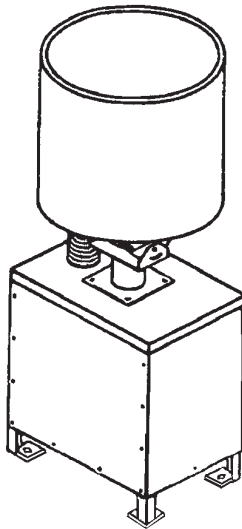


SKY-TRACKER[®] PROMOTIONAL SEARCHLIGHTS

NON-MOTORIZED SEARCHLIGHT SkyLight™ Model SLX INSTRUCTION MANUAL

Rev. November 2017



Strong
Lighting

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TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Model Designation	1
2.0	SAFETY	1
3.0	OPERATION OF THE SkyLight™	3
3.1	Input Power Requirements	3
3.2	Startup and Shutdown	3
3.2.1	Lights “ON”	4
3.2.4	Shutdown	4
3.3	Hour Meter	4
3.4	Electrical Protection	5
3.5	Transporting	5
4.0	BASE ASSEMBLY - ELECTRICAL COMPONENTS	6
4.1	Control Panel	6
4.2	Main Wire Harness Assembly	6
4.3	Cooling System	6
4.4	DC Power Supplies	7
4.4.1	Power Supply Contactors	7
4.4.2	Voltage Adjustment Terminal Board	7
4.4.4	Control PCB Assembly	8
4.4.5	Timer PCB Assembly	10
4.6	Power Factor Correction Capacitors	10
4.7	DC Power and Ignition Cables	10
5.0	BASE ASSEMBLY- MECHANICAL COMPONENTS (STX)	10
6.0	LAMPHEAD ELECTRICAL COMPONENTS	10
6.1	Igniter System	10
6.1.1	Primary Transformer	11
6.1.2	R.F. Igniter Transformer	11
6.1.3	Spark Gap and Related Components	11
6.2	DC Power Cables	11
6.3	Cooling Blowers	12
6.4	Thermal Switch	12
6.5	Xenon Lamp	12

7.0	LAMPHEAD MECHANICAL COMPONENTS	12
7.1	Reflector Assembly	13
7.2	Lower Lamp Support	14
7.3	Air Plenum/Duct	14
7.4	Upper (Anode) Lamp Adapter	14
7.5	Upper Lamp Support Spider and Adjustment Assembly	14
7.6	Housing Assembly	14
8.0	LAMP INSTALLATION	14
8.1	Final Focus and Beam Alignment	17
9.0	LAMP REMOVAL	18
10.0	ROUTINE SERVICE AND MAINTENANCE	19
10.1	Periodic Maintenance	19
10.1.1	Base	19
10.1.2	Xenon Lamphead Assemblies	19
	TROUBLE SHOOTING GUIDE	20
	WIRING DIAGRAMS	21
	LAMP HISTORY RECORD	25
	LIGHTING PRODUCT WARRANTY	26
	LAMP RETURN POLICY	27
	PARTS LISTS	28

NOTICE

PATENT POSITION

The SkyLight™ is a non-motorized, high-intensity, single head searchlight system, which was originated by Sky-Tracker of America, Inc. and is proprietary to Strong Lighting.

TRADEMARK

The name, “SkyLight™” is common trademark owned by Strong Lighting.

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1.0 INTRODUCTION

The SkyLight is an original proprietary lighting system developed specifically for the display advertising industry and related technologies. Each unit is designed with highly reliable mechanical, electrical and optical components to insure extended, trouble-free performance.

An outgrowth from space age and military advanced technology applications, the SkyLight provides an easily transported base unit for the mounting and control of high intensity searchlight. The beams can be seen for miles in every direction, pinpointing the location of the attraction.

Each light combines a Xenon plasma arc light source with a precision electro-formed metal reflector to produce a collimated beam of white light (virtually identical to sunlight; color temperature of 5600° Kelvin).

1.1 MODEL DESIGNATION

SkyLight is available in single-beam models in two intensity levels. Power requirements vary with model designation (also see section 3.1). The models available and performance characteristics are as follows:

<u>MODEL</u>	<u>NUMBER OF BEAMS</u>	<u>WATTS PER LAMP</u>	<u>CANDLE POWER PER BEAM</u>
SLX1 – 2000	1	2000	208 MILLION
SLX1 – 4000	1	4000	332 MILLION

NOTE: The components that differ between the models are identified in the sections that follow.

2.0 SAFETY

The concept of achieving maximum safety through knowledge and understanding is basic to Strong Lighting. Whether applicable to its own personnel, those of the dealer, representative, operator, servicing agency or to any member of the general public who may be exposed to or associated with the operation of a Strong Lighting product.

Safety features and concepts are designed into every Strong Lighting product and component regardless of whether its function is mechanical, electrical, or optical. Since Strong Lighting has no control over the manner in which its products are installed, operated, maintained, or utilized after the product leaves the manufacturing facility, it can not be held responsible for any injuries resulting from improper installation, use, inadequate maintenance, or any other condition beyond its control.

It is the intent of this manual to call to the attention of the owner, operator, and service technician, any and all hazardous areas or conditions which could lead to operational problems or injury and to outline proper and recommended procedures to prevent any such occurrence.

Throughout this manual, the following nomenclature will be utilized to call to the attention of the reader any potential hazards related to operation or maintenance.

CAUTION

The word **CAUTION** is utilized (preceding certain sections in this manual) to call attention to an area of particular importance, where failure to follow the specified procedure may result in improper operation of the device, impair the effectiveness or utility of the device, cause a shortened effective lifetime of components, or in any way lead to premature or ultimate failure of the device to perform to its original design standards and expectations.

The normal warranty will be voided in instances where it is determined that any component of the SkyLight has been damaged or has failed due to failure to follow procedures or instructions contained in this manual.

DANGER

This designation is utilized preceding any section within this manual where the operations described could expose anyone to the possibility of physical danger or injury of any kind. It is the responsibility of the owner, operator, or service technician to become familiar with all such **DANGER** sections and/or situations, and to follow the specified procedures and instructions explicitly and to otherwise use all prudent and responsible care to prevent injury.

The completely assembled and operational SkyLight has all electrical and optical components contained within closed and secured housings. It is recommended that, if the unit is operated at ground level in areas where crowds may be present, a rope barrier or equivalent barricade be established to keep the general public away from the SkyLight.

As is the case with all intense light sources, it is not advisable to look directly into the light source or into the light beam. It is the responsibility of the operator to see that the necessary rope barriers or other barricades are positioned suitably to prevent passersby or any member of the crowd from looking directly into the light beams from a close distance.

3.0 OPERATION OF THE SKYLIGHT

3.1 INPUT POWER REQUIREMENTS

CAUTION

Each SkyLight model has been designed and factory tested to operate satisfactorily with an input power source as specified below. The DC lamp power supply incorporated within each SkyLight base assembly is self adjusting and will compensate for input voltages which are slightly lower or higher than nominal. It is the responsibility of the owner/operator to determine that proper input power is provided and to make adjustments or corrections as may be required to provide compliance with the requirements set forth below.

CAUTION

Polarity and Grounds must be checked before cable connections are made to the SkyLight. Low voltage conditions (below the minimum levels specified) may cause damage to the SkyLight.

