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MODEL IDENTIFICATION



The model number stamped on the rating plate, identifies the configuration of the equipment, number of lightheads, type of mounting and electrical supply requirements.

The rating plate is located on the top of the extension arm or the back of the base.

NAMEPLATE DESIGNATION	TYPE OF MOUNTING	MODEL NUMBER 120V, 50/60 Hz.	MODEL NUMBER 120V EXPORT, 50/60 Hz.	MODEL NUMBER 230V EXPORT, 50/60 Hz.
	Floor (Casters)	2410M	2411M	2412M
	Wall	2410W	2411W	2412W
	Single Ceiling	2410C	2411C	2412C
	Double Ceiling	2421C	2421C	2422C
	Single Track	2410T	2411T	2412T
	Double Track	2420T	2421T	2422T

Example: Model 2412C identifies a Castle Ceiling Mounted Surgical Light equipped with a single lighthead. The light requires a 230 volt, 50/60 Hz., electrical supply line connected to the input of a remote Intensity Control. The control contains a transformer, fuses and switches.

DESCRIPTION OF SYMBOLS ON THE EQUIPMENT

The following symbols appear on the export lighthead or the Intensity Control:



Power Control or ON/OFF Switch. OFF is (O), ON is (I).

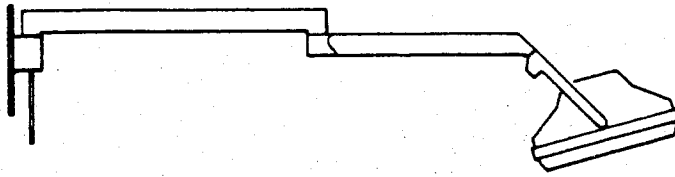


Intensity Selector Switch. Intensity or lamp brightness increases from left to right.

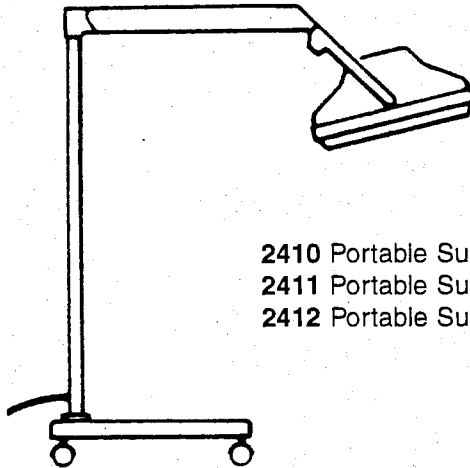


Signifies warning, type and location of fuses.

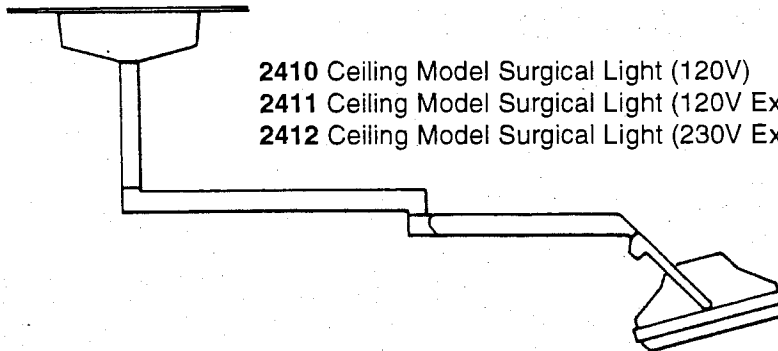
LIGHT MODELS



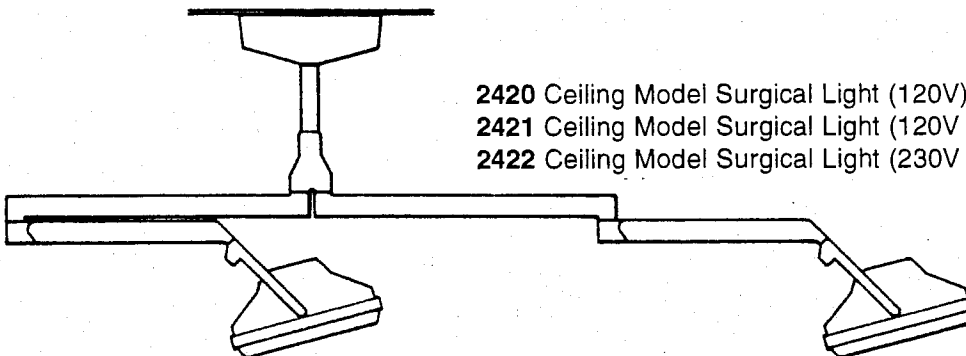
- 2410 Wall Model Surgical Light (120V)
- 2411 Wall Model Surgical Light (120V Export)
- 2412 Wall Model Surgical Light (230V Export)



- 2410 Portable Surgical Light (Floor-120V)
- 2411 Portable Surgical Light (Floor-120V Export)
- 2412 Portable Surgical Light (Floor-230V Export)



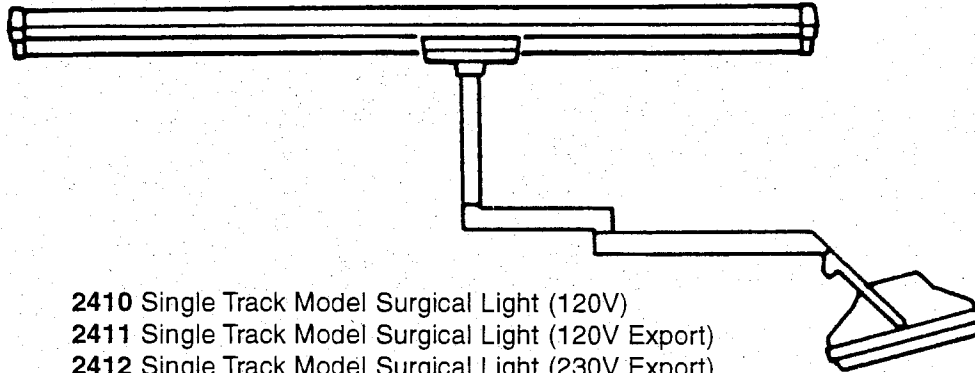
- 2410 Ceiling Model Surgical Light (120V)
- 2411 Ceiling Model Surgical Light (120V Export)
- 2412 Ceiling Model Surgical Light (230V Export)



- 2420 Ceiling Model Surgical Light (120V)
- 2421 Ceiling Model Surgical Light (120V Export)
- 2422 Ceiling Model Surgical Light (230V Export)

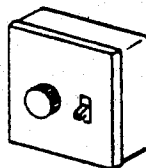
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LIGHT MODELS (Cont'd.)

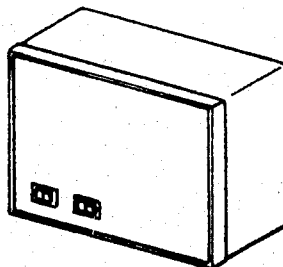


- 2410** Single Track Model Surgical Light (120V)
 - 2411** Single Track Model Surgical Light (120V Export)
 - 2412** Single Track Model Surgical Light (230V Export)
 - 2420** Double Track Model Surgical Light (120V)
 - 2421** Double Track Model Surgical Light (120V Export)
 - 2422** Double Track Model Surgical Light (230V Export)
-

LIGHT CONTROLS



OPTIONAL 120V INTENSITY CONTROL



230V INTENSITY CONTROL

2400 SERIES MODEL DESCRIPTIONS

All models use the same lighthead and support arm assembly, but they differ in their means of mechanical support. Each model is described in the following paragraphs:

FLOOR MODELS

The lighthead and arm assembly is mounted on a vertical post supported by a base. The base is equipped with casters.

The 230V Model is equipped with a transformer mounted on the base assembly.

WALL MOUNTED MODELS

The lighthead and arm assembly is attached to an extension arm which is pivot mounted to a wall bracket. The wall end of the extension arm rotates 180°, the lighthead end 280°.

The 230V Wall Model is equipped with an Intensity Control. The 120V output from the control is wired to a grounded outlet supplied with the Intensity Control.

CEILING MOUNTED MODELS

The lighthead and arm assembly is attached to an extension arm which is suspended from the ceiling by means of a suspension tube and mounting plate assembly. The extension arm rotates 360° about the suspension tube, and the support arm rotates 280° at the end of the extension arm. A junction box, located on the mounting plate, is provided for electrical connections.

Double lighthead models have both extension arms connected to a single suspension tube.

120V Ceiling Models may be equipped with an optional Intensity Control. All 230V Ceiling Models are equipped with an Intensity Control as standard. The 120V output from the control is wired directly to the light fixtures.

TRACK MOUNTED MODELS

The lighthead and arm assembly is attached to an extension arm which is suspended from a trolley. The trolley moves along an enclosed track. The extension arm has unlimited rotation capacity about the suspension tube, and the support arm rotates 280° at the end of the extension arm. A junction box, mounted in the track, is provided for electrical connections.

Double Track Models have one lighthead suspended from each track.

120V Track Models may be equipped with an optional Intensity Control. All 230V Track Models are equipped with an Intensity Control as standard. The 120V output from the control is wired directly to the light fixtures.

INTENSITY CONTROLS

120V OPTIONAL INTENSITY CONTROL

This control is remote, wall mounted, either surface or recessed. The customer provides an ON/OFF toggle switch. Rotating the control knob clockwise turns the circuit ON and increases the intensity from LOW to HIGH.

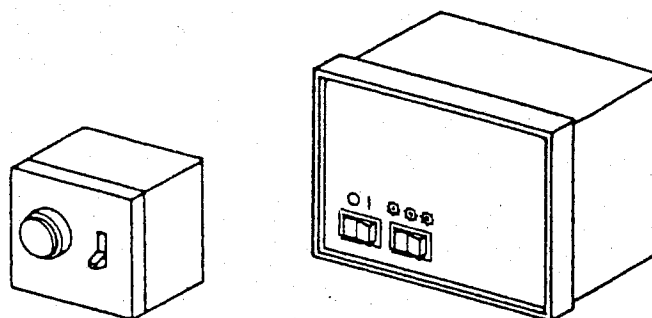


FIGURE 1-1. SURGICAL LIGHT CONTROLS

230V INTENSITY CONTROL

This control is remote, wall mounted, either surface or recessed. The control contains two 1.6 Amp, 250 volt fuses, I/O line switch, and a terminal block in the primary line of a transformer. The supply line is connected to the 220, 230 or 240 volt lead of the transformer depending on local power supply conditions.

The transformer secondary is tapped for 90, 105, and 120 volts, which are in turn selected by a three position switch to provide three levels of light intensity.

OPTICAL SYSTEM

- Lamp - 150 Watt Quartz Halogen, Double Contact Bayonet Base
- Heat Filter - Blue/Green, Color Correcting
- Reflector - Dichroic Coated, Color Correcting
- Lens- Diffused Cover

2400 SERIES SURGICAL LIGHTS

1. General

PATTERN AND NOMINAL ILLUMINATION

Light measurements are made 36 inches below the outer edge of the frosted lens.

- Illumination: 4000 foot-candles nominal at 120V
- Pattern Size: 5-1/2 to 7 inch diameter light pattern
- Depth of Field: 26 to 60 inch

SPECIAL TOOLS REQUIRED

- External Snap Ring Pliers
- Allen Wrenches 0.050" to 5/16"



After installation is completed, Getinge/Castle Service personnel or other authorized service personnel should make mechanical adjustments, and electrical Performance tests before the equipment is operated. These adjustments and tests are outlined in this section.

MECHANICAL ADJUSTMENTS

These instructions include all the adjustments provided to correct drift in the 2400 Series Lights. Refer to Figures 2-1 thru 2-5 for light components, location of the individual adjustments, and angular limitations.



Adjustments should not be required on newly installed equipment. Make the adjustments only if there is a definite drift. Tighten screws just enough to prevent drift and no more.

- C - Support Arm Horizontal Drift
- D - Support Arm Vertical Drift
- E - Lamphead Rotational Drift
- F - Lamphead Angular Drift

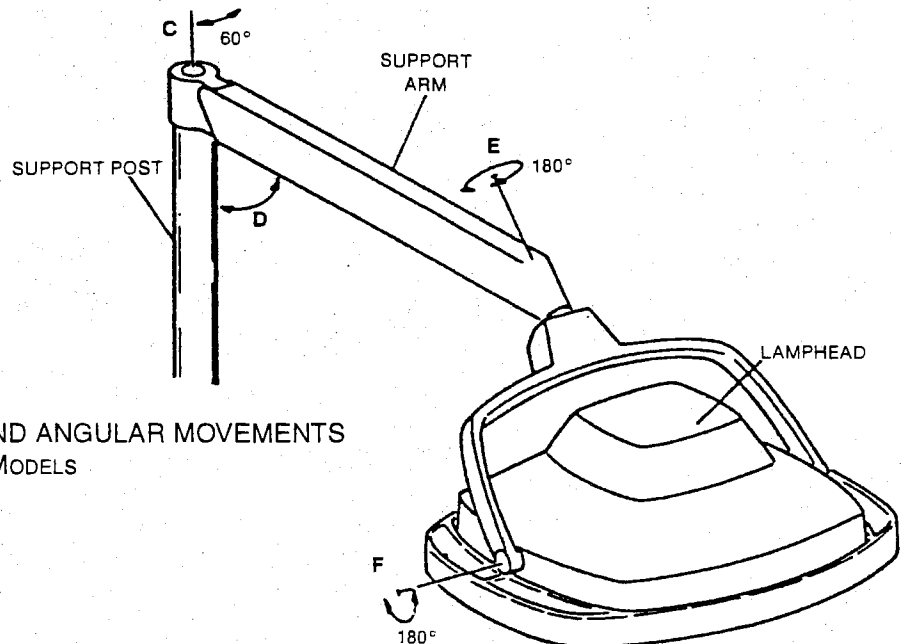


FIGURE 2-1. ROTATIONAL AND ANGULAR MOVEMENTS
FLOOR MODELS

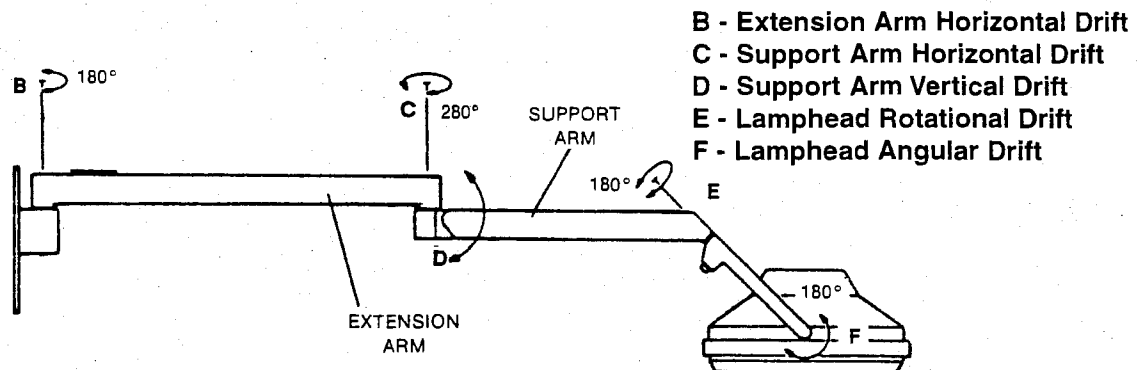


FIGURE 2-2. ROTATIONAL AND ANGULAR MOVEMENTS
WALL MODEL

2400 SERIES SURGICAL LIGHTS

1. General

B - Extension Arm Horizontal Drift C -
Support Arm Horizontal Drift D -
Support Arm Vertical Drift E -
Lamphead Rotational Drift F -
Lamphead Angular Drift

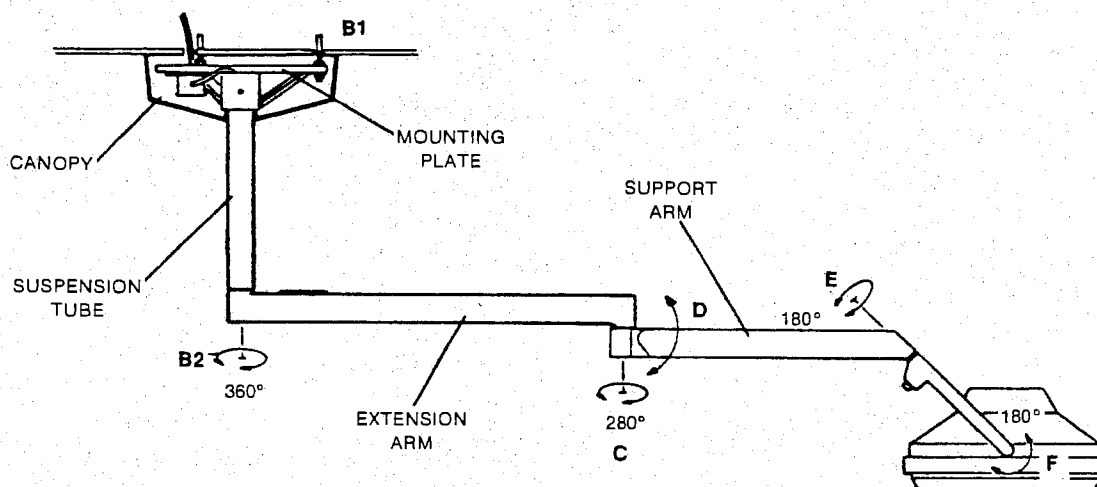


FIGURE 2-3. ROTATIONAL AND ANGULAR MOVEMENTS
Single Ceiling Model

B - Extension Arm Horizontal Drift
C - Support Arm Horizontal
Drift D - Support Arm Vertical
Drift E - Lamphead Rotational
Drift F - Lamphead Angular Drift

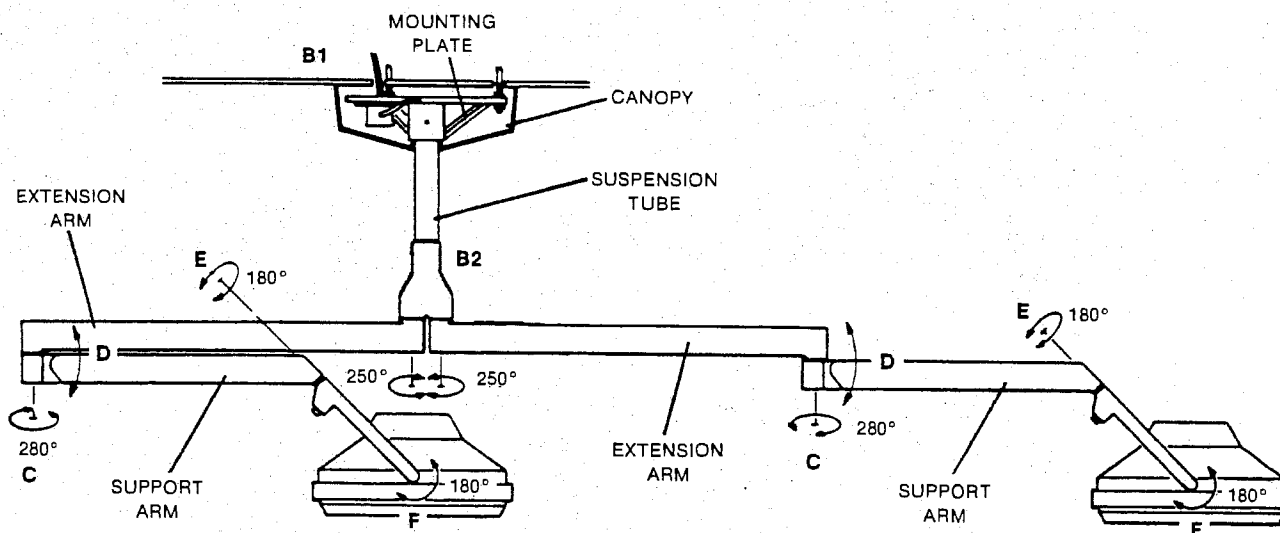


FIGURE 2-4. ROTATIONAL AND ANGULAR MOVEMENTS
Double Ceiling Model

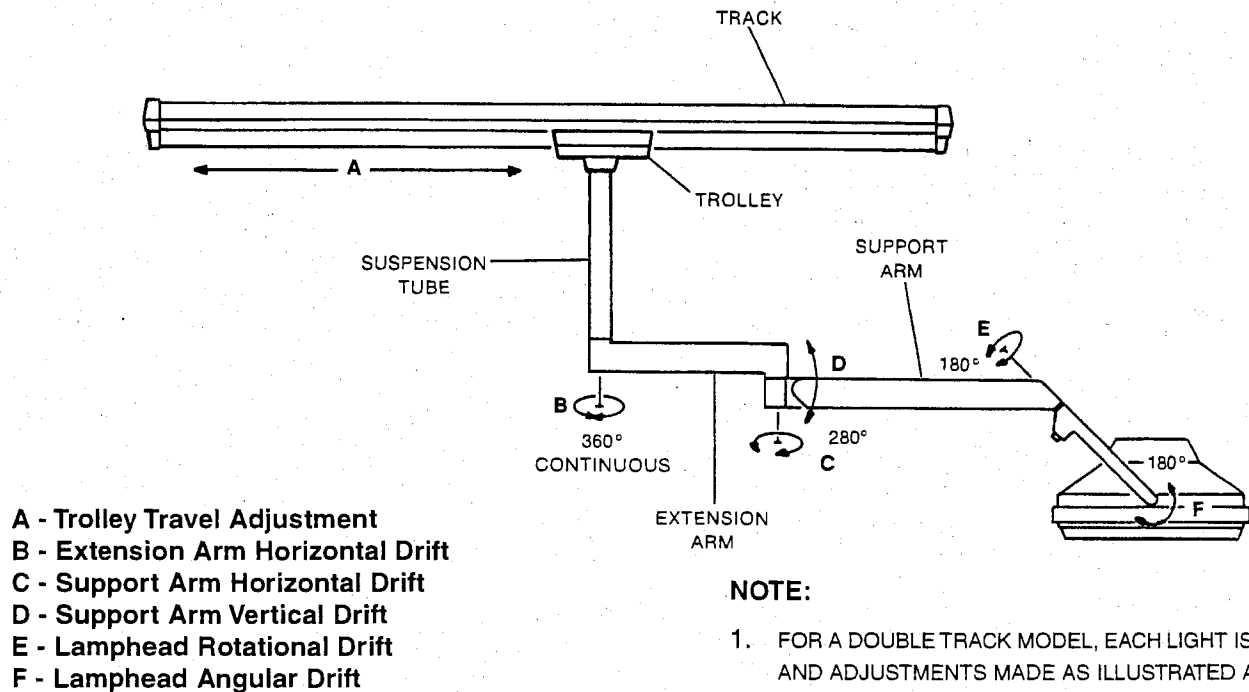


FIGURE 2-5. TRAVEL, ROTATIONAL AND ANGULAR MOVEMENTS
 Single or Double Track Model

TROLLEY ROLLER ADJUSTMENT- FIGURE 2-6
ADJUSTMENT A (TRACK MODELS)

Four roller adjustment screws are provided on the trolley assembly to regulate ease of movement along the track. The rollers are pre-adjusted at the factory, but may require a slight adjustment to eliminate any looseness or rocking of the trolley, or to restrict the trolley from coating (drift).



