

# INSTRUCTION MANUAL

## XENON POWER SUPPLY

700 - 2500 Watt

220 Volt Equipment Type

62-00014 • 62-00015

62-00091 • 62-00093

62-00002 (Export)

Rev. October 2008



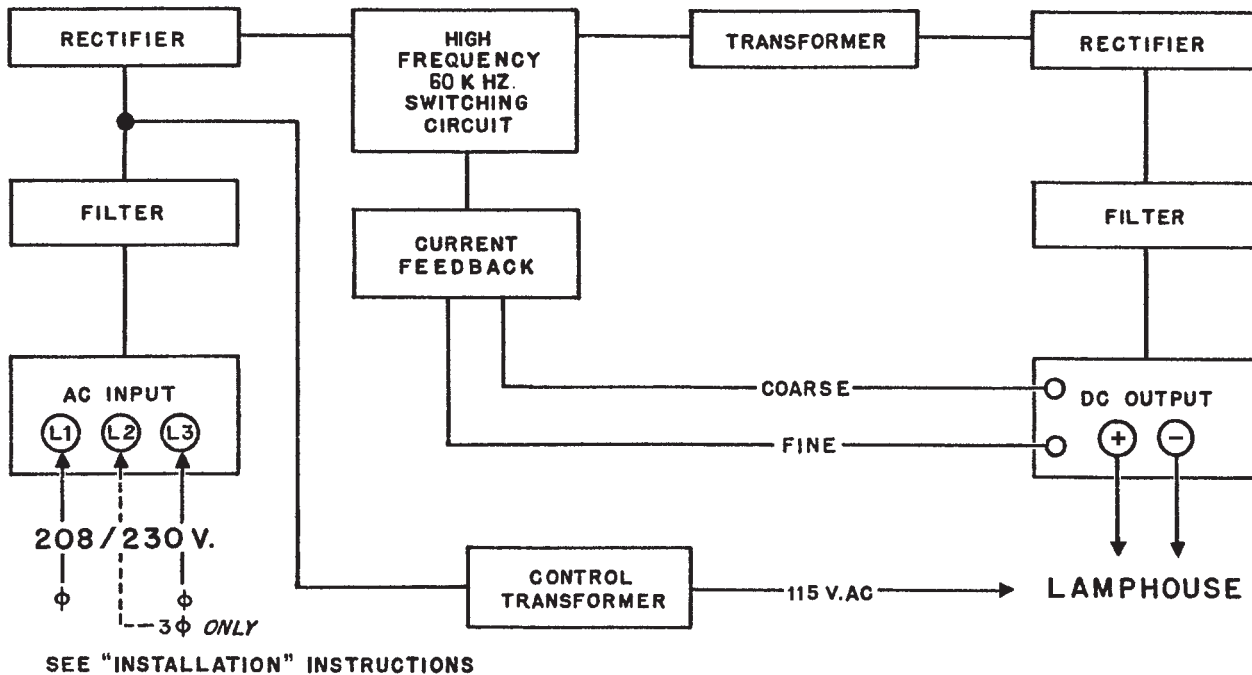
## **STRONG INTERNATIONAL**

a division of Ballantyne of Omaha, Inc.

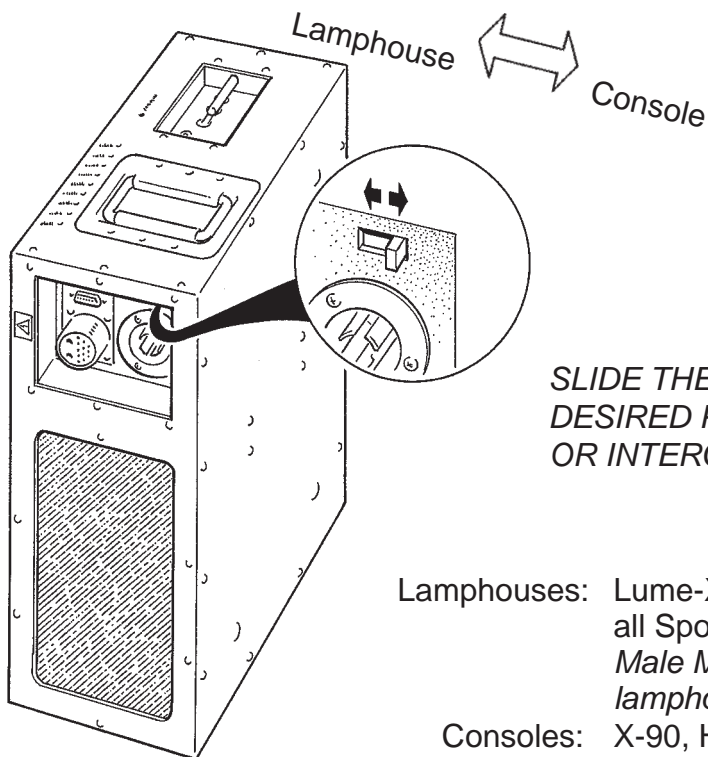
4350 McKinley Street

Omaha, Nebraska 68112 USA

Tel 402/453-4444 • Fax 402/453-7238



**NOTE:** Types 62-00014 and 62-00002 (with MS Connector) may be used for either Console or Lamphouse applications. A Selector Switch is located adjacent to the AC power input receptacle which allows the installer to select the desired application.