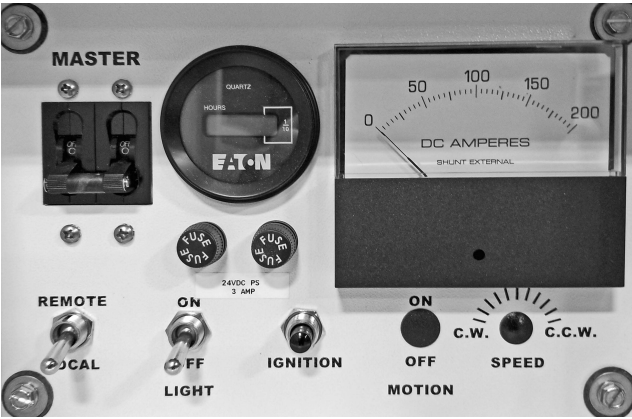
MODEL	PHASE	VOLTAGE (±10%V.AC,50/60 Hz)	CURRENT (CIRCUIT BREAKER REQUIRED)	POWER CABLES *
SLX1-2000	1	208-240	(2ea.) 15 AMP	#12 (3)
SLX1-4000	1	208-240	(2ea.) 25 AMP	#10 (4)
SLX1-4000	3	208	(3ea.) 20 AMP	#12 (4)

Use 100' (30.5 m) or shorter cables. For cables longer than 100' (30.5 m), go to larger wire sizes.

* Recommended wire sizes; *comply with local codes*

3.2 STARTUP AND SHUTDOWN

The operation of the SkyLight controls will be explained in this section. The SkyLight control panel (see Figure 1) is protected from weather, vandalism, and unauthorized access by means of a control panel enclosed by two locking clamps.



NOTE: It is not detrimental to SkyLight units to leave the input power connected when the light is not being used

SLX-1 CONTROL PANEL (Figure 1)

3.2.1 LIGHTS “ON”

To turn the light on, turn the “Master” breaker to the on position (up), and the “REMOTE/LOCAL” switch to “LOCAL” (down). The lamp will automatically ignite within 3 to 4 seconds after the “LIGHT” switch is turned “ON”. In the event that the “autostrike” feature of the SkyLight does not function properly (as evidenced by the lamp failing to light within a few seconds); the lamp can be manually lit by momentarily pressing the manual “IGNITION” button located on the control panel.

CAUTION

If the light still fails to light, there is a malfunction, which must be corrected. DO NOT hold the IGNITION button in for more than a fraction of a second. A momentary push is all that is required. Holding the manual start button in for a prolonged period is not necessary for lamp ignition, and can result in failure of the igniter components.

3.2.2 SHUTDOWN

To turn the SkyLight off, simply turn the “LAMP” switch to the “OFF” position. It is desirable, however, for prolonged lamp life, that power continue to be supplied for *at least* 10 minutes after the lamp has been turned off to provide required cooling air for optimum cool down of the lamp after operation. This requires that the “MASTER” breaker remain in the on position. SLX systems have a built-in timer that operates the cooling system for 15 minutes after shutdown.

3.3 HOUR METER

An hour meter, located on the control panel, is provided to maintain a running record of operational hours. The total hours shown on the meter provide a guide to service intervals as well as recording operational lamp hours (required for lamp warranties).

3.4 ELECTRICAL PROTECTION

The "MASTER" breaker is provided for protection of the auxiliary circuits. The auxiliary circuit breaker protects the cooling blowers and the control circuits. Two separate fuses are provided to protect the 24VDC control power supply within the SLX. The xenon lamp power supplies are internally fused at the point of power input by a 30A multi-pole fuse block.

In the event that any of the above described functions (cooling, lights) do not operate, the related circuit breaker and/or fuse should be checked (see Troubleshooting). Re-setting the circuit breaker may resolve the problem. Since circuit breakers or fuses are protective devices, failure of a circuit breaker or fuse could indicate an overload or other malfunction. If the circuit breaker or fuse blows again, it is a sign that such a malfunction exists and the cause should be determined and remedied.

CAUTION

UNDER NO CIRCUMSTANCES SHOULD A CIRCUIT BREAKER OR FUSE OF A HIGHER CURRENT RATING BE SUBSTITUTED IN AN EFFORT TO CORRECT A "CIRCUIT BREAKER / FUSE BLOWING PROBLEM". TO DO SO MAY NEGATE THE PROTECTION ORIGINALLY INTENDED, CAUSING SERIOUS COMPONENT FAILURE AND VOIDING THE WARRANTY.

3.5 TRANSPORTING

Certain precautions should be taken before moving a SkyLight. Before moving a unit, the lamphed should be brought straight up and secured.

The SkyLight can be moved by the use of "optional" casters. It can then be fork-lifted or winch-loaded onto a trailer or easily placed or relocated at point of use.

CAUTION

When traveling short distances (such as for rental situations within a city or local area) the lamp may be left in place *IF* the transport vehicle (trailer or small truck) has a soft-riding suspension, as prevent any sudden jars. For long distance transportation, or in any instance when possibility of severe jarring, shock or excessive vibration exists, AND IN ALL INSTANCES OF TRANSPORT VIA COMMON CARRIER, the lamps *must* be removed from the lamphed. The lamps should be carefully packed in their original containers and transported vertically.

Damage to a xenon lamp during transportation, whether in place in a lamphed or separately packed, is not covered under warranty, nor is consequential damage.

4.0 BASE ASSEMBLY – ELECTRICAL COMPONENTS (see Figure 2)

To aid in understanding the function of each electrical component, the system is described below in the approximate order as related to the “flow” of electricity starting from the input power connection through the entire system.

Access to the electrical components for servicing can be accomplished by the removal of the side panels. The access panels can be removed by unscrewing the fasteners located along the outside edge of the panels.

4.1 CONTROL PANEL

The control panel (see Figure 1) is mounted in a recessed compartment. Access to the control panel components is provided by the removal of four (4) corner screws and then swinging the panel forward and down. If desired, it may be removed by unplugging indexed plugs, which connect it to the individual power supplies and internal components.

The various input power cord receptacles, switches, circuit breakers, and hour meter are mounted to the panel and all electrical connections are accessible from the rear of the panel. Details of operation are covered in section 3.2.

4.2 MAIN WIRE HARNESS ASSEMBLY

The Wire Harness Assembly provides interconnection between the Control Panel and all electrical components within the base assembly. Each component may be individually dis-connected for testing or removal for servicing, by unplugging the indexed connectors from the Wire Harness Assembly.

4.3 COOLING SYSTEM

Blower(s) draw clean air through the bottom filtered inlet, pressurizing the base cabinet. The air then passes over the power supplies, cooling them, and continues through the flexible ducts to the lamphead. For systems that separate the lamphead from the power supply base, exhaust for the power supply is vented from the top panel of the base. With the aid of supplemental blowers in the lamphead, the air continues through the base plenum, cooling the bulbs. Finally, the air exits out the bottom of the lamphead through screened outlets.

CAUTION

Each lamphead is protected from overheating by a Thermal Switch. DO NOT override this protection device as premature failure of the lamp may result. The Flexible Cooling ducts must be in good condition, securely mounted on both ends and with no visible holes in the duct’s materials. The base cabinet should also be without holes and with all side panels in place to insure sufficient cooling to each lamphead.

4.4 D.C. POWER SUPPLIES

The DC power supplies are modular units. There are no user serviceable parts within the power supply module. Modules must be returned to the factory for service.

