



SURGICAL LIGHTING SYSTEM

**INSTALLATION AND
SERVICE MANUAL**



Vu Agency Approvals



Medical Electrical Equipment with respect to electric shock, fire
and mechanical hazards only In accordance with:

IEC60601-1:2006/03/09: 2005 Version

CSA C22.2.60601-1: 2008/02/01 Ed: 2: COR 2: 2011/06/01

IEC 60601-2-41: 2009/08/12 Ed: 2

IEC 60601-1-6: 2010/01/27 Ed: 3

IEC 62366: 2007/10/18 Ed: 1

Classifications:

Protection against electrical shock (6.2). Class I permanently connected,
Protection against harmful ingress of water (6.3). None.

Degree of safety in the presence of flammable anesthetics or oxygen (3.11, 3.12, 11.4, 11.5). Not
suitable for use in the presence of flammable anesthetics or oxygen.

Mode of operation (6.6). Continuous

Surgical luminaries (IEC60601-2-41)



Electromagnetic compatibility for immunity

And emissions in accordance with

EN-60601-1-2(2001) Class B and CISPR 22 (1997) Class B

Medical Electrical Equipment

Particular requirements for the safety of surgical
luminaries and luminaires for diagnosis

In accordance with IEC-60601-2-41

Intended use: Professional Medical Lighting for Hospital, Clinic, Minor Surgery, Examination or
Diagnosis, within suitable facilities designated for such purposes. This light system is mounted centrally
in a room such that access is available all around the operating environment.

User interface: The Vu lighting systems are intended to be used by medical professionals in surgeries
and exam rooms. The functional interfaces are up to 360° positioning horizontally (330° for the
NVSD3C-E)) and vertically +15° to -65°. The lamp head can be rotated approximately 330°. An
Interchangeable Sterilizable Handle assembly provides an ON/OFF button with 5 levels of dimming and
Endo mode. An optional Tablet with ON/OFF button, selectable color temperature, 5 levels of dimming,
Green Endo mode and Camera control. The NVSD3C-E offers an Interchangeable Camera assembly
which replaces the Sterilizable Handle assembly when In-Light Video capabilities are required.

Misuses: For any purpose or use at any facility other than stated above. Caution shall be exercised
when positioning the light head and avoid contact or collision with the patient, other medical
professionals or other lights/equipment.

User Profile: Any medical professional in surgery or examination rooms.

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Definition of Terms

I.E.C.: International Electrotechnical Commission

ETL: Edison Testing Laboratories

Medical Electrical Equipment: Electrical equipment intended to diagnose or treat a patient under medical supervision. Medical Lighting equipment transfers light energy to an intended area.

Central Illuminance: Illuminance of light head measured at 1 meter from the light emitting area with no obstructions. The value is expressed in Foot-candles or Lux.

Light Field Center: The point of maximum illuminance in the lighted area. This is the reference point for light field size and light distribution measurements.

Light Field Diameter: The diameter of the light pattern where the output reaches 10% of center Illuminance.

Depth of Illumination: The distance above and below 1 meter where the central Illuminance is reduced to 20%.

Shadow Dilution: Minimizing the impact of users shadows within the working area.

Correlated Color Temperature (CCT): The color temperature of the light fixture when compared to a blackbody radiator expressed in degrees Kelvin.

Total Irradiance: The total amount of energy imparted to the patient by the lighting system expressed in Watts/meter squared.

Color Rendering Index (CRI): A method of how well a light source will render other colors when illuminating them based upon eight CIE chromaticity coordinates.

Sterilizable Handle: An easily removable device that when properly sterilized maintains a sterile area in order to handle it under aseptic conditions when attached to the equipment.

Head/Yoke Assembly: The Head/Yoke Assembly includes the light source and positioning, heat removal system and light focusing system (where applicable).

Arm Assembly – Extension/Articulating Arm: The Extension Arm is the horizontal section of the positioning arm that is used to increase the area covered by the light head and articulating arm. The articulating arm allows for vertical positioning of the light head.

Light Mounting: Support apparatus used to connect arm assembly/light head to a fixed surface, consisting of either a single, double or triple ceiling mount.

Neutral Conductor (common): In an AC circuit, the return line for current

Protective earth ground: The conductor used to connect the non-current-carrying metal parts of equipment, raceways, and other enclosures to the system grounded conductor, the grounding electrode conductor, or both, of the circuit at the service equipment or at the source of a separately derived system.

Off Center Moment: The amount of torque caused by an off-center load and measured in foot-pounds.

Tablet: Android touch screen device used to control light and camera functions wirelessly through Bluetooth.

Sterilizable Handle Assembly: An Interchangeable Assembly that provides light Intensity Control and Endo mode.

List of symbols

 ETL Listing marking	
 Read accompanying documents	
 C.E. Marking	
 Fuse marking	
 Protective earth ground	
 Neutral conductor	
 Caution	
 Electric shock hazard	
 Separate collection for electric and electronic equipment. Do not dispose of as household waste.	

Vu models

The following Vu models are covered in this manual

NVSD3-E	100-240 VAC, 50/60 Hz, 180 W
NVSD3C-E	100-240 VAC, 50/60 Hz, 180 W
NVSD3P3-E	100-240 VAC, 50/60 Hz, 180 W
NVSD3M1-E	100-240 VAC, 50/60 Hz, 180 W
NVSD3CM1-E	100-240 VAC, 50/60 Hz, 180 W
NVSD3VR-E	100-240 VAC, 50/60 Hz, 180 W
NVSD3D3-E	100-240 VAC, 50/60 Hz, 360 W
NVSD3M1M1-E	100-240 VAC, 50/60 Hz, 180 W
NVSD3CM1M1-E	100-240 VAC, 50/60 Hz, 180 W
NVSD3CD3-E	100-240 VAC, 50/60 Hz, 360 W
NVSD3D3P3-E	100-240 VAC, 50/60 Hz, 360 W
NVSD3D3M1-E	100-240 VAC, 50/60 Hz, 360 W
NVSD3D3VR-E	100-240 VAC, 50/60 Hz, 360 W
NVSD3CD3M1-E	100-240 VAC, 50/60 Hz, 360 W
NVSD3CD3VR-E	100-240 VAC, 50/60 Hz, 360 W
NVSD3D3M1M1-E	100-240 VAC, 50/60 Hz, 360 W
NVSD3CD3M1M1-E	100-240 VAC, 50/60 Hz, 360 W
NVSD3D3D3-E	100-240 VAC, 50/60 Hz, 540 W
NVSD3CD3D3-E	100-240 VAC, 50/60 Hz, 540 W

Nuvo Lighting Equipment Limited Warranty

This document comprises the general terms of your product's Limited Warranty. By accepting the shipment of the product, the owner/purchaser agrees to adhere to the warranty terms and conditions expressed herein.

Nuvo Lighting Equipment is warranted against defective material and/or workmanship, excluding normal replacement parts (e.g. bulbs, sterilizable handles or glass items), for a period of three (3) years from the date of shipment. This Limited Warranty applies exclusively to the repair or replacement of parts recognized as defective by Nuvo that are in normal use and have not been modified or repaired by unauthorized personnel.

This Limited Warranty extends only to the first retail purchaser of a product, and is not transferable or assignable. This warranty supersedes all other guarantees or warranties, expressed or implied.

WARRANTY SERVICE & REPAIRS

Nuvo does not provide (or give any compensation for) outside repair services or field labor. Therefore, in the event of a failure covered under this warranty, please take the following immediate action:

1. Contact Nuvo via phone at (818) 838-3025, through our website at <http://www.medillum.com>, or by facsimile at (818) 838-3725.

A. Be prepared to give the model number, serial number, and full description of the failure.

B. Our Customer Service department will attempt to solve the problem over the phone. If it becomes necessary to send the product to the factory for repair, you will be provided with a Return Authorization number. Products sent to the factory without a Return Authorization number will not be accepted.

2. It is the retail purchaser's obligation to arrange for shipment return of a product to the factory for warranty service, which shall be at the retail purchaser's expense. Carefully package the light component (light head, arm assembly, mount assembly, etc.) and return it, freight prepaid and insured, with the Return Authorization number clearly marked on the outside of the box, to:

Nuvo
547 Library Street
San Fernando, CA 91340
RA# _____

Damage resulting from inadequate packing is not covered by this warranty, and shipping insurance does not cover damage due to inadequate packing. We recommend that the package be insured against loss or in-transit damage. Nuvo cannot be held responsible for in-transit loss or damage. In the event that freight-related damage should occur, Nuvo will notify you immediately so that you can file a damage claim with the proper freight carrier.

Nuvo Limited Warranty (cont'd)

Within the aforementioned time period of three (3) years from date of shipment, Nuvo will evaluate the returned product, repair as appropriate, and ship the product back to you with freight costs prepaid by the Company. In the event that non-warranty damage or failure is discovered, you will be contacted before any repairs are performed.

EXCLUSIONS

This Limited Warranty does not cover the following:

- Any field labor or outside services (electricians, contractors, installation services, routine maintenance or other repair services)
- Damage to the product resulting from tampering, accident, abuse, negligence, alteration, or other causes unrelated to problems with material and/or workmanship
- Damage due to improper installation, use, cleaning or maintenance, as outlined in the Installation and Service Manual for the product
- Labor costs associated with removing, re-packaging for shipment or reinstalling product

PRODUCT RETURNS:

Please contact the authorized dealer from whom the product was purchased to inquire about a product return. Additional terms and conditions set by the dealer may apply for any returned items.

SHIPMENT DAMAGE:

If the initial shipment of your purchased product arrived in damaged condition, please leave the packaging and its contents intact and contact Nuvo immediately.

Mechanical Specifications

Parameter	Value
Weights: Solo ceiling mount assembly* Duo ceiling mount assembly* Trio ceiling mount assembly* Light head assembly Light head assembly w/Sterilizable Handle Assembly Light head assembly w/Camera Assembly (*Note: The weight of the Ceiling Casting assembly is included.)	Approximately 73.5 lbs (33.3 Kg) Approximately 104.5 lbs (47.4 Kg) Approximately 155.5 lbs (70.5 Kg) Approximately 28.1 lbs (12.7 Kg) Approximately 34 lbs (15.5 Kg) Approximately 34 lbs (15.5 Kg)
Dimensions: Ceiling casting Ceiling rod Arm (articulated) Light head assembly	Ø17.0" (431.8 mm) x 4.7" (119.4 mm) deep Ø2.5" (63.5 mm) x 9.0"-43.0" (228.6 -1092.2 mm) long (depending on ceiling height) Ø4.0" (102 mm) x 26.0" (660 mm) long Ø25.5" (648 mm) 4.75" (120 mm) deep
Rotations: Ceiling mount/extension arm interface Articulating/extension arm interface Articulating arm vertical movement Articulating arm/Yoke interface Yoke/lamp head interface	Continuous for NVSD3-E, 330° for NVSD3C-E Continuous for NVSD3-E, 330° for NVSD3C-E +15 Degrees, -65 Degrees Continuous for NVSD3-E, 325° for NVSD3C-E +/-165 Degrees (330° range)

Electrical Specifications

Parameters	Value
Voltage: Input Voltage	100 - 240 VAC 50/60 Hz – Single Phase
LED life	50,000 hours (average)
Power: Solo Duo Trio	180 Watts 360 Watts 540 Watts

Optical Specifications

Parameter	Value
Correlated Color Temperature	Variable between 3,800°K to 4,800 °K ±300°K
Irradiance	128 W/m ² (1 m)
Color Rendering Index (CRI R1-R8=RA)	>95 @ 4,300°K
Color Rendering Index R9	>95 @ 4,300°K
Parameter	Value
Focal length	39.4" (1 meter)
Central Illuminance (full intensity)	160,000 +0 / -10K LUX @ 4,300° K
Dimming – 5 Levels	100% 87.5% 75% 62.5% 50%
(Indicated by 5 LED's on 2 indicator strips located 180° apart)	160,000 140,000 120,000 100,000 80,000
Endo Mode	7.4% @ 4,300° K
(6 green LED's located 60° apart)	
Light field dia (NVSD3-E is adjustable)	Ø9.5" – Ø14" (229 mm – 356 mm) @ 4,300° K
Light field dia (NVSD3C-E is fixed)	Ø9.5" (229 mm) @ 4,300° K
Depth of illumination	> 39.0" (1,000 mm)
Diameter (d50)	> Ø5.5" (Ø140 mm)
Illuminance (one mask)	> 6,930 fc (74,500 LUX)
Illuminance (two masks)	> 5,600 fc (60,200 LUX)
Illuminance at bottom of standard tube	> 12,300 fc (132,225 LUX)
Illuminance at bottom of standard tube with one mask	> 6,750 fc (72,630 LUX)
Illuminance at bottom of standard tube with two masks	> 5,800 fc (62,400 LUX)

Environmental Specifications

Parameter	Value
Ambient / Operating temperature	41°F to 104°F (5° to 40° Celsius)
Storage temperature range	-4°F to 122°F (-20° to 50° Celsius)
Humidity	10 - 90% relative humidity
Pressure	100 kPA (@<2K meters)

Pre-Installation Guidelines



SPECIAL NOTE: Installation and repair of this equipment should be performed by a qualified mechanical contractor only. Nuvo does not warranty any damage occurring as a result of improper installation.

