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INSTRUCTION MANUAL

**XENON POWER SUPPLY
208/230 V.A.C. LINE**

TYPE 61001

Rev. 12-06-88



*LAMP MODEL 61001
6-pin base*

STRONG INTERNATIONAL

12000 W. 10th Street, Denver, CO 80202

PREFACE

THIS STRONG POWER SUPPLY is a single phase, full wave silicon bridge type transformer power supply for use with the 1600-2000 watt xenon lamphouse.

THE POWER SUPPLY is designed to operate from a 208/230 (195-250) volt AC source, draws 27.5 amperes from a 208 volt line, and is rated for continuous duty. A stepdown transformer (T2) is provided to reduce the line voltage to 115 V.AC for the lamphouse and power supply control circuits. This transformer has a low voltage tap (H2, brown) that must be connected if the measured AC supply line voltage is below 220 volts. The AC supply line must be protected by a 30 ampere fuse or circuit breaker for 1600 watt, 75 ampere operation, and a 35 ampere fuse or circuit breaker for 2000 watt, 80 ampere operation. The AC supply line may be #10 AWG for 1600 watt operation, and must be #8 AWG for 2000 watt operation.

FOUR TAPS on the primary side of the T1 transformer are provided to compensate for variations in the AC line voltage. The rating on the taps are 190, 208, and 230 volts, and the tap terminal block TB4 is marked for these ratings relative to the desired wattage.

THE DC OUTPUT RANGE is from 55-80 amperes at 22-28 volts. The DC current to the bulb is adjustable by means of the (6) step dial switch, position (1) being the lowest and (6) the highest output. NOTE: Position (6) is generally disconnected; see the **INSTALLATION** section of this manual for instructions.

THE POWER SUPPLY is equipped with a cooling fan to maintain a safe operating temperature. Thermal switches, located on the heat sinks, interrupt operation of the power supply and protect the silicon diodes if the temperature at either heat sink exceeds 190° Fahrenheit (88° Celsius).

A **CHOKER** and capacitors in the DC circuit reduce the ripple to a minimum, consistent with the requirements of xenon bulbs for long life.

A **NEON GLOW LAMP** is connected across the AC supply to indicate when the AC circuit to the power supply and from the power supply to the lamphouse is energized.

CIRCUIT BREAKERS are installed in the AC control circuit to protect components in the event of a malfunction.

AN MS CONNECTOR is wired into the AC control and DC circuit on some models of this power supply. This permits direct connection to those lamphouses equipped with the mating connector. This model, generally supplied with follow spotlights, also includes a 12 foot long #10 AWG, three conductor cord with a 30 ampere, 230 volt twistlock cord cap for connection to an AC supply receptacle.

INSTALLATION - OPERATION

THE POWER SUPPLY equipped standard with an AC lead cord may be connected to any 30 ampere, three wire grounded 230 volt single phase outlet. This model includes an MS connector keyed for a similar connector wired to a lamphouse interconnect cable, and is generally used in a follow spotlight application.

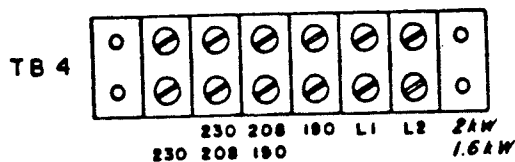
POWER SUPPLIES without the AC lead cord must be wired with #10 AWG and protected with a 30 ampere fuse or circuit breaker when used with the 1600 watt bulb, or #8 AWG with a 35 ampere fuse or circuit breaker when used with the 2000 watt bulb. Connect the AC input leads to positions L1 and L2 on the six terminal barrier strip TB4. Connect a ground wire to the terminal stud mounted to the power supply cabinet.

WITH EITHER SYSTEM, the AC supply line should be switched between the AC source and the power supply to permit turning the unit on or off.

THE POWER SUPPLY has four AC line taps on the primary side of the T1 transformer. The power supply is shipped connected for a 208-230 volt line and 1600 watt operation unless the equipment order specifies another line voltage and bulb wattage. Lead T2 from the line contactor K1 should be connected to the primary tap (190, 208, or 230) nearest the measured line voltage, and relative to the desired output wattage (1600 or 2000 watts).

THE STEPDOWN TRANSFORMER T2 has a brown low voltage tap lead (190-220 volts). If the measured line voltage is 220 or lower, the blue lead on terminal L2 must be interchanged with the brown lead. DO NOT reposition the black tap lead on terminal L1.

