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INSTRUCTION MANUAL

XENON POWER SUPPLY

High Reactance Type HRPS

Rev. August 2002

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CONTENTS

PREFACE

THE HRPS XENON POWER SUPPLY manufactured by Strong International is a high reactance unit utilizing silicon diodes as the power conversion elements. All models are designed for 50/60 Hertz operation, and are available in varying AC input types, depending upon the configuration of the main power transformer. Check the Equipment Data Plate to determine the exact AC requirement prior to installation.

COARSE AND FINE TAPS are easily set to regulate the DC current to the xenon bulb. Some models of HRPS power supplies have the capability of overdriving a xenon bulb; carefully check the power requirements specified by the bulb manufacturer and do not exceed the maximum current stated.

DC OUTPUT to the xenon bulb is filtered by means of filter capacitors. A relay-operated resistor circuit reduces the inrush current upon ignition to prolong bulb life. Suppression capacitors prevent RF interference in the theatre sound system.

OVERSIZE HEAT SINKS disperse the heat normally generated by the silicon diodes. High-wattage power supplies include an internally wired blower for additional heat dissipation. Thermal switches act as safety interlocks to shut down the power supply and protect the rectifier diodes in case temperatures reach excessive levels.

INSTALLATION

CHECK THE EQUIPMENT DATA PLATE and make certain that the AC source conforms to the power requirements of the main transformer. See the Installation Diagrams on Pages 5 & 6 for detailed AC hook-up, line protection, and lamp connections. The AC service wiring should be installed by a licensed electrician in conformance to local codes. The unit must be connected to an adequate earth ground.

THE AC LINE to the console must include a marked line safety switch or other power disconnect device adjacent to the unit and accessible to the operator. For operator safety, it is necessary to turn off all power to the unit when adjusting or servicing the xenon power supply. This safety switch or power disconnect should be tagged “OFF - UNIT UNDER REPAIR” when the power supply is being serviced.

INSTALLATION (continued)

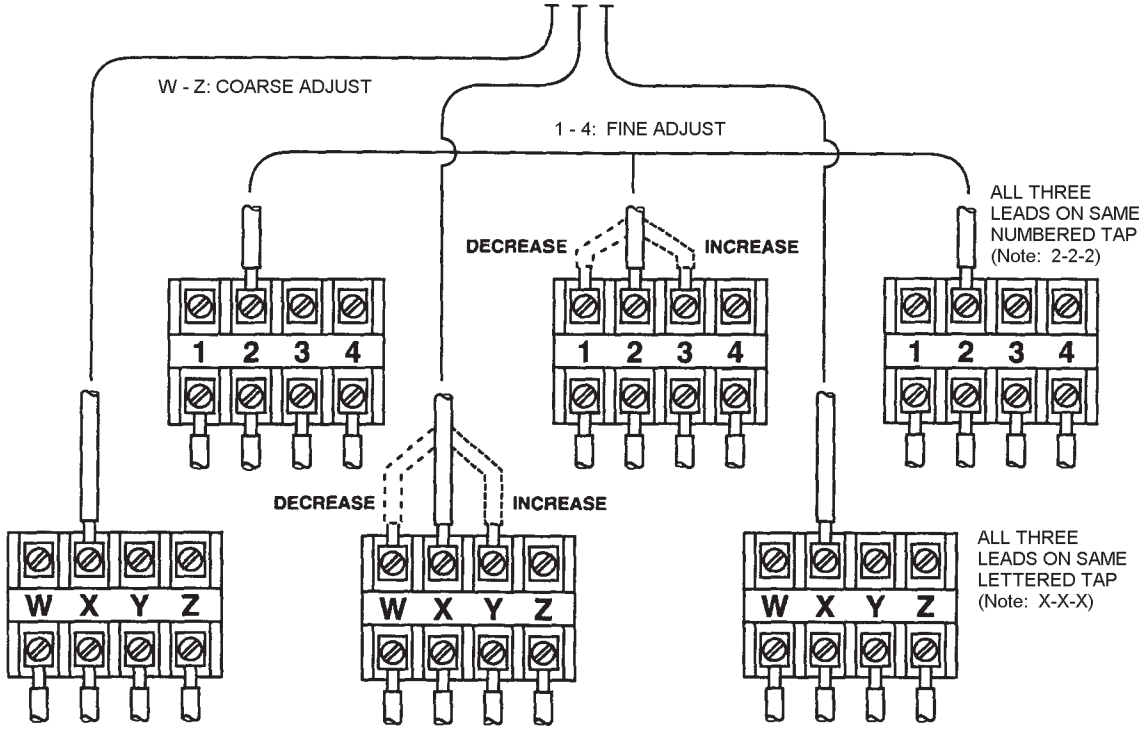
OBSERVING ALL SAFETY PROCEDURES, install a xenon bulb of the desired wattage into the lamphouse. Check the bulb manufacturer's documentation to determine the recommended current range of the bulb. A new bulb is normally first operated at "nominal" current, which is around 85% of the maximum level. DO NOT, at any time, exceed the maximum current level specified by the bulb manufacturer.

