

Sunnex MedicalLight®

**INSTALLATION AND SERVICE MANUAL**

# Celestial Star™ MRI



CEILING      MOBILE

[www.sunnex.com](http://www.sunnex.com)

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## This manual covers following models:

CS2050M-MRI, CS2050C-MRI, CS2050D-MRI, CS2050C-MRI-HW, CS2050CE-MRI-HW  
CS2050D-MRI-HW, CS2050DE-MRI-HW

# 1. SHIPPING CARTON & CONTENTS

## CS2050M-MRI (Mobile)

- One model CS2050M-MRI, Celestial Star mobile light vertical pole with 30 ft cord
- One Celestial Star balance arm with counter weight, 2 cap screws (1/4" – 20, 3/4") and Allen key (5/32)
- One caster base with 2 set screws (1/4" – 20, 1") and Allen key (1/8)
- One base counter weight with 1 socket head cap screw (5/16-18, 2 ½ ) and Allen key (1/4)
- One transformer box with 10ft hospital grade power cord and yellow safety cord
- A combination of installation guide/instruction manual & warranty card
- One Sterilizable handle  
(All Allen keys supplied are magnetic)

## CS2050C-MRI (Ceiling)

- One model CS2050C-MRI, Celestial Star ceiling light extension s-arm with transformer box and 30 ft cord
- One Celestial Star balance arm with counter weight, 2 cap screws (1/4" – 20, 3/4") and Allen key (5/32)
- One transformer box with 10ft hospital grade power cord and yellow safety cord
- One mounting bracket cover with 4 plastic screws
- One drop-ceiling hole cover
- A combination of installation guide/instruction manual & warranty card
- One Sterilizable handle  
(All Allen keys supplied are magnetic)

## CS2050D-MRI (Dual Ceiling)

- Two models CS2050C-MRI, Celestial Star ceiling light extension s-arm with transformer box and 30 ft cord
- Two Celestial Star balance arms with counter weight and 2 cap screws each (1/4" – 20, 3/4") and 2 Allen keys each (5/32)
- Two transformer boxes with 10ft hospital grade power cord and yellow safety cord
- Two bracket covers with 4 plastic screws each
- Two drop-ceiling hole covers
- A combination installation guide/instruction manual, & warranty card (Two)
- Two Sterilizable handles
- One dual mount bracket with dome cover and fasteners  
(All Allen keys supplied are magnetic)

The electrical box is packaged and shipped with the light.

\*Carefully check the contents of the shipment. Report shortages and/or errors, to Sunnex or your dealer's customer service department, within five (5) working days.

The recovery of costs related to shipping damage, concealed or otherwise, can be a long and frustrating experience. In order to avoid the uncomfortable aspects, all freight claims by either the dealer or consignee should be filed with the transportation company within five (5) working days. The carton and its inserts should be kept for inspection by the transportation company.

**CAUTION:** Please be aware, if this routine is not followed, and the carton and its contents are disposed of or destroyed before inspection by the transportation company, our assistance is of no value to you.

## 2. INTRODUCTION

The objective of this manual is to assist you in assembling your Celestial Star MRI light, to introduce some of its most important features, and to provide suggestions for its care.

### 2.1 INTENDED USE

The Sunnex Celestial Star MRI light is intended for use in MRI environments where illumination is required for medical procedures. **CAUTION! This light is intended for out of bore procedures only. Any deviation or inappropriate use may result in serious injury.**

### 2.2 SAFETY INSTRUCTIONS

The Sunnex Celestial Star MRI light must be operated with the safety of the user and patient in mind. Please read this manual and any other instructions before installing the equipment. Please make sure that all appropriate service staff is informed and educated on the equipment to ensure continued safety and needed maintenance. Be sure you understand the intended use of this equipment and recommended operation before attempting to install and use the equipment.

#### IMPORTANT!

- **This light is MRI conditional and can be used as a medical procedure light around the magnet. NOTE! It is extremely important that all guidelines are strictly followed to ensure safety for users and patients.**
- **Use the light only for its intended purpose. It is a medical procedure light intended for use outside of the bore.**
- **WARNING! The power supply contains ferrous materials. DO NOT bring the power supply close to the magnet (100 Gauss line/10 mT). ALWAYS take the furthest route away from the magnet when moving the power supply in the MRI room.**
- **The power supply must be securely fastened to a fixed structure if mounted inside the MRI room.**
- **ALWAYS bring the light outside the MRI room when performing any service on the light. This includes any cleaning and/or bulb replacements. The ceiling light balance arm can be detached and brought out of the MRI room for maintenance or repair. Assemble the mobile light outside of the MRI room.**
- **The safety guidelines of your MRI facility must NEVER be compromised. If in doubt, consult with your facilities manager on proper procedures.**

## 3. CELESTIAL STAR MRI SPECIFICATIONS

### 3.1 TECHNICAL DATA

<b>Power supply:</b>	120V - 60Hz and 230V - 50Hz
<b>Nominal Effect:</b>	120Vac, 60Hz, 50W - 1.7A 230Vac, 50Hz, 50W - 1.0A
<b>Light Source:</b>	Halogen bulb - Dichroic 3 x 12V/35W/10°
<b>Bulb Life:</b>	4,000 hours
<b>Central Illuminance:</b>	40,000 Lux at 1m
<b>Total Irradiance:</b>	79.3 Watts/m <sup>2</sup>
<b>Color Temp:</b>	3,153K
<b>Color Rendering Index:</b>	97
<b>Total Weight:</b>	Mobile 40 lbs / 18 kg Ceiling 52 lbs / 23kg

This product is rated as a Class II medical device, mode of operation is suited for continuous use. The product is rated as class I according to electrical safety standards and conforms to CAN/CSA-C22.2 No. 601.1-M-90, EN 60601-1:1990, IEC 60601-2-41: 2000, UL 60601-1, First edition, 2003.

This product does not produce any physiological effects that could harm a patient. The mains plug on the product is a disconnect device, a mains switch is not provided.

This product is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

The normal operating temperature for the product is -5°F / -20°C to 140°F / 60°C.

#### Technical Questions

Any technical questions can be directed to

America:

Sunnex Inc. phone +1 508 651 0009

Attn: Engineering Department

3 Huron Drive, Natick, MA 01760, USA.

Europe:

Sunnex Equipment AB +1 46 (0) 565 177 00

Attn: Engineering Department

Smidesvagen 7, PO Box 555, S-686 28, Sunne, Sweden

### 3.2 EMC COMPATIBILITY

Sunnex Inc.

#### Electromagnetic Compatibility User Information for the Celestial Star MRI Light

**WARNING:** Medical Electrical Equipment needs special precautions regarding EMC and needs to be installed and put into service according to the Electromagnetic Compatibility [EMC] information provided in the accompanying documents provided in the Appendix.

**WARNING:** Portable and Mobile RF Communications Equipment can affect Medical Electrical Equipment.

**WARNING:** The equipment or system should not be used adjacent to or stacked with other equipment and that if adjacent or stacked use is necessary, the equipment or system should be observed to verify normal operation in the configuration in which it will be used.

**NOTE:** The EMC tables and other guidelines that are included in the Instruction Manual provide information to the customer or user that is essential in determining the suitability of the Equipment or System for the Electromagnetic Environment of use, and in managing the Electromagnetic Environment of use to permit the Equipment or System to perform its intended use without disturbing other Equipment and Systems or non-medical electrical equipment.

To avoid electromagnetic interference, guidelines in this instructions manual and guidelines of MRI **MUST** be strictly followed.