Disconnect or turn Off power source to the light before any checks or adjustments to avoid hazardous electrical contact.

Check

1. Move the trolley to the end stops and note the end which the trolley comes closest to.
2. With the trolley close to this end of the track, remove the end cap at this end and allow the cover to rest on the trolley.
3. Go to the other end of the track and while supporting the track cover, slide it carefully toward the trolley until it disengages from the end cap.
4. Lower the cover slightly and carefully slide the track cover out of the trolley and allow it to hang from the ground wire.
5. Check for plaster or dirt on the track surfaces and trolley wheels.
6. Verify that the coil cord ground wire is secured.
7. Verify that the track cover ground wire is secured to the track and the cover.
8. Verify that the trolley rides freely in the track and there is no misalignment due to distortion or twisting of the track.
9. Ensure that there is no tendency for trolley spring-back or drift with the coil cord fully extended and track cover in place.
10. Verify that the suspension tube is firmly secured to the trolley collar.
11. Verify that the coil cord wire terminals are correctly connected to the power or interconnecting cable wires. Verify that all wire nuts are in place and properly secured.

2400 SERIES SURGICAL LIGHTS

2. Service Installation Check

Adjustment

1. Use a 5/32" hex key.
2. Turn the adjustment screws clockwise to increase the pinch against the rollers. Adjust one screw at a time. Adjust until there is a slight to moderate drag. DO NOT OVER TIGHTEN.

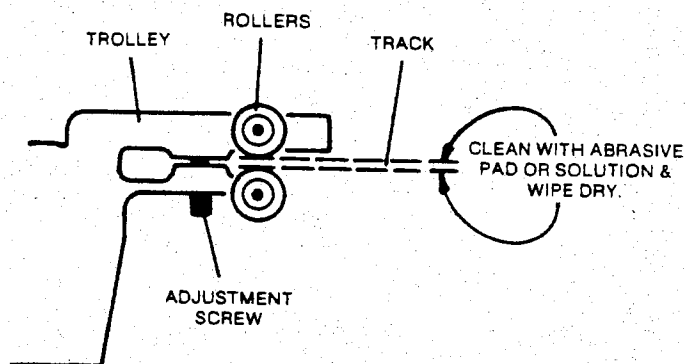


FIGURE 2-6. TROLLEY ROLLER ADJUSTMENT

3. Back off each adjustment screw 1/8 turn.
4. Check movement of trolley. The trolley should move easily without any drift when the coil cord is fully extended.
5. Correct track distortion by re-leveling the track. Refer to Adjustment B1.

EXTENSION ARM HORIZONTAL DRIFT - FIGURE 2-7 ADJUSTMENT B (WALL MODELS)

Correct extension arm drift in the horizontal plane by increasing friction on the wall pivot bearing post.

Check

1. Check that wall bracket top bearing surface is level. Level if required.
2. Rotate the extension arm. Check for drift at several locations through 180°.
3. If the extension arm drifts in either direction at any location, proceed with the adjustment.

Adjustment



Disconnect or turn OFF power source to the light before any checks or adjustments to avoid hazardous electrical contact.

1. Tighten friction adjustment setscrew until horizontal drift is eliminated at all locations of travel.

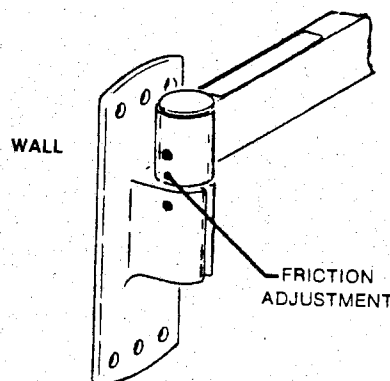


FIGURE 2-7. EXTENSION ARM FRICTION ADJUSTMENT

EXTENSION ARM HORIZONTAL DRIFT FIGURES 2-8 & 2-9

Adjustments B1 and B2 (Ceiling Models)



Double lamphead models have both extension arm pivots at a yoke which in turn is connected to a single suspension tube. Adjustments for each extension arm are the same as for a single lamphead model.

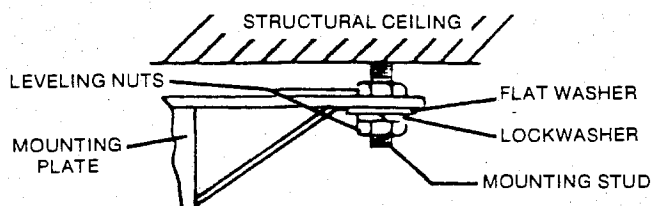
Check (Ceiling only)

1. Rotate the extension arm. Check for drift at several locations through 280°.
2. If the extension arm drifts to the same location of the 280° travel, make Adjustment B1 and B2.
3. If the extension arm drifts in either direction at any location, proceed to Adjustment B2.

Adjustment B1



Disconnect or turn OFF power source to the light before any checks or adjustments to avoid hazardous electrical contact.



1. Carefully slide canopy away from the ceiling.

FIGURE 2-8. PLUMB SUSPENSION TUBE

2. Plumb the suspension tube by adjustment of the mounting plate leveling nuts.
3. Raise mounting plate arm pointing in direction extension arm drifts toward. Lower opposite mounting plate arms if necessary.

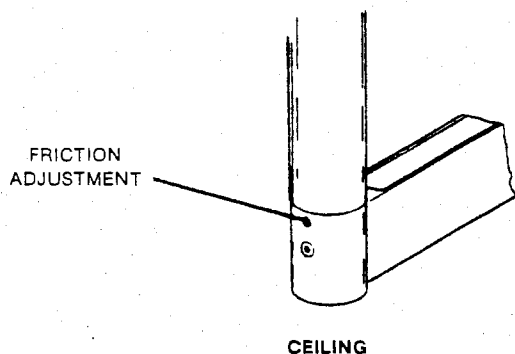


FIGURE 2-9. EXTENSION ARM FRICTION ADJUSTMENT

4. Check again for B1 type drift.
5. Tighten all leveling nuts.
6. Slide canopy flush with ceiling.

Adjustment B2

1. Tighten friction adjustment setscrew until horizontal drift is eliminated at all locations of travel.

Extension Arm Horizontal Drift-
Figures 2-10 thru 2-11

Adjustments B1 and B2 (Track Models)

Correct extension arm drift in the horizontal plane by leveling the track or by tightening the suspension tube friction adjustment.

Check

1. Extend the lighthead to its extreme horizontal position.
2. Rotate the lighthead about Axis B (Figure 2-5) and check for drift at several locations through 360°. The lighthead should remain at any point in the rotation.
3. If the lighthead drifts, make Adjustments B1 and B2.

Adjustment B1



Disconnect or turn OFF power source to the light before any checks or adjustments to avoid hazardous electrical contact.

1. Move the trolley to the end stops and note the end which the trolley comes closest to.
2. With the trolley close to this end of the track, remove the end cap at this end and allow the cover to rest on the trolley.
3. Go to the other end of the track and while supporting the track cover, slide it carefully toward the trolley until it disengages from the end cap.
4. Lower the cover slightly and carefully slide the track cover out of the trolley and allow it to hang from the ground wire.
5. Loosen jam nuts and mounting screws sufficient to allow rotation of leveling couplings. Adjust leveling couplings until track is level lengthwise and crosswise as illustrated. Check lengthwise under both sides and crosswise at each pair of mounting screws.

2400 SERIES SURGICAL LIGHTS

2. Service Installation Check

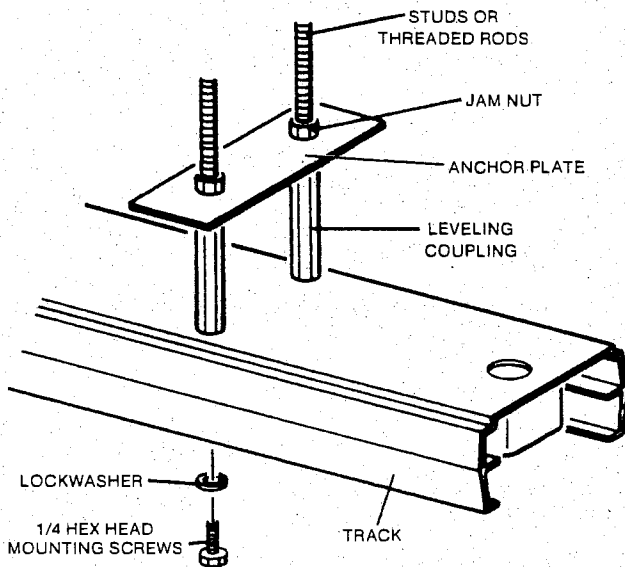


FIGURE 2-10. MOUNTING TRACK

6. Tighten jam nuts and 1/4" hex head screws. Recheck level.
7. Check again for drift.

For maximum ease of maneuverability, it is important to remove all drift by plumbing the system without adding friction.

8. Ensure that trolley stops are in place at both ends of the track.
9. Carefully replace track cover and end cap. Ensure that the cover ground wire is connected to the track and the cover.

Adjustment B2



Disconnect or turn OFF power source to the light before any checks or adjustments to avoid hazardous electrical contact

1. Tighten two suspension tube friction adjustments screws uniformly until drift is eliminated at all locations through 360° travel. DO NOT OVER TIGHTEN.

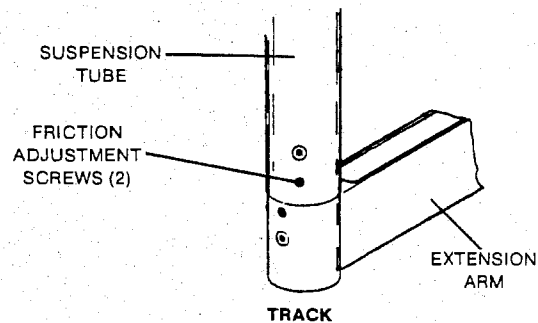


FIGURE 2-12. EXTENSION ARM FRICTION ADJUSTMENT

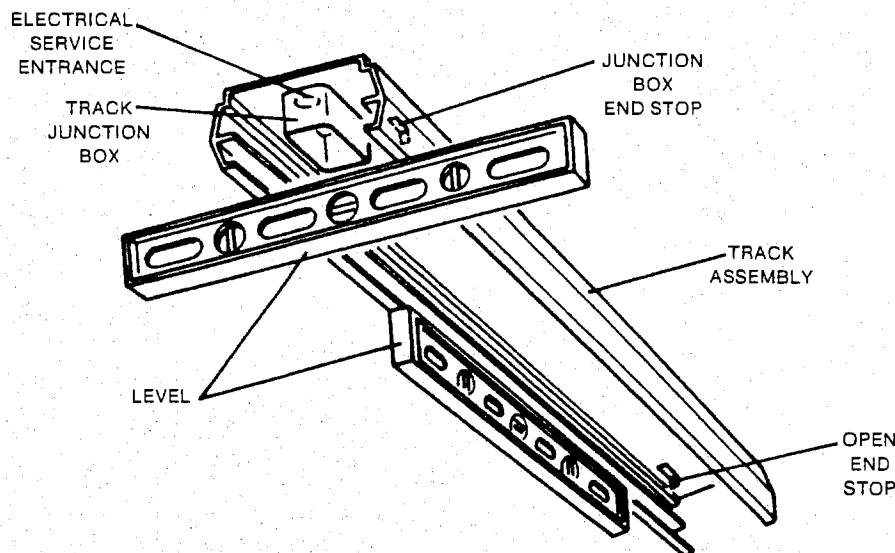


FIGURE 2-11. LEVELING TRACK

SUPPORT ARM HORIZONTAL DRIFT - FIGURE 2-13 ADJUSTMENT C

Check

1. Check Adjustment B before making this adjustment.
2. Rotate the support arm. Check for drift at several locations through 280°.

Adjustment



Disconnect or turn OFF power source to the light before any checks or adjustments to avoid hazardous electrical contact.

1. Tighten friction adjustment setscrew until horizontal drift is eliminated at all locations through 280° travel.

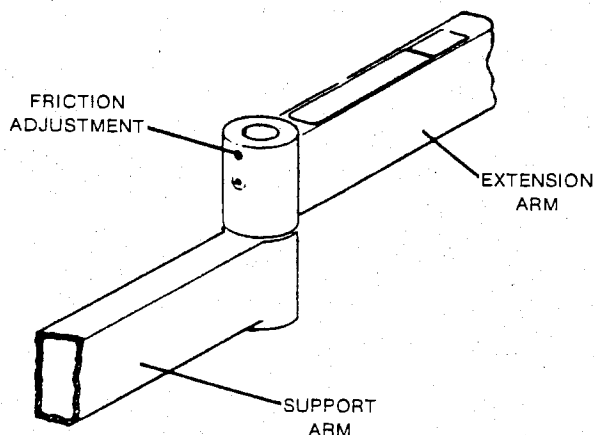


FIGURE 2-13. SUPPORT ARM FRICTION ADJUSTMENT



Adjustments D thru F should not be required on newly installed equipment. There should be free movement of the arm but no drift. Make the adjustment only if there is a definite rotational drift.

SUPPORT ARM VERTICAL DRIFT - FIGURE 2-14 ADJUSTMENT D

Correct lighthouse drift in the vertical plane by increasing tension on the support pivot spring washers.



Disconnect or turn OFF power source to the light before any checks or adjustments to avoid hazardous electrical contact.

Check

1. Move the support arm up and down using the integral handles.
2. Lighthouse should remain in position when the handle is released at any point in vertical travel.

Adjustment

1. Tighten friction adjustment screws equally until vertical drift is eliminated.

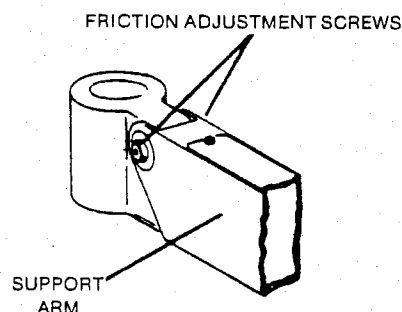


FIGURE 2-14. VERTICAL ADJUSTMENT

LIGHTHEAD ROTATIONAL DRIFT - FIGURE 2-15 ADJUSTMENT E

Correct lighthouse drift in the rotational plane by increasing tension on the yoke mounting spring washer.

Check

1. Rotate the lighthouse around the axis of the support arm.
2. Lighthouse should remain at any position when the integral handle is released.

Adjustment



Disconnect power to the light before making this adjustment to avoid hazardous electrical contact.

1. Remove the lighthouse switch cover.
2. Break loctite and remove lighthouse setscrew.

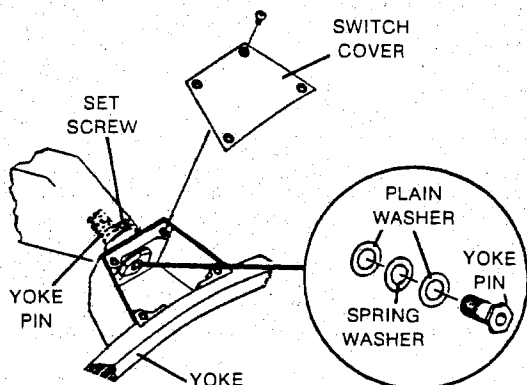


FIGURE 2-15. YOKE PIVOT ADJUSTMENT

3. Break loctite and back out yoke pin about 1/8 inch using an open end wrench.
4. Apply Loctite #222 and tighten yoke pin until rotational drift is eliminated.
5. Apply Loctite #222 and tighten lighthouse setscrews.
6. Check again for rotational drift.
7. Replace switch cover.

LIGHTHEAD ANGULAR DRIFT - FIGURE 2-16 ADJUSTMENT F

Correct lighthouse drift in the angular plane by increasing tension on the yoke pivot spring washer.

Check

1. Rotate the lighthouse about its axis.
2. Lighthouse should remain in position when the integral handle is released.

Adjustment



Disconnect or turn OFF power source to the light before any checks or adjustments to avoid hazardous electrical contact.

1. Remove the lighthouse cover. Adjustment is made on the right hand pivot.
2. Tighten locknut until angular drift is just eliminated.
3. Again check for angular drift.
4. Replace cover.

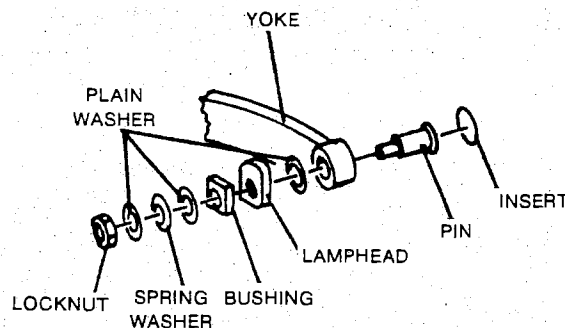


FIGURE 2-16. LAMP PIVOT ADJUSTMENT

LIGHT PERFORMANCE CHECK

Performance checks are required to ensure correct operation of the light. These checks and any necessary adjustments should be done by authorized service personnel. Refer to the Repair section of this manual for any service corrections.

OPTICAL SAFETY CHECK

1. Remove lens cover.
2. Ensure that shipping material has been removed from around blue/green heat filter.
3. Check that heat filter is in place and that three spring wires are in place.
4. Check that reflector is dichroic coated.
5. Replace lens cover.

CHECK ON/OFF SWITCH

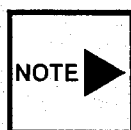
Check

Move lighthouse through maximum travel at both pivots using integral handles. Observe that the light does not flicker or go out. Check for positive action of the switch.

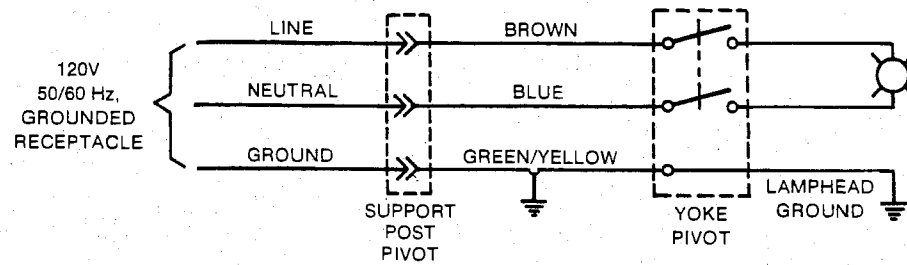
Service Correction

1. Ensure that all lighthouse wires are firmly attached to flat terminals and that terminals are secure.
2. Replace ON/OFF switch if required.

OPTICAL PERFORMANCE CHECK

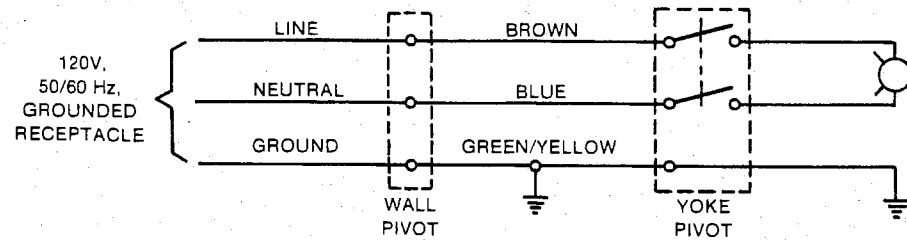


The light should have a 5-1/2 to 7 inch diameter light pattern at 35 inches below the outer edge of the lens cover. The illumination should be 1900 to 5000 foot-candles at 120V measured at the center of the pattern.



