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XENON LAMPHOUSE

BFD16F

INSTRUCTIONS

FOR

"XENOLITE"

BFD SERIES

XENON LAMPHOUSES

Manufactured by

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TD-169

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I. GENERAL DESCRIPTION

The "XENOLITE" BFD Series of Xenon Lamphousings is designed to accommodate xenon compact arc lamps in ratings from 900 - 2000 watts. These lamphousings utilize a highly efficient optical system to obtain maximum light output with extreme ease of operation and high reliability. This is accomplished by uniquely using a deep elliptical, explosion-proof reflector to allow use of conventional, proven, vertically operated xenon bulbs.

The lamphouse for motion picture projection is designed to be operated with any standard 35mm motion picture projector. It is recommended that the lamphouse be operated in conjunction with the standard Christie xenon arc-lamp power supplies for optimum performance. Both are designed to operate together as a system. The high voltage igniter (#1 Figure B) required for starting the xenon lamps is included in the lamphouse enclosure. For the lamp (bulb) description, recommendations and warranty, see the Christie (or equivalent) lamp instructions.

DANGER: *Possible Explosion Hazard. Due to the high internal pressure of xenon compact arc lamps, they may explode if dropped or mishandled. Therefore, they must be handled with great care. Whenever the protective cover is removed from the lamp, protective clothing including rubberized cotton gloves, double layer .040" acetate face shield, and quilted ballistic nylon jacket must be worn. (These items are available from Christie Electric Corp.) The instructions regarding protective clothing are subject to change by any local or federal specifications which take precedence.*

NOTE: The XENOLITE lamphousings are equipped with a double latch system on the lamp access panels to prevent "accidental" opening of the lamphousing.

II. UNPACKING

1. Be sure the container is upright. Open the case and remove the packing.

2. Carefully lift the unit from the case. Thoroughly inspect the unpacked unit for possible damage that has occurred during the shipment. Any damage discovered should be reported to the transportation company at once for inspection and filing of claim.

III. INSTALLATION

1. Place the lamphouse on a sturdy table or base where it is intended to be operated. If it is to be installed on a motion picture projector, set the lamphouse so that the front of the snood (#10 Figure A) is 6-1/4" from the aperture plate or film plane. Put the four wing bolts (furnished with the lamphouse) through the slots of the base of the projector and screw them securely into the base of the lamphouse (#14 Figure A).

2. Turn the 1/4 turn lock latch on the safety cover and lift the safety cover. Turn the four 1/4 turn fasteners on the rear panel and remove the panel from the lamphouse.

3. Insert the two d-c cables (from the power supply) through the cable entrance in the left rear of the lamphouse. Securely bolt them to the positive (+) and the negative (-) terminals of the lamphouse (#6 & 7 Figure B). Be sure to observe correct polarity as marked on terminals.

With the a-c power disconnected, connect the 115 volt a-c supply leads through the a-c cable entrance in the right rear of the lamphouse to the a-c terminal TB101-3 and 4 of the lamphouse terminal strip (#5 Figure B). The colored lead should connect to terminal 3 and the white lead to terminal 4. A third wire should be used to ground the lamphouse (#9 Figure B). Grounding the lamphouse is an important precaution. If it is desired to turn the power supply on and off at the lamphouse, connect leads from the lamphouse terminals TB101-1 and 2 to power supply remote ON-OFF terminals (if furnished) as shown on power supply schematic.

4. If installation is in a confined area such as in a projection booth, it is necessary that the hot exhaust air be ducted to the outside of the building. Connect to the exhaust duct (#13 Figure A) on top of the lamphouse a six inch ID, flexible, fireproof ducting material. Be sure that there are no obstructions in the ducting, and that the air intake openings (#15 Figure A and #6 Figure C) of the lamphouse are unobstructed and that ample air inlet into the booth will always be provided.

If the unit is procured with cooling fan, and ozone-free bulbs are used, exhaust ducting may not be necessary.

There must be air flow through the lamphouse to properly cool the Xenon bulb. If the lamphouse is furnished with a blower, additional cooling is not needed. If the lamphouse is not supplied with blower, an external blower must be installed to provide at least 100 cfm of air flow through the lamphouse at 0.5 inches static pressure with bulbs of 900 - 2000 watts.

IV. MECHANICAL ALIGNMENT

The BFD lamphouses are aligned at the factory so that the optical axis is aligned to the center of the snood. In order to achieve optimum efficiency of the system, the center of the snood must be aligned to the center of the area to be illuminated. In an installation on a motion picture projector, this area is the film aperture. This alignment is readily accomplished by using the CHRISTIE motion picture projector alignment tools (Figure "D").

The procedure is as follows:

1. Release the quarter turn latch on the safety cover which gives access to the second fastener. Then loosen the remaining fasteners to open the enclosure.

NOTE: When replacing the panels, be certain to fasten both sets of fasteners.

O.I.	12-23-70
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2. From the outside of the lamphouse remove the snood lens (#9 Figure A) by removing the front snap ring.

NOTE: It may be necessary to move lamphouse rearward to remove the snood lens.

3. Insert the short, 3/8" diameter, alignment rod (#2 Figure D) into the hole in the alignment reticle (#1 Figure D). Then place the alignment face plate with 3/8" hole (#4 Figure D) on one end of the rod, tighten its set-screw, push it back against the reticle, slide the alignemnt adapter (#8 Figure D) over the other end of the rod tightly against the opposite side of the reticle, and tighten its set-screw.

4. Place the assembled reticle into the snood with the face plate toward the front.

5. Next insert the 2-25/32" diameter aluminum plug (#6 Figure D) into the projector lens barrel holder, (using a lens adapter where required), and insert the long 1/2" diameter alignment rod (#7 Figure D) into the aluminum plug. Run the rod completely through the projector and slip the other machined alignment face plate with the 1/2" hole (#5 Figure D) onto the end of the rod.

6. Push the two alignment face plated together. If they are not aligned in all axis to within 4 or 5 thousandths, then adjust the projector base until they are aligned and flush together.

7. After the alignment is completed, remove the alignment tools, insert the lens into the snood from the front and replace snap ring. If lamphouse has been moved rearward, adjust so that working distance of 6-1/4" from front edge of the snood to aperture plate or film plane is maintained.

8. Insure that the air intake openings on the sides of the lamphouse are free from any obstruction (#15 Figure A) and (#6 Figure C).

V. INSTALLATION OF LAMP

1. Loosen the two thumb screws located above the igniter on hinged center wall (#11 Figure B). Pull the center wall, tilting it backward to its open position, (#7 Figure C).