**SLIDE THE SELECTOR SWITCH TO THE DESIRED POSITION BEFORE ENERGIZING OR INTERCONNECTING TO LAMPHOUSE.**

- Lamphouses: Lume-X, Super Lume-X, Super 80, (including all Spotlight models), Ultra 80  
*Male MS Connector is optional on Cinema lamphouse cables*
- Consoles: X-90, Highlight II & IIA, Super Highlight II

## PREFACE

THIS STRONG INTERNATIONAL switching-type power supply is designed to operate a xenon bulb in all theatrical lighting applications for Strong lamphouses. This unit will operate all xenon bulbs rated from 700 to 2500 watts throughout their full operating ranges (18-26 V.DC, 25-100 A.DC). The power requirement for this unit is 208/230 (200-240) V.AC, 30 amperes single or three phase, 50/60 Hertz.

INCOMING LINE POWER is transformed from 208/230 volts AC to a low voltage, high current DC output. The incoming AC line is filtered to eliminate noise and is then converted to DC. This DC voltage is switched on and off by a solid state switching circuit, and converted to a 60 kHz. square wave. The square wave is fed into output transformers to provide low voltage and high current. Rectifiers convert the 60 kHz. signal to DC, and the output is filtered to eliminate noise and ripple. Output to the xenon bulb is adjustable through use of potentiometers.

A STEPDOWN TRANSFORMER reduces the incoming line to 120 V.AC to power the lamphouse igniter and blower(s). A separate three ampere circuit breaker protects the control circuit in the event of a lamphouse component malfunction.

PROTECTIVE CIRCUITS include a high temperature limit switch and under- and overvoltage detection. The thermal switch will open and interrupt power supply operation if internal temperatures exceed 175° F. (80° C.). A drop in AC line voltage, reducing AC supply to inadequate levels, or a high voltage AC spike, will also disable the power supply until the voltage is corrected.

A MULTI-PIN MS RECEPTACLE is standard on units supplied for use with Strong follow spotlights and projection consoles. A lamphouse termination panel is used for motion picture or studio applications using Strong lamphouses without the corresponding MS plug.

## NOTICE



REFER ALL SERVICING of this unit to an authorized Strong International Equipment Dealer. The Switching-Type Xenon Power Supply employs solid state circuitry requiring sophisticated diagnostic equipment not generally available to field service personnel. Hazardous high voltages exist within the power supply cabinet.



## INSTALLATION - OPERATION



**CAUTION:** This equipment operates at hazardous voltages, and should be operated by qualified, trained personnel *only*. Do not remove power supply cover panels when the unit is energized.

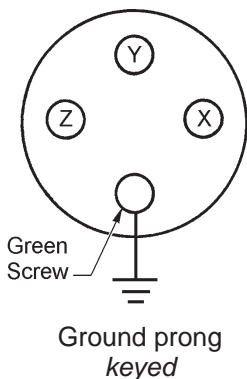


When positioning the power supply, allow several inches clearance around the power supply cabinet for unobstructed air flow. If the intake or outlet grilles are blocked, thermal switches will shut the unit off to prevent heat damage.

Connect the lamphouse DC and control leads to the output side of the power supply prior to connecting to AC power. Lamphouse to power supply connections, when not terminated in a MS plug, are illustrated on the INTERCONNECTION DIAGRAM in the lamphouse instruction manual. Make certain the lamphouse ground lead is connected.

Power leads run to the unit must be of the correct size and type to conform to local codes. Shield in conduit as required. The power supply will not energize until the circuit breakers on the side of the cabinet are placed in the ON position.

A four-prong, female plug (Part No. 21-40216) is furnished to mate to the AC receptacle mounted to the power supply. Connect 208/230 V.AC three phase input to terminals X, Y, and Z. Connect single phase input to terminals X and Z *only*. Single or three phase neutral is not required for installation of this unit. Attach an adequate earth ground to the green ground terminal.



In areas using 380/440 V.AC three phase power (Europe, etc.), connect the unit for single phase operation only, using (1) brown *phase* line on X and a blue *neutral* on Z. AC input as measured across connector terminals X and Z must not exceed 240 V.AC. Attach an adequate earth ground (yellow/green wire) to the green ground terminal.

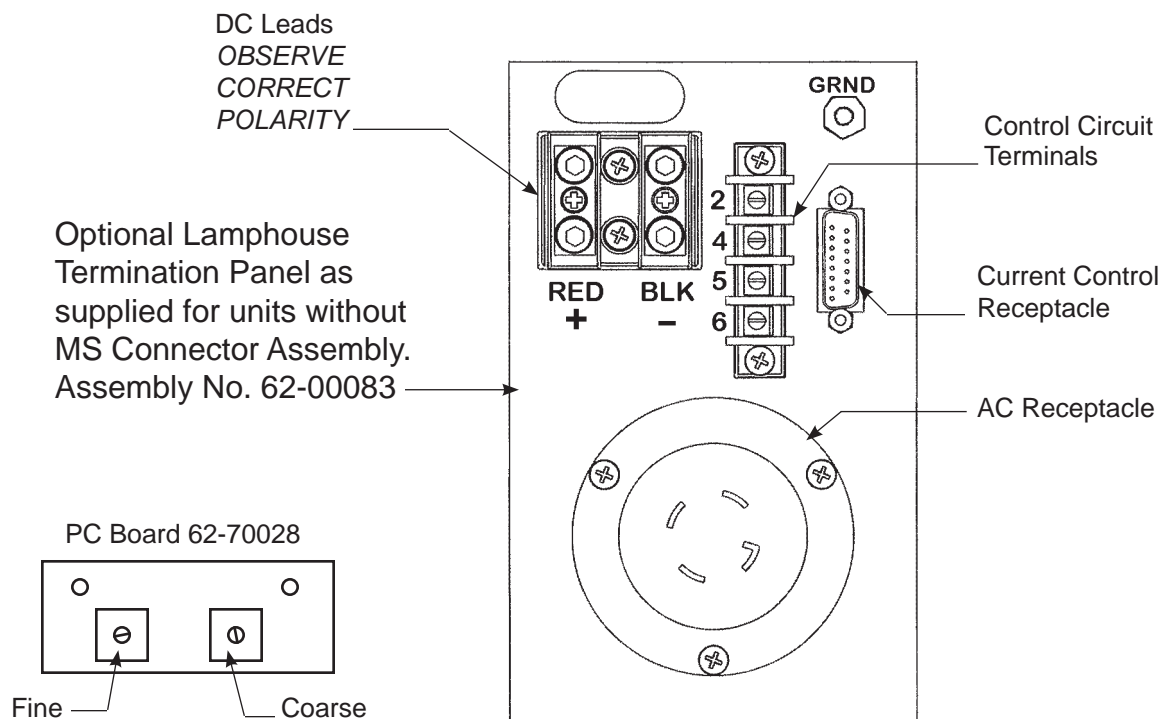
See the warranty information packed with the xenon bulb for correct operating current. Do not, at any time, exceed the maximum current level specified by the bulb manufacturer.