#### EMC Test Summary

TEST STANDARD	RESULTS	
IEC 60601-1-2:2001 w/A1:2004 Example: Basic Standards from IEC 60601-1-2:2001 w/A:2004		
SUB-TEST	TEST PARAMETER	COMMENT
Radiated and Conducted Emissions CISPR 11:2004	Emissions below Group 1, Class B limits	Pass
Harmonic Emissions IEC 61000-3-2:2001	Emissions within specified Class A limits	Pass
Voltage Fluctuation and Flicker IEC 61000-3-3:2002	4% dmax.	Pass
Electrostatic Discharge IEC 61000-4-2:2004	+/-6kV Contact, +/-8kV Air	Pass
Electrical Fast Transients IEC 61000-4-4:2004	+/-0.5,1,2kV AC Mains and P/S to Lamp	Pass
Surges IEC 61000-4-5:2001	+/-1kV Line to Line +/-2kV Line to Protected Earth	Pass
Voltage Dips and Dropouts IEC 61000-4-11:2004	5% for ½ Cycle, 40% for 5 Cycles, 70% for 25 Cycles, 5% for 5 Seconds	Pass (See Notes)

Notes: A UPS should be used if mains quality is suspect.

### 3.3 TRANSPORTATION AND STORAGE

This light is packaged in card board and should be transported protected from moisture. The light should be stored in a dry environment and room temperature.



Transportation and storage temperature: -5°F / -20°C to 140°F / 60°C

Humidity < 95%

## 4. ASSEMBLY AND INSTALLATION INSTRUCTIONS

There are several factors involved with proper installation. Considering them will help you produce a safe work environment for yourself and your patients.

The light is shipped in two pieces, the balance arm and the extension arm with supporting hardware and accessories. Please follow the directions for assembly carefully as any negligence or poorly performed installation may void the Warranty. Any modification to the structure of the light may also void the listings of this product.

### 4.1 CELESTIAL STAR MOBILE MRI CS2050M-MRI



**CAUTION! ASSEMBLE LIGHT OUTSIDE THE MRI ROOM**



**CAUTION! THE ELECTRICAL BOX CONTAINS FERROUS MATERIALS AND MUST BE HANDLED WITH CAUTION. THE ELECTRICAL BOX SHOULD BE SECURED TO A STRUCTURAL MEMBER AT A SAFE DISTANCE (100 GAUSS LINE/10mT) AWAY FROM THE MRI MACHINERY. DO NOT MOUNT BOX DIRECTLY TO SHEET ROCK OR PLYWOOD SUBSTRATES. IDEALLY, THE ELECTRICAL BOX IS SECURED BY NON-FERROUS FASTENERS, DIRECTLY TO THE FLOOR/CEILING OUTSIDE THE MAXIMUM RECOMMENDED GAUSS LINE.**

#### 4.1.1 ATTACH VERTICAL POLE TO CASTER

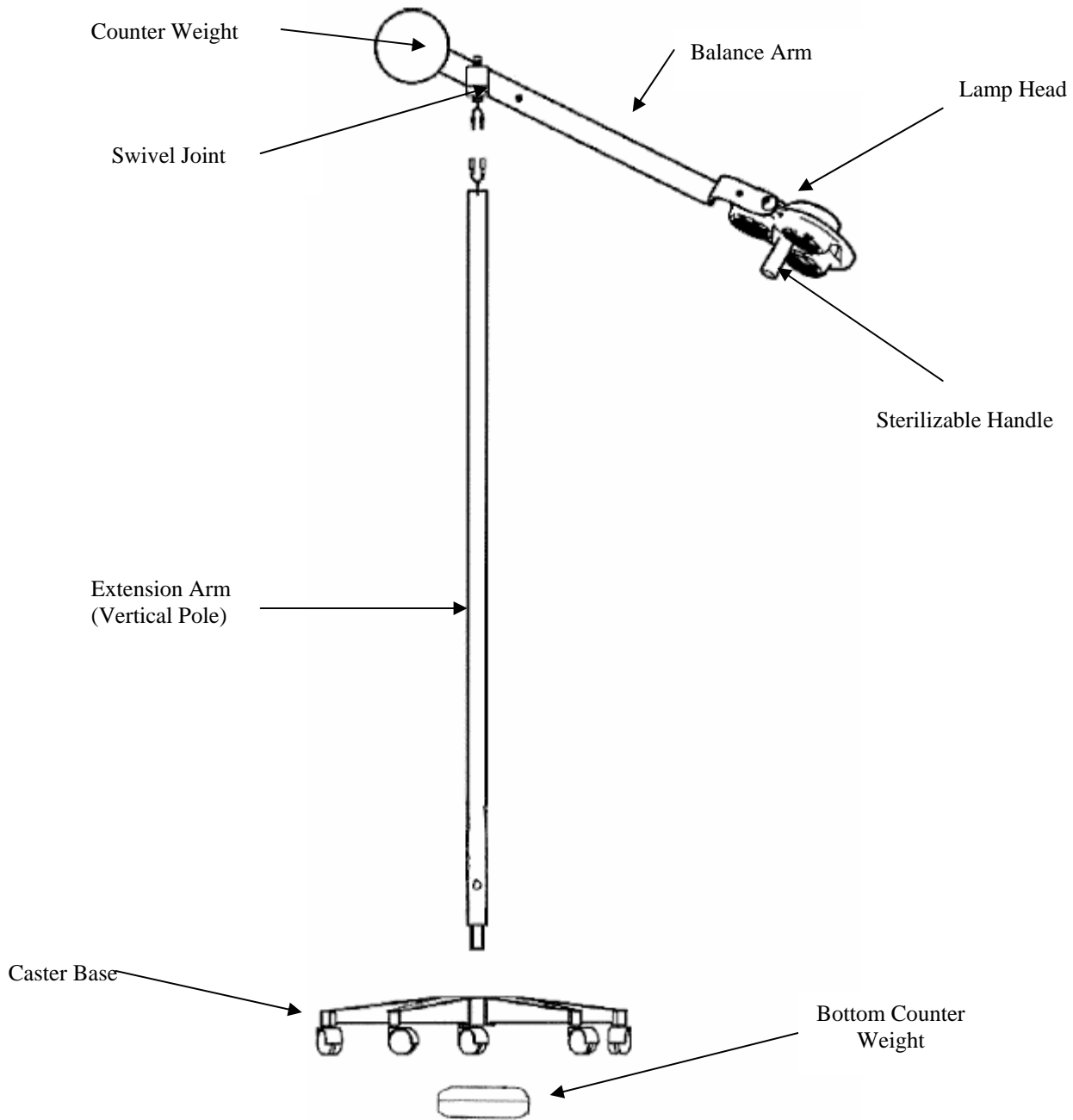
1. Insert the bottom of the vertical pole into the center housing of the caster base. Refer to Figure 1.
2. Secure the vertical pole with the two provided set screws (1/4-20 X 1") using provided Allen wrench (1/8).
3. Attach the base counter weight to bottom of vertical pole using the 5/16-18 socket head cap screw with Allen key (1/4).
4. Ensure secure connection of the vertical pole and caster base and base counter weight prior to connecting the balance arm with the vertical pole.

#### 4.1.2 ATTACH BALANCE ARM TO VERTICAL POLE

1. Attach the counter weight to the balance arm prior to connecting the balance arm to the extension arm.
2. Fix the round counter weight to other end of the lamp head balance arm. There are two counter sunk holes on this end of the balance arm. Position the counter weight on the opposite side of the counter sunk holes on the balance arm. Set the two supplied Hex screws (1/4-20 X 3/4") in the counter sunk holes and tighten them down using provided Allen wrench (5/32).
3. Attach the balance arm to the vertical pole. Connect the male Molex connector with the female Molex connector and ensure that the positive latch on the connectors is achieved. Refer to Figure 1. Position the connection in such a way that the wires will not be compromised by securing the extension arm to the balance arm.
4. Line up the holes on top of the vertical pole with the holes on the arm joint at the balance arm.
5. Use the provided stainless steel thumb screws (3 X 8-32 X 1/2") to secure the connection.

\* Connect the sterilizable handle onto the screw at the center of the lamp head.