It is recommended that this installation manual be completely reviewed prior to installation.

Before installation, check to ensure the following minimum conditions are provided:

- The structural ceiling mount is designed to support a vertical load of 300 lbs (trio) and an off-center moment of 960 ft-lbs, the solo light is significantly less. The structural mount should meet all local building codes.

 **A structural mount that does not meet these minimum conditions can cause serious injury and/or property damage.**



 **Failure to use the correct mounting hardware can cause the arm/head assembly to become unstable, causing serious injury and/or property damage.** If the ceiling mounting surface is not level, shim the ceiling casting to level the assembly.

 **Failure to level the ceiling casting may cause unwanted arm “drifting” during use.**

- It is recommended that the Vu surgical lighting system be mounted directly over a 4-0 junction box. If this is not possible the input power supply lines should be wired in accordance with all applicable building codes.
- The supply circuit line must be as follows:
 - 120 VAC lights- 110-120 VAC 50/60 Hz, single phase, three wire, capable of supplying 700 watts @ 5 amperes.
 - 750 VAC lights- 220-240 VAC, 50/60 Hz, single phase, three wire, capable of supplying 700 watts @ 2.5 amperes.
- The power supply circuit must be in compliance with all applicable building codes.
- It is recommended that the Vu Surgical Lighting System is connected to its own supply circuit with integral circuit breaker. The circuit breaker will act as the supply main disconnect switch.
- The MAINS ground wire, which is green with a yellow stripe and has a ring-type terminal at the end, should be securely fastened to the ceiling casting with a screw and lock washer, as shown in Figure: 6 Ceiling Mount (see Common Ground).



 **Failure to provide a circuit meeting these minimum standards or complying with local building codes can cause a shock hazard.**

- Check the length of the ceiling rod supplied to make sure that it is the proper length to install and operate the light without interference or over reach. (See ceiling Rod Calculation on pages 14-16).

Pre-Installation Guidelines

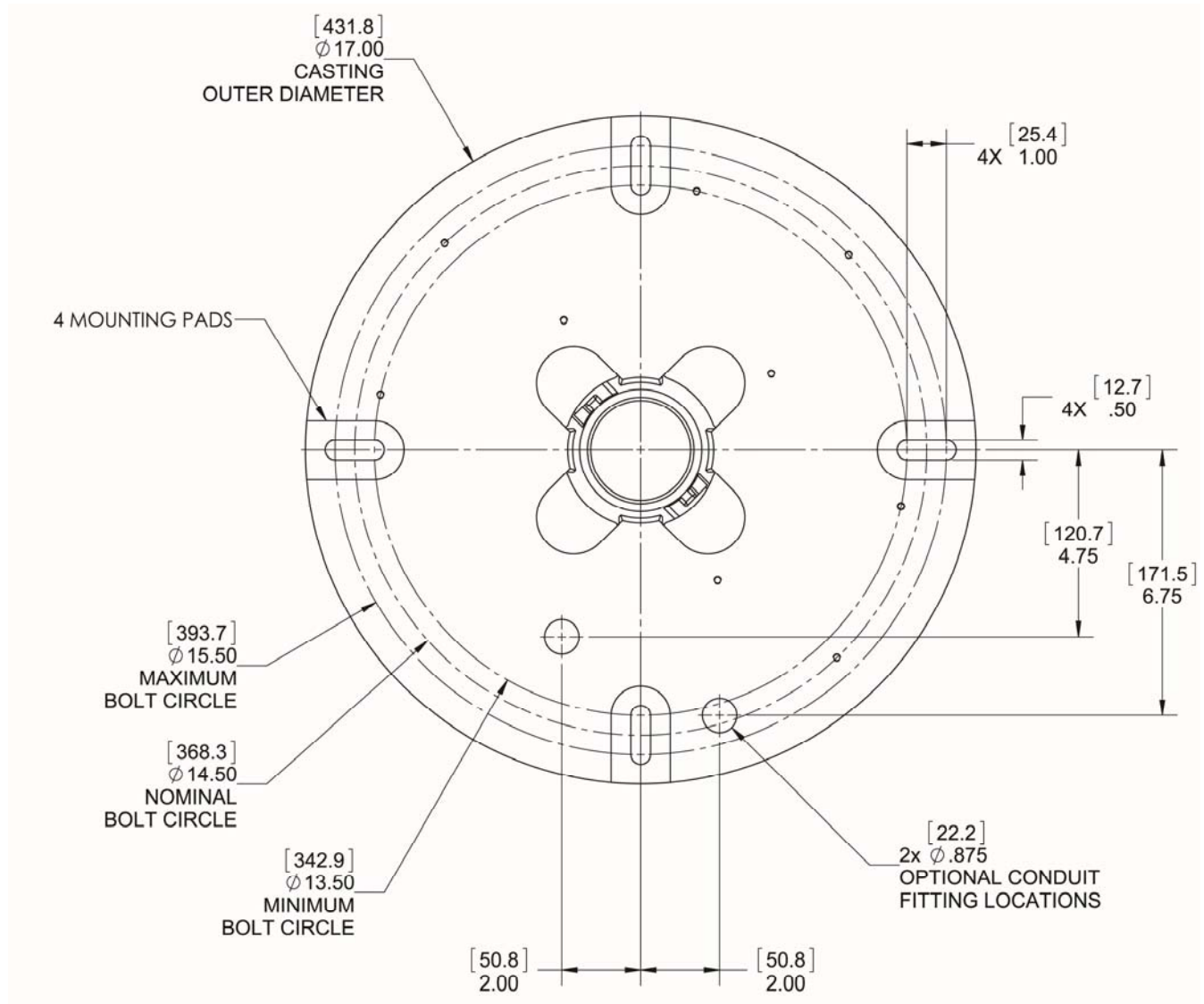


Figure 1: Mounting Dimensions for Ceiling Casting
Top View
[Dimensions with brackets are in millimeters]

Ceiling Rod Calculation, Solo Mount

Use the following table to select the correct length ceiling rod for your application.

Ceiling Mounting Height "Y"-Value	Ceiling Rod Length	"X"-Value	Head Room to Bottom of Extension Arm "Y"-Value – X-Value
8' (2.4m)	N/A	20" (508mm)	76" (1.9m)
9' (2.7m)	9.4" (239mm)	29.4" (747mm)	78.6" (2.0m)
9'6" (2.9m)	13" (330mm)	33" (838mm)	81" (2.1m)
10' (3.1m)	19" (483mm)	39" (991mm)	81" (2.1m)
10'6" (3.2m)	25" (635mm)	45" (1,143mm)	81" (2.1m)
11' (3.4m)	31" (787mm)	51" (1,295mm)	81" (2.1m)
12' (3.7m)	43" (1092mm)	63" (1,600mm)	81" (2.1m)

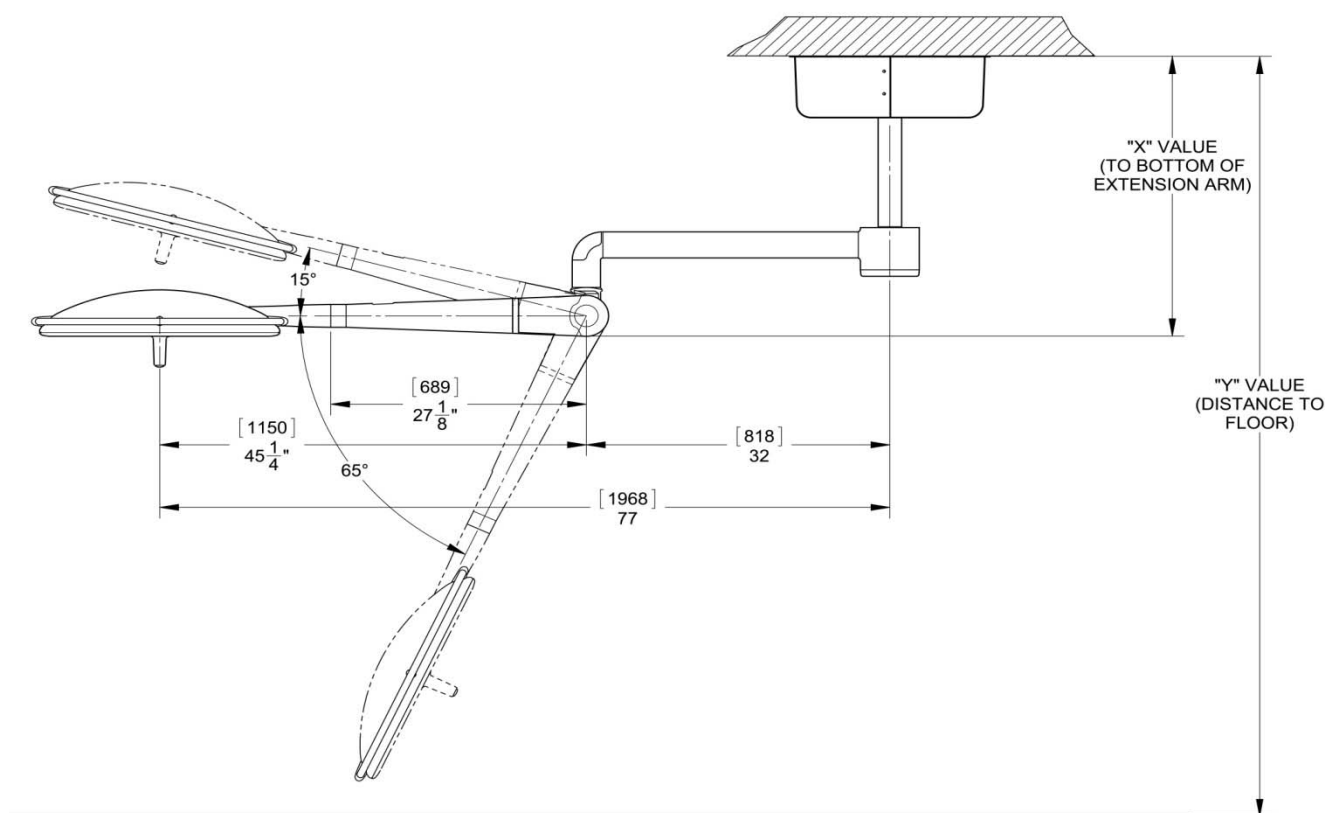


Figure 2: Ceiling Rod Calculation Solo Mount

Section 3

Ceiling Rod Calculation, Duo Mount

Use the following table to select the correct length ceiling rod for your application.

Ceiling Mounting Height "Y"-Value	Ceiling Rod Length	"X"-Value	Head Room to Bottom of Extension Arm Y-Value – X-Value
8'6" (2.6m)	N/A	25" (635mm)	77" (1.9m)
9' (2.7m)	9.4" (239mm)	34.4" (874mm)	73.6" (1.9m)
9'6" (2.9m)	13" (330mm)	38" (965mm)	76" (1.9m)
10' (3.1m)	19" (483mm)	44" (1,118mm)	76" (1.9m)
10'6" (3.2m)	25" (635mm)	50" (1,270mm)	76" (1.9m)
11' (3.4m)	31" (787mm)	56" (1,422mm)	76" (1.9m)
12' (3.7m)	43" (1092mm)	68" (1,727mm)	76" (1.9m)

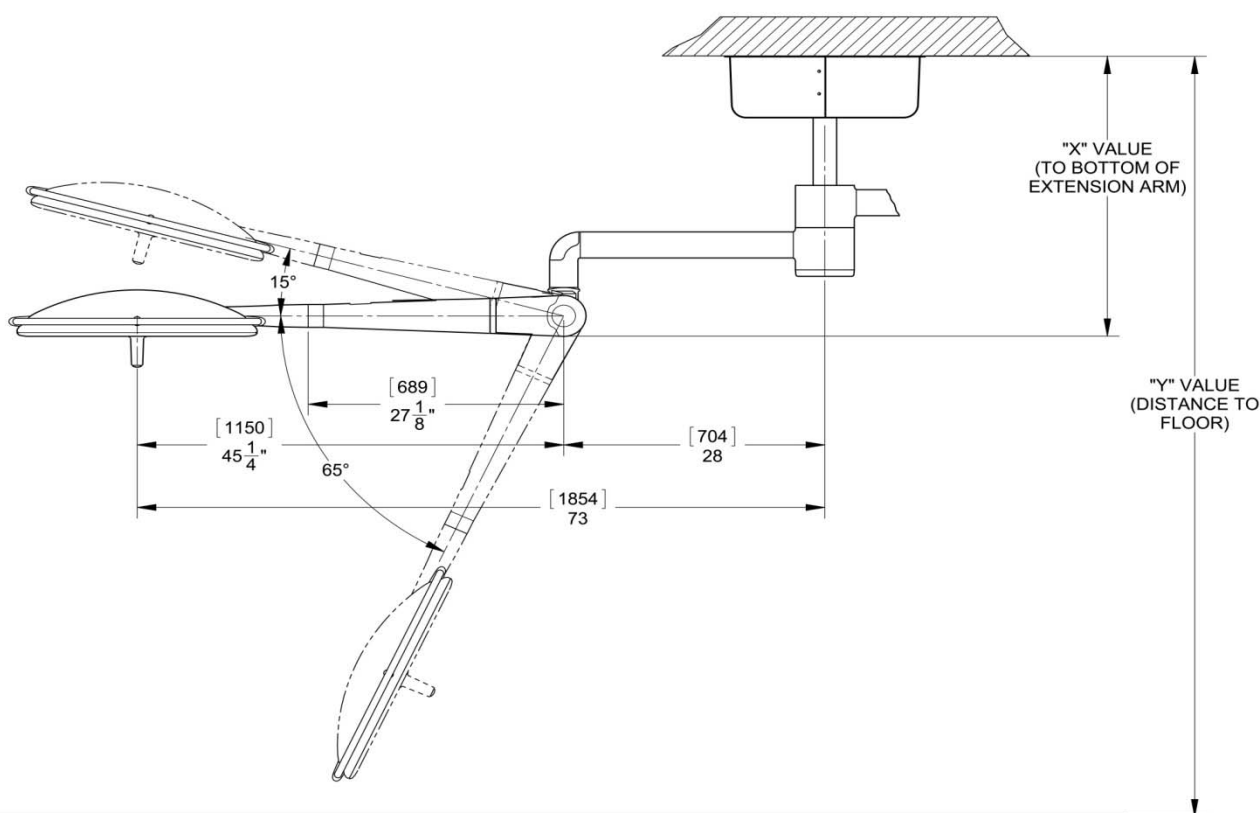


Figure 3: Ceiling Rod Calculation Duo Mount

Section 3

Ceiling Rod Calculation, Trio Mount

Use the following table to select the correct length ceiling rod for your application.

