the user in trouble-shooting those problems that are most commonly encountered, either as a result of normal wear and tear or direct damage to the unit. Trouble-shooting procedures are described in tabular form on the next two pages, for ease in reference. Procedures are listed according to problem area. Possible causes of each problem are listed, along with appropriate remedial action for each case.

A flow chart summarizing the trouble-shooting process appears on Figure 1. A schematic diagram of the unit, denoting Test Points and associated voltage along with major reference points in the circuit, is contained in the pocket of this publication for reference when trouble-shooting.

<u>PROBLEM</u>	<u>POSSIBLE CAUSE</u>	<u>RECOMMENDED ACTION</u>
NO HIGH VOLTAGE OUTPUT	<ul style="list-style-type: none"> <li>a. Defective F2 Fuse.</li> <li>b. INTLK &amp; AUX POWER plug faulty or not plugged in.</li> <li>c. Zero start faulty.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace F2 Fuse.</li> <li>b. Plug in INTLK plug, or replace faulty plug. (See J1 in schematic; prongs 2 &amp; 3 should be connected.)</li> <li>c. Clean contacts between T1 swinger and arm of zero start.</li> </ul>
LOW VOLT METER READINGS	<ul style="list-style-type: none"> <li>a. Voltmeter out of adjustment.</li> <li>b. Low line voltage.</li> </ul>	<ul style="list-style-type: none"> <li>a. Recalibrate voltmeter.</li> <li>b. Obtain reading at power source and inform responsible authority.</li> </ul>
ERRATIC HIGH VOLT-AGE OUTPUT	<ul style="list-style-type: none"> <li>a. Variac (RAISE VOLTAGE control) brushes dirty or worn.</li> <li>b. Fluctuating line voltage.</li> </ul>	<ul style="list-style-type: none"> <li>a. Clean or replace Variac brushes.</li> <li>b. Obtain reading at power source and inform responsible authority.</li> </ul>
OVERLOAD DOESN'T TRIP	<ul style="list-style-type: none"> <li>a. Faulty RY1 relay.</li> <li>b. C1 capacitor shorted.</li> <li>c. RY1 operation impaired.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace RY1 relay.</li> <li>b. Replace C1 capacitor.</li> <li>c. Check wire harness to ensure it does not impair RY1 operation.</li> </ul>
OVERLOAD TRIPS BEFORE HOOKUP	<ul style="list-style-type: none"> <li>a. Short in HV output cable.</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace HV output cable.</li> </ul>
CURRENT METER DOESN'T WORK	<ul style="list-style-type: none"> <li>a. Jumper clip on front panel not connected properly.</li> </ul>	<ul style="list-style-type: none"> <li>a. Connect jumper clip properly as described in Step 5 of "Installation Instructions" Page 9.</li> </ul>