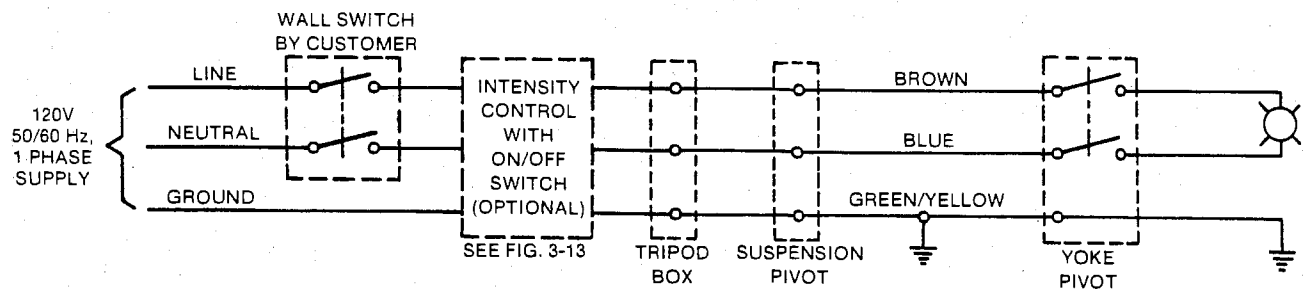
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Figure 3-1. 120V FLOOR MODEL WIRING
(Model 2410F, 2410M, 2411F, 2411M)



REF. M0266D

Figure 3-2. 120V WALL MODEL WIRING
(Model 2410W, 2411W)

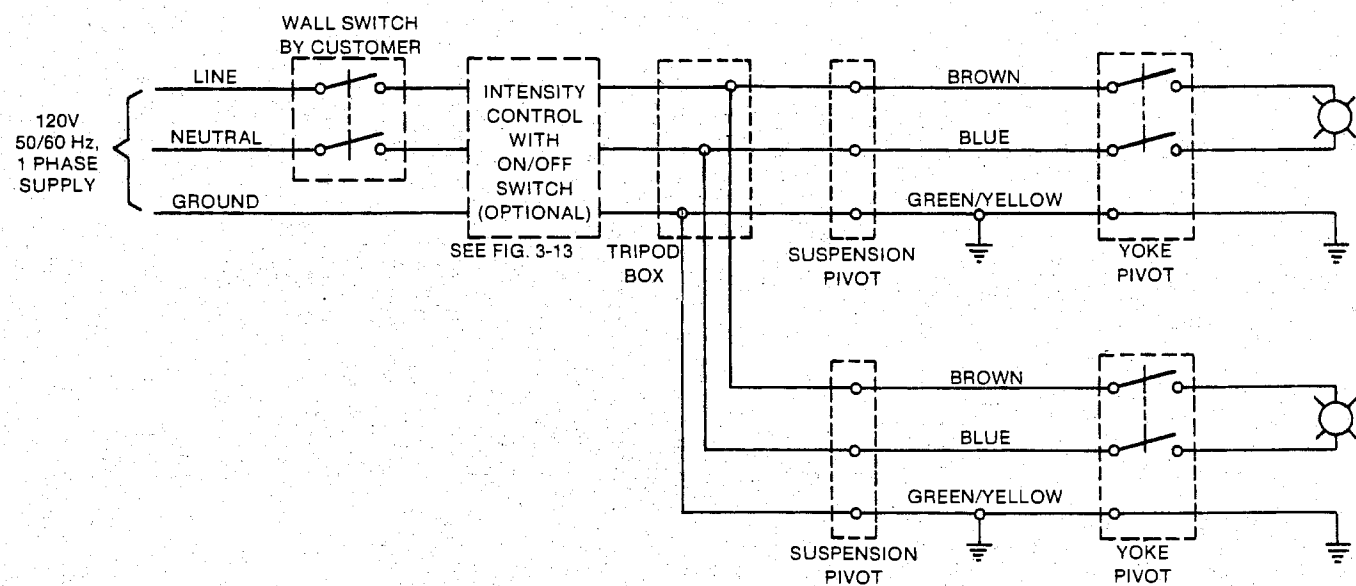


REF. M0267F

Figure 3-3. 120V SINGLE LIGHTHEAD CEILING MODEL WIRING
(Model 2410C, 2411C)

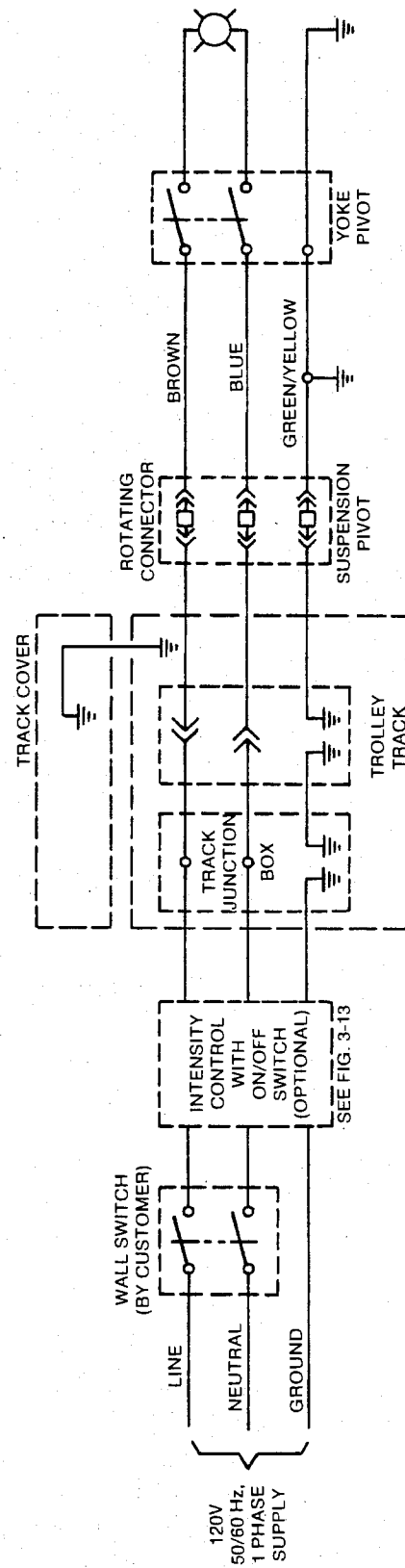
2400 SERIES SURGICAL LIGHTS

3. Wiring Diagram — 120V Models



REF. M0263G

Figure 3-4. 120V DOUBLE LIGHTHEAD CEILING MODEL WIRING



REF. M0307

FIGURE 3-5. 120V SINGLE TRACK MODEL WIRING
(Model 2410T, 2411T)

3. Wiring Diagrams — 120V Models

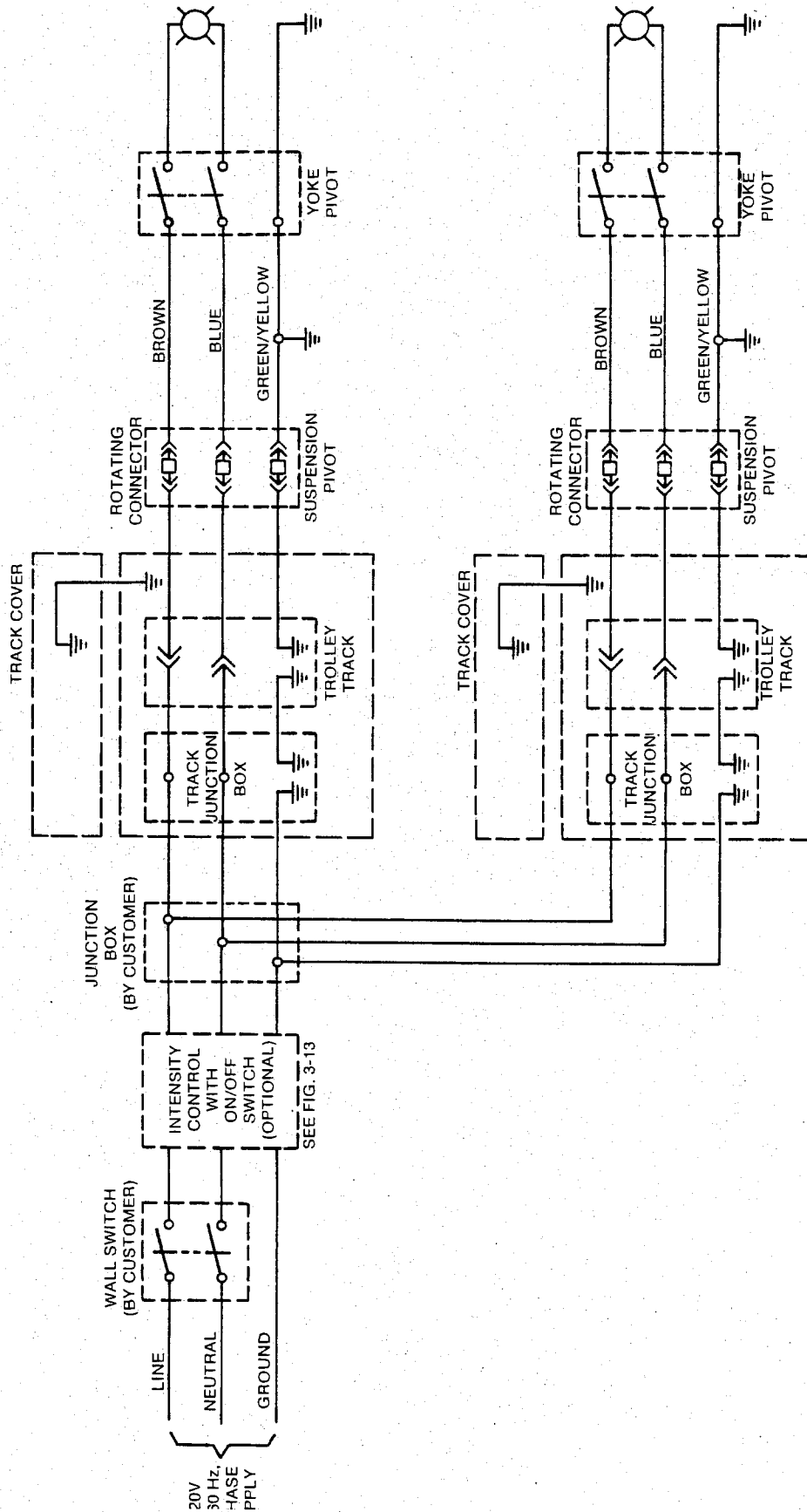
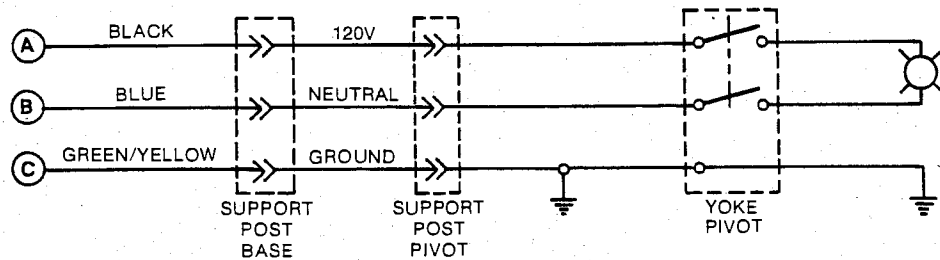
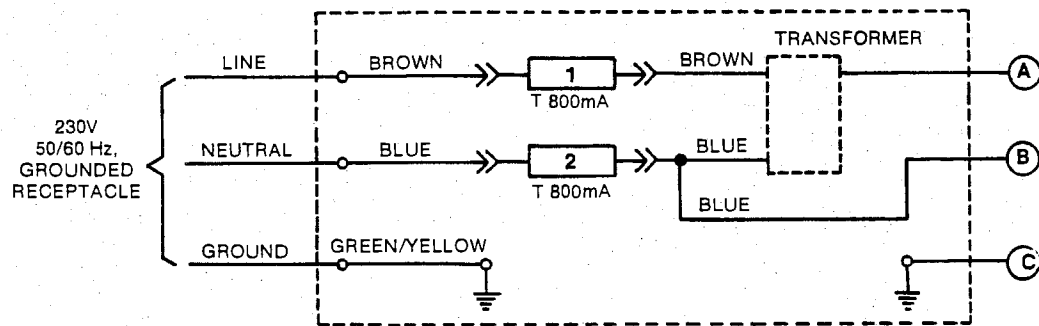
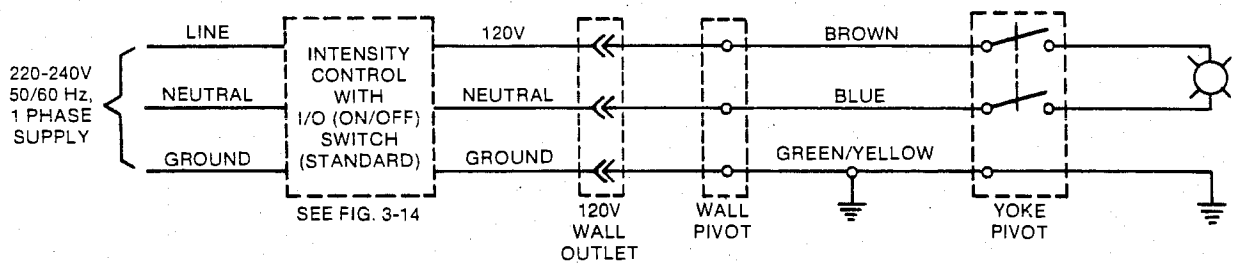


FIGURE 3-6. 120V DOUBLE TRACK MODEL WIRING
(Model 2420T, 2421T)



REF. 65709G

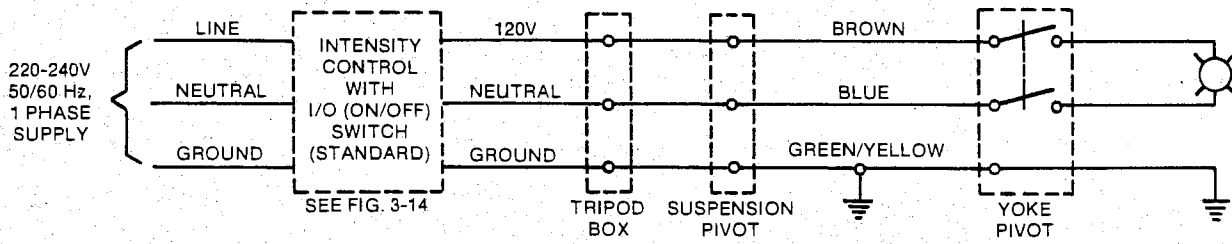
Figure 3-7. 230V FLOOR MODEL WIRING
(Model 2412F, 2412M)



REF. M0266D

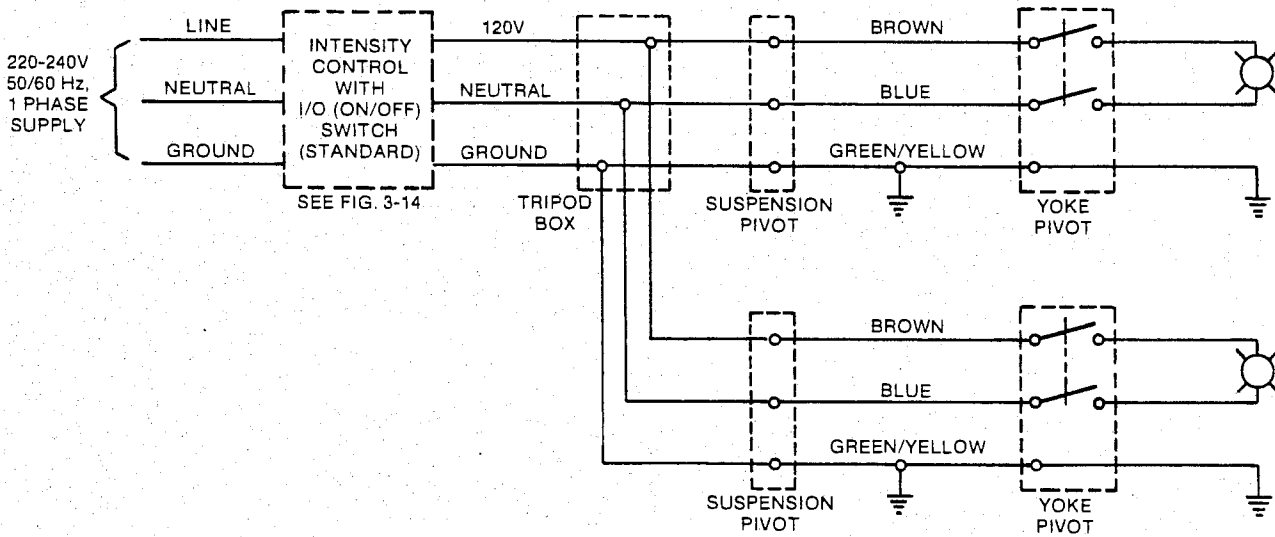
Figure 3-8. 230V WALL MODEL WIRING
(Model 2412W)

3. Wiring Diagrams — 230V Models



REF. M0267F

Figure 3-9. 230V SINGLE LIGHTHEAD CEILING MODEL WIRING
(Model 2412C)



REF. M0263G

Figure 3-10. 230V DOUBLE LIGHTHEAD CEILING MODEL WIRING
(Model 2422C)

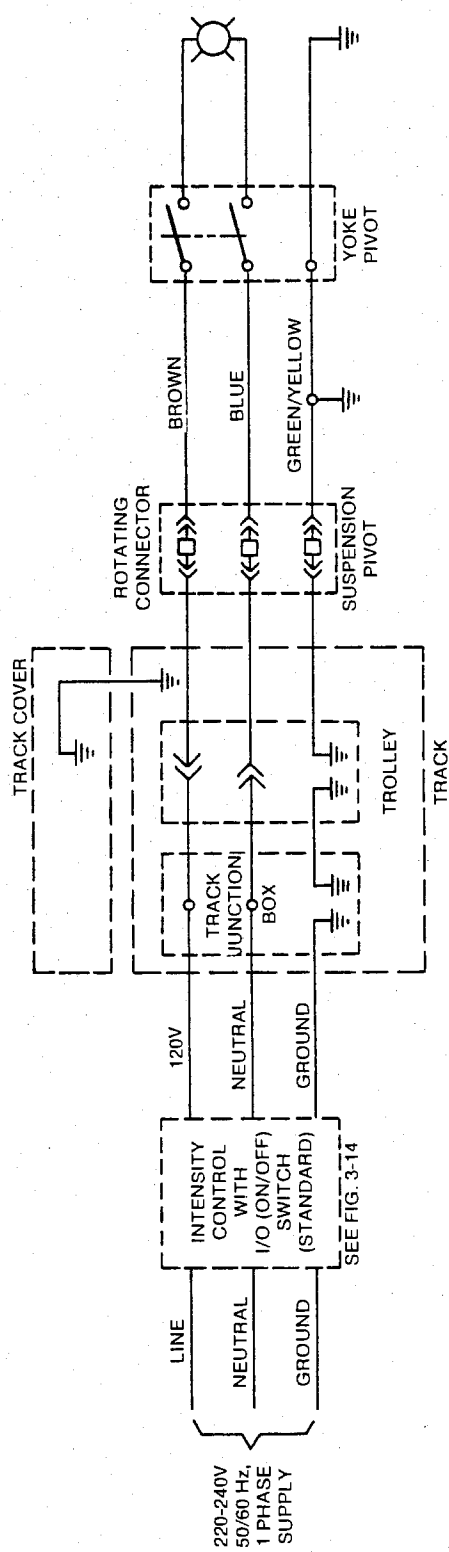


FIGURE 3-11. 230V SINGLE TRACK MODEL WIRING
(Model 2412T)

2400 SERIES SURGICAL LIGHTS

3. Wiring Diagrams — 230V Models

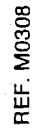


FIGURE 3-6. 120V DOUBLE TRACK MODEL WIRING
(Model 2420T, 2421T)

