

INSTRUCTION MANUAL

XENON POWER SUPPLY

115 V.AC LINE

TYPE 61000

3 - 83



STRONG INTERNATIONAL, Inc.
4350 McKinley St. Omaha, NE 68112
402/453-4444 FAX 402/453-7238 TELEX 484481

PREFACE

THIS STRONG POWER SUPPLY is a single phase, full wave bridge type, silicon power supply for use with 700-1000 watt xenon projection lamps.

THE POWER SUPPLY is designed to operate from a 115 volt (105-125V.) AC source, draws 27.5 amperes from a 115V. line and is rated for continuous duty.

THREE 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 105, 115 and 125 volts. The transformer tap terminal block has two positions and is marked for 105 and 115 volts. The 125 volt tap from the transformer is folded back and taped.

THE AC LEAD CORD is an optional item on the power supply for use with a projection lamp and a standard item on the power supply for use with a follow-spot. The AC lead is a 12 foot, #10 AWG, 3 conductor cord with a 30 ampere, 125 volt twistlock cord cap for connection to the AC supply line. The AC supply line must be protected with a 30 ampere fuse or circuit breaker.

THE DC OUTPUT RANGE is from 37-55 amperes at 18-22 volts. The DC current to the bulb is adjusted by means of the (8) step dial switch. Position (1) being the lowest and (8) the highest output.

THE POWER SUPPLY is equipped with a cooling fan to maintain a safe operating temperature. Thermal switches mounted on both the rectifier heat sink and blocking diode heat sink will stop operation of the power supply if the temperature at either heat sink reaches $190^{\circ} \pm 5^{\circ}$ Fahrenheit.

A CHOKE AND CAPACITOR in the D. C. circuit, reduces the ripple to a minimum consistent with requirements of xenon bulbs for a long life.

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

CIRCUIT BREAKERS are installed in the A. C. control circuit to protect components in the event a malfunction occurs.

AN MS CONNECTOR is wired into the AC control and DC circuit on some models of this power supply, for direct connection to the lamphouses that are equipped with the mating connector.

INSTALLATION - OPERATION

THE POWER SUPPLY with the #10/3 AWG AC lead cord can be plugged into any 30 Ampere, three wire grounded, 115 volt, 60 Hertz single phase outlet. This outlet should be switched to permit turning the power on and off to the power supply.

THIS POWER SUPPLY has three taps on the primary side of the T1 transformer. The power supply is shipped with the 105 volt and 115 volt taps connected to the transformer tap terminal block. The lead T2 from the line relay is attached to the 115 volt post.

IF THE LINE VOLTAGE is 105 volts or lower, connect the T2 lead to the post marked 105 volts. The high voltage tap (125 volts) is not attached to the terminal block but is folded back and taped to the transformer. To operate on this higher voltage, remove the 115 volt tap from the terminal block and connect the 125 volt tap to this open post. Fold back the 115 volt tap and tape to the transformer. Connect the T2 lead from the relay to this terminal post.

THE DIAL SWITCH on the power supply has eight (8) steps. Each step adjusts the DC output approximately two (2) amperes. Position number one (1) giving the lowest output and eight (8) the highest. Always start on position number one (1) for the first ignition of the xenon bulb. Wait a few minutes until the current stabilizes; then adjust the dial switch to obtain the rated current specified by bulb manufacturer. If the correct current cannot be reached by changing the dial switch, then a change must be made at the transformer tap terminal block.

IF THE ARC CURRENT is too high, connect the relay T2 lead to the next higher rated transformer tap and start at position number one (1) on the dial switch.

IF THE ARC CURRENT is too low, connect the relay T2 lead to the next lower rated tap and again start at position number one (1) on the dial switch.

AFTER THE TRANSFORMER TAP, nearest to the rated AC input voltage, is connected to relay lead T2 then the eight (8) steps on the dial switch should permit adjustment over the full current range of the xenon bulb.

IF IT IS DESIRED to operate this equipment on an "Automatic" system from a remote station, all that is necessary is to run #14 THW wire from terminals #6 and #3 on the control circuit terminal strip, to a 5 ampere

contact installed at the remote station. See the "Lamp Manual" for additional instructions regarding lamp operation under this system.

