

# Film-Tech

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# INSTRUCTION MANUAL

## **SUPER LUME-X**

Xenon Lamphouse

Type 39000

Rev. 11/99



### **STRONG INTERNATIONAL**

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## PREFACE

THE STRONG SUPER LUME-X is a reflector type, direct current motion picture projection lamphouse using a xenon bulb as the light source. Only xenon bulbs designed for horizontal operation should be used in this lamphouse. The reflector is a metal, deep ellipse type with a dichroic coating to reduce infrared heat at the film plane. The reflector is designed to operate in a fixed position at 25-3/4 inches from the aperture of the projector.

THE ADJUSTMENT CONTROL to position the xenon bulb in relation to the reflector is located on the rear of the lamphouse behind the cover panel. This control mechanism permits horizontal and vertical movement, and focus control of the xenon bulb.

A TERMINAL STUD, located in front of the bulb anode support yoke on the base of the lamphouse, is provided as a connecting point to the lamphouse DC lead and the lead from the bulb. A separate positive lead and contact is supplied with each lamphouse to permit use of bulbs without anode leads.

THE LAMPHOUSE is equipped with a DC ammeter to indicate the operating current of the lamp. A pushbutton switch below the meter alters the meter to indicate the DC voltage at the arc. This capability permits immediate calculation of the lamp power while the lamp is operating.

AN ELAPSED TIME METER registers the total number of hours the lamphouse has been in service, and provides a means of recording the number of hours each xenon bulb has been operating. A Xenon Bulb Record chart is provided on the inside back cover of this manual for maintaining an accurate log of bulb life. This information is required in the event of a bulb warranty adjustment.

A 115 V.AC BLOWER is internally wired in the lamphouse, and is required to maintain the seals on the bulb at a safe operating temperature. This blower will operate continuously until the xenon power supply is de-energized. The blower motor is protected by an in-line 1.5 ampere fuse.

AN AIR FLOW SWITCH, attached to the blower, will prevent ignition of the lamp if the blower is not operating. It will also interrupt operation of the lamp if the blower fails to maintain an adequate air flow to keep the actuator vane of the switch closed.

THE LAMPHOUSE has a key lock and interlock switch on the side door to prevent lamp operation if the access door is not closed and secured. This switch is intended to protect personnel and must not be bypassed. A sight glass in the side of the access door permits observation of the xenon arc.

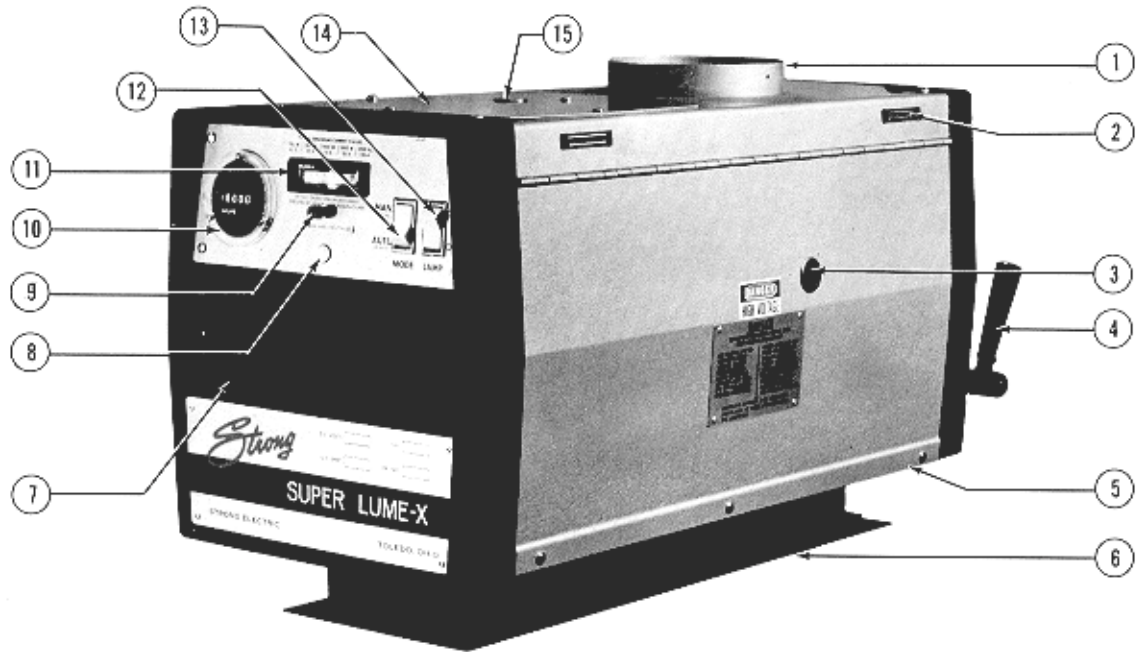
THE IGNITER is equipped with an emergency ignition switch located under the plug button on the igniter access panel on the top of the lamphouse. An interlock switch is mounted below the plastic cover of the igniter case and will prevent lamphouse operation if the igniter is opened.

THE "MODE" rocker type switch on the rear of the lamphouse provides the means of operating the equipment from a remote station or automation controller when in the "AUTO" position. The LAMP switch is used for bulb ignition when the MODE switch is in the "MAN." (manual) position.

THE LAMPHOUSE DOUSER is provided to permit cutting off the light to the projector. The lamp should not be operated for any extended period of time with the douser closed. The small intense spot of light on the douser plate may cause deterioration of the plate.

OPTIONAL ACCESSORIES for the Super Lume-X include an Electric Douser Kit (Part No. 39871) which automatically closes the douser when the projector motor turns off, and a Beam Expander Lens Kit (Part No. 39906) for 70mm projection. These accessories are factory installed when ordered with new equipment, or may be added to an existing installation as required.

IF AT ANY TIME you have a suggestion, or desire aid in securing anticipated results, please feel free to write directly to STRONG INTERNATIONAL, 4350 McKinley Street, Omaha, Nebraska 68112.



- |                              |  |
|------------------------------|--|
| 1. Exhaust Stack & Top Cover | 9. "Press for Voltage" Switch                        |
| 2. Door Catch, Magnetic      | 10. Elapsed Time Meter                               |
| 3. Arc Viewing Port          | 11. Volt/Ammeter                                     |
| 4. Douser Handle             | 12. MODE Switch (Auto/Manual)                        |
| 5. Lamphouse Access Door     | 13. LAMP Switch (On-Off)                             |
| 6. Base Adapter Assembly     | 14. Igniter Access Panel                             |
| 7. Bulb Adjust Cover Panel   | 15. Emergency Ignition Switch<br>(below Plug Button) |
| 8. Current Control *         |  |

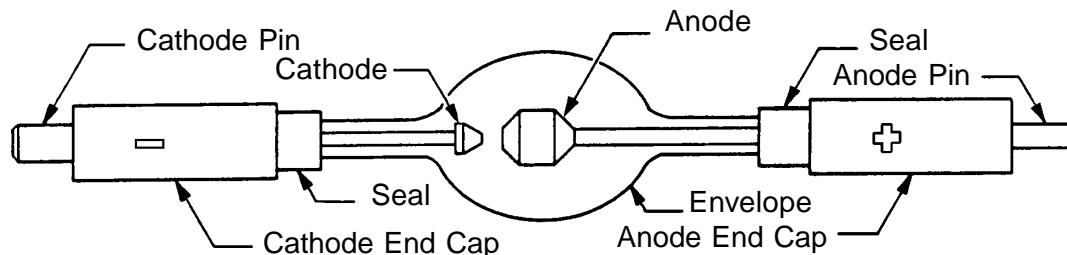
\* Used with Strong Type 88000 Power Supply *only*

## SAFETY PROCEDURES

THE XENON BULB is highly pressurized. When ignited, the normal operating temperature of the bulb increases the pressure to a level at which the bulb may explode if not handled in strict accordance to the manufacturer's operating instructions. The bulb is stable at room temperature, but may still explode if dropped or otherwise mishandled.

REFER bulb replacement and service to QUALIFIED PERSONNEL with adequate protective clothing (face shield, clean cotton gloves, welder's jacket). For routine lamphouse service, observe the following rules:

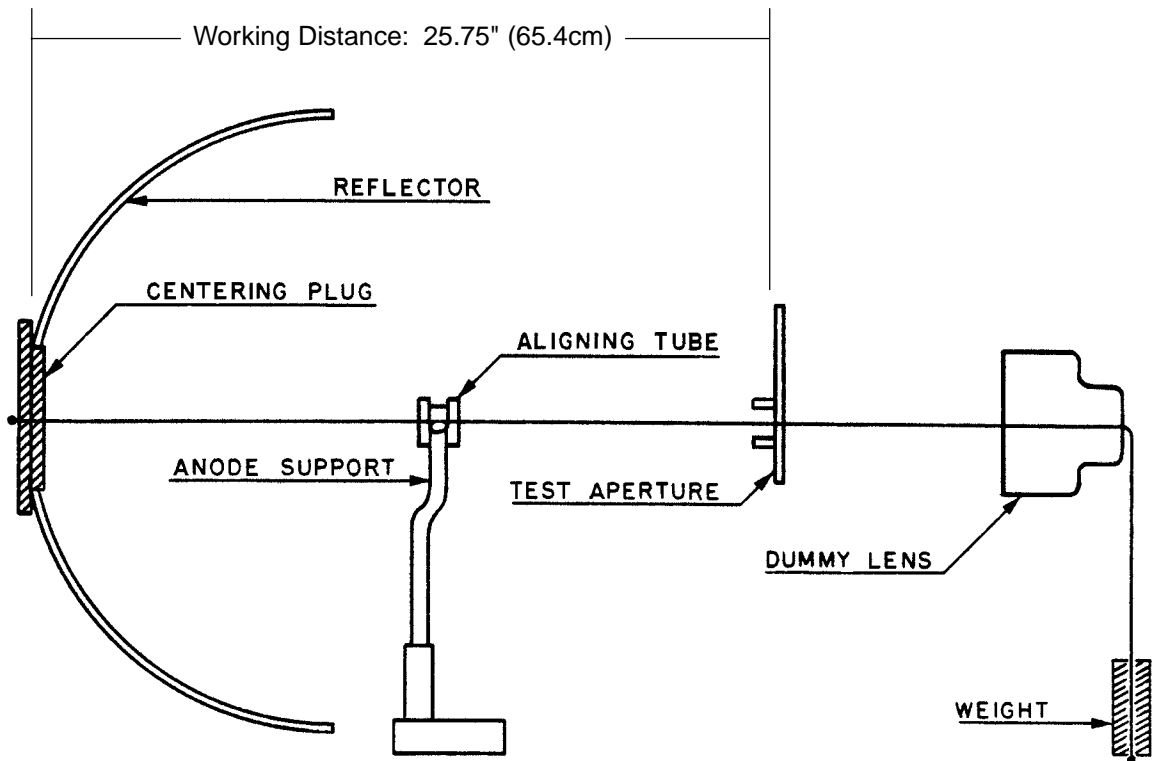
1. Allow the bulb to cool to room temperature before opening the lamphouse. Put on protective clothing described above.
2. De-energize the xenon power supply at the AC source before opening the lamphouse compartment.
3. When possible, encase the bulb in its protective cover when cleaning or servicing the lamphouse interior. The bulb, when outside the lamphouse, must be encased in the cover.
4. Clean the bulb after it has cooled to room temperature. Do not touch the quartz envelope of the bulb; fingerprints will burn in and create hot spots which may shorten bulb life. If fingermarks are made, they should be carefully removed with methyl alcohol and cotton prior to bulb operation.
5. Never view an ignited bulb directly. **BLINDNESS OR PERMANENT EYE DAMAGE MAY BE INCURRED.**
6. Use only xenon bulbs designated as OZONE FREE. When possible, vent the lamphouse exhaust to outside atmosphere.
7. Maintain the lamphouse blower in good operating condition. Keep the blower inlet clean for unrestricted air flow.
8. To insure maximum bulb life, operate the lamphouse blower and the exhaust system for **at least** ten minutes after extinguishing the bulb.
9. If returning a bulb for warranty adjustment, pack it in its original shipping container. Complete and return all required warranty information.
10. Dispose of expired bulbs that are beyond warranty in the following manner: Wrap the bulb tightly in several layers of canvas or heavy cloth. Place it on a hard surface and shatter the envelope with a sharp hammer blow. **DO NOT** place an unshattered bulb in an ordinary refuse container.
11. **DO NOT PERMIT UNAUTHORIZED PERSONNEL TO PERFORM OR ATTEMPT ANY PHASE OF XENON BULB HANDLING OR SERVICE.**



## 35mm INSTALLATION

MOUNT THE LAMPHOUSE to the projection pedestal using the 1/4-20 hardware supplied. Clearance holes in the base adapter are drilled on standard seven-inch centers. Leave the fasteners loose enough to permit movement of the lamphouse for optical alignment.