Ceiling Mounting Height "Y"-Value	Ceiling Rod Length	"X"-Value	Head Room to Bottom of Extension Arm (Y-Value – X-Value)
9' (2.7m)	N/A	30" (762mm)	78" (1.9m)
9'6" (2.9m)	9.4" (239mm)	39.4" (1,001mm)	74.6" (1.9m)
10' (3.1m)	13" (330mm)	43" (1,092mm)	77" (1.9m)
10'6" (3.2m)	19" (483mm)	49" (1,245mm)	77" (1.9m)
11' (3.4m)	25" (635mm)	55" (1,397mm)	77" (1.9m)
12' (3.7m)	31" (787mm)	61" (1,549mm)	83" (2.1m)

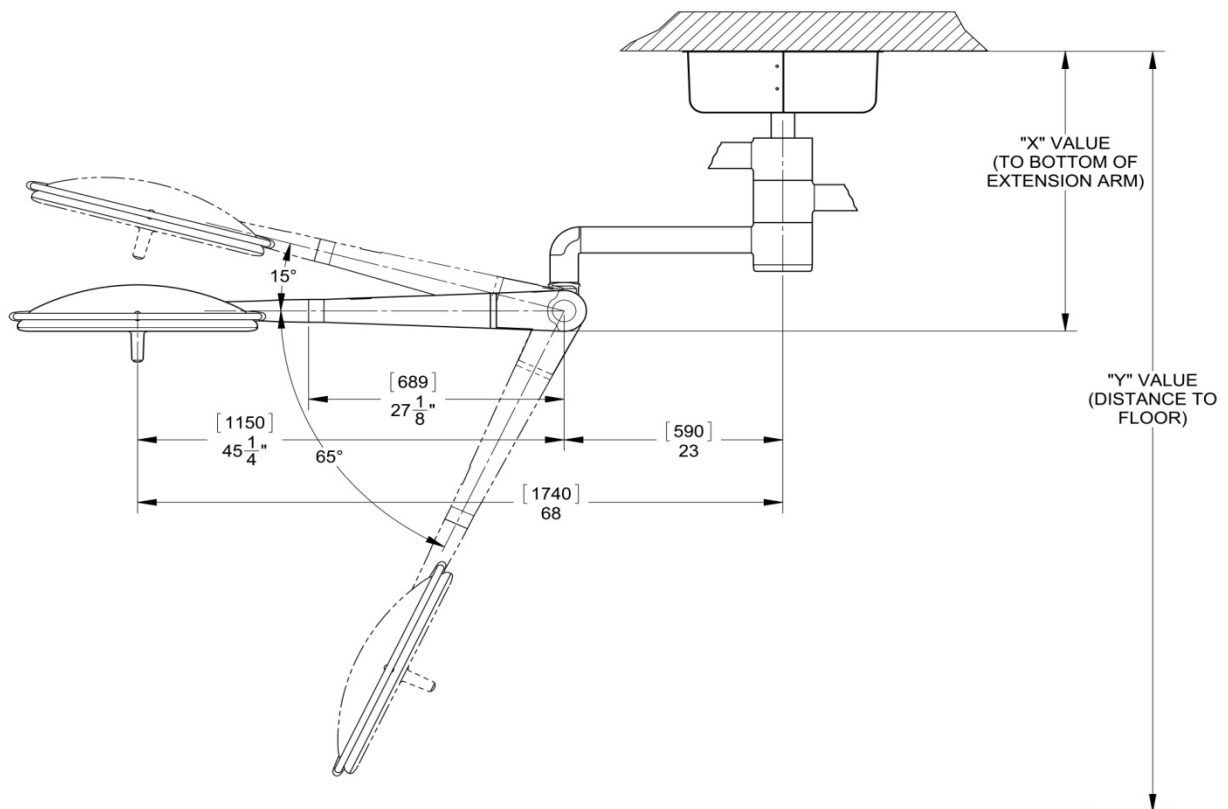


Figure 4: Ceiling Rod Calculation Trio Mount

Section 3

General Information



The Vu ceiling mounted, orbital lighting system is offered in three arm configurations, Solo, Duo & Trio. The system is shipped in separate cartons:

- The Ceiling Casting Assembly, Hardware Kit and this Manual are in one carton
- The Arm Assembly and Ceiling Rod/Adapter Assembly are in one carton
- The Light Head/Yoke Assembly is in one carton
- The Tablet and Wall Mount Housing are in one carton
- The Camera Assembly is in one carton (NVSD3C-E only)

Note: There are 6 standard length extension rods for different ceiling heights. Verify that your ceiling rod length is correct for your ceiling height.



Note: Ceilings under 8-½ feet do not require an extension rod and adapter. If not correct please contact customer service. For ceiling heights greater than 11 feet the ceiling rod/adapter assembly will be shipped separately. Prior to installation ensure that all components shown in Figure 5 are present.



WHEN REMOVING PARTS FROM THE SHIPPING CARTONS, BE CAREFUL NOT TO DAMAGE THE COMPONENTS.



IMPORTANT: THOROUGHLY CHECK EACH BOX FOR PARTS THAT MAY BE LOCATED IN AREAS THAT CAN BE OVERLOOKED.

Installation Ceiling Mount

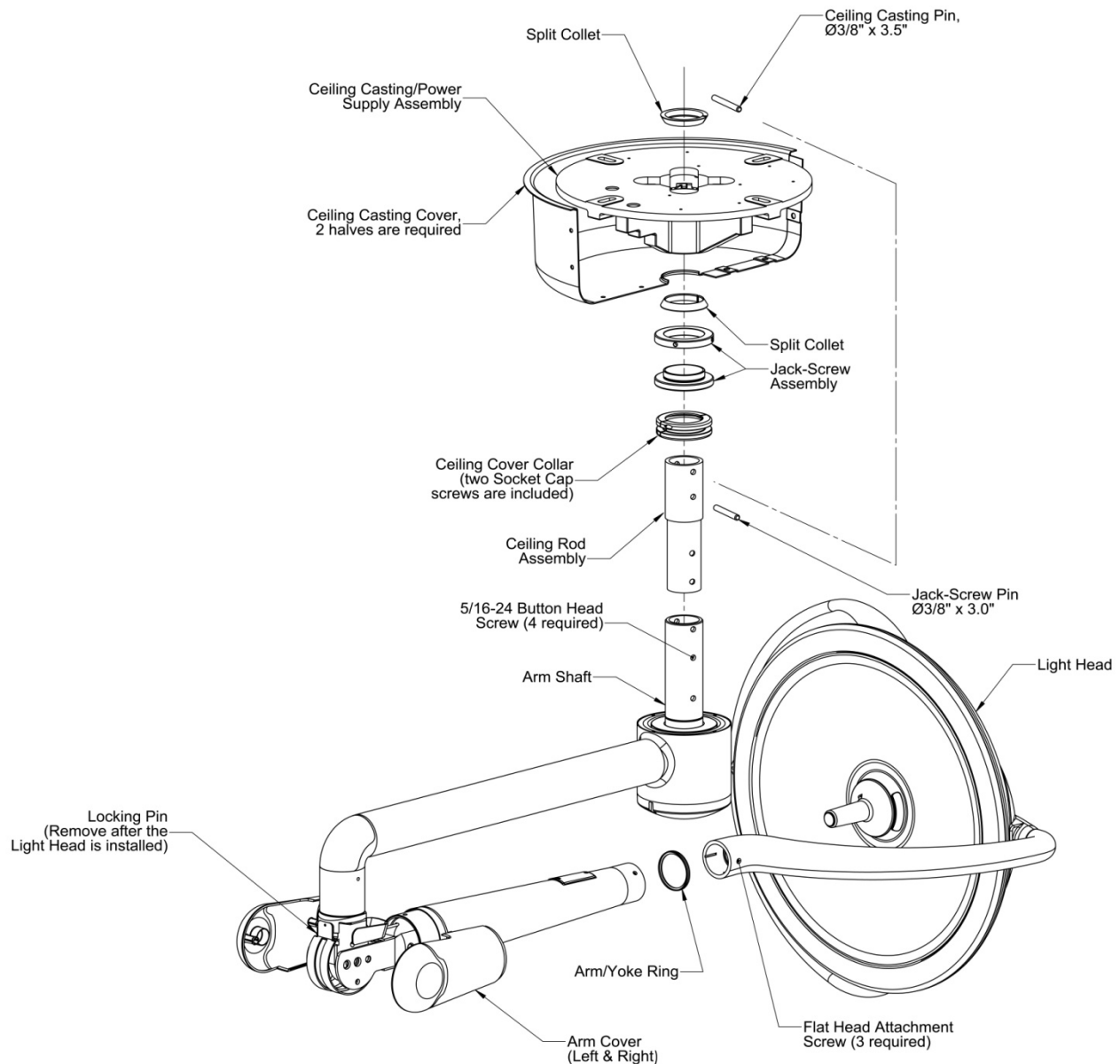


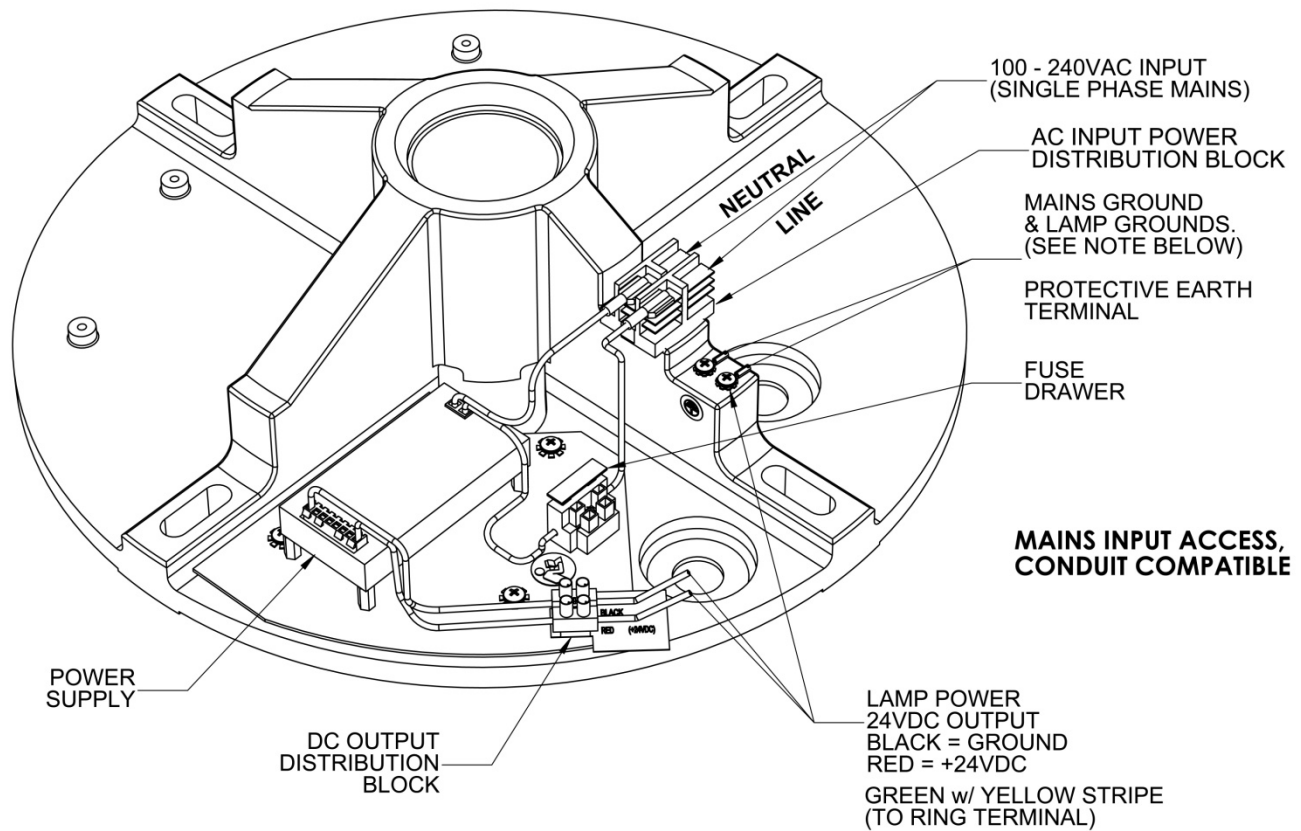
Figure 5: Shown, sub-assemblies for a Solo, ceiling mount.

