

# INSTRUCTION MANUAL

## XENON POWER SUPPLY

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### **Strong Electric Corporation**

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## PREFACE

THE STRONG D. C. POWER SUPPLY is a continuous duty three phase, full wave bridge type transformer rectifier using silicon diodes as the power conversion elements and is designed for use with the Super Lume-X 100 Ampere (2500W) xenon lamphouse using the "Low" voltage firing circuit board #39966.

THIS POWER SUPPLY is designed to operate from an A. C. source of 230 volts (195-250V) and draws 22 Amperes maximum per phase from a 230 volt line with a 100 Ampere load. The D. C. output range is from 85-100 Amperes at 26 to 32 volts D. C.

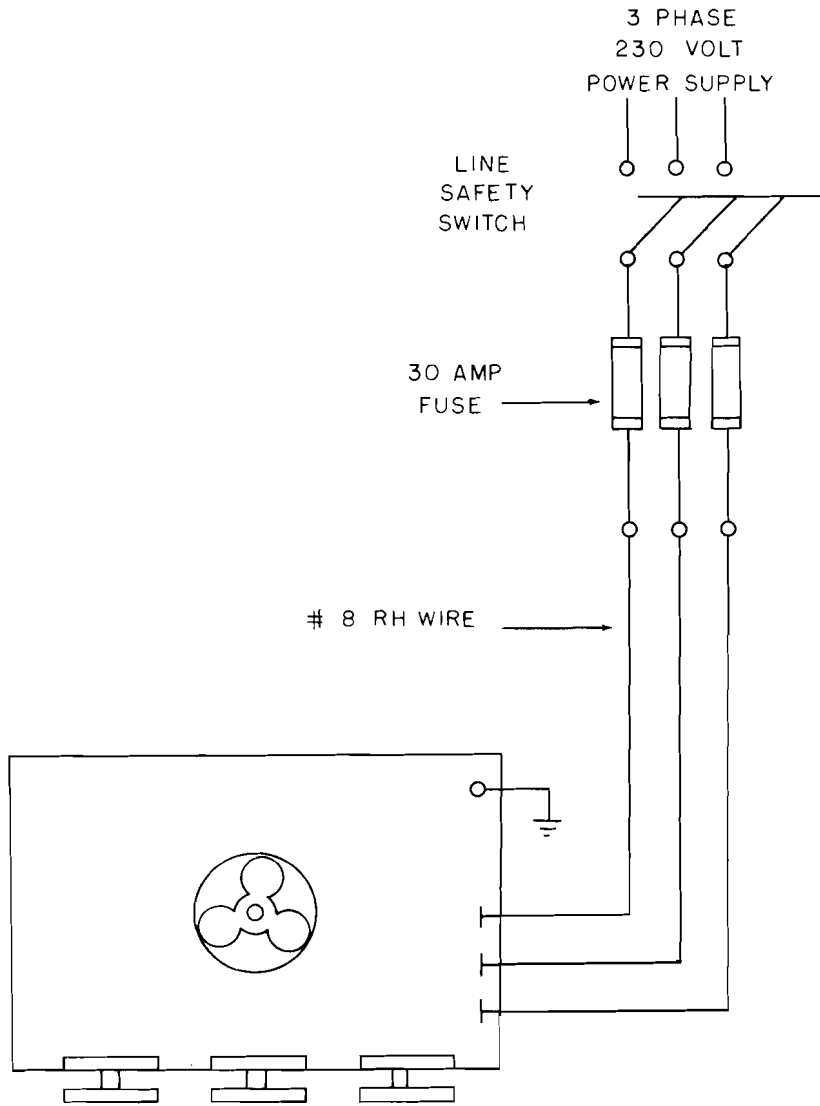
THE A. C. LINE TAPS on terminal panel TB1 are provided for a coarse adjustment of variations in the input line voltage. Moving the three relay leads from terminal "A" through "D" increases the D. C. output of the power supply. The three dial switches are used for the fine adjustment in the D. C. supply to the lamphouse.

THE POWER SUPPLY is equipped with a cooling fan to maintain a safe operating temperature and protect the rectifier elements. A step-down transformer is provided to reduce the line voltage to 115V. A. C. for the lamphouse control circuit, the fan in the power supply and coil of the line relay. This transformer has a low voltage tap (Brn.H2) that must be connected if the measured A. C. supply line voltage is below 220 volts.