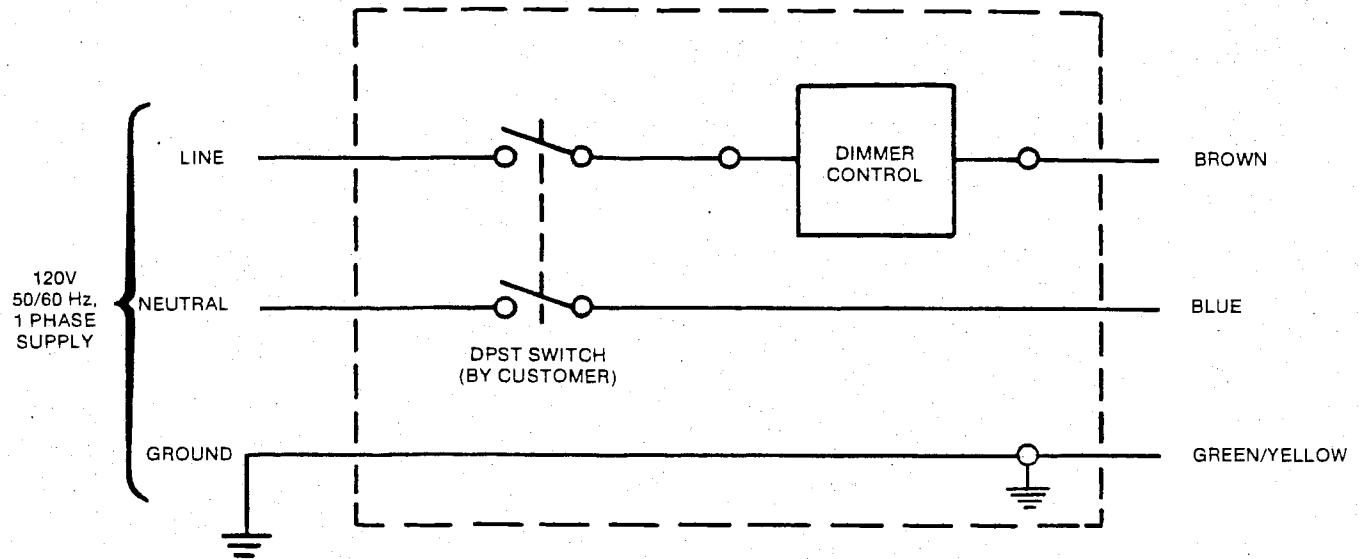


Figure 3-13. OPTIONAL 120V INTENSITY CONTROL WIRING

2400 SERIES SURGICAL LIGHTS

3. Wiring Diagrams — 230V Intensity Control

COMPONENTS:
 TB1 & TB2 TERMINAL BLOCK
 F1 & F2 FUSE 1.6 AMPS
 1SW SWITCH, ON/OFF
 2SW SWITCH, SELECTOR
 ITR TRANSFORMER

WIRE COLORS:
 ORG ORANGE
 YEL YELLOW
 BLK BLACK
 BL BLUE
 VLT VIOLET
 BRN BROWN
 RD RED

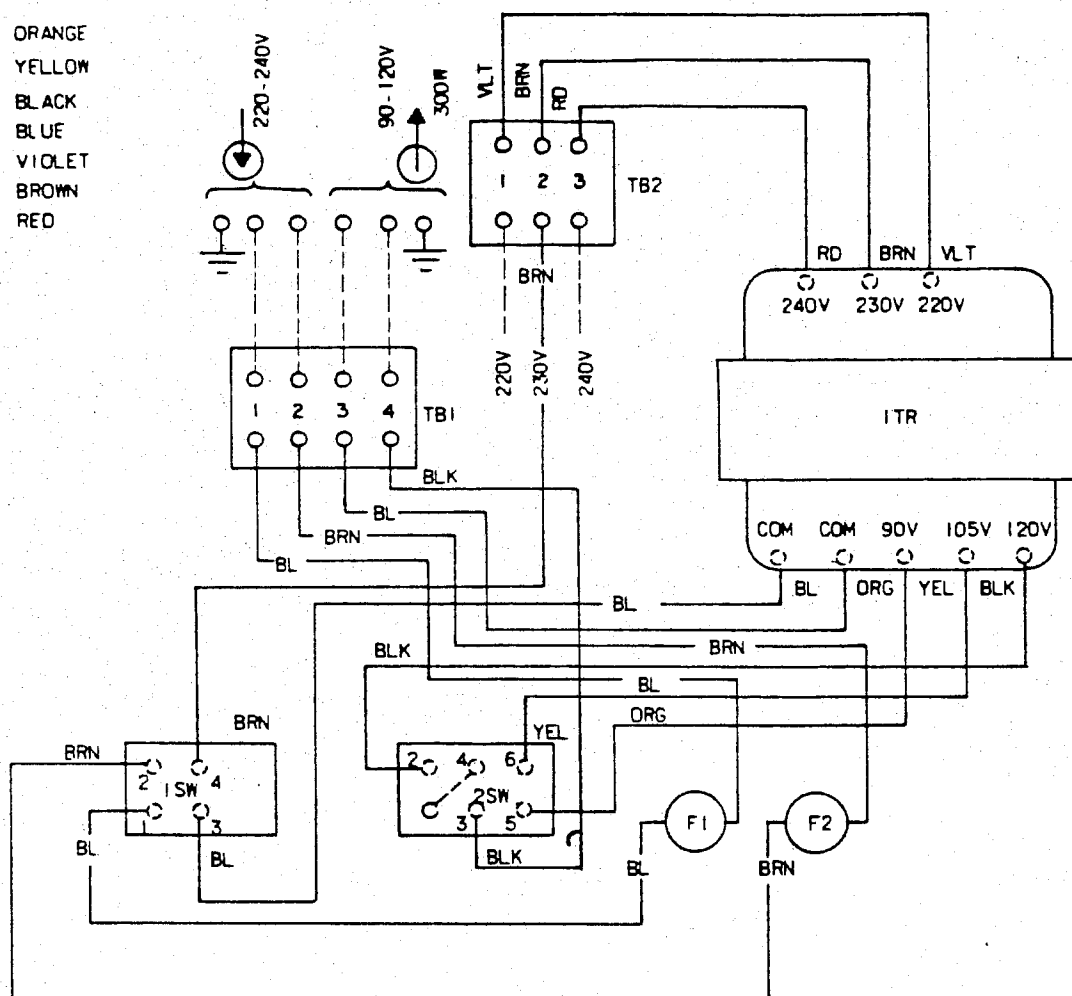


FIGURE 3-14. 230V INTENSITY CONTROL WIRING



Disconnect or turn OFF power source to the light before any maintenance to avoid hazardous electrical contact. Allow a 15 minute cool-off period to avoid touching hot lighthouse parts.

CLEANING EXTERIOR SURFACES

Use mild cleaning agents that will not damage painted, plated, or plastic surfaces.

CLEANING OPTICAL SURFACES



Optical surfaces; lens, heat filter and reflector should be handled with extreme care. Clean only when required due to dust or smudges.

1. Loosen thumb screws and lower the lens cover. The cover will be suspended by a retaining strap.

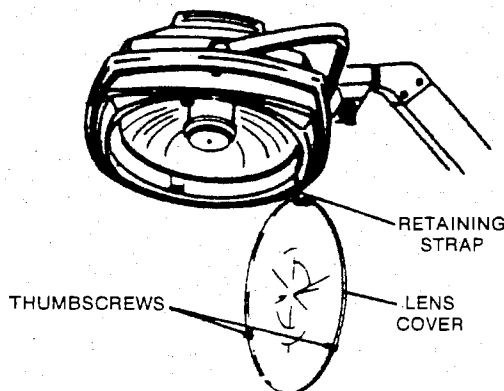


FIGURE 4-1. LOWERING LENS COVER

2. Gently clean inside of reflector with damp cotton. The cotton will conform to the contour of the reflector. Clean in direction of flutes. Wipe dry with a fresh piece of cotton.



Do not use acid solutions, including chlorinated cleaners. Do not use any scrubbing or abrasive action to avoid damage to the reflector surface.

The water should be deionized or distilled.

3. Clean the outside of the blue/green heat filter in the same manner.

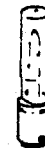
4. Clean the inside and outside of the lens using a lint-free cloth.
5. Secure the lens.



The blue/green heat filter and the lens cover must be in place to prevent ultra-violet and infrared rays from reaching the patient or operator.

REPLACEMENT LAMPS

150 Watt, Quartz Halogen
Double Contact Bayonet Base



150W
PART NO.
49455

FIGURE 4-2. REPLACEMENT LAMP

REPLACING LAMPS



Disconnect or turn OFF power source to the light or intensity control before any maintenance to avoid hazardous electrical contact. Allow a 15 minute cool-off period to avoid touching hot lighthouse parts.

1. Disconnect or turn OFF power source.
2. Loosen lens cover thumb screws. The lens cover will hang from a retaining strap.
3. Rotate the lighthouse to face the operator at a little above eye level.
4. Hold the baffle firmly and unhook the three spring wires from the baffle.
5. Remove the heat filter/baffle assembly. Avoid touching the blue/green glass.
6. Press down and turn the lamp counter clockwise to remove.



Read handling note printed on wrapper of new lamp.

Skin oils will damage and shorten life of the lamp. If accidentally touched, wipe lamp with alcohol or distilled water.

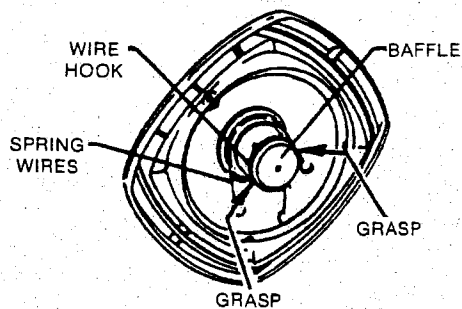


FIGURE 4-3. REMOVING HEAT FILTER

7. Hold new lamp by wrapper and insert in socket. Press down and turn clockwise to insert.
8. Clean inside and outside of the blue/green heat filter with cotton dampened with deionized or distilled water. Wipe dry with a clean cotton.
9. Replace filter/baffle assembly in upper recessed area. Attach spring wires and lens cover.



The blue/green heat filter and lens cover must be in place to prevent ultra-violet and infrared rays from reaching the patient or operator.

REPLACING HEAT FILTER



Disconnect or turn OFF power source to the light or intensity control before any maintenance to avoid hazardous electrical contact. Allow a 15 minute cool-off period to avoid touching hot lighthouse parts.

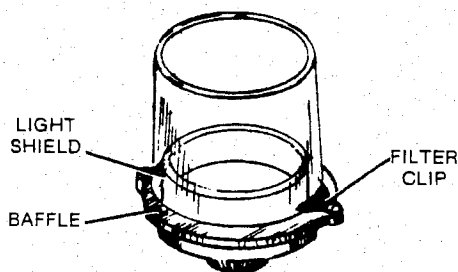


FIGURE 4-4. REPLACING HEAT FILTER

1. Loosen the lens cover and unhook the three heat filter spring wires.
2. Remove the filter/baffle assembly for bench work.
3. Remove filter clips and replace filter. The heat filter will fit around the light shield.



The heat filter is cone shaped. The larger diameter positions into the baffle assembly.

4. Replace the filter clips. Tighten screws until clips are snug. Do not over tighten.
5. Clean the inside and outside of the blue/green heat filter with cotton dampened with distilled or deionized water. Wipe dry with clean cotton.
6. Replace heat filter assembly, spring wires and lens cover.



Ensure that the heat filter is positioned in the recessed area of the baffle.



The blue/green heat filter and the lens cover must be in place to prevent unfiltered rays from reaching the operator or patient.

REPLACING FUSES (230V FLOOR MODEL ONLY)



Unplug the light before replacing fuses to avoid electrical shock.

A transformer box, containing the fuses, is located on the base of the light.

1. Remove two screws and lift the cover from the transformer box.
2. Use 800mA, 250 volt fuses, Part No. 55918.

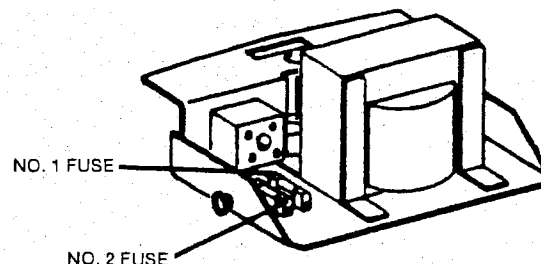


FIGURE 4-5. REPLACING FUSES (230V Floor Model)

REPLACING FUSES (230V WALL, CEILING AND TRACK MODELS)



Disconnect or turn OFF power to the Intensity Control before replacing fuses to prevent electrical shock.

1. Refer to Section 6 for removing Control Box Cover.
2. Use 1.6 Amp, 250 volt fuses, Part No. 67202.

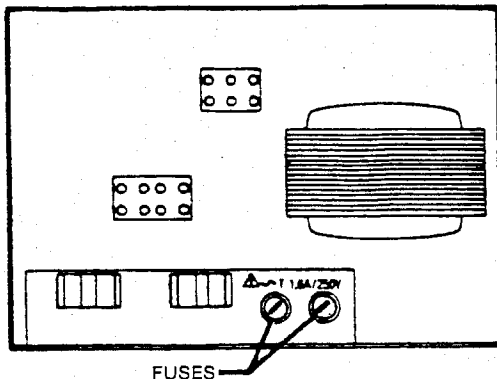


FIGURE 4-6. FUSE REPLACEMENT
(230V Wall, Ceiling and Track Models)

TRACK INSPECTION AND CLEANING



Disconnect power source before cleaning to avoid injury from contact with electrical circuits.

Ensure that all surfaces are dry before reassembling to avoid electrical shock hazard.

This procedure should only be done by trained maintenance personnel.

Inspect and clean the interior of each track every three months. Remove dust, wear particles or foreign material.

If cleaning is required, the interior of the track and cover surfaces may be carefully wiped with a soft cloth dampened with an antiseptic solution. The trolley, roller groove and roller guide groove should be wiped with a clean dry cloth. Carefully remove any foreign material from the rollers.

Verify that the trolley end stops are secured in place.

WIRING DIAGRAMS

The Wiring Diagrams are located in Section 3 of this manual. Use these diagrams in conjunction with the Trouble Analysis Guide.



Several of these checks are made with the power ON. Only trained service personnel should make these tests.

TROUBLE ANALYSIS GUIDE — ELECTRICAL AND OPTICAL

TROUBLE	PROBABLE CAUSE	REMEDY
ON/OFF Switch ON, Light out.	No power to light.	Check power cord or power source.
	Light out.	Replace lamp.
	Fuses blown (230V).	Replace fuses.
	Defective wiring.	Check wiring at: 1. Lighthead. 2. Lighthead connection box. 3. Extension arm connection or support post disconnect. 4. Mounting plate junction box (Ceiling). 5. Rotating connector, trolley and coil cord (Track Light). Correct defective wiring.
	Defective transformer (230V).	1. Check transformer connections. 2. Replace procedure.
Low light Intensity	Dirty lens or reflectors.	Clean or replace. Refer to Section 4 for suggested procedure.
	Damaged reflectors or lens	Replace defective part.
	Lamp defective.	Replace lamp.
	Power input low (120V).	Ensure full 120 V supply voltage.
	Improper Intensity Control input tap selected (210V).	Select proper input tap.
Intermittent illumination when pivoting arms.	Loose wire connections, frayed, or broken wires.	Check wiring for continuity.
	Defective lamp.	Replace lamp.
	Defective rotating connector	Replace rotating connector.
Irregular intensity increase to 120V light equipped with optional intensity control.	Defective intensity controller.	Repair or replace.
	Defective interconnecting wiring.	Check each line for continuity between intensity control and tripod junction box.
On 230V Models, I/O Switch at I, no power to light.	Defective line I/O switch.	Replace switch.
Irregular or no intensity increase to 230V light	Defective intensity position switch.	Replace switch.
Blue or cyanotic appearance to flesh.	Dichroic deterioration. High color temperature.	Check reflector and replace if defective

NOTE

Before making any friction adjustment, check the level of the mounting.

TROUBLE ANALYSIS GUIDE — MECHANICAL

TROUBLE	PROBABLE CAUSE	REMEDY
Trolley rubs on cover.	End caps not snug or square on track.	Remove end cap and reassemble.
	Cover not level.	Shim end caps.
	End caps cracked or cover warped.	Replace end caps and cover, if required.
Trolley binds in track	Dirt or foreign material on track.	Clean tracks and rollers
	Trolley roller adjustment screws too tight.	Refer to Adjustment A, Section 2.
	Track warped or bent.	Replace track.
Trolley drift or spring-back	Trolley rollers out of adjustment	Adjust trolley rollers, Adjustment A.
Horizontal drift in extension arm.	On ceiling and track models, suspension tube not plumb.	On ceiling models, adjust tripod leveling nuts, Adjustment B1.
		On track models, adjust track level and alignment, Adjustment B 1.
	On wall, ceiling and track models models, extension arm friction plug loose on bearing post.	On wall and ceiling models, adjust friction on extension arm bearing post, Adjustment B2.
		On track models, carefully increase pressure on bearing assembly friction ring. Adjustment B2.
Horizontal drift in support arm.	Support arm friction plug loose on bearing post.	Adjust friction on support arm bearing post. Adjustment C.
Vertical drift in support arm.	1. Support arm pivot out of adjustment.	1. Adjust tension on support arm washers. Adjustment D.
	2. Defective gas spring.	2. Replace gas spring.
Lighthouse drifts in rotational plane.	Yoke mounting pivot out of adjustment.	Adjust tension on yoke mounting spring washer, Adjustment E.
Lighthouse drifts in angular plane.	Yoke pivot out of adjustment.	Adjust tension on yoke pivot spring washer, Adjustment F.



Disconnect or turn OFF power source to the light or intensity control before any maintenance or service work to avoid hazardous electrical contact. Allow a 15 minute cool-off period to avoid touching hot lighthouse parts.

On these ceiling models, power must be turned OFF at the intensity controls.

After any service work, the blue/green heat filter and the lens cover must be re-installed in place to prevent ultra violet and infrared rays from reaching the patient or operator.

REMOVING LIGHTHEAD COVER

Loosen four screws and remove the lighthouse cover from the lighthouse housing. To replace cover, rotate housing away from yoke.

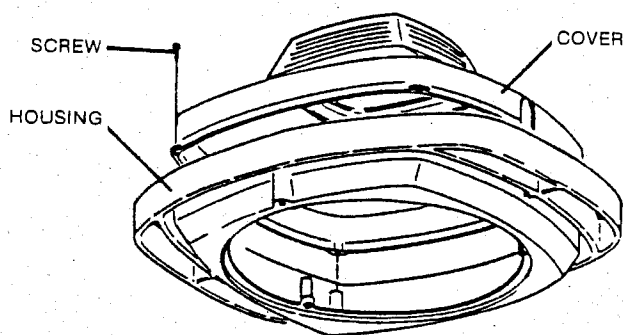


FIGURE 6-1. REMOVING LIGHTHEAD COVER

REPLACING ON/OFF SWITCH

Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

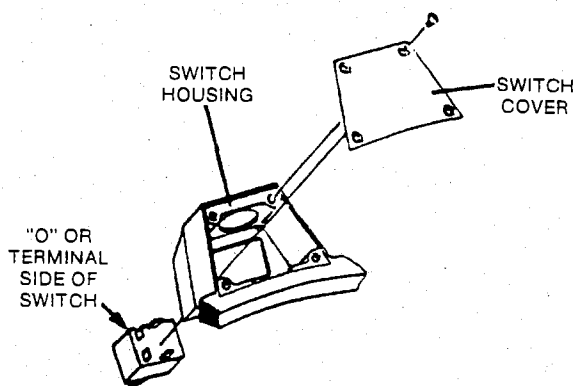
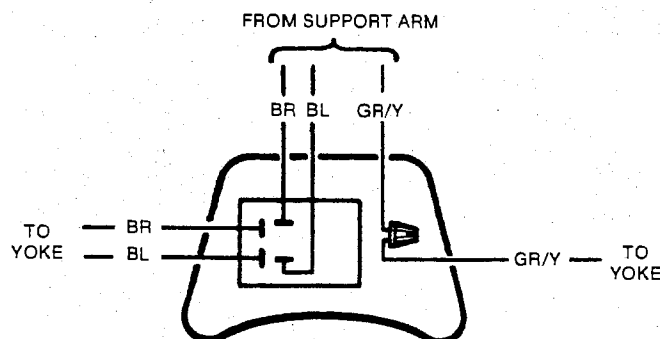


FIGURE 6-2. ON/OFF SWITCH ORIENTATION

1. Observe the switch orientation. Refer to Figure 6-2.
2. Remove switch cover. Disconnect and prevent ends of blue and brown wires from retracting into arm or yoke.



NOTE: WIRE COLORS RE SUCK AND WHITE ON SOME LIGHTS.

FIGURE 6-3. LIGHTHEAD CONNECTIONS

3. Press down on terminal surface of switch to remove from housing.
4. Install new switch in housing with terminals and OFF indication toward left.
5. Rewire switch and check for correct operation.
6. Replace switch cover.

REMOVING LIGHTHEAD/YOKE ASSEMBLY



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Remove the lighthouse switch cover.



Secure wires from lighthouse and from support arm to avoid wire ends slipping into castings.

2. Disconnect ground wire nut.
3. Disconnect line and neutral wires from ON/OFF switch.
4. Break loctite and loosen lighthouse setscrew.

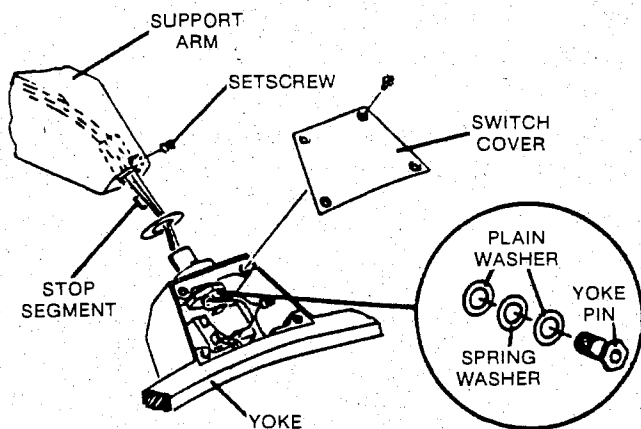


FIGURE 6-4. REMOVING LIGHTHEAD/YOKE



The support arm will spring upward when lighthead is removed. Secure arm to prevent pivot movement.