Current output to the bulb is set through use of the adjustment potentiometer(s). If installed in a Strong Xenon Projection Console, the adjustment potentiometer (62-70032) is generally remoted to the console control panel. When the remote option is not utilized, a potentiometer printed circuit board assembly (62-70028) is connected directly to the current control receptacle.

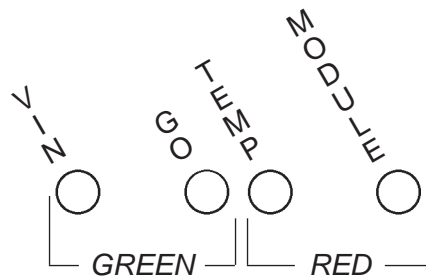
Check the lamphouse ammeter upon the first bulb ignition, and adjust the current control potentiometer to set the desired bulb current. On Strong projection consoles, this potentiometer is usually remoted to the lamphouse control panel adjacent to the ammeter. Rotate the potentiometer clockwise to increase current, or counterclockwise to reduce current. When the potentiometer printed circuit board assembly is used in place of a remote control assembly, a second (fine) adjustment potentiometer is included for output changes in small increments. The PC board is marked *coarse* and *fine* to identify the (2) potentiometers.

The stepdown transformer for the lamphouse control circuit is factory prewired. Terminals 2 & 4 supply 120 V.AC to the lamphouse. After completing the lamphouse interlock circuit, the 120 V.AC returns to the power supply on wires 5 & 6 to energize the control printed circuit board at plug PL5 upon closure of the LAMP ON switch. The same circuit (5 & 6) energizes the AC lamphouse igniter.

The DC Pulse Igniter used in some Strong lamphouses does not require the AC control voltage supplied on 5 & 6, but will be actuated from the high DC open circuit (“no load”) voltage normally generated by the power supply. The DC voltage will fall to a lower sustaining level (18 - 26 V.DC) after the xenon bulb ignites, and the DC Pulse Igniter will cease operation when the DC voltage drops below 130 V.DC.



## INDICATOR LIGHTS



WHEN BOTH of the green indicator lights are glowing, the power supply is operating normally and trouble-free. A red light, when glowing, indicates that a problem exists, and disables operation of the power supply.

### GREEN LIGHTS:

- VIN:** Indicates that the AC input voltage is within the correct range (200-240 V.AC).  
**GO:** Indicates that the lamphouse interlock circuit is complete, and that DC power is being applied to the xenon bulb.

### RED LIGHTS:

- TEMP:** Indicates that the unit is overheated.  
**MODULE:** Indicates that one or more fuses on the primary boards have opened.

## MAINTENANCE

The power supply requires very little service to insure correct operation. Periodically check all electrical connections for tightness and condition, especially those in the DC circuit. Discolored terminals may indicate oxidation which will increase resistance.

Clean the ventilation inlet and outlet grilles on a regular basis to insure good air flow. Thermal switches mounted to the power supply will interrupt operation of the power supply in the event of overheating.

The blower motors are permanently lubricated. The power supply cabinet includes (2) blowers and requires operation of both *fully functional* blowers for correct operation. In the event of a blower failure, a replacement blower must be installed immediately.

Service interruptions because of low (below 200 V.) or high (over 240 V.) AC input require adjustments to the AC supply line. To protect the equipment, voltage level protection *cannot* be bypassed.

## TROUBLESHOOTING

*See Lamphouse Manual Before Troubleshooting Power Supply*

### **Lamphouse Blower(s) Not Operating; Power Light “ON,” Circuit Breaker “ON”**

1. Lamphouse interlock switch open. See lamphouse manual.
2. Three ampere circuit breaker is tripped. Press to reset.
3. Improper AC input connection. Check AC voltage at contactor terminals; should read 200 - 240 V.AC across input terminals (X, Y, Z for three phase; X & Z only for single phase).
4. Miswired output on terminals 2 & 4. Should read 100 - 120 V.AC; check wire numbers.
5. Defective circuit breaker. Check resistance across circuit breaker CB1 with supply OFF; should measure 0 Ohms. Replace as required.
6. Defective filter board. Check across each leg of the filter board input and output; voltage should measure 200 - 240 V.AC. Replace as required.
7. Defective stepdown transformer T6. Check input voltage at X & Z; should measure 200 - 240 V.AC. Check output voltage at 2 & 4; should measure 100 - 120 V.AC. Replace if defective.
8. Improper AC connections in lamphouse. Check AC voltage at 2 & 4 in lamphouse; voltage should measure 100 - 120 V.AC; check wire numbers.
- 8a. Gladiator III & Ultra 80 lamphouse: wires 7 & 8 should measure 220 V.AC.
9. Lamphouse blower fuse blown (if applicable). See schematic in lamphouse manual.
10. Defective lamphouse blower. Check AC voltage at blower motor inputs; should measure 100 - 120 V.AC (Gladiator III & Ultra 80 lamphouse blower: 220 V.AC). Replace if defective.
11. Current Control potentiometer assembly not connected; pico fuse (early model potentiometer assembly) open. Repair or replace.

