



PS-550AC POWER SUPPLY

OPERATION MANUAL

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TABLE OF CONTENTS

	PAGE
1. INTRODUCTION	2
2. SPECIFICATIONS	3
3. INSTALLATION	4
3.1. UNPACKING	4
3.2. MOUNTING	4
4. OPERATING CONDITIONS	5
4.1. POWER CONVERSION METHOD	5
4.2. ENERGY RELATIONSHIPS	5
5. OPERATION	7
5.1. OUTPUT VOLTAGE RANGE SELECTION	7
5.2. OUTPUT VOLTAGE ADJUSTMENT MODE SELECTION	8
5.3. INTERCONNECTIONS	8
6. MAINTENANCE	9
6.1. REPAIRS	9
6.2. RE-PACKING AND STORAGE	9

FIGURES

FIGURE 1. PS-550AC OUTLINE AND MOUNTING DIMENSIONS	2
FIGURE 2. PC-550AC OUTLINE AND MOUNTING DIMENSIONS	4
FIGURE 3. CHARGE RATE VS OUTPUT VOLTAGE.....	5
FIGURE 4. OUTPUT VOLTAGE VS. TIME.....	6
FIGURE 5. PC-550AC PRINTED CIRCUIT BOARD.....	7
FIGURE 6. TERMINAL STRIP CROSS SECTION.....	8
FIGURE 7. TYPICAL INPUT AND OUTPUT CONNECTIONS FOR LINEAR LAMPS.....	9

TABLES

TABLE 1. ELECTRICAL INPUT	3
TABLE 2. ELECTRICAL OUTPUT (DISCHARGE)	3
TABLE 3. ELECTRICAL OUTPUT (TRIGGER)	3
TABLE 4. MECHANICAL PROPERTIES	3

1. INTRODUCTION

The PS-550AC Power Supply is designed for high-energy capacitor discharge service with linear xenon-filled flashtubes or other specialized high-power applications. It can be used to power clinical and analytical instrumentation, machine vision strobes and other strobe systems.

The PS-550AC unit operates from 115VAC (PS-550AC / PS-550AC-01) or 230VAC (PS-550AC-02 / PS-550AC-03), 50 or 60Hz. It is available enclosed in a metal chassis or as an unenclosed printed circuit board (PC-550AC). The enclosed version is dimensioned below. Unit is set for 115 VAC in order for customer to set for 230 VAC they must remove JP-1 jumper (see Figure 5).

