



# Leo Minor<sup>®</sup>

Multipurpose LED surgical light

INSTALLATION AND SERVICE MANUAL

LMI-300

LMI-400

LMI-550

LMI-700

## OUT OF THE SHADOWS

Innovation comes to Light

 **sunnex**

## Agency Approvals

Medical Electrical Equipment with respect to  
electric shock, fire and mechanical hazards only  
in accordance with UL60601-1 / CAN/CSA C22.2 601-1 M90

Classifications:

IEC 60601-1  
IEC 60601-1-2  
EMC for Medical Electrical Equipment EN60601-1-2:2007 Group 1 Class A  
Test Report Number 13F266

Medical Electrical Equipment  
Particular requirements for the safety of surgical  
luminaires and luminaires for diagnostics  
in accordance with IEC 60601 2-41



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## Section 1: Terminology

### 1.1 Definition of Terms

- **Lux**  
Unit for the amount of visible light measured by a light meter at a certain point.
- **Central Illuminance**  
Illuminance at 1m distance from the light emitting surface in the light field center expressed in Lux.
- **Light Field Centre**  
Point in the light field (lighted area) where illuminance reaches maximum lux intensity.
- **Depth of Illumination**  
The distance under the light emitting area where the illumination reaches 20% of the central illuminance.
- **Shadow Dilution**  
The lights ability to minimize the effect of obstructions. Shadows can be due to partial obstruction by the operator or other medical personnel.
- **Correlated Color Temperature**  
The color temperature of the light fixture when compared to a blackbody radiator expressed in Kelvin.
- **Total Irradiance**  
The total amount of energy imparted to the patient by the lighting system expressed in Watts/meter squared.

## 1.2 List of Symbols



**Caution** - Non-compliance with caution notes may cause injuries or material damage.



**Explosion Hazard**

The above is an explosion hazard warning symbol. Non-compliance with this symbol may result in injuries due to explosion.



**Electric Shock Hazard** - Non-compliance with this symbol may result in injuries due to electric shock.



**Warning!** - Non-compliance with warning notes may cause serious or fatal injuries.



**C.E. Marking**

**N**

**Neutral Conductor** – Return line for current.



**Earth Ground** – Protective conductor.

**L1**

**Live Conductor**

## Section 2: Specifications

### 2.1 General Specifications

#### Mechanical Specifications

	Weight
Head	15 lbs (6.8 kg)
Mobile Stand (Head included)	31 lbs (14.1 kg)
Single Ceiling Mount (Head included)	33 lbs (15.0 kg)
Dual Ceiling Mount (Head included)	46.4 lbs (21.0 kg)
IP Rating	IP 42

#### Electrical Specifications

<b>Voltages</b>	
Input Voltage	110-240 VAC, 50-60 Hz, 40W
Head Voltage	24 VDC
Power Consumption	34W MAX
LED Life	50 000 hours on average
Dimming Control	Adjustable 20-100% of $E_c$ 5 discrete settings

#### Optical Specifications

Central Illuminance ( $E_c$ ) @ 1 m (39.3")	80 000 LUX (Nominal)
Color Rendering Index ( <b>CRI</b> )	90 MIN
Correlated Color Temperature @ 1 m (39.3")	4500K (Nominal)
Light Field Diameter @ 1 m (39.3")	
D50, 50% of $E_c$	4.75"
D10, 10% of $E_c$	8"
Maximum Total Irradiance	<1000 W/m <sup>2</sup>
Depth of Illumination	37.8" (96cm)
R9 Value	98

**Optical Specifications cont'd**

Illuminance with one mask.	.04%
Illuminance with two masks.	60%
Illuminance at the bottom of a standardized tube.	99 %
Illuminance at the bottom of a standardized tube with one mask.	.04%
Illuminance at the bottom of a standardized tube with two masks.	58%

**Rotational Specifications**

Spring Arm/ Yoke interface	Unlimited
Light Head/Yoke interface	180°
<b>CEILING HORIZONTAL</b> Down Tube/Extension Arm Extension Arm/Spring Arm interface	<b>LMI-550 Series</b> Unlimited
<b>CEILING VERTICAL</b> Spring Arm	<b>LMI-700</b> 330° 330° +/- 45° from horizontal position
<b>WALL HORIZONTAL</b> Wall Bracket Spring Arm	<b>LMI-400</b> +/- 180° from wall bracket Unlimited
<b>WALL VERTICAL</b> Spring Arm	330° +/- 45° from horizontal position
<b>MOBILE HORIZONTAL</b> Spring Arm	55°
<b>MOBILE VERTICAL</b> Spring Arm	+/- 45° from horizontal position

**Environmental Specifications**

## Operating Conditions

Temperature	50°F to 95°F, 10°C to 35°C
Humidity	30% -75 %
Atmospheric Pressure	70kPa – 106kPa

## Transport and Storage Conditions

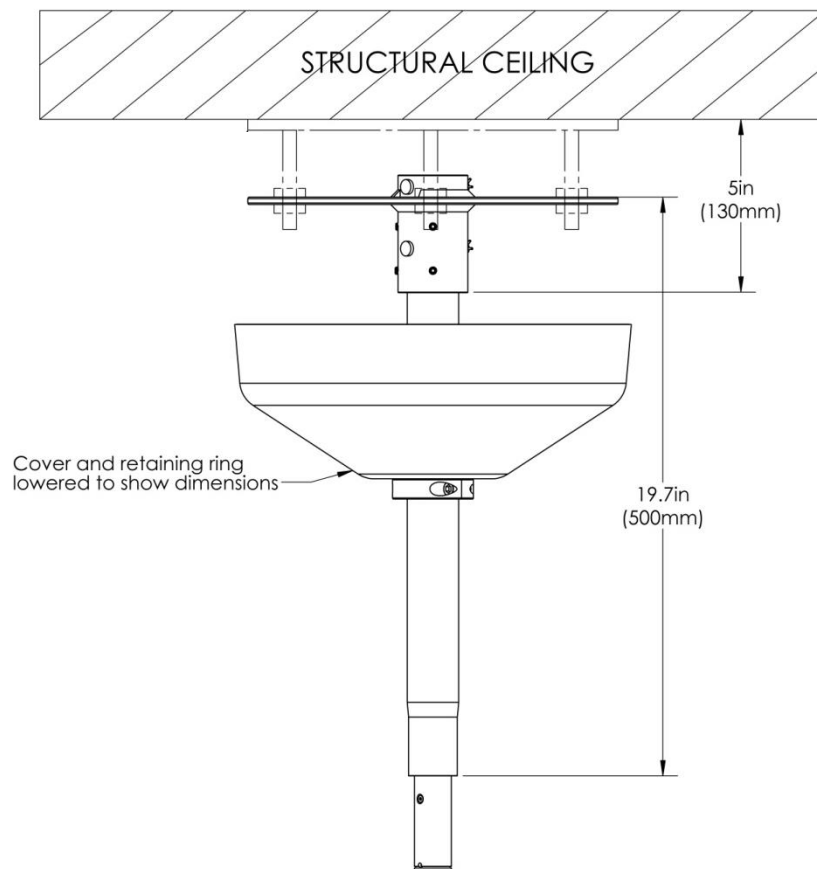
Temperature	-13°F to 158°F, -25°C to 70°C
Humidity	10% -75 %
Atmospheric Pressure	50kPa – 106kPa



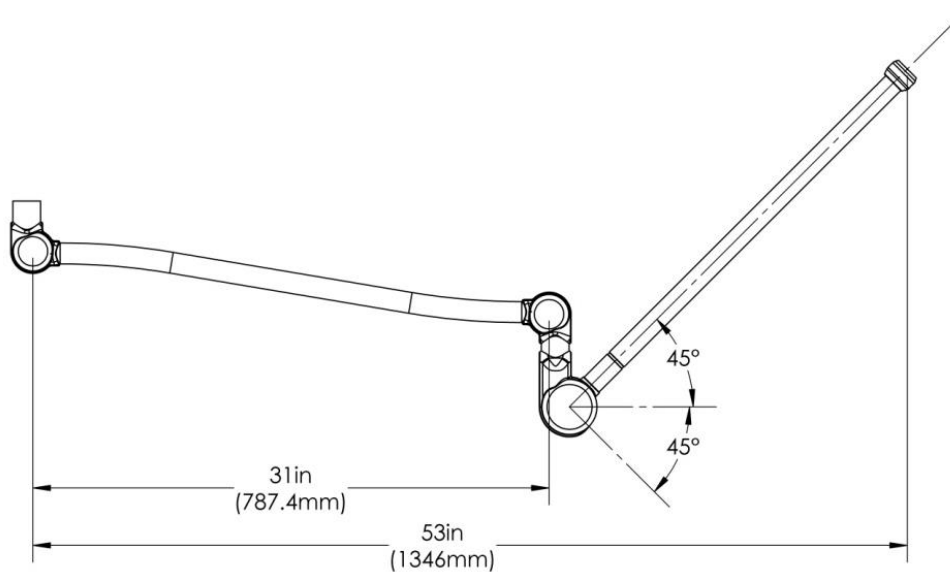
The equipment is not suitable for operation in areas with an explosion hazard.

- Device is not suitable for usage in combustible mixtures of anesthetic agents with air or in combustible mixtures of anesthetic agents with oxygen or laughing gas.

## 2.2 Single Ceiling Mount Dimensions



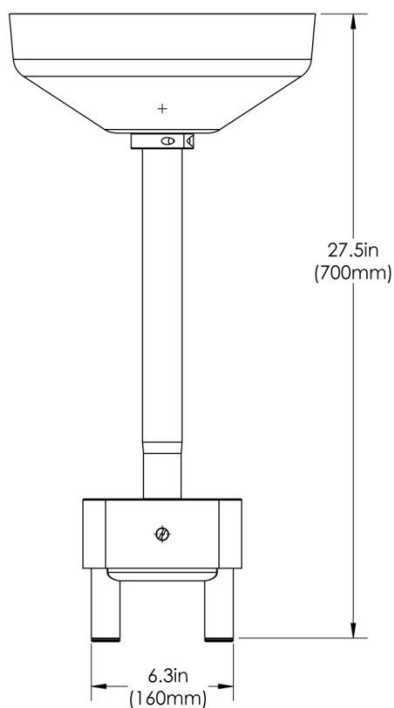
**Figure 1: Single Ceiling Mount Dimensions, LMI-550 shown.**



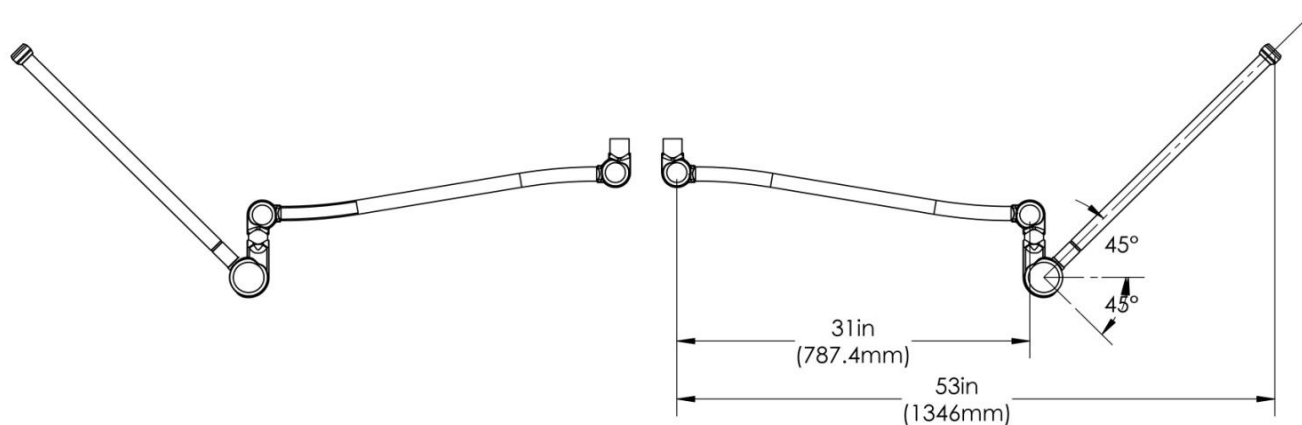
**Figure 2: Extension Arm & Spring Arm Dimensions – LMI-550 Series.**