\*You are now ready to take the CS MRI mobile inside your MRI room. **CAUTION! THE TRANSFORMER BOX CONTAINS FERROUS MATERIALS.**



**Figure 1: Celestial Star Mobile MRI**

### 4.1.3 INSTALLATION IN THE MRI ROOM

1. Mount electrical box securely to a structural member outside of the safe perimeter (100 Gauss line/10mT) of MRI machinery with a fastener 1/2" diameter x 2" L. (Four holes are provided on the base plate of transformer box).
2. It is recommended not to mount the electrical box on wall.
3. Velcro is provided on the base plate of the electrical box and a rope and snap-on hook is provided on the electrical box to assist in proper installation.
4. Plug male connector (from lamp cord) into the female connector on the electrical box. **CAUTION:** Male connector has a mechanical latch. Be sure lamp connector is fully engaged into electrical box female connector and the latch is fully engaged. (To disconnect, press tab on the female connector [and hold] and pull the male connector.)



**Figure 2. Lamp connector connection with electrical box**

CAUTION	<ol style="list-style-type: none"> <li>1. IN CASE YOU NEED TO DETACH MALE CONNECTOR FROM FEMALE CONNECTOR OF POWER SUPPLY, YOU MUST FIRST "PUSH" ON THE TAB OF FEMALE CONNECTOR AND THEN PULL THE MALE CONNECTOR OUT.</li> <li>2. PULLING THE MALE CONNECTOR FIRST, WITHOUT "PUSHING" THE TAB ON FEMALE CONNECTOR MAY MAKE THE CONNECTION TIGHT.</li> <li>3. IF THE CONNECTION FEELS TIGHT, [1] PRESS ON THE MALE CONNECTOR FIRST [2] "PUSH" ON THE TAB OF FEMALE CONNECTOR AND HOLD [3] PULL THE MALE CONNECTOR OUT.</li> </ol>
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5. Plug electrical box lead into a hospital grade electrical socket.
6. Lamp is ready for use.

## 4.2 CELESTIAL STAR CEILING CS2050C-MRI

### Before you get started!

Refer to Figure 4 for dimensions

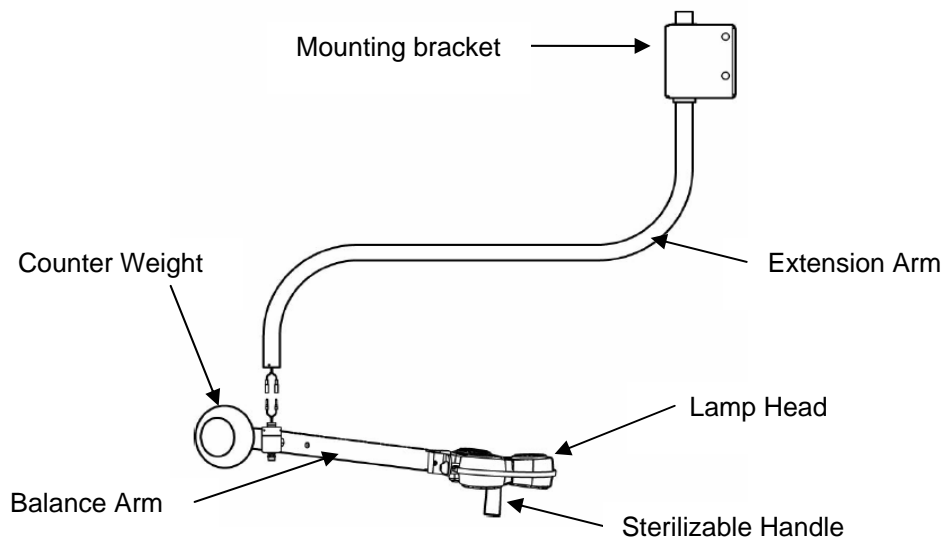
Dimensions and hole pattern of transformer bracket in the Appendix

\*It is recommended to install the transformer box outside the MRI room and run the power through an RF filter (Option 1). In the event the transformer box must be installed inside the MRI room (Option 2), the box must be secured to a structural member at a safe distance (100 Gauss line/10mT) away from the MRI machinery. Refer to section ELECTRICAL CONNECTIONS below for guidance.

\* The suggested floor-to-(fixed) ceiling height is 9' (2.7m). While an 8' (2.4m) minimum is acceptable, it will affect head clearance for tall people. For ceiling heights over 9' please see below for instructions. Please refer to Figure 4 for mounting height guidelines.

\* The total weight of the light is 56 pounds (25 Kg). NEVER attempt to affix a ceiling light to a drop (false) ceiling.

\* The light bracket should be mounted against a permanent member just above the drop (false) ceiling. If the ceiling surface is to be finished, the light is mounted first. A small panel should then be constructed in the finished ceiling surface, to provide access to the electrical connections and the bracket.



**Figure 3: Celestial Star MRI Ceiling**

**CAUTION:** Installations in which there is a great distance between the hard ceiling surface and the drop ceiling surface, require construction of an additional support structure. This structure must be of adequate strength and stability, to support the light and prevent any swaying or torque when the light is moved during use. In some installations, a structure in the form of a rectangle box with an angle iron fixture at its base, is constructed. At its top, it is bolted to the hard surface above the drop ceiling. At its base, is the angle iron. The CELESTIAL STAR light bracket is then mounted to the vertical portion of the angle iron, using four (4) 3/8" x 2 1/4" (M10 x 60mm) bolts and 3/8" x 1/2" (M10 x 12mm).

- If metal brackets are in use, the same consideration given to the mounting of a sink, toilet or similar wall mounted items should be given for mounting of the light.



**CAUTION! IF CONSTRUCTING ADDITIONAL SUPPORT STRUCTURES TO INSTALL THE LIGHT, THE LIMITATIONS AND REQUIREMENTS OF THE MRI ENVIRONMENT MUST BE CONSIDERED. NON-MAGNETIC MATERIALS SHOULD BE USED. CONSULT WITH YOUR MRI FACILITY MANAGER IF UNCERTAIN.**

## 4.2.1 INSTALLATION OF THE EXTENSION ARM TO THE CEILING

For illustrations please refer to Figure 4 and 5. Attach the extension arm to the ceiling prior to connecting the balance arm to the extension arm. The balance arm will easily be attached when the extension arm is properly secured in the ceiling.



**CAUTION!** It is important that the extension arm with the mounting bracket is properly aligned during installation. Failure to do so may cause drifting of the fixture.

1. Fasten the mounting bracket to the desired location using four (4), 3/8" x 2 1/4" (M10 x 60mm) lag bolts. The ceiling joists/brackets and the bolts used in mounting, should support a minimum of 100 pounds (45kg) pull on each mounting bolt and a minimum of 100 pounds (45kg) shear on each bolt. Pilot holes should be drilled to ensure the lag bolts are not broken off during installation. A more secure mounting can be made with machine bolts long enough to pass through the joists and held in place with a nut and washer.
2. Ensure that the extension arm is aligned by placing a level on the horizontal portion of the extension arm.



**CAUTION:** An attempt to mount the light in any manner other than one which is safe and secure, can lead to problems, with possible injury to you or your patient.

\* To ensure the ceiling rod is plumb, shim the bracket if necessary. Accurate alignment will enhance the stability of the light and reduce drift.

\* These minimum requirements are called for in order to support loads applied each time the light beam is adjusted.