5. Remove yoke pin and stop segment. Separate lighthead from support arm.
6. Cut flag terminals from support arm wires at yoke.



Stop segment must be in place to prevent over rotation of yoke and light-head.

7. Replace lighthead in reverse order of removal. Refer to Figure 6-4 for placement of spring washer. Apply Loctite #222 and tighten yoke pin until rotation drift is eliminated.
8. Refer to Adjustment E in Section 2 to correct any lighthead rotational drift.
9. Crimp on new flag terminals to support arm wires (Part No. 65199). Connect line (brown) and neutral (blue) wires to ON/OFF switch. Refer to Figure 6-3.
10. Connect ground wires with wire nut and secure with tape.
11. Check lighthead for correct operation and rotation.

REPLACING LAMP CONTACT



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

Use Repair Package 67501 for this procedure. Package consists of the contact with wiring, retaining ring, two flat terminals and sleeving.

1. Remove lens, heat filter, back cover, lamp and switch plate.
2. Disconnect ground wire from heat dissipation plate.
3. Remove cable clamp from heat dissipation plate.
4. Disconnect lighthead wires from ON/OFF toggle switch. Cut flag terminals from wires.
5. Lift gasket from yoke to expose contact wires. Lift wires from yoke.

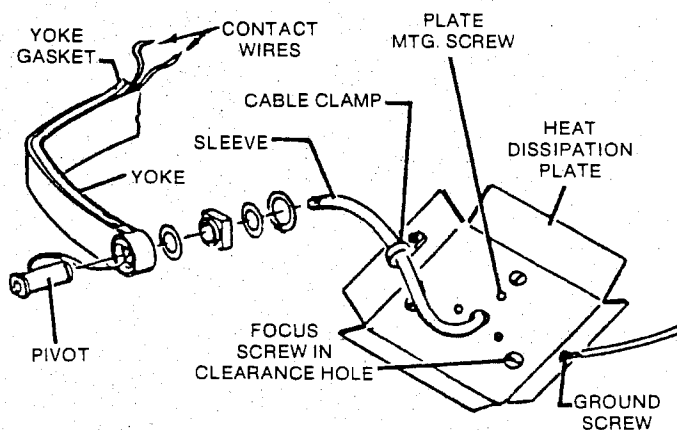


FIGURE 6-5. LAMP CONTACT WIRING

6. Remove three plate mounting screws and guide heat dissipation plate along the sleeve. Do not move or adjust focus screws at this time.
7. Insert a small screwdriver blade between the external teeth of the contact retaining ring to pry it loose from the finned heat sink. The retaining ring will be destroyed.

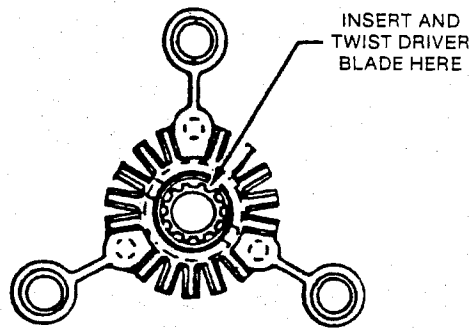


FIGURE 6-6. DISLODGING RETAINING RING

8. Attach a fish wire to the cut ends of the contact wires and tape. Pull old wires through pivot and sleeve.



Correct lamp contact orientation must be made. Observe that there are four internal slots in the finned heat sink. Use only the narrow slots for the lamp contact.

9. Install new contact into finned heat sink casting. Guide socket lugs into narrow slots, 90° apart.
10. Thread leads thru spring and new retaining ring.
11. Use a screwdriver blade to install new retaining ring. Ring must be seated against bottom of casting.
 - Check spring tension on lamp contact.
 - Check lamp fit and orientation of contacts before reassembling.
12. Guide new contact wires through sleeve and pivot.



Check that wire insulation is not frayed or torn.

13. Align wires along yoke gasket groove and into switch cavity. Lay wires into groove one at a time.
14. Form gasket into groove to the correct length.

15. Refer to Figure 6-3. Crimp new flag terminals onto wires and connect to ON/OFF switch.
16. Reconnect ground wire securely. Reassemble cable clamp. Replace heat plate and lamp.



The line and neutral wires must be contained in the sleeve and the sleeve in place to maintain integrity of codes and regulatory commission mandates.

17. Turn ON power and check operation of light and switch.
18. Turn OFF power to light.
19. Replace all lighthouse parts in reverse order.

REPLACING REFLECTOR



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact. Allow a 15 minute cool off period to avoid touching hot lighthouse parts.

1. Remove lens, lighthouse cover and heat sink. Refer to this section for these procedures.

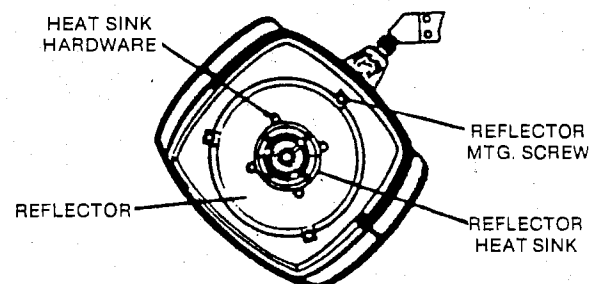


FIGURE 6-7. REPLACING REFLECTOR

2. Remove ground wire from heat plate.
3. Remove four screws, nuts and washers to lift reflector heat sink assembly from the reflector.
4. Remove three screws and lift old reflector from housing.
5. Install new reflector and reassemble lighthouse in reverse order of disassembly. Refer to Figure 6-8 for orientation of components.

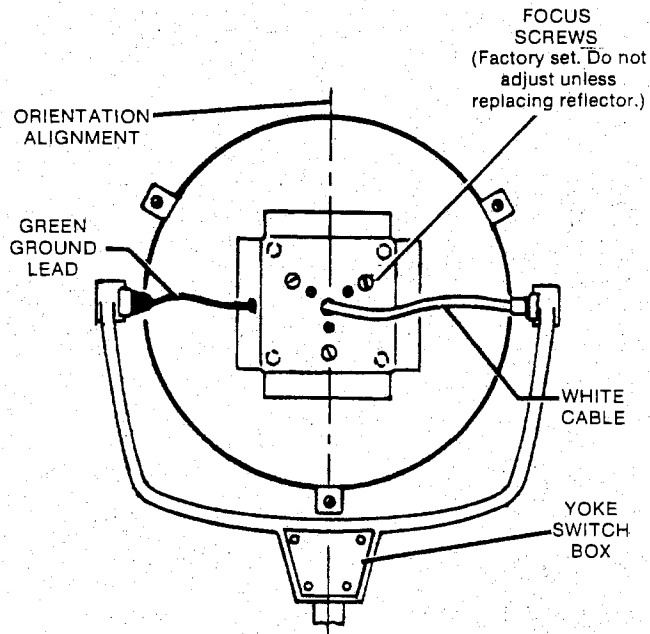


FIGURE 6-8. REFLECTOR ORIENTATION

LAMP FOCUS

Lamp focus is factory set, but can be adjusted if required. Position lighthead 36" from and parallel to the illuminated surface. Adjust focus screws to achieve maximum illumination consistent with a uniform, round pattern.

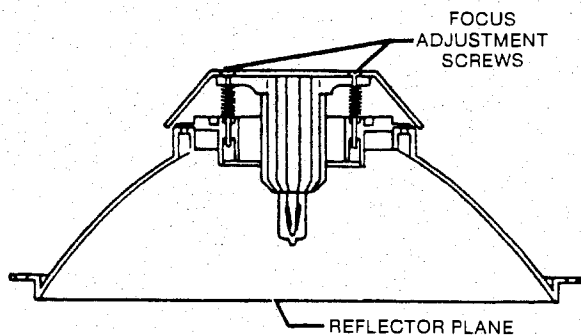


FIGURE 6-9. LAMP FOCUS (NEW REFLECTOR)

REPLACING LIGHT CORD (WALL MODELS)



Unplug the light to avoid hazardous electrical contact.

1. Unplug power cord.
2. Remove the setscrew in the side of the wall bracket.

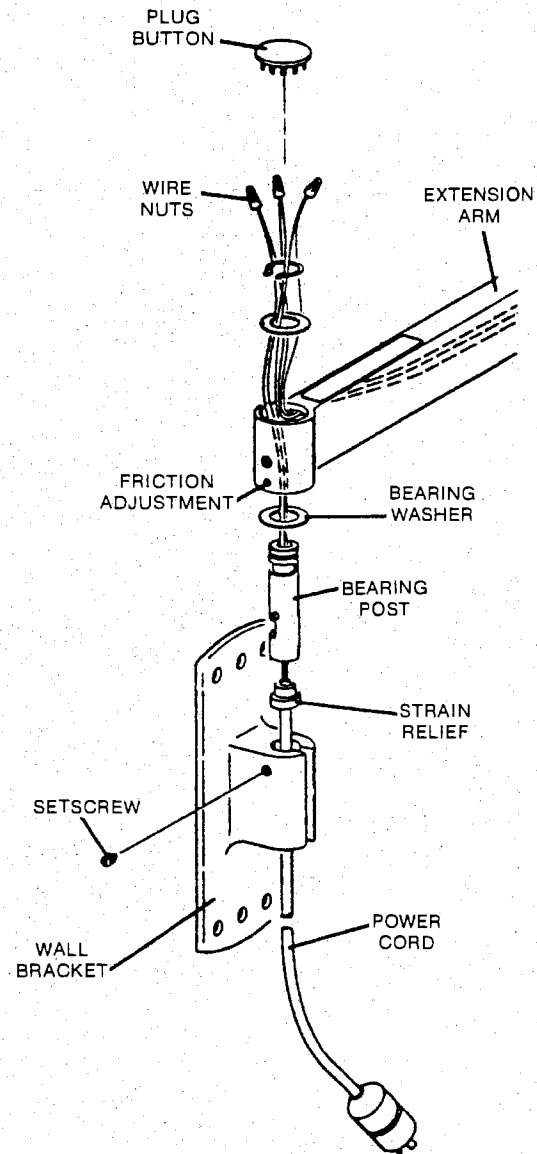


FIGURE 6-10. WALL MOUNTING

3. Remove light for bench work.
4. Remove the plug button and pull the wire connections from the cavity in the extension arm.
5. Remove old cord from light.
6. Guide the new power cord through the bearing washer and bearing post to the top of the extension arm.
7. Connect like color wires. Tape wire nuts.

8. Coil connected wires and snug them into the cavity in the extension arm. Replace the plug button.
9. Insert the light arm bearing post into the wall bracket. Do not lose the bearing washer. Swing extension arm to seat bearing post.
10. Align the setscrew hole with the pre-drilled alignment hole in the bearing post.
11. Assemble the setscrew through the wall bracket and into the bearing post. This will align the stop screw.
12. Check arm rotation. If arm rotates 180° the stop is oriented correctly.
13. Refer to Adjustment B2 in Section 2 to correct any Extension Arm Horizontal Drift.

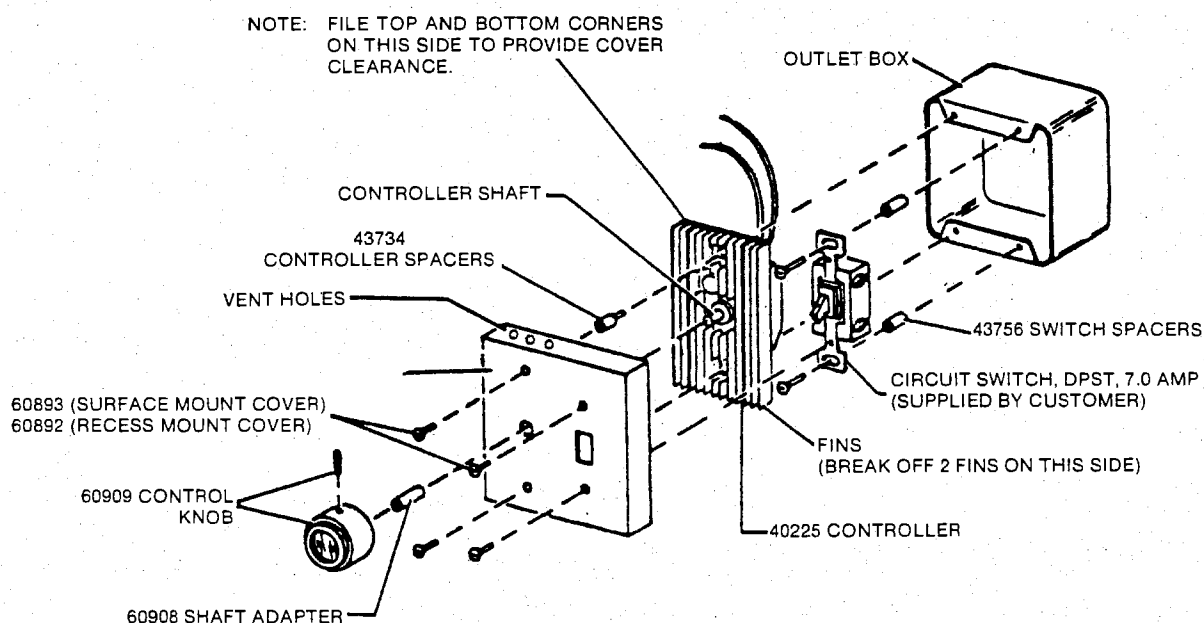


FIGURE 6-11. 120V OPTIONAL INTENSITY CONTROL

120V OPTIONAL INTENSITY CONTROL

Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

If the light does not respond when the intensity control is operated, check the lighting system in the following sequence:

1. Check that the lighthead ON/OFF switch is ON.
2. Check that the electrical supply circuit to the Intensity Control is energized.
3. Check with a 120V test light or AC voltmeter for proper voltage through the toggle switch and the dimmer control.
4. Rotate the control shaft to the extreme positions. A continuous smooth intensity response should be obtained.
5. Replace the toggle switch or the dimmer control if they malfunction.
6. If replaced, assemble the toggle switch to the right side of the outlet box with the switch spacers.
7. To assemble a new controller:
 - Break off two fins on the right side taking care not to crack plastic switch housing.
 - File top and bottom corners on the left side.
 - Assemble controller to the outlet box with spacers.
8. Position the cover with the vent holes over the controller.
9. Assemble shaft adapter to knob with two setscrews. Push knob and adapter onto controller shaft.

REMOVING 230V INTENSITY CONTROL COVER



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Turn OFF power to the Intensity Control.
2. Remove the two screws from the top and two from the bottom that secure the trim strip and cover to the control box.
3. Take off the trim strip and then carefully remove the cover.

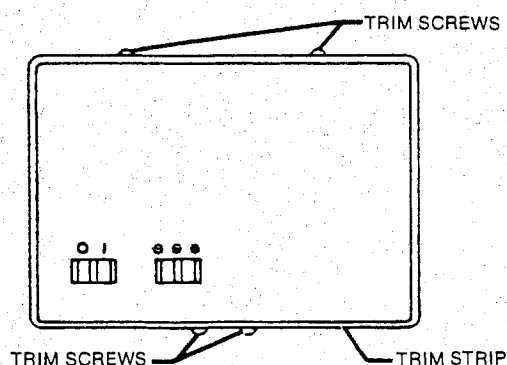


FIGURE 6-12. CONTROL BOX COVER

REPLACING I/O SWITCH, 230V



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Remove the cover and trim strip.
2. Disconnect four switch wires.
3. Remove switch and spacers from fuse bracket.
4. Assemble new switch using existing spacers.
5. Reconnect two brown and two blue wires.

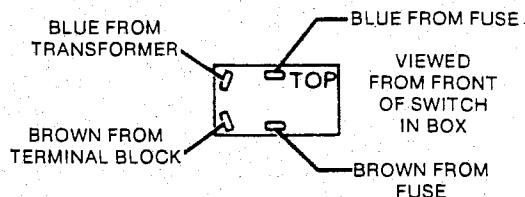


FIGURE 6-13. I/O (ON/OFF) SWITCH WIRING

REPLACING INTENSITY SWITCH, 230V



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Remove the cover and trim strip.
2. Disconnect four switch wires.
3. Remove switch and spacers from fuse bracket.
4. Assemble new switch using existing spacers.
5. Reconnect orange, yellow and two black wires.

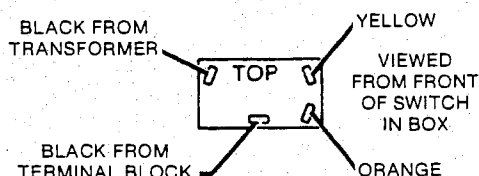


FIGURE 6-14. INTENSITY SWITCH WIRING, 230V

REPLACING TRANSFORMER, 230V



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Remove cover and trim strip from the Intensity Control. Refer to this section for procedure.
2. Disconnect eight transformer wires.
3. Remove four screws and replace transformer.
4. Connect eight transformer wires. Refer to wiring diagram.
5. Replace control box cover and trim strip.

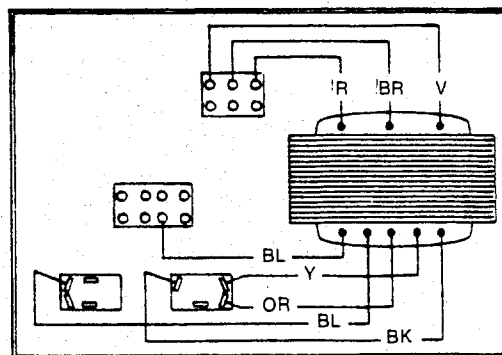


Figure 6-15. TRANSFORMER WIRING, 230V

REMOVING SUPPORT ARM



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Remove the stop screw and back off friction plug setscrew.
2. Refer to Figure 6-18. Disconnect and remove wiring from extension arm.
3. Remove the bearing post retaining ring to lower the support arm from the extension arm.
4. Wipe bearing post clean and apply a thin coat of grease.
5. Reassemble the arms in reverse order of disassembly.

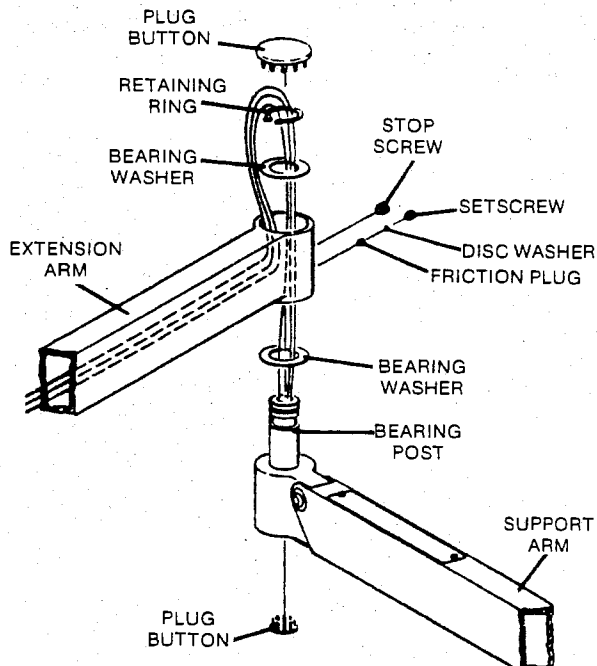


FIGURE 6-16. REMOVING SUPPORT ARM

6. Use retaining ring pliers to insert the retaining ring into the groove in the bearing post.
7. Use a screwdriver blade to ensure that the retaining ring is seated and secure in the post groove.



A loose or unseated retaining ring could cause the stop screw to loosen and allow the support arm to disengage.

8. Refer to Adjustment C in Section 2 to correct any Support Arm Horizontal Drift.

REPLACING GAS SPRING



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Secure the lighthouse and support arm in the up position.
2. Remove the upper and lower access covers.
3. Remove the C-Washer from the cylinder mounting pin.
4. Gently joggle the support arm upward to remove the mounting pin. The end of the gas spring will move into the upper recess area.
5. Snug the electrical wires to the side of and under the gas spring.
6. Guide the gas spring through the upper access opening as the support arm is slowly lowered.
7. Note that one end of the groove pin is smaller. Drive groove pin out from the smaller end.
8. Lift the old gas spring out of the arm.



If the old spring is equipped with a low limit stop normally used on ceiling models, follow Steps 9, 10 and 11.

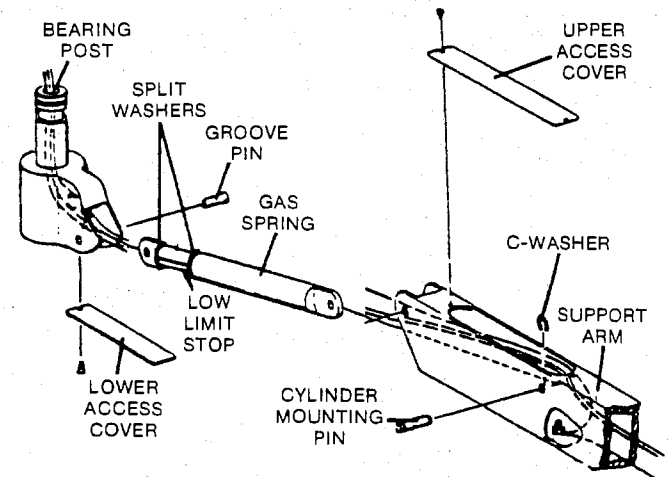


FIGURE 6-17. REPLACING GAS CYLINDER

9. Cut and remove the black electrical tape wrapped around the stop halves.
10. Remove and install the split washers on the new spring. Crimp split ends.