## 2.3 Dual Ceiling Mount Dimensions

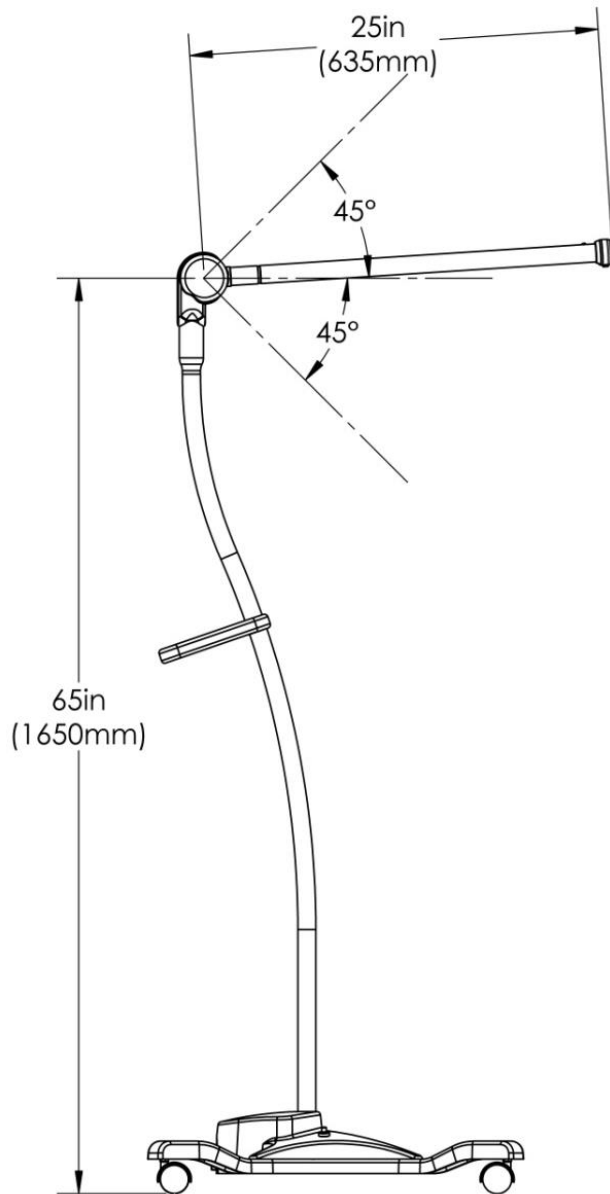


**Figure 3: Dual Ceiling Mount Dimensions, LMI-700 shown.**

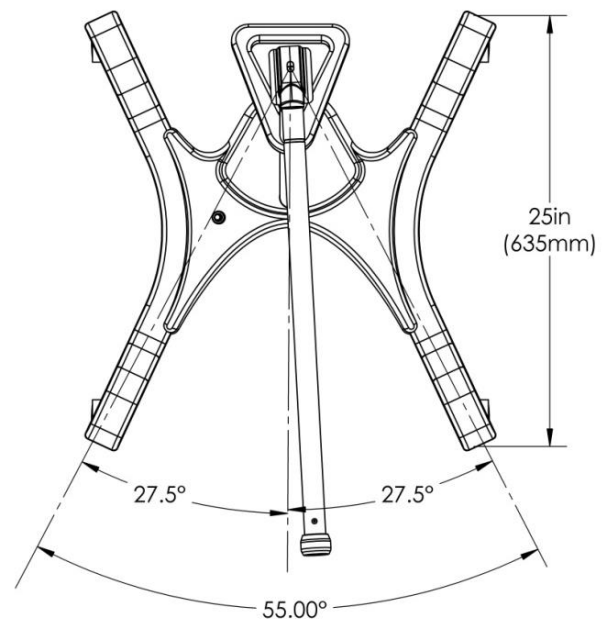


**Figure 4: Extension Arm and Spring Arm Dimensions - LMI-700 Series.**

## 2.4 Mobile Dimensions

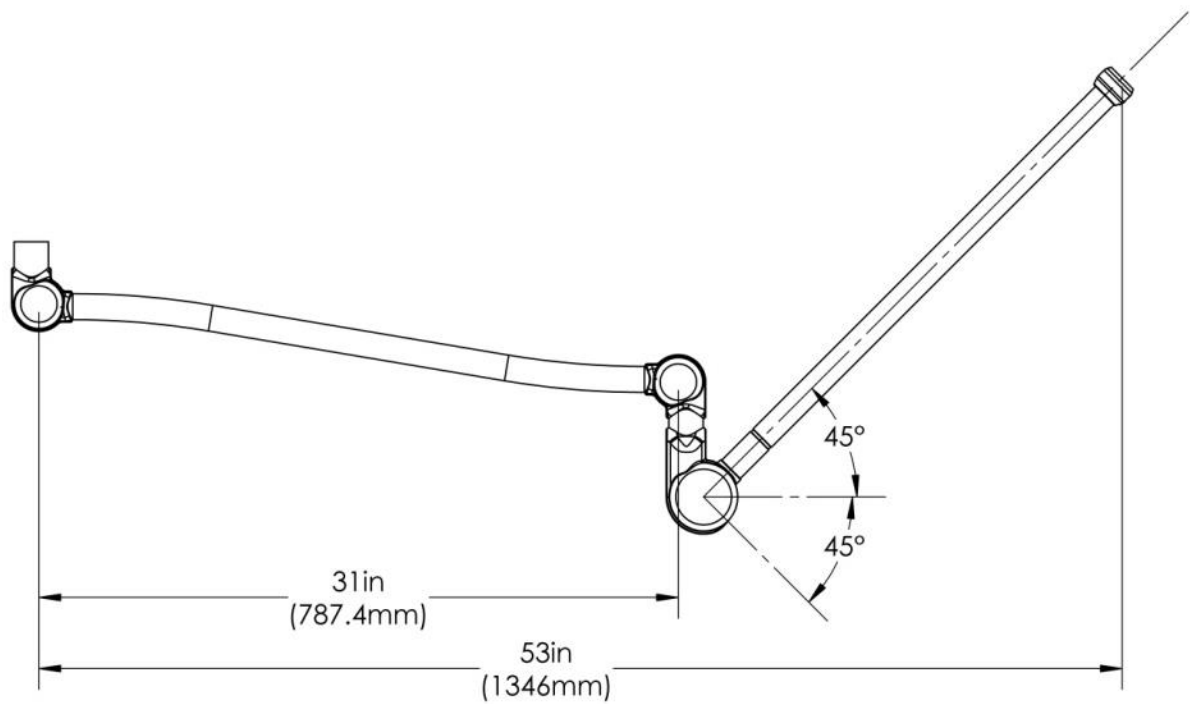


**Figure 5: Floor Stand Dimensions - Side View.**

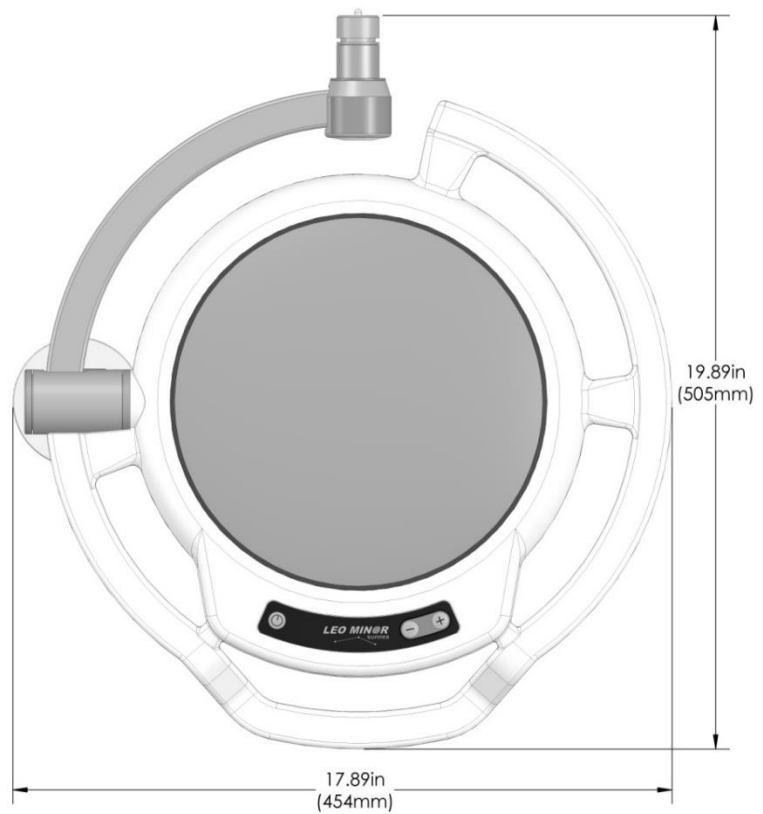


**Figure 6: Floor Stand Dimensions - Top View.**

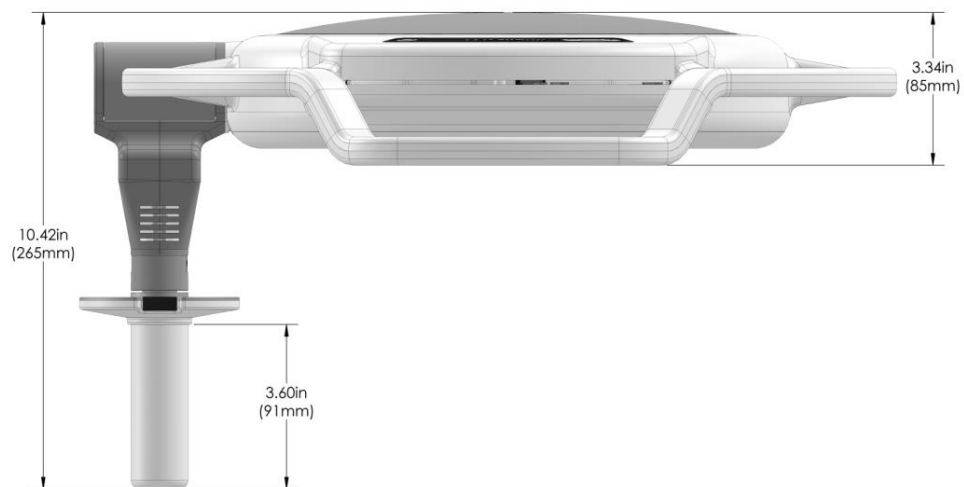
## 2.5 Wall Mount Dimensions



## 2.6 Light Head Dimensions



**Figure 7: Light Head Dimensions - Top View.**



**Figure 8: Light Head Dimensions - Side View.**

## 2.7 Warranty

### 2.7.1 Limited Warranty

Sunnex warrants that the Product, if properly used, will be free from defects in material and workmanship, for a period of three (3) years from the date of shipment to Customer. This Limited Warranty extends only to the original buyer. If the Product is determined to be defective within the warranty period, Sunnex, at its option, will repair or replace the Product, at no charge or refund the then-current value of the Product.

### 2.7.2 Disclaimers and Limitations

This Limited Warranty shall be the sole remedy of Customer and the sole liability of Sunnex to Customer.

This Limited Warranty does not extend or apply to any defects, failures or damage due to or resulting from: (a) acts of God, accident, misuse, use of the Product other than its normal and customary manner, abuse or negligence; (b) everyday wear and tear; (c) alteration or modification of, or to any part of, the Product; (d) improper operation and maintenance; or (d) any repairs or attempted repairs by anyone other than Sunnex. This Limited Warranty does not cover any products sold AS IS or WITH ALL FAULTS.

TO THE FULL EXTENT PERMITTED BY APPLICABLE LAW, THIS LIMITED WARRANTY REPLACES ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED INCLUDING, WITHOUT LIMITATION, ANY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SUNNEX DISCLAIMS ALL OTHER WARRANTIES AND CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, IMPLIED WARRANTIES OF TITLE, NONINFRINGEMENT, ABSENCE OF LIENS OR INCUMBRANCES, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDLESS OF WHETHER SUNNEX KNOWS OR HAS REASON TO KNOW OF CUSTOMER'S PARTICULAR NEEDS. IF IMPLIED WARRANTIES MAY NOT BE DISCLAIMED UNDER APPLICABLE LAW, THEN ANY IMPLIED WARRANTIES THAT MAY BE IMPOSED BY LAW ARE LIMITED IN DURATION TO THE LIMITED WARRANTY PERIOD SET FORTH HEREIN, AND THEREAFTER ANY IMPLIED WARRANTIES ARE EXPRESSLY DISCLAIMED.

No employee, agent, dealer, reseller or distributor of Sunnex is authorized to modify this Limited Warranty, or to make any additional warranties.

REPAIR, REPLACEMENT OR REFUND, AS PROVIDED UNDER THIS LIMITED WARRANTY, ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL SUNNEX BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR TORT DAMAGES OR LOSSES, WHETHER TO PERSON OR PROPERTY, INCLUDING DEATH, ARISING OUT OF OR RESULTING FROM ANY BREACH OF WARRANTY OR ANY OTHER LEGAL THEORY, OR ARISING OUT OF OR IN CONNECTION WITH THE PRODUCT OR CUSTOMER'S USE OF THE PRODUCT, EVEN IF SUNNEX IS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY EVENT, THE TOTAL LIABILITY OF SUNNEX TO YOU FOR ANY CAUSE WHATSOEVER SHALL BE LIMITED TO THE PURCHASE PRICE YOU PAID FOR THE PRODUCT. THIS LIMITATION SHALL APPLY REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT OR TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE).

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE.

### 2.7.3 Claims Procedure

**(a)** Customer must contact Sunnex at (800)-445-7869 with a request for warranty service or to report a technical issue. Sunnex Technical Support will attempt to identify, diagnose and resolve the reported problem via the telephone.

**(b)** If attempts by Sunnex to resolve a reported problem are unsuccessful, Customer will then be provided with a Customer-specific Returned Merchandise Authorization number ("RMA"). The RMA number must be noted on any correspondence to Sunnex and displayed prominently on the outside packaging of any Product shipped to Sunnex.

**(c)** Within ten (10) days of receipt of the RMA number, Customer must ship the Product to Sunnex at Customer's expense (insuring the Product is recommended) in either its original packaging or packaging affording an equal degree of protection, to *Sunnex Inc. 8001 Tower Point Drive, Charlotte NC 28227*, with a statement describing the problem in reasonable specificity. Proof of purchase must be included to obtain warranty service. Sunnex will not be held responsible for shipping damages that occur in transit. Any damage to the Product during shipping will not be covered under this Limited Warranty and shall be subject to a service charge.

**(d)** Subject to the limitations specified herein, upon receipt, Sunnex will inspect the shipped Product and, at its sole discretion, repair or replace the Product with the same or a like product



to the extent it does not conform to this Limited Warranty. In the event Sunnex, at its sole discretion, opts to replace the Product, should said product be discontinued or no longer be offered for sale by Sunnex, a like product in design and functionality will be provided to Customer.

**(e)** Sunnex will ship the repaired Product or a replacement to Customer within ten (10) business days after receipt from the date that Sunnex receives the Product. Standard shipments to the Customer will be paid by Sunnex. Sunnex assumes no responsibility for shipment delays by the carrier.

**(f)** If Customer requires warranty service to be provided in less than ten (10) business days, but not less than three (3) business days, Sunnex will charge Customer an additional One Hundred Dollars (\$100.00) express handling charge per request for each Product.