2. Take the lamp out of its package LEAVING THE PROTECTIVE COVER ON. Place a lamp adapter (if required) onto each end of the lamp. Make sure of a good fit and tighten the set screws (if any) of the lamp adapter. Normally, CHRISTIE bulbs are furnished with proper adapters on them. Still leaving the protective cover on the lamp, place the bottom adapter (negative) into the socket on the adjustment mechanism. Then lift the spring-loaded upper lamp support (#3 Figure C) so the top adapter (positive) fits under it, seating the adapter into the recess in the support. The anode, which is the large electrode of the lamp (base marked "+"), must be at the top. When inserting or connecting the lamp, hold it on the base on which you are working in order to avoid a transfer of twisting or bending stresses to the quartz body. Be sure that the lamp adapters are properly seated.

3. Take care to insure that the leads on lamp or adapters are connected with the right polarity; the positive lead to be connected to the high voltage terminal in lamphouse (#4 Figure C), and the negative lead to the lower terminal on lamphouse (#2 Figure C). Operating with reversed polarity will ruin the lamp.

   Make sure that the positive lead from the lamp to the igniter does not touch, or run close to any metal parts of the lamphouse or the mirror. If these leads are close to any metal parts, it will cause arcing during the starting pulse and the lamp will not ignite. If the positive lead is excessively long, wrap it once around the lamp as shown in (#8 Figure C).

   DANGER: POSSIBLE EXPLOSION HAZARD. WEAR AUTHORIZED PROTECTIVE MASK, JACKET AND GLOVES, WHEN WORKING WITH ANY COMPACT ARC LAMP WHEN THE PROTECTIVE COVER IS REMOVED. DO NOT TOUCH THE QUARTZ BODY OF THE LAMP WITH BARE HANDS.

4. If the quartz body of the lamp is accidentally touched with the bare hands, or if it becomes dirty, clean it with alcohol and subsequently clean it with a soft cloth and distilled water. *AUTHORIZED PROTECTIVE MASK, JACKET AND GLOVES MUST BE WORN.*

5. Remove any tools, paper or foreign matter in the lamphouse. Now remove the protective cover from the lamp.

6. Carefully close the hinged center wall and tighten thumb screws so that center wall is tight and secure. Observe and record the elapsed time meter reading before starting any new lamp.

7. Install the rear panel and turn the four 1/4 turn fasteners, insuring that the panel is closed securely, then lower the safety cover and turn its 1/4 turn lock latch.

   NOTE: An interlock switch will prevent the system from operating if the rear panel is not closed securely.

IV. STARTING AND OPERATING

1. Before starting the lamp, check the maximum lamp operating current which will be found on the lamp data sheet in the box in which the lamp is shipped.

2. Check to see that D.C. POWER ON-OFF switch (#4 Figure A) is in the OFF position. Energize the a-c power supply to the lamphouse and to the d-c power supply and switch the d-c power supply to the ON position. (The power supply should not energize until the switch on the lamphouse is switched on). Set the current adjust on the power supply to its medium position. Check to insure that the lamphouse cooling fan is operating.

3. Check that the dowser handle (#12 Figure A) is closed (up position). Turn D.C. POWER ON-OFF switch to ON position. The lamp (bulb) will automatically ignite. If not, momentarily press the EMERGENCY START button (#2 Figure A), this will strike the lamp again. Observe the ammeter to insure that the rated lamp current is not exceeded. Never allow the current to exceed the rated maximum lamp current, or drop below 40% of that value. If the current is too high or too low, adjust the power supply to the proper current. The lamp may extinguish when the power supply is switched, but should restart automatically. If not, it must be restarted by pressing the EMERGENCY START button.

4. NEVER VIEW THE LAMP DIRECTLY. Serious and permanent eye damage can be caused by the ultra-violet radiation of the lamp. Under no condition should the lamphouse be opened except as described in Paragraph VIII below.

   DANGER: FIRE HAZARD. KEEP HANDS AND COMBUSTIBLE MATERIAL AWAY FROM THE CONCENTRATED LIGHT BEAM IN FRONT OF THE SNOOD.

5. The lamp is extinguished by turning the D.C. POWER ON-OFF switch to the OFF position. Do NOT open the lamphouse door until at least 10 minutes after switching off the lamp. Always wear authorized protective face mask, jacket and gloves. Pull the a-c disconnect in the a-c line before entering the lamphouse or the power supply unit.

VII. OPTICAL ALIGNMENT AND ADJUSTMENTS

1. After the lamp has been started and adjusted per paragraphs 2 and 3 of section VI, open dowser (down position) and observe light on the screen or other viewing surface. Adjust the focus (forward and back) adjustment of lamp (#5 Figure A) for brightest field, and then adjust the lateral position of the lamp (#7 Figure A) for maximum light uniformity from side to side. Then readjust the focus adjustment.

2. Next, check proper height adjustment of lamp (bulb) to achieve maximum light output and uniform field. Move bulb up or down using vertical adjustment (#6 Figure A) until there is a shadow at the bottom of the screen or other viewing surfaces. Then lower the bulb gradually so that the shadow just disappears below the bottom of the screen of other viewing surface. This insures that the bulb is in its proper optical position for maximum illumination. It may be necessary to readjust the lamp focus for desired uniformity.

3. If it is noted that the top of the screen has a lower light level than the bottom, the mirror adjustment (#11 Figure A) may be used to improve the light balance. A snap-in plug is in front of the adjustment and must first be removed. Then try turning the adjustment clockwise (facing the lamphouse) watching the screen. If it is found that the mirror adjustment is all the way to the right, (clockwise) then turn the adjustment counter-clockwise about one and one-half turns and observe screen. At this point readjust vertical adjustment of bulb and focus adjustment. A balance between these adjustments will provide the optimum illumination from the system.

4. Fine adjustment is made with the focus adjustment of the bulb.

NOTE: There is normally no need to change any of the adjustments until lamp is replaced.

VIII. REPLACEMENT OF LAMPS

1. Be sure that the lamp has been cooled for at least 10 minutes and that authorized protective face mask, jacket and gloves are worn. Pull the a-c disconnect to the lamphouse and turn off the power supply. Remove the rear panel. Loosen the thumb screws in the center wall and carefully tilt it back to its open position. PLACE THE PROTECTIVE COVER AROUND THE LAMP, taking care not to touch the quartz envelope.

2. It is recommended to replace the lamps after a running time which exceeds the warranted lifetime by not more than 20%. The running time can be checked by the elapsed time indicator on the side of the lamphousing. Be sure to record the elapsed time reading when installing a new lamp.

   Useful lamp life is normally defined as operation until the light output of the lamp is decreased by 20% due to blackening of the lamp envelope. If the lamp is operated beyond the recommended time, it should be checked often to see that the envelope does not become noticeably black. As it blackens, the quartz envelope absorbs heat, and if allowed to operate too long, this can overstress the envelope causing violent failure which may damage the optics.