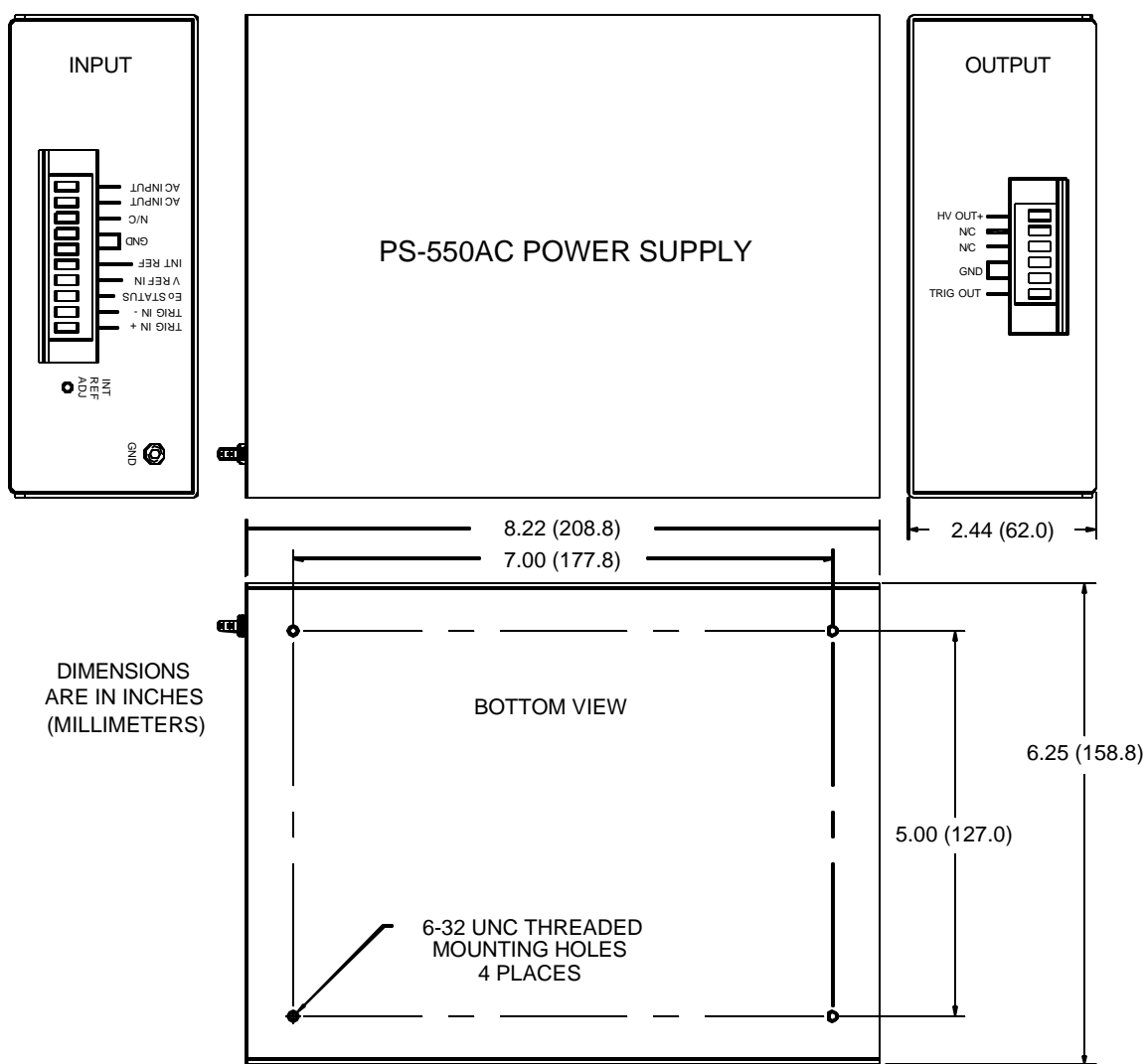


Figure 1. PS-550AC Outline and Mounting Dimensions

2. SPECIFICATIONS

Table 1. Electrical Input

Voltage ¹	115/230VAC ±10% 50/60Hz
Current	2.5A _{rms} max. (115VAC)
Trigger	TTL compatible, optically isolated ² , 5µsec pulse width minimum on time, duty cycle 50% or less.
Trigger current	20 to 40mA peak
Reference voltage	3 to 10VDC

¹Common mode choke/capacitor filtering on AC input line.

²Optical Isolator: 4N26 or 4N36 with 150Ω series resistor.

Table 2. Electrical Output (discharge)

	PS-550AC / -02	PS-550AC-01 / -03
Average power	120W max.	120W max.
Low range voltage ³	225 to 750V max.	225 to 750V max.
High range voltage ³	450 to 1500V max.	450 to 1500V max.
Line regulation	±1%	±1%
Peak to peak ripple voltage	1% @ 1KV, 1µF	1% @ 1KV, 1µF
Internal discharge capacitor	0.05µF	0.05µF
Recharge delay (typical)	300µS ⁴	100µS ⁴
Internal output bleeder	6MO	6MO
Charge rate (minimum)	120J/S @ 1KV	120J/S @ 1KV

³Output V to Reference V ratio: 75:1±3% Lo Range; 150:1±3% Hi Range.

Range can be changed by internal jumpers. Units shipped in Hi Range.

⁴Internal adjustment. Delay range to approximately 3msec.