Table 3. Trouble-Shooting Guide



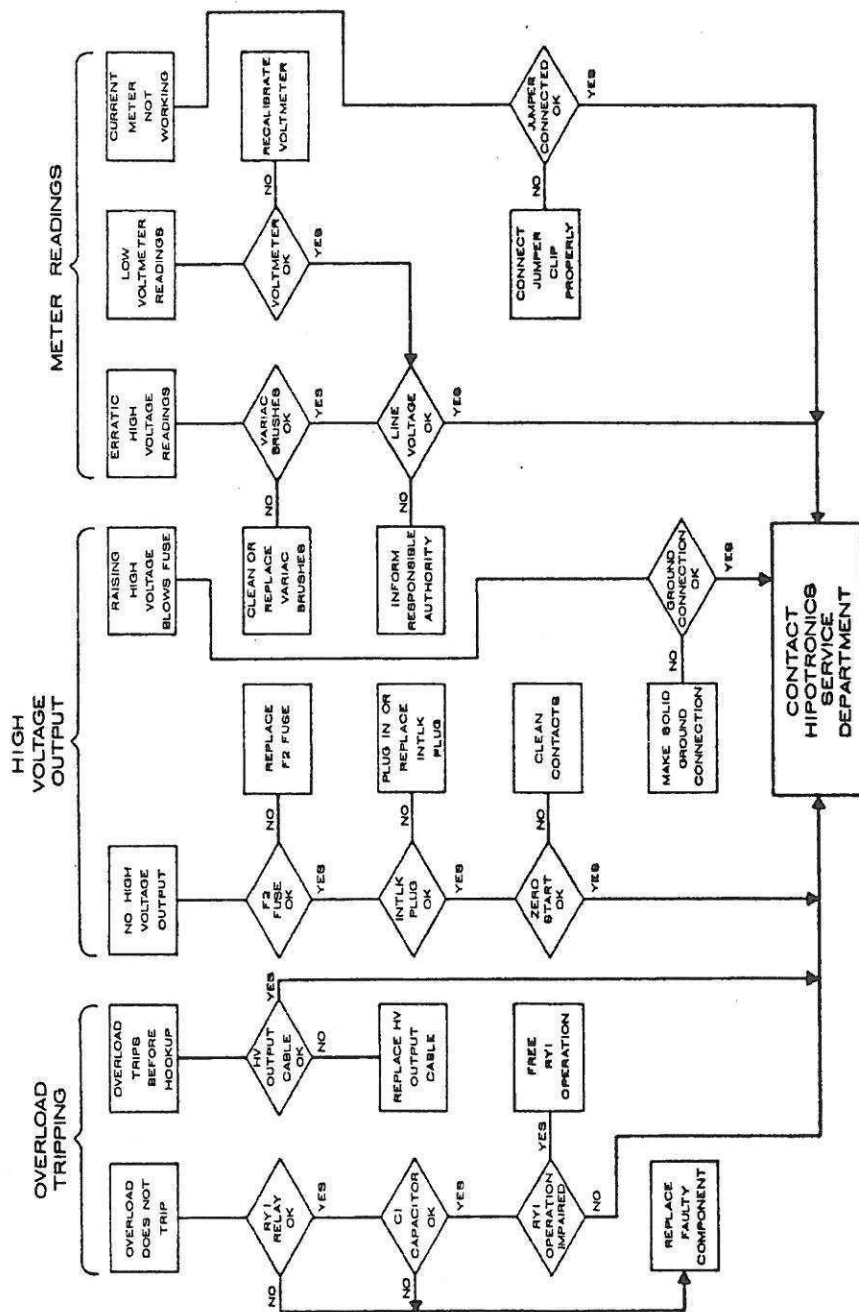


Figure 2 - H800 PL - TROUBLE SHOOTING FLOWCHART

## RETURNED MATERIAL

If, for any reason, it should become necessary to return the equipment described in this publication to the factory, the Warranty Service Department of HIPOTRONICS must be contacted, at which time the following data must be given in order that we may identify the unit and determine the necessity for return. (Tel. 914-279-8035) MODEL, SERIAL NO. and TYPE (Part No.) is indicated on the black and silver tag affixed to the unit.

MODEL:  
SERIAL NUMBER:  
TYPE (Part No.):  
REASON FOR RETURN:  
DEFECT:  
ALLEGED CAUSE OF DEFECT:

If HIPOTRONICS deems return of the unit appropriate, an "Authorization for Return" tag will be issued. This will instruct you as to the method of return. The pink copy is for your records, the hard copy to be affixed to the unit being returned. 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 performed until such time as the proper steps have been taken.

Your cooperation is requested in order to ensure prompt service. Thank you.

## PARTS ORDERING

To order replacement parts for this unit, please refer to the Parts List contained in the pocket of this publication. The number of the specific component is required, along with the TYPE (Part No.) of the unit. The TYPE (Part No.) is indicated on your Parts List, and on the black and silver tag affixed to the unit.





WARRANTY

HIPOTRONICS, INC. warrants to the original purchaser of any new merchandise that the merchandise is free from defects in material and workmanship under normal use and service for a period of one (1) year from the date of shipment. The obligation of Hipotronics, Inc. under this Warranty is limited, in its exclusive option, to repair, replace or issue credit for parts or materials which prove to be defective, and is subject to Purchaser's compliance with the Hipotronics, Inc. Warranty Claim Procedure as set forth below. The happening of any one or more of the following events will serve to void this Warranty and any defect or damage resulting therefrom is specifically excluded from Warranty coverage: (a) defects due to accident, negligence, alteration, modification, faulty installation by Purchaser or Purchaser's agents or employees, abuse or misuse; (b) attempted or actual dismantling, disassembling, service or repair by any person, firm or corporation not specifically authorized in writing by Hipotronics, Inc. (c) defects caused by or due to handling by carrier, or incurred during shipment, transshipment or other move.