<u>AC LINE VOLTAGE</u>	<u>PRIMARY</u>	<u>T2 STEPDOWN CONNECTION</u>
190-208	190	Blk & Brn
208-220	208	Blk & Brn
220-230	230	Blk & Blu
230-254	230	Blk & Blu



DC OUTPUT to the bulb is determined by the connection of lead T1 to one of the six output taps on terminal board TB2, located on the main transformer T1, through dial switch S1. The numbered steps of the dial switch correspond to the fine tap terminal numbers on TB2.

THE POWER SUPPLY is shipped with dial switch lead #6 connected to terminal #5 on TB2. This measure reduces the possibility of overdriving the xenon bulb. Switch position #6 is used only in the event of extremely low line voltage.

START ON STEP 1 for the first ignition of the bulb. Allow a few minutes for the current to stabilize, and read the lamphouse ammeter. If more current is required, extinguish the bulb and advance the dial switch to step 2. Each step adjusts the DC output approximately four amperes. Repeat this operation as required to obtain

the rated current specified by the bulb manufacturer. If the correct current cannot be reached on the highest (No. 6) step, extinguish the bulb, and move the T2 lead to the next **lower** coarse tap, i.e. from 230 to 208. With the dial switch returned to step 1, re-ignite the bulb and increase the switch setting as required to reach the desired current.

IF THE OUTPUT exceeds the rated current on step 1, move the T2 lead to the next **higher** coarse tap, i.e. from 208 to 230. Starting on switch position 1, increase the switch setting to reach the desired current.

TO PROLONG THE LIFE of dial switch S1, extinguish the bulb before increasing or decreasing the switch setting. It will be necessary to periodically increase current to compensate for decreased light because of normal bulb aging.

DO NOT, AT ANY TIME, EXCEED THE MAXIMUM CURRENT SPECIFIED BY THE MANUFACTURER OF THE XENON BULB.

WHEN THE MAIN LINE SWITCH is in the "ON" position, the neon glow lamp DS1 will be energized, indicating that one side of the K1 relay contacts are "hot" and the AC control circuit through circuit breakers CB1 and CB2 to the cooling fan B1 in the power supply is also energized. The AC power to the lamphouse is carried through circuit (2-4) to the interlock switches and to the blower in the lamphouse. The blower in the lamphouse and the fan in the power supply will operate as long as the main AC line switch to the power supply is in the "ON" position.

THE AC CONTROL CIRCUIT (2-4) is completed through the lamphouse and back to the power supply (5-6) when the LAMP switch is placed in the "ON" position and all lamphouse interlock switches are closed.

THE THERMAL SWITCHES S2 and S3 sense the temperature at the CR1 and CR3 heat sinks and will open at 190° Fahrenheit (88° Celsius) to break the circuit to the coil of contactor K1 and protect the diodes from overheating. These switches will remain open and prevent operation of the power supply until the temperature falls below 185-190° Fahrenheit.

POWER IS APPLIED to the DC circuit, the CR2 boost diode and the R1 current limiting resistor; charging the C2 boost capacitor to the peak voltage developed over the tertiary winding of the T1 transformer. Resistor R3 is the bleeder for capacitor C2. Approximately 120 V.DC is momentarily applied to the DC circuit for the xenon bulb ignition. Upon ignition, the boost circuit is reduced, and 21-30 V.DC is supplied to the lamphouse to sustain operation of the xenon arc. Capacitor C3 functions as a RF bypass circuit at the time of bulb ignition to protect the CR1 rectifier bridge network.

THE CHOKE L1 and capacitors C1 serve as filters to reduce the DC ripple to the level required for long bulb life. Resistor R2 functions as a bleeder for the C1 capacitors. Diode CR3 is the blocking diode in the negative DC circuit to permit build-up of the high DC voltage required for bulb ignition.

CAPACITORS C4 and C5, mounted to the bridge rectifier, and C6, mounted to the blocking diode, protect the diodes by suppressing the RF voltage at ignition.

MAINTENANCE

VERY LITTLE MAINTENANCE is necessary to keep this equipment in top operating condition. The frequency of cleaning the equipment depends on dust conditions at each installation.

THE RECTIFIER (CR1) heat sink and the blocking diode (CR3) heat sink must be kept clean to permit dissipation of the heat generated by the power supply.