### 2.7.4 Customer Responsibilities

**(a)** Customer is required to follow the user manual associated with the Product for proper operation.

**(c)** Customer is required to perform periodic preventive maintenance as called for in the user manual associated with the Product.

**(d)** Any modifications or repairs made to the Product without prior written authorization from Sunnex will render this Limited Warranty null and void. Instances whereby this is determined to be the case by Sunnex technical staff will be subject to an initial service charge of \$75.00 (\$25.00 evaluation charge and \$50.00 minimum labor cost).

### 2.7.5 Miscellaneous

In the event that any provision of this Limited Warranty should be or becomes invalid and/or unenforceable during the warranty period, the remaining provisions shall continue in full force and effect.

The provisions of this Limited Warranty shall be governed by the laws of the State of North Carolina without regard to its conflict of laws principles. This Limited Warranty shall not be modified except by an agreement signed by both parties specifically referencing this Limited Warranty.

This Limited Warranty represents the entire agreement between Sunnex and Customer with respect to the subject matter herein and supersedes all prior or contemporaneous oral or written communications, representations, understandings or agreements relating to this subject.

For service assistance or resolution of a service problem, or for Product or warranty information, write to *Sunnex Inc. 8001 Tower Point Drive, Charlotte NC 28227*, or visit [www.sunnexonline.com](http://www.sunnexonline.com).

**Sunnex Customer Service**

Sunnex, LLC USA	+ 1 800 445 7869
Sunnex Equipment AB Sweden	+ 46 565 177 00
Warranty	+ 1 800 445 7869

## Section 3: Installation/Assembly



Modifications are never to be made for any reason. This is to ensure safety for all persons involved. Any modifications made to the system void the warranty.

### 3.1 Customer Responsibilities

Sunnex lights are built to provide exceptional illumination and should impart you with years of reliable service. Please follow the list below of installation criteria to ensure proper steps are taken prior to the mounting of the fixture, and help ensure its appropriate use.

- Note down product's serial #  
- *Serial # is:* \_\_\_\_\_
- Carefully follow guidelines specified in this manual
- The contractor/installer has responsibility for the superstructure/mounting brackets strength and stability
- Check with State and Local compliance boards or engineering agencies to assure that all installation and use codes are followed.

### 3.2 Single Ceiling Mount Assembly – LMI-550 Series

#### Pre-Installation Guidelines

**PLEASE NOTE:** Installation of the equipment should be performed by qualified persons only. Please follow the directions for assembly carefully, as failure to do so may result in the voiding of the warranty. It is recommended that this installation manual be completely reviewed prior to installation.

- It is recommended that the equipment 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 must comply with the following requirements: Input: 100V-240V, HZ 50-60, 2 Amperes. Supply circuit must have breaker or disconnect to allow power to be turned off for service.
- The power supply circuit line must be routed and wired to the light head in compliance with all applicable building codes.



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



**To Avoid risk of electric shock, this equipment must only be connected to a 120V-240V supply with protective earth.**



**To isolate Power Supply Main, disconnect power cord on Model #'s LMI-550 and LMI-700.**

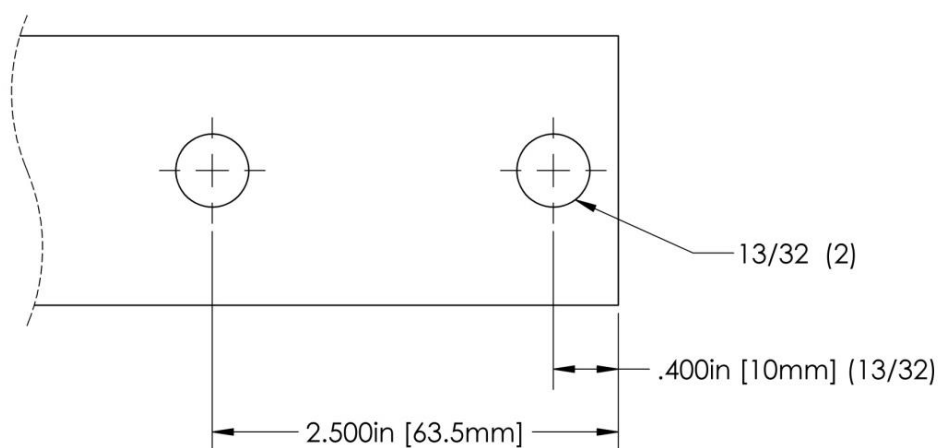
### General Information

Prior to installation, insure that all the following components are present in the shipping cartons:

1x Transformer box with light wiring harness and power cable	1x Leo Minor Head Assembly 1x Detachable Handle	1x Ceiling Mount
1x Ceiling Arm	1x Ceiling Down Tube with light wiring harness	1x Down Tube Washer 1x Down Tube Safety Washer 2x Down Tube Locking Rings
2x Down Tube Mounting Pins 2x Down Tube Cotter Pins	2x Leo Minor Head Yoke Brass Bushing	1x Ceiling Cover 1x Retaining Ring

**NOTES:** Standard length on Ceiling Down Tube is 19.7" (500mm). Other lengths available upon request.

If the ceiling tube is too long, it may be cut to the length required. The cut end must be thoroughly deburred, and two holes must be drilled in the locations indicated below.



**Figure 9: Drill instructions when shortening ceiling tube.**

## Ceiling Mount Installation

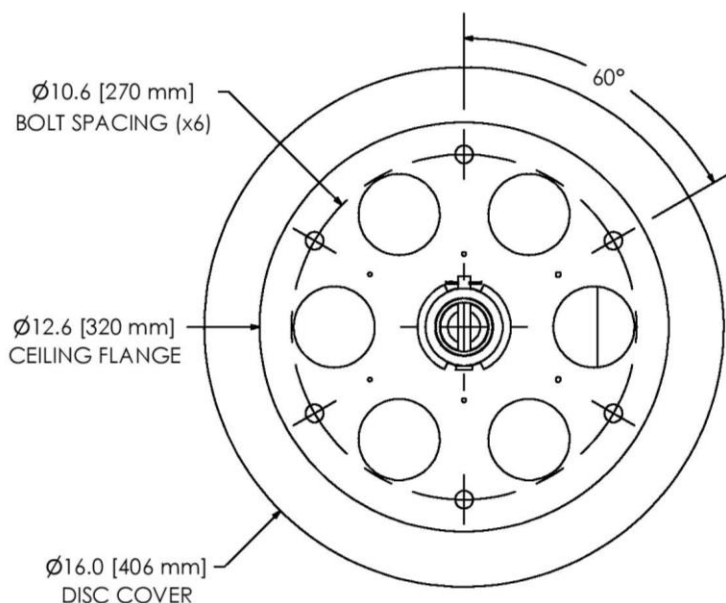
- Load data:

<b>Bending Moment <math>M_B</math></b>	<b>max 130 Nm (96 lb-ft)</b>
<b>Vertical weight forces <math>F_G</math></b>	<b>max 180 N (40 lbs)</b>

Regional safety factors to be considered.

Maximum device load is assumed and included.

- Secure ceiling mount to the ceiling using the mount holes provided and the load data. **Mounting hardware not included.**
- Insure 2''- 4'' (50mm – 100mm) of clearance is present above the ceiling mount.
- Pull the lamp wiring harness from the down ceiling tube through the mounting.
- Insert down ceiling tube into the mounting.
- Secure the down ceiling tube with the 2 mounting pins and 2 cotter pins.
- Securely tighten the 4 Allen screws in the mounting.
- **NOTE:** Down ceiling tube and the mounting must be plumb or leveled.
- Slide cover and retaining ring onto ceiling down tube.



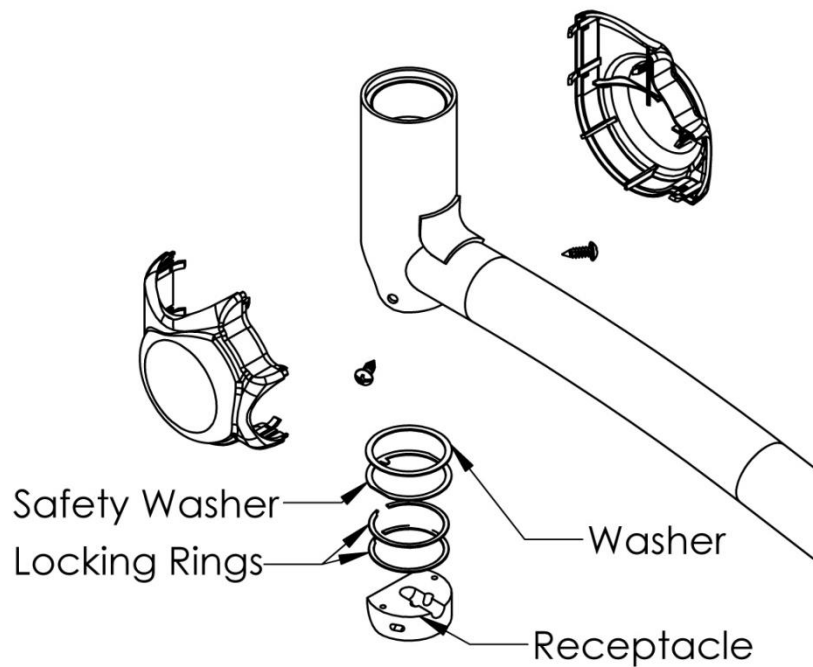
**Figure 10: Ceiling Mount - Top View.**



**If ceiling rod is not plumb, unwanted arm drifting may occur.**



### Extension Arm Installation



**Figure 11: Extensions Arm Installation.**

- Gently pry the two halves of the cover apart and set them aside.
- Remove the 2 screws from the receptacle mount.
- Gently pull the receptacle out of the arm downward, this will ensure clearance of installing the washer set onto the down ceiling tube.



**For the next steps, having a second person to assist with assembly is recommended.**

- Slide the extension arm assembly up onto the ceiling mount and hold it into place.
- First install the washer, followed by the safety washer with the notch facing into the hole in the ceiling tube, and finally snap the two retaining rings into the groove.



**Always ensure the safety washer tooth is properly inserted into the hole to avoid a potential safety hazard. The safety washer acts as a secondary safety support in the case that both retaining rings fail.**

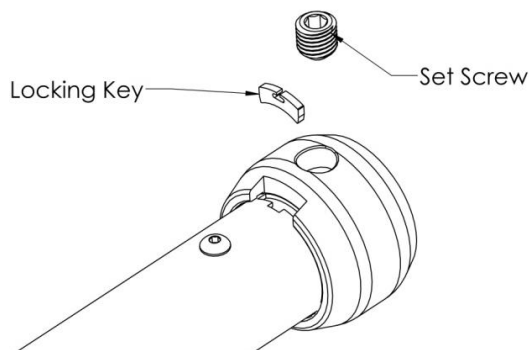
- Replace receptacle into mount.
- Reinstall the 2 screws, do not over tighten.
- Gently replace covers and snap together.

## Light Head Installation

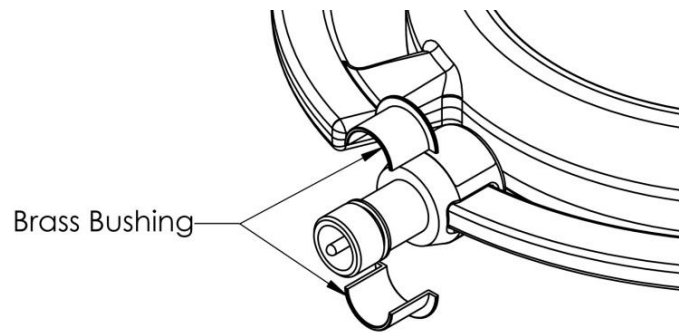


**Always disconnect the spring arm system from the power supply when installing the end device. Failure to do so may result in an electric shock.**

- Loosen set screw on arm end sleeve and rotate 180° to align with locking key and key hole.
- Gently pry locking key from hole and pull end cap off of arm.
- Place the 2 brass bushings onto yoke with flange side toward the head.
- Place a small amount of grease (supplied) on the inside and outside of the coupler.
- Slide head with brass coupler into the arm.
- Replace locking key into hole.
- Rotate arm end sleeve 180°, add blue Loctite, and tighten set screw (3 in\*lb).



**Figure 12: Locking Key Installation.**



**Figure 13: Brass Bushing Installation**



**Always make sure the proper locking key is used. Use only the original locking key or a Sunnex replacement key. Failure to do so may result in serious injury. End device may separate from the spring arm if the key is not properly in place. Sunnex recommends assistance from another person when installing or removing light head to prevent spring arm from causing personal injury and/or property damage.**

### Transformer Box Installation

- Mount transformer box in a suitable location.
- Plug connector from down tube with the connector from the transformer box.
- Join grounding wires from the transformer box, down tube and ceiling cover onto the common grounding bolt located on the ceiling mount.
- Adjust ceiling cover to fit over the ceiling mount.
- Plug transformer power cable into 120-240 VAC / 50-60 Hz power receptacle.



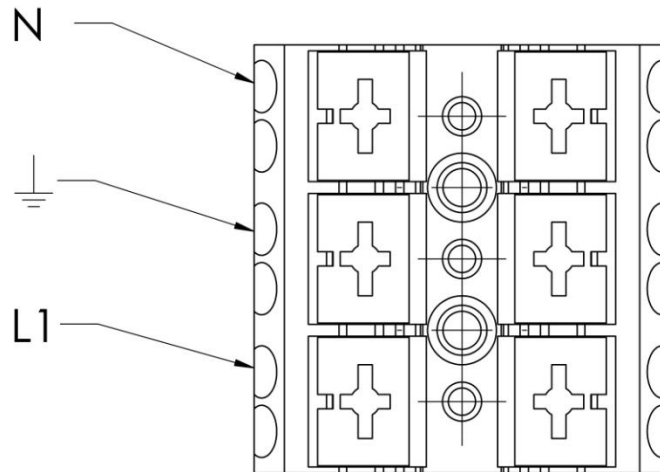
**To ensure proper grounding reliability this cordset must be used with a receptacle marked “Hospital Grade”.**

#### **HARDWIRE INSTALLATION:**



**Always turn off power to the circuit used when hardwiring to the power box. Failure to do so may result in an electric shock.**

- Punch out strain relief hole on the power box. Mount strain relief (not supplied) and feed through power cable (not supplied) from 120-240 VAC / 50-60 Hz source.
- Wire to terminal block as shown in figure 14.
- Tighten strain relief.