CENTER THE LAMPHOUSE between the ways machined into the pedestal lamp-house table. Slide the lamphouse horizontally in the ways to position the reflector center hole 25-3/4 inches (65.4cm) from the picture aperture of the projector.



WITH A XENON PROJECTION LAMP it is **imperative** that the lamphouse optical system is aligned exactly with the projector optical center in both the vertical and horizontal planes.

ONE ALIGNING KIT is furnished with each xenon lamphouse to provide an accurate and reliable method of optical alignment. Optimum screen results can be obtained *only* by careful use of this aligning kit.

OPEN THE CHANGEOVER DOUSER and secure the fire shutter so it cannot fall shut. Turn the projector mechanism by hand to clear the shutter blades.



OPEN THE SIDE DOOR of the lamphouse. The security screw must be removed before the key lock will open, and a special screwdriver is provided to remove the (3) tamperproof screws. Open the douser. Place the small aligning tube in the anode support yoke. The lamphouse is shipped with the yoke positioned for 700, 1000, and 1600 watt bulbs. Do not reposition the yoke or move the spring pin until the lamphouse alignment procedure has been completed.

REMOVE THE PROJECTOR LENS and insert the dummy lens into the lens barrel. Position the centering plug in the back of the reflector, and run the cord through the lamphouse and projector as illustrated. Use an object with adequate weight to hold the cord taut. Place the test aperture into the film trap and close the film gate to hold it in place.

ALIGN THE LAMP so the cord passes through the exact center of the aligning tube in the bulb support yoke and the test aperture plate. Tighten the lamphouse mounting hardware to secure the lamp to the pedestal table.

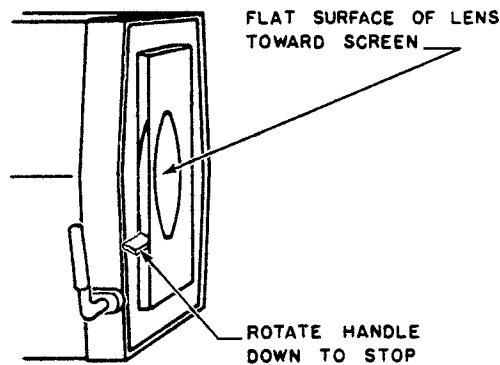
MOST PROJECTOR BASES have adjustable lamphouse tables so the lamp can be brought into correct optical alignment with the projector aperture and lens. On those that are not adjustable, the lamp must be centered by using shims or washers between the pedestal table and the lamphouse base to obtain optical alignment with the projector aperture and lens.

### 70mm OPERATION

BECAUSE of the larger aperture area of a 70mm projector, it is necessary to incorporate a beam expander lens to insure proper coverage of the screen. Beam Expander Kit No. 39906 is factory installed when ordered with new equipment, or may be added to an existing installation at a later date.

THE KIT consists of a lens holder (39905) which mounts to the front casting of the lamphouse with two 1/4-20 x 1-3/4" hex head screws (701) and flatwashers (863), a lens assembly (39904), and a nose cone (39959). The nose cone mounts to the lens holder with three 6-32 x 1/8" pan head screws (1412).

IF THE KIT is added at a later date, the front casting of the lamphouse must be drilled and tapped to permit mounting the lens holder. The nose cone may be trimmed to fit with tin snips as required.



(NOSE CONE NOT ILLUSTRATED)

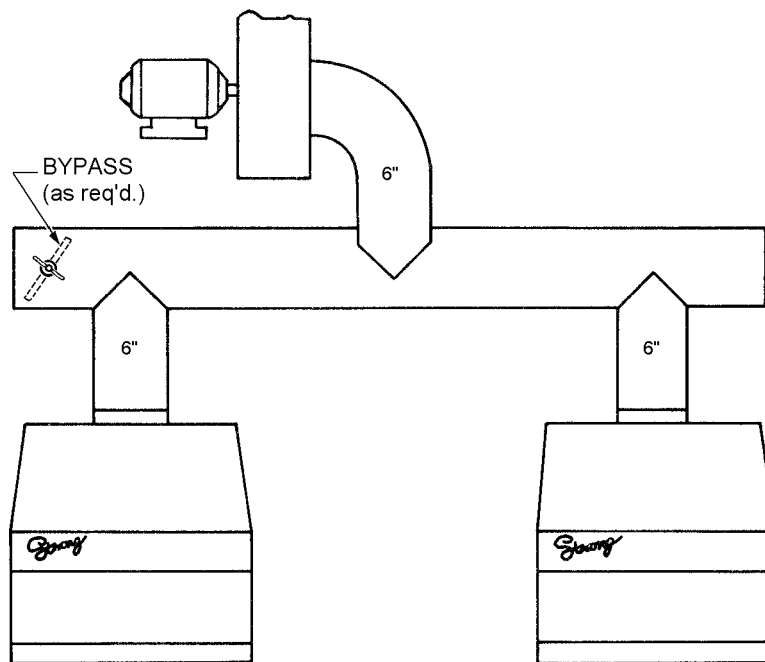
THE LENS is to inserted into the lens holder as illustrated *only* for 70mm operation. DO NOT insert the lens for 35mm projection. The lens holder 39905 may also be used to retain the optional 40939 Heat Filter & Ring assembly.

## EXHAUST SYSTEM INSTALLATION

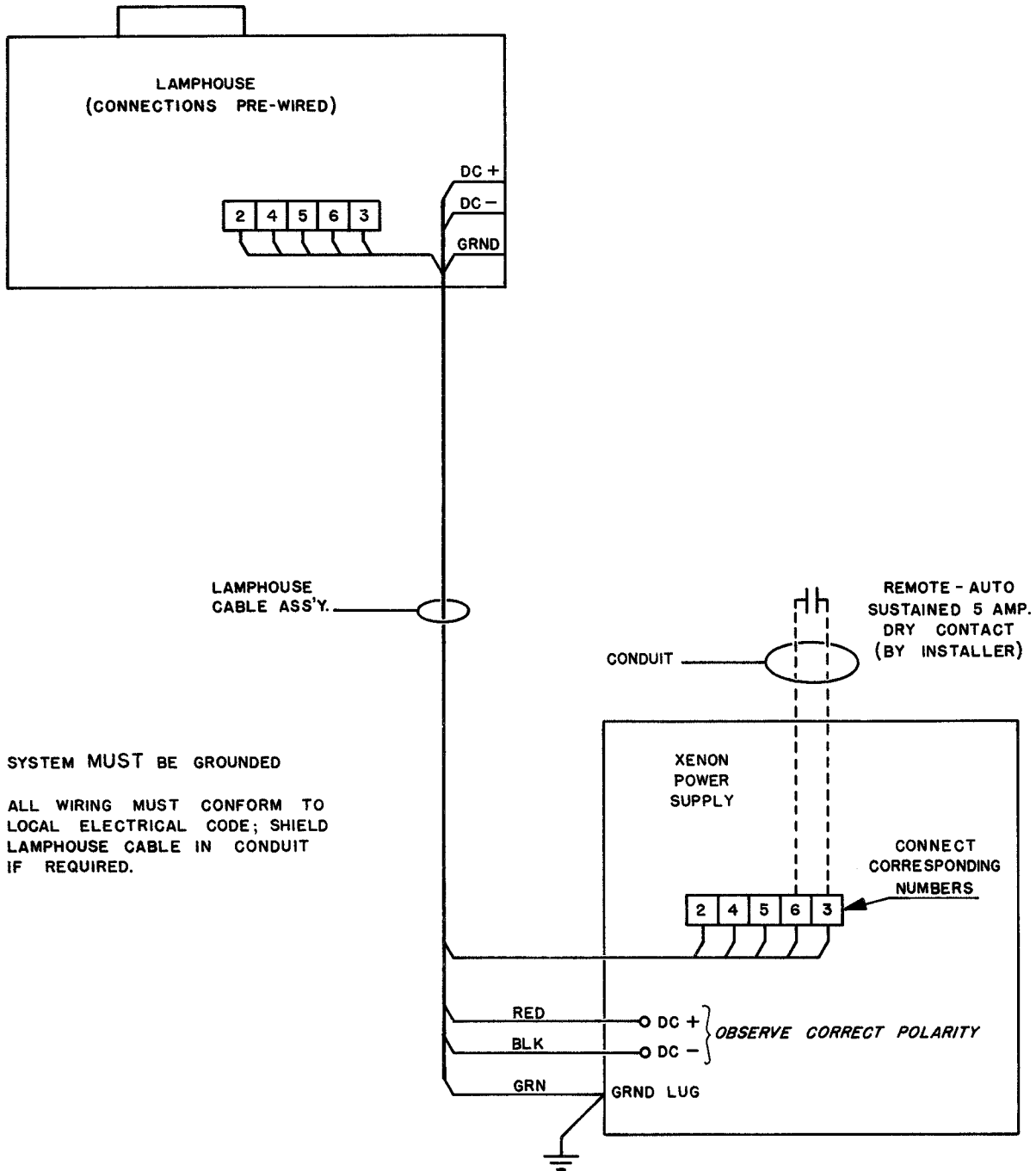
THE EXHAUST STACK of the Super Lume-X is designed to fit a six inch diameter duct. This size ducting, either rigid or heat-resistant flexible, must be used throughout the complete exhaust system. The exhaust system must be vented to outside air, and installed in such a manner as to eliminate any possibility of downdraft or rain dripping into the lamphouse.

THE EXHAUST SYSTEM must be capable of removing 300 cubic feet of air per minute (300 cfm) *measured at each lamphouse*. Insufficient exhaust draft can significantly reduce bulb life, and cause possible injury by overheating the lamphouse enclosure.

IF EXHAUST AIR FLOW must be restricted for any reason, it is recommended to install bypasses, rather than dampers, in the exhaust system.



# LAMPHOUSE-POWER SUPPLY INTERCONNECTION DIAGRAM



## WIRING INSTALLATION

THE LAMPHOUSE LEADS must be connected to the xenon power supply as shown in the Interconnection Diagram.

CONNECT THE TWO HEAVY LEADS to the DC output terminals in the power supply. **Observe correct polarity.** Connect the RED to the positive (+) terminal, and the BLACK to the negative (-) terminal.

THE CONTROL CIRCUIT LEADS must be connected to the terminal strip located in the power supply cabinet. Leads 2, 4, 5 and 6 are the AC circuit leads between the lamphouse and power supply. Lead 6 is switched through 3 for remote/auto operation.

EARLY MODEL Super Lume-X lamphouses included three current control leads (32, 33, 34) for connection to a Type 88000 power supply. If connecting an older lamphouse to a newer high reactance (61000) or switching (62-80000) type power supply, these leads are *not* connected. See the Power Supply Instruction Manual for details regarding current adjustment.

### CONNECT AS FOLLOWS:

Brown	- 2	Yellow	- 6
Red	- 3	Grey *	- 32
Orange	- 4	Purple *	- 33
Blue	- 5	White *	- 34
		* Older Models <i>only</i>	

CONNECT THE GROUND LEAD (AWG #8 green) to the 1/4-20 terminal stud located in the power supply cabinet.

IF EMPLOYING the "MAN. - AUTO" feature in lamphouse operation, the required wiring is most easily connected at the power supply. See the Interconnection Diagram for 3 - 6 wiring; DO NOT apply voltage to these terminals.