A CHOKE and capacitor in the DC circuit reduce ripple to a minimum, consistent with the requirements of the xenon bulbs for long life, and a circuit breaker is installed in the 115V. AC control circuit to protect components in the event a malfunction occurs.

IF AT ANY TIME you have a suggestion, or desire aid in securing anticipated results, write directly to STRONG ELECTRIC, P. O. Box 1003, 87 City Park Ave. , Toledo, Ohio 43697.

INSTALLATION DIAGRAM



## INSTALLATION - OPERATION

ATTACH THE CABLE from the lamphouse to the mating MS connector on the side of the power supply.

THE D. C. CIRCUIT between the power supply and lamphouse must be a direct connection without fuses or switches in the circuit and avoid runs of over 15 feet, if possible.

THE A. C. INPUT POWER LINES between the power supply and fused safety switch should be as short as possible and conform to the size indicated on the installation diagram in this manual. A terminal lug, located inside the housing, is provided for the ground connection.

FOR BEST PERFORMANCE install the power supply in a well ventilated room. The power supply should not be operated in an ambient temperature over 120° Fahrenheit.

THE D. C. OUTPUT to the lamphouse is adjustable by means of the three dial switches, position #8 giving the highest output, and by moving the three AC leads from the relay across the terminal panel from position "A" to "B", "C" and "D". These three leads at position "D" gives the highest output. The three AC leads, from the relay to the tap panel must be in the same lettered position.

EACH DIAL SWITCH must be set on step (1). Each switch must be set on the same number and as they are moved from (1) to (8) the current to the bulb will be increased.

DO NOT BLOCK AIR VENT on top of the power supply, or operate with the front panel or top removed as this will cause the equipment to over-heat. Ignite the xenon lamp as specified in the lamp instruction manual. Wait a few minutes until the current stabilizes; then adjust the power supply for the current as specified by the bulb manufacturer.

THE STEPDOWN TRANSFORMER (T-2) has a low voltage 190-220V. tap (brown H2). If the measured line voltage is 220V. or lower, the brown lead (H2) must be connected to the relay to replace the blue (H3) lead. If the A. C. line voltage is over 220V., then the blue (H3) lead must be connected to the relay. Tape the end of the exposed or disconnected lead to prevent a short. This transformer must be connected properly to supply 115V. A. C. to the control circuit of the lamphouse to ensure proper firing of the igniter and operation of the lamphouse blowers. This circuit must also supply 115V. A. C. for full R. P. M. operation of the power supply blower B1 to maintain adequate cooling of the rectifier diodes and main transformers.