IGNITE THE XENON BULB and check the current as indicated on the lamphouse ammeter. Allow (30) seconds for the current to stabilize and provide an accurate reading. If the current is not within the desired range, extinguish the bulb. It will be necessary to increase or decrease the DC output.

OUTPUT CURRENT ADJUSTMENT

WARNING

Turn off ALL primary AC power before making any adjustments or performing service procedures. Allow several minutes for the capacitors to drain stored energy. The power supply normally operates warm to hot; allow the unit to cool to room temperature.



INSTALLATION (continued)

FINE ADJUSTMENT of the DC current is made to the *NUMBERED* taps found on the upper three terminal blocks (TB4, TB5, TB6). Fine taps are numbered 1-2-3-4, with "1" providing the **lowest** output, increasing to "4," yielding the **highest** output. A "fine" tap adjustment raises or lowers the current approximately four amperes. The three fine tap terminal blocks are interconnected by means of a three-lead jumper wire assembly attached to like-numbered terminals.

- To *increase* the DC output, move the jumper wire assembly to tap the next (3) *higher* numbered terminals, for example, move from terminals "2" to terminals "3." ALL TAPS MUST BE ON THE SAME NUMBERED POSITION (1-1-1, 2-2-2, 3-3-3, or 4-4-4). If the DC output is still too low when terminals "4" are interconnected, see the following instructions for adjusting *"coarse"* taps.

- To *decrease* the DC output, move the jumper wire assembly to tap the next (3) *lower* numbered terminals, for example, move from terminals "3" to terminals "2." ALL TAPS MUST BE ON THE SAME NUMBERED POSITION (1-1-1, 2-2-2, 3-3-3, or 4-4-4). If the DC output is still too high when terminals "1" are interconnected, see the following instructions for adjusting *"coarse"* taps.

COARSE ADJUSTMENT of the DC current is made to the *LETTERED* taps found on the lower three terminal blocks (TB1, TB2, TB3). Coarse taps are lettered W-X-Y-Z, with "W" providing the **lowest** output, increasing to "Z" at the **highest** output. The coarse tap terminals connect to contactor terminals T1, T2, and T3. The (3) contactor leads must connect to the same lettered step (W-W-W, etc.). A "coarse" tap adjustment raises or lowers the current approximately twelve amperes.

- To *increase* the coarse DC output, move each of the contactor leads to tap the next *higher* lettered terminals, for example, move from terminals "W" to terminals "X." ALL TAPS MUST BE ON THE SAME LETTERED POSITION (W-W-W, X-X-X, Y-Y-Y, or Z-Z-Z). Place the fine tap jumper on 1-1-1. Ignite the lamp, check the output, and increase the fine tap setting as required.

- To *decrease* the coarse DC output, move each of the contactor leads to tap the next *lower* lettered terminals, for example, move from terminals "Y" to terminals "X." ALL TAPS MUST BE ON THE SAME LETTERED POSITION (W-W-W, X-X-X, Y-Y-Y, or Z-Z-Z). Place the fine tap jumper on 1-1-1. Ignite the lamp, check the output, and increase the fine tap setting as required.

INSPECT TAP CONNECTIONS to verify that the terminal is clamping the copper conductor, not the insulation. Make certain all terminal clamping screws are tight.

WHENEVER MAKING A COARSE ADJUSTMENT, again check the lamphouse ammeter and make certain the current is within the desired range. A fine tap re-adjustment is frequently required after changing coarse taps.