To replace a module remove the control cable, the AC input lines and the output buss bar. At this point the module can be

4.4.1 POWER SUPPLY CONTACTOR

The Power Supply Contactors (mounted on the top of each power supply) serve as the main power switch to turn each power supply on and off. They are actuated when the “Master” switch on the main control panel is turned to the “ON” position and the individual “Lamp OFF” switch is in the “ON” position. However, if the lamphead thermal switch or power supply thermal switch is opened due to a “high temp” condition, the contactor for that particular head will not engage.

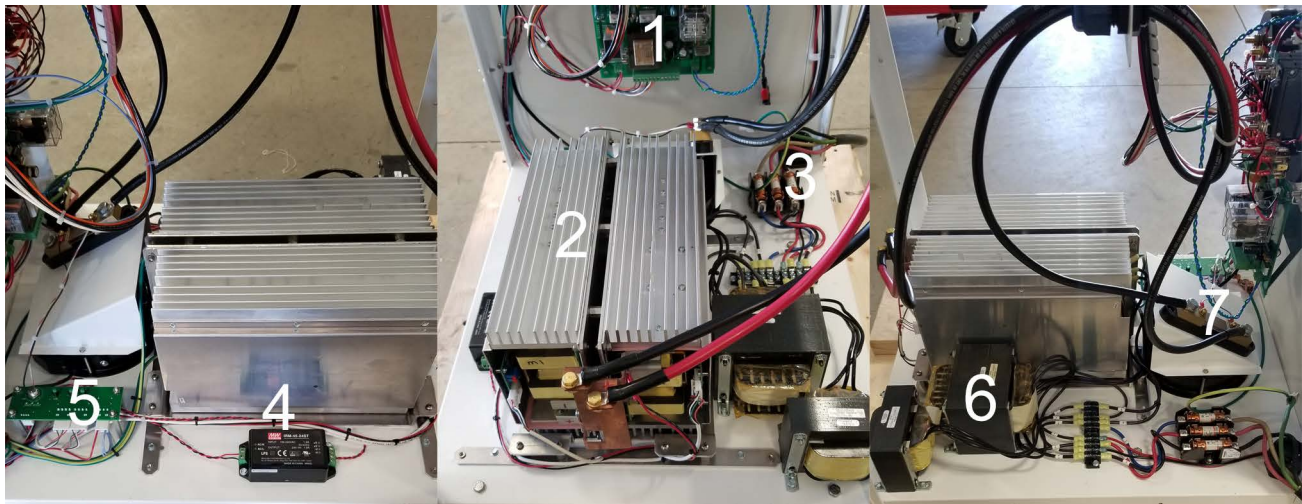


FIGURE 2

- | | |
|---------------------------|---|
| 1. Control PCB Assy | 5. Power Supply Module Control PCB Assy |
| 2. Power Supply Module(s) | 6. Phase Balancing Transformers |
| 3. Power Input Fuse Block | 7. Current Shunt |
| 4. 24VDC Power Supply | |

4.4.2 POWER SUPPLY MODULE CONTROL BOARD

The power supply within each SkyLight is provided with variable resistor for adjusting the power delivered to the xenon lamp. This adjustment is made at the factory and only need to be readjusted after a lamp change. The power supply is a constant power design and will compensate for line voltage fluctuation and lamp age to maintain the lamp at rated power.

CAUTION

If input voltages (measured with the SkyLight in full operation are found to be outside the levels specified in section 3.1, damage to components may result. If voltages are found to be outside the specified range, DO NOT OPERATE THE SkyLight. Components damaged from out of range voltage operation will NOT be replaced under warranty. Similarly, if any other components fail (including the xenon lamp) from out of range voltage operation, they will NOT be replaced under warranty.

4.4.3 CONTROL PCB ASSEMBLY

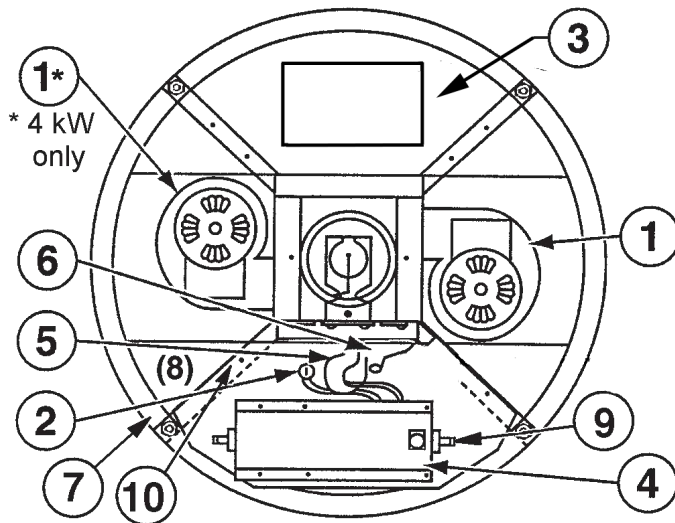
The Control PCB Assembly is a module consisting of a printed circuit board and related components located just below the inside of the front panel. Functionally, this circuit does a number of important actions. All control inputs are routed through this board including the optional "Remote Control" capability. When given a validated "On" command this board activates the igniter circuit. If the Control Board detects that the lamp did not ignite it will retry a set number of times and then timeout in order to protect the system. The auto strike cycle can be reactivated by turning the "Master" switch off and then back on again.

In addition to controlling the ignition process this board provides a 15 minute cool-down period where it will continue to operate the cooling fans until the lamp is ready.

This Control PCB Assembly contains no field service able parts besides the protection fuses installed. Replace fuses with fuses of identical rating and size. Repeated fuse failure is an indication of a more serious problem that should be referred to a factory trained technician.

6.0 LAMPHOUSE ELECTRICAL COMPONENTS

All high voltage igniter components, cooling blower(s), thermal switch, and D.C. power connections to the xenon lamp are located in the lamphouse (see Figures 5 & 6). The functions of the various components are as follows:



1. Blower*
2. Spark Gap
3. Primary Transformer
4. R.F. Igniter Transformer
5. Doorknob Capacitor
6. R.F. Trap
7. Cable/Conduit Entry
8. Control Terminal Strip **
9. Connection Point, DC- **
10. Connection Point, DC+ **

* (2) req'd. with 4 kW
** Type "C" Units only

LAMPHOUSE BASE PLATE ELECTRICAL COMPONENTS
FIGURE 5

6.1 IGNITER SYSTEM

The complete high voltage igniter circuitry is located on the lamphouse base plate. To gain access to the internal electrical components, it is only necessary to remove the two screws located at the bottom of the housing. Then, slide the housing upward and away from the tubular frame assembly. With the components exposed, the following items that make up the igniter system can be accessed.

DANGER

Before opening the lamphouse, disconnect all input power to the SkyLight so that the igniter cannot be accidentally operated. Severe electrical shock can result if the igniter is accidentally operated when these parts are exposed.

6.1.1 PRIMARY TRANSFORMER

The Primary Transformer receives an input pulse when either the autostrike assembly or the manual start button is actuated, and raises this voltage to approximately 6,000 V.AC, 50/60 Hz. If replacement is required, it may be easily removed by unplugging the two (2) pin input connector, disconnecting the single output wire from the capacitor and removing the two (2) screws which hold it to the right hand Plenum Support Bracket.

CAUTION

This transformer is wound with a large number of very fine windings and is subject to "burn-out" if, for any reason, the input power is supplied for longer than two seconds.