Table 3. Electrical Output (trigger)

	PS-550AC / -02	PS-550AC-01 / -03
Trigger capacitor	0.47µF	0.22µF
Trigger capacitor voltage	175V ±15V	175V ±15V
Maximum pulse rate	1KHz	1KHz

Table 4. Mechanical Properties

Connectors	Wago type 238 modular strip
Dimensions	5.87 (149) x 7.38 (187) x 2.43 (62)
Weight	28.5 oz. (800g)

3. INSTALLATION

3.1. Unpacking

If the condition of the outer packaging suggests mishandling has occurred, examine the power supply for any signs of breakage during shipment. If there are any signs of damage, contact the carrier immediately and do not proceed with the installation.

It is recommended that the packaging material be retained and stored in the event that the unit has to be reshipped.

3.2. Mounting

Use the four threaded holes (6-32 UNC) in the base of the PS-550AC enclosure to mount the unit in any position (see Figure 1). Mounting hardware is user-supplied.

The PC-550AC PC Board has four holes (#6 clearance) for mounting (see Figure 2).

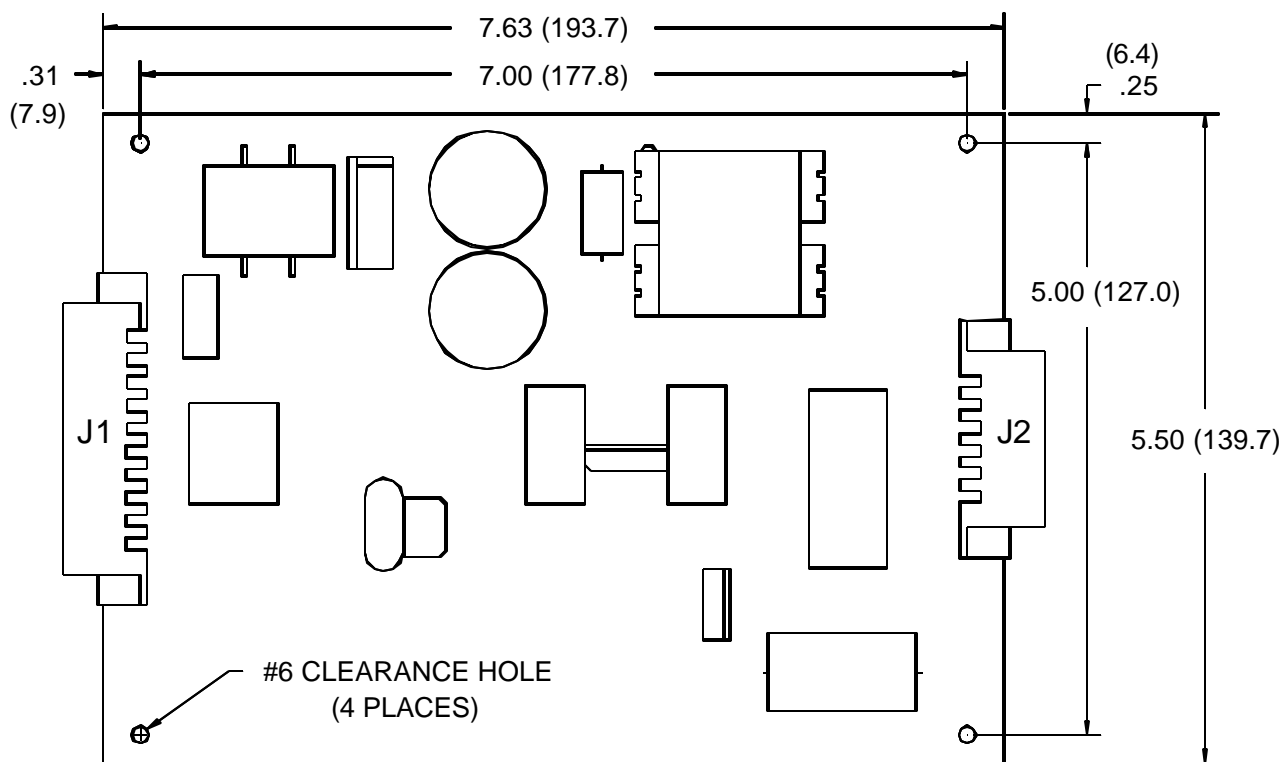


Figure 2. PC-550AC Outline and Mounting Dimensions

4. OPERATING CONDITIONS

4.1. Power Conversion Method

The PS-550AC Power Supply uses a high frequency, inductive storage, energy release (flyback) charging system. Output voltage level control is maintained by sensing through a HV divider to a reference, difference amplifier. The difference amplifier controls the number of energy cycles released to the storage capacitor in accordance with the variable reference voltage (V_{ref}) applied to the input.

4.2. Energy Relationships

At 105V input, 1000V output, the PS-550AC Power Supply delivers a minimum of 120 joules per second to the discharge capacitor. Figure 3 shows typical charge rate values vs output voltage. Before operating the supply, determine the external capacitor value (C in μF), the maximum output voltage (V in kV), and the maximum energy (J in joules) required for the application using the formula $J = \frac{1}{2}CV^2$.

(Note: A fixed 0.05 μF capacitor is built into the supply and must be included in all calculations.)