INSTALLATION (continued)

AFTER PROLONGED OPERATION, the light output of the xenon bulb will decrease. This is a normal factor of bulb aging, and can be compensated by raising the DC output of the xenon power supply. If the bulb was first operated at "nominal" current, the power supply output can gradually be increased to, but not in excess of, he maximum current specified by the bulb manufacturer. Increase the current as instructed above. Decrease the power supply output to its former "nominal" current level upon the installation of a new replacement bulb.

MAINTENANCE

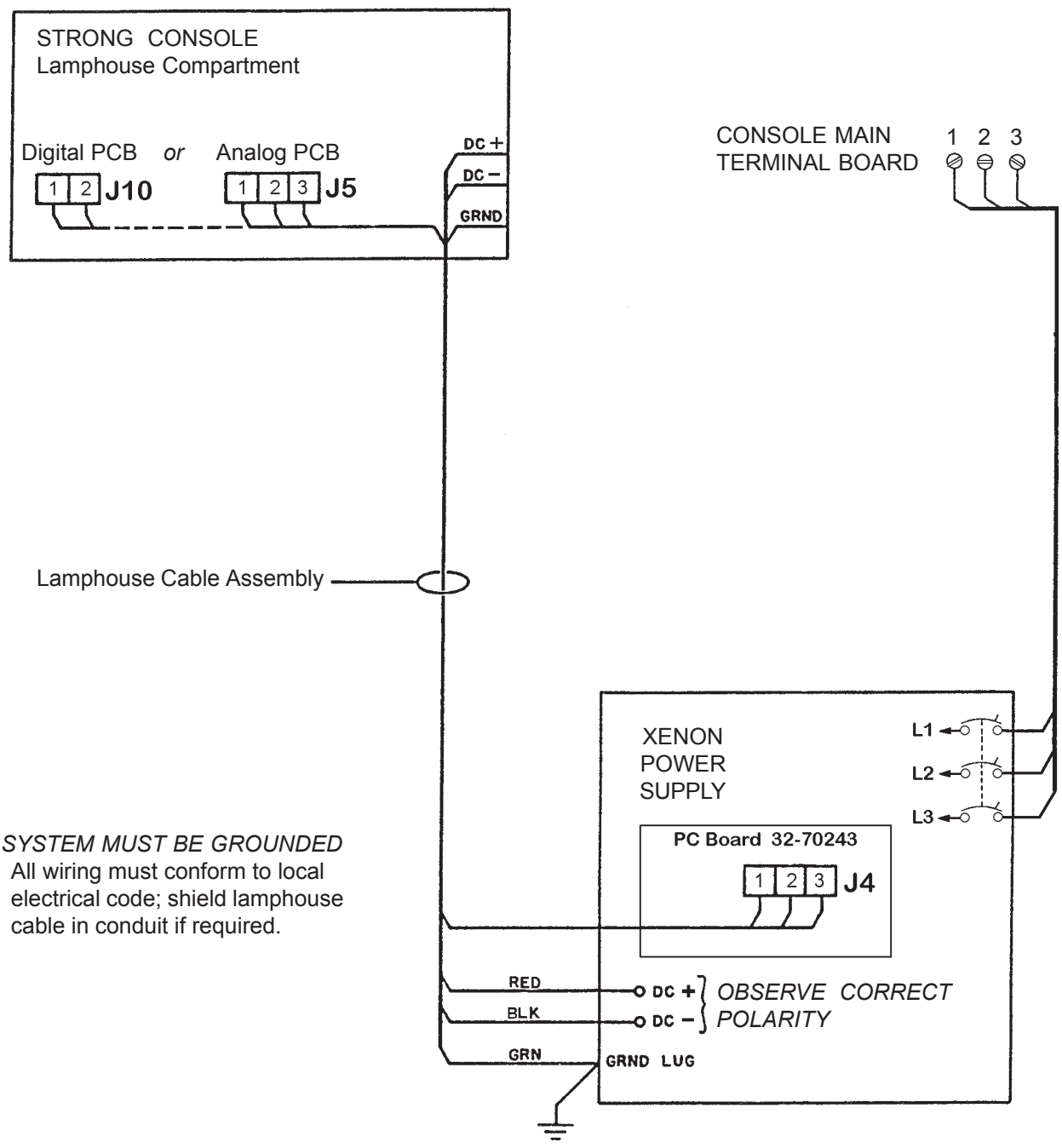
VERY LITTLE MAINTENANCE is required to keep this power supply in good operating condition. Like most booth equipment, regularly scheduled cleaning is most important.