The same installation applies for the Duo & Trio



Note: Do not remove locking pin until light head is installed on arm.

Installation Ceiling Mount



Ceiling Mount Installation
Figure 6: Ceiling Mount
(Note: Shown as a Solo with Power Supply)

Electrical Connection

Note:

Protective Earth Ground Warning: To avoid risk of electrical shock, this equipment must only be connected to supply mains with protective earth ground.

When connecting the Vu to power ensure that all connections are made in accordance with the local building codes standard. See Figure 12 for electrical connection.

Installation Ceiling Mount

Locate the cartons containing the arm assembly and the ceiling casting. Unpack these components using the instructions on the outside of the container. Remove the contents such that the arm assembly is sitting by itself on top of the lower packing foam. Assemble the arm with the ceiling mounting components shown in Figure 8.

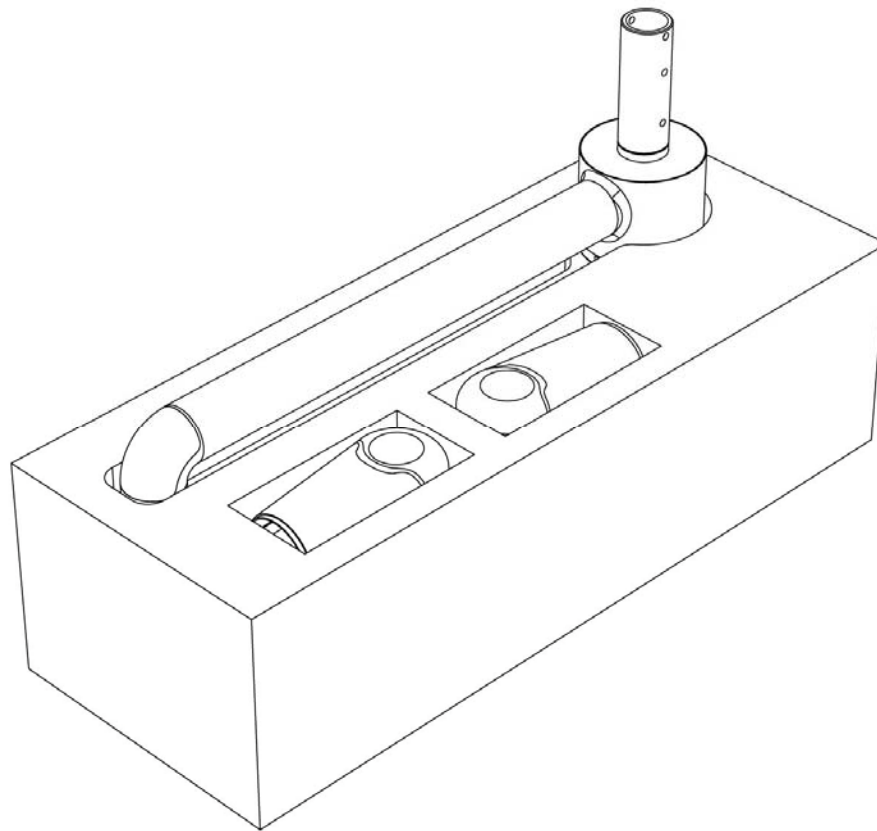


Figure 7: Unpacking and installation setup.

Installation Ceiling Mount

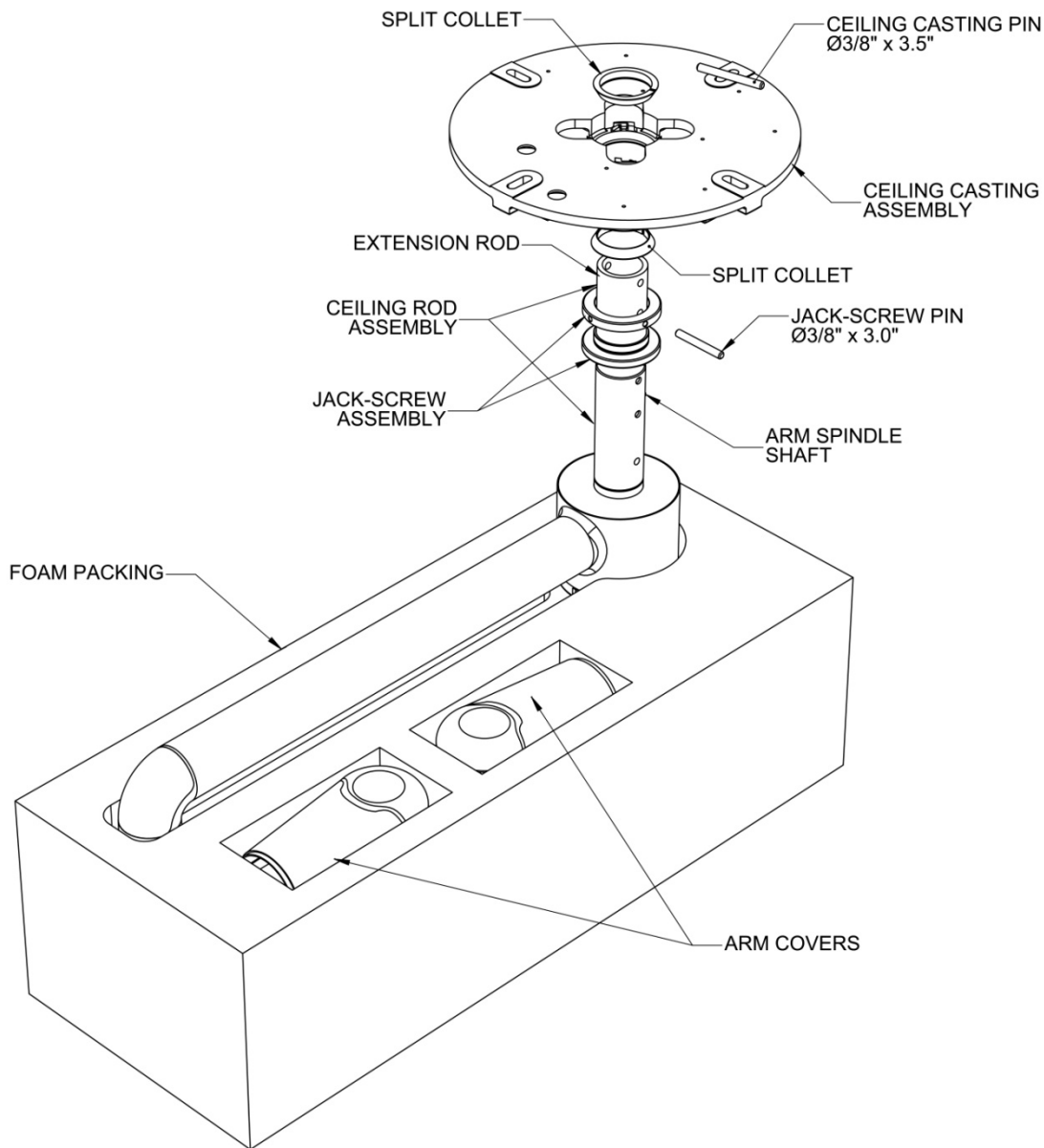


Figure 8: Installation setup

For ceiling heights 8 ½ - 12 feet (this will vary for solo, duo & trio)



Before installing the ceiling casting assembly to the arm spindle shaft, verify the appropriate extension rod length has been ordered and supplied (see figures 2, 3 or 4 on pages 14, 15 or 16). With the correct extension rod, place the large arm ring over the ceiling rod/adaptor and slide the ceiling rod assembly into the spindle shaft while aligning the four screw holes (see figure 8).

Section 3

Installation Setup (cont'd)

Install four 5/16-24 button head screws to secure the arm shaft to the ceiling rod/adaptor. 
Complete the assembly as shown in figure 8.

 **Failure to tighten the 5/16-24 button head screws can cause the arm/head assembly to become unstable causing serious injury and/or property damage.** 

For all ceiling heights

Insert the 3/8 x 3" long dowel pin into the 3rd through hole from the end of the shaft. Screw the two parts of the Jack-Screw assembly together. Slide the Jack-Screw assembly over the shaft, so that the 3" long dowel pin is fully seated into the notch on the Jack-Screw (see figure 8). Slide one of the split tapered collets onto the shaft, tapered end pointed toward the end of the shaft (see figure 8).

Slide the ceiling casting onto the spindle shaft.

Place the other split tapered collet into the tapered counter bore in the top side of the casting and then insert the cable(s) through the shaft hole in the ceiling casting and through the collet. Insert the 3.5" dowel pin through the access holes in the ceiling casting and into the end hole in the spindle shaft. Make sure the pin is on top of the split collet.

Rotate the ceiling casting counter clockwise such that the dowel pin slides up the locking notch ramp and into the locking slot (see figures 10 & 11).

 **Make sure that both dowel pins are seated into their respective slots. Failure to do so could result in damaging the light head arm assembly or cause personal injury.** 

Hand-tightening the Jack-Screw assembly will remove most of the play. Final tightening must be accomplished after the ceiling casting has been bolted in place. Use the two Jack-Screw tightening rods in the hardware kit to tighten the Jack-Screw.

Feed the arm power cables through the ceiling casting large access holes and connect each arm power cable to the appropriate power-supply (see Fig 12 on Page 26). Using the lower packing foam component, hoist or lift the arm assembly toward the ceiling. *Using the foam packing component will prevent the arm from swinging around and assist the installation.* The mains power input cable (not supplied) should be run through the large access holes nearest to the power distribution block.

Securely install the ceiling casting on the ceiling using four (4) 3/8" bolts and washers. It is recommended that only Grade 8 or equivalent fasteners be used for the installation. Make sure the ceiling casting is level. **Note: Fasteners are not provided by Nuvo.**

Using the two Jack-Screw tightening bars, finish tightening the Jack-Screw (see figure 9). To assist tightening wiggle the arm assemble while tightening to remove any excess play. Make sure that all of the play has been removed between the Jack-Screw, the spindle shaft and ceiling casting.