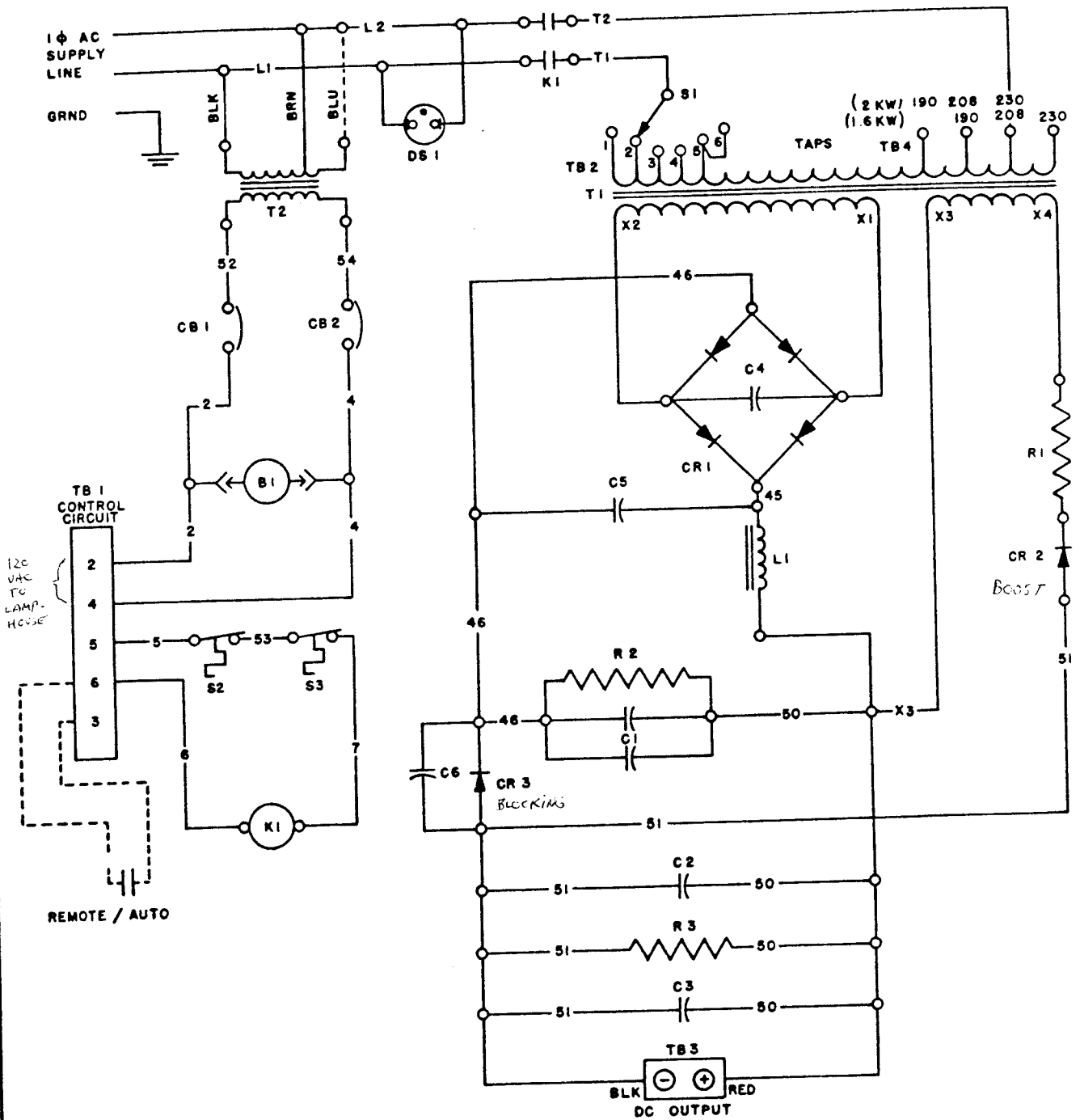
PERIODICALLY examine all electrical connections for tightness. A loose connection will cause overheating and possible intermittent operation.

IF THIS POWER SUPPLY is operated in an ambient temperature high enough to permit the internal temperature at either heat sink to reach 190° Fahrenheit, the thermal switches (S1 and S2) will stop operation of the power supply until the temperature falls below this level.

THE COOLING FAN and grill must be kept clean to allow the fan to operate at its rated R. P. M. and permit full air flow through the power supply. Intermittent operation of the power supply may be an indication of inadequate cooling due to dirt on the grill or fan blades.

THE AIR OUTLET GRILL must be cleaned periodically from the inside of the power supply to insure proper air circulation.