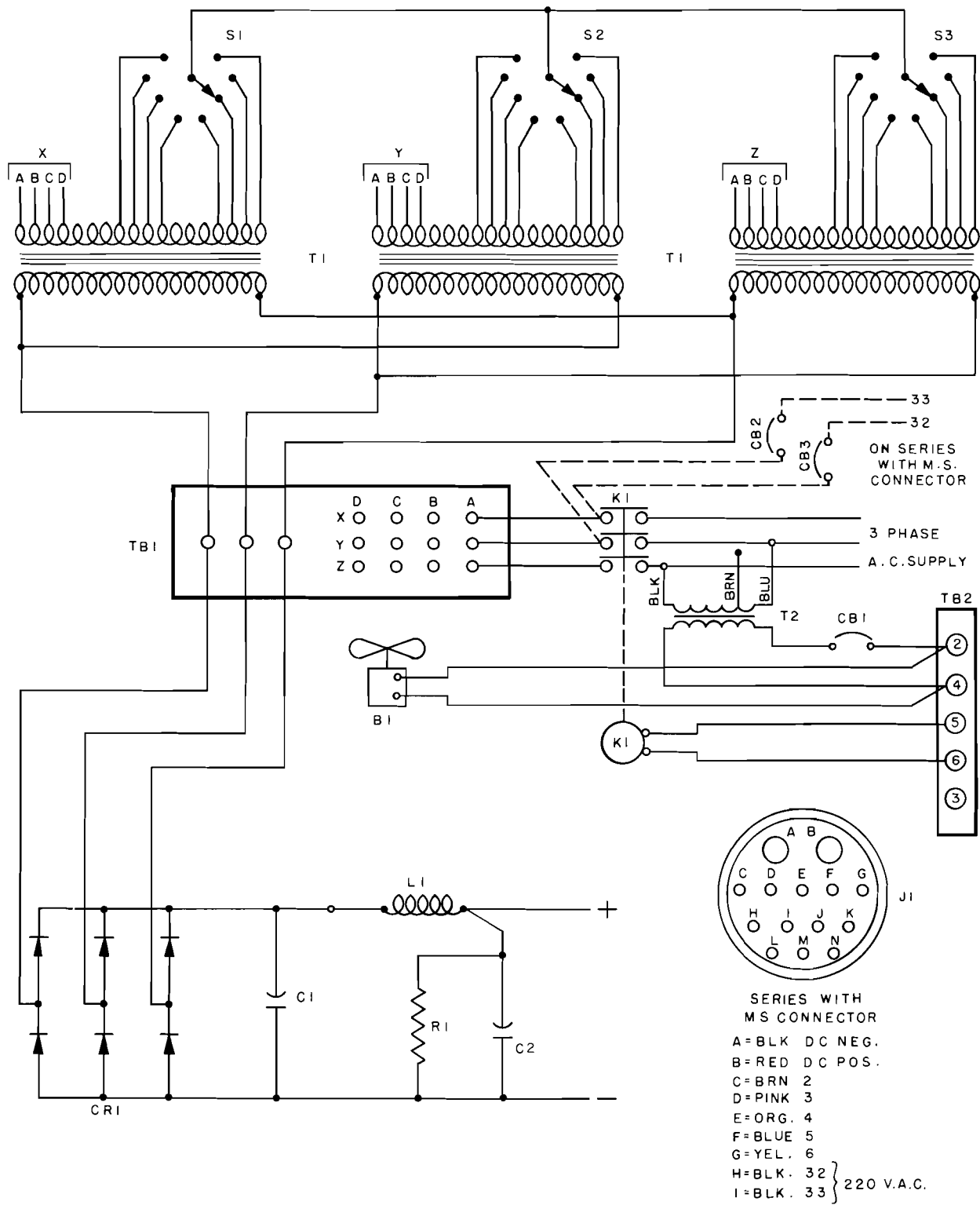
#### ARC CURRENT TOO LOW: (To increase current)

The arc current can be raised by turning the dial switch to a higher number. All 3 dial switches must be on the same number. If the switches are on number 8 and the current is still too low it can be raised by changing the coarse tap leads in the power supply to a higher tap (letter) i. e. tap "B" to tap "C". Again, when one lead is changed, all 3 must be changed. When the tap leads are changed, the dial switches must be set to number 1 step and then raised to a higher number if the current is too low. Do not exceed rated operating range of the xenon bulb being used in the lamphouse.

#### ARC CURRENT TOO HIGH: (To decrease current)

The arc current can be lowered by turning the dial switches to a lower number. All 3 switches must be on the same number. If the switches are on number 1, the current can be lowered by changing the coarse tap leads in the power supply, to a lower tap (letter) i. e. tap "B" to tap "A". Again, when one tap lead is changed all 3 must be changed. When the coarse tap leads are changed, the dial switches must be set to number 1 step and then raised to a higher number if the current is too low.

WIRING DIAGRAM



PARTS LIST  
WIRING DIAGRAM

<u>Ref. Desig.</u>	<u>Part No.</u>	<u>Description</u>
B1	94248	Motor & Leads Blower 50/60 Hz.
-	94138A	Fan Blades
C1	77957	Capacitor, R.F. Bypass, .01 MFD, 500 Volts
C2	84151	Capacitor, Filter, 12000 MFD, 125 WVDC
CB1	79107	Circuit Breaker
..	77898	Lead Assy. (CB1 to TB2)
CB2	79107	Circuit Breaker
-	77891	Lead Assy. (CB2 to K1)
CB3	79107	Circuit Breaker
..	77892	Lead Assy. (CB3 to K1)
CR1	77198	Silicon Rectifier Stack
-	77901	Lead Assy. (CR1 (Pos.) to L1)
-	77902	Lead Assy. (CR1 to TB1)
..	77905	Lead Assy. (CR1 to J1)
J1	77893	MS Connector & Leads Assy.
-	88319	MS Connector
K1	88116	Contacto 50/60 Hz
-	77897-1, 2, 3	Lead Assy. (K1 to TB1)
-	77970	Lead Assy. (K1 Coil to TB2)
L1	77907	Choke & Lead Assy.
-	77895	Lead Assy. (L1 to J1)
-	77899	Lead Assy. (L1 to C2)
-	77920	Lead Assy. (L1 to CR1 (Pos.))
R1	77158	Resistor, Bleeder, 1500 Ohm, 12 Watt
S1, 2, 3	15494B	Dial Switch & Lead Assy.
T1	*	Transformer, Banked
	*	Transformer, Wired With S1, S2, S3
	*	Order by Type & Serial No. on Nameplate.
T2	77904	Control Transformer Assy. 50/60 Hz.
TB1	77141	Terminal Panel
TB2	69149	Terminal Block, A.C. Control
-	77191	Terminal Marker Strip