**Figure 14: Terminal Block Connections**

### 3.3 Dual Ceiling Mount Assembly – LMI-700 Series

#### Pre-Installation Guidelines

**PLEASE NOTE:** Installation of the equipment should be performed by qualified persons only. Please follow the directions for assembly carefully, as failure to do so may result in the voiding of the lights warranty. It is recommended that this installation manual be completely reviewed prior to installation.

- It is recommended that the equipment 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 must comply with the following requirements: Input: 100V-240V, HZ 50-60, 2Amperes. Supply circuit must have breaker or disconnect to allow power to be turned off for service.
- The power supply circuit line must be routed and wired to the light head in compliance with all applicable building codes.



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



To Avoid risk of electric shock, this equipment must only be connected to a 120V-240V supply with protective earth.



To isolate Power Supply Main, disconnect power cord on Model #'s LMI-550 and LMI-700.

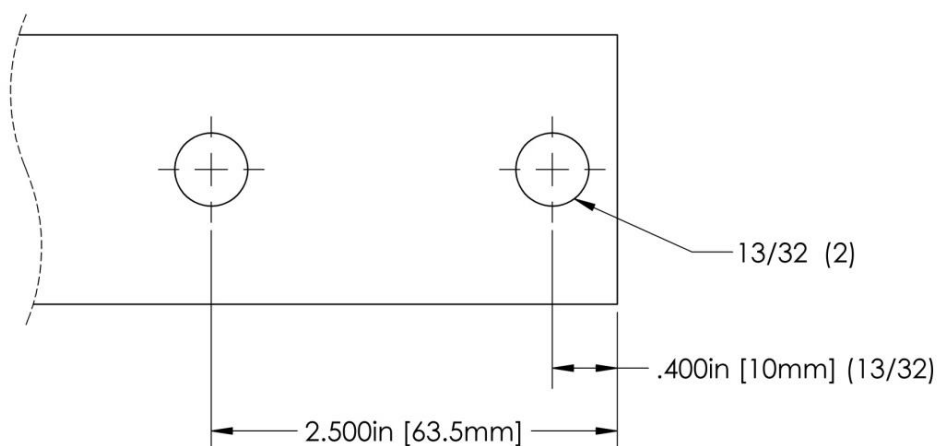
### General Information

Prior to installation, insure that all the following components are present in the shipping cartons:

2x Transformer box with light wiring harness and power cable	2x Leo Minor Head Assembly 2x Detachable Handle	1x Ceiling Mount
2x Ceiling Arm	1x Down Tube with dual mount and light wiring harness	2x Down Tube Washer 2x Down Tube Safety Washer 4x Down Tube Locking Rings
2x Down Tube Mounting Pins 2x Down Tube Cotter Pins	4x Leo Minor Head Yoke Brass Bushing	1x Ceiling Cover 1x Retaining Ring

**NOTES: NOTES:** Standard length on Ceiling Down Tube is 19.7" (500mm). Other lengths available upon request.

**NOTES:** If the ceiling tube is too long, it may be cut to the length required. The cut end must be thoroughly deburred, and two holes must be drilled in the locations indicated below.



**Figure 15: Drill instructions when shortening ceiling tube.**

### Dual Ceiling Mount Installation

- Load data:

<b>Bending Moment <math>M_B</math></b>	<b>max 260 Nm (192 lb-ft)</b>
<b>Vertical weight forces <math>F_G</math></b>	<b>max 310 N (70 lbs)</b>

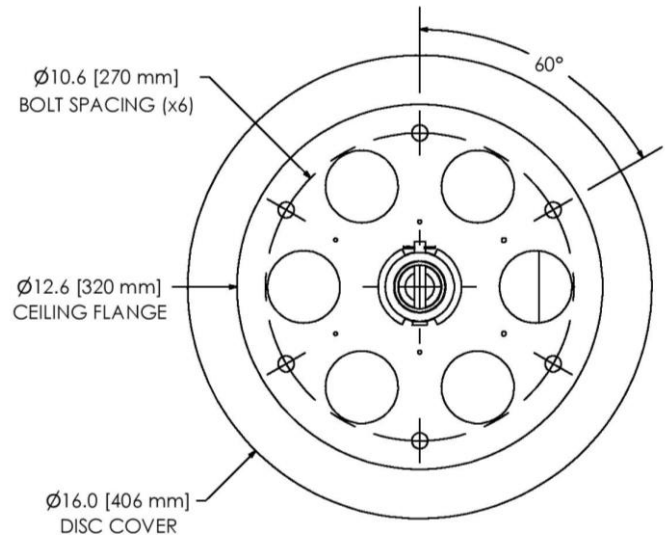


Regional safety factors to be considered.  
Maximum device load is assumed and included.

- Secure ceiling mount to the ceiling using the mount holes provided and the load data.
- **Mounting hardware not included.**
- Insure 2''- 4'' (50mm – 100mm) of clearance is present above the ceiling mount.
- Slide cover and retaining ring onto ceiling down tube.
- Pull the lamp wiring harness from the down ceiling tube through the mounting.
- Insert down ceiling tube into the mounting.
- Secure the down ceiling tube with the 2 mounting pins and 2 cotter pins.
- Securely tighten the 4 Allen screws in the mounting.
- **NOTE:** Down ceiling tube and the mounting must be plumb or leveled.

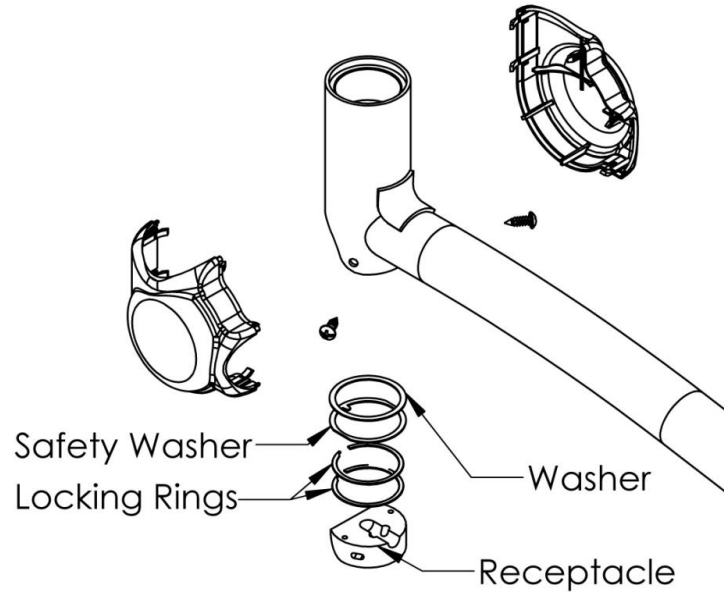


**If ceiling rod is not plumb, unwanted arm drifting may occur.**



**Figure 16: Ceiling Mount Top View.**

### Extension Arm Installation



**Figure 17: Extension Arm Installation.**

**NOTE:** The following procedure is to be repeated for both arm assemblies.

- Gently pry the two halves of the cover apart and set them aside.
- Remove the 2 screws from the receptacle mount.
- Gently pull the receptacle out of the arm downward, this will ensure clearance of installing the washer set onto the dual ceiling mount.



**For the next steps, having a second person to assist with assembly is recommended.**

- Slide the extension arm assembly up onto the dual ceiling mount and hold it into place.
- First install the washer, followed by the safety washer with the notch facing into the hole in the ceiling tube, and finally snap the two retaining rings into the groove.



**Always ensure the safety washer tooth is properly inserted into the hole to avoid a potential safety hazard. The safety washer acts as a secondary safety support in the case that both retaining rings fail.**

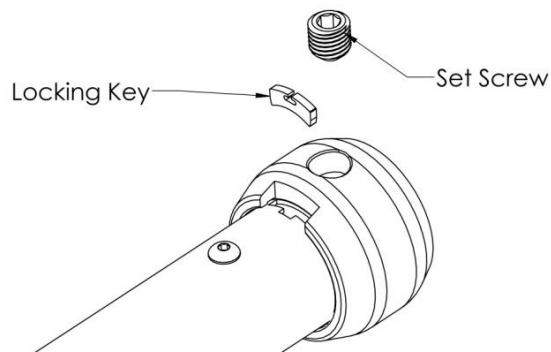
- Replace receptacle into mount.
- Reinstall the 2 screws, do not over tighten.
- Gently replace covers and snap together.

## Light Head Installation

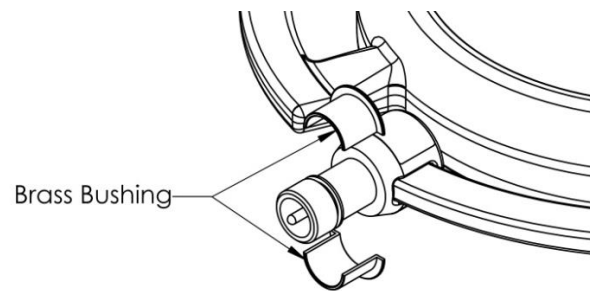
**NOTE:** The following procedure is to be repeated for both head assemblies.

**⚡ Always disconnect the spring arm system from the power supply when installing the end device. Failure to do so may result in an electric shock.**

- Loosen set screw on arm end sleeve and rotate 180° to align with locking key and key hole.
- Gently pry locking key from hole and pull end cap off of arm.
- Place the 2 brass bushings onto yoke with flange side toward the head.
- Place a small amount of grease (supplied) on the inside and outside of the coupler.
- Slide head with brass coupler into the arm.
- Replace locking key into hole.
- Rotate arm end sleeve 180°, add blue Loctite, and tighten set screw (3 in\*lb).



**Figure 18: Locking Key Installation.**



**Figure 19: Brass Bushing Installation**

**! Always make sure the proper locking key is used. Use only the original locking key or a Sunnex replacement key. Failure to do so may result in serious injury. End device may separate from the spring arm if the key is not properly in place. Sunnex recommends assistance from another person when installing or removing light head to prevent spring arm from causing personal injury and/or property damage.**

### Transformer Box Installation

**NOTE:** The following procedure is to be repeated for both transformer boxes.

- Mount transformer box in suitable location.
- Plug connector from down tube with the connector from the transformer box.
- Join grounding wires from the transformer box, down tube and ceiling cover onto the common grounding bolt located on the ceiling mount.
- Adjust ceiling cover to fit over the ceiling mount.
- Plug transformer power cable into 120-240 VAC / 50-60 Hz power receptacle.



**To ensure proper grounding reliability this cordset must be used with a receptacle marked “Hospital Grade”.**

#### **HARDWIRE INSTALLATION:**



**Always turn off power to the circuit used when hardwiring to the power box. Failure to do so may result in an electric shock.**

- Punch out strain relief hole on the power box. Mount strain relief (not supplied) and feed through power cable (not supplied) from 120-240 VAC / 50-60 Hz source.
- Wire to terminal block as shown in figure 14.
- Tighten strain relief.

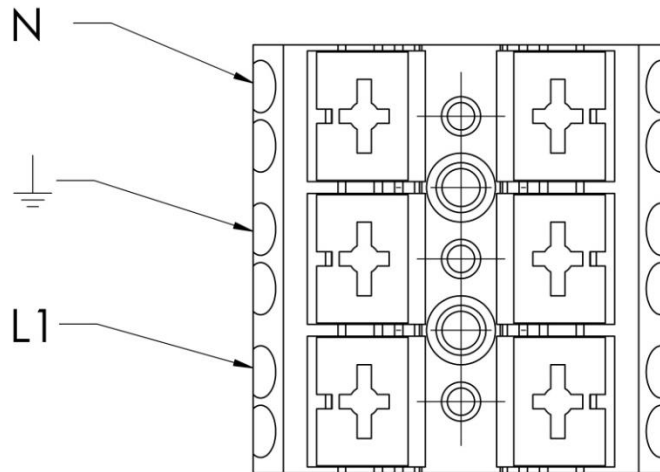


Figure 20: Terminal Block Connections

### 3.4 Mobile Assembly – LMI-300

#### Pre-Installation Guidelines

**PLEASE NOTE:** Installation of the equipment should be performed by qualified persons only. Please follow the directions for assembly carefully, as failure to do so may result in the voiding of the lights warranty. It is recommended that this installation manual be completely reviewed prior to installation.

- The supply circuit must comply with the following requirements:  
 120 VAC lights: 110 – 120 VAC 60Hz, single phase, three wire, capable of supplying 40 Watts @ 0.5 Amperes.  
 220 VAC lights: 230 – 240 VAC 50Hz, single phase, three wire, capable of supplying 40 Watts @ 0.25 Amperes.