WHEN THE MAIN A. C. 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. Note: Some models of this power supply incorporate a single circuit breaker. Refer to the wiring diagram following in this manual. The AC power to the lamphouse is carried through circuit (2-4), to the interlock switches and the fan in the lamphouse. The fan in the lamphouse and power supply will operate as long as the main AC line switch 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 lamphouse "ON-OFF" switch is placed in the "ON" position and the lamphouse interlocks are closed.

THE AC POWER is then transmitted to the coil of relay K1, closing the contacts of this relay and energizing transformer T1.

THE THERMAL SWITCH S2 senses the temperature at the CR1 rectifier heat sink and switch S3 at the CR3 blocking diode heat sink. If the temperature at either switch reaches $190^{\circ} \pm 5^{\circ}$, the switch will open and break the A.C. circuit to the coil of relay K1 and protect the power supply from overheating. Either switch will remain open and prevent operation of the power supply until the temperature drops below 185-190° Fahrenheit.

POWER IS APPLIED TO THE DC CIRCUIT, the CR2 diode boost circuit and R1 current limiting resistor; charging the C2 boost capacitor to the peak voltage developed across the tertiary winding of T1 transformer. Resistor R3 is the bleeder for capacitor C2. Approximately 120 volts D.C. is momentarily applied to the DC circuit for the xenon bulb ignition. Upon ignition the boost circuit is reduced and 18-22 volts DC is supplied to the lamphouse to maintain operation of the xenon arc. Capacitor C3 functions as a RF by-pass circuit at the time of bulb ignition.

THE CHOKE L1 and capacitor C1 serve as filters to reduce the DC ripple to the level required to insure a long bulb life. Resistor R2 functions as a bleeder for C1 capacitor and 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, protect the CR1 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.

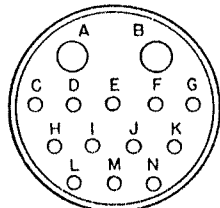
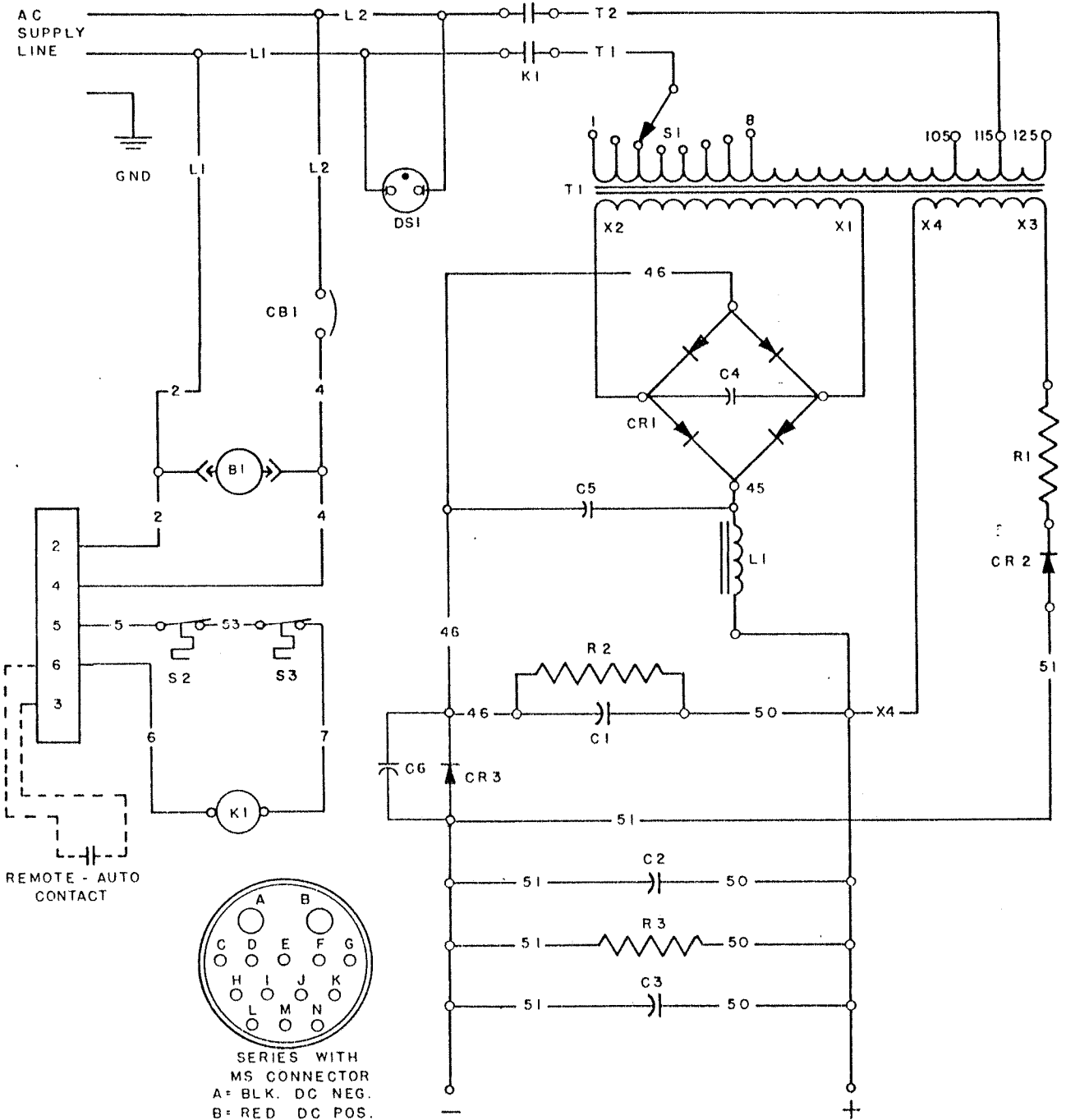
THE RECTIFIER (CR1) heat sink and the blocking diode (CR3) heat sink must be kept clean to permit dissipation of the heat generated by the power supply.