Arm and Ceiling Casting Assembly

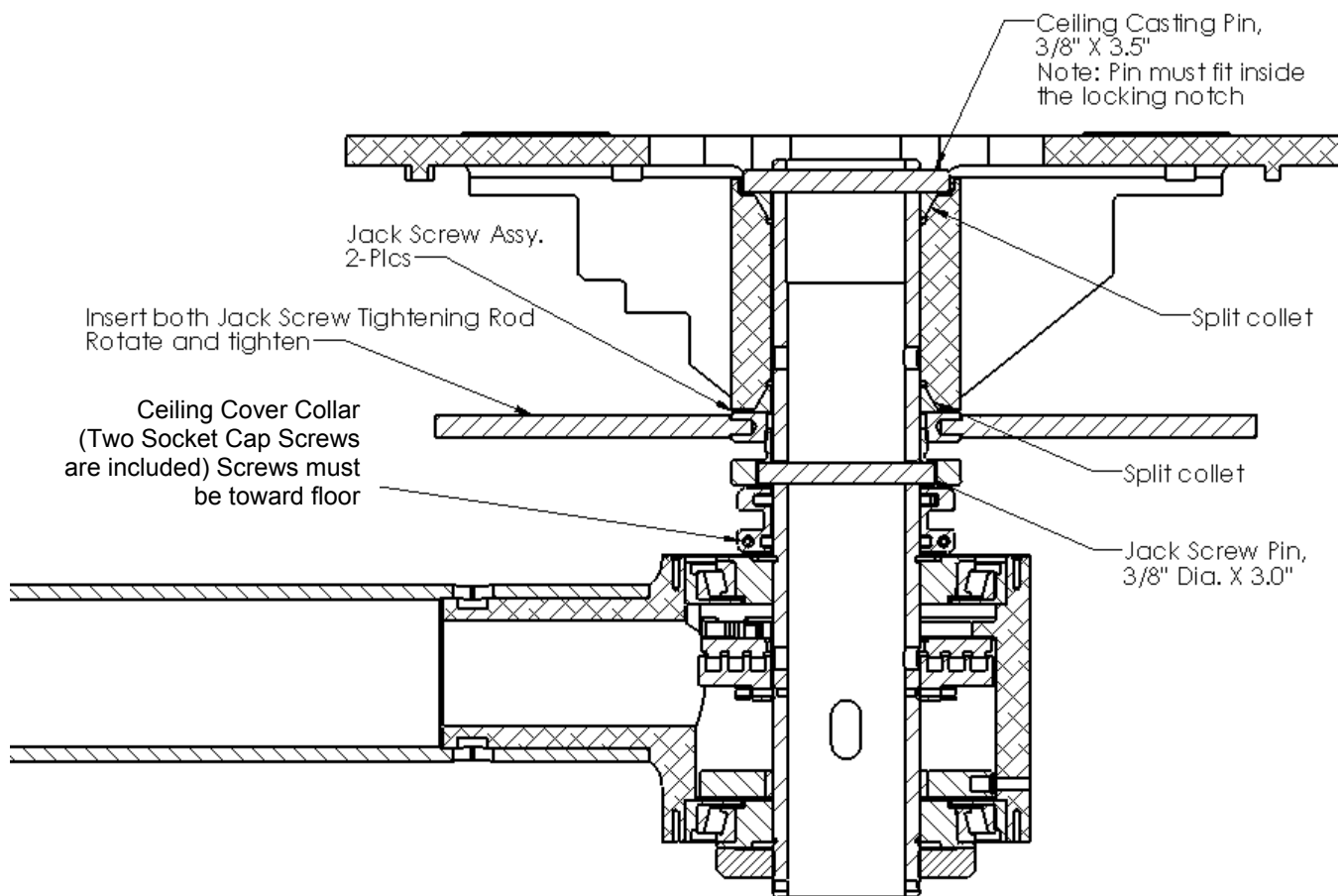


Figure 9: Arm and Ceiling Casting Assembly



Installation Ceiling Mount

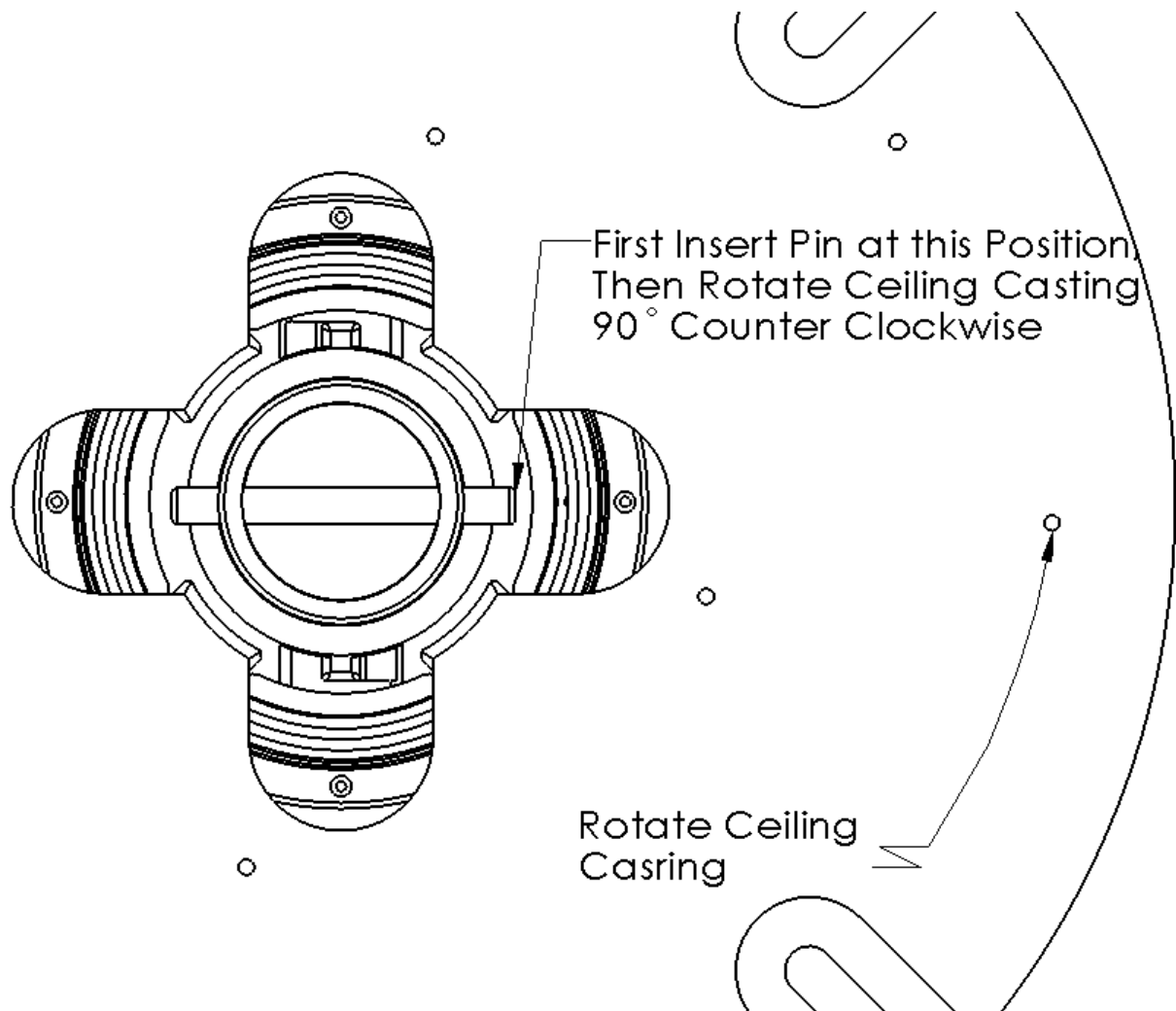


Figure 10: Ceiling & Shaft dowel pin insertion

Installation Ceiling Mount

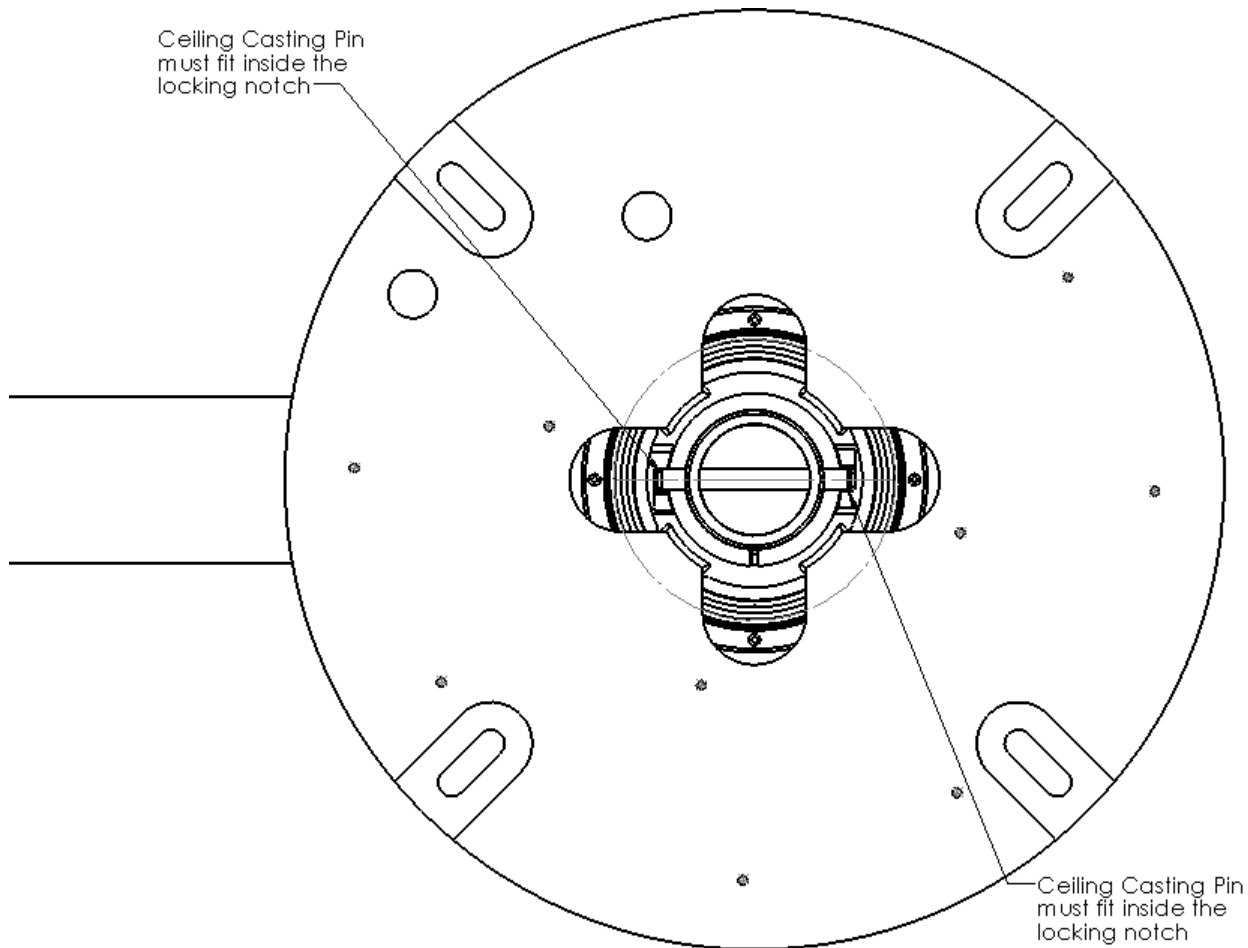


Figure 11: Ceiling & Shaft dowel pin locking. 

 The structural ceiling mount must be designed to support a vertical load of 300 lbs and an off center moment of 960 ft-lbs. The structural mount should meet all local building codes. A structural mount that does not meet these minimum conditions can cause serious injury and/or property damage. 

 Failure to use the correct mounting hardware can cause the arm/head assembly to become unstable, causing serious injury and/or property damage. If the ceiling mounting surface is not level, shim the ceiling casting to level the assembly.

 Failure to level the ceiling casting may cause unwanted arm “drifting” during use.

Arm Cable Termination

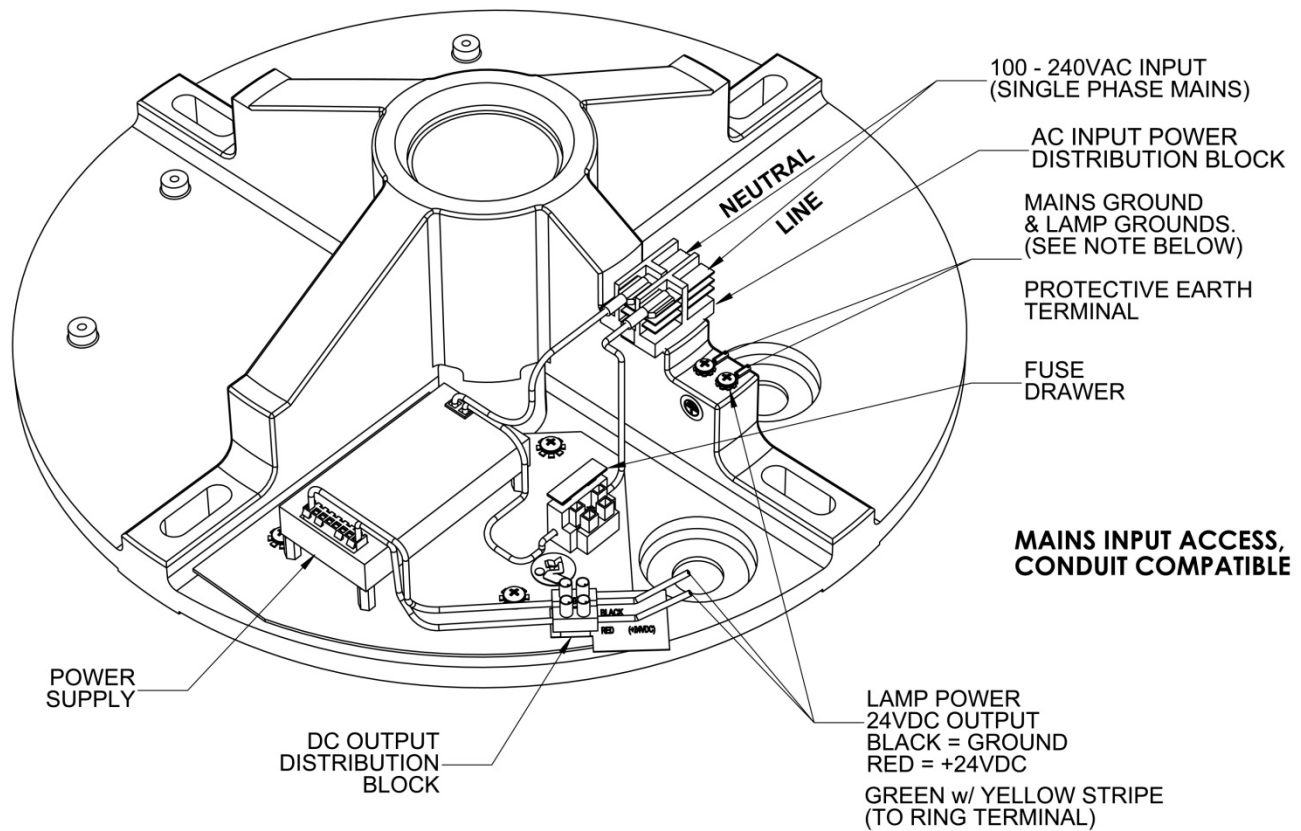


Figure 12: Arm Cable termination
(Note: Shown as a Solo with Power Supply)

Strip 3/16" (7mm) of insulation and twist the ends of each power cables from the Arm Assembly. Connect each one to the DC Output Power Distribution Block: First connect the Green w/ Yellow Strip lead to the Mains Earth Ground  terminal, the Black cable to the Ground and the Red cable to the +24VDC terminal.