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



**To Avoid risk of electric shock, this equipment must only be connected to a 120V-240V supply with protective earth.**

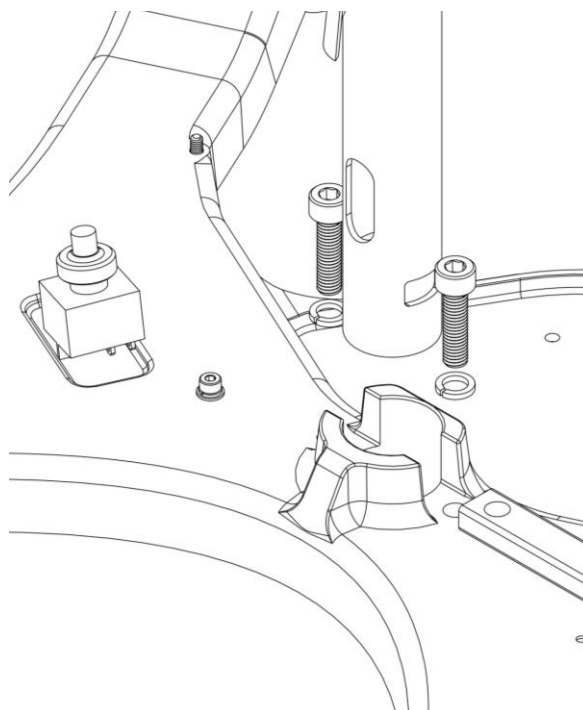
### General Information

Prior to installation, insure that all the following components are present in the shipping cartons:

1x Base with attached transformer	1x Leo Minor Head Assembly 1x Detachable Handle	1x Pole 1x Handle with hardware
1x Spring Arm	2x Leo Minor Head Yoke Brass Bushing	1x Allen Key 2.5mm 1x Allen Key 3mm 1x Allen Key 6mm

### Pole Installation

- Using your finger release the fuse holder on the power outlet by pushing downward on the tab and pulling outward. Place the fuse holder aside.
- Remove screws holding plastic cover using 3mm Allen Key.
- Remove the electrical switch nut by unthreading it from the push button switch.
- Carefully pull the bottom of the plastic cover over the power outlet. Remove the base cover.
- Remove the two bolts, washers and the attachment bar from the base.
- Pull the wires through the hole on the side of the pole.
- Mount the pole to the mounting hole. Make sure to also mount through the base cover.



**Figure 21: Pole to base installation.**

**NOTE:** When inserting the post, Make sure the wires are facing the front of the base, **not** the transformer.

- Insert attachment bar through pole and fasten with bolts and washers.
- Mount ground wire from transformer and ground wire from pole to ground bolt on base.
- Attach connectors from pole to connectors on transformer.
- Slide cover onto base while making sure the push-button goes through the base cover.
- Secure push-button using the electrical switch nut.
- Fasten cover with previously removed screws. Make sure no wires are pinched in this process.
- Install the proper amperage fuses into the fuse holder that you previously removed and reinsert the fuse holder into the power outlet ensuring the fuse holder clicks into place and is secure.



**Make sure attachment bar is in proper position in the pole, and that it is secure to the base. Failure to do so may cause personal injury and/or property damage.**

### Handle Attachment

- Undo the screws in the handle using a Phillips screwdriver to separate it into two pieces, if not already in two pieces.
- On the **smaller portion** of the handle there is a little hole in the middle. This hole is used for positioning the handle to the pole. Ensure the head of the positioning screw (which is located half way up the pole) is inserted into this hole.
- After mounting the small piece onto the pole overtop the positioning screw, attach the large part of the handle using the two Phillips screws.
- Ensure proper orientation of small piece. Both pieces of the handle assembly will be flush.
- Secure the handle using the two screws and the Phillips screwdriver. Screw in each screw evenly to avoid the handle gap being offset.

### Spring Arm Installation

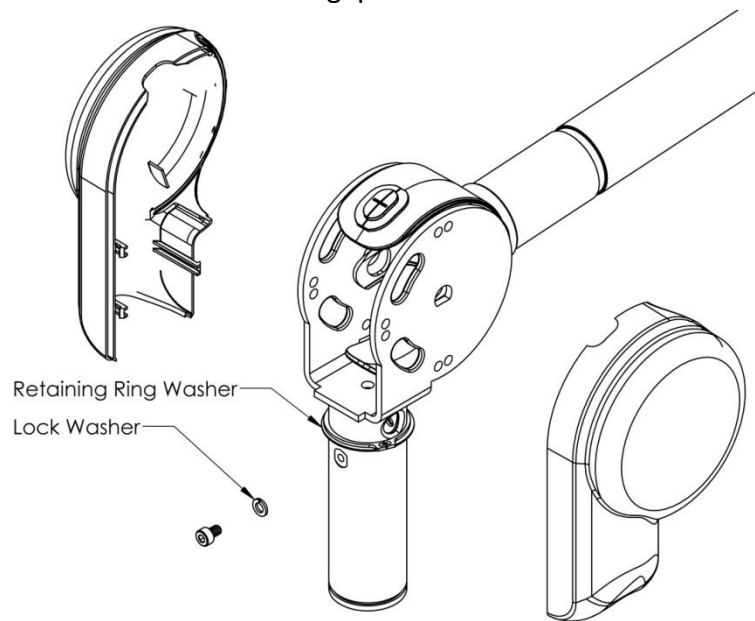
- Gently remove plastic covers on spring arm by inserting slot driver into the parting line and pry the two halves up and outwards.

- Once the covers are removed, using a 3mm Allen key remove the rotational stop screw from the back of the spring arm post. See Figure 26. Take care to ensure that the lock washer and retaining ring washer do not fall off during this step.
- Connect the spring arm electrical connector to the mounting post electrical connector by pushing them together.
- Slide the spring arm into the mounting post. Ensure the retaining ring washer is present and did not fall off the spring arm shaft.
- Using the 3mm Allen wrench, fasten the rotational stop screw with lock washer into the back of the spring arm post.



**Make sure the rotational stop screw is properly fastened to avoid a safety hazard.**

- Gently snap the right hand cover onto the spring arm in reverse to removal instructions described above. When performing this step, ensure that the sliding cover (already on the spring arm) mates with a groove on the inside of the spring arm cover.
- Gently snap the left hand cover onto the spring arm. Also ensure that both covers mate properly to each other as they are snapped together. Check all parting lines between the two covers and ensure there are no gaps.



**Figure 22: Spring Arm Installation**

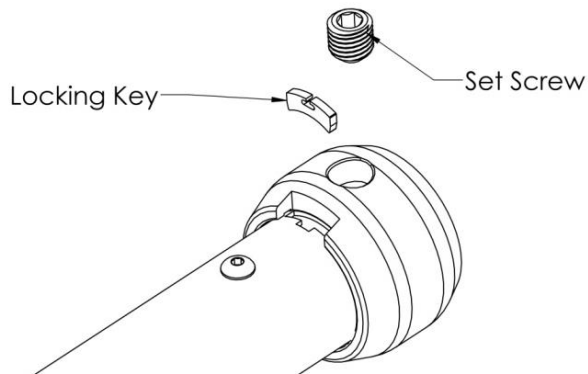


## Light Head Installation

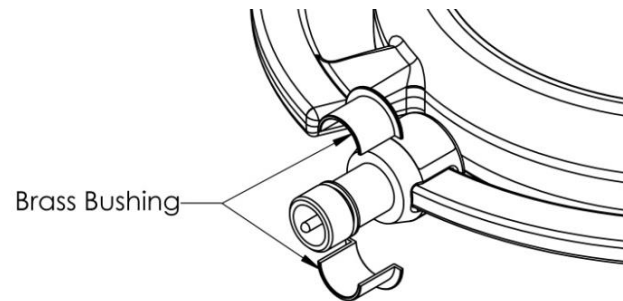


**Always disconnect the spring arm system from the power supply when installing the end device. Failure to do so may result in an electric shock.**

- Loosen set screw on arm end sleeve and rotate 180° to align with locking key and key hole.
- Gently pry locking key from hole and pull end cap off of arm.
- Place the 2 brass bushings onto yoke with flange side toward the head.
- Place a small amount of grease (supplied) on the inside and outside of the coupler.
- Slide head with brass coupler into the arm.
- Replace locking key into hole.
- Rotate arm end sleeve 180°, add blue Loctite, and tighten set screw (3 in\*lb).



**Figure 23: Locking Key Installation**



**Figure 24: Brass Bushing Installation**



**Always make sure the proper locking key is used. Use only the original locking key or a Sunnex replacement key. Failure to do so may result in serious injury. End device may separate from the spring arm if the key is not properly in place.**

**Sunnex recommends assistance from another person when installing or removing light head to prevent spring arm from causing personal injury and/or property damage.**

### 3.5 Wall Mount Assembly – LMI-400 Series

#### Pre-Installation Guidelines

**PLEASE NOTE:** Installation of the equipment should be performed by qualified persons only. Please follow the directions for assembly carefully, as failure to do so may result in the voiding of the lights warranty. It is recommended that this installation manual be completely reviewed prior to installation.



**The wall must be able to sustain load data listed below.**



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

- The input power supply lines should be wired in accordance with all applicable building codes.
- The supply circuit must comply with the following requirements: Input: 100V-240V, HZ 50-60, 2Amperes. Supply circuit must have breaker or disconnect to allow power to be turned off for service.
- The power supply circuit line must be routed and wired to the light head in compliance with all applicable building codes.



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



**To Avoid risk of electric shock, this equipment must only be connected to a 120V-240V supply with protective earth.**



**To isolate Power Supply Main, disconnect power cord on Model #'s LMI-400 LMI-550 and LMI-700.**

### General Information

Prior to installation, insure that all the following components are present in the shipping cartons:

1x Transformer box with light wiring harness and power cable	1x Leo Minor Head Assembly 1x Detachable Handle	1x Wall Mount 1x Wall Mount Plate
1x Wall Arm 2x Screws (attached to arm receptacle mount)	1x Wall Mount Cable Grommet	1x Washer 1x Safety Washer 2x Locking Rings
2x Allen Keys	2x Leo Minor Head Yoke Brass Bushing	4x M6 x 10mm hex screws

### Wall Mount Installation

- Load data:

<b>Bending Moment <math>M_B</math></b>	<b>max 210 Nm (1858 in*lb)</b>
<b>Vertical weight forces <math>F_G</math></b>	<b>max 205 N (40 lbs)</b>

Regional safety factors to be considered.

Maximum device load is assumed and included.

- Ensure supply cable passes through the cableway and grommet at the end of the wall bearing.
- Secure wall mount plate to the wall using the mounting bracket holes indicated in figure 10. Hardware and supporting structure must meet load requirements above.

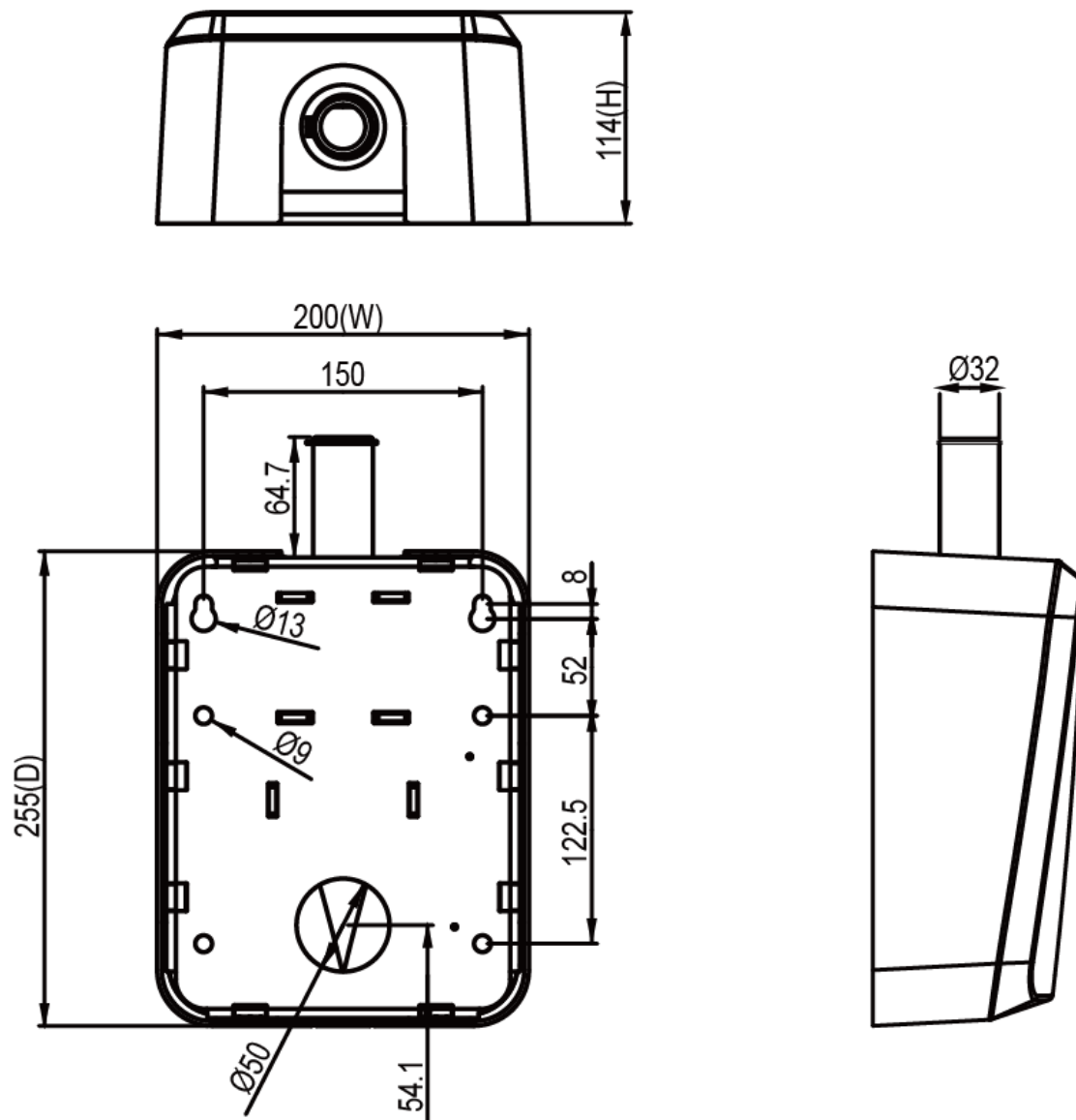
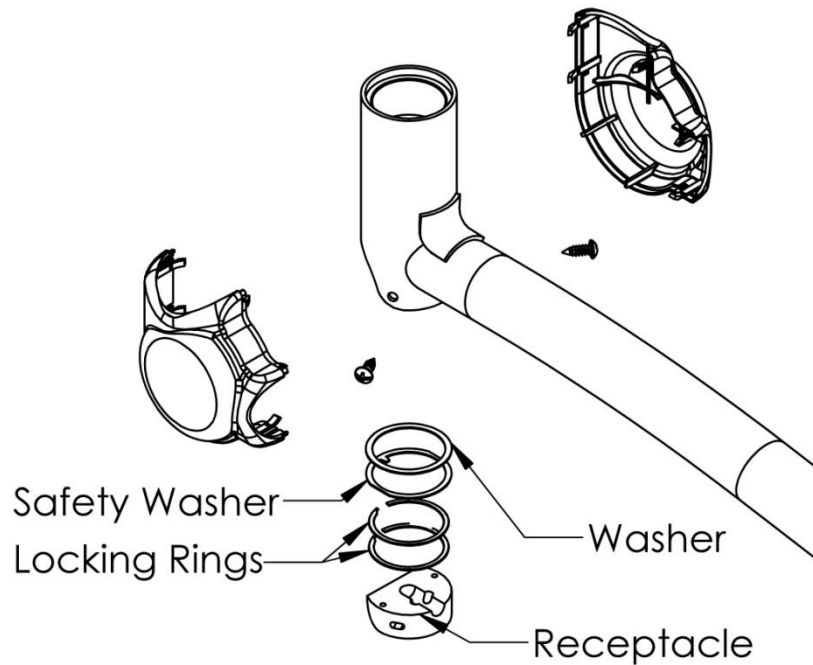