POWER SUPPLY SCHEMATIC



**PARTS LIST
SCHEMATIC DIAGRAM**

<u>Ref. Desig.</u>	<u>Part No.</u>	<u>Description</u>
B1	71220	Blower, 115 V. AC, 50/60 Hz. Dayton # 40550
C1	88233	Filter Capacitor, 37000 MFD, 75 V. DC (2 req'd)
C2	88185	Boost Capacitor, 1100 MFD, 150 W VDC
C3	88981	RF Bypass Capacitor, .01 MFD, 500/1000 V. DC (with R3)
C4	61933	RF Supression Capacitor, .01 MFD, 1000 V. DC
C5	61932	RF Supression Capacitor, .01 MFD, 1000 V. DC
C6	61902	RF Bypass Capacitor, .05 MFD, 600 V. DC
CB1,2	79107	Circuit Breaker, 5 Amp, 250 V.
CR1	61976	Silicon Bridge Rectifier
-	84112A	Forward Diode, 600 PRV, 85 A. ECG 6076
-	61140	Reverse Diode, 600 PRV, 85 A. ECG 6077
CR2	85112	Boost Diode, 1000 PIV, 2.5 A. (with R1)
CR3	84112A	Blocking Diode, 600 PRV, 85 A. ECG 6076
DS 1	61993	Neon Glow Lamp, 210/250 V. AC
K1	88116	Contacto, 115 V. AC, 50/60 Hz. Coil
L1	61919	Choke
R1	88982	Current Limiting Resistor, 200 Ohm, 25 W. (with CR2)
R2	88979	Bleeder Resistor, 450 Ohm, 12 W.
R3	88981	Bleeder Resistor, 100K Ohm, .5 W. (with C3)
S1	62069	Rotary Switch (new style)
S1	61898A	Dial Switch Ass'y.
-	15494B	Dial Switch
S2,3	88118	Thermal Switch, 190° F. (88° C.)
T1	61001-11W	Main Transformer, Banked & Wired
T2	61984	Step-down Transformer, Control Circuit
TB1	72218	Barrier Strip, 6 Terminal (Control Circuit)
TB2	61116	Barrier Strip, 6 Terminal (Fine Taps)
TB3	61111	Barrier Strip, 2 Terminal (DC Output)
TB4	61116	Barrier Strip, 6 Terminal (Coarse Taps)

Specify Equipment Type and Serial Number when ordering replacement parts.

TROUBLE SHOOTING

REFER TO THE INSTALLATION-OPERATION section and the schematic diagram of this manual before attempting any trouble shooting. Some models of this power supply have taps on both the primary and secondary sides of the main transformer to compensate for variations in line voltage and supply the proper current for operation of the various xenon bulbs.

IN ADDITION, the power supplies manufactured for use on a supply line of 208/230 volts A.C., or higher have a stepdown transformer to reduce the A.C. supply voltage to 115-120 volts required for the A.C. control circuit in the lamphouse and power supply. This stepdown transformer has a high (blue) and low (brown) voltage tap on the primary side.

THESE TAPS, on both the main transformer and stepdown transformer, must be connected in accordance with the instructions in your manual to insure proper operation and ignition of the xenon bulb.

THESE POWER SUPPLIES have two (2) thermal switches. One is attached to the bridge rectifier heat sink and one on the blocking diode heat sink. If either switch opens, the power supply will stop operating.

CRI Rectifier Bridge Test

Remove the rectifier bridge (CR1) #61101, from the power supply. This bridge has two forward and two reverse diodes. Connect one lead of an ohmmeter to the heat sink of the diode being tested. A functional diode will show an infinite resistance in one direction and a low (approximate 15 Ohm) in the other direction. A shorted diode will indicate low resistance in both directions.