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 (S2 & S3) 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.

POWER SUPPLY
SCHEMATIC



- SERIES WITH
MS CONNECTOR
- A = BLK. DC NEG.
 - B = RED DC POS.
 - C = BRN. 2
 - D = PINK 3
 - E = ORG. 4
 - F = BLUE 5
 - G = YEL. 6

PARTS LIST
WIRING DIAGRAM

<u>Ref. Desig.</u>	<u>Part No.</u>	<u>Description</u>
B1	45227	Blower, 115 V. AC, 50/60 Hz.
-	61994	Power Cord, Blower
C1	88233	Filter Capacitor, 37000 MFD, 75 V. DC
C2	61132	Boost Capacitor, 1200 MFD, 250 W VDC
C3	88981	RF Bypass Capacitor, .01 MFD, 500/1000 V. DC
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	79107	Circuit Breaker, 5 A.
CR1	61976	Silicon Bridge Rectifier
-	84112A	Forward Diode (Replacement), 600 PRV, 85 A.
-	61140	Reverse Diode (Replacement), 600 PRV, 85 A.
CR2	88982	Boost Diode, 1000 PIV, 2.5 A. (with R1)
CR3	84112A	Blocking Diode, 600 PRV, 85 A.
DS1	61993	Neon Glow Lamp
K1	88116	Contactora, 115 V. AC, 50/60 Hz. Coil
L1	*	Choke (with T1 & S1)
R1	88982	Current Limiting Resistor, 200 Ohm, 25 W. (with CR2)
R2	88979	Bleeder Resistor, 450 Ohm, 12 W.
R3	88981	Bleeder Resistor, 100 K. Ohm, .5 W. (with C3)
S1	61971	Dial Switch & Lead
S2, 3	88118	Thermal Switch, 190° F. (88° C.)
T1	*	Transformer (with L1 & S1)
-	61987	MS Connector & Leads
-	61996	AC Power Cord

* Order by Equipment Type and Serial Number on nameplate.

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.

CR1 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.