Figure 10: Alignment of Wall Mount to Wall Mount Plate

### Extension Arm Installation



**Figure 11: Extension Arm Installation.**

- Gently pry the two halves of the cover apart and set them aside.
- Remove the 2 screws from the receptacle mount.
- Install Wall Arm



**For the next steps, having a second person to assist with assembly is recommended.**

- Slide the extension arm assembly up onto the wall mount and hold it into place.
- First install the washer, followed by the safety washer with the notch facing into the hole in the ceiling tube, and finally snap the two retaining rings into the groove.



**Always ensure the safety washer tooth is properly inserted into the hole to avoid a potential safety hazard. The safety washer acts as a secondary safety support in the case that both retaining rings fail.**

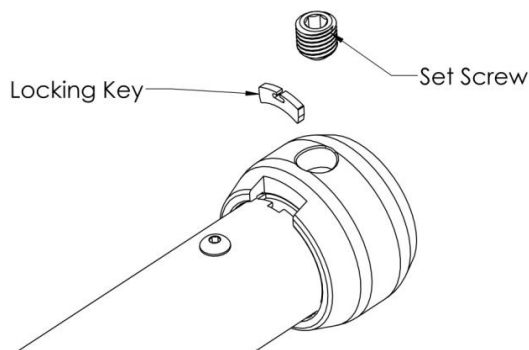
- Replace receptacle into mount.
- Reinstall the 2 screws, do not over tighten.
- Gently replace covers and snap together.

### Light Head Installation

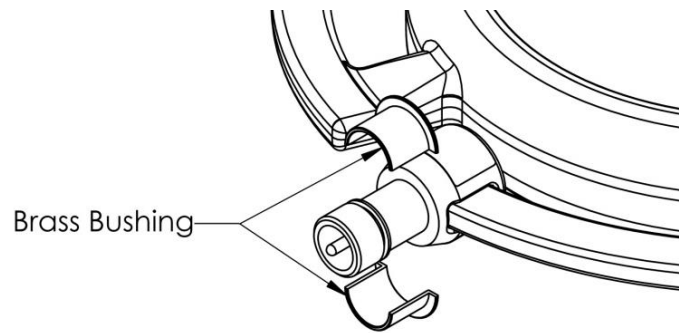


**Always disconnect the spring arm system from the power supply when installing the end device. Failure to do so may result in an electric shock.**

- Loosen set screw on arm end sleeve and rotate 180° to align with locking key and key hole.
- Gently pry locking key from hole and pull end cap off of arm.
- Place the 2 brass bushings onto yoke with flange side toward the head.
- Place a small amount of grease (supplied) on the inside and outside of the coupler.
- Slide head with brass coupler into the arm.
- Replace locking key into hole.
- Rotate arm end sleeve 180°, add blue Loctite, and tighten set screw (3 in\*lb).



**Figure 12: Locking Key Installation.**



**Figure 13: Brass Bushing Installation**



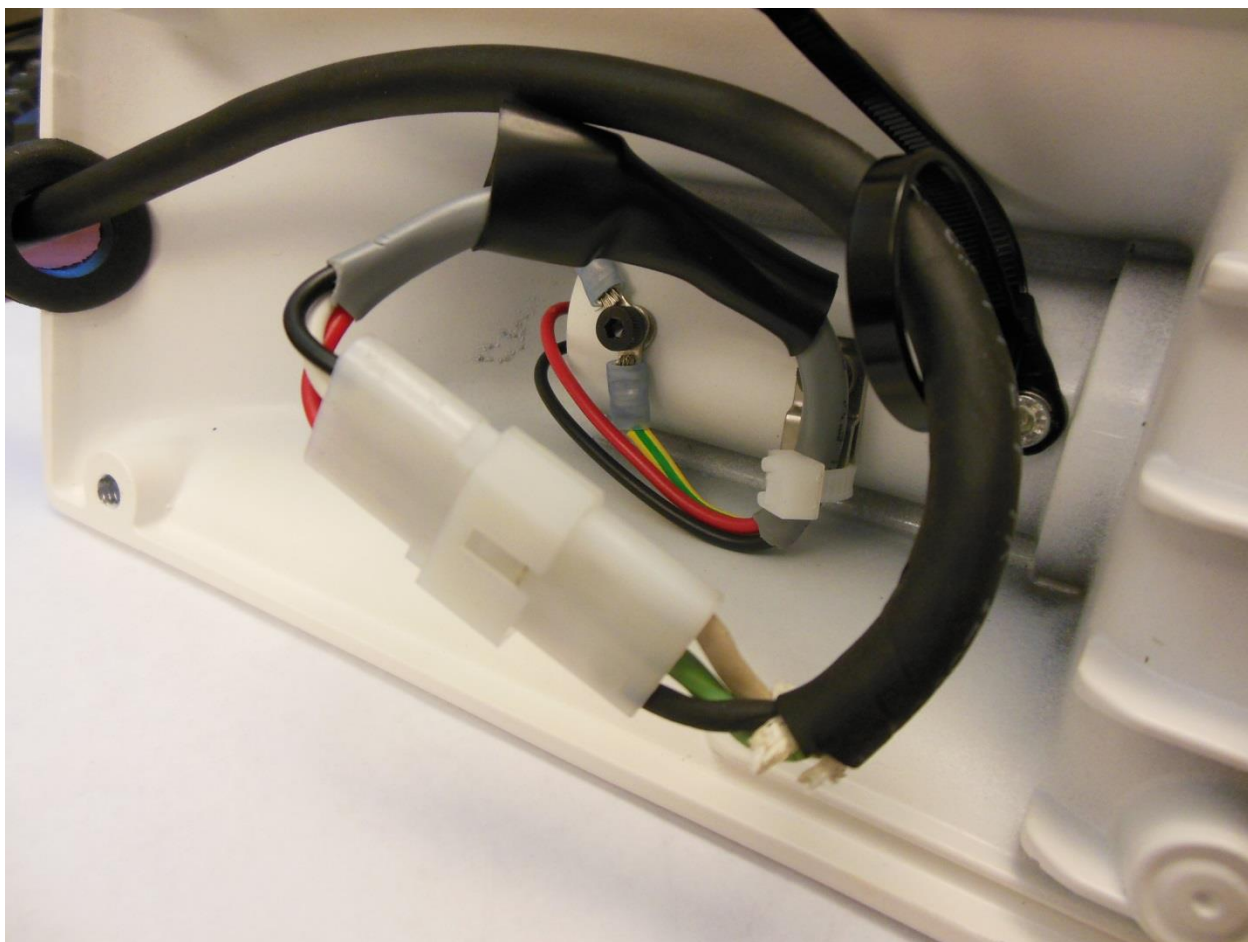
**Always make sure the proper locking key is used. Use only the original locking key or a Sunnex replacement key. Failure to do so may result in serious injury. End device may separate from the spring arm if the key is not properly in place.**

**Sunnex recommends assistance from another person when installing or removing light head to prevent spring arm from causing personal injury and/or property damage.**

### Transformer Box Installation

- Mount transformer box in a suitable location.
- Plug connector from wall mount with the connector from the transformer box.

- Secure transformer end of cable to inside of wall mount with zip tie provided to prohibit disconnection of cables.
- Align wall mount with wall mount plate and secure with provided M6 hex screws.
- Plug transformer power cable into 120-240 VAC / 50-60 Hz power receptacle.

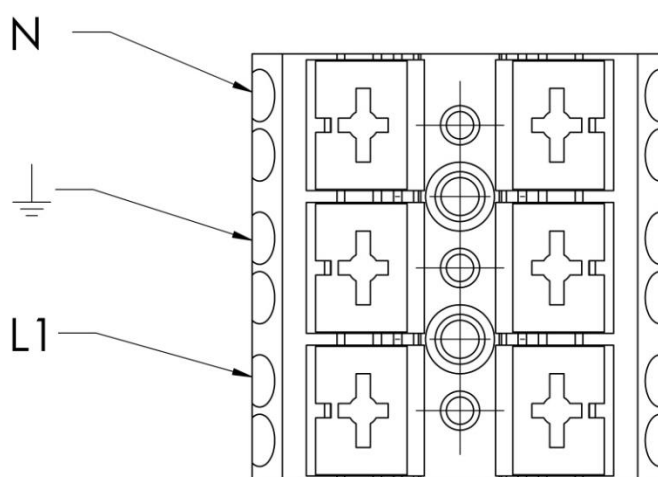


**To ensure proper grounding reliability this cord set must be used with a receptacle marked “Hospital Grade”.**

**HARDWIRE INSTALLATION:**

**Always turn off power to the circuit used when hardwiring to the power box. Failure to do so may result in an electric shock.**

- Punch out strain relief hole on the power box. Mount strain relief (not supplied) and feed through power cable (not supplied) from 120-240 VAC / 50-60 Hz source.
- Wire to terminal block as shown in figure 14.
- Tighten strain relief.



**Figure 14: Terminal Block Connections**



## Section 4: Operating Instructions

### 4.1 Mobile Stand

- To power the light head, plug in power cable. If the light head does not start when pushing the I/O-button on the head, press the power switch on the floor stand.
- The base rests on the floor and can be moved around via rolling wheels equipped with a locking mechanism on the front two wheels. The base houses the transformer and other electrical components. There is also a handle attached to the vertical post for easy movement of the system. Care must be taken so that the stand does not roll over any objects or the power cord.
- The spring arm can be rotated 55° horizontally and can be moved vertically up 45° or down 45°, and the spring arm is designed to be easily positioned and come to rest at any desired position within this range. If it is not, see section 6.1 for tensioning spring.



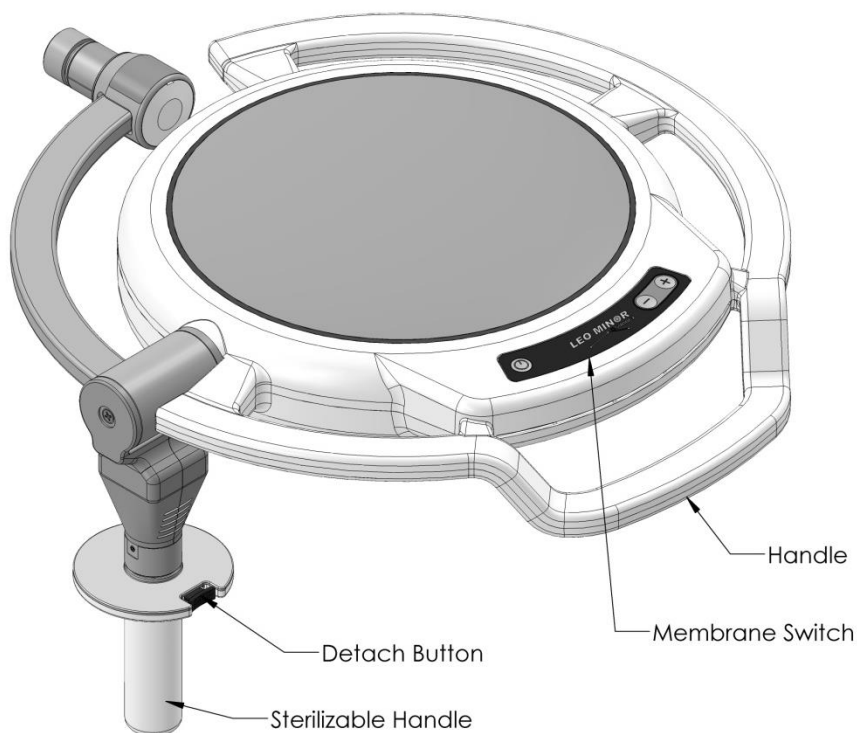
**DO NOT try to move the Floor Stand around when the locks are engaged on the rollers. Always check this before trying to move the system around. Also make sure your work station is within the range of the power cord. The spring arm, with end device attached, should always be in its lower most position during transport.**



**Figure 25: Floor Stand Operation**

## 4.2 Lamp Head

- To energize or de-energize the light, press the I/O-button on the membrane switch on the light head.
- To change between the 5 different dimmer states, use +/- buttons on the membrane switch or rotate sterilizable handle.
- To position the light head over the work area, grasp the handle located on the side of the lamp head or the sterilizable handle and bring the light to the desired location.