3. Disconnect the bulb leads from the positive and negative terminals and remove the lamp from the lamphousing.

4. Worn out lamps are to be returned to Christie Electric in their protective cover and original packing.

IX. TROUBLE SHOOTING

1. Power Supply will not start:

   A. Check electrical connections and rear panel interlock in the lamphouse.

   B. See power supply instruction manual.

2. Lamp cannot be ignited, check following:

   A. D-C power supply is set to proper value, as specified.

   B. D-C voltage at lamphouse is connected with correct polarity and should be not less than 85 volts open-circuit. If d-c voltage is low, check the power supply (see power supply instructions).

   C. 115 volt a-c is supplied to igniter.

D. Wiring connections to lamp and power supply are correct and secure.

E. When the ON-OFF switch is turned ON, listen for the normal buzz of the igniter when the d-c voltage reaches 85 volts. If there is no buzzing, remove the rear panel from the lamphouse and take the cover off the igniter. Check to see if the igniter relay pulls in.

DANGER: DO NOT TOUCH IGNITER WHEN ENERGIZED DUE TO VERY HIGH VOLTAGE.

If relay is not operating, check relay circuit, operate relay manually. Replace relay if found defective. If relay is operating but no buzz is heard, replace the spark gap.

F. When the EMERGENCY START button is pushed, listen for the normal buzz of the igniter. If there is no buzzing, remove the rear panel from the lamphousing and take the cover off the igniter. Replace the spark gap.

DANGER: DO NOT TOUCH IGNITER WHEN ENERGIZED DUE TO VERY HIGH VOLTAGE.

G. If the igniter is operating properly, chech for high-voltage arcing to ground as follows:

1) Disconnect the d-c power leads from power supply.

2) Connect one end of a jumper to terminal #6 on the igniter terminal board. When the other end is touched to terminal #8 on the igniter, the igniter will energize.

3) While looking down through the exhaust air duct (#13 Figure A) touch the jumper to terminal #8 and observe if there is any arcing from the top of the lamp or from the positive (top) lamp lead to any metal parts of the lamphouse or mirror.

4) If arcing is noticed from the flexible lamp lead, relocate the lead routing as far as possible away from any metal parts.

5) If arcing is detected from the lamp to the mirror, install a silicon rubber gasket around the edge of the mirror using silicon cement (RTV). If necessary, contact the factory for assistance.

H. Check the lamp: *USE AUTHORIZED PROTECTIVE FACE MASK, JACKET AND GLOVES.*

1) Check for air leakage into bulb. A Xenon lamp which "goes air" while running will turn suddenly black and cloudy.

3. Light intensity on screen changes to a lower level:

A. Check lamp current.

B. Check focus adjustment of lamp while viewing raw light on the screen to get brightest setting.

C. Turn off and cool lamp 10 munutes. With face mask on, open lamphouse and observe if there has been any damage or deterioration of the mirror surface or if lamp has dropped into a new position due to incorrect placing.

X. MAINTENANCE

1. Before opening the lamphouse, PULL THE A-C LINE DISCONNECTS TO THE LAMPHOUSE AND D-C POWER SUPPLY. USE AUTHORIZED FACE MASK, JACKET AND GLOVES AND PLACE PROTECTIVE COVER OVER LAMP. Check the contact surfaces of the (+) and (-) connections at regular intervals or approximately 500 hours for cleanliness. If need be, clean them. It is important that this procedure be followed regularly, as the contact resistance may lead to a scorching of the connectors. Clean air intake openings.

2. Cleaning Optical Surfaces. The exposed optical surfaces of the lamphouse occasionally require cleaning. The snood lens may be removed for cleaning by merely removing the retainer ring and taking out the lens. To clean the mirror surface, it is recommended to remove the entire snood by taking out the four screws securing it to the face of the lamphouse.

Using the cleaning supplies listed in Table 1, clean optical surfaces as follows (optics cleaning kits are available from Christie Electric Corp.)

NOTE: Since repeated cleaning of optical surfaces can be more harmful than helpful, cleaning should be performed only when the surfaces are excessively dirty.

A. For surfaces that are dusty but do not have smudges, fingerprints or grease marks:

1) Brush the dust away from the surface with a camel hair brush.

2) Blow any remaining dust away with an ear syringe.

B. For surfaces that are smudged or have oil or grease smears:

1) Moisten a pad of cotton with detergent solution. The pad should be well moistened but not dripping wet.

2) Gently swab the exposed lens or mirror surface, using a spiral motion and working from the center of the surface toward the edge.

3) Sponge up moisture with cheese cloth or lens tissue.

CAUTION: Never use cheese cloth or lens tissue for more than one sponging. Throw it away.

4) Dampen a pad of cotton with methyl alcohol. Wipe surface, using spiral motion from center to edge, in one continuous motion.

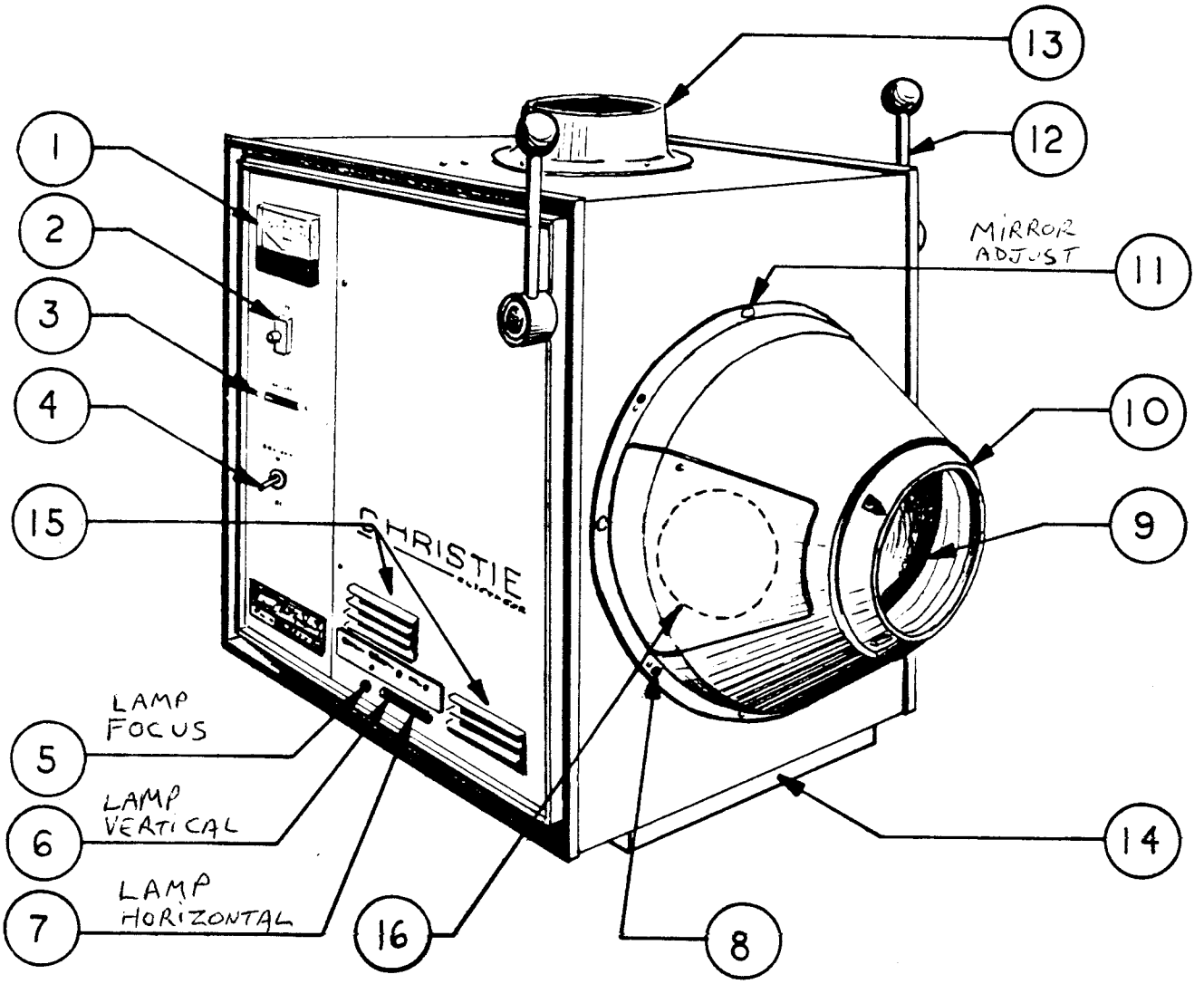
5) Dry exposed surface with a dry pad of cotton or with lens tissue.