### **Lamphouse Blower(s) Operate, but Power Supply GO Indicator does not glow**

1. No voltage on terminals 5 & 6. Possible open interlock switch in lamphouse or power supply; check air flow and interlock switches and interlock connections.
2. Incorrect setting of lamphouse MODE (AUTO - MAN.) switch. See lamphouse manual.
3. Faulty remote or automation contact (if using lamphouse in AUTO mode).
4. No voltage on terminals 5 & 6. Check for 120 V.AC at control PC board PL5. If no voltage, check for loose connection or broken wire.
5. Defective control PC board. Check for 20 V.DC at U14 pin 2 & ground test point on power supply control board. Check for 120 V.AC on PL5. If voltages present and GO light does not glow, *consult factory*.
6. Power supply overheated (red TEMP light glowing; open thermal switches). Check for correct blower operation and unobstructed air flow in power supply cabinet. Thermal switches will open if temperatures inside the power supply cabinet exceed 175° Fahrenheit (80° Celsius).

## TROUBLESHOOTING (continued)

### **Xenon Bulb Fails to Ignite; Blowers Operating, GO Indicator glowing**

1. Defective or expired xenon bulb. Replace as required.
2. Potentiometer assembly turned down; potentiometer defective.
3. Incorrect igniter printed circuit board. Strong AC type igniters should be connected to high voltage igniter PC board (Part No. 40913, 65992B, or equivalent).
4. Check DC no load output voltage. Should measure 150 - 180 V.DC; if lower, *consult factory*.
5. Faulty DC output connection. Check and correct as required. Tighten connections securely.
6. No DC voltage output. Blown fuse on primary board; allow power supply twenty minutes (power OFF) to discharge capacitors before removing fuse. Good fuse should measure 0 Ohms; replace as required. If fuse blows repeatedly, *consult factory*.
7. Defective igniter. Allow unit to cool and attempt re-ignition. Check DC voltage at output; should measure 150 V.DC or higher. If voltage is correct, check DC connections in lamphouse and power supply; tighten securely. Attempt re-ignition; if no ping is audible in the lamphouse, replace igniter. If ping is audible, but no flash is apparent, check for lamphouse DC lead shorting to ground. If ping is heard and arc is visible between bulb electrodes, and bulb fails to ignite, replace bulb.

### **Xenon Bulb Goes Out During Operation (Intermittent Operation)**

1. Defective or expired xenon bulb. Replace as required.
2. Fault in lamphouse interlock circuit (loose access door, inadequate exhaust draft). See lamp-house manual.
3. Power supply overheated. Check for blower operation and unobstructed air flow in power supply enclosure. Thermal switches will open if heat sink temperatures exceed 175° Fahrenheit (80° Celsius).
4. Brown-out (voltage drop) or spike (voltage surge) in AC supply. Measure AC source.

### **No Output Current Adjustment**

1. Defective power module. *Consult factory*.

Xenon Power Supplies, Lamphouse Igniters, and other components shipped to the factory for credit, repair or repair/exchange must be returned through an authorized Strong International Equipment Dealer. Contact your Strong International Dealer for a **Return Authorization** and instructions prior to shipping any goods to Strong.