WARNING

Turn off ALL primary AC power before making any adjustments or performing service procedures. Allow several minutes for the capacitors to drain stored energy. Allow the power supply to cool to room temperature.

1. Remove all accumulated dust and dirt from the rectifier. Vacuum the heat sinks. Make certain all air inlets and outlets are unobstructed.
2. Regularly check all electrical connections for tightness. Clean, retighten, or replace any discolored connections or terminals.
3. The blower motor contains sealed bearings and requires no lubrication.

INSTALLATION WIRING DIAGRAM
Console System



SYSTEM MUST BE GROUNDED
All wiring must conform to local electrical code; shield lamphouse cable in conduit if required.

TROUBLESHOOTING

WARNING: Exercise extreme caution when taking voltage measurements in a power "ON" condition. Allow the capacitors (2) minutes to discharge.

POWER LINE PROBLEMS

PRIMARY POWER (AC source) problems are most commonly (a) complete loss of AC power, or (b) phase loss, in which one phase loses power.

a) Check line safety switch ("ON"). Check fuses or breakers in supply line. Using an AC voltmeter, measure input power at contactor terminals L1, L2, L3.
b) When power is lost on one phase, the current ripple will increase and trip the AC line circuit breaker (at the wall, or in a Console Distribution Panel). To detect a lost phase, measure the AC voltage phase-to-phase at contactor input terminals L1, L2, and L3.

PROBLEMS of this nature, once detected, are generally corrected by the power supplier (i.e. the local utility company).

BOOST CIRCUIT PROBLEMS

THE BOOST CIRCUIT generates the high open circuit ("no load") DC voltage which, in conjunction with the igniter pulse, will ignite the xenon bulb. The open circuit voltage should measure at least 110 V.DC. It is displayed briefly on the lamphouse ammeter by pressing the "VOLTAGE" button at ignition, or the reading can be sustained by disabling lamphouse ignition by removing one AC lead from the igniter feed (Strong lamphouse: 5 or 6).

A TERTIARY WINDING on the main transformer (T1) supplies the source for the Boost Circuit. Three wires derive from the T1 transformer; two are single conductors, and the third is a soldered pair. The Boost Circuit should be connected only to the (2) single conductors. Filter capacitors C4-C8, C10-C13, & C16 store energy and also contribute to bulb ignition.

CONTROL CIRCUITRY

THE MAIN POWER TRANSFORMER is energized by contactor K1, which is pulled by (a) an automation system closure or (b) manual actuation of the lamphouse "ON" switch. All lamphouse interlock switches ("Door," "Air," etc.) must also be closed to complete the contactor circuit.

ANY INTERRUPTION of the control circuit will disable K1 and open the AC circuit to the rectifier. In addition to the above lamphouse interlock switches, thermal switch S1, mounted to the rectifier heat sink, will open and disable K1 if the temperature at the heat sinks exceeds 190° F. (88° C.). The S1 switch will automatically re-set when temperatures fall to safe levels.

THE COOLING BLOWER (B1) is protected by a three ampere fuse (F1) located on the 32-70243 printed circuit board. Should this fuse require replacement, use the correctly rated fuse; *do not overfuse.*

TROUBLESHOOTING (continued)

POWER CONVERSION PROBLEMS

RECTIFICATION (AC to DC) is performed by bridge diodes CR1 - CR6. CR1, CR2, and CR3 are **forward** diodes, and CR4, CR5, and CR6 are **reverse** diodes. The two types are *not interchangeable.*

AN OPEN DIODE will cause a pronounced flicker in the light output. Two or more open diodes will disable bulb ignition. A shorted diode will trip the circuit breaker (at the wall or in a Console Distribution Panel) protecting the AC input line. See the following DIODE TESTING & REPLACEMENT section.

BANKED CAN CAPACITORS C4-C8, C10-C13, and C16 filter the rectified DC output. C4-C8 capacitors also store energy to contribute to the open circuit ignition discharge. A shorted capacitor can trip the AC circuit breaker.