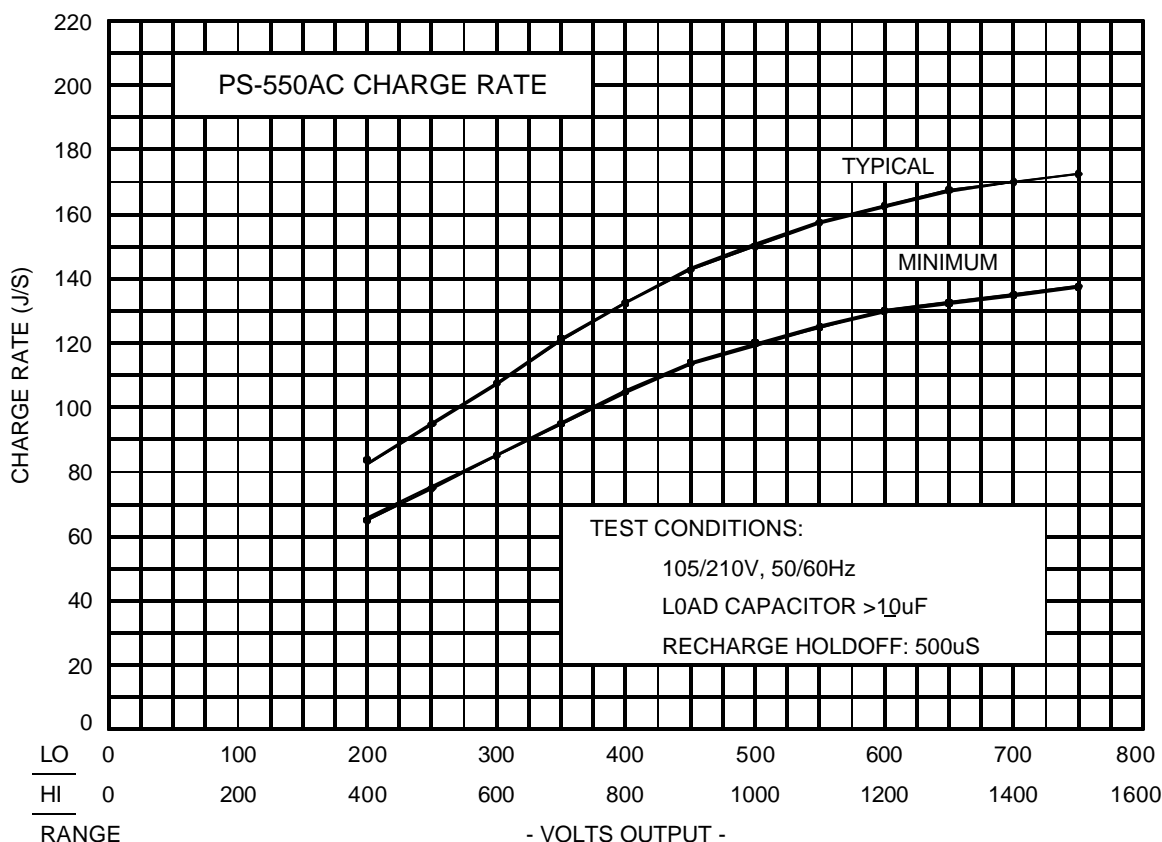


Figure 3. Charge Rate vs Output Voltage

Example: $C = 10\mu\text{F}$ (including the $0.05\mu\text{F}$ internal capacitor)

$V_m = 1000\text{V}$

$J = 5 \text{ joules } (J = \frac{1}{2}CV^2)$

Referring to the charge rate curves shown in Figure 3, the power supply charges to 1000V at a 120J/sec rate at 105V input. The time to charge to 5 joules is:

$$5\text{J} \div 120\text{J/sec} = 41.5\text{msec}$$

The minimum time between flashes is then 41.5msec for a full 5 joule discharge. The discharge power for continuous operation in this mode is equal to the charge rate or 120 watts.