6) Repeat the procedure above as required. When exposed lens or mirror surface is dry and clean, loosen any remaining lint with brush and blow clean with the ear syringe.

3. Periodically clean the high voltage insulator of the igniter to prevent any accumulation of dust or dirt.

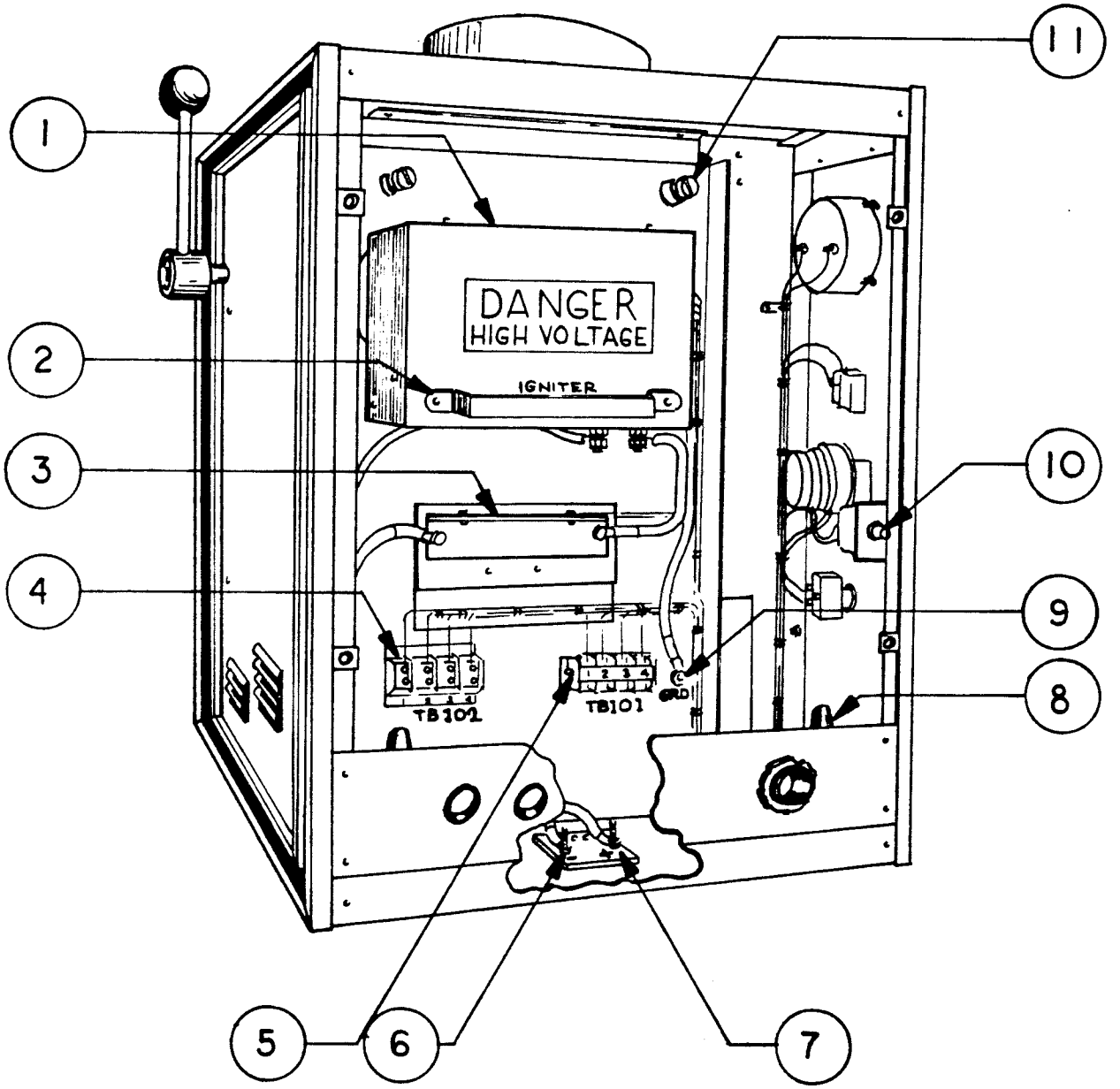
4. The blower motor should be oiled approximately every 6 months through the oil holes in the blower motor housing.