This Warranty covers only those parts and/or materials deemed by Hipotronics, Inc. to be defective within the meaning of this Warranty. The liability of Hipotronics, Inc. shall be limited to the repair, replacement or issuance of credit for parts deemed defective within the meaning of this Warranty. Costs incurred by purchaser for labor or other expenses incidental to the inspection, repair, replacement or issuance of credit for such parts and/or material shall be the sole responsibility of purchaser. This Warranty shall not apply to any accessories, parts, or materials not manufactured or supplied by Hipotronics, Inc. and if, in the sole discretion of Hipotronics, Inc., Purchaser's claim relates to any materials or workmanship manufactured or performed by the supplier of a component part, or of the manufacturer of a device of which the defective part is a component, Hipotronics, Inc. reserves the right to disclaim liability under this Warranty and to direct that the Purchaser deal directly with such supplier or manufacturer. Hipotronics, Inc. agrees to assist the Purchaser in processing or settling any such claim without prejudicing its position as to liability.

WARRANTY CLAIM PROCEDURE Compliance with the following Warranty Claim Procedure is a condition precedent to the obligation of Hipotronics, Inc. under this Warranty:

(a) Purchaser must notify Hipotronics, Inc. in writing by certified or registered mail, of the defect claimed within twelve (12) months after date of original shipment. Said notice



# ADDENDUM

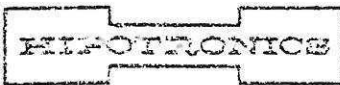
## GUARD - GROUND - RETURN CONNECTION

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*****
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*
*****
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PARTS LIST

MODEL NO. H860PL  
 PART NO. DS11-489

	Subassembly, Control Panel, P/N DL24-1-143
C1,C2	Capacitor, .033 uF, 600 V
F1,F2	Fuse, 5 A in Buss Holder HKP-CC Cable Clamp Cap #324, Amphenol
J1	Jack Socket, 78-RS5, Amphenol
M1	Meter, 50 uA, API 7045 , N5-2052-0000,with scales 0-12, 0-30 & 0-60 kv dc
M2	Meter, 5 uA, API 7045 , N5-0022-0050, with 0-5 uA scale
PL1,PL2	Pilot Light, Drake, 5100-832, NE-51H Lamps
P1	Power Cord, Type 18/3 SJ
P2	Socket, 78-58, Amphenol
P3	Plug, INTLK & AUX PWR, 86-CP5, Amphenol Cable Clamp Cap #324, Amphenol
S1	Switch, Toggle, DPDT, C&H 7565 K5
S2	Switch, Pushbutton, AH&H 3391 GJ
S3	Switch, Pushbutton, AH&H 3391 GL
S4	Switch, Rotary, SP3T, CRL PA-2002
S5	Switch, Rotary, SP4T, CRL PA-2002
SG1,2	Spark Gap, 90 V
T1	Transformer, Superior Powerstat 10B
<u>A1</u>	<u>Subassembly, VM Circuit, F30-344B</u>
C1	Capacitor, 2 uF, 150 V dc
C2	Capacitor, .22 uF, 100 V dc
K1	Relay, DPDT, 115 V ac, L-E MKTO-2A
NE1-3	Neon, NE-2
R1	Resistor, 15 k ohms, 1/2 W, 10%
R2	Resistor, 360 k ohms, 1/2 W, 1%
R3	Resistor, 2.2 k ohms, 1/2 W, 10%
R4	Resistor, 1 k ohm, 1/2 W, 10%
R5	Resistor, pot,50 k ohms, 1/2 W
R6	Resistor, 90 k ohms, 1/2 W, 1%
R7	Resistor, 240 k ohms, 1/2 W, 1%