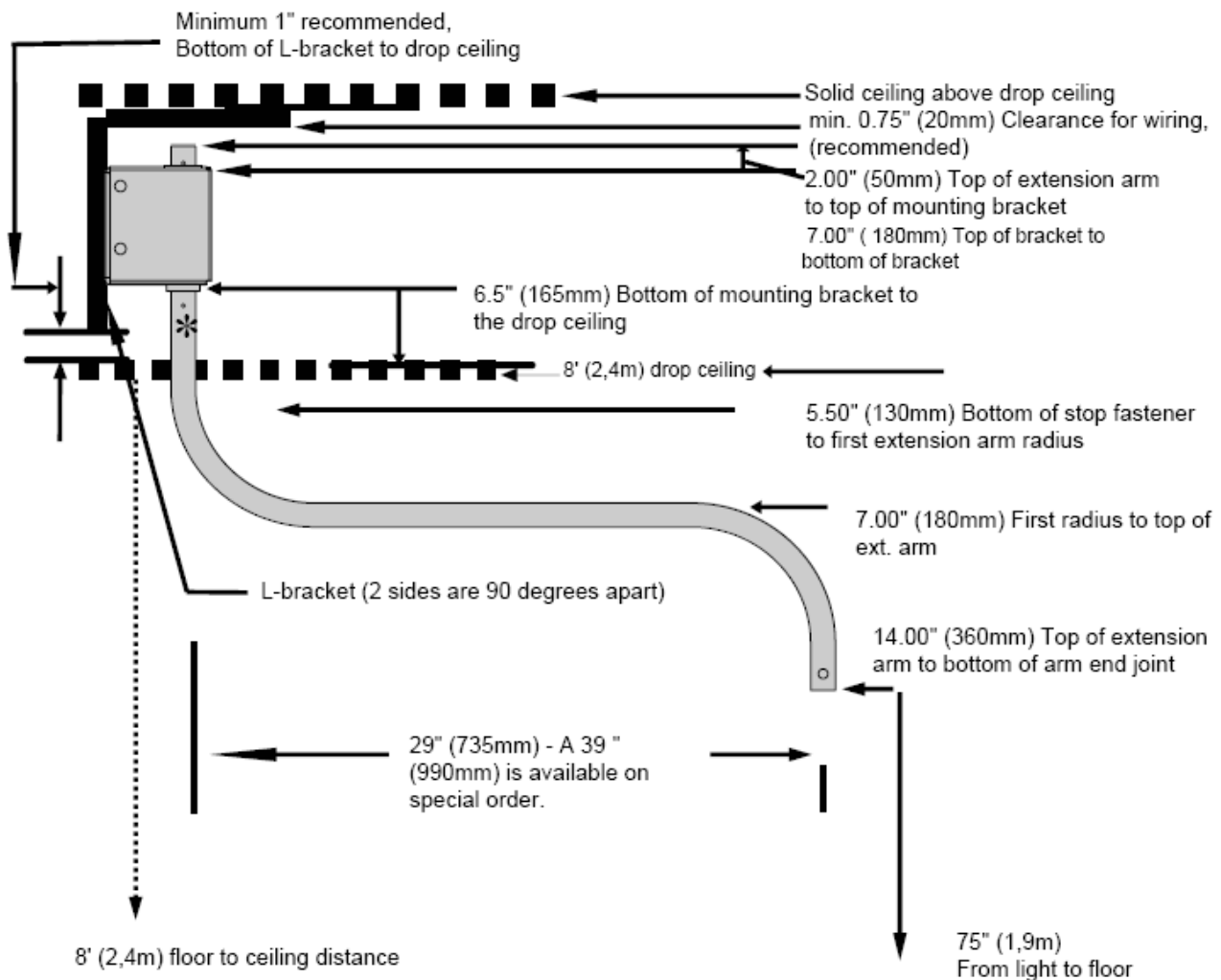
**NOTE!** An access panel in the drop/false ceiling should be constructed near the extension arm for potential maintenance or adjustments post installation. If sections of the drop ceiling around the extension arm are easily removed, then this access panel may not be required.

### 4.2.2 MOUNTING WITH AN ANGLE L-BRACKET AS SUPPORT



**CAUTION:** WHEN MOUNTING CELESTIAL STAR CEILING MRI LIGHT, CARE MUST BE TAKEN TO USE ONLY NON-MAGNETIC MOUNTING STRUCTURE AND HARDWARE.

An angle L-bracket can be used to secure the mounting bracket to a vertical plane above the drop (false) ceiling. Please refer to the dimensions below to determine the appropriate distance to the drop ceiling based on the desired clearance under the lowest point of the extension arm. The bottom of mounting bracket **MUST** be mounted at 6.5" from the drop ceiling to achieve 75" (plus or minus 1") from the light to floor for a floor to drop ceiling distance of 8'.

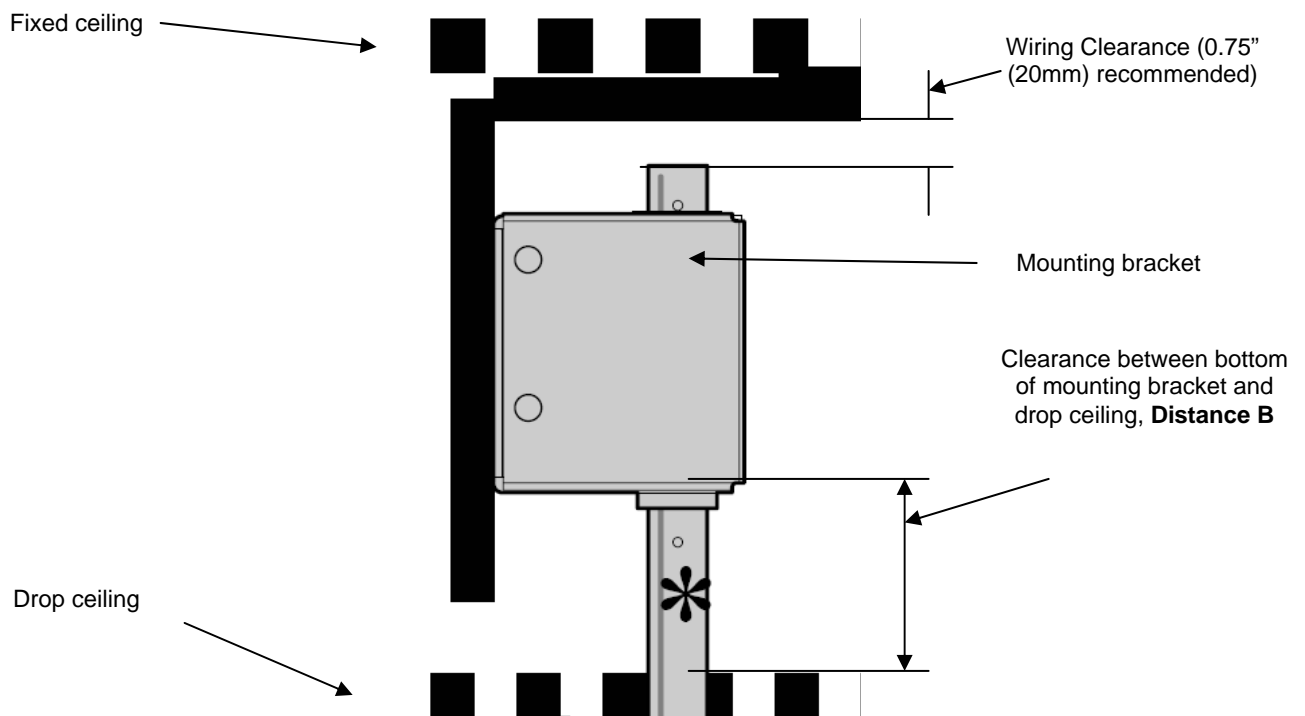


**Figure 4: Mounting with an angle L-bracket (Celestial Star MRI Ceiling)**

It is to be noted that 6' 3" (1,9 m) is the recommended distance from the bottom of extension arm to floor. A lower installation height may affect head clearance for tall people and a higher installation height may affect the reach of the light and the user. However, it is up to the user to determine the most appropriate mounting height. The following table can be used to determine where to mount the transformer bracket relative to the drop ceiling. The recommended minimum is 2". The distance 'B' in Table 1 should be chosen depending on the requirements of the end user. The distance between drop ceiling and solid ceiling should also be considered. If no drop ceiling is present, please refer to Figure 4 for the appropriate mounting height.