6.1.2 R.F. "IGNITER" TRANSFORMER

The R.F. (Radio Frequency) Igniter Transformer is specially constructed transformer that provides an ignition pulse of 40,000 volts when the output of the Primary Transformer is fed through its primary winding to a grounded spark gap. The negative (-) DC power from the power supply is fed through the secondary winding of the R.F. transformer to the lower (or cathode) end of the xenon lamp.

6.1.3 SPARK GAP AND RELATED COMPONENTS

Other components of the Igniter System include a spark gap, a "door knob" capacitor, and various smaller capacitors and "R.F. Traps". Figure 5 indicates the location of these components.

6.2 DC POWER CABLES

The flexible cables that carry the DC power from the Base Assembly to the lamphead enter through the baseplate. The positive (+) input cable is attached at an interconnect point to a similar cable within the lamphead connected to the upper lamp support spider. The spider in turn carries the DC positive (+) power through jumper cables then to the upper lamp adapter which is attached to the front or anode (+) end of the xenon lamp.

The negative (-) DC input cable is attached directly to one end of the R.F. transformer. A short, flexible cable then connects the other end of the R.F. transformer to the end of the lamp, which is the cathode (-) end of the xenon lamp. This cable and all components between the output side of the R.F. transformer and the xenon lamp must be well insulated and maintained at least one inch from any "ground" or conductive components of the lamphead, in order to prevent shorting and/or loss of ignition energy to the lamp.

6.3 COOLING BLOWERS

One or two cooling blowers, depending on the lamphead model, are attached to a square plenum, which distributes air to the lamp and rear of the reflector and also provides support for the base (cathode end) of the lamp. Access to this plenum and the base end of the lamp is achieved through removal of four screws securing a cover plate to one side of the plenum.

6.4 THERMAL SWITCH

Each lamphead is equipped with a Thermal Switch that will detect “High Temperature” conditions. The switch is located on the upper lamp support spider (Figure 6, Item 7). When the temperature in a lamphead reaches a level that may be harmful to the system, the Thermal Switch will open, turning the lamp off.

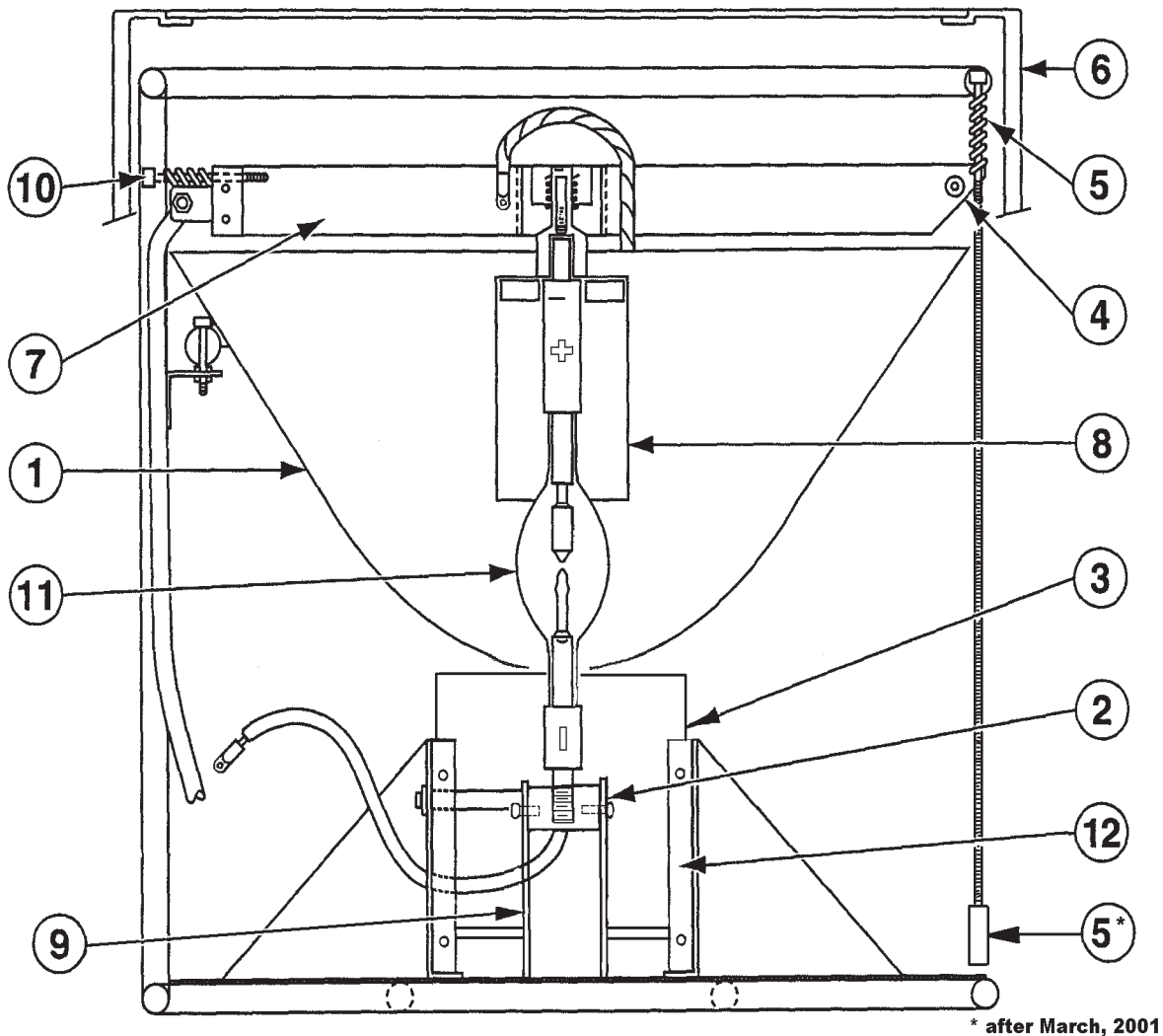
6.5 XENON LAMP (LIGHT SOURCE)

The light source is supplied through the use of a high quality xenon lamp (see Figure 6). The lamp is securely attached to the circuit to minimize mechanical and thermal stresses. Instructions to install and remove the lamp are detailed in sections 8.0 and 9.0.

7.0 LAMPHEAD MECHANICAL COMPONENTS

The xenon lamphead has been designed and constructed for ease of operation and serviceability in extreme weather conditions and operates satisfactorily in rain or snow. In operation, the lamphead is slightly pressurized as a result of the cooling air inflow, thus aiding in the exclusion of dust or moisture. The basic components are shown in Figure 6.

The two primary components of the lamphead are the deep dish electroformed parabolic reflector and the xenon lamp (light source). To function efficiently, these components must be mounted in such a manner that the lamp can be carefully positioned with its radiant energy source precisely located at the focal point of the reflector. The lamp must be capable of adjustment as to its relationship with the reflector to optimize the projected beam characteristics. All electrical connections to the lamp must be of low resistance and capable of carrying relatively high currents (80 to approximately 150 amperes) and cooling must be constant and effective to maximize lamp life and minimize electrical conductivity problems that can result from overheating. The components, which accomplish these functions, are noted below.