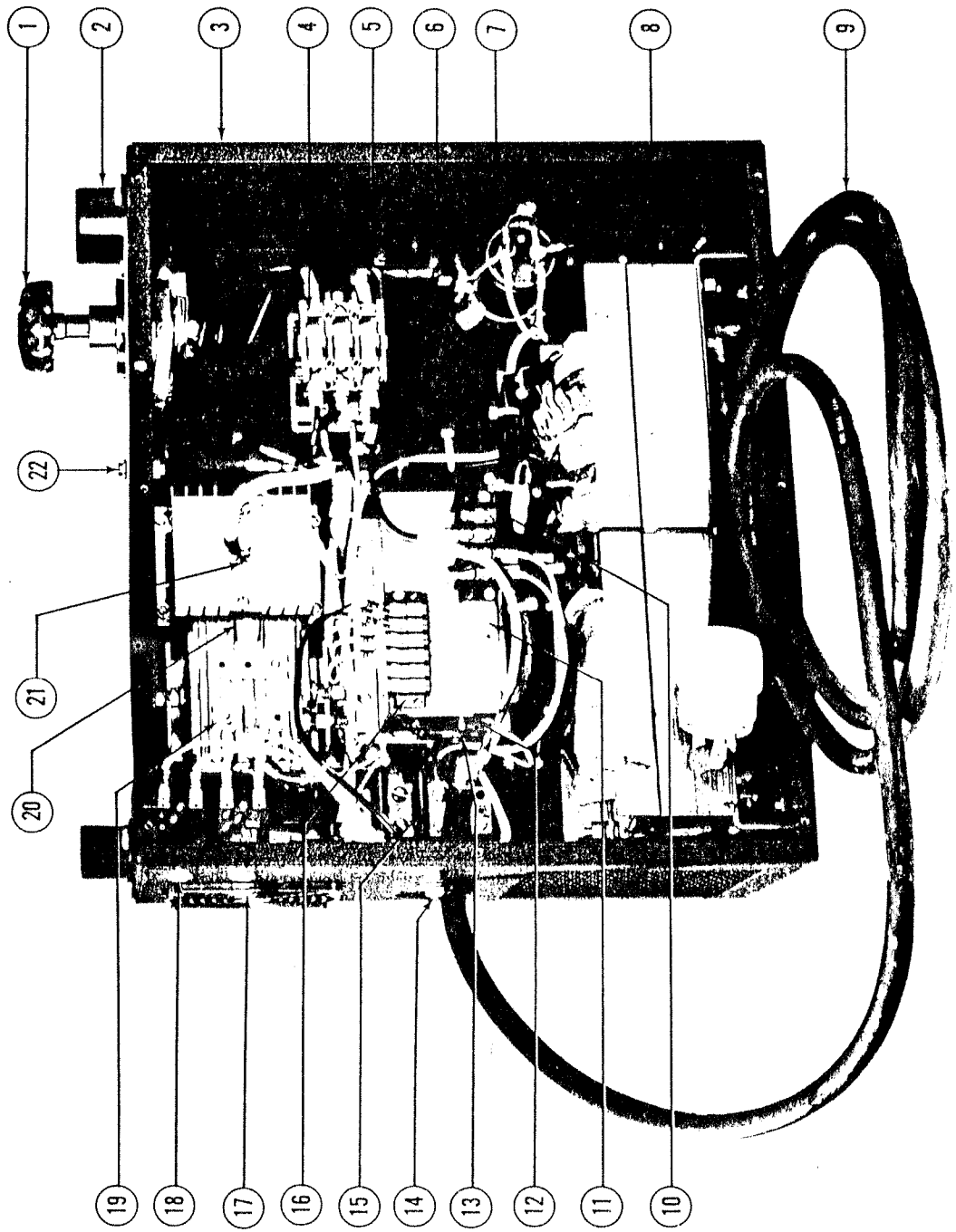
<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
Line contactor does not energize (no loud click from contactor when lamp switch is turned on. Red indicator light <u>not lit.</u>	Main power switch not turned on. Blown line fuses.	Check main line switch. Check line fuses.	Turn on. Replace 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.
	Lamphouse 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 resist- and 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, re- place diode.
	Defective current limiting resistor R1.	Measure resist- ance with an ohmmeter. Check reading with listed resistance value <u>+ 20%</u> .	If defective, re- place resistor and CR2 diode.
	Possible defective diode in bridge rectifier if less than 40 volts measured at DC terminal block.	See test for recti- fier 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.	-----	Turn dial switch 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 $190^{\circ}+5^{\circ}$ thermal switch will open.