**Figure 26: Light Head Operation**

### 4.3 Light Head Handle Attachment/Detachment

To Detach Handle – Push in Detach Button and slide off of Yoke Tube

To Attach Handle – Side Handle Up/Onto Yoke Tube until “Click” is heard

## Section 5: Safety Instructions



**Do not use or install this equipment in a MRI room near MRI machinery. Materials found in this equipment are ferrous.**



**Only facility authorized maintenance personnel should troubleshoot the unit. Troubleshooting by unauthorized personnel could result in personal injury and/or property damage.**



**Only facility authorized personnel should repair the unit. Repair by unauthorized personnel could result in personal injury and/or property damage and could void warranty.**



**Use only original parts or Sunnex replacement parts. To ensure reliability, safety, and overall function of the spring arm system only Sunnex parts are to be used. Other unauthorized parts may cause failure, which could lead to serious injury. The replacement of spare parts is only to be carried out by Sunnex or by someone with proper training recognized by Sunnex.**



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



**This product should be acclimatized to its operating conditions for 24 hours prior to its first use.**



**To isolate Power Supply Main, disconnect power cord on Model #'s LMI-550 and LMI-700.**

## Section 6: Maintenance

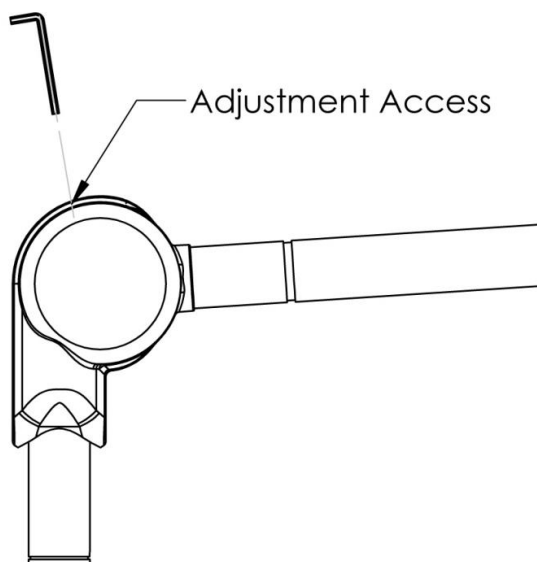
### 6.1 Spring Arm System Adjustment



**The adjustment of the spring arm system must be carried out by a hospital technician or someone with similar qualifications.**

The spring in the system is subject to natural wear. Therefore, the spring force may be reduced after long operation and may need to be adjusted.

1. Make sure the spring arm with the lamp head is in the right position. For Ceiling version this is the highest position, for Floor Stand version this is the lowest position.
2. Insert Allen wrench (4mm) into adjustment access.
3. If the spring arm has a tendency to fall down, the spring force is too low. Rotate the Allen wrench in the counterclockwise direction.
4. If the spring arm has a tendency to spring up, the spring force is too high. Rotate the Allen wrench in the clockwise direction.



**Figure 27: Spring Arm System Adjustment**

## 6.2 Handle Sterilization

- Remove sterilizable handle by pressing the detach button near the base of the handle and pulling the handle off the handle post.
- Sterilize the handle utilizing steam sterilization of minimum 250°F for a minimum of 30 minutes in compliance with AAMI-SSSA-1988: Good Hospital Practices, Steam Sterilization and Sterility Assurance, or equivalent method.



Handle sterilization **CAN NOT** exceed 270°F. This causes permanent damage to the handle.

## 6.3 Fuse Replacement (LMI-300 only)



Unplug power cord before fuses are replaced. Failure to do so could result in personal injury and/or property damage.



Always disconnect the spring arm system from the power supply when installing or removing the fuses. Failure to do so may result in an electric shock.



**DO NOT** use light should it continue to blow fuses. Contact manufacturer immediately.



To isolate Power Supply Main, disconnect power cord on Model #'s LMI-550 and LMI-700.

The fuse holder is located on the back of the base, at the bottom of the power outlet. There is a clip at the top of the fuse holder. To remove, press the clip downwards and pull out.

- Replace damaged fuses with Sunnex approved replacement fuses. Cooper Bussmann, GMC series, 5mm x 20mm, 250V , RoHS compliant.

Install the fuse holder back into the power outlet by clipping it back into place.

## 6.4 Cleaning Instructions



**To prevent a potential electrical shock, disconnect system from power supply and protect it from accidental reconnection when performing cleaning (LMI-300 only). Ensure no cleaning fluid goes into the machinery.**



**To avoid damage DO NOT use scouring agents and alkaline or acidic containing cleaning agents.**

- Clean the lens using glass/plastic cleaner. Use a clean, soft cloth to avoid any scratching of the front lens. Never spray the cleaning fluid directly onto the lens surface.
- To clean the arm system, use mild soap solutions or standard detergents as cleaning agents. Wipe down the surfaces of the equipment with a dampened cloth. If necessary, use small quantities of mild soap solution as cleaning agent. Then wipe the outer surfaces with a soft, clean cloth until they are completely dry.

## 6.5 Disinfection Instructions



**To prevent a potential electrical shock, disconnect system from power supply and protect it from accidental reconnection when performing cleaning. Ensure no cleaning fluid goes into the machinery.**



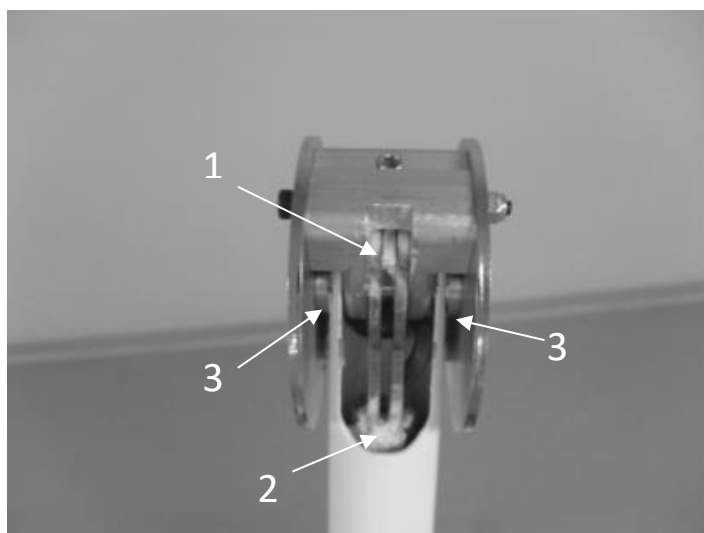
**To avoid damage DO NOT use alcoholic disinfectants, highly alkaline solutions, acids, and pure alcohol. Disinfect the end device only when cooled down.**

- Wipe the area to be disinfected rather than spraying it.
- Do not use areas that have been wiped until the disinfectant is dry.
- Operator and Responsible Organization shall follow the national requirements (standard and directives for hygiene and disinfection).

## 6.6 Lubrication Instructions

The following maintenance must be completed in accordance with all other maintenance checks found in section 6.7.

- Lubricate the link pivot pins [1,2] and the central pivot pin [3] using appropriate aerosol penetrating white grease or equivalent (See figure 28). Note: Have a second person hold the spring arm at its lowered position in order to access the lower link pivot pin [2].



**Figure 28: Lubrication Instructions**

- On the floor stand post (LMI-300 only), lubricate the main pivot bushing [4] using appropriate white grease or equivalent (See Figure 29). To do this, the spring arm must be removed from the post.





**Figure 29: Main Bushing Lubrication**

## 6.7 Maintenance Schedule

<b>Every 6 months</b>	<ul style="list-style-type: none"> <li>• Ensure end device is easy to move left/right, and the spring arm glides freely up/down throughout its range of motion. Refer to section 6.6 for lubrication instructions.</li> <li>• Check the spring arm to ensure it retains its support at its full upper/lower positions and does not drift. Refer to section 6.1 for tensioning instructions.</li> <li>• Check for damage/cracks to paintwork and plastic covers.</li> <li>• Check that all components are secure and not loose.</li> </ul>
<b>Every 2 years</b>	<ul style="list-style-type: none"> <li>• The securing element of the cantilever arm must be checked and <u>greased</u> by a qualified professional.</li> </ul>



**WARNING!** Do not attempt to “quick-fix” with tape, jumpers, wires etc. If the equipment is not functioning properly and there is no solution in this manual, please contact the manufacturer.

## 6.8 Disposal of Parts

**While disposing parts of the product or the product itself, intender should consider local, state, country and international regulations about disposal of parts.**

- **Fuses:** Fuses go in normal waste.
- **Plastic parts:** Plastic parts are to be put in recycling bins.
- **Transformer box and Circuit Boards:** Electrical and electronic components are to be put in electrical and electronic waste.
- **Metal parts:** Metal parts go in metal waste.
- **Risks associated with disposal of parts:** To minimize risks associated with disposing parts, care should be taken to avoid cuts when dismantling.

## 6.9 Detachable Parts

In the event, parts need to be replaced; only Sunnex parts should be used as replacements, use of other parts or materials can degrade safety.

- Lamp head: Sunnex Part Number 32537
- Electrical box (LMI-550 and LMI-700): 32633
- Sterilizable Handle: Sunnex Part Number 32545

## Section 7: Troubleshooting

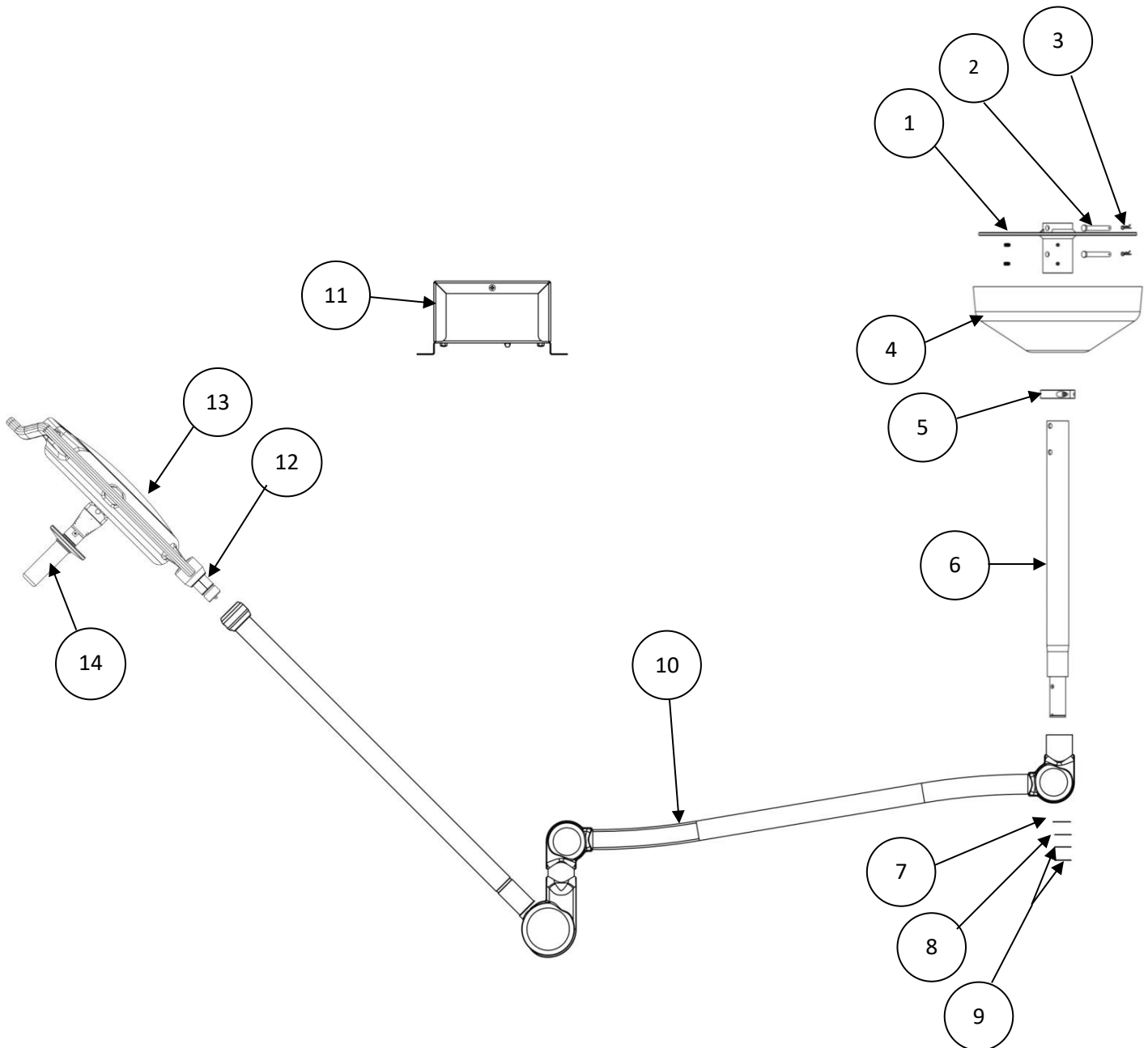


**Disconnect the light from the power supply before attempting any of the electrical checks mentioned below.**

Problem	Possible Cause	Solution
No light from light head	Power button on light head is OFF	Press power button on light head to ON
No light from light head, when ON/OFF-button on light head is ON	No power to the transformer box	Check for facility power to the transformer box
	No power output from transformer when input power to transformer is measured	Replace transformer
	Wires not connected correctly during installation	Check all wiring connections
	<b>Mobile Only</b> Power switch on base is OFF  Fuse is blown	Turn power switch on base ON  Replace fuse (check for correct fuse)
Light does not maintain its vertical position	Spring tension is incorrect	Adjust spring tension, see section 6.1, p. 33
<b>Ceiling Only</b> Extension Arm does not rotate freely or drifts	Improper installation of ceiling mount	Check for excessive flexing of ceiling support structure and check that ceiling mount is plumb. Readjust if necessary
Head does not rotate easily	Set screw over tightened	Loosen set screw