2400 SERIES SURGICAL LIGHTS

6. Repair

11. Install the stop halves on the new spring with their edges 90° to the gas spring blade. Bind the stop halves with tape.
12. Place the new spring into the arm with the rod or stop end toward the bearing post and with the end lugs vertical.
13. Guide the groove pin through the arm and the spring with the electrical wires over the pin. Rotate the flutes on the groove pin to form new grooves in the housing. Drive the pin flush with the surface of the housing.



To prevent the motion of the spring from cutting the wires, route two of the three wires through one slot of the knuckle, and the third wire through the other slot of the knuckle.

As an additional precaution, ty-wrap the three wires together both within the knuckle and again 3 inches toward the lighthouse.

14. Raise the lighthouse until the spring mounting shoulder pin can be installed. Install the pin below the three electrical wires. Add C-Washer to retain pin.
15. Replace the upper and lower access covers.
16. Refer to Adjustment D in Section 2 to correct any Support Arm Vertical Drift.

WIRING EXTENSION/SUPPORT ARMS

Use 50 inch lengths of wires. Use #18 AWG for brown and blue wires, and #16 AWG for green/yellow wire.

1. For Floor Model:

Remove support arm from the support post for bench work. Disconnect multi-pin connection.

For Wall, Ceiling and Track Models:

Remove extension arm for bench work. Refer to that procedure in this manual.

2. Remove gas spring from the support arm. Refer to "Replacing Gas Spring", Steps 1 thru 8, in this manual.
3. Disconnect ground wires in the support arm.
4. Remove ON/OFF switch plate and all plug buttons.
5. Disconnect flag terminals on brown and blue wires from support arm. Cut off terminals. Remove wire nut from green/yellow ground wires.

6. Attach a fish wire to all three support arm wires in the switch compartment. Pull old wires and fish wire out the upper access area. Secure fish wire and cut wires from it. Remove and save fiberglass tubing.
7. Cut ring terminal off green/with yellow ground wires.
8. Attach a separate fish wire to each wire. Guide and pull each wire out of Hub A. Secure each fish wire and cut wires from them.

For Floor Model, Proceed to installations of new wires.

9. Attach a fish wire to all three wires at Hub B. Pull and guide the wires out of Hub A. Secure fish wire and cut wires. Remove and save fiberglass tubing.

For Track Model, remove rotating connector and cut off terminals before attaching fish wire.

Install new wires and fiberglass tubing as follows:

1. Install short piece of fiberglass tubing over the three replacement wires. Tape tubing in place with four inches of each wire protruding.
2. Attach wires at the tubing end to the single fish wire coming from the ON/OFF switch compartment, at the upper access area. Pull and guide the fish wire and wires until taped end of fiberglass tubing becomes visible in the ON/OFF compartment.
3. Cut the three new wires 2-1/2 inches beyond their entrance into the ON/OFF switch compartment.
4. Strip brown and blue wires and crimp a flag terminal on each (Part No. 65199). Connect to ON/OFF switch. Refer to Figure 6-3.
5. Strip green/yellow ground wire. Secure to mating wire from lighthouse yoke with wire nut and tape.
6. Cut the green/yellow wire at a point so that it protrudes 1-1/2 inches from the upper access area. Strip both ends of the cut wire and crimp with ground ring terminals (Part No. B0167).
7. Secure ring terminals to support arm ground connection with hex nut.
8. At the upper access area, attach a fish wire to each wire. Pull and guide each wire from the upper access area to Hub A. Remove each fish wire.

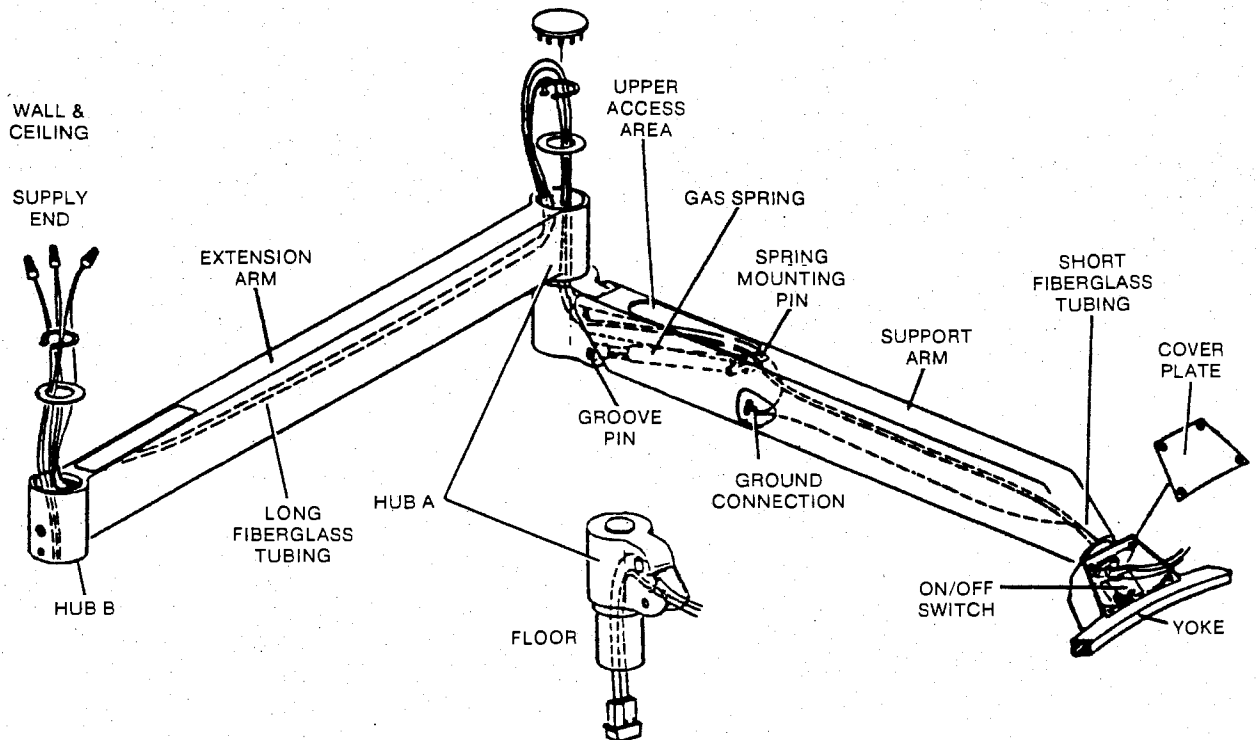


FIGURE 6-18. EXTENSION/SUPPORT ARM WIRING

For Floor Model, proceed to Step 11.

9. Install long piece of fiberglass tubing over the three replacement wires. Push tubing over wires and into Hub A approximately two inches. Tape other end of wires to secure tubing.
10. Attach the fish wire at Hub A to the three wires. Pull and guide wires to Hub B.
11. Cut and strip the three wires so they protrude two inches up from Hub B.

For Floor Model wires, protrude down from Hub A.

12. Replace gas spring per instructions in this manual, Steps 12 thru 16.
13. **For Wall, Ceiling and Track Models:**
Install extension arm per instructions in this manual.
14. Replace ON/OFF switch cover plate and all plug buttons.

15. For Floor Models:

Install pins in wire connector (refer to removed assembly for proper wire color/pin location). Reconnect multi-pin connectors. Assemble support arm to support post.

For Track Models:

Add terminals to new wires. Crimp per UL Standard No. 486.

- Brown or blue wire:
0.110 Female Slip-On Terminal, Part No. 68499.
- Green/yellow wire:
1/4 Female Slip-On Terminal, Part No. 68504.

Connect terminals to rotating connector and reassemble bearing post.

- Brown wire to center terminal.
- Green/yellow wire to large terminal.
- Blue wire to remaining terminal.

REMOVING EXTENSION ARM (CEILING MODELS)

Single Arm



Disconnect or turn OFF power source to the track before repair procedure to avoid hazardous electrical contact.

The extension arm cable has about two inches extra length to permit ease of assembly and service. The excess is tucked into the cavity in the extension arm. If the excess loop is pulled or caught during service work, the terminals may come loose at the rotating connector. Use this procedure to reconnect these terminals.

1. Elevate the lighthead to its highest position.
2. Remove plug button.
3. Remove two suspension tube friction adjustment screws.
4. Support the extension arm and loosen three lighthead assembly mounting screws. Lower the extension arm just enough to disengage it from the suspension tube.
5. Disconnect the suspension tube wire terminals from the rotating connector.
6. Lower the extension arm and lighthead assembly to a work area.

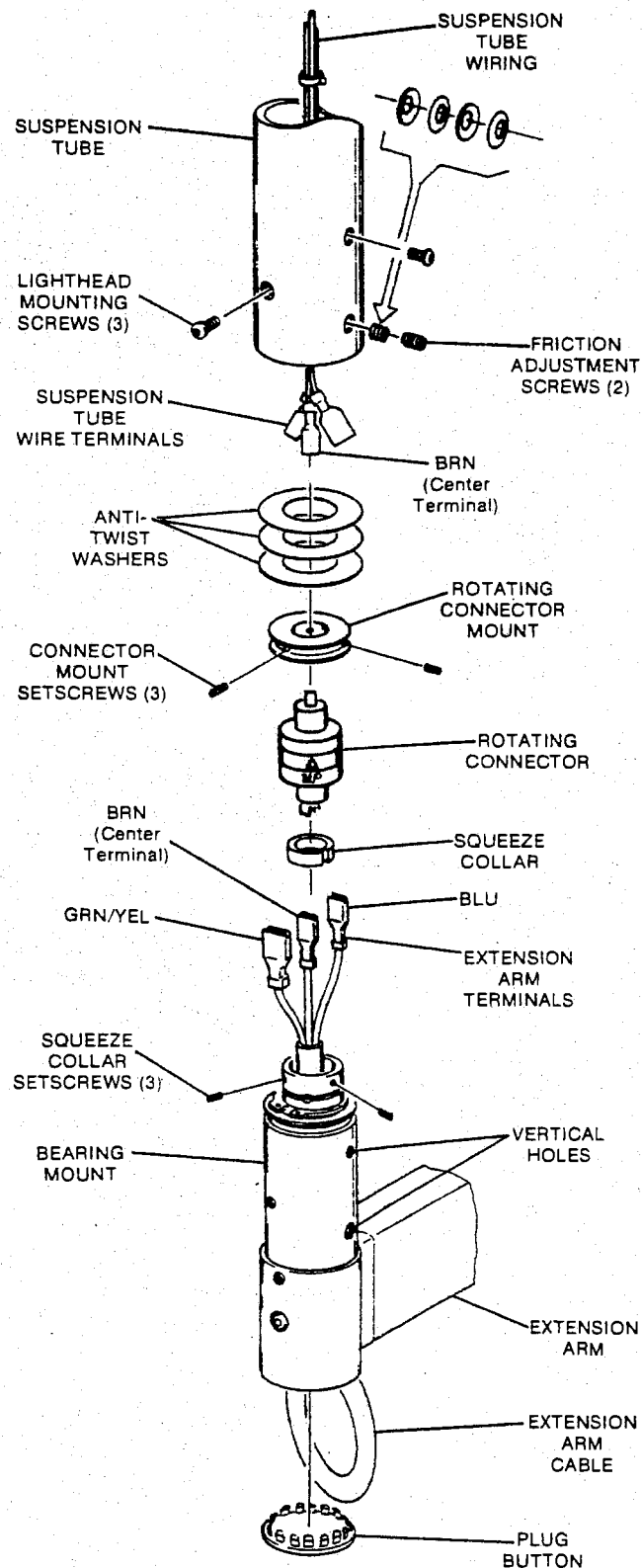


Figure 6-19.
RECONNECTING EXTENSION ARM CABLE

Double Arm



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Remove plug button.
2. Disconnect wire nuts.
3. Loosen stop screw.
4. Loosen friction adjustment setscrew.
5. Support the extension arm. Remove the bearing post retaining ring and lower bearing washer. Lower the extension arm from the suspension tube.
6. Retain upper bearing washer.

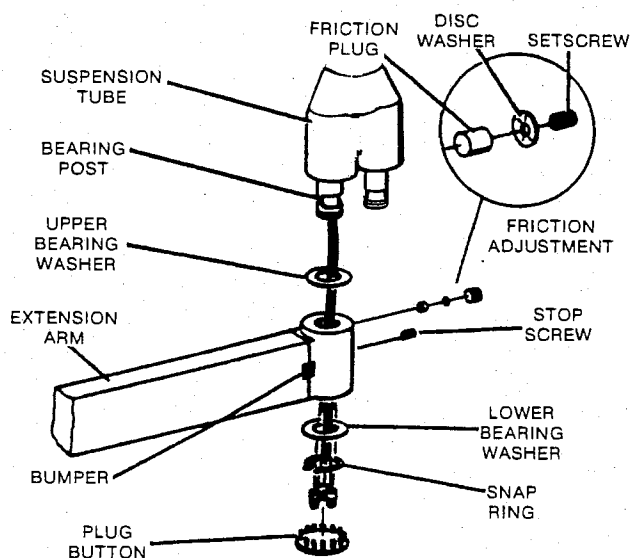


Figure 6-20.
REMOVING EXTENSION ARM

INSTALLING EXTENSION ARM (Ceiling Models)

Single Arm

The extension arm cable has about two inches extra length to permit ease of assembly. The excess is tucked into the cavity in the extension arm. If the excess loop is pulled or caught during installation, the terminals may come loose at the rotating connector. Use steps 1 through 6 to reconnect. Start at step 7 for installation.

1. Remove plug button.
2. Loosen three squeeze collar setscrews.
3. Reconnect the extension arm terminals to the rotating connector. Connect terminals as illustrated.
4. Tuck the excess cable into the extension arm cavity.
5. Position rotating connector in bearing post. Ensure that squeeze collar is in position around the base of the connector.
6. Tighten the three squeeze collar setscrews. Use Loctite #222.
7. Align the holes on the bearing mount with the mating holes in the suspension tube.
8. With the extension arm and lighthead on your shoulder, connect the suspension tube wires to the upper rotating connector terminals. Connect terminals as illustrated.
9. Form the suspension tube wires so that they will push up into the suspension tube.
10. Use Loctite #222 on the lighthead assembly mounting screws.
11. Lift the bearing assembly into the support tube. With the extension arm resting on your shoulder, fine align the light assembly mounting screws with an allen wrench or similar tool. Do not mar or damage threads.

Continued ...

6. Repair

12. Start the three lighthead assembly mounting screws into the suspension tube and the bearing mount. Do not tighten screws until all three are aligned and engaged. Then, tighten screws securely.



The flexible anti-twist washers create an interference fit with the inside diameter of the suspension tube. Ensure that these washers are aligned and even.

13. Assemble and start the two suspension tube friction adjustment setscrews and their associated spring washers. Position the spring washers as illustrated.



Do not over tighten setscrews and then back off. Approach adjustment slowly. Over tightening will flatten and destroy the usefulness of the spring washers under the setscrew.

14. Tighten suspension tube friction adjustment screws until drift is eliminated at all locations through 360 travel. Tighten both screws evenly.

15. Replace plug button.

Double Arm



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.



Use two people to lift and attach the extension arm (and lighthead) to avoid damage to the equipment.



For double lighthead models, each lighthead will be installed in the same manner. Rotation for each arm is 150°.

1. Install upper bearing washer over cord and onto bearing post.
2. Lift the extension arm and align with bearing post. Guide wires through arm and pivot opening.
3. Lift extension arm onto the bearing post. Tighten dog point stop screw into undercut. The lighthead and arm will lower about 1/8 inch but will not drop from the bearing post.
4. Install lower bearing washer.
5. Use retaining ring pliers to insert snap ring securely into groove in bearing post. Lift up on arm to set snap ring in post groove.
6. Use a screwdriver blade to ensure that the snap ring is seated and secured in the Post.



A loose or unseated retaining ring could cause the stop screw to loosen and allow the extension arm to disengage.

7. Check rotation of extension arm. Advance stop screw until it bottoms, then back off 1/4 turn.
8. Adjust friction setscrew. Extension arm should rotate freely without drift.
9. Push any excess cord into the hollow of the extension arm.
10. Connect like color wires.
11. Tape wire nuts.
12. Replace plug button.

**SUPPORT TUBE AND MOUNTING PLATE
(Ceiling Model)**

Refer to Installation Manual 30704 for this procedure.

REMOVING TRACK COVER

Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact

1. Move the trolley to the end stops and note the end which the trolley comes closest to.
2. With the trolley close to this end of the track, remove the end cap at this end and allow the cover to rest on the trolley.
3. Go to the other end of the track and while supporting the track cover, slide it carefully toward the trolley until it disengages from the end cap.
4. Lower the cover slightly and carefully slide the track cover out of the trolley and allow it to hang from the ground wire.

**INSTALLING TRACK COVER**

Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Move the trolley to the open end of the track.
2. Connect the ground wire on the track to the brass ground nut on the cover.
3. Lay the coil cord neatly on the inside of the track cover. Do not tangle the cord.
4. Slip the track cover through the trolley until the cover and track are aligned.
5. Install the end cap at the junction box end of the track.



The end cap must fit correctly on the track as illustrated. The projections on the cap must match up with the grooves on the track. Using force or pounding will only split or otherwise damage the plastic end cap.

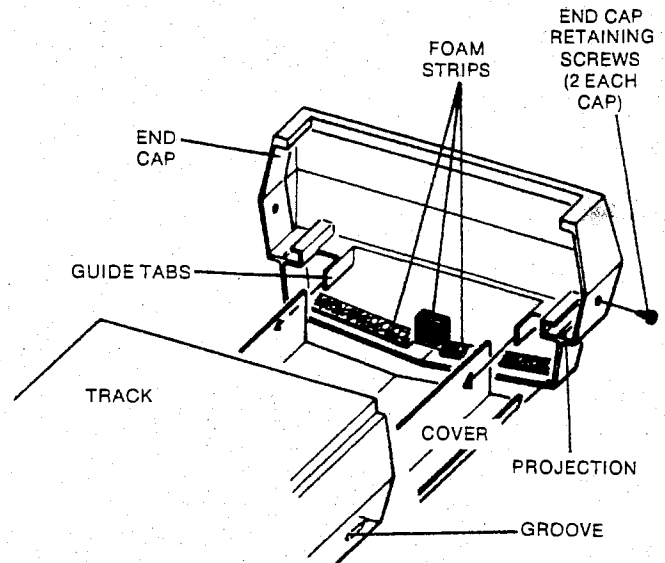


FIGURE 6-21. END CAP INSTALLATION

6. Position the track cover in the end cap.



The cover must be raised over the foam strips on the end cap and moved between the guide strips. A misaligned end cap could break the plastic guide tabs.

7. Raise the other end of the track cover slightly and carefully install the other end cap.
8. Carefully move the trolley along its travel to detect if any rubbing or scraping occurs. If rubbing does occur, place layers of tape on the foam strips.
9. Install end cap retaining screws; two each end cap.

TRACK ELECTRICAL CONNECTIONS



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Move the trolley to the area of the track junction box.
2. Remove shipping cylinder from coil cord.



Do not allow coil to droop for an extended time.

3. Ensure that the coil cord has 23-1/2 turns before securing the strain relief. Twist or relax turns as required.



Orient coil cord in junction box connector so that first coil faces away from the end stop. This will avoid coil interference with the end stop.

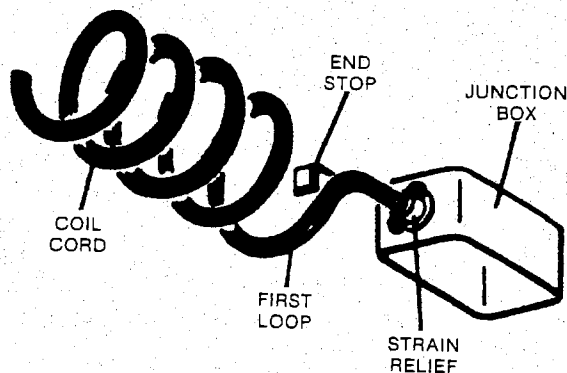


FIGURE 6-22. COIL CORD ORIENTATION

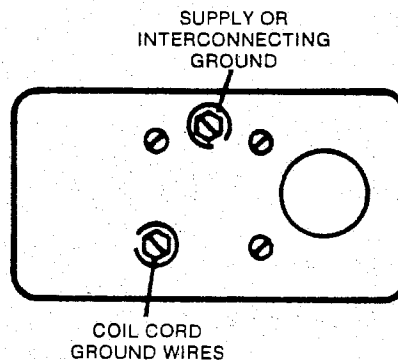


FIGURE 6-23. GROUND WIRES

4. Connect electrical service or interconnecting lines from intensity control at the track junction box. Connect with wire nuts.
 - Line supply wire to brown light wire.
 - Neutral supply wire to blue light wire.
 - Ground supply wire to green ground screw.
5. Tape all wire nut connections.
6. Connect supply or interconnecting ground screw as illustrated.
7. Connect coil cord ground wires (two wires with common terminal) to ground screw as illustrated.
8. Replace junction box cover.
9. Check coil cord position in track.
 - 23-1/2 coil loops between trolley and junction box.
 - Ensure that there is no contact between coil and mounting bolt hex heads.
 - With track cover in place, ensure that there is a smooth glide of the coil as the trolley is moved along the track.