FIGURE "A"



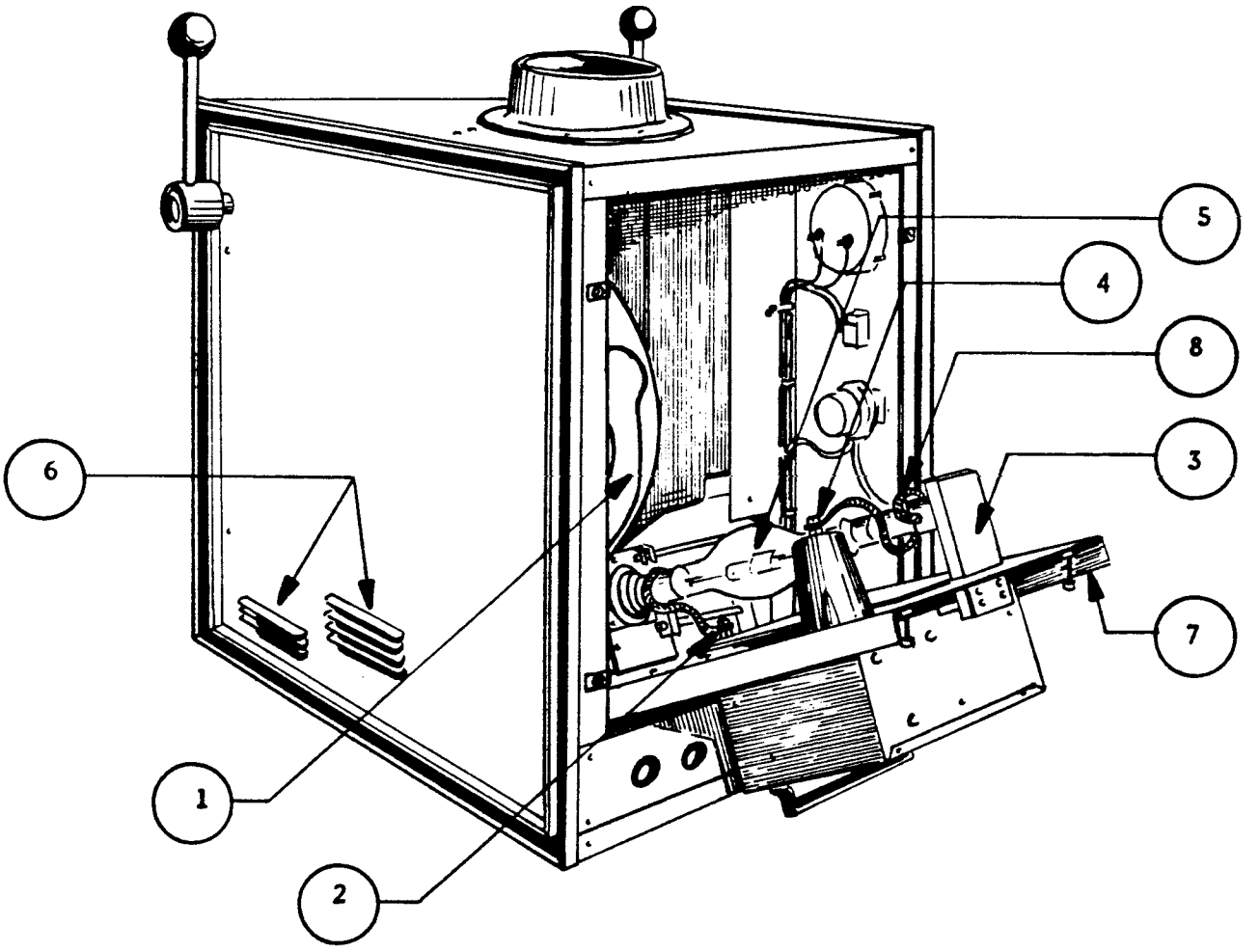
1. Ammeter
2. Emergency Start Button
3. Elapsed Lamp Time Meter
4. D.C. POWER ON-OFF Switch
5. Lamp Adj., Focus
6. Lamp Adj., Vertical
7. Lamp Adj., Lateral
8. Mirror Support Screws - 4 plcs. (Factory Use Only)
9. Snood Lens
10. Lamphouse Snood
11. Mirror Adjust
12. Dowser Handle
13. Exhaust Air Duct
14. Lamphouse Base
15. Air Intake Openings
16. Mirror Cleaning Access Cover

FIGURE "B"



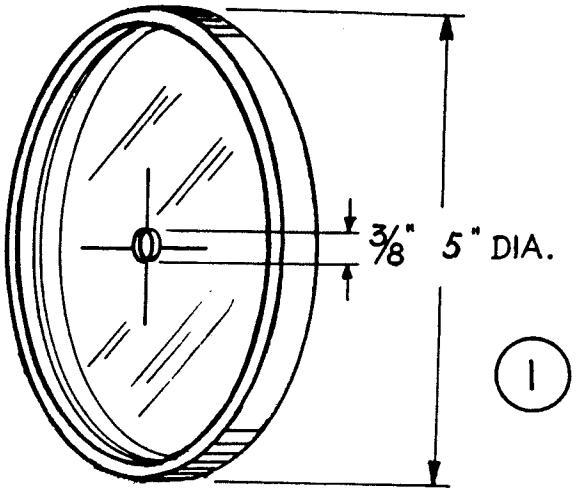
1. Igniter
2. Center Panel Opening Handle
3. Shunt
4. TB102 Terminal Board
5. TB101 Terminal Board
6. Negative (-) Terminal
7. Positive (+) Terminal
8. Center Panel Stops (2 plcs.)
9. Ground Connection
10. Door Interlock Switch
11. Center Panel Fasteners (2 plcs.)

FIGURE "C"

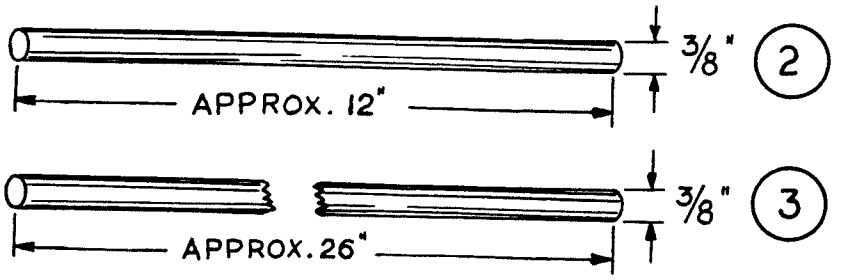


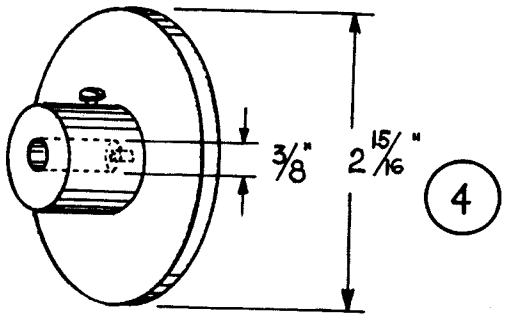
1. Mirror
2. Negative (-) Lamp Connection
3. Upper Lamp Support Brkt.
4. Positive (+) Lamp Connection (high voltage)
5. Lamp (Bulb)
6. Air Intake Openings
7. Center Wall
8. Positive Lead of Lamp