RELAY K1, in the presence of high DC open circuit voltage, will pull and place the nichrome resistor in series with Capacitors C4-C8. This resistor limits the inrush surge and prolongs the discharge of C4-C8 to promote bulb ignition. If K2 relay fails, the nichrome resistor will remain in circuit.

DIODE TESTING & REPLACEMENT

1. Disconnect the diode from its circuit. Inspect for discoloration, oxidation, or loose crimp at lead junction.
2. A "shorted" diode will show low resistance in both directions. An "open" diode will have infinite resistance in both directions. An Ohmmeter test is required.
3. a) Analog VOM: Select R x 1 Ohm scale. With meter leads connected in one direction, the reading should be zero (or nearly so); reversing the meter leads should show very high resistance. If the diode does not exhibit these characteristics, replace it. NOTE DIODE TYPE: forward or reverse.
   b) Digital VOM: Select "Diode Test." With meter leads connected in one direction, the reading should be "OL" (overload); reversing the meter leads should display approximately .4 volt. If the diode does not exhibit these characteristics, replace it. NOTE DIODE TYPE: forward or reverse.
4. Carefully clean the area of the heat sink in which the diode mounts. Apply heat sink compound (Radio Shack #276-1373 or equivalent) using a wood or plastic spatula or stick. A thin layer is adequate.

WARNING: *HEAT SINK COMPOUND IS HIGHLY CAUSTIC.* Do not apply with fingers; keep away from eyes. Carefully follow ALL the instructions printed on the package.

5. Install the new diode and tighten securely for maximum mechanical contact and electrical conduction. Clean and firmly secure the lead terminal to the buss.

TROUBLESHOOTING (continued)

Contactor does not energize (no audible "click")

1. Line safety switch open. Turn "ON."
2. Console "Rectifier" circuit breaker off. Turn "ON."
3. Circuit breaker or fuse in AC line open. Check AC source.
4. Lamphouse interlock switch open. See lamphouse manual.
5. Faulty K1 contactor coil or loose connection at coil terminals. Repair or replace.
6. Defective S1 thermal switch. Repair or replace.
7. Check voltage at J9-1 and J9-2 on printed circuit board 32-70243; should measure 220 V.AC.
8. Check T1 output; voltage at J4-1 and J4-3 should measure 12 V.AC.
9. Defective relay K1 or K2 (on PC board 32-70243); Repair or replace.

Contactor pulls but lamphouse igniter does not fire

1. Faulty contactor contacts. With coil energized, check for continuity across the contacts from the "L" side to the "T" side; repair or replace if defective.
2. Insufficient DC output. See INSTALLATION section; increase tap setting as required.
3. Faulty igniter. See lamphouse manual.
4. Low open circuit voltage (less than 110 V.DC).
   a) Check ceramic resistors R1 & R2; should be in circuit and measure 100 Ohms.
   b) Check boost diodes D2 and D3. See preceding DIODE TESTING section.
   c) Check filter capacitors C4-C8, C10-C13, and C16. Replace if defective.

NOTE: Lamphouse "Emergency Ignite" switch (if present) will frequently overcome low open circuit voltage condition, but will not permit normal autostrike function.

Bulb requires multiple ignition pulses to light

1. Insufficient DC output. See INSTALLATION section; set tap setting as required.
2. Faulty or expired xenon bulb. Check for darkened envelope, worn electrodes; replace if required.
3. One or more faulty bridge diodes. See preceding DIODE TESTING section.

Bulb goes out during operation

1. Fuse F1 missing or open. Replace with same rated (3 ampere) fuse.
2. Excessive heat at rectifier heat sinks; thermal switch S1 opening. Check for free air flow, blower operating at full speed. Check for loose connection.
3. Faulty lamphouse interlock switch ("Door," "Air," etc.). See lamphouse manual.