Long-term (1 minute or more) average power must be limited to 120 watts. Therefore, the sum total of the accumulated energy discharges (Joules) divided by the operating period (seconds) must be ≤ 120 watts.

The flashtube may be fired any time after $t=41.5\text{msec}$ (see Figure 4).

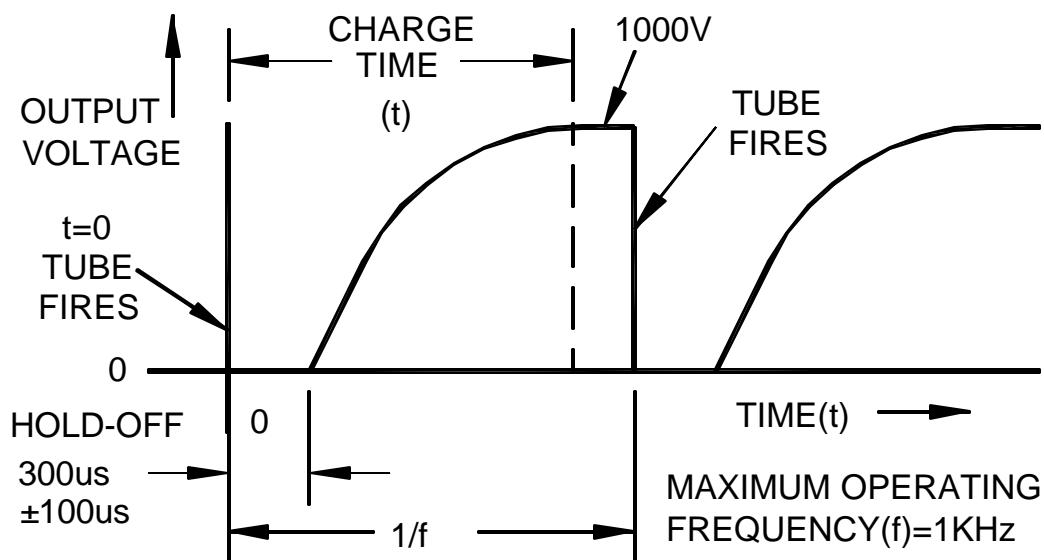


Figure 4. Output Voltage vs. Time

5. OPERATION

5.1. Output Voltage Range Selection

The PS-550AC has dual output ranges which are selected by positioning jumpers on the printed circuit board.

WARNING!

The PS-550AC Power Supply produces lethal voltages. Ensure that input power is disconnected and storage capacitors have been discharged before beginning any inspection or internal adjustment.