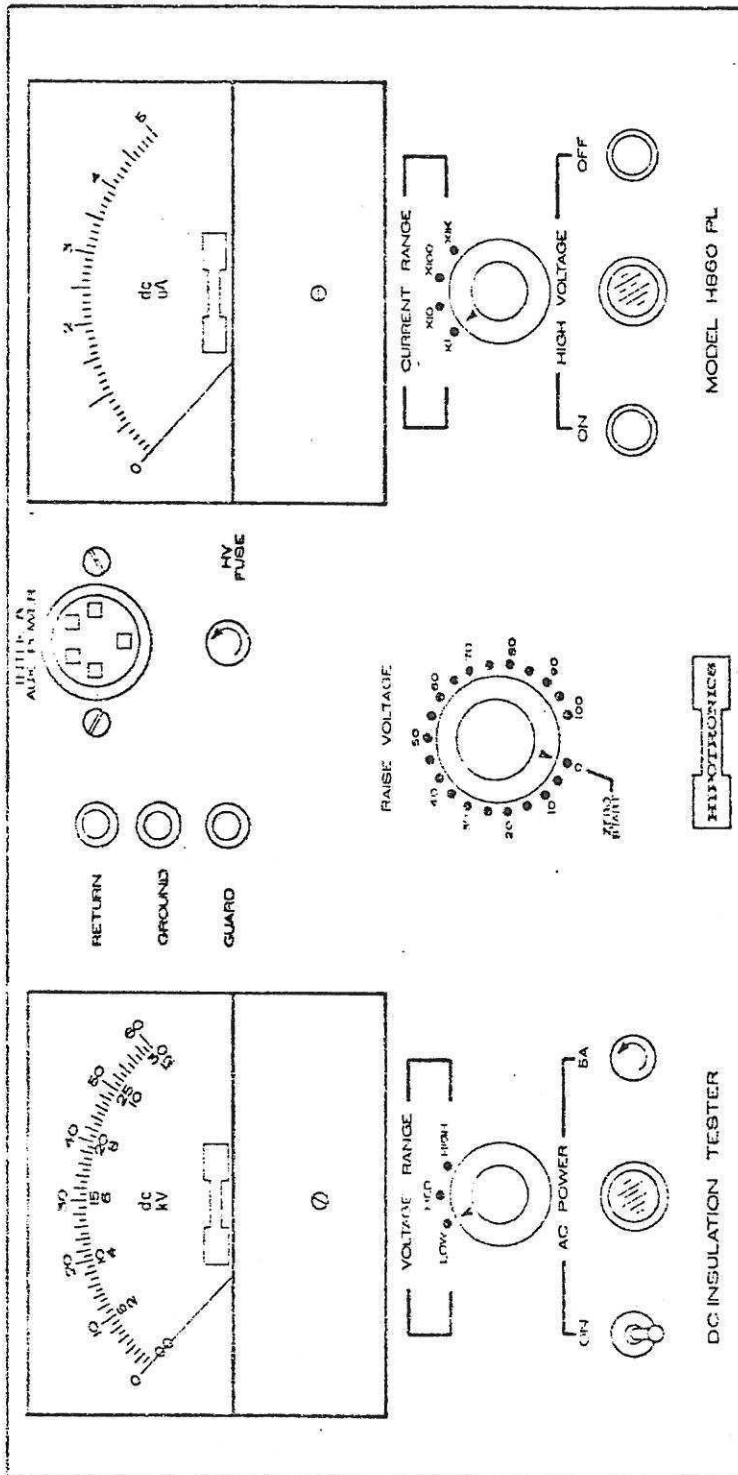


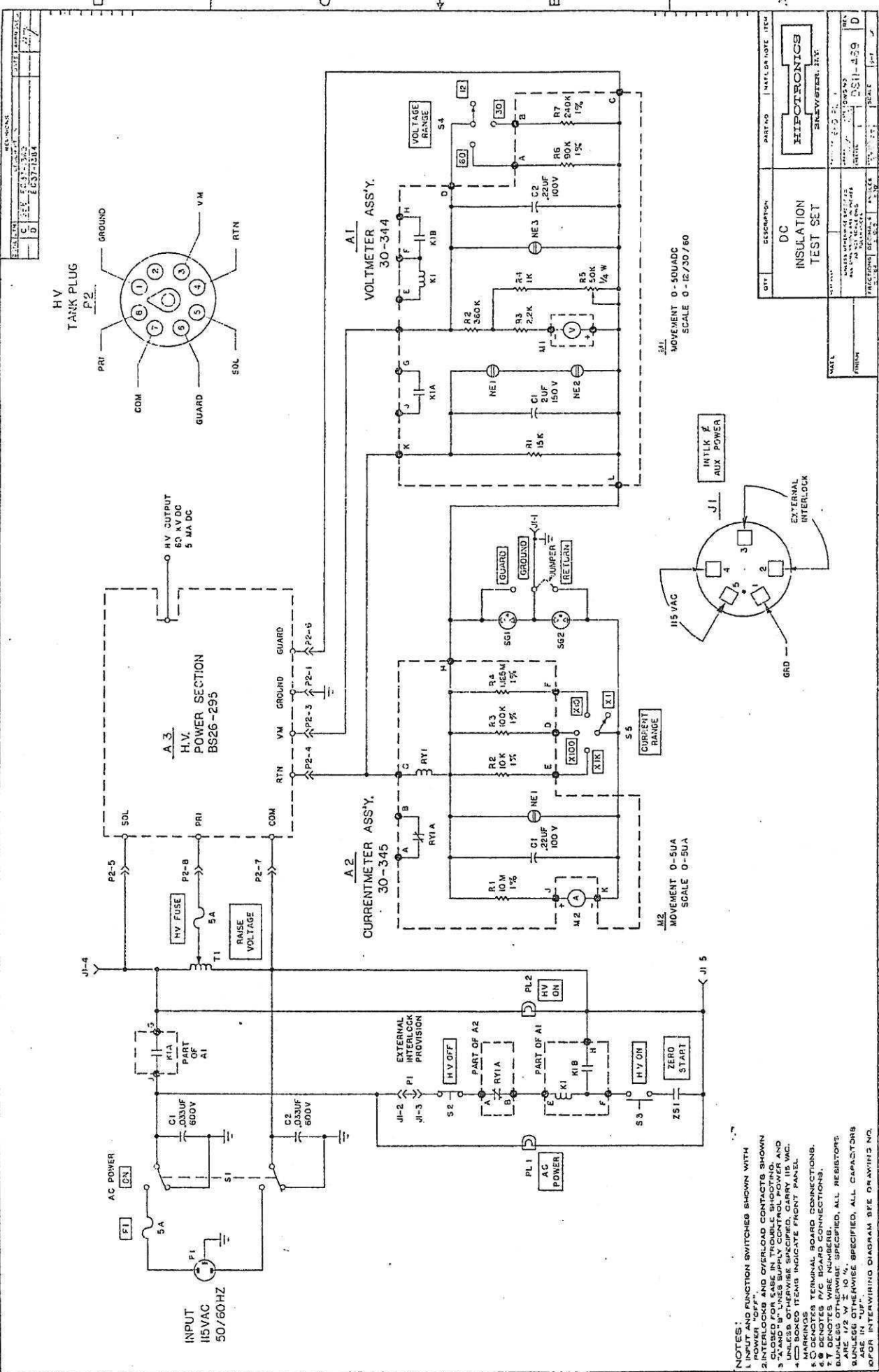
Parts List  
cont.