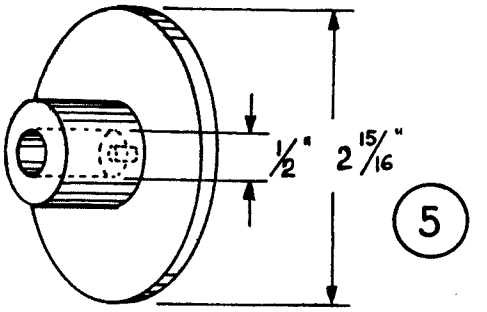
FIGURE "D"

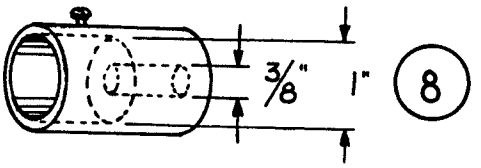


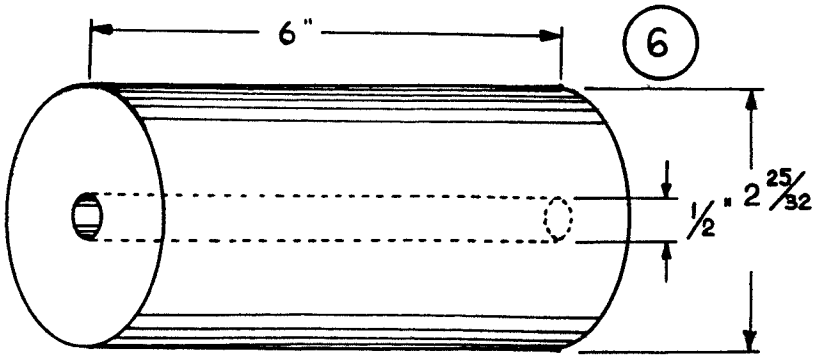
1. Alignment reticle
2. Short alignment rod 3/8" diameter (BFD Series only)
3. Long alignment rod 3/8" diameter (BSG Series only)
4. Alignment face plate (3/8" diameter hole)
5. Alignment face plate (1/2" diameter hole)
6. Aluminum plug (2-25/32" diameter)
7. Long alignment rod (1/2" diameter)
8. Alignment adapter

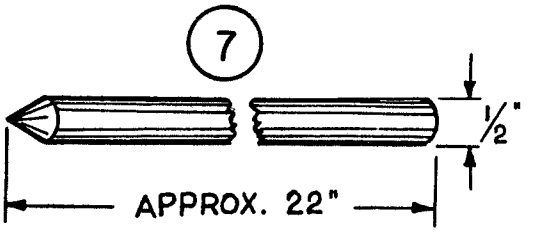












APPENDIX "A"

POWER SUPPLY & IGNITER STARTING ALIGNMENT AND/OR MODIFICATION

1. Start (and restart) lamp and set the power supply to the desired operating current.

2. Turn off power supply and disconnect a-c power to igniter (terminal 5 of igniter, located in rear of lamphouse).

3. Turn on power supply (with a-c to igniter still disconnected). Read power supply open circuit d-c voltage (with at least 1000 ohms per volt voltmeter). This voltage should be between 120 and 130 volts. Choose proper tap of boost transformer to provide this output. Then turn off power supply.

4. If manual (push button) ignition is employed, reconnect the a-c voltage to the igniter. The unit is now ready for normal operation.

5. If automatic ignition is employed (lamp is automatically ignited by turning on power supply) take off back cover of igniter (a-c to igniter still disconnected). Turn the power supply on and check the d-c voltage when the relay clicks in. Then adjust (and properly retighten) the slider on the adjustable resistor so that the relay clicks in when open circuit voltage of power supply reaches about 100 volts d-c after turn on. (After turning power supply off, wait for d-c voltage to fall below 10 volts before turning power supply back on again). Since this adjustment is dependent on the voltmeter damping characteristics, the slider setting may have to be trimmed in one or the other directions later, to give the most dependable starting.

6. Check that igniter capacitor C8 (in series with relay coil) is rated 100 microfarads (150 volts d-c minimum). If it is only 50 microfarads, parallel another 50 microfarads (150 VDC minimum) capacitor with it (plus to plus, minus to minus), or replace it with a 100 microfarad capacitor (observing same polarity). It is acceptable to use as much as 150 microfarads total.

7. Replace igniter cover and reconnect a-c to igniter.

TABLE 1

CLEANING OPTICAL SURFACES

NAME	DESCRIPTION	MANUFACTURER
Detergent solution in plastic bottle (M113691-1)	Comprising 1 part ORVUS to 9 parts water, or 1 teaspoonful of TIDE to 1 quart of water. ORVUS is a liquid and TIDE is a flake detergent.	ORVUS and TIDE are produced by the Procter and Gamble Co., Cincinnati, Ohio
Brush (598900-076)	3/4" camel hair	
Lens tissue	Optical rice paper No. 51, 5-1/2 pound UT	C.H. Dester and Sons, Inc., Windsor, Conn.
Cotton (598900-083)	1 inch pads, sterilized, medical (soft), absorbent	
Case, plastic, clear (598900-082)		
Ear Syringe (598700-018	Medical	
Bag, plastic	4 X 6	
Bag, plastic	9-1/2 X 12	

SHEET 1 OF 5 — CHRISTIE ELECTRIC CORP. BILL OF MATERIAL — ASSEMBLY # PL- D191300-1

REG.#	ASSEMBLY NAME	MODEL #
W.O.#	ASS'Y., FINAL	QTY / DATE REQ'D

ITEM NO.	PART NO.	PART NAME	QTY PER ASS'Y	QTY REQ'D	QTY ISSUED	QTY SHT.	PER EACH PART NO. LABOR HRS.	LABOR $	MAT. $	PER ASS'Y TOTAL HRS.	TOTAL $
1	D191232-1	ASS'Y., MECHANISM, PLASTIC LAMP ADJUSTMENT	1								
2	~~D191360-1~~ ~~D190290-3~~	ASS'Y., WRAP	1								
3	D191301-1	ASS'Y., MIRROR, DEEP DISH	1								
4	D191313-2	BRACKET, DOWSER	2								
5	D191318-1	ASS'Y., CENTER WALL MOVEABLE	1								
6	515900-005	CHASE NIPPLE	1								
7	515900-023	CHASE NIPPLE	1								
8	D190305-2	HANDLE, DOWSER	2								
9	D190334-2	KNOB, DOWSER	2								
10	D191337-2	SPACER	4								
11	D191089-2	BRACKET, SWITCH	1								
12	D191190-1	SNAP RING, 5.06 DIA.	2								
13	G191226-3	LENS, PLANO-CONCAVE 5" DIA. 7" R	1								
14	D191249-3	LENS RETAINER	1								
15	D191252-2	LEVER, DOWSER	1								
16	D191253-2	LINK	1								
17	D191254-2	WALL, CENTER, STATIONARY - UPPER	1								
18	D191255-2	WALL, CENTER, STATIONARY - L.S.	1								
19	D191256-2	WALL, CENTER, STATIONARY - R.S.	1								