ALL LEADS may be run in conduit or greenfield if desired or if required by local code. This may also be necessary as shielding to prevent electrical interference from feeding into the theatre sound system.

## AUTOMATION SYSTEMS

TO INTERCONNECT the Super Lume-X to an automation system, two 16 gauge wires (not supplied by Strong) must be customer-installed as illustrated on the Interconnection Diagram. These wires must be shielded to prevent interference in the theatre sound system.

NOTE: Lamphouse ignition in "AUTO" mode is effected by a sustained dry contact closure across terminals 3 and 6. DO NOT apply voltage to these terminals. Refer to instructions furnished by the manufacturer of the automation controller.

TO OPERATE with an automation system, place the MODE switch in "AUTO," and the LAMP switch to "ON." When the xenon power supply is energized, the lamphouse blower will operate. The bulb will not ignite until the automation controller applies a dry contact closure between terminals 3 and 6. This closure must occur *after* the projector motor "start." Opening this contact will extinguish the bulb, but allow the blower to continue to operate.

IN THE EVENT of an automation failure, manual control of the lamphouse can be restored by placing the MODE switch in "MAN." and switching "ON" and "OFF" using the LAMP switch.

## SUPER LUME-X LAMP CHART

REFER TO THE FOLLOWING TABLE of adapters for the parts required and the position of the anode support yoke relative to the use of the various types and wattages of bulbs used in the Super Lume-X Lamphouse. Bulbs not listed on the chart have not been factory tested in the Super Lume-X, and may not be suitable for use. If using a bulb not listed on the chart, check with the bulb supplier regarding its compatibility in the Super Lume-X.

THE ANODE SUPPORT YOKE height positioning holes (“A - B - C”) permit adjustment of the yoke to compensate for the difference in anode stem diameters of the OSRAM® and Hanovia® bulbs. The stem of the Hanovia is generally larger than the OSRAM in higher wattages. Therefore, if changing from Hanovia to OSRAM, or vice versa, the anode yoke must be repositioned.

TO CHANGE THE POSITION OF THE SUPPORT YOKE (Item 7), back off the set screw (Item 10) and remove the spring pin (Item 9). Raise, lower, or rotate the yoke to the proper position shown on the chart for the bulb being installed. Insert the spring pin (Item 9) into the correct hole in the yoke and tighten the set screw (Item 10).

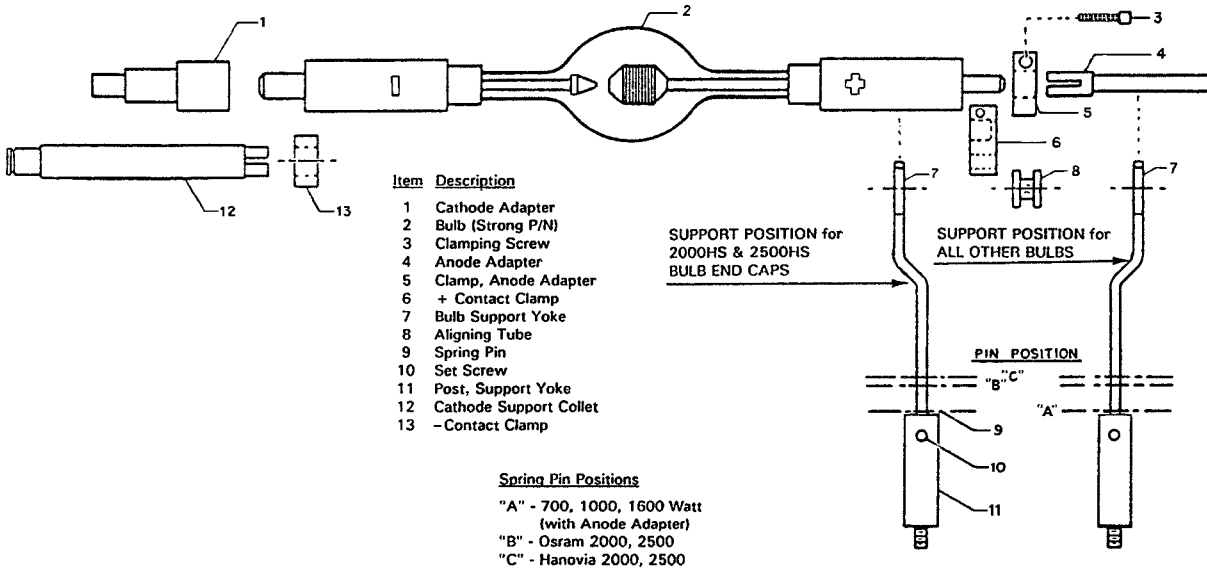
THE 2500 WATT HORIZONTAL, and the “short” 2000 bulbs (-HS suffix) require use of a different cathode support collet (Item 12) and cathode contact clamp (Item 13). If an anode lead is not supplied with the bulb, a different anode contact clamp (Item 6) is also required. These components are factory mounted when lamps are specifically ordered for 2500 watt operation.

TO REPLACE THE CATHODE SUPPORT COLLET, remove the contact clamp located inside the lamphouse from the end of the support. Detach the negative (igniter) lead from the clamp. Remove the cover panel from the rear of the lamphouse and locate the black snap ring on the end of the white support rod. Remove the snap ring, and pull the support rod out of the focus control from inside the lamphouse. Reverse the procedure to install the replacement cathode support collet and contact clamp.

STANDARD 2000 WATT HORIZONTAL BULBS (i.e. Hanovia XH2000HW, L5330-000 or OSRAM XBO2000W/H OFR) require no bulb adapters to mount in the Super Lume-X. The anode contact (Item 6) and lead may be attached directly to the anode end pin, or the bulb anode lead may be used in place of the contact and lead assembly. If using the lead supplied with the bulb, remove the anode contact and lead from the lamphouse, and connect the bulb anode lead terminal to the lamphouse positive lead at the base of the bulb yoke.

ALL DC CONNECTIONS TO THE BULB MUST BE SECURELY TIGHTENED. Loose connections will cause overheating and bulb damage, and will lead to premature bulb failure *not covered* by the bulb warranty.

# SUPER LUME-X BULB ADAPTER CHART



MFGR WATTS NUMBER	HANOVIA 700 994C0010 XH0700HS	HANOVIA 1000 993C0010 XH1000HS	HANOVIA 1600 992C0010 XH1600HS	HANOVIA 2000 L5330-000 XH2000HW	HANOVIA 2500 995C0010 XH2500HS	OSRAM 700 X80 700 HS -OFR	OSRAM 1000 X80 1000 HSC-OFR	OSRAM 1600 X80 1600 HSC-OFR	OSRAM 2000 X80 2000 H OFR N-C	OSRAM 2500 X80 2500 HS -OFR	OSRAM 2000 X80 2000 HS -OFR
ITEM NO.											
1	65169	65169	65169			65169	65169	65169			
2	65356	65247	65258	65273	65274	65355	65357	65358	65255	65260	65406
3	1532	1532	1532								
4	65344	65344	65344								
5	65343	65343	65343								
6	65148	65148	65148		65400						
7	39975	39975	39975	39975	39975	39975	39975	39975	39975	39975	39975
8	M2586	M2586	M2586			M2586	M2586	M2586			
9	1704	1704	1704	1704	1704	1704	1704	1704	1704	1704	1704
10	1721	1721	1721	1721	1721	1721	1721	1721	1721	1721	1721
11	39135	39135	39135	39135	39135	39135	39135	39135	39135	39135	39135
12	65960	65960	65960	65960	65924	65960	65960	65960	65960	65924	65924
13	65131	65131	65131	65131	65265	65131	65131	65131	65131	65265	65265

A terminal stud, located on the anode support block (adjacent to Item 11 Post), is provided to permit use of bulbs with anode leads. OSRAM "HSC" bulbs require use of anode adapter 39318 which is *not included* with the standard bulb adapter kit and must be ordered separately. 700 - 1000 watt bulbs without anode leads (Type "HS") employ the standard bulb adapters supplied with each Super Lume-X: 65169 Adapter (for threaded cathode pin; Item 1) with Anode Adapter 65344 (Item 4) and Clamp 65343 (Item 5). Positive Contact Clamp 65148 (Figure 2, Item 7) is included with each Super Lume-X. Item 8 (M2586) is used only for the "35mm Installation" mechanical alignment procedure and requires the Support Yoke (Item 7) and Spring Pin (Item 9) be in Position "A."

## BULB INSTALLATION

**CAUTION: OBSERVE ALL SAFETY PROCEDURES.** Put on the protective face shield. Wear clean cotton gloves to prevent marking the quartz envelope with fingerprints. Remove the door interlock screw and unlock the side access door. Use the special screwdriver provided to release the (3) tamperproof door fasteners. The Super Lume-X is designed to operate with xenon bulbs rated from 700 to 2500 watts. Before installing any bulb, make certain that the preceding “35mm INSTALLATION” aligning procedure has been carefully completed.

THE SUPER LUME-X is shipped with the anode support yoke set for use with 700 to 1600 watt bulbs; position “A” of the preceding chart. This accommodates optical alignment of the lamphouse to the projector. Only one size aligning tube (Item 8) is supplied with the lamphouse Aligning Kit.

ADAPTERS required to permit use of the Hanovia 700, 1000 or 1600 watt bulbs, with or without leads, and the OSRAM 700, 1000 or 1600 watt without leads are furnished with each lamphouse when ordered for 700 to 2000 watt operation. OSRAM 700, 1000, 1600 and 2000 watt bulbs with leads (-HSC OFR suffix) have no anode pins and require a 39318 adapter for use with the Super Lume-X lamp. This anode adapter replaces the 1600-3 adapter formerly supplied by OSRAM, and must be ordered separately. Hanovia 2000 watt bulbs (L5330-000 or XH2000HW) and OSRAM XBO2000W/H OFR require no bulb adapters.

WHEN ADAPTERS or extensions for the desired bulb are required, the adapters must be assembled to the bulb before insertion into the lamphouse and while the bulb is still in its protective casing. Be very careful to *not* put any strain or torque on the quartz envelope when assembling the adapters to the bulb.

THE ANODE CLAMP (Item 6) and lead supplied with the lamphouse may be removed if it is desired to operate a 2000 watt bulb (L5330-000, XH2000HW, or XBO2000W/H OFR) using the anode lead supplied with the bulb. If doing so, connect the terminal of the bulb lead to the lamphouse positive lead using the 1/4-20 screw in front of the support yoke. If no anode lead is supplied with the bulb, the clamp (Item 6) will mount directly to the 2000 watt anode end pin.

THE 2500 WATT HORIZONTAL, and “short” 2000 watt bulbs (-HS suffix), require use of a different cathode support collet (Item 12) and contact clamps (Items 6 & 13). See the preceding BULB ADAPTERS chart.

REMOVE THE PLASTIC PROTECTIVE COVER from the xenon bulb only if necessary. If the bulb envelope should accidentally become fingermarked, the marks must be removed with isopropyl alcohol and wiped clean. Skin oils from fingerprints will permanently burn into a bulb envelope if not removed.

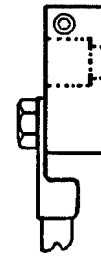


INSERT THE BULB into the lamphouse passing the cathode (-) end into the reflector and through the center hole. Take care not to touch or scratch the surface of the reflector. Insert the cathode pin or adapter stem into the rear support collet as far as possible to permit full focus travel of the bulb.

TIGHTEN THE SOCKET HEAD CLAMPING SCREW in the negative contact securely to insure a good electrical connection. Rest the anode (+) end of the bulb, or the anode adapter stem, in the front bulb support yoke.

INSTALL THE ANODE (+) lead contact clamp over the anode pin or the stem of the adapter only up to the shoulder of the contact. Tighten the socket head clamping screw securely to provide a secure electrical connection.

THE TERMINAL STUD (hex head cap screw), located on the anode support block, is provided to permit use of xenon bulbs with anode leads in the Super Lume-X lamphouse. Remove the short anode lead and contact clamp from the lamphouse. Attach the lamphouse lead and the bulb anode lead in contact with each other under the hex head cap screw. Position both leads off to opposite sides of the stud for maximum clearance between the douser plate and leads when the douser is opened. Dress the bare anode lead of the bulb so it cannot make contact with the reflector or the base of the lamphouse. Securely tighten this connection to prevent overheating.