PARTS LIST

<u>Item No.</u>	<u>Part No.</u>	<u>Description</u>
1	61971	Dial Switch & Lead (S1)
-	543	Screw 1/4-20 x 3/8" Oval Bd. Hd.
-	15008	Bearing
-	807	Nut 5/16-18 Hex
-	15035	Spring
-	61967	Contact Finger & Lead
-	15489	Switch Body & Contacts
-	61973	Knob & Shaft
-	61122	Spacer, Knob & Shaft
2	88208	Handle
-	542	Screw 1/4-20 x 3/4" Oval Bd. Hd.
-	805	Nut 1/4-20 Hex
-	876	L'Washer 1/4" Split Ring
3	61999	Housing
-	1311	Screw #8-32 x 3/8 Pan Hd.
-	88161	Cover
-	61985	Base Plate
4	88116	Relay (115V. 50/60 Hz) (K1)
-	1382	Screw #8-32 x 5/16" Bd. Hd.
5	88982	Resistor, Current Limiting (R1 with CR2)
-	1579	Screw #6-32 x 1/4" Bd. Hd.
6	61132	Capacitor, Boost (C2)
-	61133	Clamp
-	1579	Screw #6-32 x 1/4" Bd. Hd.
7	88981	Capacitor, RF Bypass (C3 with R3)
8	-	Transformer Wired (T1 with L1 & S1)
-	(Order by Type & Serial No. on nameplate)	
-	1315	Screw 5/16-18 x 5/8" Hex Hd.
-	807	Nut 5/16-18 Hex
-	853	Washer 5/16" Flat
-	877	L'Washer 5/16" Split Ring
9	61996	A. C. Power Cord
-	61102	Plug (125V. 30 Amp)
-	61165	Bushing
10	61162	Terminal Block (4 Term.)
-	1312	Screw #8-32 x 1/2" Bd. Hd.
-	61164	Marker Strip
11	61163	Mounting Bracket, Capacitor
-	464	Screw #10-32 x 1/4" Bd. Hd.
12	88233	Capacitor, Filter (C1)
13	88979	Resistor, Bleeder (R2)

<u>Item No.</u>	<u>Part No.</u>	<u>Description</u>
14	1487	Ground Bolt 1/4-20 x 7/8" Hex Hd.
-	806A	Nut 1/4-20 Hex
-	881	L'Washer 1/4" Split Ring
-	853	Washer, Flat 5/16"
-	889	L'Washer 1/4" Int. Shakeproof
15	61111	Terminal Block (D. C.)
-	61121	Marker Strip
-	1729	Screw #10-32 x 3/4" Pan Hd.
16	61103	Terminal Block (6 Term.)
-	61109	Marker Strip
-	1312	Screw #8-32 x 1/2" Bd. Hd.
17	45227	Blower (B1)
-	61127	Mounting Clip
-	61994	Blower Lead & Cap
-	83131	Finger Guard
-	1763	Screw #6-32 x 1" Pan Hd.
18	79107	Circuit Breaker (CB1)
-	1741	L'Washer 7/16" Int. Shakeproof
19	61976	Silicon Bridge Rectifier Assy. (CR1)
-	61101	Rectipoint
-	84112A	Forward Diode (Replacement)
-	61140	Reverse Diode (Replacement)
-	61933	Capacitor Assy. (C4)
-	77957	Capacitor Assy. (C5, replace with 61932)
-	88118	Thermal Switch (S2)
-	178	Screw, 6-32 x 3/16" Fil. Hd.
-	892	Lockwasher, #6 Shakeproof
-	61107	Mounting Bracket, Bridge
-	1304	Screw, 8-32 x 5/16" Pan Hd.
20	61118	Buss Bar
-	687	Screw 1/4-20 x 1/2" Hex Hd.
-	852	Washer, 1/4" Flat
-	1372	L'Washer 1/4" Ext. Shakeproof
-	805A	Nut 1/4-20 Hex
-	1307	Screw #10-32 x 3/8" Pan Hd.
-	866	Washer #10 Flat
-	1344	L'Washer #10 Int. Shakeproof
21	84112A	Diode, Blocking (CR3)
-	1722	Screw #6-32 x 1/2" Hex Allen Hd.
-	1494	L'Washer #6 Int. Shakeproof
-	793	Nut #6-32 Hex
-	61120	Heat Sink (CR3)
-	88237	Insulator Bushing
-	1473	Screw #6-32 x 1/2" Pan Hd.
-	88118	Thermal Switch (S3)
-	178	Screw #6-32 x 3/16" Fil. Hd.