<b>A: Floor to Drop Ceiling Distance</b>	7'6" (2,25m)	8' (2,4m)	8'6" (2,55m)	9' (2,7m)
<b>B: Clearance between BOTTOM of transformer bracket to drop ceiling</b>	6.5" (165mm)	6.5" (165mm)	6.5" (165mm)	6.5" (165mm)
<b>C: Distance you get from bottom of extension arm to floor (Recommended: 6'3" – The user can specify need)</b>	5'9" (1,75m)	6'3" (1,9m)	6'9" (2,05m)	7'3" (2,2m)

**Table 1. Guideline for Celestial Star ceiling MRI mount**



**Figure 5: Celestial Star Ceiling MRI mounting guidelines**



**CAUTION:** If the floor to drop ceiling distance is greater than 9'6" (2.9m), a different arrangement is required. In such case, please contact Sunnex customer service at 800-445-7869 (North America) or +46 565 177 00 (Europe) for mounting alternatives.



## Recommendations for mounting Celestial Star MRI ceiling (for hard ceiling to drop ceiling distance greater than 5 feet)

When using a set up shown in figure 6: If the drop ceiling to hard ceiling distance is 3 feet or less than 3 feet, then one horizontal plate is recommended. If this distance is more than 5 feet then use of another horizontal plate above the first horizontal plate is recommended for assuring stability of the structure and stability of the light.

On the horizontal plate shown in figure 6, 4 holes can be drilled for mounting the L-bracket. More than 4 holes can also be drilled on the horizontal plate to assist in mounting the light at a proper location.

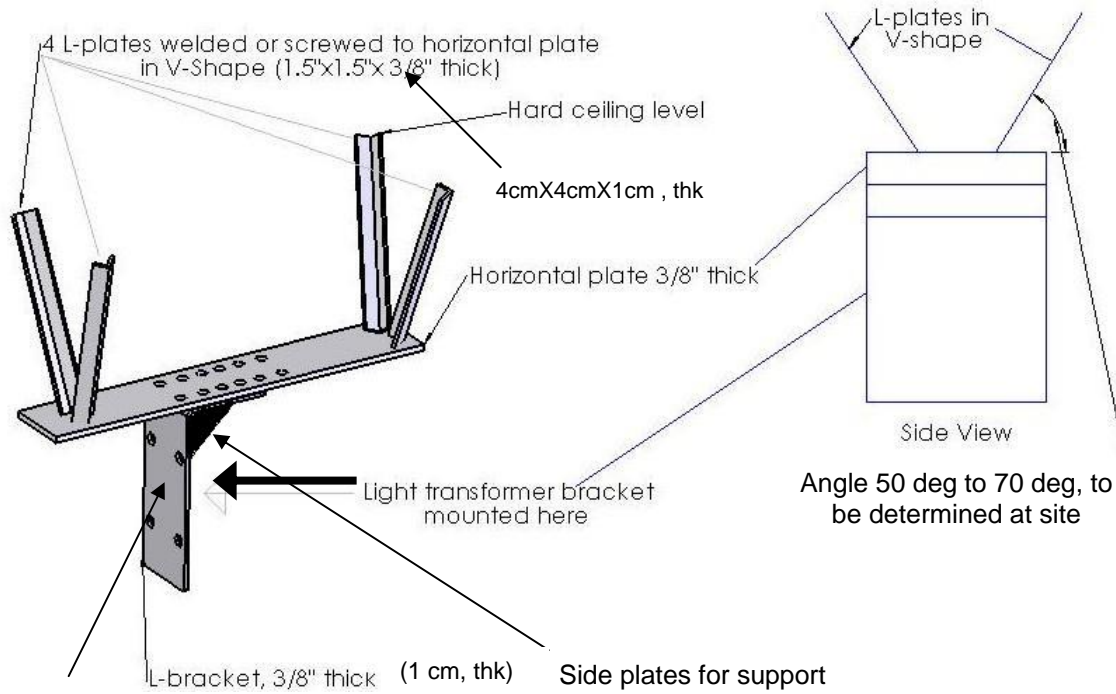
- **Maximum load of the light is 50 lbs.**
- **Moment of assembly, balance arm extended horizontal outwards, (29" [74cm] long extension arm) = 50 lbs X 57 inches = 2,850 lbs.inches (322 Newton.m)**
- **Moment of assembly , balance arm extended horizontal outwards, (39" [100cm] long extension arm) = 50 lbs X 67 inches = 3,350 lbs.inches (379 Newton.m)**
- **If the longer extension arm (39"/100cm) is used, then the lamp head extended horizontally inwards will not reach the same point that the 29"/74cm arm will reach.**

### MOUNTING NON-MAGNETIC STAINLESS STEEL PLATES FOR INSTALLING THE LIGHT (RECOMMENDATIONS)



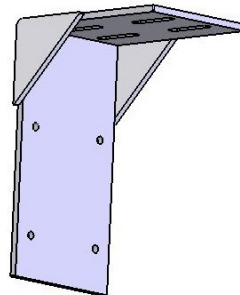
**CAUTION!** Non-magnetic materials should be used in the MRI environment. Consult with your MRI facility manager if uncertain.

1. Non-magnetic stainless steel: Flat horizontal plate, minimum 3/8" (10mm) thick, length of the plate to be determined by the contractor (Recommended dimensions: 63"LX6"W/160cm LX16cm W).
2. Non-magnetic stainless steel: 4 L-plates for supporting flat plate and stability of the light, minimum 3/8" (10mm) thick, length of the plate to be determined by the contractor.
3. Non-magnetic stainless steel: L-bracket, minimum 3/8" (10mm) thick, dimensions of the bracket to be determined by the contractor. (Recommended dimensions: 12"L1X8"L2X6"D/31cm L1X21cm L2X16cm D).
4. Non-magnetic stainless steel: side plates for extra support for L-bracket, minimum 3/8" (10mm) thick, dimensions of the bracket to be determined by the contractor. (Recommended dimensions: 4"X4"X3/8"/11cmX11cmX1cm).



This side of L-bracket to be mounted square, otherwise the light may sway

**Figure 6: Celestial Star ceiling MRI mounting with horizontal plate and L-bracket (Recommendations)**



**Material: Steel, thickness 3/8" for L-plate and 2 side plates.**

**Fillet weld 2 side plates to L-plate**

**Figure 7: Celestial Star MRI L-bracket (Recommendations)**

**NOTES**

1. These are recommendations only; Sunnex is not responsible for all the material required for mounting. Bolts, nuts, horizontal plates, L-brackets and all other materials required for mounting the light on ceiling supplied by the Contractor.
2. Contractor has the final responsibility for the strength and stability of the Mounting Structure.

### 4.2.3 ATTACH BALANCE ARM TO EXTENSION ARM

Follow these instructions to attach balance arm to the extension arm

1. Do not attach the counter weight to the balance arm prior to connecting the balance arm to the extension arm.
2. Connect the male Molex connector with the female Molex connector and ensure that the positive latch on the connectors is achieved. Refer to Figure 3. Position the connection in such a way that the wires will not be compromised by securing the extension arm to the balance arm.
4. Line up the holes on the bottom of the extension arm with the holes on the arm joint at the balance arm.
5. Use the provided stainless steel thumb screws (3 X 8-32 X ½") to secure the connection. If needed, use a wrench to tighten the screws.



**CAUTION! IF THE MAGNET IS ACTIVE, USE EXTREME CAUTION WHEN BRINGING TOOLS INTO THE MRI ENVIRONMENT. NON MAGNETIC TOOLS SHOULD BE USED TO THE EXTENT POSSIBLE. FAILURE TO FOLLOW MRI RULES AND GUIDELINES MAY RESULT IN SERIOUS INJURY.**

6. Once the light is securely in place, fix the round counter weight to other end of the lamp head balance arm. There are two counter sunk holes on this end of balance arm. Position the counter weight on the opposite side of the counter sunk holes on the balance arm. Set the two supplied Hex screws in the counter sunk holes and tighten them down using provided Allen wrench.