A REV	011812 ECO	B REV	13633 ECO	C REV	13804 ECO	D REV	14204 ECO	REV	ECO
			2-71		10-18-71				

PREPARED	POSTED	MAT. ISSUED	CORRECTED
By E. JULIAN	By W.D.SHIELDS	By	By
Date ~~10-70~~ 10-71	Date 2 NOV 71	Date	Date

SHEET 2 OF 5 — CHRISTIE ELECTRIC CORP. BILL OF MATERIAL — ASSEMBLY # PL- D191300-1

REG.# | ASSEMBLY NAME: ASS'Y., FINAL | MODEL # BFD 16

W.O.# | QTY | DATE REQ'D

ITEM NO.	PART NO.	PART NAME	QTY PER ASS Y	QTY REQ D	QTY ISSUED	QTY SHT.	PER EACH PART NO. LABOR HRS.	LABOR $	MAT. $	PER ASS Y TOTAL HRS.	TOTAL $
20	D191258-2	SUPPORT, STACK 6"	1								
21	D191259-2	CONNECTOR PANEL	1								
22	D191260-2	SPACER, HINGE	1								
23	D191290-1	PLATE, CONTROL	1								
24	D191302-1	BAFFLE, AIR	1								
25	D191305-2	BASE, PLATE	1								
26	D191306-2	PANEL, SIDE, LEFT	1								
27	D191307-2	PANEL, CONTROL	1								
28	D191308-3	PANEL, INSTRUMENT	1								
29	D191312-1 ~~[illegible]~~	SNOOD ASSY.	1								
30	D191310-1	DOWSER	1								
31	D191311-~~3~~4	PANEL, REAR, ASSY.	1								
32	D191312-2	BRACKET, DISTORTION	4								
33	D191314-2	STOP, DOWSER	1								
34	D191315-2	SPACER, DOWSER	2								
35	D191316-2	SHAFT, DOWSER	1								
36	D191327-2	BLOCK, SUPPORT	2								
37	D191327-4	BLOCK, SUPPORT	2								
38	D191341-1	SPACER	4								

A REV	011812 ECO	B REV	13633 ECO	C REV	13804 ECO	D REV	14204 ECO	REV	ECO

PREPARED	POSTED	MAT. ISSUED	CORRECTED
BY E. JULIAN	BY W.D.SHIELDS	BY	BY
DATE 10-70	DATE 2 NOV 71	DATE	DATE

SHEET 3 OF 5 — CHRISTIE ELECTRIC CORP. BILL OF MATERIAL — ASSEMBLY # PL- D191300-1

REG.#	ASSEMBLY NAME	MODEL #
W.O.#	ASS'Y., FINAL	QTY / DATE REQ'D

ITEM NO.	PART NO.	PART NAME	QTY PER ASS'Y	QTY REQ'D	QTY ISSUED	QTY SHT.	PER EACH PART NO. LABOR HRS.	LABOR $	MAT. $	PER ASS'Y TOTAL HRS.	TOTAL $
39	507531-201	TAPE	A/R								
40	515610-004	STUD EJECTOR (SOUTHCO CO.) (43-13-1-14)	4								
41	515610-009	SPRING, COMPRESSION	4								
42	515700-052	SPLIT RING RETAINER, SPRING (SOUTHCO CO.) (82-32-101-17)	4								
43	515700-084	STUD 1/4 TURN OVAL HD. (SOUTHCO CO.) (82-11-180-16)	4								
44	515700-085	RECEPTACLE, CLIP-ON (SOUTHCO CO.) (82-47-112-15)	4								
45	515813-502	NYLON .020 THICK, BLACK (SOUTHCO CO.) (82-46-101-41)	4								
46	D191366-1	WINDOW, INSTRUMENT PANEL	1								
47		EPOXY ORDER NO. 03813	A/R								
48	518800-004	BLACK RUBBER BUMPER	2								
49	520570-030	KNOB, RED, ROUND 3/8-24 (DIMCO GRAY)	2								
50	535112-320	AMMETER, EXT., SHUNT 2% D.C. W/ZERO 0-100 ADJ.	1								
51	578000-028	SWITCH, SPDT, WHITE, START PLASTIC (MICRO SWITCH)	1								
52	578000-034	SWITCH, SPDT, QUICK, DOOR CONN. (CUTLER HAMER) (844-2K2)	1								
53	578722-011	SWITCH, DPDT, 1/4 QUICK ON-OFF CONN. (A-H 826-607-P)	1								
54	581399-008	TIMER, 10K HOUR (HAYDON EG 1335)	1								
55	M113139-001	ASS'Y., TERMINAL BOARD	1								
56	M101126-016	SPACER	2								
57	515700-054	FASTENER, PEM	4								

A REV	011812 ECO	B REV	13633 ECO	C REV	13804 ECO	D REV	14204- ECO	REV	ECO	PREPARED	POSTED	MAT. ISSUED	CORRECTED
			2-71		10-18-71					By E. JULIAN	By W.D. SHIELDS	By	By
										Date 10-70	Date 2 NOV 71	Date	Date

SHEET 4 OF 5 — CHRISTIE ELECTRIC CORP. BILL OF MATERIAL — ASSEMBLY # PL- D191300-1

REG.#	ASSEMBLY NAME	MODEL # BFD 16
W.O.#	ASS'Y., FINAL	QTY / DATE REQ'D

ITEM NO.	PART NO.	PART NAME	QTY PER ASS'Y	QTY REQ'D	QTY ISSUED	QTY SHT.	PER EACH PART NO. LABOR HRS.	LABOR $	MAT. $	PER ASS'Y TOTAL HRS.	TOTAL $
58		SCREW, FLAT HD., 6-32 x 1/2 x 100°	8								
59		SCREW, PAN HD., 5-40 x 5/16	2								
60		SCREW, PAN HD., 6-32 x 1/4	6								
61		SCREW, PAN HD., 6-32 x 3/8	20								
62		SCREW, SOC. HD., 6-32 x 1/2	6								
63		SCREW, PAN HD., 8-32 x 3/8	14								
64		SCREW, PAN HD., 8-32 x 1/2	8								
65		SCREW, PAN HD., 8-32 x 5/8	8								
66		SCREW, SOC. HD., 8-32 x 1-1/2	4								
67		SCREW, PAN HD., 10-32 x 1	2								
68		SCREW, SET 8-32 x 3/8	1								
69											
70		SCREW, SOC. HD., 8-32 x 1 LG	4								
71		SCREW, FLAT HD., 6-32 x 1/4 x 82° SELF TAP	4								
72		RIVETS, POP AD-32-BS	2								
73		RIVETS, POP AD-34-BS	10								
74		SCREW, PAN HD., 6-32 x 1/2	4								
75		SCREW, PAN HD., 8-32 x 1-3/4	4								
76											