ANODE CONTACT CLAMP

IT IS RECOMMENDED to establish a routine of periodically checking all electrical connections, particularly those in the DC circuit, for tightness. Loose connections at or near the bulb or its adapters will overheat, causing damage to the leads or contacts, and may destroy the xenon bulb.

MAGNETIC STABILIZATION of the xenon arc is provided by the bar magnet mounted below the reflector. This magnet is factory set and requires no adjustment. If removed for any reason, the magnet must be replaced with the SOUTH (painted) pole nearest the access door.

## OPERATION

REMOVE THE PLASTIC COVER from the xenon bulb. Do not ignite the lamp with the cover on the bulb.

SECURE THE LAMPHOUSE ACCESS DOOR with the key lock and the latch locking screw. The door must be secured in the closed position to actuate the door interlock switch and permit lamp ignition. Install and secure the (3) tamperproof screws using the special screwdriver provided. Close the lamphouse douser and place the MODE switch in the "MAN." (manual) position.

TURN ON THE MAIN LINE SWITCH to energize the xenon power supply. The lamphouse blower will start, and the air flow interlock switch will close, permitting lamp ignition. The lamphouse blower will operate continuously as long as the xenon power supply is energized.

TURN ON THE EXHAUST FAN.

PLACE THE "LAMP" SWITCH on the "ON" position and the lamp will ignite. If ignition does not occur, or the high voltage ignition pulse is not apparent, press the emergency ignition switch located under the plug button on the top of the lamphouse. Do not hold for more than **one second**; release immediately upon bulb ignition.

REPEATED USE of the emergency ignition switch indicates an abnormal condition. See the TROUBLESHOOTING section following in this manual.

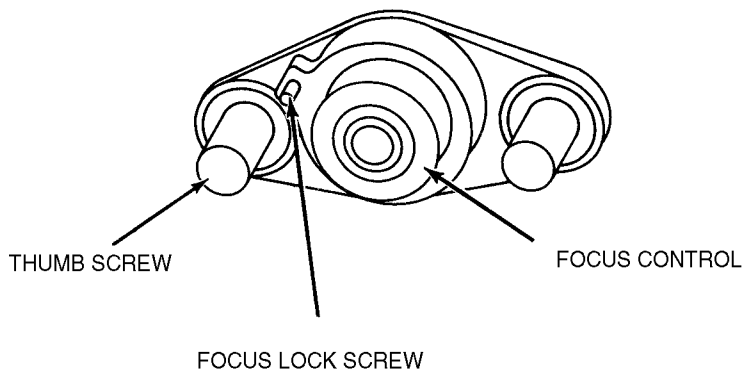
DO NOT, at any time, exceed the maximum current recommended by the xenon bulb manufacturer. Always adjust power supply output to first operate a new bulb at the low end of its current range. Then increase the current to the suggested nominal current, which is approximately ten amperes below the maximum established by the bulb manufacturer. Most xenon power supplies have the capability to overdrive any rated xenon bulb. See the power supply manual for the correct means of adjusting current output.

OPERATING CURRENT is displayed on the ammeter located on the instrument panel at the rear of the lamphouse. The pushbutton switch directly below the ammeter may be pressed while the lamp is operating to convert the meter reading to indicate the DC voltage at the arc. This permits immediate calculation of the power at which the lamp is operating (volts x amps = wattage). Holding the switch button in during the ignition cycle will also briefly display the "no load" DC voltage applied to the xenon bulb for ignition.

REMOVE THE REAR COVER PANEL using the two pull type knobs to expose the bulb position adjustment controls.

THE CENTER SECTION of the control is a threaded member that focuses the bulb in relation to the reflector. Turning this adjustment moves the bulb in only one plane, into or away from the reflector. Clockwise rotation moves the bulb **away** from the reflector. The small knurled screw to the left of this section can be tightened to lock the focusing mechanism, after the following procedures have been completed.

BULB ADJUSTMENT CONTROLS

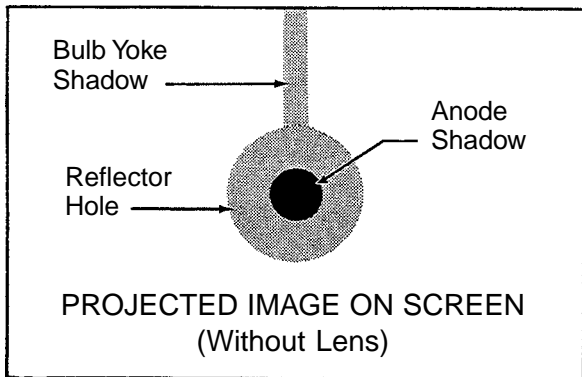


THE THUMB SCREWS on either side of the focusing control lock the horizontal and vertical adjustment mechanism in position.

REMOVE THE PROJECTION LENS, start the projector motor and open the lamp-house douser. Since a xenon light source can be focused to a small intense spot at the projector lens, **do not operate the lamp without the projector running.**

TURN THE CENTER FOCUSING SECTION of the bulb positioning control until the smallest black spot obtainable is focused on the projection screen. It may be best to run this adjustment both directions to permit positive identification of the spot. The position of the spot may be to the right, left, top or bottom of the screen, and not necessarily at the center.

LOOSEN the two thumb screws, one on either side of the focusing section just enough to permit manual movement of the complete assembly. The bulb adjustment control will now move about these two thumb screws, and as this control is shifted, the smooth shadow of the electrode can be seen extending beyond the projected hole in the reflector. The electrode shadow must be centered in the projected hole of the reflector.



MOVE THIS CONTROL SECTION around the two thumb screws until the black spot is as round as possible to project. It may be necessary to again adjust the focus control to project a sharp spot. After the black spot is as even around the outside as possible to project, tighten the two thumb screws to lock the adjustment section. This adjustment has now centered the projected image of the electrode shadow and the hole in the reflector on the aperture and screen.

IF THE PROJECTED IMAGE is not centered on the screen as illustrated, move the pedestal or adjust the lamphouse/projector tilt to correct.

REPLACE THE PROJECTION LENS and install a CinemaScope aperture plate. Turn the center focus adjustment until the desired light distribution is projected to the screen. Avoid running the projector in this manner for any extended period of time without *frequently* closing the lamphouse douser. Without film, the heat from the xenon bulb can damage the projection lens.

THIS ADJUSTMENT should not be disturbed until it is necessary to replace or rotate the xenon bulb. Then, only the bulb adjustments outlined above may have to be repeated; do not disturb or adjust the optical alignment of the lamphouse on the projector table.

REPLACE THE REAR COVER PANEL over the bulb adjustment control mechanism. Secure with the two plungers.

BECAUSE OF MANUFACTURING TOLERANCES on any given xenon bulb, and normal aging, it may be necessary to operate one lamp of a two-machine installation at slightly higher or lower current to obtain equal light balance on the screen. This is done by adjusting the output of the xenon power supply.

TO EXTINGUISH THE ARC, place the LAMP switch in the "OFF" position. The lamphouse blower will continue to operate until the main line switch in the AC power line to the xenon power supply is opened. To prolong bulb life, leave the lamphouse blower and the exhaust fan operate for at least ten minutes after turning off the lamp.

RECORD THE INSTALLATION of each xenon bulb on the Xenon Bulb Record chart located on the back cover of this manual. It is recommended to replace the bulb on expiration of warranty. In the event of a bulb explosion, the reflector might sustain damage, and if the subject bulb is out of warranty, the bulb manufacturer will allow *no credit* on a replacement reflector.

RETURN BULBS on which a warranty claim is being made to the theatre equipment dealer through whom the bulb was purchased. Pack the bulb in its original shipping carton with the protective cover over the bulb. Complete and enclose all warranty forms supplied by the bulb manufacturer.

DAMAGED REFLECTORS should be forwarded to the **bulb** manufacturer or dealer, with an invoice copy authenticating the replacement cost.

## MAINTENANCE

THE SUPER LUME-X LAMPHOUSE requires very little maintenance to keep it in good working order. Cleanliness is the most important element.

THE REFLECTOR should be cleaned periodically with a soft, clean, lint free cloth to remove any dust from the reflecting surface. If excessively soiled, use of a mild commercial glass cleaner (Windex® or equivalent) is acceptable; USE NO ABRASIVE CLEANERS.

THE XENON BULB should be checked occasionally for the presence of any foreign material on the envelope. Any dirt or other foreign material should be removed promptly. Use only alcohol and a clean cloth to clean the bulb; rinse with distilled water and dry carefully. DO NOT touch the bulb with bare fingers, and observe all safety procedures when working around the bulb.

THE INSIDE OF THE LAMPHOUSE and the impeller blades of the blower should be cleaned periodically, depending on the dust conditions at each installation. The grille over the air intake can be removed for cleaning without dismounting the blower; do not allow dirt or dust to build up on the grille or in the fan impeller.

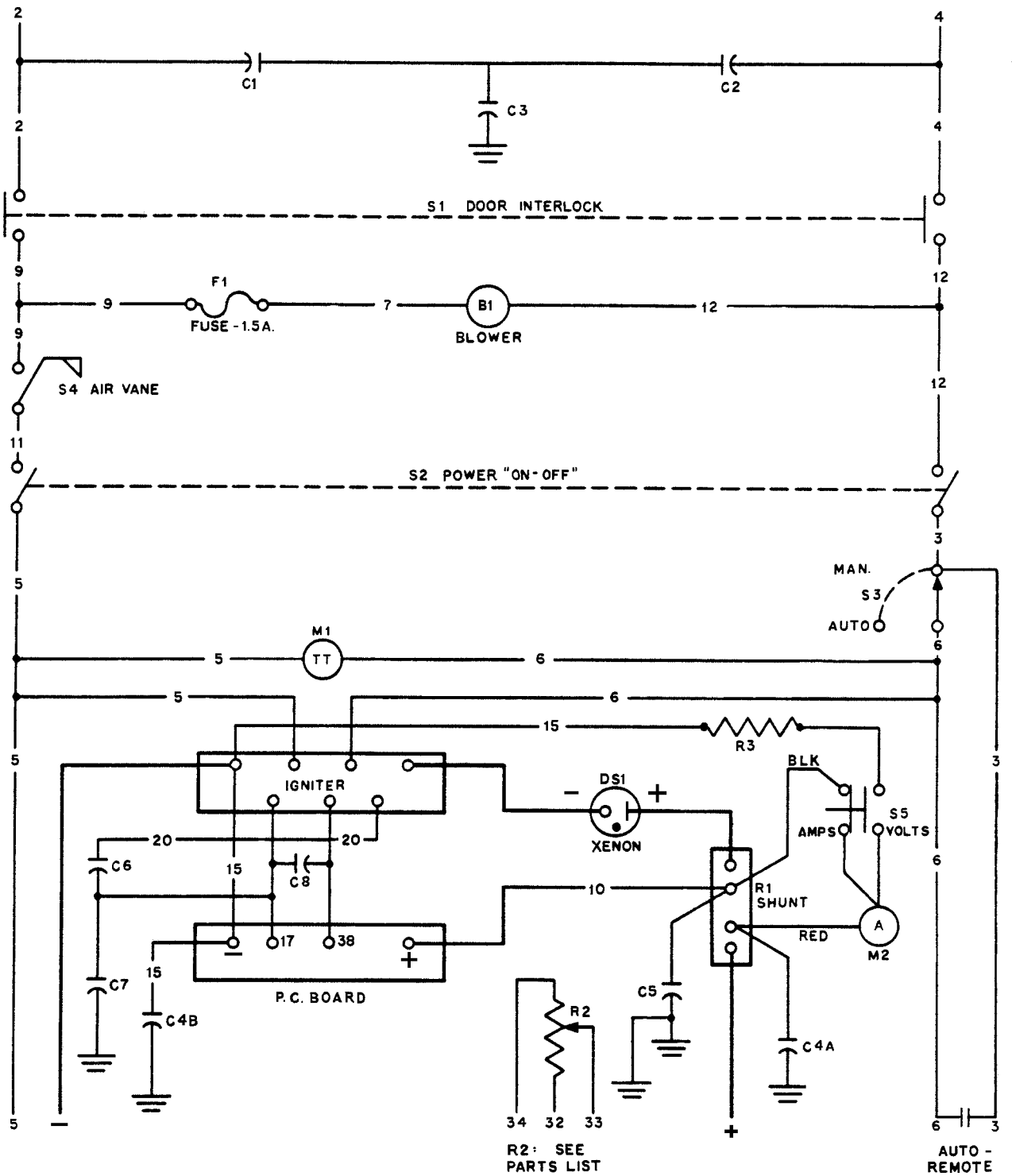
THE XENON LAMPHOUSE does not require any lubrication other than at the blower. This should be lubricated with two or three drops of non-detergent motor oil every four to six months. The oil holes are marked and located on the top of the blower motor.