 **Protective Earth Ground Warning**, to avoid risk of electrical shock, this equipment must be only connected to supply mains with protective earth.

 **Ensure that the building mains supply is turned off before proceeding.**

 **Provide supply mains in accordance with Local Electrical Code.**

 **Ensure the input supply is Single Phase, between 100-240 VAC. This will be determined by your Country of Installation.**

Section 3

Arm Cable Termination (cont'd)

Secure the building ground wire to the protective earth terminal (ring lug and screw are already installed on the ceiling casting). The protective earth screw will be designated with a ground symbol. Strip the building mains line (Load and Neutral) power input cable ends; crimp on the two ¼ wide quick connect connectors provided in the hardware kit. Connect the Load input wire (from the Junction box) to the black wire on the AC Input Power Distribution Block and the Neutral to the White wire. Tie the two primary wires together (near the power distribution block) with the cable tie provided in the hardware kit.



Remove the two screws from the ceiling cover collar (see figure 9) using the Allen wrench provided in the hardware kit. Install the ceiling cover collar onto the ceiling shaft, ensuring that two screws locations are positioned toward the floor. Tighten the two screws such that the collar does not slip down the rod by itself but can still be moved when pushed by hand.

Install the two ceiling casting covers in the groove on the ceiling collar. Install eight ¼ -20 screws provided in hardware kit to hold the covers together. Slide the collar cover assembly, flush to the ceiling and tighten all screws.

Section 3

Light Head Attachment and Arm Locking Pin Removal

NOTE:  
Do not remove pin until light head is installed on arm

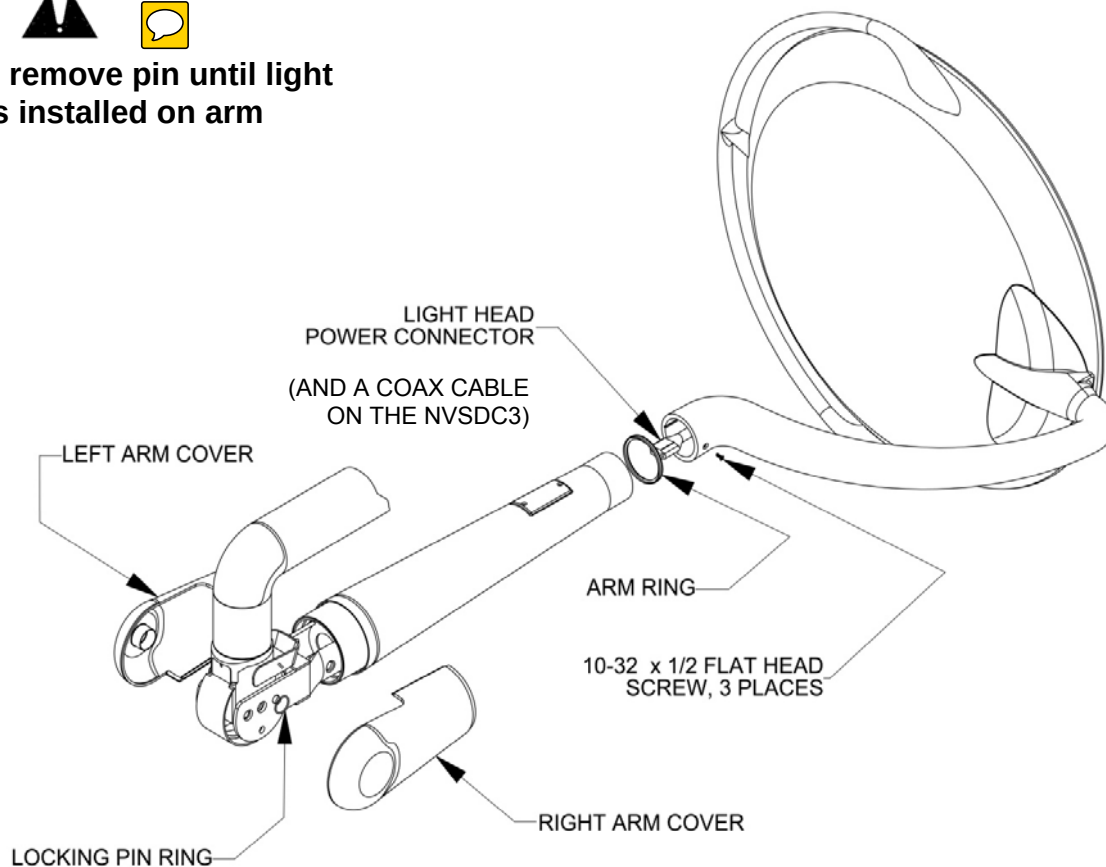


Figure 13: Locking Pin Removal 

 The arm assembly is shipped with a locking pin that prevents the arm from rotating vertically. Do not remove the locking pin until light head has been installed onto the arm assembly. Failure to do so can result in serious injury and/or property damage. Install the small arm ring onto arm assembly. Plug the Light Head Power Connector in the Arm into the Power Connector in the Yoke. Once connected, slide the head assembly over the shaft protruding from the arm and secure using three 10-32x1/2 flat head screws provided in the hardware kit. 

 Failure to install or tighten the three 10-32x1/2 flat head screws can cause the head assembly to fall causing serious injury and/or property damage. 

Note: The pin must be removed before trying to operate the arm. Slightly pull the arm down releasing the tension on the pin; the pin should easily pull out. Keep the pin in a safe place for further use such as normal maintenance.

Remove the arm locking pin and install the plastic arm covers.

The installation is now complete. Refer to operation sections before trying to operate light and arm mechanism.

Operating Instructions



Ensure that the Light is properly installed before attempting to operate the light and arm mechanism. 

To position the light head and arm, firmly grasp the sterilizable handle and move the light head or arm to the desired location.

On/Off: To turn the light on or off, depress the on/off intensity button on the bottom of the sterilizable handle. To dim the light intensity, depress the dimming button on the sterilizable handle, repeating this action will continue dimming the light intensity. The dimming consists of five distinct increments with dimming values in between 100% and 50% of the total illuminance. The light head will automatically reset to full mode if the dimming button is depressed with the light on its lowest setting.

To adjust the light pattern (spot-size), grasp the sterilizable handle and rotate. Rotating the handle counterclockwise will increase the spot size. Rotating the handle clockwise will focus or tighten the spot. Note: Increasing the spot size can will act as a dimmer as it will spread out the light pattern reducing intensity. This feature is only available on the NVSD3-E only. The NVSD3C-E has a fixed pattern.

Installation and Removal for the Sterilizable Handle Assembly (NVSD3C-E only)



Before the light can be used, the Sterilizable Handle Assembly must be installed.



The NVSD3C-E comes equipped with an interchangeable Sterilizable Handle Assembly. The available interchangeable options are the Sterilizable Handle Assembly and a HD Camera Assembly.

To install the Sterilizable Handle Assembly it is first necessary to remove the plastic Sterilizable Handle; then turn the mounted light head so that the LED's face vertically towards the ceiling. Position the Handle Assembly so that the alignment pins align with the corresponding alignment holes in the light head. Using one hand to prevent the light head from moving gently push the Handle Assembly until it is firmly inserted into the light head. Then fasten the three captive screws and reattach the plastic Sterilizable Handle. The light head is now ready to use.

To remove the Sterilizable Handle Assembly, reverse the above sequence.

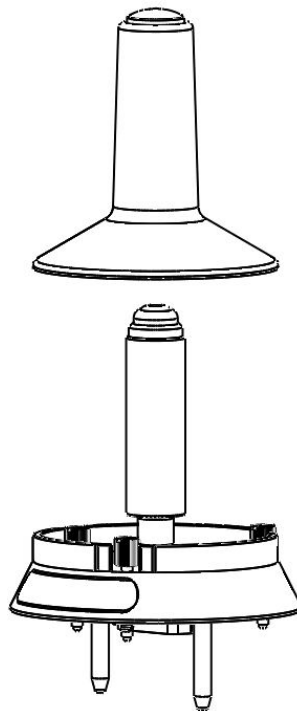


Figure 14: Sterilizable Handle Assembly

Section 4

Installation and Removal for the HD Camera Assembly (NVSD3C-E only)



To install the HD Camera Assembly it is first necessary to remove the Sterilizable Handle Assembly as listed above. Once the Sterilizable Handle Assembly has been removed and the light head has the LED's facing vertically towards the ceiling, remove the outer housing on the camera by pushing the retaining ball and sliding the outer housing off of the Camera Assembly. Then position the Camera Assembly so that the alignment pins align with the corresponding alignment holes in the light head. Using one hand to prevent the light head from moving gently push the Camera Assembly until it is firmly inserted into the light head. Then fasten the three captive screws and reinstall the camera outer housing (a click will be heard when the housing is locked in place). The light head now has HD Camera ready.

NOTE: The camera is a delicate instrument and must be handled with caution.

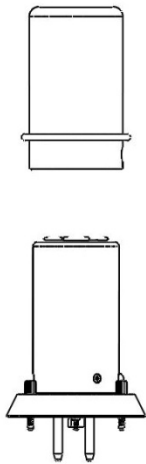


Figure 15: Camera Assembly

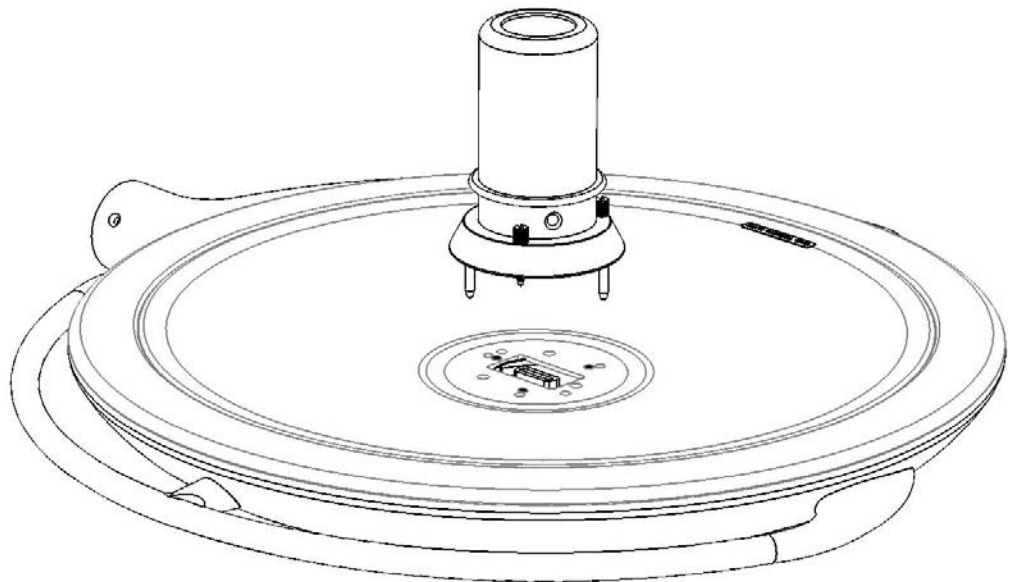


Figure 16: Inserting Camera Assembly

Section 4

Positioning and Using the Light Head and Arm

To position the light head and arm, firmly grasp the Outer Handle or the Sterilizable Handle and move the light head or arm to the desired location.

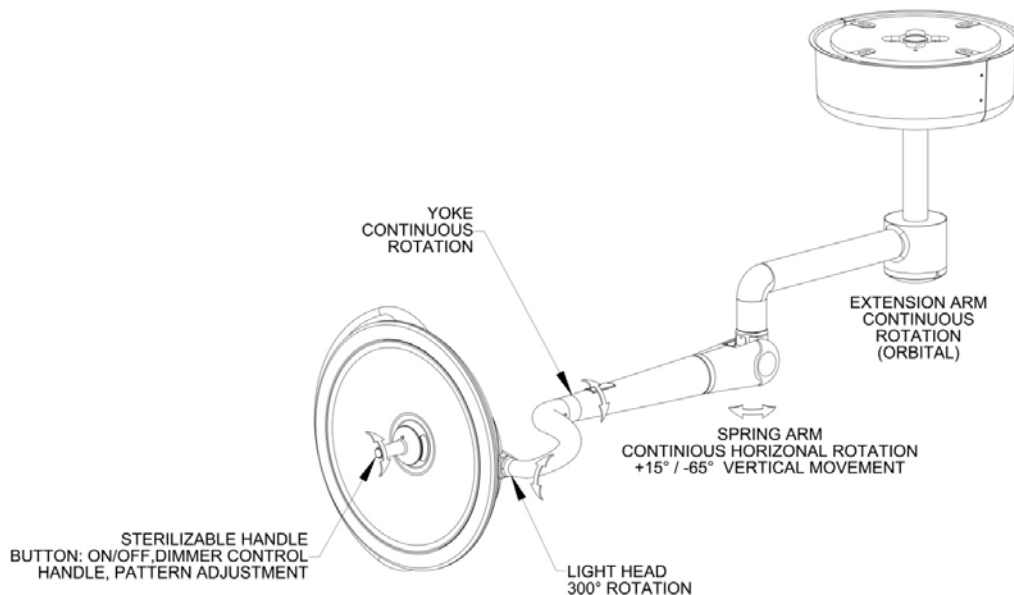
On/Off & Dimmer Control: To turn the light on or off, depress the on/off intensity button on the bottom of the Sterilizable Handle. To dim the light intensity, depress the dimming button on the sterilizable handle. The dimming consists of five (5) distinct increments with dimming values between 100% and 50% of total illuminance. The light head will automatically reset to full mode if the dimming button is depressed with the light on its lowest setting.