- | | |
|-------------------------|---|
| 1. Reflector Assembly | 7. Anode Support Spider |
| 2. Cathode Pin Receiver | 8. Anode Adapter |
| 3. Air Plenum | 9. Lower Lamp Support |
| 4. Thermal Switch | 10. "X" and "Y" Focus Adjustment |
| 5. "Z" Focus Adjustment | 11. Xenon Lamp |
| 6. Housing Assembly | 12. Insulator Cover Plate (removed for clarity) |

FIGURE 6

7.1 REFLECTOR ASSEMBLY

The electroformed parabolic reflector is precision bonded to a circular support ring, which in turn bolts to the lamphouse tubular frame. If replacement is required, first, remove the lamp as noted in section 9.0. Next, detach the upper support spider and associated components. Finally, unbolt the reflector from the lamphouse tubular frame.

7.2 CATHODE SUPPORT

The rear, or cathode (-) end of the xenon lamp is supported by slotted lamp guides, which are bolted to the bottom of the air plenum. This allows the lamp to move freely in the vertical axis for beam adjustment and to eliminate strain on the quartz envelope of the lamp.

7.3 AIR PLENUM/DUCT

The air plenum is attached to the base center support baffle and provides a means of ducting and directing the airflow around and over the xenon lamp to the front, or anode (+) end of the lamp.

NOTE: It is crucial that heat be properly removed from the anode end of the lamp to avoid damage to its internal seal.

7.4 ANODE ADAPTER

The upper lamp adapter, which is a tubular section surrounding the front portion of the lamp and attaches to the anode (+) end of the lamp, serves a dual purpose. The point of attachment to the lamp and also provides a means of removing heat from the lamp by direct conduction. As the heat is conducted outward from the lamp into the front lamp adapter, it spreads outward into the tubular section of the adapter by conduction. It is then removed by convection to the air stream, which has been directed over the lamp by the air duct.

7.5 ANODE SUPPORT – SPIDER AND ADJUSTMENT ASSEMBLY

The upper lamp support also serves a dual purpose. Its construction of highly conductive aluminum permits D.C. power to be carried from the input cable to the anode end of the lamp with very little loss due to electrical resistance. Additionally, it provides a pivot point, which allows the xenon lamp to be adjusted in the X or Y axis without developing any undesirable bending forces that could stress the quartz envelope of the xenon lamp. Movement of the lamp along the Z axis during focusing is also readily accomplished by the pivoting motion of the upper lamp support.

7.6 HOUSING ASSEMBLY

The housing assembly provides a front closure to the lamphead. A tempered glass window is attached to the housing by means of silicone rubber sealant to provide a watertight seal. The tempered glass window is not affected by temperature shock, (such as rain or snow suddenly applied to the window) even when it is operating at elevated temperatures. The high strength tempered glass also resists accidental breakage resulting from foreign objects.

8.0 LAMP INSTALLATION

Upon original delivery or subsequent common carrier transportation of the SkyLight, the customer will be required to install the xenon lamp into the lampheads. The procedure is as follows:

DANGER

The handling of a xenon lamp may expose the operator or technician to hazards resulting from bursting of the quartz envelope, because of the high internal pressure of the xenon gas.

Bursting may occur if the lamp is dropped or mishandled. The hazard is substantially increased if the lamp is hot from operation, as the gas pressure increases in a manner directly proportional to the increased temperature. Whenever the xenon lamp is removed from its protective cover, and until the installation or removal is complete and the lamphouse window assembly is secured, the operator or technician MUST wear protective clothing, including Kelvar™ gloves, acetate face shield, and quilted ballistic nylon jacket or equivalent. (These items are available from Strong.) Instructions regarding protective clothing are subject to change by any local or federal agency that may have authority over such matters, dependent on area or point of use of the SkyTracker equipment.

It should be noted that xenon bulbs do not “explode” in the normal sense, in that there is no combustible energy releasing reaction occurring. They merely “burst” like a balloon or a pressure vessel. The hazard is related to the flying particles of glass-like quartz, which are propelled with sufficient force to penetrate normal clothing, eyes, and skin. It can not be over-emphasized that protective clothing, gloves, and eye protection be worn when handling xenon lamps.

LAMP INSTALLATION STEPS

1. Place and secure the lamphead in the upright vertical position.
2. Remove the housing and set aside.
3. Remove the two bolts that secure the power jumper cables to the upper lamp adaptor (Figure 6, Item 8). Remove the central bolt, washer and spring assembly that secures the front lamp adaptor to the anode support “spider.”
4. Inspect reflector for cleanliness; clean if necessary.
5. Carefully remove xenon lamp from shipping container and remove protective cover. (Save the container and packing for future shipping purposes.) Use caution to handle the lamp only from the metal end fixtures, not allowing finger contact with the quartz envelope. Finger oils or other foreign material on the quartz envelope can lead to rapid, premature failure. If accidentally touched and contaminated, carefully clean the quartz envelope with tissue moistened with alcohol and then wipe dry with a clean, dry, lint-free tissue.
6. Inspect the upper lamp adapter and end pins of the lamp to make sure that these contact areas are clean and free of corrosion or any contaminant which could cause a high resistance electrical joint. Make sure that the clamp screws on the upper lamp adapter are loosened and that the upper lamp adapter will slide freely over the front anode (+) end of the lamp.

7. After sliding the top lamp adapter onto the anode (+) end of the lamp, carefully turn the two components upside down and hold the adapter with the lamp vertically. Then, while tighten the clamp screws. This will insure that no bending force is applied to the lamp body, which could cause an accidental and dangerous bursting if stressed. Tighten the screws carefully, a little at a time, alternating back and forth between each clamp screw until they are completely tight, alternating back and forth between each clamp screw until they are completely tight and no further screw rotation is possible using moderate force. Carefully check to be sure that the lamp end is not loose within the top lamp adapter clamp.
8. Hold the lamp and upper lamp adapter subassembly carefully by the adapter (continue using caution not to touch or contaminate the quartz lamp envelope). Lower the lamp carefully through the hole in the center of the reflector, using caution not to nick or damage the reflector or bump any portion of the lamp. Carefully insert the cathode end of the lamp into the lower lamp receiver. Rotate the lamp so that all three leads of the threaded ferrule start. Tighten until the spring pins of the receiver engage the lamp. Apply one-quarter turn to the lamp. Do not overtighten the lamp. Insert the upper lampb adapter pivot bolt/washer/spring assembly into the center of the “spider” and engage the bolt a few turns into the upper lamp adapter.
NOTE: If space appears inadequate to accomplish this joining of the spherical pivot points, more space can be provided by adjusting the Z focus screw in a clockwise direction, which moves the spider away from the reflector.
9. The top adapter may have to be carefully rotated, so that the two tapped holes on the adapter are symmetrically located with respect to the two spider legs, which are located at a right angle (90 degrees apart). Loosen the two clamp screw if required. This is necessary so that the front power jumper cables can be properly attached. When this positioning has been achieved, the upper lamp adapter attachment bolt and spring assembly may be tightened. *The shoulder bolt should be tightened until it bottoms.* The clamp screws should be tightened if necessary.
10. The front power jumper cables, which conduct power from the spider to the upper lamp adapter, can now be attached. Make sure that the cables are properly positioned within the protected area of the upper lamp adapter, so that they do not protrude into the light beam (which will cause some loss of light and overheating of the cables). Make sure all connections are tight.

11. Carefully replace the lamphed cover assembly. Make certain that the adjustment holes in the housing align to the frame. Make sure that the window is clean, both inside and out.

The lamphouse is now ready for operation, pending final focusing and adjustment during nighttime conditions.

8.1 FINAL FOCUS AND BEAM ALIGNMENT

Final focusing and beam alignment can only be properly accomplished outdoors during nighttime operation.