CHECK ALL ELECTRICAL CONNECTIONS periodically for tightness, especially the DC leads at the xenon bulb and at the shunt and igniter.

FOLLOW THE RECOMMENDATIONS of the xenon bulb manufacturer regarding periodic bulb rotation. It is a general practice to rotate the bulb 180° at 50% of warranty life. After rotating a bulb, increase current to the maximum allowable level. Operate the bulb at this level for three or four shows and then reduce the current to its previous setting.

ALWAYS allow the lamphouse blower and the exhaust system to operate for *at least* ten minutes after extinguishing the bulb. Failure to do so will shorten bulb life.

# LAMPHOUSE SCHEMATIC



**PARTS LIST**  
Schematic Diagram

Ref. Desig.	Part No.	Description
B1	39938	Blower Assembly, 120 V.AC, 50/60 Hz.
C1	76132	Capacitor, .005 $\mu$ f, 600 WVDC
C2	76132	Capacitor, .005 $\mu$ f, 600 WVDC
C3	76133	Capacitor, .01 $\mu$ f, 400 WVDC
C4A,B	80177	Capacitor, 1.0-1.0 $\mu$ f, 600 WVDC
C5	81947	Capacitor Assembly, .01 $\mu$ f, 500 WVDC
C6,7	88263	Capacitor, .05 $\mu$ f, 600 WVDC
C8	39956	Capacitor Assembly, .05 $\mu$ f, 1200 VDC
DS1	—	Xenon Bulb (by Customer)
F1	39198	Fuse, 1.5 A. Standard
-	39199	Fuseholder
M1	39920	Elapsed Time Meter (60 Hz.)
M1	65325	Elapsed Time Meter (50 Hz.)
M2	65142	Ammeter
R1	82167	Shunt
R2	88122	Current Control Potentiometer (Early Models Only)
R3	39151	Resistor, 150k Ohm, 1/2 Watt, 5% (Order 21-46059)
S1	80168	Switch, Door Interlock
S2	81275	LAMP Switch (ON - OFF)
S3	81276	MODE Switch (AUTO - MAN.)
S4	85109	Switch, Air Flow (60 Hz.)
S4	39955	Switch, Air Flow (50 Hz.)
S5	39970	Switch, Voltage Test
-	39999A	Igniter Assembly (See Figure 5)
-	40913	Igniter Printed Circuit Board (High Voltage)
-	39966	Igniter Printed Circuit Board (Low Voltage)

NOTE

Two Igniter PC Boards are currently available, depending upon the nominal “no load” voltage characteristics of the associated xenon power supply. See the Power Supply Manual for its “no load” rating. The PC Board must match the “no load” rating of the power supply to insure proper ignition of the lamphouse. Less than 100 V.DC is considered “Low Voltage.” A third PC Board, 39981, remains available for users of High Reactance Type 61000 and 61001 Strong Power Supplies.

## PRINCIPLE OF IGNITER OPERATION

THE IGNITER is energized through the 115 V.AC control circuit when the LAMP “ON-OFF” switch (S2) is depressed and all interlocks and air flow switches are closed.

CAUTION: Do not use the Emergency Ignition switch (S102) in the igniter until it is determined that the polarity of the xenon bulb is correct. Use of the S102 switch bypasses the polarity sensing diode (CR201) on the igniter printed circuit board; if polarity is not correct, the bulb will be seriously damaged or destroyed. **No credit** is allowed on bulbs damaged by reversed polarity.

THE IGNITER supplies a high RF voltage pulse to the bulb, together with the high “No Load” DC voltage from the xenon power supply, to ignite the xenon bulb. After the arc is sustained, the AC circuit in the igniter is interrupted by the opening of K201 relay contacts on the signal of the timer circuit on the PC board. The DC output of the xenon power supply is automatically lowered to the power level required to maintain the arc. The DC power to the bulb is dependent upon the bulb characteristics and the setting of the output of the xenon power supply.

DC VOLTAGE is applied to the printed circuit board from the xenon power supply, energizing the 12 V.DC coil and closing the contacts of K201 relay, completing the AC circuit through the igniter to the T102 high voltage (10 kV.) transformer. High voltage boost capacitor C107 is charged to a voltage sufficient to cause breakdown across the E101 spark gap. Approximately 35 kV. is supplied to the xenon bulb for ignition.

S101 is the igniter cover interlock switch and S102 is the Emergency Ignition switch, which is a bypass for the K201 relay contacts and CR201 polarity sensing diode on the PC board. Components C101, 102, and 103 function as RF bypass capacitors on the igniter. The C108 capacitor serves as a coupling capacitor to the current coil.

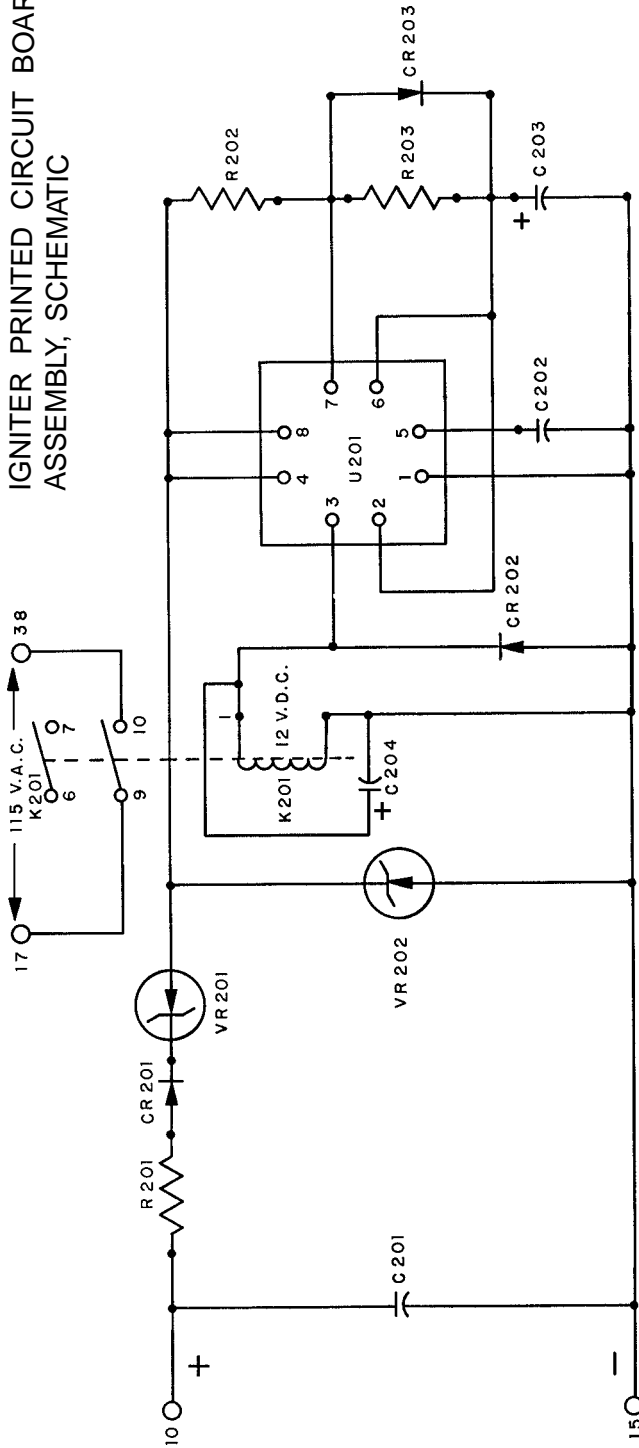
THE PC BOARD operates on DC voltage from the xenon power supply. Capacitor C201 across the positive #10 and negative #15 is an RF suppression capacitor. Resistor R201 and zener diodes VR201 and 202 drop the DC voltage to 12 volts for the K201 relay coil. CR201 is the polarity sensing diode. C204 is a polarized capacitor used for arc suppression at the K201 relay coil, and CR202 functions as a transient protection diode.

THE FOLLOWING COMPONENTS are parts of the timing circuit on the PC board: Timer chip U201, resistors R202, 203, and the polarized capacitor C203. The C203 capacitor functions as the timing control, and CR203 serves as the “ON” time control diode. C202 is the control voltage isolation capacitor.





# IGNITER PRINTED CIRCUIT BOARD ASSEMBLY, SCHEMATIC



WIRE MARKERS  
 A = 10  
 B = 15  
 C = 17  
 D = 38

Ref.	Desig.	Part No.	Description
C201	88263	39159	Capacitor, .05 $\mu$ f, 600 WVDC
C202	79127	72185	Capacitor, .01 $\mu$ f, 600 WVDC
C203	39156	39164	Capacitor, 15 $\mu$ f, 30/35 WVDC
C204	88249	39211	Capacitor, .1 $\mu$ f, 600 WVDC
CR201	85112	39167	Diode, 2.5 A. 1000 PRV
CR202	85112	39162	Diode, 2.5 A. 1000 PRV
CR203	85112	39145	Diode, 2.5 A. 1000 PRV
K201	39154	40913*	Relay, P&B R10-E1-W2S800
-	39160	39966*	Relay Socket
-	39161		Relay Hold-Down Spring
R201	39157		Resistor, 1k Ohm, 12 Watt
R202	39158		Resistor, 100k Ohm, 1/2 Watt
VR201			Relay
VR202			Relay
U201			Timer IC, Motorola MC11455P1

\* Assembly Number written on Component Side of PCB.

## TROUBLE CHART

NOTE: When working inside the lamphouse, enclose the bulb in its protective covering and/or wear protective clothing and face shield. Do not touch the quartz envelope of the bulb with bare fingers.

ALLOW THE LAMPHOUSE to cool, with all blowers operating, for at least (20) minutes before opening the access door.

### NORMAL OPERATION:

When the switch in the main AC supply line to the xenon power supply is placed in the "ON" position, with the door interlock switch closed, the lamphouse POWER light will glow and the lamphouse blower will operate. The lamphouse blower will close the S4 air vane switch, completing the circuit to the S2 LAMP "ON-OFF" switch.

Place the lamphouse MODE switch S3 in the "MAN." position. When the lamphouse LAMP switch S2 is in the "ON" position, the elapsed time meter will operate and the AC circuit (5 - 6) to the xenon power supply will energize the circuitry necessary to supply DC voltage to the igniter and bulb.

There will be an audible high voltage arc ping at the spark gap in the igniter and at the xenon bulb. The bulb should ignite immediately after one or two of these high voltage pulses, and the lamp current will adjust to the sustaining level set at the xenon power supply.

### TROUBLESHOOTING:

If the xenon bulb does not ignite, observe the following operational sequences for assistance in locating and isolating the trouble area.

When operating with a xenon power supply equipped with the red indicator light, and the light is "ON," the AC circuit in the power supply is trouble free up to the terminal block (L1, L2, L3) in the power supply. See the power supply data plate for correct AC input voltage.

The blower in the lamphouse should operate. If this does not occur, the trouble is in either the door interlock switch, the blower, a loose connection, a broken #2 or #4 lead, or a defective stepdown transformer in the xenon power supply. The Super Lume-X has an in-line fuse in the blower lead; check the fuse and replace if blown. Do not overfuse; use 1.5 A. standard.

**CAUTION:** To prevent bulb ignition when checking the AC control circuit, remove the #6 lead running from the igniter at the terminal post on the lamphouse base pan. Tape the exposed lead to prevent shorting out the circuit.