**CAUTION! THE PROVIDED ALLEN WRENCH CONTAINS FERROUS MATERIALS. IF THE MAGNET IS ACTIVE, USE EXTREME CAUTION WHEN BRINGING TOOLS INTO THE MRI ENVIRONMENT. NON MAGNETIC TOOLS SHOULD BE USED TO THE EXTENT POSSIBLE. FAILURE TO FOLLOW MRI RULES AND GUIDELINES MAY RESULT IN SERIOUS INJURY.**

- \* Connect the sterilizable handle onto the screw at the center of the lamp head.
- \* Plug the hospital grade plug into the receptacle. Your light is ready for use.

### 4.2.4 ELECTRICAL CONNECTIONS

#### Option 1 – Installing the transformer box outside MRI room using RF filter

The transformer box is equipped with 30ft of cord on the secondary side and 10ft of cord on the primary side. If installing the transformer box outside the MRI room, connectors may be required on the secondary side to accommodate the use of an RF filter. RF filter connectors will be different based on which RF filter is used. Total length of cord on the secondary side should not be altered from the original 30ft. If your facility construction requires alterations beyond these guidelines, please contact Sunnex Technical Support.

#### WHICH RF FILTER TO USE

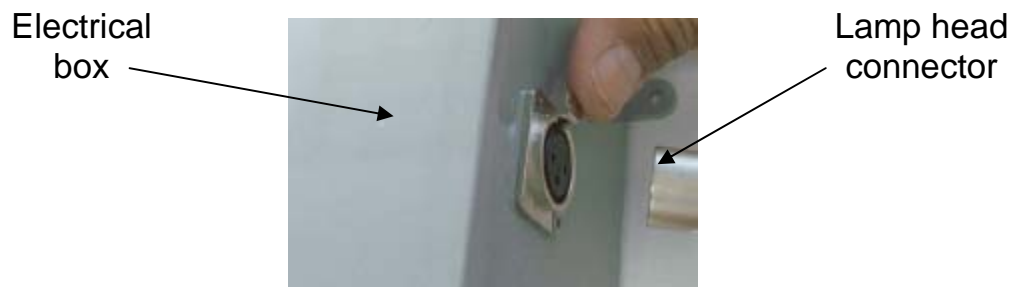
##### Celestial Star specifications:

Power Supply:	120V - 60Hz and 230V - 50Hz
Nominal Effect:	120VAC, 60Hz, 3x35W - 1.7A 230VAC, 50Hz, 3x35W - 1.0A

Voltage output: 14V DC  
Current: 7.5 Amp. DC in secondary

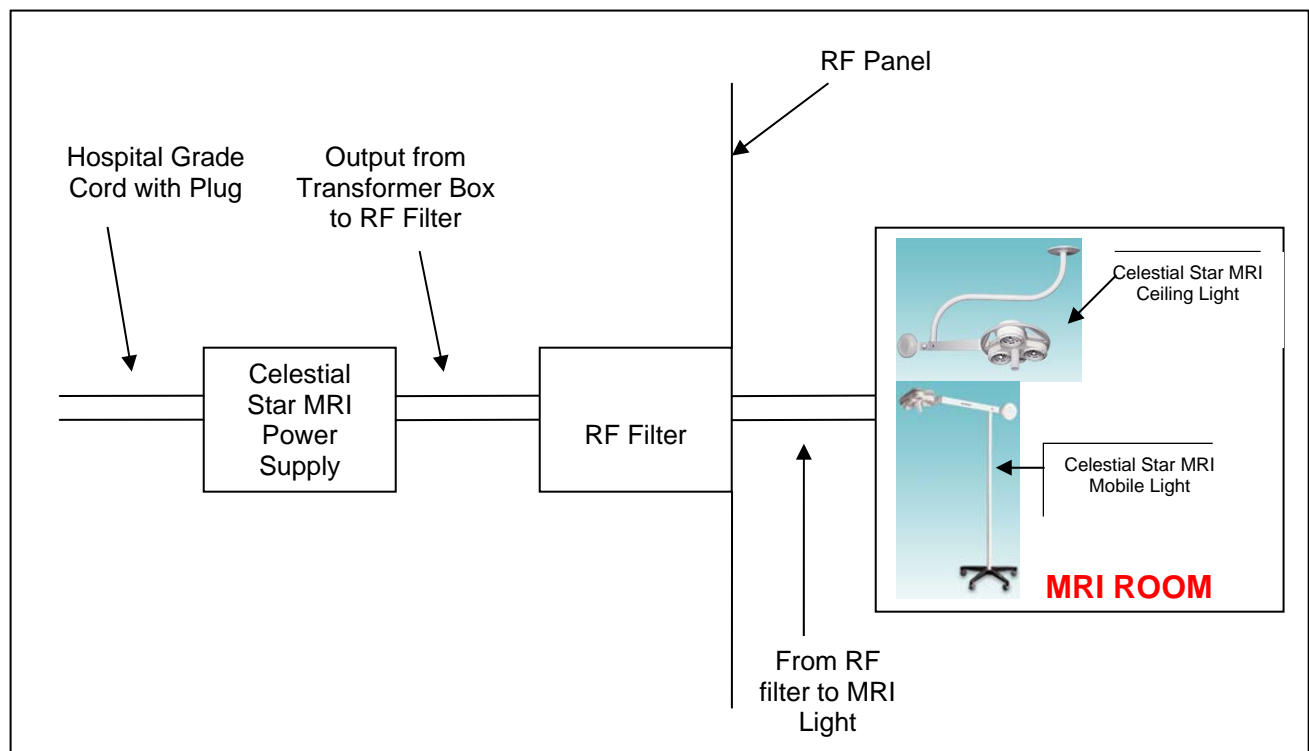
Sunnex does not recommend any specific filter but the specifications of the Celestial Star product must be carefully considered when selecting a filter. Some manufacturers that make RF filters are: Amphenol Canada, Spectrum Control, ERNI, Conec. (Amphenol Canada part# FCC17-A3W3AD-2X0 or equivalent filter should be used.) The voltage drop over the filter must be minimal to ensure proper performance of the light fixture. The guidelines and requirements of your MRI facility must be considered as well. Consult with your MRI facility manager or the RF panel support technician if uncertain.

1. Mount transformer box securely to a structural member in the area close to the RF panel in the adjacent equipment room using 1/4 X 2" bolts (Four holes are provided on the base plate of transformer box). The transformer box should not be stacked with other power supply units.
2. It is recommended not to mount the transformer box on wall.
3. Velcro is provided on the base plate of the transformer box and a rope and snap-on hook is provided on the transformer box to assist in proper installation.
4. Install the connectors accepted by your RF filter in line on the secondary side at the appropriate distance from the transformer box.
5. Connect the leads through the RF filter.
6. Plug lamp lead connector into the receptacle on the side of the electrical box. **CAUTION:** Lamp lead connector has a mechanical latch. Be sure lamp connector is fully engaged into electrical box receptacle and the latch is fully engaged. (To disconnect, press lever on the receptacle and pull the lamp head connector.)



**Figure 8. Lamp lead connection with electrical box**

7. Confirm connection through the RF panel into the light fixture in the MRI room.
8. Plug electrical box lead into a hospital grade electrical socket.
9. Lamp is ready for use.



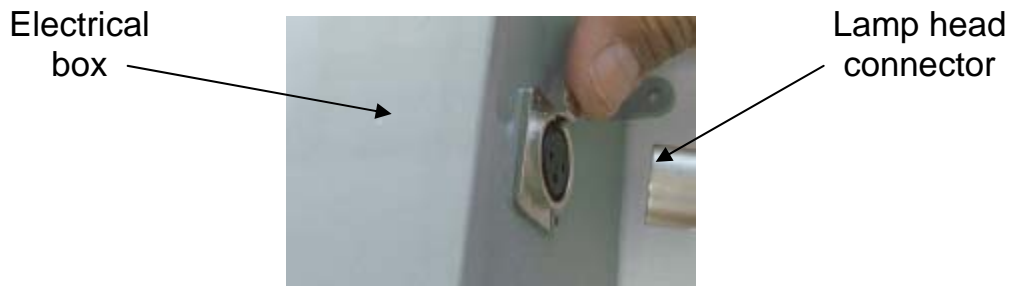
**Figure 9. Schematic for option 1 (Installing the transformer box outside MRI room using RF filter)**

### Option 2 – Installing the transformer box inside the MRI room.

The light is equipped with 30ft of cord on the secondary side and 10ft of cord on the primary side. If installing the transformer box inside the MRI room. The total length of cord on the secondary side should not be altered from the original 30ft.