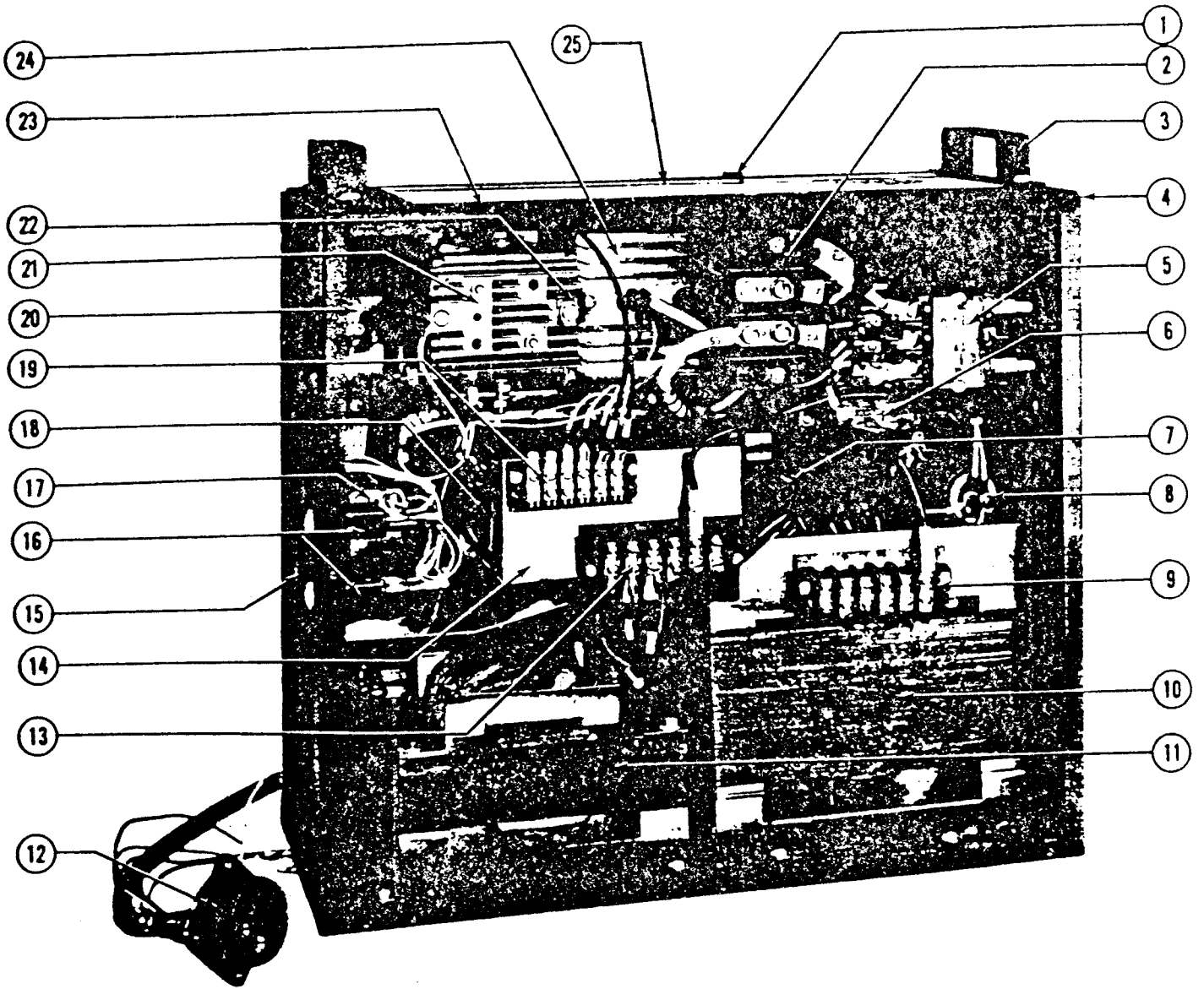
<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
Line contactor does not energize (no loud click from contactor when lamp switch is turned on. Red indicator light <u>not lit.</u>	Main power switch not turned on. Blown line fuses.	Check main line switch. Check line fuses.	Turn on. Replace bad fuses.

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
Line contactor does not energize (no loud click from contactor when lamp switch is turned on. Red indicator light is <u>lit</u> .)	Contactors K1 coil burned out.	Check for 115V. AC across terminals 5 & 6 on terminal block with lamp switch on.	If line voltage appears across these terminals replace contactor.
	Circuit breakers CB1, CB2 open.	Check for short.	Reset circuit breakers.
	Defective thermal switch or switches S2 & S3.	Remove one lead at switch and test for continuity with an ohmmeter across switch on bridge rectifier. Repeat same test for switch on blocking diode heat sink.	Replace switch or switches if open.
	Defect in lamp-house A. C. Circuit.	(See lamp manual)	
Contactor clicks on but bulb does not ignite. (Bulb does not flash)	Contacts in K1 line contactor burned or defective.	Check AC voltage on leads T1 & T2.	Replace contactor if voltage is not indicated.
	Lamp house igniter.	(See lamp manual)	
	Shorted blocking diode CR3.	(See test under Low-No Load D. C. voltage)	Replace diode.
Repeatedly blows line fuses.	Wrong size fuses.	Check size of fuses.	Replace with proper size fuses.
	Shorted silicon bridge (CR1).	Check bridge. See instruction for test in this manual.	Replace defective bridge.