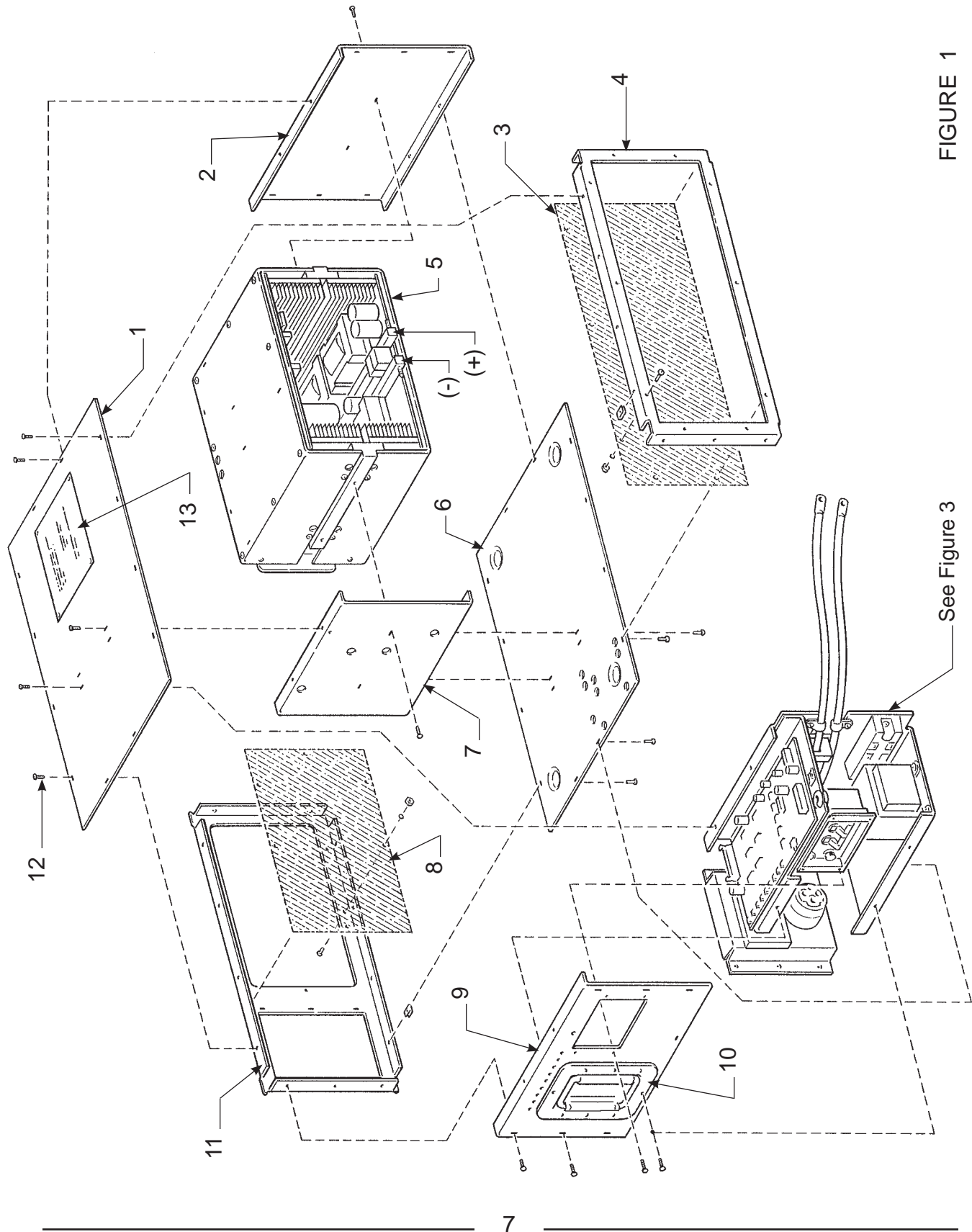


FIGURE 1

See Figure 3

## PARTS LIST

Figure 1

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	62-00041	Top Cover Panel
2	62-00036	Side Panel (Left)
3	62-00034	Vented Panel, Rear
4	62-00027	Rear Panel Bracket
5	62-00046	Power Module (See Figure 2)
6	62-00042	Base Plate
7	62-00037	Brace Panel
8	62-"00028	Vented Panel, Front
9	62-00039	Side Panel (Right)
10	77271000	Handle, Spring-Loaded
11	62-00026	Front Panel Bracket (62-00014, 62-00002)
11	62-00080	Front Panel Bracket (62-00015)
12	4080370	Panel Mounting Screw, 8-32 x 3/8"
13	62-80036	Name & Data Plate