1. Mount electrical box securely to a structural member in the ceiling (ceiling models only) outside of the safe perimeter (100 Gauss line/10mT) of MRI machinery with a bolt 1/2" diameter x 2" L. (Four holes are provided on the base plate of transformer box).
2. It is recommended not to mount the electrical box on wall.
3. An access panel should be constructed to allow access to the transformer box for maintenance and repair such as fuse replacements.
4. Velcro is provided on the base plate of the electrical box and a rope and snap-on hook is provided on the electrical box to assist in proper installation.
5. Plug lamp lead connector into the receptacle on the side of the electrical box. **CAUTION:** Lamp lead connector has a mechanical latch. Be sure lamp connector is fully engaged into electrical box

receptacle and the latch is fully engaged. (To disconnect, press lever on the receptacle and pull the lamp head connector.)



**Figure 10. Lamp lead connection with electrical box**

6. Plug electrical box lead into a hospital grade electrical socket.
7. Lamp is ready for use.



**CAUTION! THE ELECTRICAL BOX CONTAINS FERROUS MATERIALS AND MUST BE HANDLED WITH CAUTION. THE TRANSFORMER BOX SHOULD BE SECURED TO A STRUCTURAL MEMBER AT A SAFE DISTANCE (100 GAUSS LINE) AWAY FROM THE MRI MACHINERY. DO NOT MOUNT BOX DIRECTLY TO SHEET ROCK OR PLYWOOD SUBSTRATES. IDEALLY, THE TRANSFORMER BOX IS SECURED BY NON-FERROUS FASTENERS, DIRECTLY TO THE FLOOR/CEILING OUTSIDE THE MAXIMUM RECOMMENDED GAUSS LINE.**

### **Option 3 – Hardwiring the light to mains supply**

#### **Instructions to hardwire Celestial Star MRI light**

The hardwiring instructions apply to following models only:


1. CS2050C-MRI-HW (Celestial Star ceiling MRI, 120V)
2. CS2050CE-MRI-HW (Celestial Star ceiling MRI, 230V)



**CAUTION: A LICENSED ELECTRICIAN MUST BE USED TO PERFORM HARDWIRING INSTALLATIONS, NATIONAL ELECTRICAL CODE (NEC) MUST BE FOLLOWED DURING HARDWIRING INSTALLATION.**

The Celestial Star lights may be hardwired with mains supply. During such hardwiring, following instructions must be used:

1. The light is supplied with a hard service cord (STOW 18/3, 600V, -35 °C to 105°C, 10 Amp per conductor @ 25 °C, approved as water resistant, oil resistant, outdoor use) suitable for ceiling hardwiring applications. This cord has 3 conductors (Hot, neutral and ground). The earth and neutral conductors are labeled as follows:

EARTH	
NEUTRAL	N

This STOW cord runs through a hole in the transformer box. The outer diameter of the STOW cord is 0.378” (9.66mm). The hole in transformer box is 0.90” (22.86mm) for a metal conduit of (Trade size ½ or metric designator 16). The conduit must be fixed to the transformer box with use of nut.

2. Connect the earth conductor with earthing of the facility, neutral conductor with neutral of mains supply and hot conductor with hot terminal of mains supply.

3. Use proper wire nuts of appropriate electrical rating considering the STOW cord specifications and electrical rating of the light.

### 4.3 CELESTIAL STAR DUAL CEILING CS2050D-MRI

#### Before you get started!

\*Drawing of dual mounting bracket provided in the Appendix

\*The dual mounted Celestial Star comprises two identical single ceiling mounted lights. The two lights are to be mounted back to back by creating structures described in the single arm installation procedures above. If installing the dual light above a drop ceiling, the flat, plastic ceiling covers (provided) can be used to cover the hole in the drop ceiling created for the extension arms.

\*If the distance between the fixed ceiling and the drop ceiling is large, an additional support structure must be constructed to allow for mounting of the lights at the appropriate height. Please refer to section 4.2 for directions.

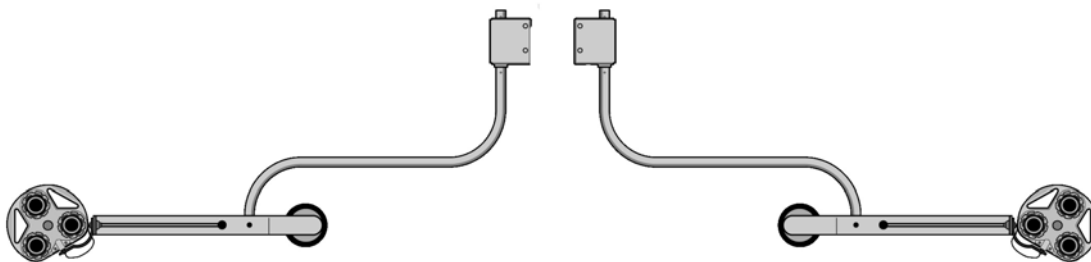
\*The total weight of the light is 130 pounds (59kg). NEVER attempt to affix a ceiling light to a drop (false) ceiling.

\*The dual mounted Celestial Star requires two (2) transformer boxes and two RF filters (if mounted outside MRI room).

The dimensions and recommended installation height is identical to the single arm Celestial Star. Please refer to the single arm installation instructions for complete details and illustrations in Section 4.2.



**CAUTION! IF CONSTRUCTING ADDITIONAL SUPPORT STRUCTURES TO INSTALL THE LIGHT, THE LIMITATIONS AND REQUIREMENTS OF THE MRI ENVIRONMENT MUST BE CONSIDERED. NON-MAGNETIC MATERIALS SHOULD BE USED. CONSULT WITH YOUR MRI FACILITY MANAGER IF UNCERTAIN.**



**Figure 11: Dual mounted Celestial Star Ceiling with Seismic Bracket**

## 5. OPERATING INSTRUCTIONS

Power-on your light via the rocker switch in the back cover of the lamp head. The Celestial Star MRI is powered by a 200W isolation, step-down transformer that contains an internal thermal cut-off for your added safety.

## 6. ABOUT YOUR CELESTIAL STAR

### 6.1 CELESTIAL STAR MOBILE CS2050M-MRI

While this light is MRI compatible and can be used as a medical procedure light around the bore, it is extremely important that all guidelines are strictly followed to ensure safety for users and patients.

- This light is only intended for use outside of the bore
  - The installation guidelines must be strictly followed. The electrical box contains ferrous materials and must **NEVER** be placed close to the magnet.
  - **NEVER** operate the light while the electrical box is unsecured.
  - The lamp may vibrate slightly during its operation, but it is absolutely normal to the operation of the light.
  - It is recommended that the light is operated minimum 3 feet away from the bore of the magnet. Operation of the light closer to the magnet may reduce bulb life.
1. Position the light fixture conveniently to illuminate the target area
  2. Verify that the power cord is connected to the electrical box and the electrical box is powered from the receptacle.
  3. Turn on light
- The ON/OFF switch should be used to turn the light on and off. It is located at the back side of the lamp head.
  - When light is not in use, turn it off. Unplug the hospital grade plug from the hospital grade socket when light is not in use. A mains switch is not provided on the electrical box.
  - The Celestial Star mobile series light, being a mobile light can be moved on its wheels by holding the vertical light pole.

**CAUTION !** The electrical box is specifically made to run the Celestial Star series MRI light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, CS2050CE-MRI) in an MRI environment, a power supply different than this should **NEVER** be used to operate the light.