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
(Cont'd) Repeatedly blows line fuses.	Shorted filter capacitor (C1).	Test with capacitor checker.	Replace if defective.
	Shorted boost capacitor C2.	Same test as C1 above.	Replace if defective.
	Shorted step- down transformer (T2).	Disconnect T1 transformer at relay K1. T2 secondary leads 52 & 54 at CB1&2. Energize AC circuit.	If fuse blows, replace T2 stepdown transformer.
	Shorted trans- former T1.		If fuses still blow after com- pleting tests on other components replace T1 transformer.
Circuit breakers CB1, 2 open repeatedly. Lamp power switch <u>not</u> "on".	Defective fan in power supply	Disconnect fan.	If circuit breakers do not open, re- place fan.
	Defective fan in lamphouse.	-----	See lamp manual trouble chart.
Circuit breakers CB1, 2 open repeatedly. Lamp power switch "On".	Defective igniter.	-----	See lamphouse manual trouble chart.
	Defective contactor (K1).	Remove leads 6-7 from contactor.	If circuit break- ers do not open. replace contactor.
Repeatedly failed diodes (CR1).	Defective suppression capacitors (C4, 5).	Test with capacitor checker.	Replace if defective.

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
Low-no load DC voltage to lamphouse (less than 100 volts DC measured across DC terminal board in power supply).	Defective filter capacitor (C1).	(See test and remedy under repeatedly blows line fuse.)	
	Defective boost capacitor (C2).	Remove and test with capacitor tester if available.	Replace capacitor.
	Defective boost diode (CR2). Possible defect if only 50-60 VDC measured at DC terminal block.	Check continuity across the diode with an ohmmeter. Must show low resistance in only one direction when reversing ohmmeter leads	If tests show low resistance in both directions or does not show low resistance in either direction, replace diode and R1 resistor assembly.
	Shorted or open blocking diode CR3. Check voltage at DC terminal block. Possible defect if only 50-60V. DC measured at DC terminal block.	Check with an ohmmeter, the continuity from the (-) heat sink to the negative output lead. Should show continuity in only one direction when reversing ohmmeter leads.	If tests show continuity in both directions, replace diode.
	Defective current limiting resistor R1.	Measure resistance with an ohmmeter. Check reading with listed resistance value $\pm 20\%$.	If defective, replace resistor and CR2 diode.
	Possible defective diode in bridge rectifier if less than 40 volts measured at DC terminal block.	See test for rectifier bridge (CR1) on first page of trouble shooting.	Replace if defective.
Excessive light flicker.	Defective xenon bulb.	(See lamp manual trouble shooting)	

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
Excessive light flicker. (cont'd)	Defective silicon diode bridge (CR1).	See previous test for bridge.	Replace if defective.
	Filter capacitor (C1).	See test under repeatedly blows line fuse.	Replace capacitor.
	Boost capacitor (C2).	See test under repeatedly blows line fuse.	Replace capacitor.
Reduced light output.	Defective xenon bulb.	(See lamp manual troubleshooting)	
	Defective silicon diode bridge (CR1).	See previous test for bridge.	Replace if defective.
Xenon bulb does not light (bulb flashes).	Defective xenon bulb.	(See lamp manual trouble shooting)	
	Open blocking diode (CR3).	See previous test for CR3.	Replace CR3 if defective.
	Power setting too low to maintain ignition of xenon bulb.	-----	Advance T1 tap lead on TB2 up a step or two. Do not attempt to operate bulb below the manufacturers recommended minimum rating.
Bulb goes out during operation.	B1 blower.	-----	Replace if not operating, clean if dirty and running slow.
	Thermal switches located on CR1 bridge heat sink and blocking diode CR3 heat sink.	See test under trouble of line contactor does not energize and indicator light is lighted.	Replace switch if defective. If temperature at heat sink reaches $190^{\circ} \pm 5^{\circ}$ thermal switch will open.