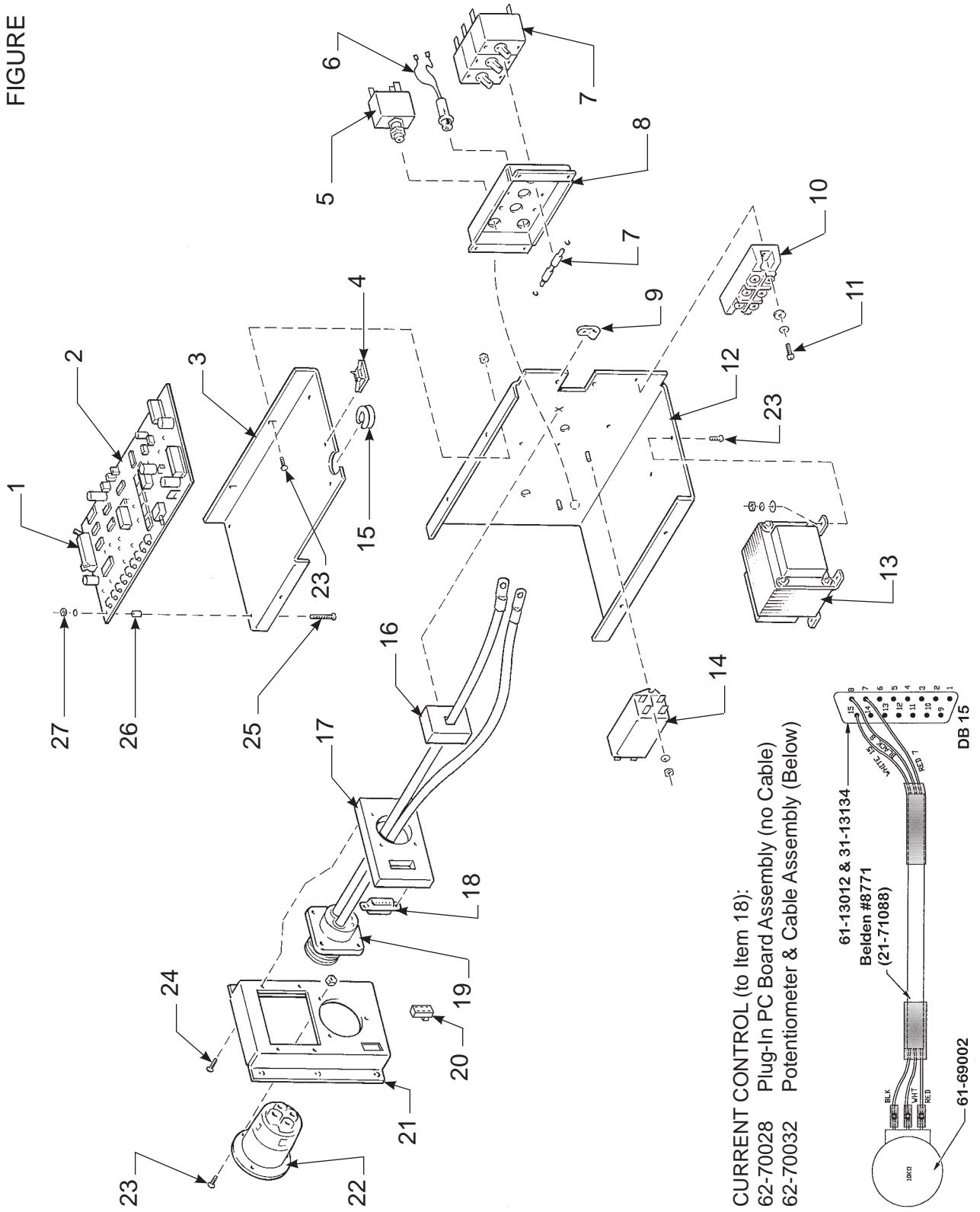


## PARTS LIST

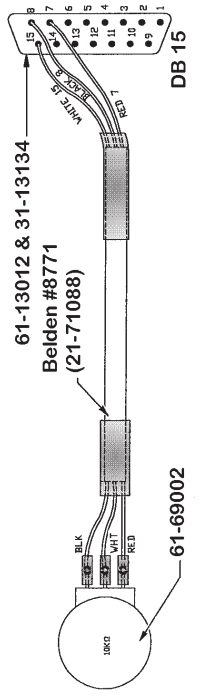
Figure 2

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	62-00045	Faraday Shield (2 req'd.)
2	4060250	Screw, 6-32 x 1/4" Bind Head
-	4067001	Lockwasher, #6
3	4061001	Screw, 6-32 x 1" Brass
4	61-98031	Spacer, #6 x 1/4"
5	62-20021	Insulated Support
6	4080502	Screw, 8-32 x 1/2" Socket Head
7	61-98002	Fan, 115 V.AC, 50/60 Hz.
8	88253000	Cord & Molded Plug
9	62-00009	Fan Panel
10	4060620	Screw, 6-32 x 5/8" Phillips Head
11	61127000	Fan Clip, 6-32
12	62-70015	Primary Module Assembly
-	81-21001	Fuse, 15 Ampere (2 req'd.)
13	62-20027	Primary Buss Bar
14	62-70020	Secondary Module Assembly
15	62-20028	Output Buss Bar
16	4258002	Locknut, 1/4-20
-	61-70002	Spring Washer
17	4060250	Screw, 6-32 x 1/4" Bind Head
18	4080370	Screw, 8-32 x 3/8" Phillips Head

FIGURE 3



CURRENT CONTROL (to Item 18):  
 62-70028 Plug-In PC Board Assembly (no Cable)  
 62-70032 Potentiometer & Cable Assembly (Below)