After the lamphed has been placed into operation and allowed to warm up for approximately five minutes, the beam can be adjusted and aligned as follows:

LAMP FOCUS PROCEDURE

1. Loosen the lamphed swing and position the lamphed extended in the outermost position. This provides easier access to the focus adjustments. Remove the lamphed cover.

The two lamp centering movements (normally described as X and Y adjustments, see Figure 6) are located in the sides of the lamphed. They are approximately three inches down from the top, or window end, of the lamphed and immediately adjacent to the ends of the two spider legs, which are located at right angles to each other (90 degrees apart). Insert the appropriate adjustment tool (5/32" Allen wrench).

2. With the light operating, the operator should position himself adjacent to either one of the X or Y adjustments so that he can view the beam from that angle, while adjusting the other adjustment. In other words, if he positions himself adjacent to the X adjustment and views the beam from that position, he will be able to visually assess the results of his adjustment of the Y adjustment. The operator should alternately turn the opposite adjustment first clockwise and then counterclockwise to observe the movements of the apparent center of the beam and try to obtain symmetry.

The operator should then move and reposition his body adjacent to the other adjustment, 90 degrees removed, and then adjust the other beam centering adjustment. The combination of movements of these X and Y adjustments should result in a completely symmetrical beam shape when viewed from any position.

3. Focus adjustment (see Figure 6): The focus adjustment is performed on the third leg of the spider assembly and is accessible via a hole located on the bottom outside edge of the lamphouse rear cover (Figure 6, Item 5*). Clockwise rotation of this adjustment will move the lamp forward, or away from the reflector, causing the beam to converge to a narrower appearing beam. Counterclockwise will cause the lamp to be moved deeper into the reflector, causing a divergence or spread of the beam. The operator will have to judge which type of beam is most suitable for the intended application or use.
4. After adjustment is complete, replace the lamphouse cover.

Since all of the above noted adjustments are spring loaded, there should be little or no free movement or “backlash,” nor drifting of the adjustments due to vibration associated with transport. The lamp should remain reasonably well focused for long periods of time. However, as the lamp ages and the cathode tip burns back, some refocusing may be required to maximize performance and appearance.

9.0 LAMP REMOVAL

DANGER

Wear all required protective clothing and follow prescribed steps carefully.

1. If the xenon lamp has been in operation, wait *at least* 15 minutes after Lamp shutdown, (with blowers operating) before opening the lamphouse. This will allow the internal lamp pressure to reduce to a level that is permissible for handling, provided that the specified protective clothing is worn.
2. Reverse the steps of the Lamp Installation Procedure in section 8.0.

10.0 ROUTINE SERVICE AND MAINTENANCE

10.1 PERIODIC MAINTENANCE

Except for unusual conditions of use (dirty environment, flooding, non-passive lamp failure, etc.) the frequency of service and replacement of certain parts and components because of normal wear is directly related to hours of use.

Inspection and preventive maintenance should be performed approximately every 250 hours of use or every 3 months (whichever occurs first). The period can be adjusted according to actual circumstances. The following items are to be included at the time of each periodic servicing:

10.1.1 BASE

1. Remove and replace the intake air filter.
2. Remove, lubricate, and reinstall blower motors.
3. Inspect and tighten, as required, all electrical connections.
4. Tighten all mounting bolts.
5. Inspect all of the flexible cooling ducts.

10.1.2 XENON LAMPHEAD ASSEMBLIES

NOTE: See Section 8.0 for safe handling instructions of xenon bulbs.

1. Remove lamphousings and the xenon lamps (Section 9.0).
2. Inspect and tighten all electrical connections.
3. Inspect all focus mechanisms. Lubricate focus screws.
4. Clean reflectors and windows.
5. Clean lamp ends. Clean inside contact area of Upper Lamp Adapters, clean contact points on upper lamp support spider.
6. Tighten DC cables.
7. Inspect blower motors for proper air flow.
8. Reinstall lamp and replace housings.

Operate the system – Check automatic ignition, thermal switch operation, and pilot lights.

Any parts (such as flexible air ducts, switches, etc.) which are found to be worn or in questionable condition, should be replaced to insure trouble-free operation. Xenon lamps should also be replaced as required.

CAUTION

Upon expiration of the lamp warranty (see warranty information packaged with lamp), the possibility of the lamp bursting increases, particularly if the quartz envelope shows signs of excessive darkening.

If bursting occurs, the tempered window may also break and the reflector may become scratched, resulting in a degradation of the system's performance.

For this reason, it is recommended that the xenon lamps be replaced once the specified warranted life span has been reached.

TROUBLESHOOTING GUIDE

<u>PROBLEM</u>	<u>PROBABLE CAUSE</u>	<u>WHAT TO CHECK</u>
LAMP IS OUT	Auto Strike is non-operational.	Try manual "Ignition" switch.
	Igniter Circuit is out.	Try manual "Ignition" and listen for arcing sound.
	Lamp has failed.	Inspect lamp for damage.
	AC Input power is out or AC power cord is out.	Check indicator light on panel; check voltage with meter.
	Cooling Blower(s) in the lamphead is out, causing the Thermal Switch to open.	Check Aux. circuit breaker/fuse.
Power Supply is out.	Check Aux. circuit breaker. Also check DC output (should be 125/165 V.DC prior to ignition).	

EQUIPMENT WARRANTY

Beamlight LLC (DBA Strong Lighting) agrees that its products shall be free from defects in materials and workmanship for a period of one year, from the date of original shipment from its factory. This warranty is nontransferable and applies to the original purchaser only. Said warranty will not apply if equipment is used in conditions of service for which it is not specifically intended. The manufacturer is not responsible for damage to its apparatus through improper installation, physical damage or poor operating practice.

If any device is found to be defective under the warranty, the buyer should notify the manufacturer. Such equipment will be repaired or replaced, at manufacturer's option, free of all charge except transportation, F. O. B. its factory. Any such repair or replacement by the manufacturer shall constitute fulfillment of all obligations to the purchaser. This warranty does not include troubleshooting expense, labor charges associated with service calls, and disassembly or reassembly of the lamp system. Should such a repair or replacement require an on-site service call, the Purchaser shall bear the responsibility for all costs and associated expenses. The manufacturer does not assume responsibility for any unauthorized repairs to its products, even though defective, and unauthorized parts or repairs shall void this warranty.

This warranty is the only warranty given with the manufacturer's products. There are no warranties of merchantability of fitness for a particular purpose or other warranties or representations of any kind, express or implied, which are made with respect to these products.

The remedies of the Owner set forth in this warranty are exclusive. In no event shall the buyer be entitled to recover for incidental, special or consequential damages, arising from the sale or use of these products, including but not limited to loss of profits or revenue, other commercial losses, inconvenience, delay, labor, repairs, or other cost of rental or replacement equipment.

This warranty excludes any and all incidental damage that may be caused by xenon lamp explosions. The bulbs used in manufacturer's products are not included in this warranty; they are however covered by the lamp manufacturer's warranty.