Rotary Switch 62069 NOT SHOWN

PARTS LIST

<u>Item No.</u>	<u>Part No.</u>	<u>Description</u>
1	61993	Neon Indicator Lamp (DS1)
2	61111	Barrier Strip, Transformer Secondary (Coarse Taps)
-	61121	Insulated Marker Strip
-	61113	Bracket
-	541	Screw, 1/4-20 x 1/2", Pan Hd.
-	805A	Hexnut, 1/4-20
-	889	Shakeproof Lockwasher, 1/4"
-	392	Screw, 10-32 x 7/8", Fil. Hd.
-	1344	Shakeproof Lockwasher, #10
3	88208	Handle
-	541	Screw, 1/4-20 x 1/2", Pan Hd.
-	805A	Hexnut, 1/4-20
-	889	Shakeproof Lockwasher, 1/4"
4	61911	Cabinet
-	61921	Base Plate, Cabinet
-	88161	Cover Plate, Cabinet
-	1794	Screw, 8-32 x 3/8", Slotted Hex Washer Hd.
5	88116	Contacto (K1)
-	1382	Screw, 8-32 x 3/16", Pan Hd.
-	88164	Bracket
-	541	Screw, 1/4-20 x 1/2", Pan Hd.
-	805A	Hexnut, 1/4-20
-	889	Shakeproof Lockwasher, 1/4"
6	61984	Control Transformer, Stepdown (T2)
-	1382	Screw, 8-32 x 3/16", Pan Hd.
7	88982	Fixed Resistor & Diode Ass'y. (R1 with CR2)
-	1412	Screw, 6-32 x 1/8", Pan Hd.
8	88185	Boost Capacitor (C2)
-	88125	Capacitor Clamp
-	1412	Screw, 6-32 x 1/8", Pan Hd.
9	61116	Barrier Strip, Fine Taps
-	61187	Insulated Marker Strip
-	1312	Screw, 8-32 x 1/2", Pan Hd.
10	6100111W	Transformer (T1)
-	1419	Screw, 5/16-18 x 3/4", Hex Hd.
-	807	Hexnut, 5/16-18
-	877	Split Lockwasher, 5/16"
11	61919	Choke (L1)
-	1419	Screw, 5/16-18 x 3/4", Hex Hd.
-	807	Hexnut, 5/16-18
-	853	Flatwasher, 5/16"
-	877	Split Lockwasher, 5/16"
12	61987	MS Connector & Leads Ass'y. (61001-11 only)
-	464	Screw, 10-32 x 1/4", Pan Hd.

<u>Item No.</u>	<u>Part No.</u>	<u>Description</u>
13	61116	Barrier Strip, AC Line
-	61117	Insulated Marker Strip
-	1312	Screw, 8-32 x 1/2", Pan Hd.
14	61112	Capacitor Mounting Bracket
-	464	Screw, 10-32 x 1/4", Pan Hd.
-	88233	Filter Capacitor (C1), 2 req'd.
15	1487	Ground Bolt, 1/4-20 x 7/8", Hex Hd.
-	889	Shakeproof Lockwasher, 1/4"
-	805A	Hexnut, 1/4-20
-	835	Flatwasher, 1/4"
16	79107	Circuit Breaker (CB1, 2) See Item 23 for Alternate Location
17	61111	Barrier Strip, DC Output (TB3; 61001-10 only)
-	61121	Insulated Marker Strip
-	392	Screw, 10-32 x 7/8", Fil. Hd.
-	1344	Shakeproof Lockwasher, #10
-	831	Flatwasher, #10
18	88979	Bleeder Resistor (R2)
19	61103	Barrier Strip, Control Circuit (TB1)
-	61109	Insulated Marker Strip
-	1312	Screw, 8-32 x 1/2", Pan Hd.
20	71220	Blower (B1) Dayton # 40550, 110 cfm
-	61994	Power Cord, Blower
-	1795	Screw, 6-32 x 1", Self-tapping
-	61127	Tinnerman Nut, #6
21	61976	Silicon Bridge Rectifier (CR1) See Figure 2
22	61118	Buss Bar See Figure 2
23	-	Alternate Location for Circuit Breakers, Item 16
24	61977	Blocking Diode Ass'y. See Figure 2
25	61182	Nameplate
-	1639-3	Rivet, 1/8", Domed Hd.

Parts Not Listed Above

61194	Air Deflector, Blower Outlet
61983	AC Power Cord with Plug
61115	Plug, 30 Amp. 250 V.
61126	Power Cord Strain Relief Bushing
61898A	Dial Switch Assy.

Specify Equipment Type and Serial Number when ordering replacement or optional parts.