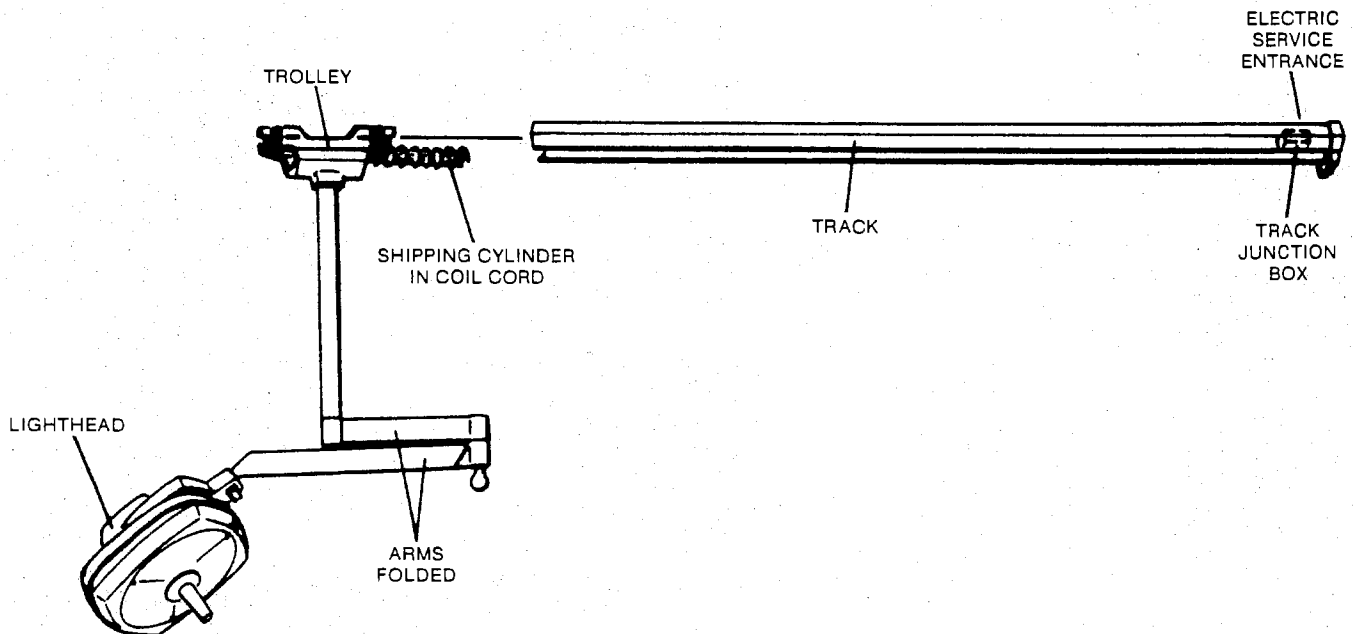


FIGURE 6-24. INSTALL TROLLEY AND LIGHTHEAD

REMOVING TROLLEY AND LIGHTHEAD ASSEMBLY



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Move the trolley to the end stops and note the end which the trolley comes closest to.
2. With the trolley close to this end of the track, remove the end cap at this end and allow the cover to rest on the trolley.
3. Go to the other end of the track and while supporting the track cover, slide it carefully toward the trolley until it disengages from the end cap.
4. Lower the cover slightly and carefully slide the track cover out of the trolley and allow it to hang from the ground wire.² work area.
5. Disconnect the coil cord at the track junction box.
6. Remove the stop on the open end of the track.
7. Elevate lighthouse to highest position. Slide the trolley from the open end of the track and carefully lower the assembly to the work area.

INSTALLING TROLLEY AND LIGHTHEAD ASSEMBLY



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

1. Install the trolley and light assembly onto the track from the open end. The coil cord must face the junction box.
2. Ensure that rollers engage properly in rail groove.
3. Replace the stop on the open end of the track.
4. Ensure that the trolley moves freely along the track at all points of travel without excessive drag or binding.
5. Connect the coil cord at the track junction box. Refer to "Track Electrical Connections" procedure in this section.
6. Replace the track cover. Refer to "Installing Track Cover" procedure in this section.

REPLACING TRACK ASSEMBLY

Refer to Installation Manual 30704 for this procedure.

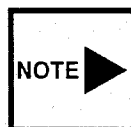
REMOVING AND INSTALLING EXTENSION ARM/WIRING (TRACK MODEL)



Disconnect or turn OFF power source to the track before repair procedure to avoid hazardous electrical contact.

The extension arm cable has about two inches extra length to permit ease of assembly and service. The excess is tucked into the cavity in the extension arm. If the excess loop is pulled or caught during service work, the terminals may come loose at the rotating connector. Use this procedure to reconnect these terminals.

1. Elevate the lighthead to its highest position.
2. Remove plug button.
3. Remove two suspension tube friction adjustment screws.
4. Support the extension arm and loosen three lighthead assembly mounting screws. Lower the extension arm just enough to disengage it from the suspension tube.
5. Disconnect the suspension tube wire terminals from the rotating connector.
6. Lower the extension arm and lighthead assembly to a work area.
7. Loosen three squeeze collar setscrews.
8. Reconnect the extension arm terminals to the rotating connector. Connect terminals as illustrated.
9. Tuck the excess cable into the extension arm cavity.
10. Position rotating connector in bearing post. Ensure that squeeze collar is in position around the base of the connector.
11. Tighten the three squeeze collar setscrews. Use Loctite #222.
12. Align the holes on the bearing mount with the mating holes in the suspension tube.
13. With the extension arm and lighthead on your shoulder, connect the suspension tube wires to the upper rotating connector terminals. Connect terminals as illustrated.



The flexible anti-twist washers create an interference fit with the inside diameter of the suspension tube. Ensure that these washers are aligned and even.

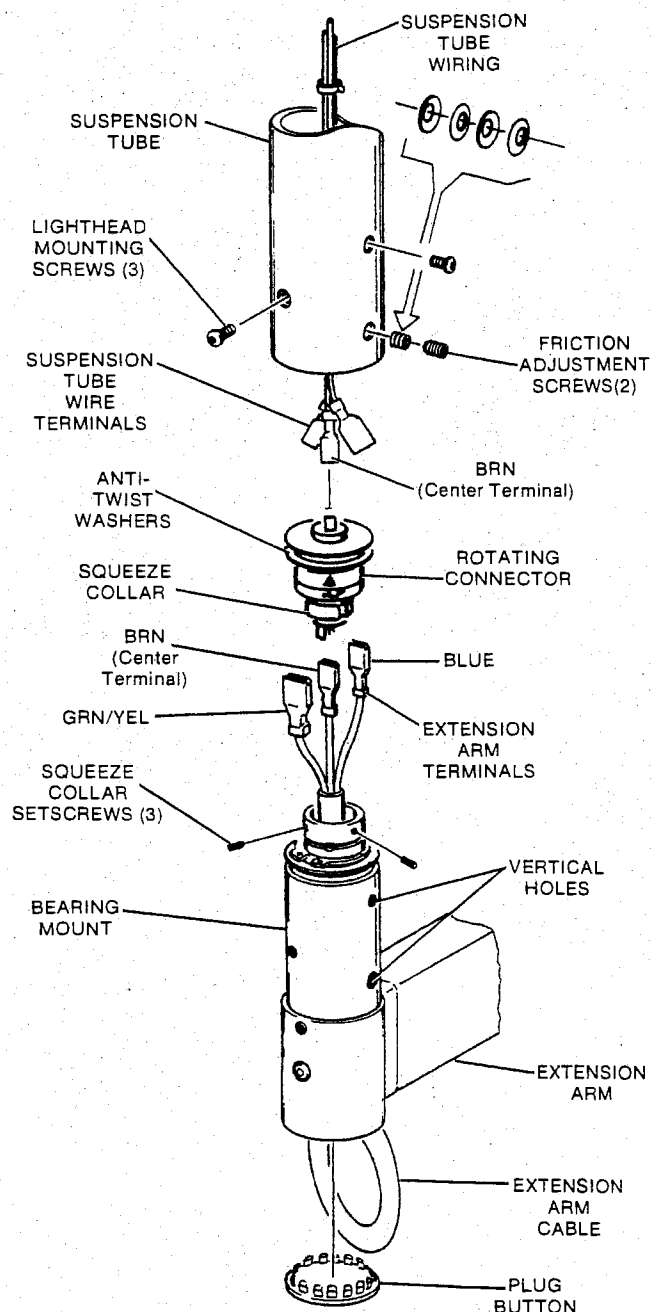


FIGURE 6-25.
RECONNECTING EXTENSION ARM CABLE

14. Form the suspension tube wires so that they will push up into the suspension tube.
15. Use Loctite #222 on the lighthead assembly mounting screws.
16. Lift the bearing assembly into the support tube. With the extension arm resting on your shoulder, fine align the light assembly mounting screws with an allen wrench or similar tool. Do not mar or damage threads.
17. Start the three lighthead assembly mounting screws into the suspension tube and the bearing mount. Do not tighten screws until all three are aligned and engaged. Then, tighten screws securely.
18. Assemble and start the two suspension tube friction adjustment setscrews and their associated spring washers. Position the spring washers as illustrated.



Do not over tighten setscrews and then back off. Approach adjustment slowly. Over tightening will flatten and destroy the usefulness of the spring washers under the setscrew.

19. Tighten suspension tube friction adjustment screws until drift is eliminated at all locations through 360° travel. Tighten both screws evenly.
20. Replace plug button.

REPLACING ROTATING CONNECTOR



Disconnect or turn OFF power source to the track before repair procedure to avoid hazardous electrical contact.

The extension arm and lighthead assembly will be disconnected and lowered from the suspension tube for bench work. The rotating connector can then be disconnected and replaced.

1. Elevate the lighthead to its highest position.
2. Remove plug button.
3. Remove two suspension tube friction adjustment screws.
4. Support the extension arm and loosen three lighthead assembly mounting screws. Lower the extension arm just enough to disengage it from the suspension tube.

5. Disconnect the suspension tube wire terminals from the rotating connector.

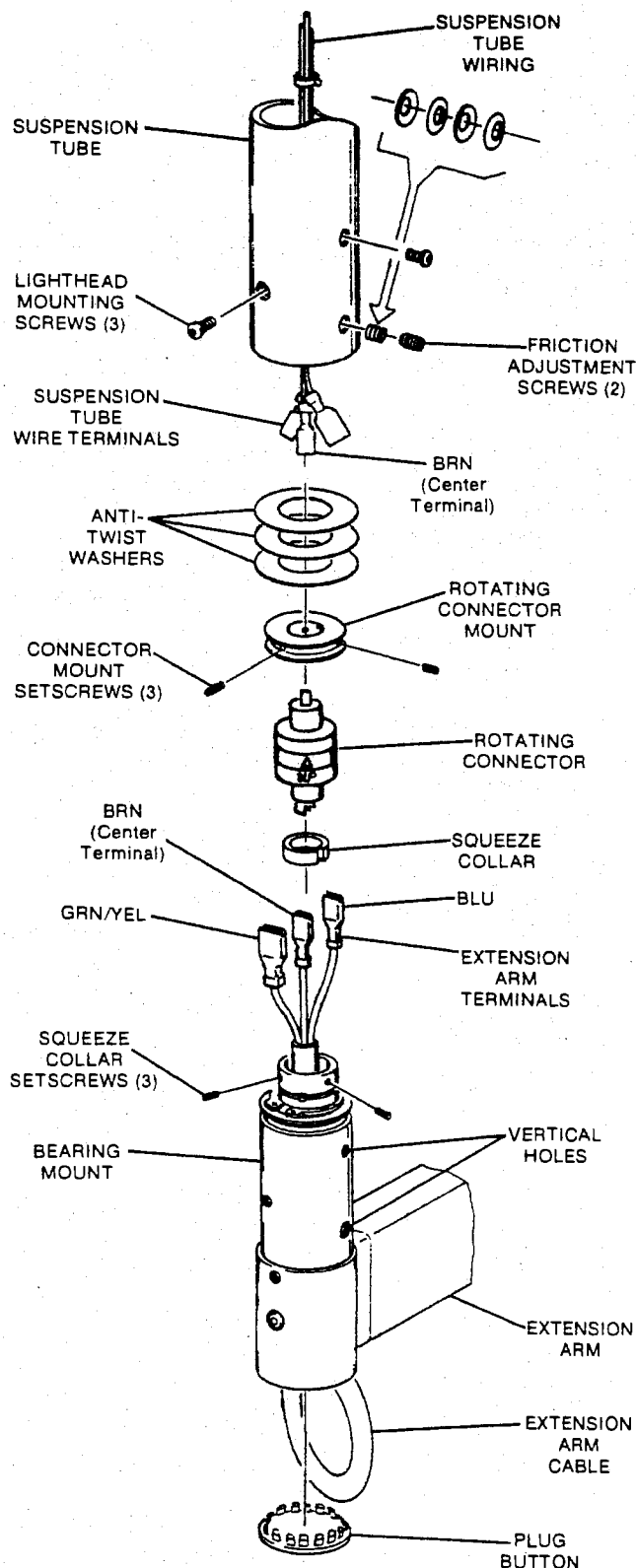


FIGURE 6-26.
REPLACING ROTATING CONNECTOR

2400 SERIES SURGICAL LIGHTS

6. Repair

6. Lower the extension arm and lighthead assembly to a work area.
7. Loosen three squeeze collar setscrews.
8. Disconnect the extension arm terminals from the rotating connector.
9. Remove the three anti-twist washers from the rotating connector.
10. Loosen four setscrews and remove the rotating connector mount from the existing rotating connector.



Observe proper orientation of the connector when attaching it to the connector mount. See the illustration.

11. Assemble the connector mount to the new rotating connector. Use Loctite #222 on the setscrews.
12. Replace the three anti-twist washers.
13. Reconnect the extension arm terminals to the rotating connector. Connect terminals as illustrated.
14. Tuck the excess cable into the extension arm cavity.
15. Position rotating connector in bearing post. Ensure that squeeze collar is in position around the base of the connector.
16. Tighten the three squeeze collar set screws. Use Loctite #222.
17. Align the holes on the bearing mount with mating holes in the suspension tube.
18. With the extension arm and lighthead on your shoulder, connect the suspension tube wires to the upper rotating connector terminals. Connect terminals as illustrated.



The flexible anti-twist washers create an interference fit with the inside diameter of the suspension tube. Ensure that these washers are aligned and even.

19. Form the suspension tube wires so that they will push up into the suspension tube.

20. Use Loctite #222 on the lighthead assembly mounting screws.
21. Lift the bearing assembly into the support tube. With the extension arm resting on your shoulder, fine align the light assembly mounting screws with an allen wrench or similar tool. Do not mar or damage threads.
22. Start the three lighthead assembly mounting screws into the suspension tube and the bearing mount. Do not tighten screws until all three are aligned and engaged. Then, tighten screws securely.
23. Assemble and start the two suspension tube friction adjustment setscrews and their associated spring washers. Position the spring washers as illustrated.



Do not over tighten setscrews and then back off. Approach the adjustment slowly. Over tightening will flatten and destroy the usefulness of the spring washers under the setscrews.

24. Tighten suspension tube friction adjustment screws until drift is eliminated at all locations through 360° travel. Tighten both screws evenly.
25. Replace plug button.

BEARING POST ADJUSTMENT



Disconnect or turn OFF power source to the track before repair procedure to avoid hazardous electrical contact.

This bearing post adjustment will be required if the extension arm will not rotate freely through 360°.

Check

1. Loosen the bearing post friction adjustment screws.
2. If the extension arm will not rotate continuously through 360°, proceed to Adjustment B2 in Section 2 of this manual.

OR

3. If the extension arm still binds at any point in the 360° rotation, proceed to the *Adjustment* portion of this procedure.

Adjustment

The extension arm and lighthead assembly will be removed from the suspension tube for the adjustment.

1. Elevate the lighthead to its highest position.
2. Remove plug button.
3. Remove two suspension tube friction adjustment screws.
4. Support the extension arm and loosen three lighthead assembly mounting screws. Lower the extension arm just enough to disengage it from the suspension tube.
5. Disconnect the suspension tube wire terminals from the rotating connector.
6. Lower the extension arm and lighthead assembly to a work area.
7. Loosen three squeeze collar setscrews.
8. Lift the rotating connector out of the bearing post.
9. Disconnect the extension arm terminals from the rotating connector.
10. Remove the top bearing post retaining ring.



Do not remove the back-up retaining ring or the bottom retaining ring. Lack of these rings could result in failure of the suspension system.

11. Remove the insulator bushing from the bearing post.
12. Arrange the three extension arm cable wire terminals as illustrated so that they will pass thru the insulator bushing and into the bearing post.
13. Tape a fish wire to the arranged terminals.
14. Carefully slide the insulator bushing over the terminals.
15. Pull the terminals into the bearing post until they are clear of the bearing post adjustment holes.



Two 1/8 inch diameter holes are provided for adjustment. Use an allen wrench or similar tool to turn the bearing post for adjustment.

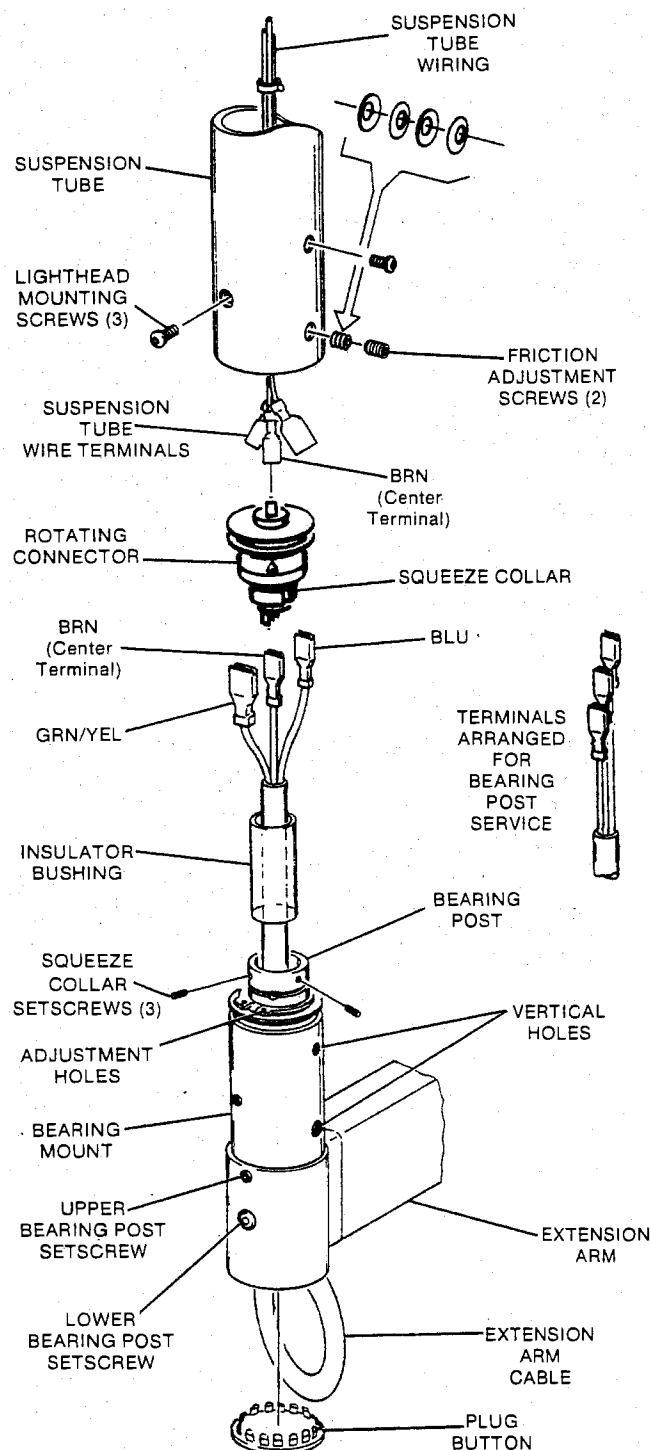


FIGURE 6-27. BEARING POST ADJUSTMENT

6. Repair

16. Loosen bearing post setscrews, then adjust height of bearing post for smooth finger rotation of bearing assembly consistent with minimal end play.
17. Tighten upper and lower bearing post setscrews to firmly lock the assembly.
18. Fish the extension cable terminals out of the bearing post and thru the insulator bushing.
19. Seat the insulator bushing in the bearing post.
20. Replace the top bearing post retaining ring.
21. Reconnect the extension arm terminals to the rotating connector. Connect terminals as illustrated.
22. Tuck the excess cable into the extension arm cavity.
23. Position rotating connector in bearing post. Ensure that squeeze collar is in position around the base of the connector.
24. Tighten the three squeeze collar setscrews. Use Loctite #222.
25. Align the pair of vertical holes on the bearing mount with the pair of vertical holes in the suspension tube.
26. Lift the extension arm and align the bearing assembly with the support tube, vertical holes aligned. Support the extension arm and lamphead on your shoulder.
27. Connect the suspension tube wires to the upper rotating connector terminals. Connect terminals as illustrated.