LAMP POLICY

1. To avoid unnecessary down time because of lamp failure, it is suggested that all owners keep at least one spare lamp, of each type required, on hand.
2. To return a lamp, the owner must first obtain a Returned Materials Authorization Number (RMA) from Strong Lighting's Customer Service Department.
3. All returned lamps must be accompanied by the manufacturer's warranty form, properly completed, and must be shipped in the original manufacturer's shipping container with proper cushioning inserts.
4. It is not Strong's policy to supply "replacement bulbs" for lamp returned with a warranty claim form. If a replacement lamp is requested, it must be ordered from the sales department, and it will be shipped and invoiced as a sale.
5. All lamp invoices are to be paid within the established terms, without regard to any warranty claim.
6. Failure to remit invoices under the established terms will result in the owner being placed on COD status.
7. Lamps returned to Strong that are re-workable by the manufacturer will be reworked and returned to the owner.
8. Lamps returned to Strong that the manufacturer determines test satisfactorily will be returned to the owner.
9. Lamps returned to Strong that are defective and are covered under warranty and that are not re-workable will result in a credit being issued to the owners account in accordance to policy #10.
10. Lamps covered by warranty, which have failed within the first 100 operating hours, will be credited in full. Credit for lamps failing after more than 100 operating hours will be pro-rated as per the average life span of the lamp type (see #15).
11. Lamps that have been overheated are not covered by warranty.
12. Lamps that suffer any unusual damage not caused by normal wear are not covered by warranty.
13. Lampss received broken and not in their original container, with proper cushioning packing, are not covered by warranty.
14. The return authorization number must be written on the shipping label to be properly recognized and accepted by our Receiving Department.
15. Average Lamp Life Span:

2 kW Lamps are warranted for 2000 hours.
4 kW Lamps are warranted for 1000 hours.

SkyLight Lamphood Assembly,
2000, 4000 Watt

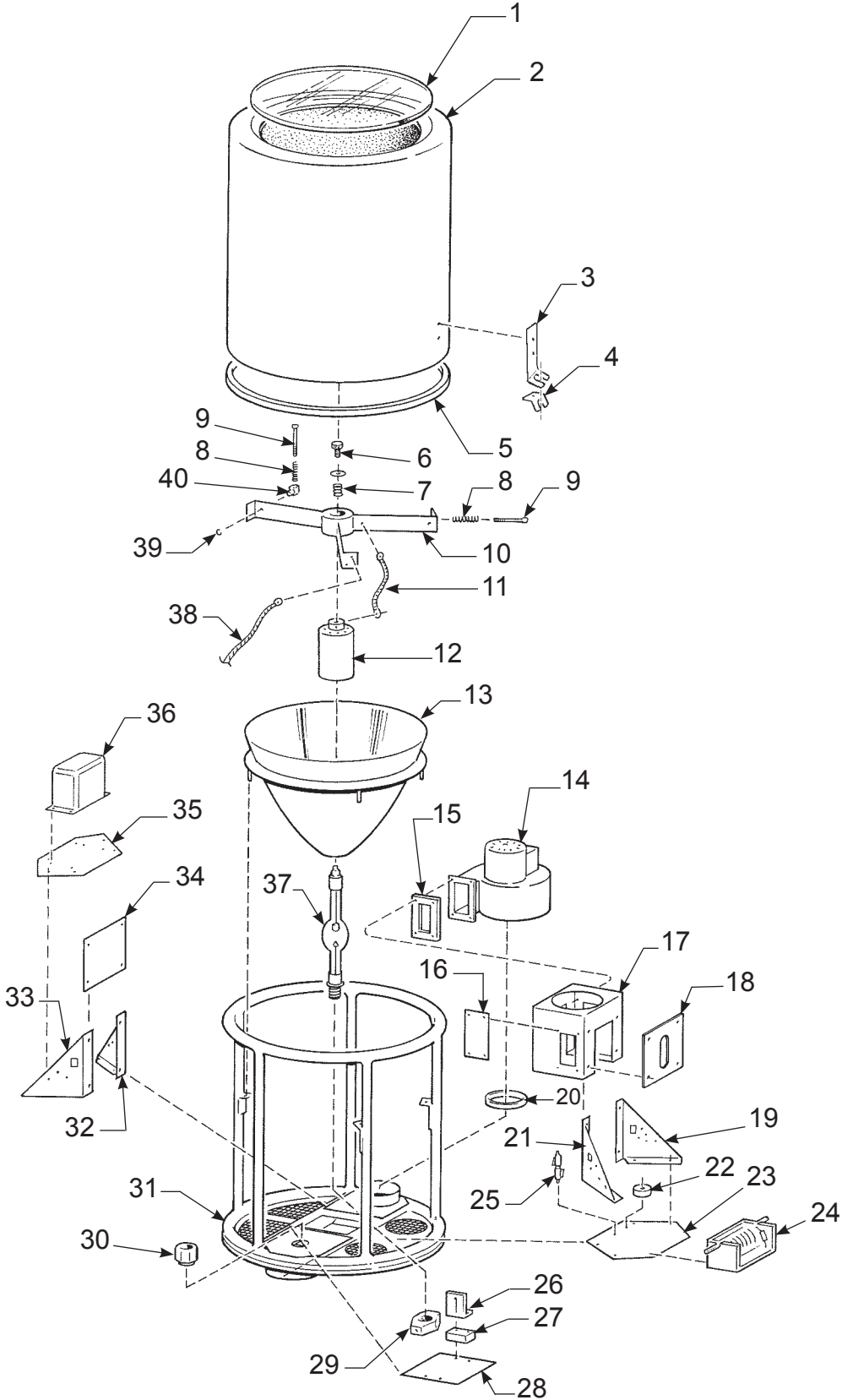


FIGURE 1

PARTS LIST

Figure 1

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	3198097	Cover Lens, Glass
-	1198062	RTV Silicone Sealant (3 oz. Tube)
2	3198096	Lamphead Housing, Fiberglass
3	3200337	Housing Latch (2 req'd.)
-	3240463	Nut Plate, Latch (not shown)
-	3250024	Lamphead Housing Assembly (Items 1-3,5)
4	3240462	Catch (mounts to Item 31; 2 req'd.)
5	3198098	Lower Gasket, Trimlock (incl. with 3250024)
6	4151767	Shoulder Bolt, 5/16 x 3/4" 1/4-20 Thrd.
-	4170005	Flatwasher, 5/16"
7	3158005	Compression Spring, .720" x .75"
8	3158006	Compression Spring, .300" x 2.0"
9	4151216	Screw, 10-32 x 2" Socket Head
10	3250013	Lamp Support Spider
-	3161007	Thermal Switch
11	3250244	Positive Lead (2 req'd.)
12	3250177	Radiation Shield & Anode Clamp
13	3250435	Reflector Assembly, Parabolic
14	3250055	Blower, 220 V.AC, 50/60 Hz. (2 req'd. for 4 kW)
15	3198136	Gasket, Blower Outlet
16	3240090	Cover Plate
17	3240088	Blower Box
18	3220031	Insulator Plate
19	3240084	Support Bracket, Right
20	3220030	Ring, Blower Coupling
21	3140083	Support Bracket, Left
22	39110000	Capacitor
23	3240089	Base Plate, Lower Lamp Support
24	3250036	RF Coil Assembly (2 kW)
24	3250053	RF Coil Assembly (4 kW)
25	3161018	Spark Gap
26	3198076	Mounting Bracket, Cathode Receiver (2 req'd.)
27	3220029	Spacer Block, Bracket (2 req'd.)
28	(ref.)	Plate (welded to Item 32 Frame)
29	3198078	Cathode Receiver, Threaded
33	3198163	Strain Relief Bushing
31	3240098	Frame, Welded Assembly
-	3250051	Base Molding, Plastic (glued to Item 31)
32	3240084	Support Bracket, Right

PARTS LIST, Figure 1 (continued)