The Vu also has an Endo (Endoscopy) Mode integrated into the lights' dimming capabilities. The output in this mode produces Green lighting for use during endoscopic surgery. To put the Vu into the Endo Mode, at any dimming level, press and hold the dimming button for 4-5 seconds.

To turn off the light, set the light into the Endo Mode by holding the dimming button for 4-5 seconds and then press the dimming button once afterwards.

The intensity, color temperature controls and camera controls can be performed via the Wireless Wall Control. See the Wireless Wall Control Supplement Manual for details.

To adjust the light pattern (spot-size), grasp the sterilizable handle and rotate. Rotating the handle counterclockwise will increase the spot size. Rotating the handle clockwise will focus or tighten the spot. Note: Increasing the spot size can act as a dimmer as it will spread out the light pattern reducing intensity (this feature is only available on NVSD3-E).



**Figure 17: Head and Arm Movement
(Solo light shown)**



Safety Tips & Warnings

 Only facility authorized maintenance personnel should install, troubleshoot and/or repair the Vu Surgical Lighting System. Troubleshooting by unauthorized personnel could result in personal injury and/or property damage.



 No modification of this equipment is allowed. Do not modify this equipment without authorization of the manufacturer. If this equipment is modified, appropriate inspection and testing must be conducted to ensure continued safe use of the equipment.

 Isolation from Supply Mains- The isolation shall be provided by the facility. Appropriate Breakers with simultaneous action to all poles shall be made available.

 The articulating arm is spring loaded. When removing the head/yoke ensure that the arm lock pin has been installed. Failure to do so could result in personal injury and/or property damage.

 The articulating arm is spring loaded. Never remove the arm lock pin until the head/yoke has been installed. Failure to do so could result in personal injury and/or property damage.

 Follow the product manufacturer's instructions. Failure to do so could result in personal injury and/or property damage.



 If the unit fails any part of the preventive maintenance functional checks, repair the unit before use on any patient. Failure to do so could result in personal injury and/or property damage.

 Do not use harsh cleaners, solvents, or detergents. Failure to do so could result in equipment damage.

 Do not use silicone based lubricants. Equipment damage could occur.

 The front lens is supplied with a protective hard coat to resist scratching. Never use abrasive cleaners on the front lens. Failure to do so could result in equipment damage.

 Do not back the set screw out past the Hub surface or over-tighten the set screw. Doing either could damage the friction braking system.

 Use caution when maneuvering the Light Head or Arm not to swing into any person, patient or equipment.

Safety Tips & Warnings (cont'd)

-  Turn off main power before any repairs are started. Failure to do so could result in personal injury and/or property damage. 
-  Do not pinch any wires during installation. Pinched wires can cause an electrical shock hazard, resulting in personal injury and/or property damage.
-  Use only Nuvo fuses P/N 0001475 (250 VAC/1.6A slo-blo, Break Capacity: 150%, 1.6A @ 60 minutes min. 1000%, 1.6A @ 20ms min to 300ms max.) if replacement is necessary. Failure to do so could result in personal injury and/or property damage.
-  Do not expose the unit to excessive moisture. Failure to do so could result in personal injury and/or property damage.
-  Do not rest articles or liquids on top of the Vu Surgical Lighting System. Spilled liquids will damage the light head and arm assemblies causing an electric shock hazard.

Section 6

Fuse Replacement

 **Turn off main power before fuses are replaced. Failure to do so could result in personal injury and/or property damage.** 

- To remove the ceiling cover halves, remove the eight ¼-20 attachment screws that hold the covers together and pull the halves apart. It may be necessary to loosen the two ceiling collar screws and slide the collar down the ceiling rod.
- Locate the FUSE HOLDER and pull the FUSE DRAWER out with your fingers.
Note: A spare replacement fuse is located in the upper part of the fuse holder. Take out the blown fuse in the lower fuse holder and replace it with the fuse in the upper holder.
- Replace defective fuse with Nuvo P/N - 0001475, 250VAC/1.6 amp slow-blow fuse, Break Capacity: 150%, 1.6A @ 60 minutes min. 1000%, 1.6A @ 20ms min to 300ms max.

 **Use only Nuvo fuses P/N 0001475, if replacement is necessary. Failure to do so could result in personal injury and/or property damage.** 

- Replace ceiling covers and restore main power to the unit.

Note: Do not use light should it continue to blow fuses. Contact the factory immediately

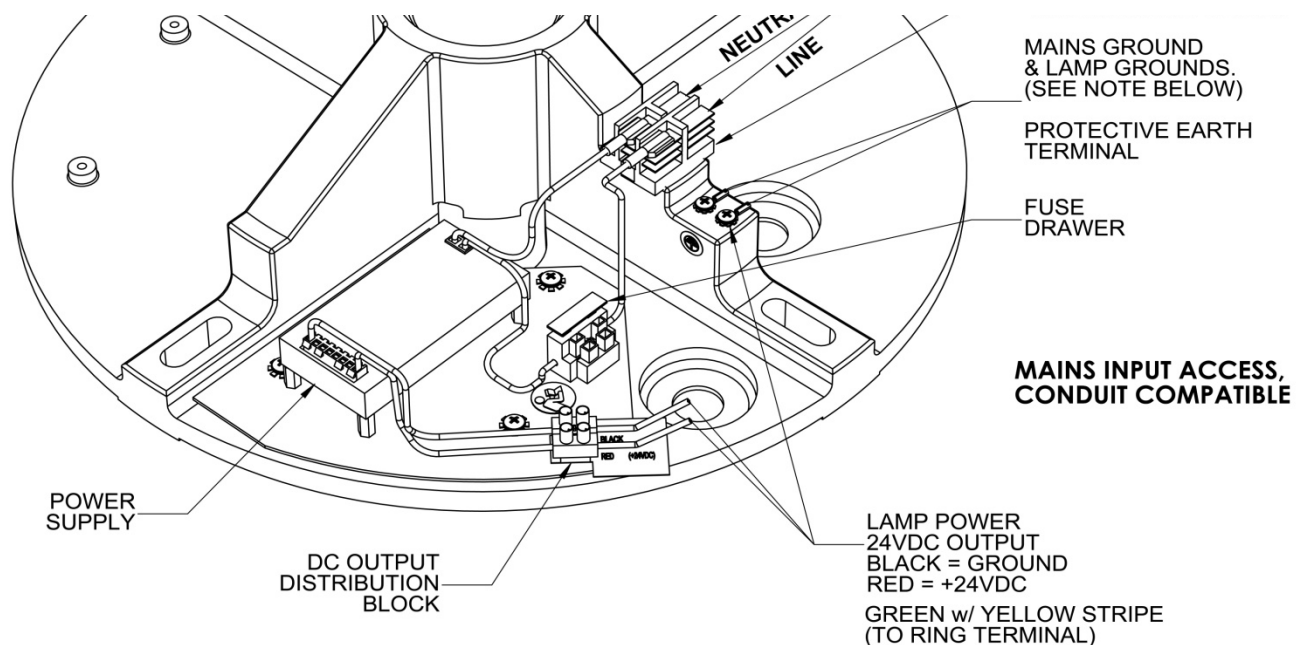


Figure 18: Fuse Replacement

Arm Adjustment

⚠ If the articulating arm will not maintain its vertical position (up or down), the spring inside the arm needs to be adjusted

- Remove the two screws on the access cover.
- Lower the arm and head until the adjustment holes in the spring tension adjustment nut is accessible.

⚠ Make sure the adjustment rod is firmly in the spring tension adjustment nut before adjusting the spring. Failure to do so could result in personal injury and/or property damage.

- Turn the 1/4" diameter rod clockwise to increase the tension in the spring (needed when light head tends to droop on arm). Turn the spring rod counterclockwise to decrease the tension in the spring. Continue to adjust until light head is again balanced.

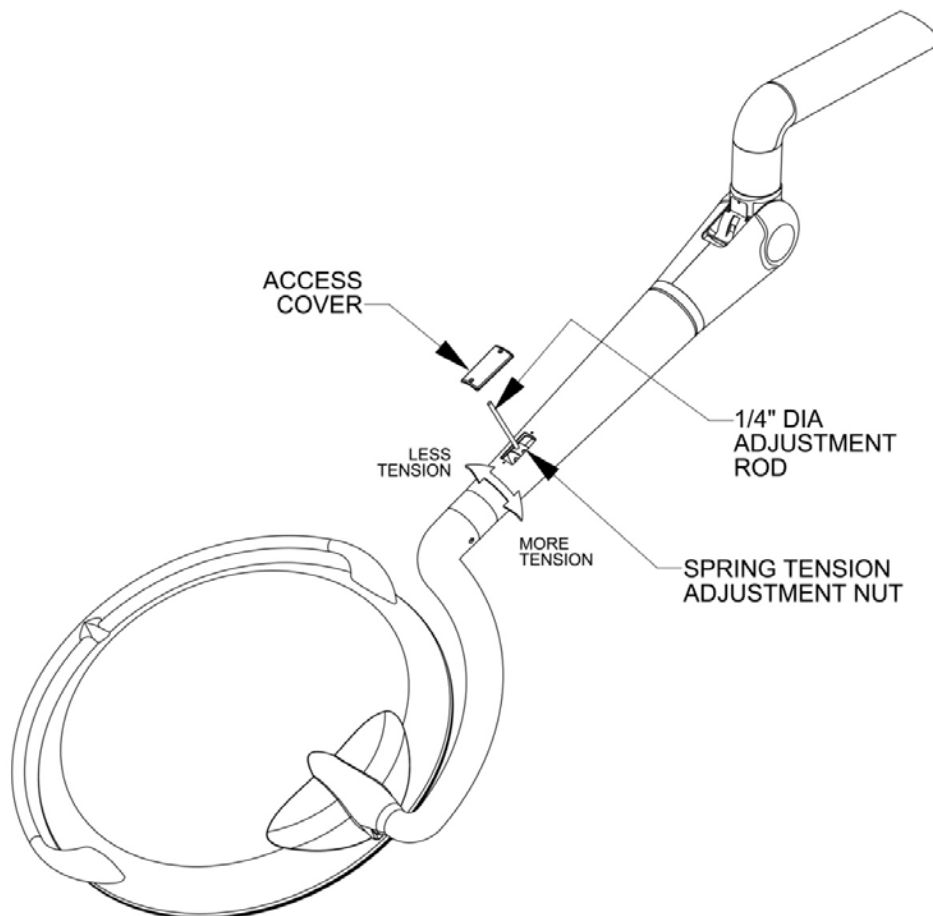


Figure 19: Arm Adjustment

Head Adjustment

- To adjust the friction between the head and the yoke, rotate the head until the hole in the yoke is exposed, as shown below. 
- Insert the 5/16" Allen wrench into the hole and tighten the set screw to increase the head friction or loosen the set screw to decrease head friction.