Model No. 860PL  
Part No. DS11-489

<u>A2</u>	<u>Subassembly, CM Circuit, F30-345B</u>
C1	Capacitor, .22 uF, 100 V
NE1	Neon, NE-2
R1	Resistor, 10 M ohms, $\frac{1}{2}$ W, 1%
R2	Resistor, 10 k ohms, $\frac{1}{2}$ W, 1%
R3	Resistor, 100 k ohms, $\frac{1}{2}$ W, 1%
R4	Resistor, 1.125 m ohms, $\frac{1}{2}$ W, 1%
RY1	Relay, SPDT, 5 k Coil, Line Electric, WETC-1
<u>A3</u>	<u>Subassembly, 60 kV, Power Supply, BS26-295</u>
PCB	Fab. 30-353 (2), Hipo
C1,2	Capacitor, .02 uF @ 30 kV
CR1,2	Diode, 50G10, 10 in series, each Connector, 125-SFR-90W-RP-0S-8, Electric Industries
R1,5	Resistor, 47 M ohms, 1 W, 10 in series, each
R2,3	Resistor, 250 k ohms, 50 W
R4,6	Resistor, 100 M ohms, 6 W
SL1	Solenoid, P/N 9-297M, 115 V ac, 50 Hz
T1	Transformer, DO1681, Hipo







REV. NO. 1  
 DATE 12/30/60  
 DESIGNED BY  
 CHECKED BY  
 DRAWN BY  
 SCALE 1:1

DESCRIPTION  
 DC INSULATION TEST SET

PART NO. HIPTRONICS  
 ELECTRONICS DIV.

REV. NO. 1  
 DATE 12/30/60  
 DESIGNED BY  
 CHECKED BY  
 DRAWN BY  
 SCALE 1:1

REV. NO. 1  
 DATE 12/30/60  
 DESIGNED BY  
 CHECKED BY  
 DRAWN BY  
 SCALE 1:1

NOTES:  
 1. INPUT AND FUNCTION SWITCHES SHOWN WITH POWER "OFF".  
 2. POWER "OFF" AND OVERLOAD CONTACTS SHOWN CLOSED FOR SAFE IN TROUBLE SHOOTING.  
 3. "A" AND "B" LINES SUPPLY CONTROL POWER AND UNLESS OTHERWISE SPECIFIED, CAPACITORS ARE 50% TOLERANCE.  
 4. "C" LINES INDICATE FRONT PANEL MARKINGS.  
 5. "D" DENOTES TERMINAL BOARD CONNECTIONS.  
 6. "E" DENOTES WIRE CONNECTIONS.  
 7. "F" DENOTES WIRE NUMBERS.  
 8. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE 1/2 W ± 10%.  
 9. UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS ARE 50% TOL.  
 10. FOR INTERWIRING DIAGRAM SEE DRAWING NO. 100-100-100