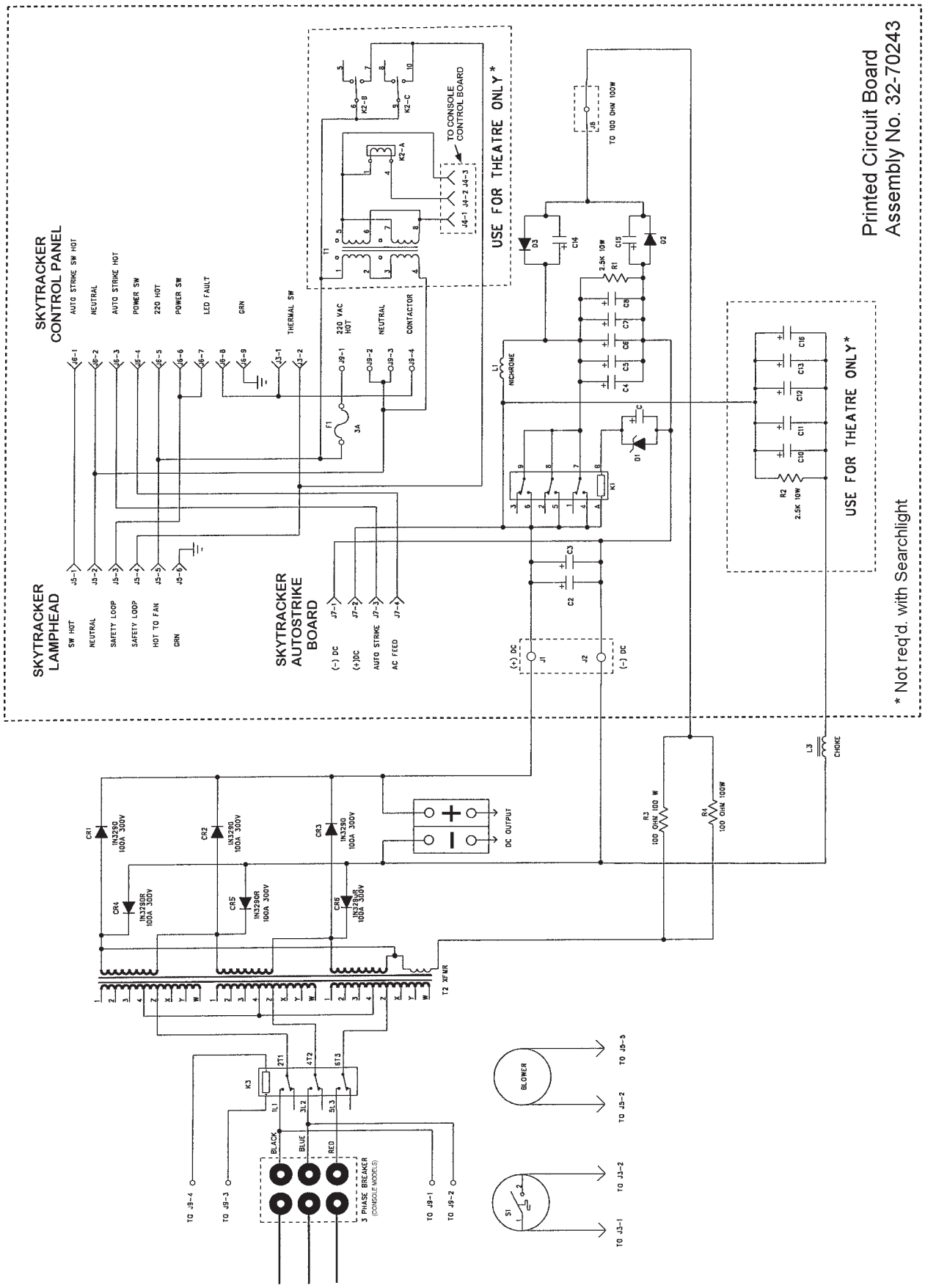
Excessive flicker in light output

1. Improper tap setting. All taps must be on same numbered or lettered step.
2. Faulty bridge diode. See preceding DIODE TESTING section.
3. Faulty xenon bulb. Check for cracked or sagging electrode(s).
4. Open filter capacitors on PC board 32-70243; Replace if defective.

TROUBLESHOOTING (continued)

Bridge diodes (CR1-6) fail repeatedly

1. Insufficient air flow; defective blower. Clean, repair, or replace as required.
2. Incorrect replacement diode. Use only the specified rated diode(s).