<u>Item No.</u>	<u>Part No.</u>	<u>Description</u>
-	892	L'Washer #6 Int. Shakeproof
22	61993	Glow Lamp (DS1)

Parts Not Listed Above

61987	MS Connector & Leads
61100	Name Plate
72199	CableTie Mount

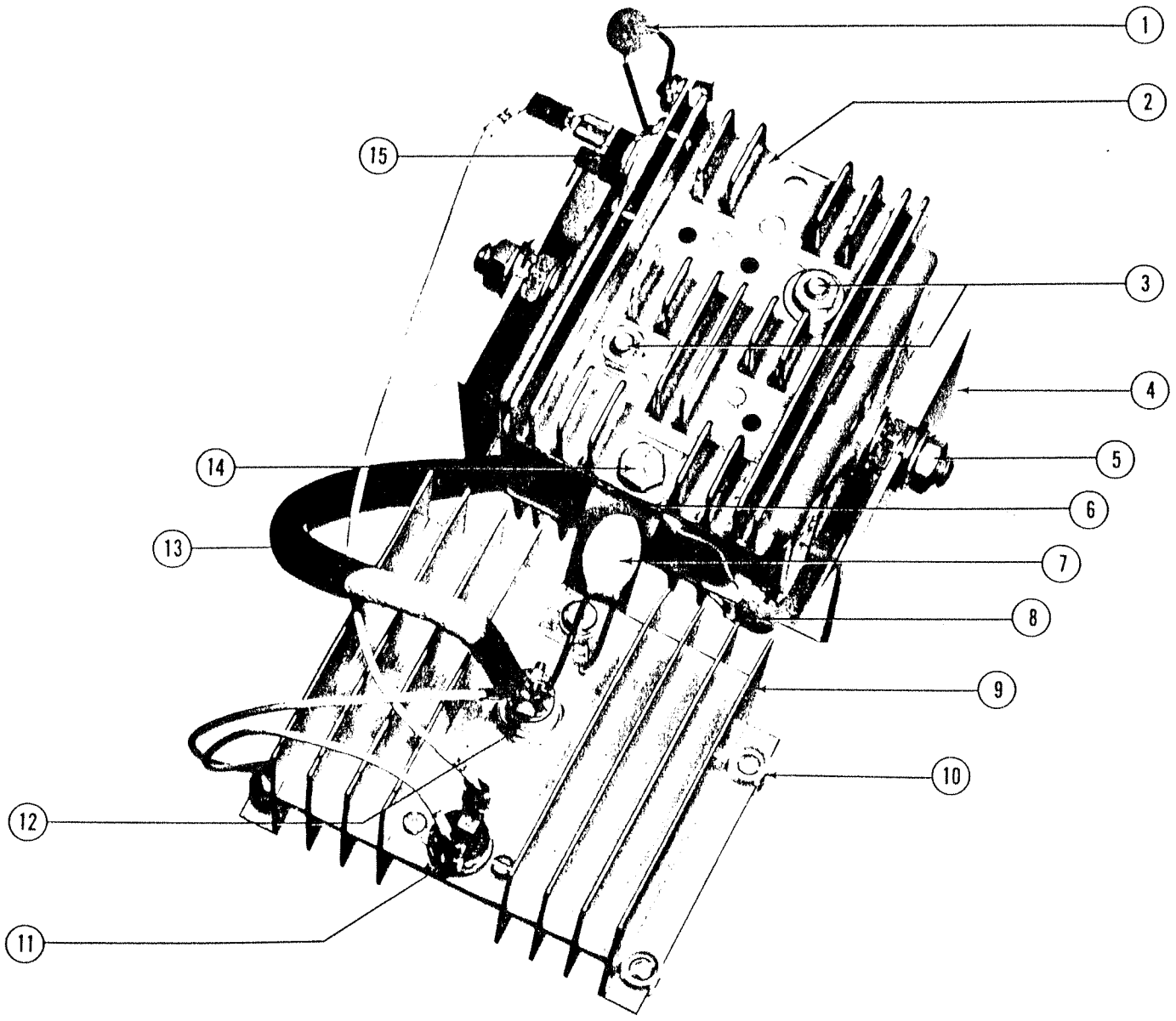
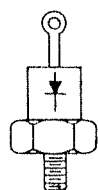


FIGURE 2

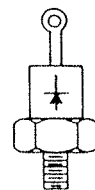
FIGURE 2
PARTS LIST

<u>Item No.</u>	<u>Part No.</u>	<u>Description</u>
1	61933	Capacitor Ass'y. (C4)
2	61101	Rectipoint (with CR1 Diodes)
3	61140 *	Reverse Diode
-	84112A*	Forward Diode (not shown)
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)
-	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:



FORWARD



REVERSE