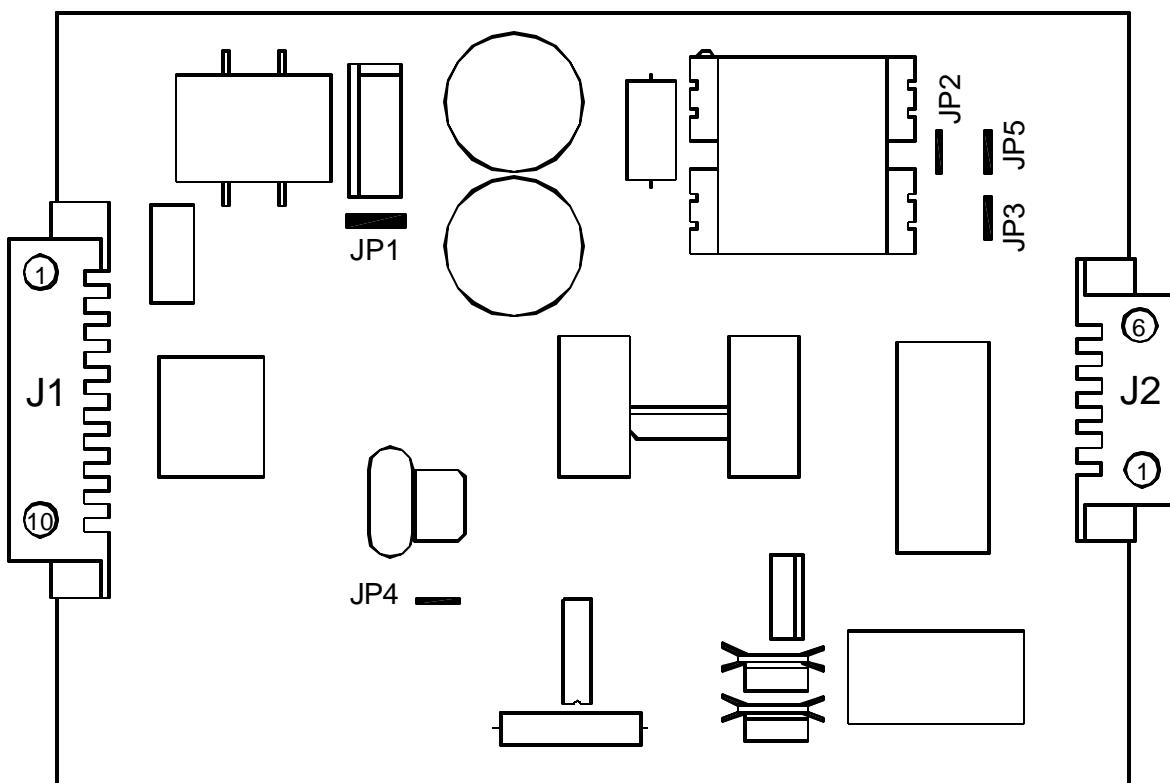


Figure 5. PC-550AC Printed Circuit Board

WARNING!

The output voltage of the PS-550AC MUST be limited to match the specifications of those components to which it is connected. Exposing any system component to voltage (or any other operating condition) that exceeds its rating can result in damage to the unit and personal injury.

The output voltage range is selected by placing a jumper *pair* (zero ohm resistors) in one of two configurations on the printed circuit board (see Figure 5):

The unit is set to the HIGH range at the factory with the pair of jumpers in the JP4 and JP5 positions. (JP4 is located in the lower center area of the board.) The HIGH output range is 450 to 1500VDC, corresponding to 150 volts output per volt of input (control voltage, V_{ref}).

The LOW range may be selected by relocating the pair of jumpers to the JP2 and JP3 positions. The LOW output range is 225 to 750VDC, corresponding to 75 volts output per volt of input (control voltage, V_{ref}).

5.2. Output Voltage Adjustment Mode Selection

The output voltage in each of the ranges can be adjusted through the use of internal or external control methods.