Printed Circuit Board
Assembly No. 32-70243
* Not req'd. with Searchlight
SKYTRACKER CONTROL PANEL
AUTO STRIKE SW HOT
NEUTRAL
AUTO STRIKE HOT
POWER SW
220 HOT
POWER SW
LED FAULT
GRN
THERMAL SW
USE FOR THEATRE ONLY*
TO CONSOLE CONTROL BOARD
TO 100 OHM 100W
SKYTRACKER LAMPHEAD
SW HOT
NEUTRAL
SAFETY LOOP
SAFETY LOOP
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SKYTRACKER AUTOSTRIKE BOARD
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(+)DC
AUTO STRIKE
AC FEED
220 VAC HOT
NEUTRAL
CONTACTOR
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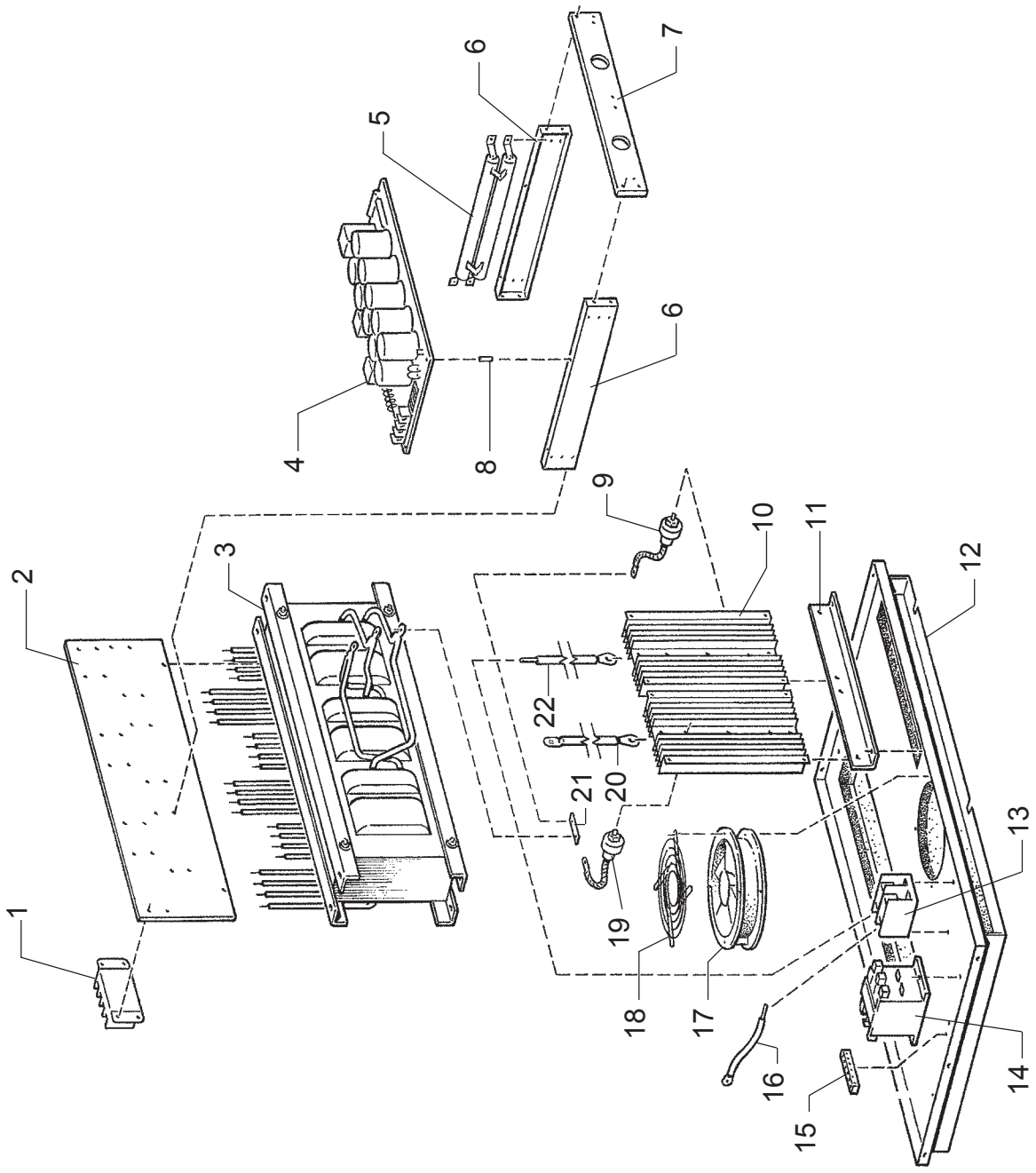
2.5K 10W
USE FOR THEATRE ONLY*
DC OUTPUT
CHOKE
100 OHM 100 W
100 OHM 100W
T2 XFMR
K3
BLACK
BLUE
RED
3 PHASE BREAKER
(CONSOLE MODELS)
BLOWER
TO J9-4
TO J9-3
TO J9-1
TO J9-2
TO J5-5
TO J5-2
TO J3-2
TO J3-1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PARTS LIST