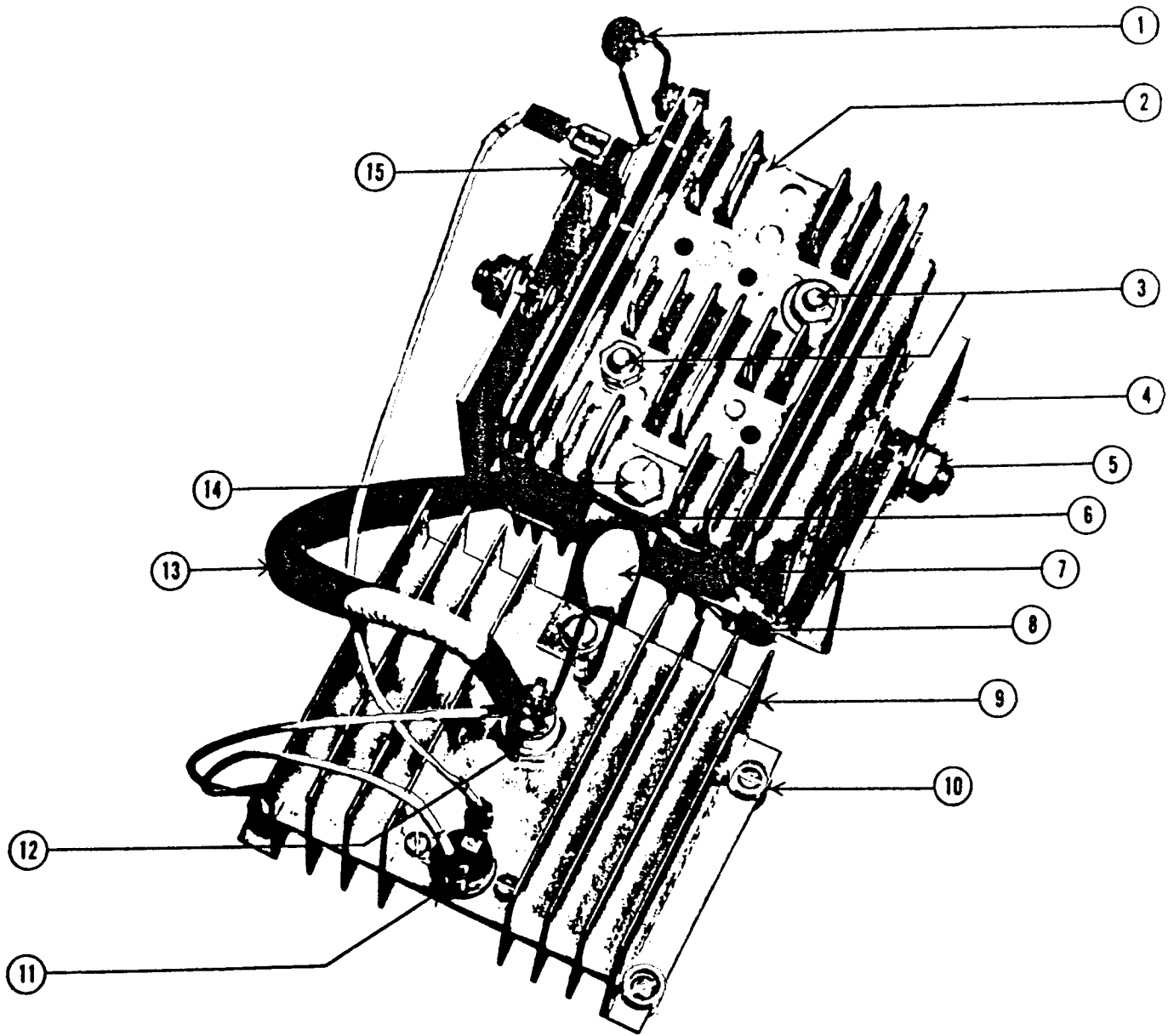


FIGURE 2

**FIGURE 2
PARTS LIST**

<u>Item No.</u>	<u>Part No.</u>	<u>Description</u>
1	61933	Capacitor Ass'y. (C4)
2	61101	Rectipoint (with CRI Diodes)
3	61140 *	Reverse Diode ECG 6077
-	84112A*	Forward Diode (not shown) ECG 6076
4	61107	Mounting Bracket
-	1304	Screw, 8-32 x 5/16", Pan Hd.
5	-	Hardware supplied with Rectipoint, Item 2
6	61118	Buss Bar
-	1307	Screw, 10-32 x 3/8", Pan Hd.
-	1344	Lockwasher, #10
7	61902	Capacitor Ass'y. (C6)
8	61932	Capacitor Ass'y. (C5)
9	61120	Heat Sink
10	88237	Mounting Insulator
-	1473	Screw, 6-32 x 1/2", Pan Hd.
11	88118	Thermal Switch (S2)
-	1305	Screw, 6-32 x 1/4", Pan Hd.
12	84112A	Blocking Diode (CR3) ECG 6076
-	1722	Screw, 6-32 x 1/2", Socket Hd.
-	793	Hexnut, 6-32
-	1494	Lockwasher, #6
13	61988A	Negative Lead Ass'y.
14	687	Screw, 1/4-20 x 1/2", Hex Hd.
-	805A	Hexnut, 1/4-20
-	852	Flatwasher, 1/4"
-	889	Lockwasher, 1/4"
15	88118	Thermal Switch (S1)
-	1305	Screw, 6-32 x 1/4", Pan Hd.

* Note marking for correct replacement.