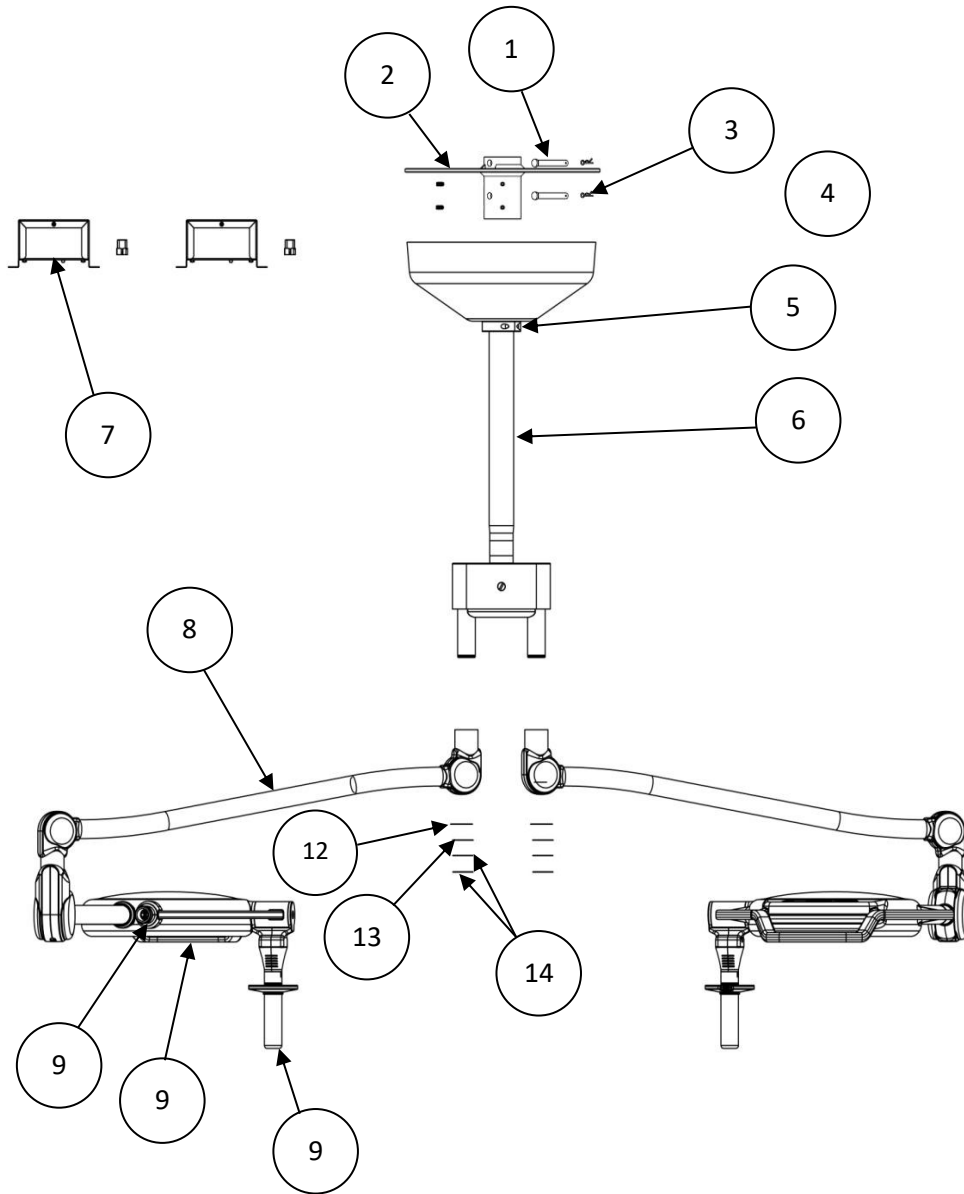
## Section 8: Exploded Views and Parts list

### 8.1 LMI-550 Series



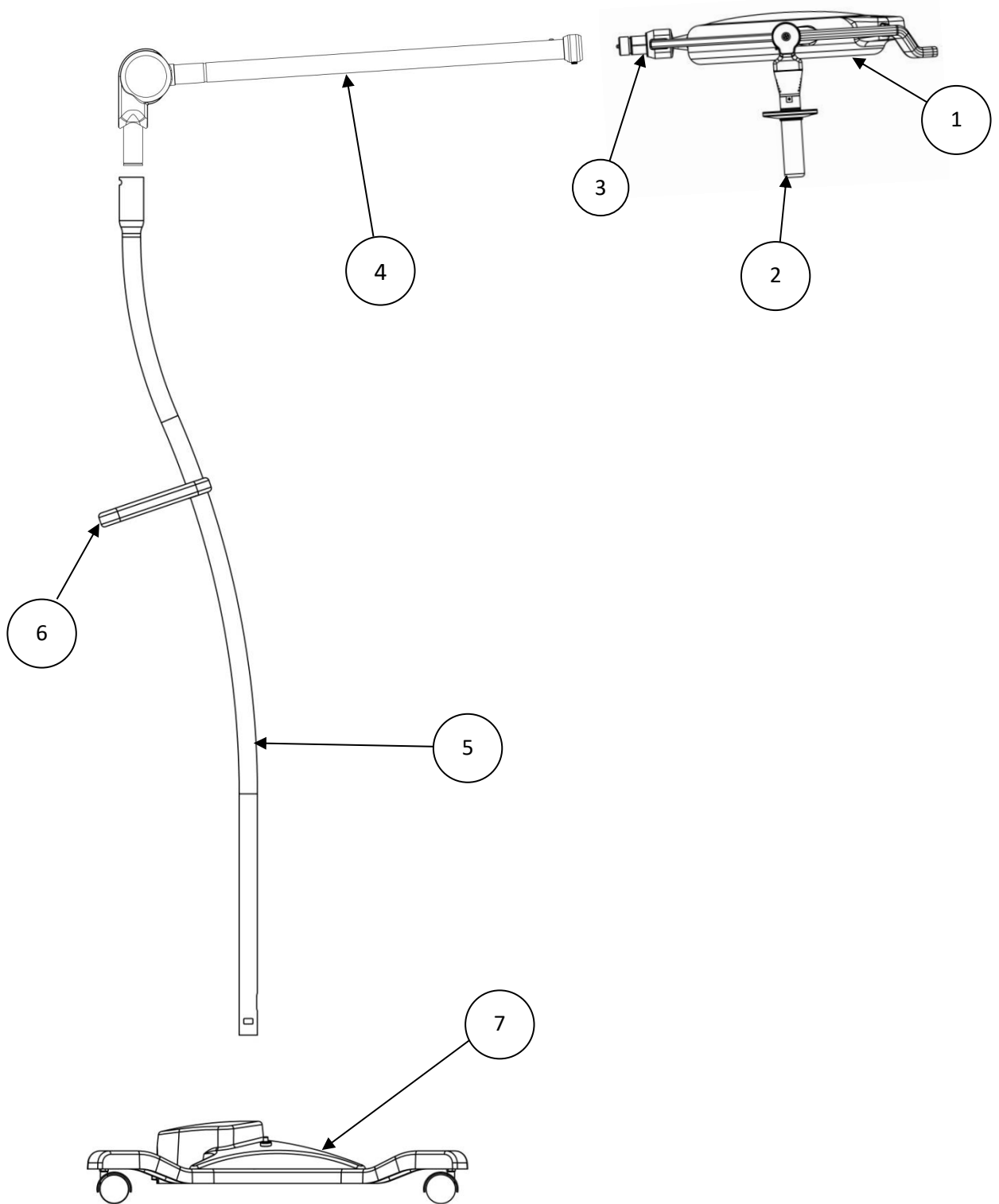
	<b>Description</b>	<b>Quantity</b>
1	Ceiling Mount	1
2	Down Tube Mounting Pins	2
3	Down Tube Cotter Pins	2
4	Ceiling Cover	1
5	Retaining Ring	1
6	Ceiling Down Tube with light wiring harness	1
7	Down Tube Washer	1
8	Down Tube Locking Rings	1
9	Down Tube Safety Washer	1
10	Ceiling Arm	1
11	Transformer box with light wiring harness and power cable	2
12	Leo Minor Head Yoke Brass Coupler	2
13	Leo Minor Head Assembly	1
14	Sterilizable Handle	1

## 8.2 LMI-700 Series



	Description	Quantity
1	Down Tube Mounting Pin	2
2	Ceiling Mount	1
3	Down Tube Cotter Pin	2
4	Ceiling Cover	1
5	Retaining Ring	1
6	Down Tube with dual mount and light wiring harness	1
7	Transformer box with light wiring harness and power cable	2
8	Ceiling Arm	2
9	Leo Minor Head Yoke Brass Bushing	4
10	Leo Minor Head Assembly	2
11	Sterilizable Handle	2
12	Down Tube Washer	2
13	Down Tube Safety Washer	2
14	Down Tube Locking Ring	4

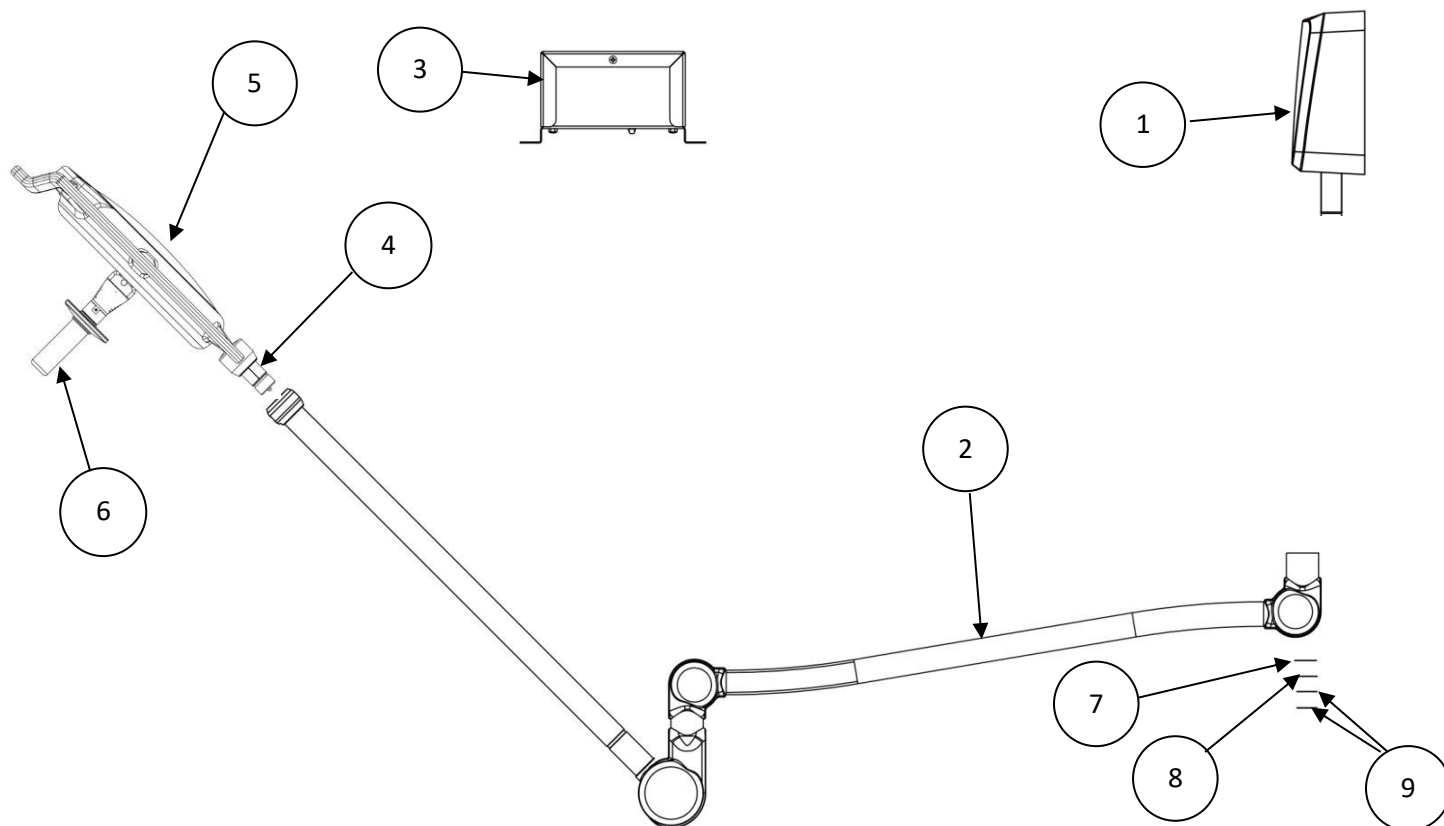
### 8.3 LMI-300





	<b>Description</b>	<b>Quantity</b>
1	Leo Minor Head Assembly	1
2	Sterilizable Handle	1
3	Leo Minor Head Yoke Brass Coupler	2
4	Spring Arm	1
5	Pole	1
6	Handle	1
7	Base with transformer	1

## 8.4 LMI-400 Series



	Description	Quantity
1	Wall Mount	1
2	Wall Arm	1
3	Transformer box with light wiring harness and power cable	1
4	Leo Minor Head Yoke Brass Coupler	2
5	Leo Minor Head Assembly	1
6	Sterilizable Handle	1
7	Washer	1
8	Safety Washer	2
9	Locking Rings	1