Check the 115 V.AC control circuit in the lamphouse at the door switch, then the blower leads at terminals #9 and #12. The door interlock switch must be manually actuated to energize the blower circuit.

The vane on the air flow switch should move, completing the circuit to the LAMP switch. With the MODE switch in the “MAN.” position, and the LAMP switch in the “ON” position, the elapsed time meter should start to indicate elapsed time. If this meter does not operate, check for continuity at the LAMP and MODE switches. Check continuity of the air flow switch; should read 0 Ohms between “NO” and “COM” when actuated. A defective elapsed time meter will **not** prevent bulb ignition. Replace lead #6.

With the LAMP switch in the “ON” position, a distinct high voltage arc ping at the igniter spark gap should be heard, and a flash from the xenon bulb should be visible through the ammeter, as DC voltage is applied to the bulb electrodes.

If the high voltage ping or the flash at the ammeter is not apparent, check the DC “No Load” voltage between the lamphouse and power supply. Again disconnect lead #6 running from the igniter at the terminal strip on the lamphouse base. Tape the end of the disconnected lead and close and secure the lamphouse door.

Press the switch below the ammeter, and the meter will indicate the “No Load” DC voltage supplied to the lamphouse when the LAMP switch is turned “ON.” This voltage will vary between different types of power supplies. See your power supply manual for its correct “No Load” rating.

The standard 40913 igniter printed board in the Super Lume-X is designed for use with a high DC “No Load” voltage typically developed by Strong’s switching-type xenon power supply. Consult the factory if using a xenon power supply with normally lower DC “No Load” voltage.

If the correct open circuit voltage for the power supply being used is not indicated on the meter, the problem is in the lamphouse/power supply interconnecting cable, or in the power supply. See the troubleshooting guide in the power supply manual for additional instructions and tests. Replace lead #6 on the terminal strip on the lamphouse base.

If the high voltage arc is audible at the lamphouse, and the bulb does *not* flash, replace the bulb and attempt ignition with the new bulb.

Using the new bulb, if the high voltage arc is audible at the lamphouse, the flash of the bulb is visible in the ammeter, and ignition is *not* sustained, the problem is in the power supply.

If the high voltage arc is *not* audible or the flash of the bulb visible, the trouble is in the igniter or the igniter printed circuit board.

## SUPER LUME-X TROUBLESHOOTING

*WARNING: Exercise Caution when reading voltages in a power ON condition.*

### **Bulb fails to ignite**

1. AC power not on to lamphouse. If 115 V.AC not read at 2 & 4, see power supply manual.
2. Door interlock switch S1 open. Close and secure lamphouse access door. Tighten all three screws.
3. Faulty door interlock switch. Check for 115 V.AC at 9 & 12; replace switch if defective.
4. Air vane switch S4 not closing. Check for unobstructed operation; clean if required. Check continuity between “NO” and “COM”; replace if defective.
5. Faulty S2 “ON-OFF” switch. Check for voltage at 3 & 5; check for loose wiring. Replace if defective.
6. Automation fault. Override automation by switching MODE to “MAN.” and placing LAMP switch in “ON.”

### **Bulb fails to ignite; ping audible, bulb flash visible**

1. Inadequate DC output from xenon power supply. Set power supply output to correct range required for bulb wattage.
2. Faulty or expired xenon bulb. Replace as required.

### **Bulb fails to ignite; ping audible, no bulb flash**

1. Faulty xenon bulb. Check for cracked electrodes or darkened envelope. Replace if defective.
2. Ignition pulse shorting to ground. Inspect DC leads for burned insulation; dress leads away from grounded metal components.

### **No high voltage ping audible; MODE switch in “MAN.” and LAMP switch in “ON”**

1. Loss of AC control voltage. Check xenon power supply for tripped circuit breaker or open thermal switch. See power supply manual.
2. Little or no DC “No Load” voltage. Measure DC “No Load” voltage at 10 & 15. See power supply manual.
3. Faulty igniter printed circuit board. If bulb ignites by pressing Emergency Ignition switch, replace printed circuit board.
4. Faulty igniter. Check for 115 V.AC at 5 & 6; adequate DC “No Load” at 10 & 15. Replace igniter if defective.

### **Bulb goes out during operation**

1. Xenon power supply overheated; thermal switch open. Check power supply blower(s), air inlets and outlets unobstructed. See power supply manual.

### **Bulb goes out during operation (continued)**

2. Lamphouse blower B1 failed or obstructed. Clean dust and dirt from blower inlet grille. Check for 115 V.AC at 9 & 12; replace blower if defective.
3. Blower fuse F1 blown. Replace if defective (1.5 A. Std.).
4. Lamphouse air vane switch S4 faulty. Check for vane actuation; adjust or replace as required.
5. Backdraft from exhaust system. Check exhaust system installation; increase exhaust draft as required.
6. Switching-type power supply interlock: AC voltage surge or drop, phase loss. See power supply manual.
7. Defective xenon bulb. Check for discolored envelope or scorched electrodes; high current and low voltage may indicate seal leakage.

### **Power supply does not energize when actuated**

1. S1 door interlock switch, B1 blower, S4 air vane switch, S2 power switch, S3 MODE switch. Check for 115 V.AC at each station; replace defective component.
2. Automation fault. Check for continuity between 3 & 6. See Automation Controller manual. Use "MAN." mode to override.

SEE POWER SUPPLY TROUBLESHOOTING UNDER SAME HEADING.

### **Noise in theatre sound as bulb ignites**

1. Faulty RF suppression capacitor(s). Remove and test C1, C2, C3, C4A or C4B. Replace if defective.
2. Lamphouse, power supply, or sound system not properly grounded. Connect to adequate earth ground.
3. Leads between lamphouse and automation contact not shielded. Shield leads in conduit.

### **Excessive light flicker**

1. Faulty or aged bulb. Check for cracked or sagging electrodes; replace if defective.
2. Excessive ripple in DC output. See power supply manual.
3. Projector shutter mistimed. See projector manual.

### **Reduced light output**

1. Normal bulb aging. Increase output current. DO NOT EXCEED MAXIMUM CURRENT SPECIFIED BY BULB MANUFACTURER.
2. Defective seals on bulb. Check for discolored envelope and low arc voltage.
3. Soiled reflector. Clean using commercial glass cleaner. USE NO ABRASIVES.
4. Soiled projection lens or port glass. Clean as required.

### **Extremely long duration between ignition pulses**

1. Low DC “No Load” from xenon power supply. Check “No Load” voltage; see power supply manual.
2. Defective spark gap E101. A “Ping” sound is normal; excessive “Hissing” is abnormal. Replace if defective.
3. Low AC voltage to lamphouse. Check for 115 V.AC at 2 & 4; if below 95 volts, check stepdown transformer in xenon power supply. See power supply manual.
4. Faulty K201 relay or U201 timer chip on igniter printed circuit board. Remove and test PCB; replace if defective.

### **Igniter continues to fire after bulb ignites**

1. Faulty igniter printed circuit board. Replace IMMEDIATELY to prevent bulb damage.

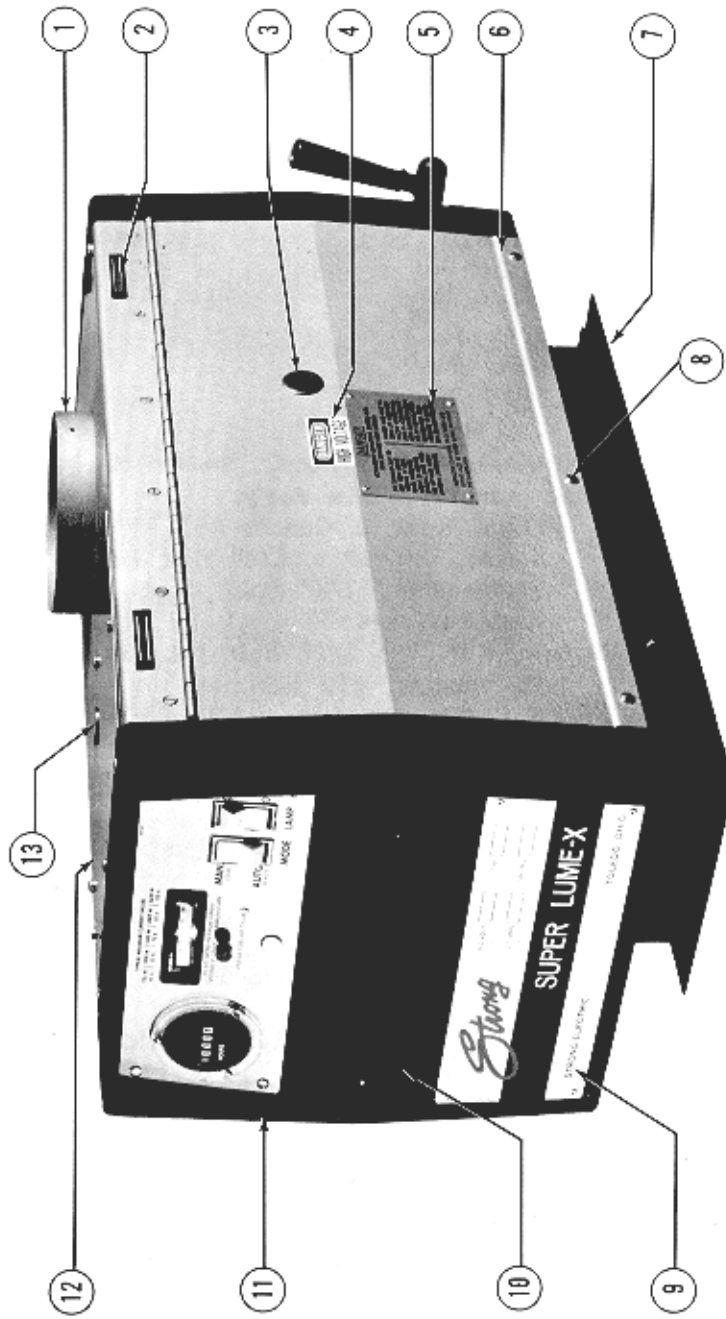


FIGURE 1



## PARTS LIST

Figure 1

Item	Part No.	Description
1	39994	Top Cover & Side Door Welded Assembly
-	1307	Screw, 10-32 x 3/8" Pan Head
-	885	Lockwasher, #10
2	39139	Magnetic Catch
3	48930	Arc Viewing Port
-	48284	Glass
-	48285	Frame
-	48331	Screen
4	65353	DANGER Label
5	81282	CAUTION Plate
-	1639-1	Pop Rivet
6	39994	Side Door & Top Cover Welded Assembly
7	39995	Base Adapter Plate Assembly
-	39129	Shim, Rear & Center
-	689	Screw, 1/4-20 x 5/8" Hex Head
-	876	Lockwasher, 1/4" Split
-	805	Hex Nut, 1/4-20
8	1736-1	Screw, 10-32 x 1/2" Holt Head (Tamperproof)
-	1715	Flatwasher, #10 Stainless Steel
-	1507	Nut, #10 Tinnerman (Clip-on)
-	65149A	Screwdriver, Holt Head (for 1736-1)
9	39219	Name & Data Plate
-	1639-2	Pop Rivet
10	65968	Cover Plate Assembly (Bulb Adjust Controls)
-	65140	Cover Plate
-	65166	Plunger
-	65167	Grommet
11	39980	Rear Casting Assembly (See Figures 3 & 4 for Components)
12	39122	Access Panel, Igniter
-	1304	Screw, 8-32 x 5/16" Pan Head
-	891A	Lockwasher, #8
13	57275	Plug Button, Chromed