XENON POWER SUPPLY Type HRPS

2000 - 7000 Watt

Item	Part No.	Description
1	81-62001	Tap Terminal Block (6 req'd.)
2	82-40047	Insulated Mounting Plate, Tap Terminal Blocks
3	91-64008	Power Transformer (T2), 2000 Watt, 208/230 V.AC
3	91-64009	Power Transformer (T2), 2000 Watt, 380/440 V.AC
3	91-64004	Power Transformer (T2), 3000 Watt, 208/230 V.AC
3	91-64006	Power Transformer (T2), 3000 Watt, 380/440 V.AC
3	91-64012	Power Transformer (T2), 4000 Watt, 208/230 V.AC
3	91-64001	Power Transformer (T2), 4000 Watt, 380/440 V.AC
3	91-64011	Power Transformer (T2), 7000 Watt, 208/230 V.AC
3	91-64007	Power Transformer (T2), 7000 Watt, 380/440 V.AC
NOTE:	*Item 3 Transformer includes Item 2 Plate & (6) Item 1 Terminal Blocks.*	
4	32-70243	Printed Circuit Board Assembly
5	81-46026	Ceramic Resistor (R1, R2), 100 Ohm, 100 W.
6	82-40040	Support Bracket, Rectifier Heat Sinks (2 req'd.)
7	82-40254	Heat Sink Mounting Plate, Phenolic
8	41-56002	Spacer, PC Board
9*	81-47004	Forward Diode (CR1,2,3), 150 A. 300 V. (1N3290A)
10*	82-20032	Heat Sink (2 req'd.)
11	82-40255	Heat Sink Mounting Bracket, Phenolic
12	82-40432	Chassis Plate
13	61-62012	Barrier Strip, DC Output, (2) Terminal
14	81-14003	Contactor (K3), 230 V.AC, 50/60 Hz. Coil
15	91-71005	Barrier Strip, (6) Terminal
16	92-70064	Negative Lead (Order Wire Harness)
17	71627000	Blower (B1), 230 V.AC, 50/60 Hz.
18	71307000	Blower Grille, 6" Diameter
19*	81-47001	Reverse Diode (CR4,5,6), 150 A. 300 V. (1N3290A-R)
20	92-70064	Negative Lead (Order Wire Harness)
21	91-98031	Buss Bar, Diode Lead Connection (3 req'd.)
22	92-70064	Positive Lead (Order Wire Harness)
*	92-70063	Diodes & Heat Sink Assembly, Complete

EQUIPMENT SPECIFICATIONS
Xenon Power Supply
Type HRPS

MODEL	WATTAGE; AC INPUT	TYPE NO.	DC AMPS	DC VOLTS
HRPS 2kW	2000 Watt; 208/230 V.	93-90029	60-100	25
HRPS 2kW	2000 Watt; 380/440 V.	93-90042	60-100	25
HRPS 3kW	3000 Watt; 208/230 V.	93-90036	80-120	30
HRPS 3kW	3000 Watt; 380/440 V.	93-90041	80-120	30
HRPS 4kW	4000 Watt; 208/230 V.	93-90037	100-150	30
HRPS 4kW	4000 Watt; 380/440 V.	93-90040	100-150	30
HRPS 7kW	7000 Watt; 208/230 V.	93-90038	130-180	40
HRPS 7kW	7000 Watt; 380/440 V.	93-90039	130-150	40

NOTES:

1. For 2500 Watt Operation, use 2 kW or 3 kW Supply
   (Consult with Strong International Dealer per Application)
2. For 3600 Watt Operation, use 3 kW or 4 kW Supply
   (Consult with Strong International Dealer per Application)
3. For 5000 Watt Operation, use 4 kW Supply
4. 6000 & 7000 Watt Operation for 70mm and Special Venue ONLY
5. Average Shipping Weight: Approx. 250 lb. (113.5 kg)