## INSTRUCTIONS FOR REPLACEMENT OF SILICON STACK OR DIODES

IN CASE OF REPEATED BLOWN FUSES, noticeable reduction in light output, or excessive flicker, check for failure of a diode in the rectifier stack. Diodes of a silicon stack can be checked with an ohmmeter. In event of an open or shorted diode, it is relatively easy to make a replacement after the faulty element is located.

SINCE REPAIR OR REPLACEMENT of the unit or a diode will be required, it is best to remove the inoperative stack entirely from the rectifier by disconnecting the three AC and two DC leads and removing the two mounting bolts which fasten the unit to the bottom of the case.

WITH AN OHMMETER set on lowest range, check the resistance between the DC positive and each of the three AC terminals. Reverse ohmmeter leads and check the resistance again.

REPEAT THE ABOVE STEP between the negative terminal and each of the three AC terminals.

A GOOD DIODE will show high resistance in one direction and low resistance in the other. A shorted diode will have a very low resistance in either direction. An open diode will have infinite resistance in both directions.

ONCE THE FAULTY DIODE is located, two wrenches will be required for replacement. Proceed as follows:

- (1) Disconnect the flexible wire to the defective diode.
- (2) Remove the diode using two wrenches, one for the hex diode face and the other for the retaining nut and lock nut.
- (3) Install the new diode and tighten securely to insure perfect heat and electrical conductivity.
- (4) With the new diode in place; connect the diode flexible lead to the diode terminal.
- (5) Replace the diode stack in the power supply and connect the two D. C. leads, making sure the D. C. polarity is not reversed. Connect the three A. C. leads to the rectifier stack.



## TROUBLE CHART

### NORMAL OPERATION:

When the line power switch is turned on, voltage is supplied to the stepdown transformer T2, the line side of the line contactor in the power supply, and to the 115V. AC control circuit of the lamp. The fan in the power supply will operate. The control circuit to the lamphouse is protected by circuit breaker CB1 and the lens system blower by CB2 and CB3.

When the power switch in the lamp is turned on the line contactor in the power supply will be energized, a loud click will be heard as the contacts close and line voltage will be applied to the transformers and to the silicon rectifier unit. Approximately 85 volts DC is momentarily applied to the DC circuit for the xenon bulb ignition. Upon ignition this voltage is reduced and 26 to 32 volts D.C. is supplied to the lamphouse to maintain operation of the xenon arc. Capacitor C1 functions as a RF bypass circuit at the time of ignition to protect the CR1 rectifier circuit.

The choke L1 and capacitor C2 serve as filters to reduce the D.C. ripple to the level required to insure long bulb life. Resistor R1 functions as a bleeder for C2 capacitor.

If the dial switches, or coarse taps are adjusted to a higher step, the voltage to the lamp is increased, and due to the bulb characteristics, the current is increased.

If the dial switches, or coarse taps are adjusted to a lower step, the voltage to the bulb is decreased, and due to the bulb characteristics, the current is decreased.