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
33	3140083	Support Bracket, Left
-	3200850	Insulator Block, 1/2" Phenolic (not shown)
34	3240092	Blower Input Cover
-	3240091	Blower Port Cover (not shown), 2 kW only
35	3200851	Transformer Mounting Plate
36	3164017	High Voltage Transformer
37	3130241	Xenon Lamp 2 kW Type XT
37	3130242	Xenon Lamp 4 kW Type XT
38	3250244	Positive Lead
-	3198078	Negative Lead (to Power Supply; not shown)
39	3198075	Snap Ring
40	3220003	Focus Block
-	3200266	Focus Rod, 1/4-20 x 19.75" (not shown)
-	3200265	Lower Spacer, Focus Rod (not shown)

SkyLight Base Assembly

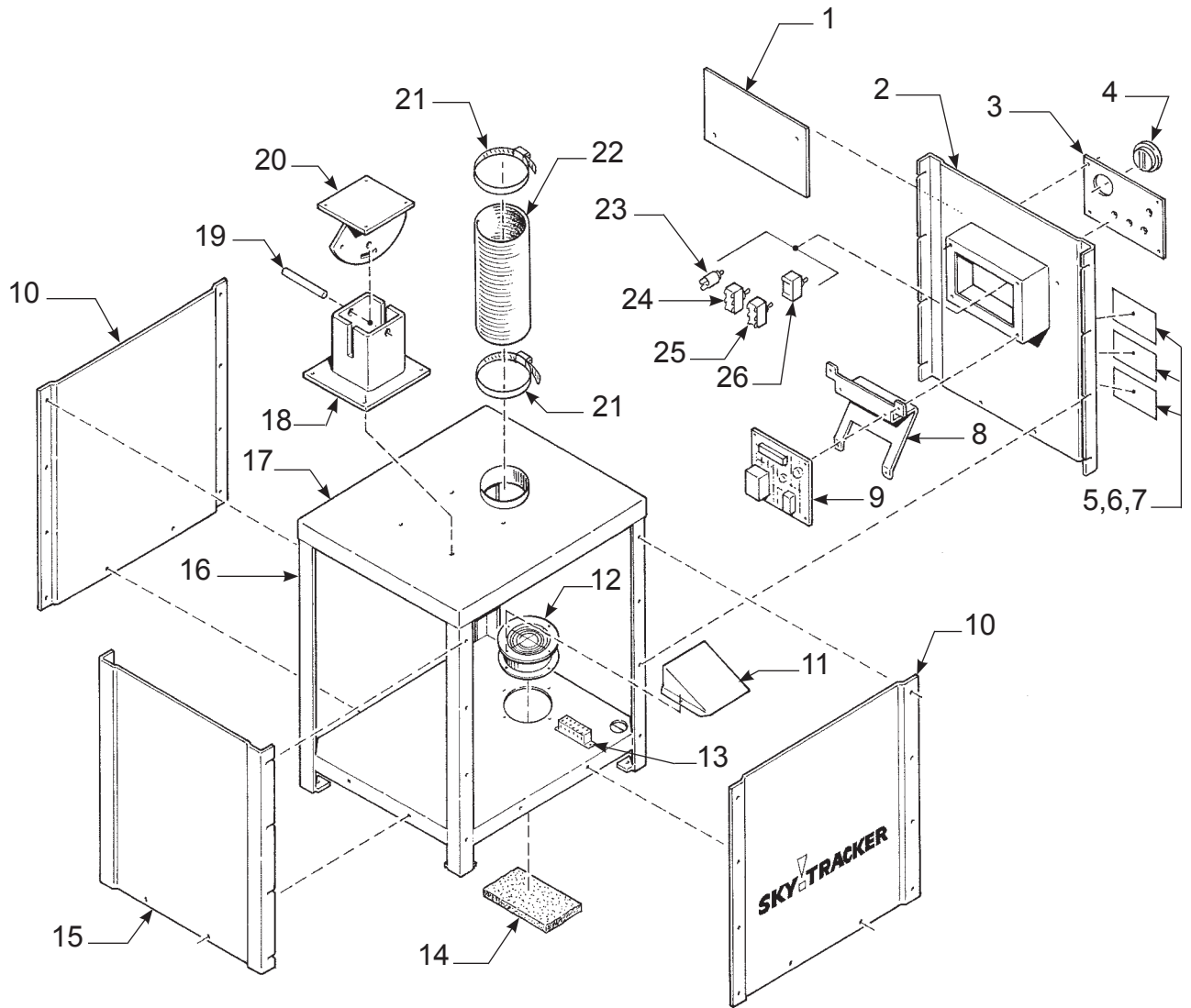


FIGURE 2

PARTS LIST

Figure 2

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	3200894	Cover, Instrument Panel
-	3118008	Door Latch (2 req'd.)
2	3240208	End Panel, Welded Assembly
3	3240160*	Plate, Instrument Panel (less Components)
-	4100753	Mounting Screw, 10-32 x 3/4" Hex Head
-	4257106	Flatwasher, 1/4" Weatherseal
4	3132001*	Hour Meter
	8132009*	Current Meter (not shown)
5	3134032	Sticker, Serial Number & Electrical Data
6	3200082	WARNING Sticker
7	3200081	Sticker, "Suitable for Damp Conditions. . ."
8	3240220	Mounting Bracket, PC Board
9	3200578	Printed Circuit Board Assembly
-	4080310	Mounting Screw, 8-32 x 3/8" Pan Head
10	3240207	Side Panel
	4100751	- Mounting Screw, 10-32 x 3/4" Pan Head
	4257106	Flatwasher, 1/4" Weatherseal
11	31269000	Air Deflector
12	71627000	Blower, 230 V.AC, 50/60 Hz.
-	71307000	Blower Grille
-	71929000	Blower Power Cord Assembly
-	4102500	Mounting Screw, 10-32 x 2-1/2" Pan Head
13	1251138	Terminal Board
-	4080310	Mounting Screw, 8-32 x 3/8" Pan Head
14	3150002	Intake Air Filter, Washable
-	3198116	Filter Holder, Formed Wire
15	3240206	End Panel
16	3240213	Base Frame, Welded Assembly
17	3240211	Top Panel
18	3240219	Base Bracket, Lamphead Pivot
	4370750	-Mounting Screw, 3/8-16 x 3/4" Hex Head
	4377003	-Lockwasher, 3/8" Split
	4377103	Flatwasher, 3/8" SAE
19	3220089	Pivot Pin, 1/2" Diameter
20	3240218	Lamphead Pivot Bracket
21	4110045	Hose Clamp, 5" Diameter
22	3200793	Flexible Air Duct, 5" Diameter x 14" Long
23	3161091*	Pushbutton Switch, IGNITE
24	3161048*	Toggle Switch, READY/OFF
25	3161048*	Toggle Switch, REMOTE/LOCAL
26	3161092*	Circuit Breaker, 10 A.
	2121039*	Fuseholder (2 req'd) (not shown)
	5121008*	Fuse 3 Amp Slow Blow (2 req'd) (not shown)
*	3200963	Instrument Panel, Wired Assembly (Items *)

Exploded View - Pending

PARTS LIST

Figure 3

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	EPSU4524ST	Power Supply 24VDC
2	3200574	Assy Ballast Control PCB 250V
3	AS4K60814A	Ballast Assy
-	EBL2CCI0	2000W Ballast (2 req'd)
-	SS4K60816	Positive Buss Bar
-	SS4K60817	Negative Buss Bar