### Not Shown

71284	Cam Lock & Keys, Lamphouse Access Door
25372	Security Interlock Screw, Special Hex Head

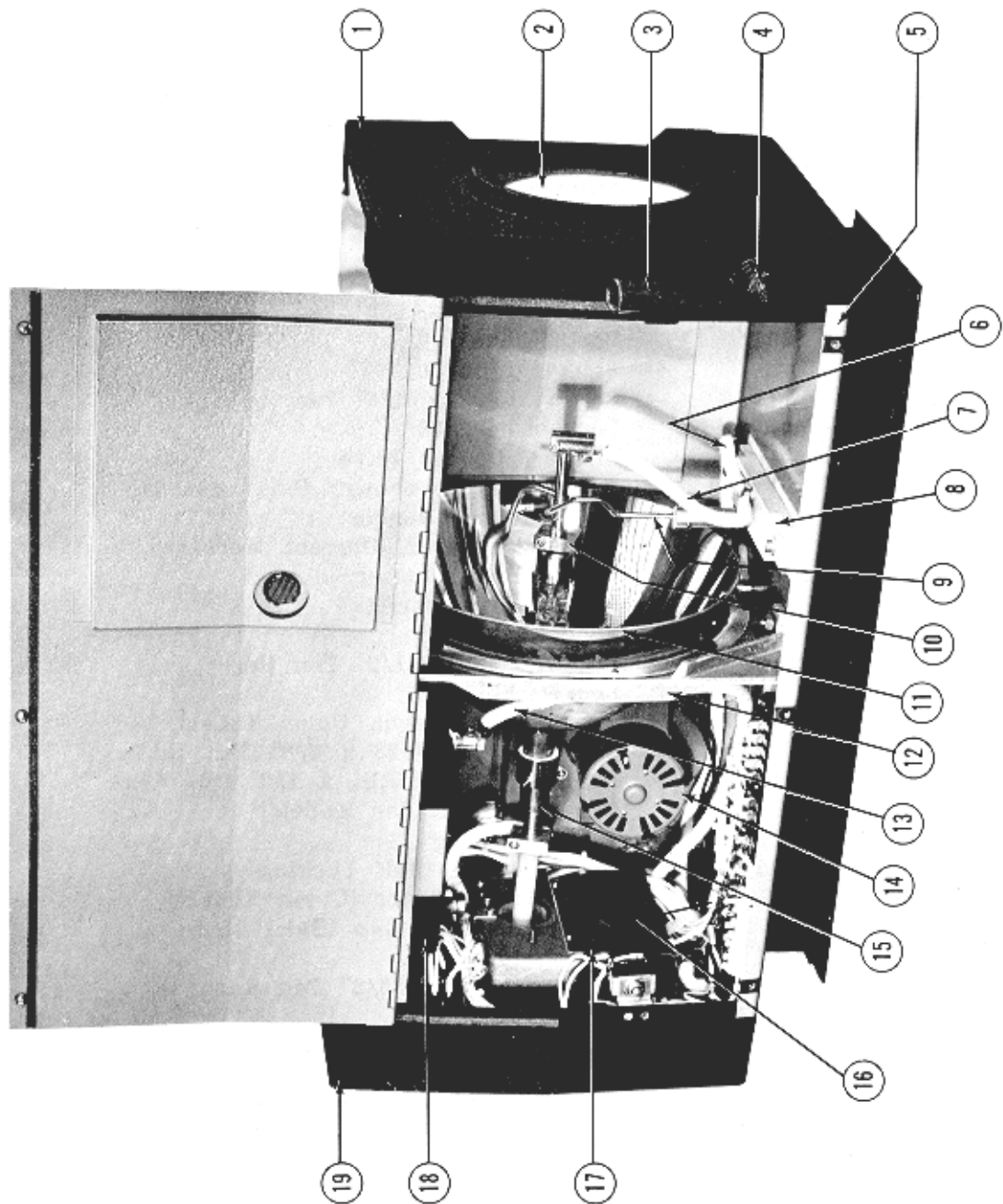


FIGURE 2

## PARTS LIST

Figure 2

Item	Part No.	Description
1	39115	Front Casting
-	21-18006	Catch, Douser
-	1473	Screw, 6-32 x 1/2" Pan Head
-	892	Lockwasher, #6
-	793	Hex Nut, 6-32
2	39132	Douser Plate
-	81234	Rubber Bumper
-	1312	Screw, 8-32 x 1/2" Pan Head
-	891A	Lockwasher, #8
-	39148	Striker Bracket
-	1305	Screw, 6-32 x 1/4" Pan Head
-	1494	Lockwasher, #6
-	51-98018	Striker, Douser Plate
3	51509	Douser Handle (as shown; Older Models)
-	M2526	Stud, Douser Handle
3	45150A	Douser Handle Grip, Red Vinyl (Current Models)
-	39210	Cross Shaft, Douser
-	39211	Collar, Cross Shaft
-	39208	Spacer
-	1312	Screw, 8-32 x 1/2" Pan Head
-	891A	Lockwasher, #8
4	39147	Douser Hub (as shown, Older Models)
-	1759	Set Screw, 1/4-28 x 3/8" Slot Head
-	90267	Washer, 1-1/8" O.D. x 1/2" I.D. Fibre
-	39131	Cross Shaft (Older Models)
-	39144	Torsion Spring
-	1405	Nut, 5/16-24, Self Locking
-	19637	Cap, Douser Shaft (Older Models)
-	19638	Washer, Douser Cap (Older Models)
5	39972	Lamphouse Base Pan
-	1307	Screw, 10-32 x 3/8" Pan Head
-	885	Lockwasher, #10
-	1507	Nut, #10, Tinnerman (Clip-on)
6	65948	Positive Lead
7	39983	Anode Lead (39984 includes Contact 65148)
-	65148	Contact Clamp (see BULB ADAPTER chart, Item 6)
-	1532	Clamping Screw, 8-32 x 7/8" Socket Head
-	685	Screw, 1/4-20 x 3/8" Hex Head
-	899	Lockwasher, 1/4"
8	39934	Anode Support, Block, Post & Bushings (as shown) Replace with 39931 & (2) 1761 Screws

**PARTS LIST, Figure 2 (continued)**

Item	Part No.	Description
8	39931	Anode Support, Block & Post Assembly
-	1761	Screw, 1/4-20 x 1" Hex Head Nylon
-	39150	Insulator Strip
-	689	Terminal Screw, 1/4-20 x 5/8" Hex Head
-	876	Lockwasher, 1/4" Split
9	39975	Support Yoke
-	1704	Spring Pin
-	1721	Set Screw, 8-32 x 5/16" Headless
10	65343	Clamp (see BULB ADAPTERS chart, Item 5)
-	1532	Clamping Screw, 8-32 x 7/8" Socket Head
-	65344	Anode Adapter (see BULB ADAPTERS chart)
11	39978	Reflector, Potted Assembly; 11 inch (replace with 39876)
11	23755	Reflector, 11 inch Flanged (current production)
-	1432	Screw, 1/4-20 x 1/2" Socket Head
-	876	Lockwasher, 1/4"
12	65118	Reflector Support Casting
-	876	Lockwasher, 1/4" Split
-	805	Hex Nut, 1/4-20
-	691	Screw, 1/4-20 x 3/4" Hex Head
-	39146	Cover Plate, Support Casting
-	39962A	Arc Stabilization Magnet & Brackets
-	1304	Screw, 8-32 x 5/16" Pan Head
-	891A	Lockwasher, #8
*	39149	Tie Rod, Reflector Frame
13	39968	Lamphouse/Power Supply Interconnect Cable Assembly
14	39938	Blower Assembly (B1 with F1), 120 V.AC, 50/60 Hz.
-	83131	Intake Grille, Blower
-	65971	Intake Grille, Blower (Old Style; Welded)
-	1304	Screw, 8-32 x 5/16" Pan Head
-	891A	Lockwasher, #8
-	85109	Air Vane Switch (S4) Order 39955 for 50 Hz.
-	953	Screw, 4-40 x 1/2" Round Head
-	1343	Lockwasher, #4
15	65169	Cathode Adapter (see BULB ADAPTERS chart, Item 1)
16	39933	RF Suppression Capacitor Assembly (C1, C2, C3)
17	39165	Shield, Igniter PC Board
-	254	Screw, 8-32 x 1/4" Fillister Head
-	886A	Lockwasher, #8
18	39999A	Igniter Assembly (see Figure 5A)
19	39980	Back Casting Assembly (see Figures 3 & 4 for Components)
*	39149	DO NOT ADJUST. This Tie Rod is factory set.

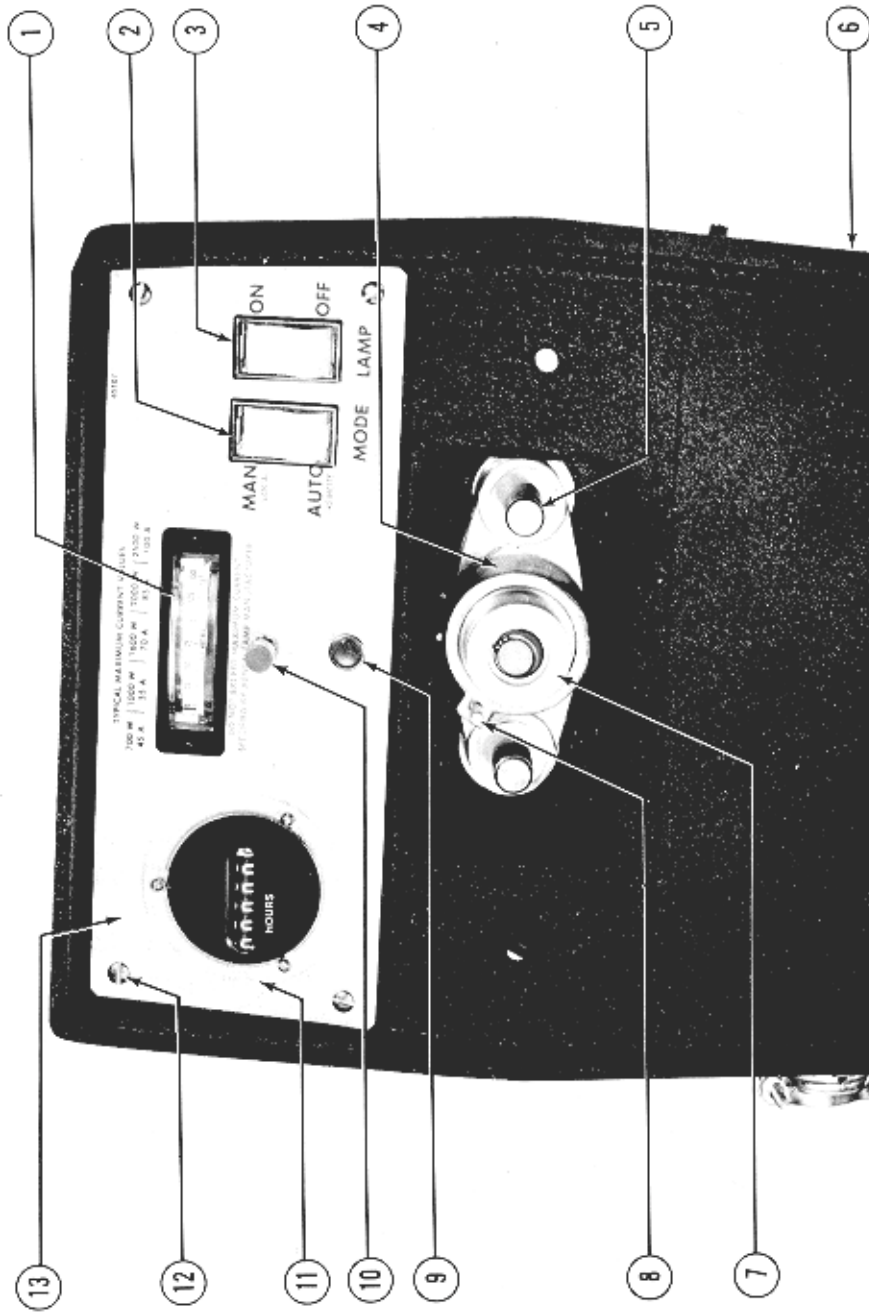


FIGURE 3

## PARTS LIST

Figure 3

Item	Part No.	Description
1	65142	Ammeter (M2)
2	81276	MODE Switch, "AUTO - MAN." (S3)
3	81275	LAMP Switch, "ON - OFF" (S2)
4	65116	Casting, Bulb Adjust Mechanism
-	65197	Fender Washer, Inner
5	37985	Thumb Screw
-	15010	Compression Spring
-	65150	Fender Washer, Outer
6	65112	Rear Casting
7	65959	Focus Screw & Bearing Assembly
-	90416A	Snap Ring
8	65153	Knurled Lockscrew
-	65154	Locking Ball, Nylon
9	76329	Plug Button
10	39970	VOLTAGE Switch Assembly (S5)
-	72275	Switch
-	39151	Resistor (R3) Order 21-46059
-	39152	Label, "Press for Voltage"
11	39920	Elapsed Time Meter, 60 Hz. (M1)
-	65325	Elapsed Time Meter, 50 Hz. (M1)
-	953	Screw, 4-40 x 1/2" Round Head
-	1343	Lockwasher, #4
-	1620	Hex Nut, 4-40
12	1304	Screw, 8-32 x 5/16" Pan Head
-	891A	Lockwasher, #8
13	65107	Instrument Panel (less Components)