The flexible anti-twist washers create an interference fit with the inside diameter of the suspension tube. Ensure that these washers are aligned and even.

28. Form the suspension tube wires so that they will push up into the suspension tube.
29. Use Loctite #222 on the lighthead assembly mounting screws.
30. Lift the bearing assembly into the support tube. With the extension arm resting on your shoulder, fine align the light assembly mounting screws with an allen wrench or similar tool. Do not mar or damage threads.

31. Start the three lighthead assembly mounting screws into the suspension tube and the bearing mount. Do not tighten screws until all three are aligned and engaged. Then, tighten screws securely.

32. Assemble and start the two suspension tube friction adjustment setscrews and their associated spring washers. Position the spring washers as illustrated.



Do not over tighten setscrews and then back off. Approach the adjustment slowly. Over tightening will flatten and destroy the usefulness of the spring washers under the setscrews.

33. Tighten suspension tube friction adjustment screws until drift is eliminated at all locations through 360° travel. Tighten both screws evenly.

34. Replace plug button.

REPLACING COIL CORD



Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

REMOVING

The track cover will be removed from the track. The coil cord will be disconnected at the track junction box and the trolley removed from the track for coil cord replacement.

1. Remove the trolley from the track. Refer to "Removing Trolley and Lighthead Assembly" procedure in this manual.
2. Remove the cable clamp from the end of the coil cable.
3. Remove the trolley ground screws.
4. Disconnect the black and white wires at the trolley connection point and remove coil cable. Remove and discard existing coil cable.

REPLACEMENT

1. Place the new coil cable and shipping cylinder (if present) on the trolley and connect the black and white cable wires as illustrated.
2. Secure the coil cable to the trolley with the cable clamp.
3. Secure the coil cable and the suspension ground wires at the trolley ground screw.
4. Ty-wrap new coil cable to the trolley.
5. Re-install the trolley on the track. Refer to "Installing Trolley and Lighthead Assembly" procedure.

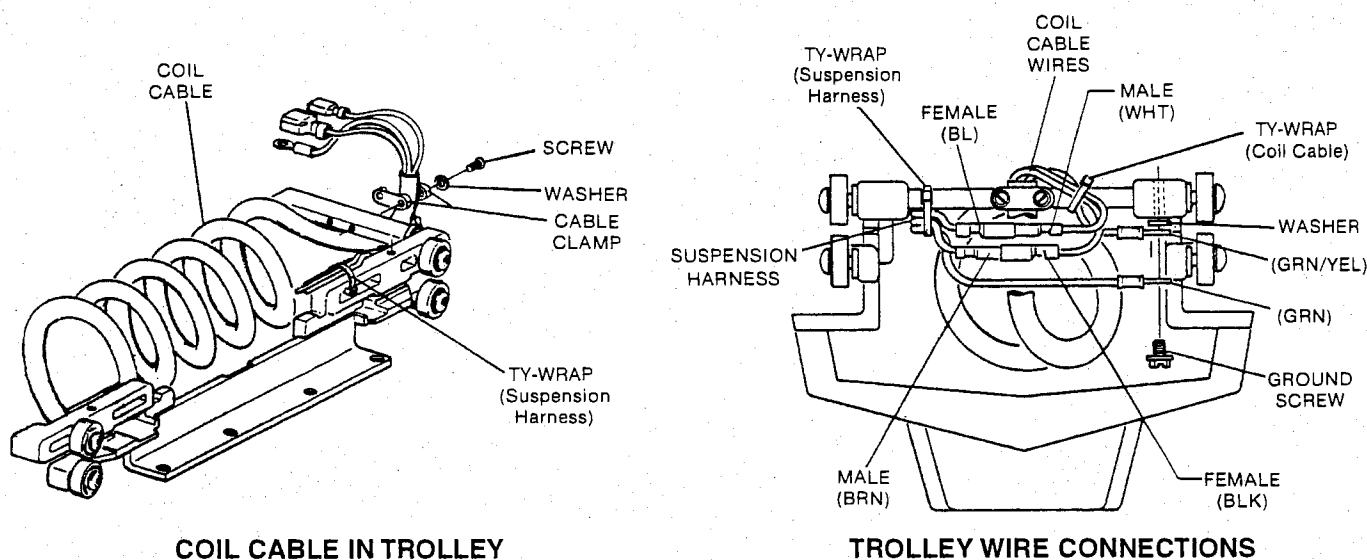


FIGURE 6-28. REPLACING COIL CORD

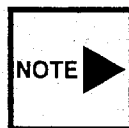
REPLACE SUSPENSION HARNESS

Disconnect or turn OFF power to the light or Intensity Control to avoid hazardous electrical contact.

The track cover will be removed from the track. The coil cable will be disconnected at the track junction box and the trolley removed from the track. The lighthead and extension arm assembly will be removed from the suspension tube for suspension harness connections at the rotating connector.

1. Remove the trolley from the track. Refer to "Removing Trolley and Lighthead Assembly" procedure in this manual.
2. Remove and disconnect the extension arm and lighthead assembly from the suspension tube. Refer to "Removing and Installing Extension Arm/Wiring" procedure in this manual.
3. Cut the suspension harness ty-wraps from the trolley.
4. Remove the trolley ground screw and washer.
5. Disconnect the blue and brown wires at the trolley connection point.
6. Remove three screws securing the wire cover and the protective bracket to the trolley.
7. Attach a fish wire to the terminals at the rotating connector end of the existing harness.

8. Pull and guide the existing harness out through the opening in the trolley. Remove the existing harness from the fish wire.



The suspension harness is made long enough for the maximum length suspension tube. If a shorter tube is used, the harness is looped and secured with ty-wraps.

9. Loop the replacement suspension harness and secure with ty-wraps to equal the length of the existing harness.
10. Connect the new harness to the fish wire at the trolley end. Pull and guide the harness through the suspension tube.
11. Connect the suspension harness terminals to the rotating connector and install the extension arm to the suspension tube. Refer to "Removing and Installing Extension Arm/Wiring" procedure in this manual.
12. Form the harness wires, protective bracket and wire cover into the casting. Ensure wires are flat and parallel in casting groove and through wire cover.
13. Secure the protective bracket and the wire cover to the trolley.
14. Connect the brown and blue harness wires to the coil cable as illustrated.
15. Secure the coil cable and the suspension harness ground wires with the trolley ground screw.
16. Ty-wrap harness wires to the trolley, two places.
17. Re-install the trolley on the track and connect the coil cord at the track junction box. Refer to "Installing Trolley and Lighthouse Assembly" procedure in this manual.

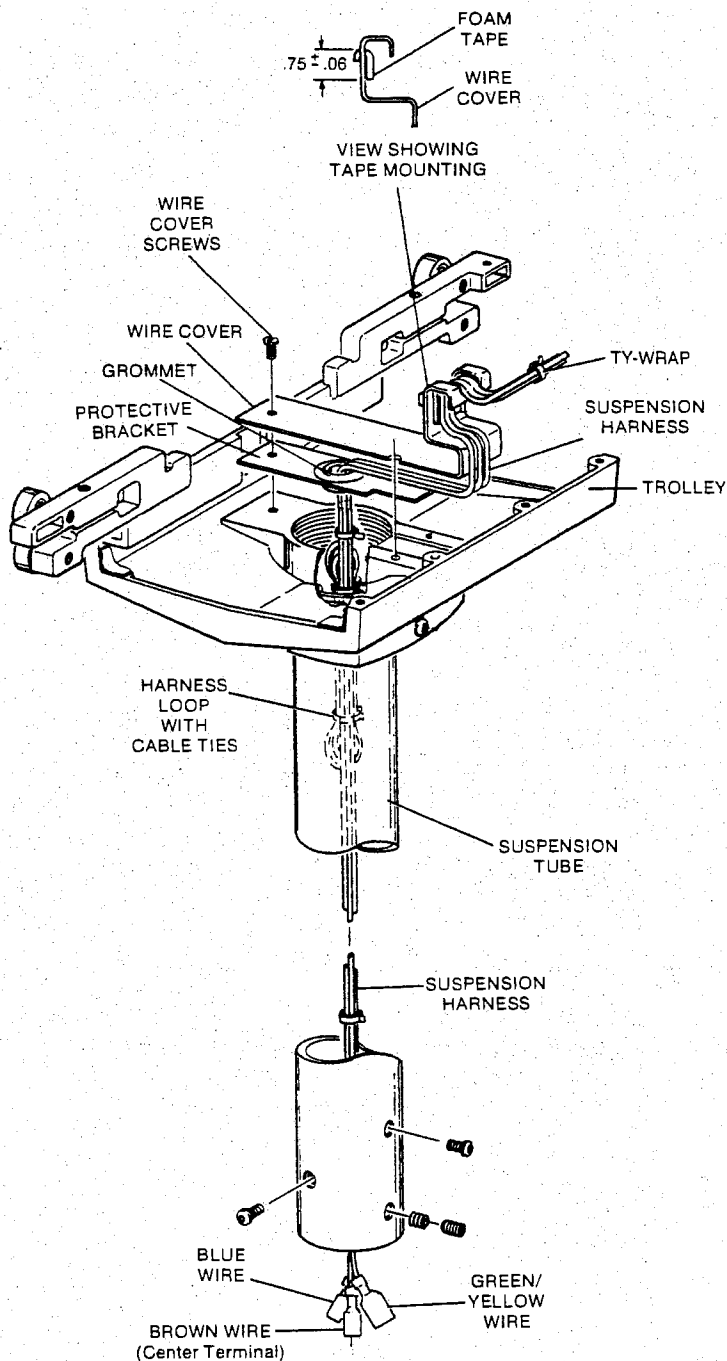


FIGURE 6-29. REPLACING SUSPENSION HARNESS

REPLACING LIGHT CORD



Unplug power cord to the light to avoid hazardous electrical contact.

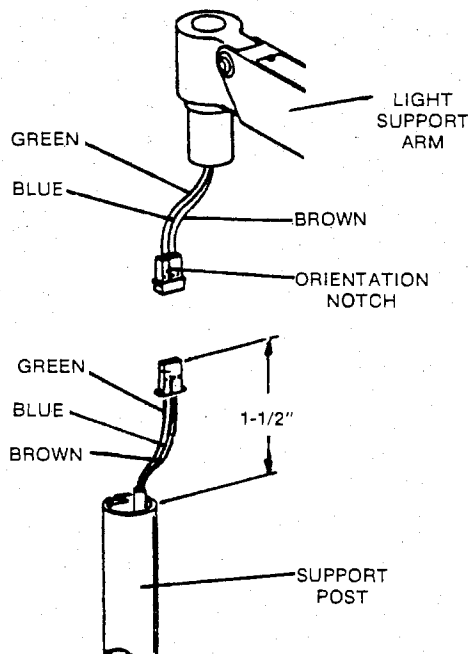
120V FLOOR MODELS

1. Remove the support arm from the support post and disconnect the multi-pin connector.
2. Remove the three prong plug from the light cord and release the strain relief from the support post.
3. Install the new cord so that the multi-pin connector is 1-1/2 inches above the top of the support post. Insert the strain relief into the post to rewire the three prong plug into end of light cord.
5. Connect multi-pin connectors and reassemble the light support arm onto the light support.



The stop pin must fit into the groove for proper assembly.

FIGURE 6-30. WIRE CONNECTOR



230V FLOOR MODELS



Unplug power cord to the light to avoid hazardous electrical contact.

1. Remove the cover from the transformer box located on the base.
2. Disconnect the ground wire from the ground screw.

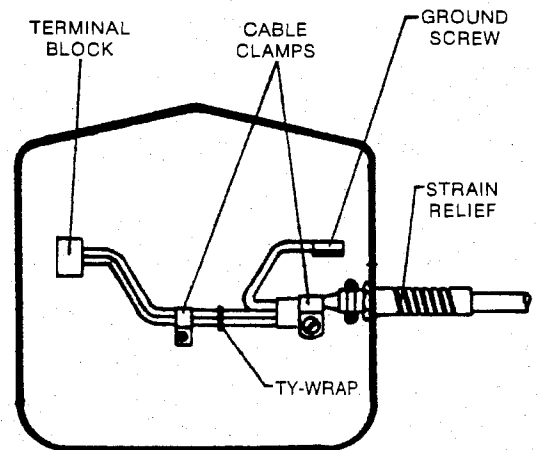


FIGURE 6-31. 230V LAMPCORD

3. Disconnect the line and neutral wires from the terminal block.
4. Loosen two cable clamps and the strain relief. Cut ty-wrap. Remove old light cord.

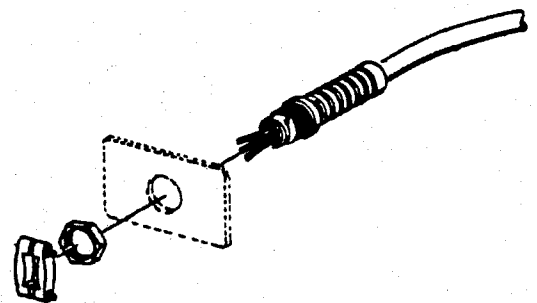


FIGURE 6-32. STRAIN RELIEF

5. Install new Light cord .
6. Replace all parts and make required connections in reverse order of removal. Install new ty-wrap.

2400 SERIES SURGICAL LIGHTS

6. Repair

120V WALL MODELS



Unplug power cord to the light to avoid hazardous electrical contact.

1. Remove the setscrew in the side of the wall bracket and remove extension arm for bench work.
2. Remove the plug button and pull the wire connections from the cavity in the extension arm. Remove wire nuts.
3. Disengage strain relief and remove old cord from light.
4. Guide the new power cord through the bearing washer and bearing post to the top of the extension arm. Reinstall strain relief.
5. Connect like color wires with wire nuts and tape.
6. Coil connected wires and snug them into the cavity in the extension arm. Replace the plug button.
7. Align the setscrew hole with the stop groove in the bearing post. Assemble the setscrew through the wall bracket and into the bearing post.
8. Insert the lamp arm bearing post into the wall bracket. Do not lose the bearing washer. Swing extension arm to seat bearing post.
9. Check arm travel for 180° rotation.
10. Refer to Adjustment B in Section 2 to correct any Extension Arm Horizontal Drift.

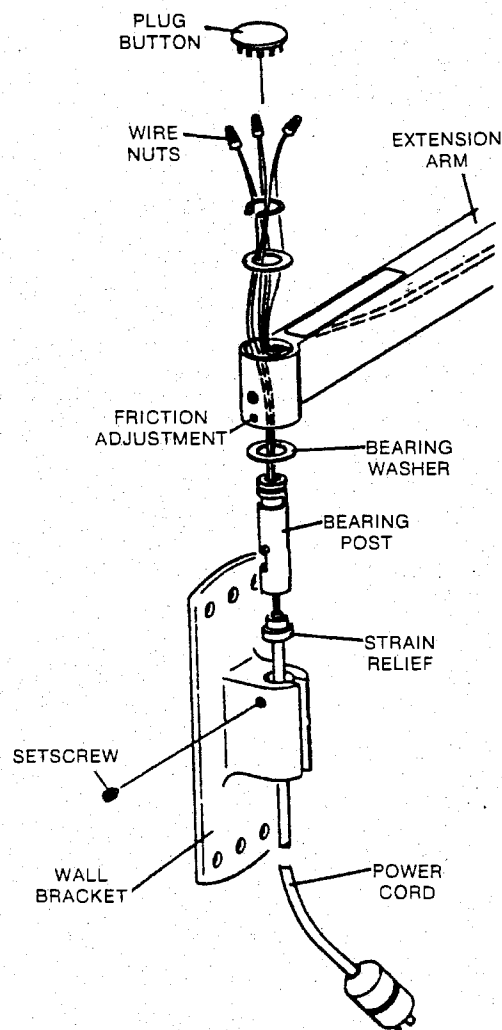


FIGURE 6-33. WALL MOUNTING

REPLACING DISCONNECT 230V Floor Model



Unplug power cord to the light to avoid hazardous electrical contact.

1. Remove the cover from the transformer box located on the base.
2. Disconnect the ground wire.
3. Disconnect the blue wire from the No. 1 fuse.
4. Loosen two cable clamps.
5. Remove the black transformer wire from the disconnect. Do not cut any length from the transformer wire.
6. Replace all parts and make required connections in reverse order.

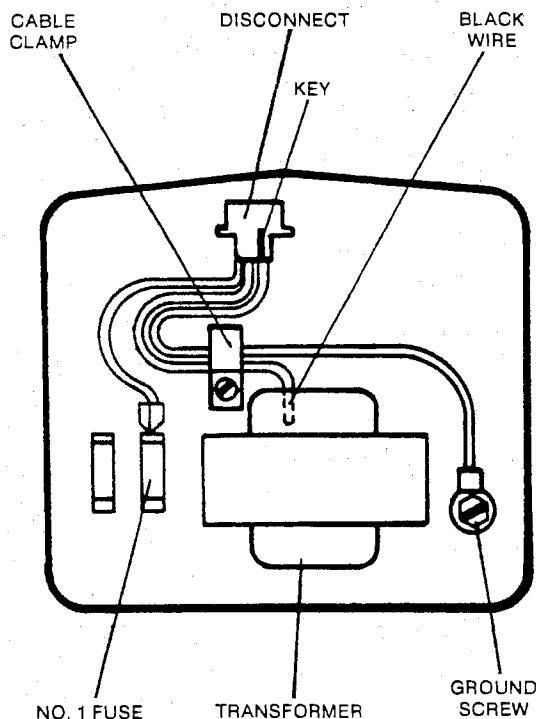


FIGURE 6-34. TRANSFORMER DISCONNECT

REPLACING TRANSFORMER 230V Floor Model



Unplug power cord to the light to avoid hazardous electrical contact.

1. Remove two transformer cover screws. Lift the cover from the transformer box and secure it to the support post.
2. Loosen two cable clamps.
3. Remove the black transformer wires from the disconnect.

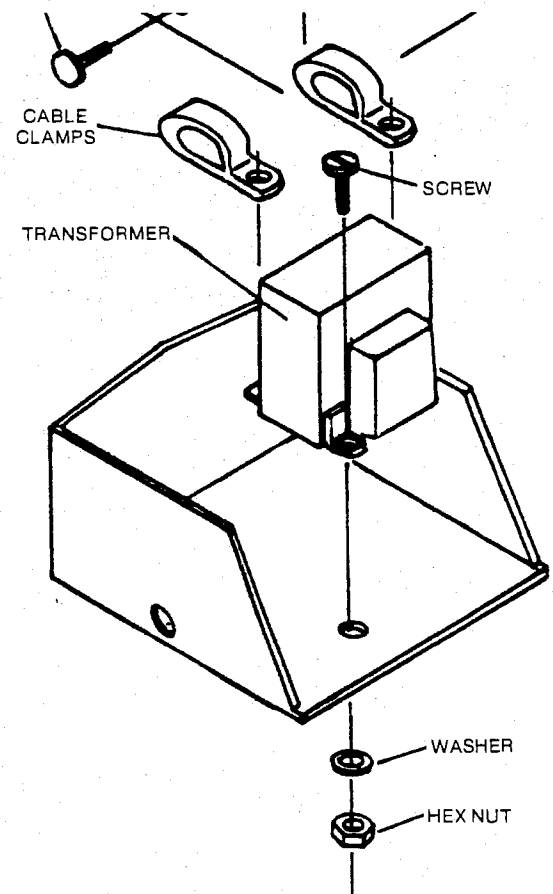


FIGURE 6-35. REPLACING TRANSFORMER

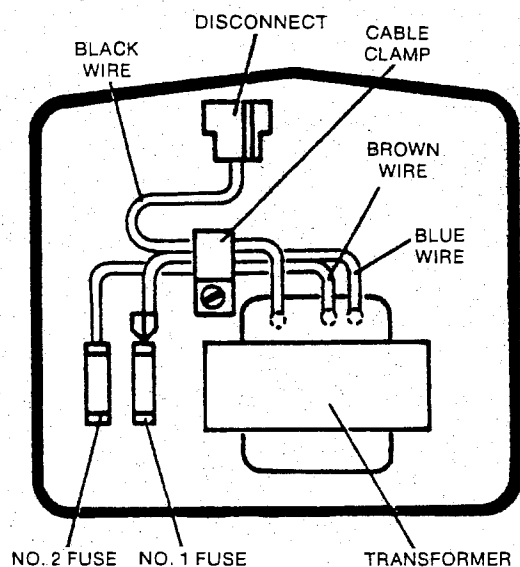


FIGURE 6-36. TRANSFORMER WIRING

4. Disconnect the brown wire from the No. 2 fuse.
5. Disconnect the blue wire from the No. 1 fuse. Remove old transformer.
6. Install the new transformer with the wire toward the back of the box as illustrated.
7. Replace all parts and make required connections in reverse order.