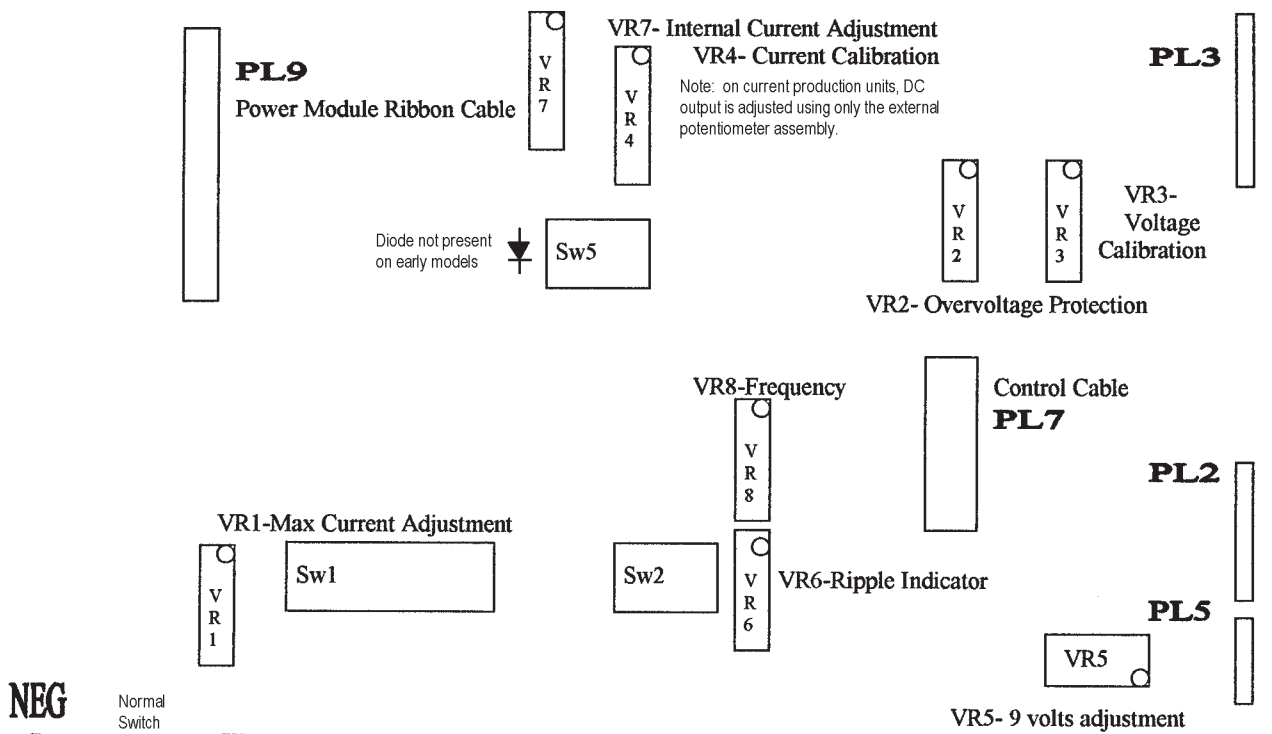
## PARTS LIST

Figure 3

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	61-71013	Ribbon Cable Assembly
2	61-72015	Control Printed Circuit Board Assembly
3	62-40120	Chassis, Control PCB
4	21-10003	Wire Tie Mount, Self-Adhesive
5	61-61002	Circuit Breaker, 3 Ampere 1 phase
5	21-21039	Fuse Holder (current production)
-	21-21017	Fuse, 3 A.
6	61-30001	Indicator Light, Red
7	61-61001	Circuit Breaker, 30 Ampere 3 phase
8	62-00040	Circuit Breaker Mounting Panel
9	41-10029	Cable Clamp, Nylon
10	61-17001	Diode Bridge
11	41-51078	Screw, 8-32 x 7/8" Bind Head
12	62-00043	Chassis Bracket
13	62-70023	Stepdown Transformer, AC Control
14	61-98035	Line Filter
15	41-98045	Grommet
16	62-70026	LEM Harness
17	62-40128	MS Receptacle Mounting Panel
18	61-13007	Amphenol Plug, DB15
19	62-70025	MS Connector, Wired Assembly (with Item 20)
-	88319000	MS Receptacle, (14) Pin Female
20	61-61008	Slide Switch, DPDT 10 A. (not req'd on 62-00015)
21	62-00038	Mounting Plate
22	61-40007	AC Input Receptacle, 30 Ampere Hubbell
-	21-40216	AC Power Input Plug ( <i>not shown</i> )
-	62-70035	AC Power Cord (Spotlight models; <i>not shown</i> )
23	4080370	Screw, 8-32 x 3/8" Phillips Head
24	4060620	Screw, 6-32 x 5/8" Phillips Head
25	4040500	Screw, 4-40 x 1/2" Bind Head
26	51-56002	Nylon Spacer
27	4048001	Hexnut, 4-40
-	4047001	Lockwasher, #4

NOT SHOWN (see Page 3)

62-00083	Lamphouse Termination Panel	61-62014	Barrier Strip, (2) Terminal (DC)
62-00082	Panel Bracket (less components)	21-62059	Barrier Strip, (4) Terminal (AC)
62-00081	Cover, Lamphouse Termination Panel	62-70034	DB Connector Assembly
61-98039	Strain Relief Bushing, Cover	61-13007	DB Connector, (15) Pin
41-35088	Locknut for Bushing	61-40007	AC Receptacle, (4) Prong



**NEG**  
 ○  
 ○  
**POS**

Normal Switch Setting

- SW1**
- on 1. (a) Master Enable--- If **OFF** will disable SW1 2 thru 5
  - on 2. (b) Aux. Volts Good
  - on 3. (c) Input Volts Good
  - on 4. (d) Power Section Good
  - on 5. (e) Xenon On
  - on 6. (f) Master Override- If **OFF** will allow supply to operate
  - off 7. (g) Short Circuit---If **ON** will shut supply off when the output is shorted.
  - off 8. (h) Not used
- If switches are **ON**, unit will operate only if L.E.D.'s light.
- SW2**
- on 1. (a) Master Inhibit---In the **OFF** position--will disable switches SW2-2, SW2-3 and SW1-7
  - on 2. (b) Thermal Inhibit---In the **ON** position--will shut supply off, if too hot.
  - off 3. (c) Open circuit, short circuit or strike failure- If **ON** position-- will turn power supply off.
  - on 4. (d) Selects the external Current Control
- SW5**
- off 1. (a) Overvoltage shutoff--- If **ON** -will turn power supply off if voltage goes high
  - on 2. (b) Selects local Current control --**On** is for control at PCB. **OFF** is for External Control.
  - on 3. (c) Selects local master --Must be On unless the power supply is a slave unit.
  - off 4. (d) Remote master --Must be turned on if unit is a master and there are slaves connected to it.

- PL7**
- |       |                       |
|-------|-----------------------|
| Pin # |                       |
| 1.    | Com signal            |
| 2.    | V signal ( 20 mv/v)   |
| 3.    | I signal ( 20 mv/a)   |
| 4.    | 9v power return       |
| 5.    | Go signal input (+9v) |
| 6.    | +9v out               |
| 7.    | Power Section fault   |
| 8.    | Enable fault          |
| 9.    | Inhibit fault         |
| 12.   | I adjust fine         |
| 13.   | +9v signal            |
| 14.   | I adjust course       |

- PL2**
- |       |                 |
|-------|-----------------|
| Pin # |                 |
| 6.    | } <b>9 VAC</b>  |
| 7.    |                 |
| 9.    | } <b>18 VAC</b> |
| 10.   |                 |

- PL3**
- |       |               |
|-------|---------------|
| Pin # |               |
| 1.    | -1.2 V        |
| 2.    | +20 V         |
| 3.    | Com. signal   |
| 4.    | DCCT signal V |
| 5.    | I DCCT signal |
| 6.    | } Master/     |
| 7.    |               |

- PL 5**
- |       |                 |
|-------|-----------------|
| Pin # |                 |
| 1.    | 110 V common    |
| 2.    | 110 V go signal |

- DB 15 Connector**
- |       |                     |
|-------|---------------------|
| Pin # |                     |
| 1.    | Com Signal          |
| 2.    | I Signal (20mv/a)   |
| 3.    | GO Signal Input     |
| 4.    | Power Section Fault |
| 5.    | Inhibit Fault       |
| 6.    | (not used)          |
| 7.    | +9 V.               |
| 8.    | +9 V. Return        |
| 9.    | V Signal (20 mv/v)  |
| 10.   | +9 V. Return        |
| 11.   | +9 V.               |
| 12.   | Enable Fault        |
| 13.   | (not used)          |
| 14.   | I Adjust Fine       |
| 15.   | I Adjust Coarse     |

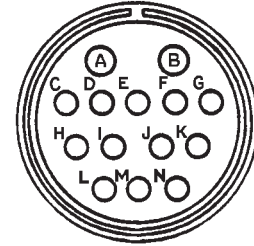
FIGURE 4

CONTROL PC BOARD, Component Functions

APPENDIX “A” - MS Connector Assembly

Type 62-80107, 62-80110 (for Consoles only)

A	DC- (Blk)	B	DC+ (Red)
C	#2 (Orn) & (Blk)	D	Unused
E	#4 (Orn)	F	#5 Jumper to E (Blk)
G	#6 (Blk)		



Modification for use with Spotlight or other non-console lamphouse: Remove the jumper from between Pin E & F; remove black lead from Pin C and relocate to Pin F. This will supply 110 V.AC to the main board for the **GO** light.