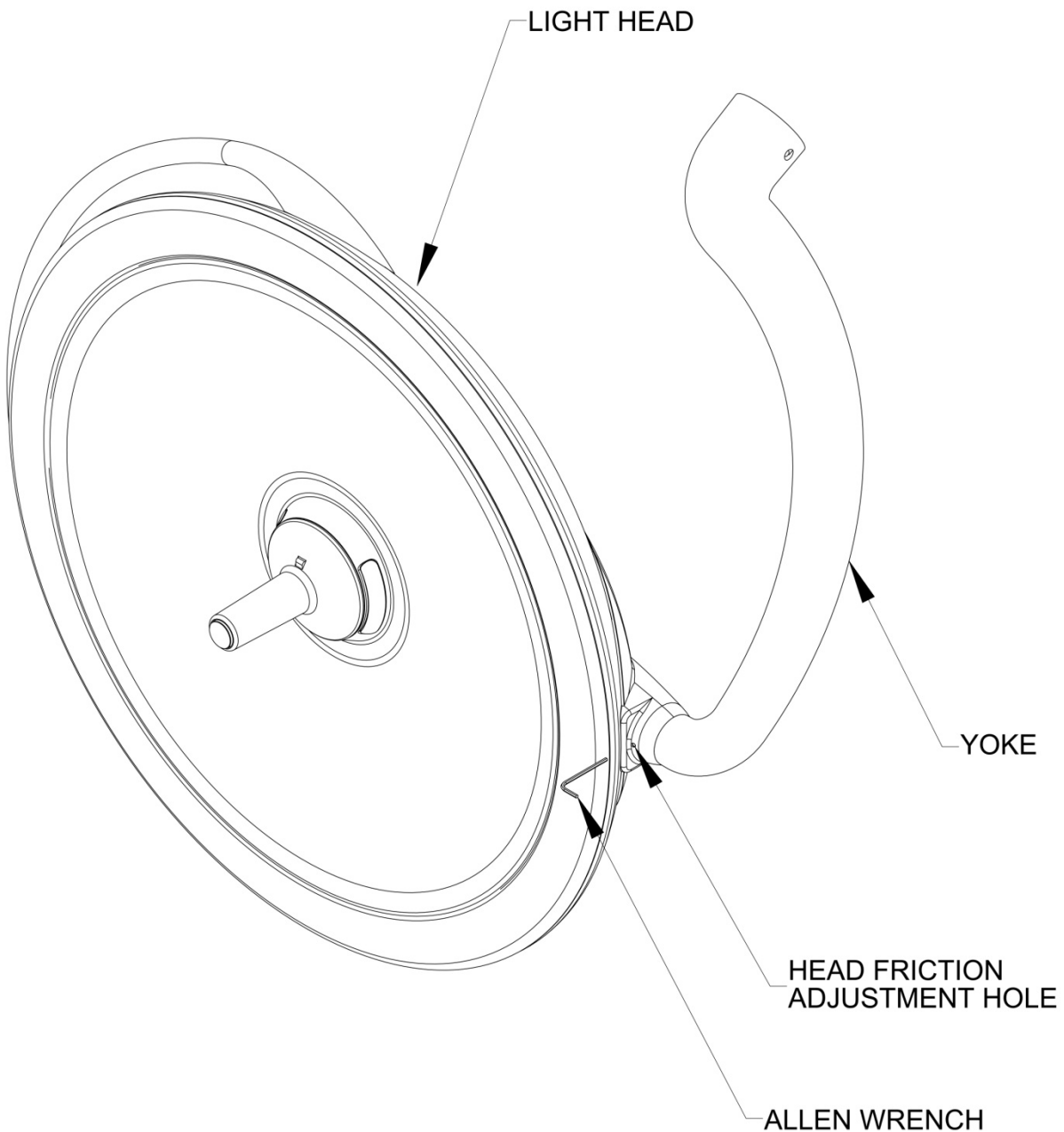


Figure 20: Light Head Adjustment

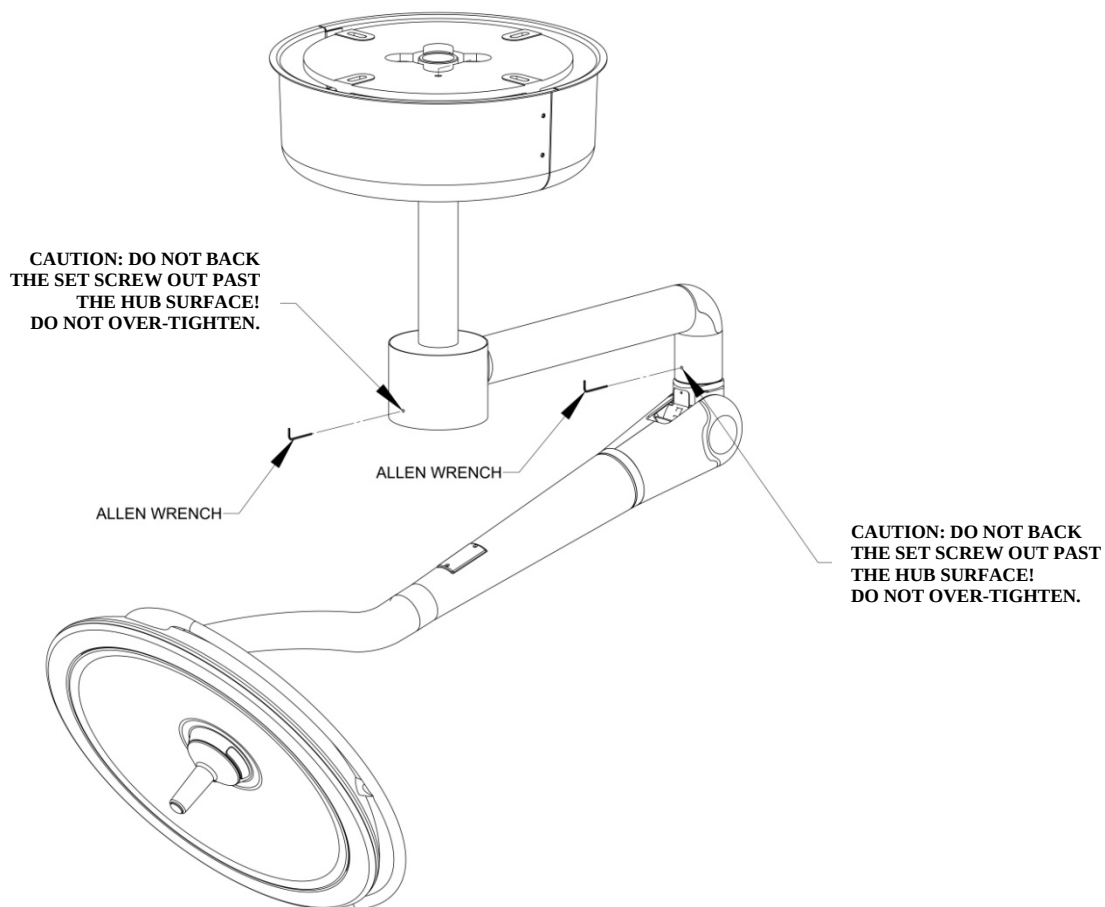
Arm Friction Adjustment



Before setting tension, check mount for level/flex

- All arm/head assemblies have an internal brake to eliminate arm/head drifting during use. These brakes are pre-adjusted at the factory. If the whole arm assembly and head is drifting, adjust the brake closest to the ceiling casting.
- Using the Allen wrench (supplied in the hardware kit) turn the 2 set screws located on the arm housing clockwise to increase friction or counterclockwise to decrease friction. If the head and articulating arm are drifting, adjust the brake located on the extension arm.
- Using the Allen wrench (supplied in the hardware kit) turn the set screw (2 locations) located on the elbow clockwise to increase friction or counterclockwise to decrease friction. **DO NOT BACK THE SET SCREWS OUT PAST THE HUB SURFACE!**
- Do not over-tighten set screw.

Note: If the Arm exhibits excessive drifting, check that the Ceiling Mount is level and that the mounting bolts are tight and the Jack-Screw is securely tightened (see figure 9).



**Figure 21: Arm Friction Adjustment
(solo light shown)**

Handle Sterilization

- Remove the sterilizable handle by pressing the Handle Button near the base of the handle towards the center and pull the handle off the handle post.
- Sterilize the handle utilizing steam sterilization of minimum 250° Fahrenheit for a minimum of 30 minutes in compliance with AAMI-SSSa-1988 Good Hospital Practices, Steam Sterilization and Sterility Assurance, or equivalent method.

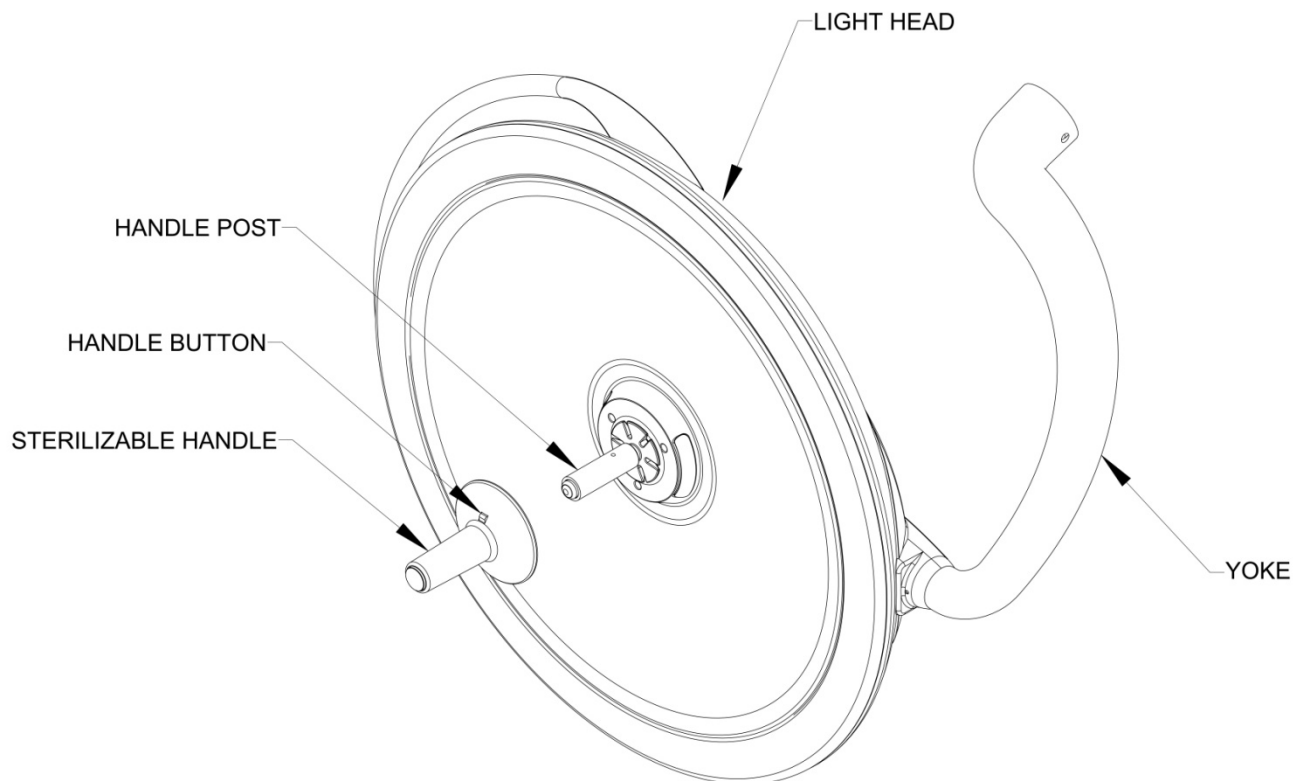


Figure 22: Handle Sterilization

Cleaning Instructions

- The front lens is made from a UV resistant polycarbonate plastic that has an external hard coating to resist scratching. Clean the lens using glass/plastic cleaner or mild soap and water mix. It is very important to use a clean, soft cloth to avoid any scratching of the diffuser. Never spray the cleaning fluid directly onto the lens surface, but instead spray into clean cloth and then wipe the lens.
- Clean the light housing and arm using mild soap and water mixture. Apply this mixture to a clean cloth and wipe down the light head and arm. Never spray the cleaning fluid directly onto the light head or arm, but instead spray onto clean cloth and then wipe the light head and arm.

 **Do not use harsh cleaners, solvents, or detergents. Failure to do so could result in equipment damage.** 

 **The front lens is supplied with a protective hard coat to resist scratching. Never use abrasive cleaners on the front lens. Failure to do so could result in equipment damage.**

 **Do not expose the unit to excessive moisture. Failure to do so could result in personal injury and/or property damage.**

Table 1: Preventative Maintenance Schedule

Function	Procedure	
Bolts and nuts	Check to see that all mounting and attachment bolts, set screws, pins, etc. are in place and securely tightened. Replace any missing bolts and re-tighten as required.	
Moving joints/Adjustments	Check to make sure all moving joints function properly along the mounting system and head and arm system. If the articulating arm does hold its position (drifts from original position) refer to the Arm Adjustment section. If the Light Head drifts, refer to Light Head friction adjustment. If this does not solve the problem contact customer service as the unit may require factory repair	
Overall appearance	Check the general aesthetics of the Vu Surgical Lighting System. The unit should be kept clean and dust free. Clean and dust as necessary.	

Note: Maintenance schedules vary for each light depending on usage and operating instructions. An annual inspection of the equipment is recommended. 

Note: Nuvo recommends that the maintenance records for this equipment be kept on file at the health care facility.

Section 7

Troubleshooting

 **Warning:** Disconnect the light from the power supply before attempting any of the electrical checks mentioned below. 

Problem	Cause	Remedy
Light will not turn on	1. Power to unit is off 2. Fuse is blown 3. Exposed wires are cut or damaged 4. Wire not connected correctly during installation 5. Wire connections made during installation have disconnected 6. No input power to light unit 7. Disconnected wires at power supply 8. No power output from power supply when input power to power supply is measured.	1. Turn on power (plug in unit) 2. Replace fuse/fuses (check for correct fuse) 3. Replace wire assembly 4. Check all wiring connections 5. Reconnect wires per the instructions 6. Check power input connections and circuit breakers 7. Reconnect wires 8. Replace faulty power supply
Light does not maintain its position vertically	Spring tension or friction is incorrect. Additional equipment was added to unit.	Adjust spring Remove additional equipment from arm.
Arm/Head assembly does not maintain its position horizontally (Orbital)	Ceiling casting mount is not level. Ceiling casting mounting screw are loose. Arm/Head needs friction adjustment. Jack-Screw is loose.	Level ceiling casting mount by shimming. Tighten ceiling casting mounting fasteners. Tighten Jack-Screw.
Light head is loose (drifts) at yoke interface	Head needs friction adjustment.	Adjust light head (see light head friction adjustment)
Light head will not rotate at yoke interface	Light head is against internal stop.	Rotate head in opposite direction.
Articulating arm cannot be moved any lower	Arm is against internal stop.	Rotate arm in opposite direction.
Articulating arm cannot be raised any higher	Arm is against internal stop.	Rotate arm in opposite direction.