<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 power switch is turned on.)	Line power switch not turned on.	Check line switch.	Turn on.
	Blown line fuses.	Check line fuses.	Replace blown fuses.
	Circuit breaker CB1 open.	Check for short in control circuit.	Reset circuit breaker, repair short.
	K1 contactor coil burned out.	Check for line voltage across A. C. control terminals 5 and 6, with lamp power switch on.	If line voltage appears across these terminals replace contactor.
	Lamphouse interlock switches.	If line voltage is not measured across 5 & 6 but is measured across 2 & 4 on terminal board.	See lamp manual "Trouble Chart" section.
	Loose connection or broken lead in wires 2 & 4 or 5 & 6 between lamp & power supply.	Check continuity on 2-4 and 5-6.	Tighten connection or replace broken wire. See also lamp manual "Trouble Chart".
Contactor clicks on but bulb does not ignite. (Bulb does not flash).	Contacts in K1 line contactor burned.  Lamphouse igniter.	Check AC voltage on Term. Panel TB1 in power supply. (See lamp manual)	Replace contactor if voltage is not indicated.
Circuit Breaker CB2 & CB3 opens repeatedly. Lamp power switch "On".	Defective 230V. AC blower on lens system.	Check for short in blower or blower leads.	Replace blower or repair short in leads.

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
Low-No load DC voltage to lamp (less than 85 volts measured across positive & neg. leads at MS connector in power supply.	Coarse taps or dial switches set wrong.	Check installation procedure in this manual.	Adjust taps and dial switches properly.
	Contacts in line contactor defective or burned.	Check contacts.	Replace contactor.
	Dial switch.	Check that fingers of switches make solid contact with switch contacts.	Replace dial switch fingers or entire dial switch.
Circuit breaker CB1, opens repeatedly. Lamp power switch "on".	Defective fan or igniter in lamphouse.	-----	See lamp manual trouble chart.
	Defective B1 blower motor in power supply.	Test motor for short.	Replace motor if defective.
Bulb goes out during operation.	Air flow switches in lamphouse.	Check that switches remain closed.	See lamphouse "Troubleshooting".
Repeatedly blows line fuses.	Wrong size fuses.	Check size of fuses.	Replace with proper size fuses (see installation diagram).
	Wired improperly.	Check wiring (see installation diagram).	Wire properly.
	Shorted CR1 silicon rectifier unit.	Check silicon unit (See instruction for replacement of silicon stack diodes) in this manual.	Replace defective diodes.

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
(Cont'd) Repeatedly blows line fuses.	Shorted trans- former.	Disconnect sili- con unit at terminal panel. Turn on lamp power switch.	If fuses still blow replace transformer bank.
	Shorted filter capacitor C2.	Test with capaci- tor checker if available. A shorted capacitor will generally become so hot it will damage insul- ation on the leads.	Replace if defective.
Repeated shorted diodes.	Insufficient air flow thru power supply.	Check for blocking of air thru silicon unit, screen in bottom of case, air outlet on top of case.	Clean power supply and re- move any obstructions to air circulation. Check connection (Brn H2), (Blue H3) of control trans- former for 115V. supply to fan motor.
	Defective fan.	Fan blade mov- ing slow, not much air.	Replace fan motor.
	Wrong replace- ment diode being used.		Replace defec- tive with proper one.
	Defective RF bypass capac- itor C1.	Remove & test with capacitor tester if available.	Replace if defective.
Excessive light flicker.	Improper dial switch or coarse tap settings.	Check that all 3 dial switches are on the same step number. Check that all 3 coarse taps are on the same letter taps.	Set properly.

<u>TROUBLE</u>	<u>PROBABLE CAUSE</u>	<u>TEST</u>	<u>REMEDY</u>
(Cont'd) Excessive light flicker.	Defective silicon unit.	Check silicon unit. See "Instruction for replacement of silicon stack diodes in this manual.	Replace defective diodes.
	Defective xenon bulb.	(See lamp manual trouble shooting)	
	Open filter capacitor C2.	Disconnect bleeder resistor R1 & one side of the D. C. leads to lamphouse. Turn on lamp power switch to charge capacitor. Turn off lamp switch and use voltmeter. Open capacitor will not hold a charge.	Replace if defective.
Reduced light output.	Defective xenon bulb.	(See lamp manual trouble shooting)	
	Defective CR1 silicon diode	See previous test for rectifier.	Replace if defective.
Xenon bulb does not light (bulb flashes).	Defective xenon bulb.	(See lamp manual trouble shooting)	
	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 manufacturer's recommended minimum rating. Check connection of (Brn H2), (Blue H3) control transformer leads to provide 115V. for lamphouse control circuit.