The output voltage level can be controlled by an external reference voltage of 3 to 10VDC placed on pin 7 of the input connector J1, with the return on pin 4 or 5.

For internal control, pins 6 and 7 of the input connector J1 must be jumpered. The output voltage level can then be set by adjusting the potentiometer RV1 on the printed circuit board.

5.3. Interconnections

Once operating conditions have been determined, make input and output connections according to Figure 7. Keep lead lengths as short as possible.

Connectors J1 and J2 are Wago Type 238 modular terminal strips, illustrated in Figure 6.

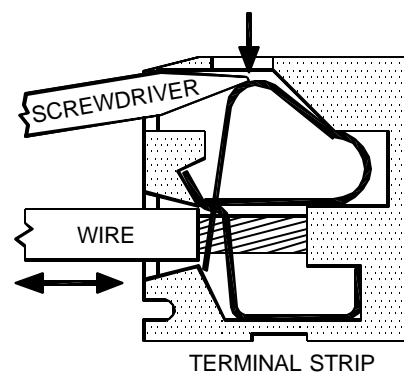
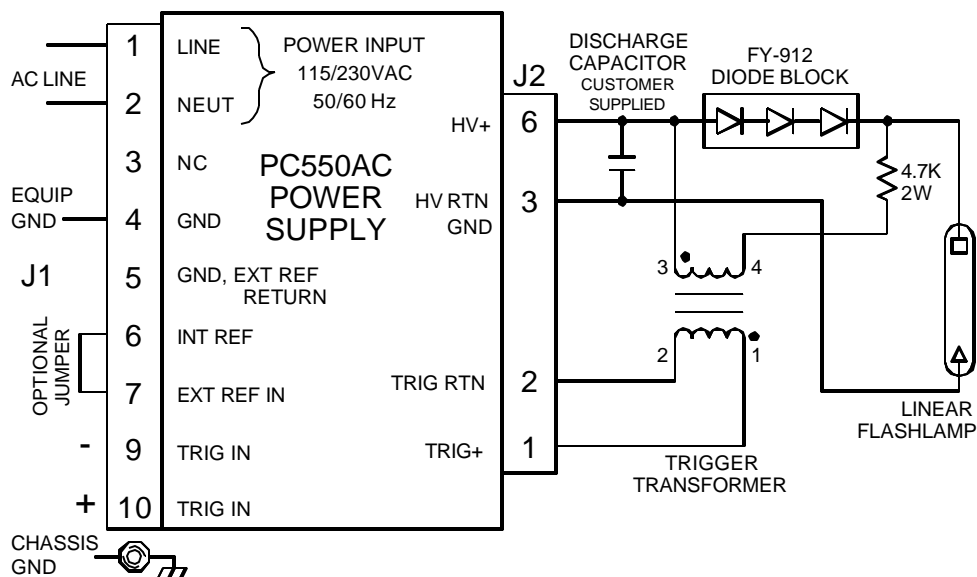


Figure 6. Terminal Strip Cross Section



**Figure 7. Typical Input and Output Connections for Linear Lamps
(Pseudo-Series Triggering)**

6. MAINTENANCE

6.1. Repairs

The PS-550AC Power Supply is, generally speaking, a trouble-free unit. No routine maintenance or repair is required.

In the event that the unit fails or does not function properly, it is strongly suggested that no attempt be made to troubleshoot. Field repairs or customer modifications are not authorized, and, if attempted, will void the warranty. Repairs must be made only by factory-trained personnel.

6.2. Re-packing and Storage

If the PS-550AC unit is to be stored for a prolonged period, shipped to another location, or returned to the factory for repair, it should be repacked in the original packaging material. If the packaging material has been discarded, the unit should be packaged in a suitable container with sufficient protective material to ensure that the unit cannot move within the package and is protected from damage that could occur from improper handling.

If the unit is to be stored for a prolonged period, the storage area should be dry, at a temperature of -40°F to +194°F (-40°C to +90°C).