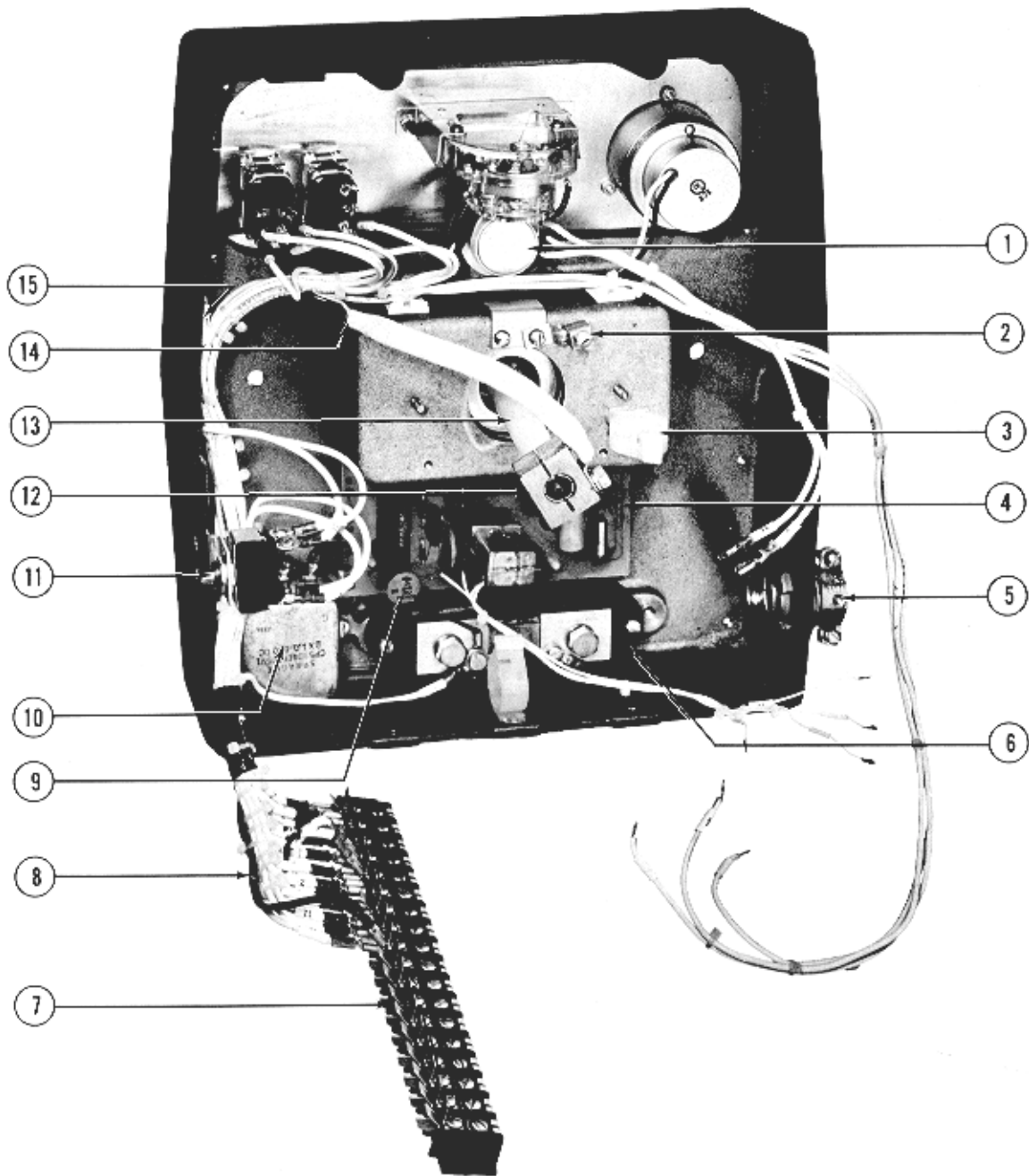


FIGURE 4

## PARTS LIST

Figure 4

Item	Part No.	Description
1	39969	Current Control Potentiometer (Early Models)
2	79131	Ground Lug
-	255	Screw, 8-32 x 5/16" Fillister Head
-	886A	Lockwasher, #8
3	39143	Cable Clamp
4	40913	Igniter Printed Circuit Board (High Voltage)
4	39966	Igniter Printed Circuit Board (Low Voltage)
-	39155	Circuit Board Stand-off, Nylon
5	81143	Cable Clamp, Strain Relief
-	39968	Lamphouse/Power Supply Interconnect Cable Assembly
6	82167	Shunt (R1)
-	385	Screw, 10-24 x 1/2" Fillister Head
-	875	Lockwasher, #10
7	39130	Barrier Strip, 15 Terminal
-	39153	Insulator/Marker Strip
8	39922	Wire Harness Assembly (includes 39130, Item 7)
9	81947	Capacitor Assembly (C5)
-	377	Grounding Screw, 10-24 x 1/4" Fillister Head
-	885	Lockwasher, #10
10	39922	Capacitor Assembly (C4A)
-	80177	Capacitor
11	80168	Door Interlock Switch (S1)
-	39322	Bracket
-	167	Screw, 6-32 x 1/2" Flat Head
-	892	Lockwasher, #6
-	793	Hex Nut, 6-32
12	65131	Cathode Clamp (see BULB ADAPTERS chart, Item 13)
-	65265	Cathode Clamp for 2, 2.5 kW "HS" Bulb
-	1532	Clamping Screw, 8-32 x 7/8" Socket Head
13	65960	Bulb Support Collet (see BULB ADAPTERS chart, Item 12)
-	65924	Bulb Support Collet for 2, 2.5 kW "HS" Bulb
14	65966	Igniter Cable Assembly (includes 65131, Item 12)
-	685	Screw, 1/4-20 x 3/8" Hex Head
-	889	Lockwasher, 1/4"
15	72199	Wire Tie Mount



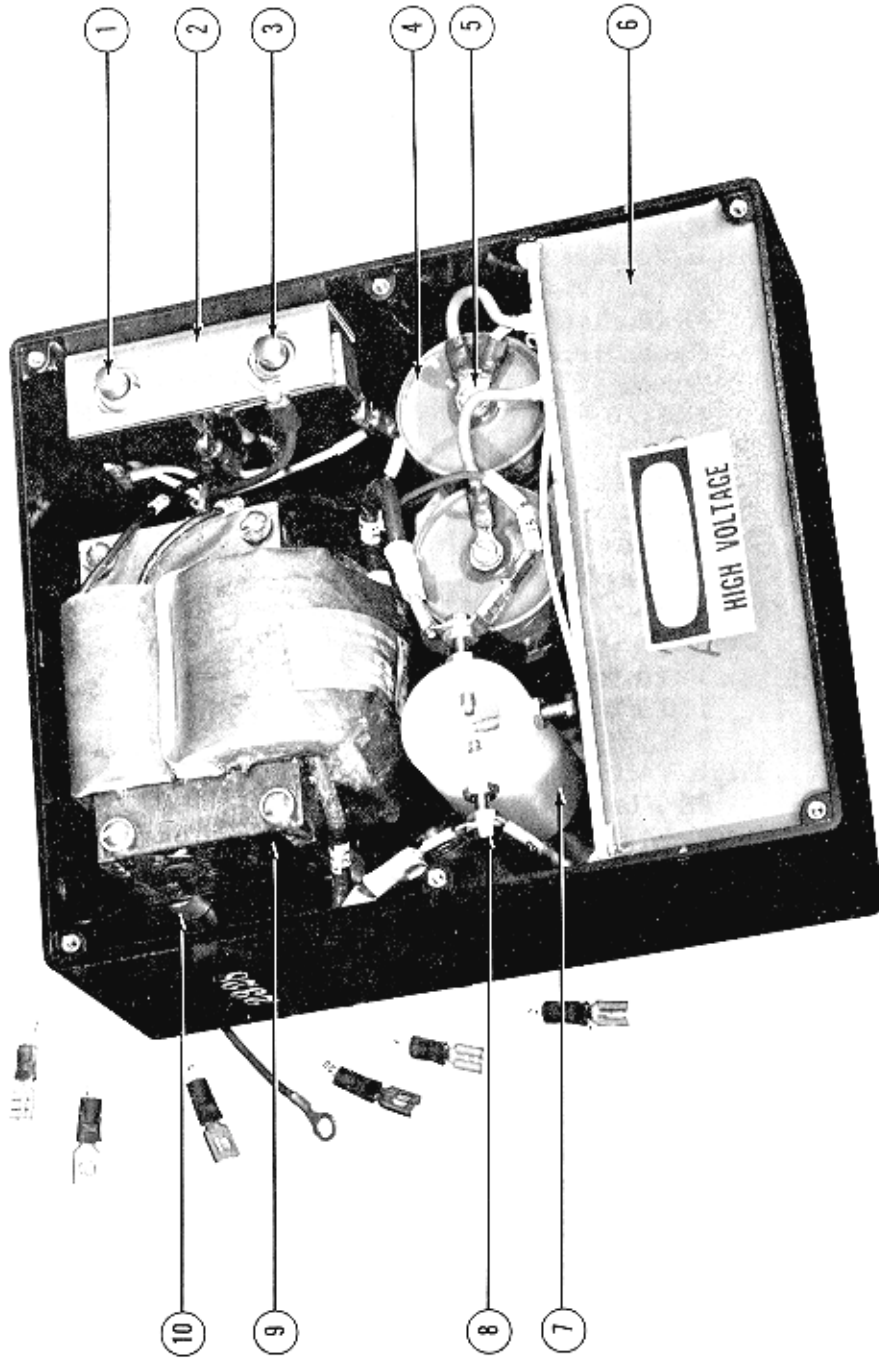


FIGURE 5

## PARTS LIST

Figure 5

Item	Part No.	Description
-	39999A	Igniter Assembly 115 V.AC, 50/60 Hz.
1	39260	Cover Interlock Switch (S101)
2	39113	Switch Bracket
-	343	Screw, 10-32 x 1/4" Flat Head
3	39260	Emergency Ignition Switch (S102)
4	39110	High Voltage Capacitor (C107, C108)
-	254	Screw, 8-32 x 1/4" Fillister Head
-	891A	Lockwasher, #8
-	39112	Capacitor Mounting Bracket
-	1752	Screw, 1/4-20 x 1" Hex Head Nylon
-	1754	Hex Nut, 1/4-20 Nylon
5	1742	Screw, 8-32 x 1/4" Pan Head
-	981A	Lockwasher, #8
6	39998	Case & Coil Potted Assembly
-	65353	DANGER Label
7	39201 *	Spark Gap Body, Nylon
-	1567	Screw, 10-24 x 1/2" Pan Head
8	39107 *	Contact Screw, Tungsten
-	39109	Terminal Tab
-	831	Flatwasher, #10, Brass
-	795	Hex Nut, 8-32
9	39937	High Voltage Transformer (T102)
-	1582	Flatwasher, #8
-	795	Hex Nut, 8-32
10	39204	Transformer Spacer (4 req'd.)
*	39923	Spark Gap Assembly (Items 7 & 8, assembled and gapped)

### Parts Not Shown

39101	Igniter Box Cover, Plastic
1305	Cover Mounting Screw, 6-32 x 1/4" Pan Head