A REV	011812 ECO	B REV	13633 ECO	C REV	13804 ECO	D REV	14204 ECO	REV	ECO
			2-71		10-18-71				

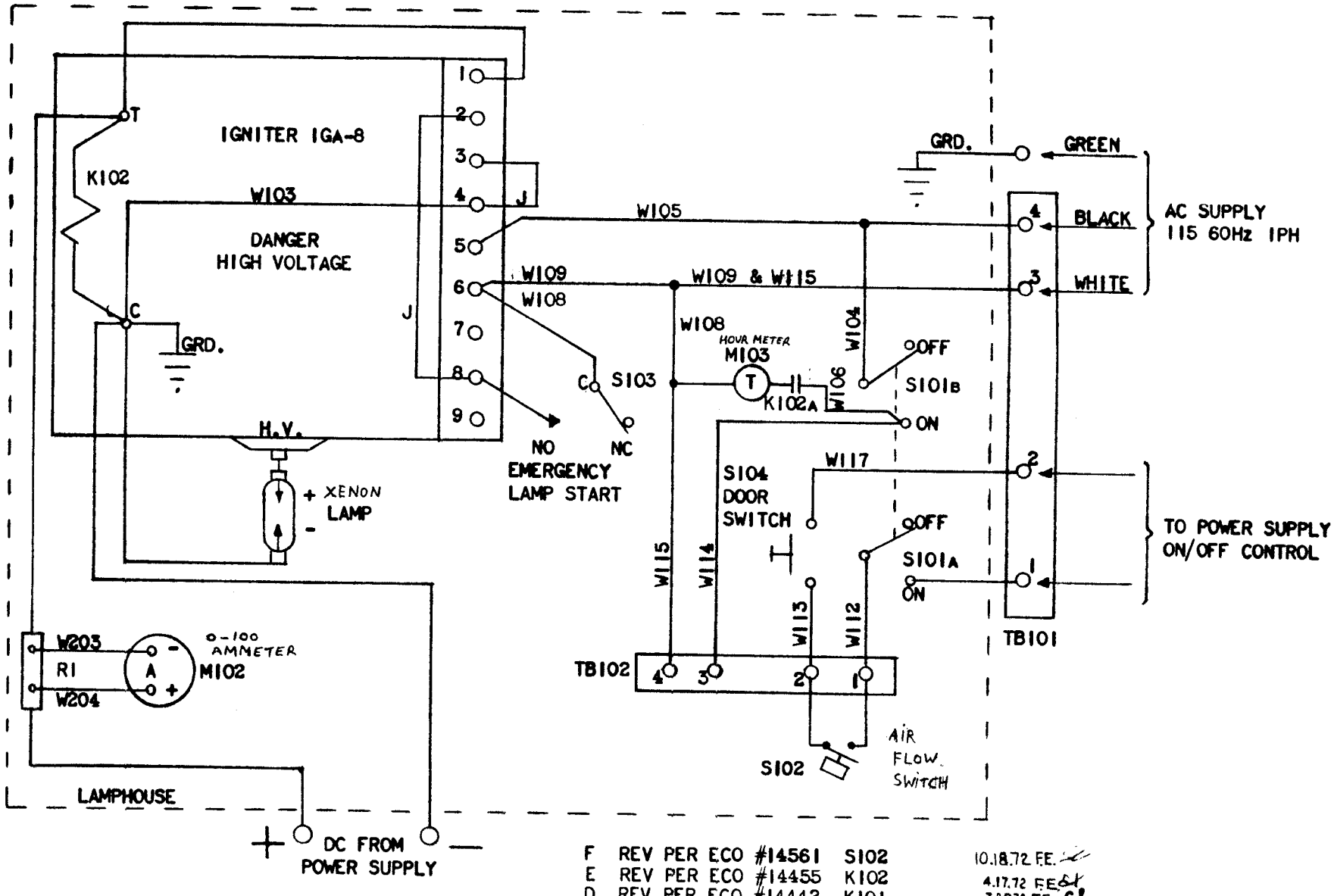
PREPARED	POSTED	MAT. ISSUED	CORRECTED
BY E. JULIAN	BY W. D SHIELDS	BY	BY
DATE 10-70	DATE 2 NOV 71	DATE	DATE

SHEET 5 OF 5 — CHRISTIE ELECTRIC CORP. BILL OF MATERIAL — ASSEMBLY # PL- D191300-1

REG.#	ASSEMBLY NAME ASS'Y., FINAL	MODEL # BFD 16
W.O.#		QTY / DATE REQ'D

ITEM NO.	PART NO.	PART NAME	QTY PER ASS Y	QTY REQ	QTY ISSUED	QTY SHT.	PER EACH PART NO. LABOR HRS.	LABOR $	MAT. $	PER ASS Y TOTAL HRS.	TOTAL $
77		WASHER, FLAT #6	30								
78		WASHER, FLAT #8	33								
79		WASHER, FLAT #10	2								
80		WASHER, LOCK #6	36								
81		WASHER, LOCK #8	34								
82		WASHER, LOCK #10	2								
83		NUT, HEX 6-32	16								
84		NUT, HEX 8-32	26								
85											
86											
87											
88											
89											
90											
91											
92											
93											
94		ASS'Y. TIME D191300-1									
95		TOTAL ASS'Y. D191300-1									

A	011812	B	13633	C	13804	D	14204			PREPARED	POSTED	MAT. ISSUED	CORRECTED
REV	ECO	REV	ECO	REV	ECO	REV	ECO	REV	ECO	BY E. JULIAN	BY W. D. SHIELDS	BY	BY
			2-71		10-18-71					DATE ~~10-18-71~~ 10-19-71	DATE 2 NOV 71	DATE	DATE



SYM	REVISION	DATE	DR.	APP'D
F	REV PER ECO #14561 S102	10.18.72	FE.	
E	REV PER ECO #14455 K102	4.17.72	FE	
D	REV PER ECO #14442 K101	3.28.72	FE	
C	REV PER ECO #14185 JUMPER 2-8	12/30/71	Wm	
B	REV PER ECO #14167 S102	11/5/71	Wm	

DATE 11-17-71 FE		
CHECKED		BFD10F
APP'D E.E. Smith 4/17/71		BFD16F
SUPERSEDES 501885	USED ON	

LAMPHOUSE SCHEMATIC

CHRISTIE ELECTRIC CORP. LOS ANGELES, CALIF. 90043

DWG. NO. 502021 REV. F

SHEET 1 OF 1