Type 62-80106, 62-80108, 62-80113, 62-00014 (with CONSOLE/SPOTLIGHT Switch)

With the switch in the DOWN (out) position, the switch will set the jumpers between Pin E (#4) and Pin F (#5) for Console use:

A	DC- (Blk)	B	DC+ (Red)
C	#2 (Orn)	D	Unused
E	#4 (Orn); jumper to F thru Switch	F	#5 (Blk) jumpered to E thru Switch
G	#6 (Blk)	H	Unused
I	#7 (Blk) 220 V.AC	J	#8 (Blk) 220 V.AC
M	Ground (Grn)		

With the switch in the UP (in) position, the switch removes the jumpers between Pin E (#4) and Pin F (#5) for Spotlight & Lamphouse\* use:

A	DC- (Blk)	B	DC+ (Red)
C	#2 (Orn)	D	Unused
E	#4 (Orn)	F	#5 (Blk)
G	#6 (Blk)	H	Unused
I	#7 (Blk) 220 V.AC	J	#8 (Blk) 220 V.AC
M	Ground (Grn)		

\*Lume-X, Super Lume-X, Super 80



## APPENDIX B - X-90 Modification

### Replacing Version 0 Strong Switching Power Supply with Ver. 1/Ver. 2

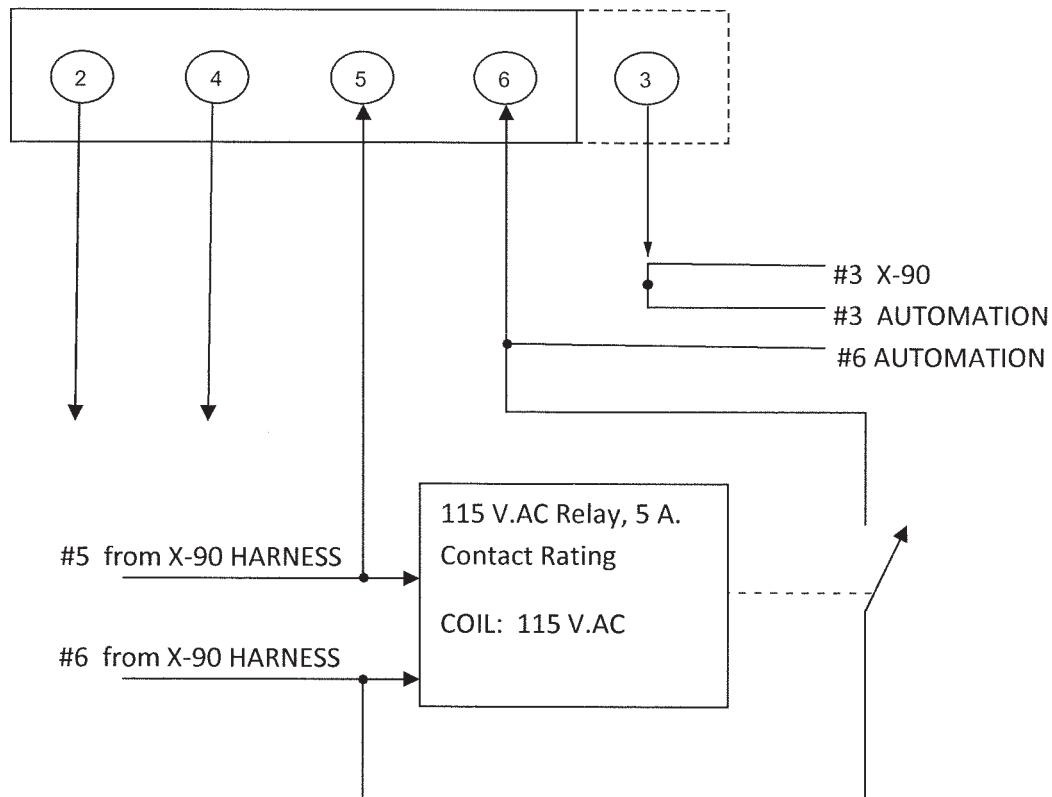
Ver. 0 = Type No. 62-800xx (black cabinet with POWER light)

Ver. 1 = Type No. 62-801xx (smaller black cabinet with 9 L.E.D.'s)

Ver. 2 = Type No. 62000xx (grey cabinet with 4 L.E.D.'s)

When installing a replacement V1 or V2 Electronic Switching Ballast into an X-90 Strong Xenon Projection Console, it may be necessary to add a 115 volt AC isolation relay to prevent the switcher from enabling. The X-90 suppression capacitors allow approximately 30 to 35 volts AC of leakage on the interlock return wires #5 and #6. This low-level AC voltage is sufficient to “turn on” the later model switcher’s electronic control board, causing the switcher’s green L.E.D. (XENON ON or “GO”) to blink on and off.

The newer V1 and V2 power supply will not have a #3 terminal. When installing the replacement unit, remove the wires from the V0 terminal 3 and tie them together as shown.



Install the customer-supplied (i.e. Radio Shack) 115 V.AC Coil Relay Single Pole/Single Throw with contact rating of 5 A. as pictured above