**BALANCE ARM STABILITY.** The balance arm is connected to the vertical pole via a unique compression joint. Once the light has been mounted, move the lamp head about as you would in positioning the beam over a task site. The lamp head should hold position. If there is a drift or droop, VERY GENTLY adjust the balance arm nut, using a 3/4" socket wrench.

#### VERTICAL POLE

The upright is 5' 4" in (160cm) from the bottom of caster base to the top of the compression joint. The balance arm rests perfectly in balance with the center mass located directly on top of the upright. The light is very easy to maneuver while providing exceptional stability.

#### VERTICAL POLE/BALANCE ARM MOVEMENT

The balance arm moves over 350 degrees both horizontally and vertically at its junction with the VERTICAL POLE.

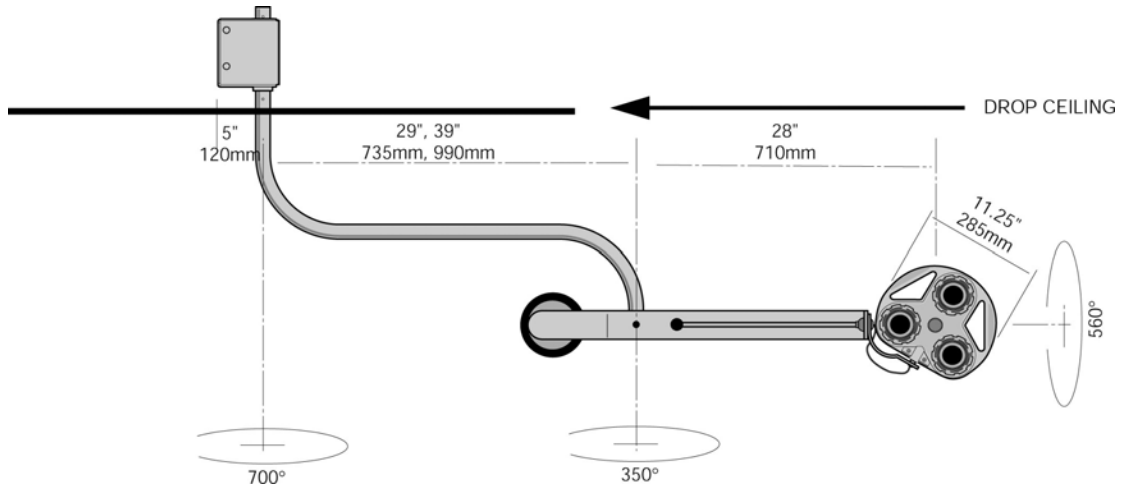
#### LAMP HEAD/YOKE & YOKE/BALANCE ARM MOVEMENT

The lamp head rotates 350 degrees at its connection to the yoke. The yoke rotates more than 700 degrees at its connection to the balance arm. The two co-act to provide unlimited choices for beam positioning.

**MOVING THE CELESTIAL STAR MOBILE**

When moving the light, please fold the balance arm toward the center of the light to prevent tipping.

**6.2 CELESTIAL STAR MRI CEILING CS2050-C-MRI**



**Figure 12: Celestial Star Ceiling dimensions**

**REACH:** With the lamp head/balance arm fully extended in the horizontal plane, the reach from the center of the ceiling “S” extension arm to beam center is, 58” (1.5m). If the light is mounted above the center of a 6’6” (2m) exam/treatment table, the beam center will reach 19” (0.5m) beyond its head and foot ends. A 10’ (3m) circle of coverage is available. Refer to figure 12.

When the lamp head/balance arm is fully extended downward in the vertical plane, the beam center will be placed at a point 46.5” (1.2m) from the floor. (This measurement relates to a light fixed above a drop ceiling in a room with an 8’ floor-to-drop ceiling clearance.)

**CEILING EXTENSION ARM MOVEMENT:** The ceiling “S” extension arm rotates over 700 degrees in either direction. There is a built-in rotation stop which limits rotary movement in either direction.



**CAUTION! DO NOT ATTEMPT TO FORCE ROTATION PAST THIS POINT. REVERSING THE ACTION WILL ACCOMPLISH COVERAGE WITHOUT DAMAGING THE ROTATION STOP COMPONENT.**

**BALANCE ARM STABILITY:** The lamp head/balance arm is connected to the ceiling and wall extension arms, via a unique compression joint. Once the light has been mounted, move the lamp head as you would in positioning the beam over a task. The lamp head should hold position. If there is a slight drift or droop, remove the white cap on balance arm nut on the balance arm and very gently adjust the nut, using a 3/4” socket wrench.



**CAUTION! OVER TIGHTENING THE BALANCE ARM NUT CAN DAMAGE THE LEATHER WASHERS, CAUSING THE LAMP HEAD TO DRIFT UPWARDS.**

**BALANCE ARM/EXTENSION ARM MOVEMENT:** The balance arm moves over 350 degrees both horizontally and vertically at its junction with the extension arm.



**CAUTION! DO NOT FORCE MOVEMENT PAST EITHER STOP POSITION, AS THIS WILL CAUSE DAMAGE TO THE ARM END JOINT.**

**LAMP HEAD/YOKE MOVEMENT:** The lamp head rotates over 350 degrees at its connection to the yoke. Movement is controlled by grasping either of the in-frame handles, or, with the aid of an added accessory, a sterilizable handle and mount assembly which may be fixed to the center of the lamp head.

**CAUTION ! DO NOT FORCE MOVEMENT PAST ITS STOP POSITION.**

**YOKE/BALANCE ARM MOVEMENT:** The yoke rotates over 600 degrees at its connection to the balance arm. Again, movement is controlled by grasping either of the in-frame handles or, with the aid of an added accessory, a sterilizable handle and mount assembly which may be fixed to the center of the lamp head.

**CAUTION! DO NOT FORCE MOVEMENT PAST ITS STOP POSITION.**

\*\*\*\*\* The combined movements of the lamp head/yoke and yoke/balance arm joints, offer an unlimited range in beam placement. They work in concert to allow setting the beam at the angle best suited for viewing of the task at hand.

## 7. SERVICE AND MAINTENANCE



**ALWAYS** bring the light outside the MRI room when performing any service on the light. This includes any cleaning and/or bulb replacements. The ceiling light balance arm can be detached and brought out of the MRI room for maintenance or repair. Assemble the mobile light outside of the MRI room.



The safety guidelines of your MRI facility must **NEVER** be compromised. If in doubt, consult with your facilities manager on proper procedures.

While your CELESTIAL STAR light has been designed to provide you many hours of professional performance, it will benefit from your periodic care and concern. The lamp head is constructed of high impact polycarbonate which exhibits certain strength and thermal characteristics, offering a protection not available with metal reflector lamps. One reward is a lack of heat build-up normally experienced with metal reflectors, thus eliminating the danger of burns from contact made with those hot reflector surfaces, either by you or your patient.

### Detachable parts

Lamp head: Bulb housing, bulb

Light assembly: Joint of vertical pole and balance arm, joint of vertical pole and caster base, caster wheels, counter weight

Electrical box: Light cord connector and electrical box receptacle

**CAUTION!** 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. Also, there are no user-serviceable parts in the Celestial Star series MRI light.

### 7.1 CLEANING AND DISINFECTION

**CAUTION! ALWAYS SHUT OFF THE LIGHT AND LET COOL BEFORE PERFORMING ANY CLEANING.**

Good physical characteristics of polycarbonates offer additional advantages. While metal reflectors are susceptible to denting, which will distort their beam pattern, the frame and covers of the CELESTIAL STAR provide a safeguard to the lamp/reflector assemblies. In combination with the low voltage circuitry, they offer a level of “double insulation” against possible current leakage. The covers and frame may easily be cleaned with a soft damp cloth of a mild soap water solution or mineral spirits. Isopropyl alcohol is another acceptable cleansing agent. The heat absorbing front glass filters offer a protection between the lamp/reflector and the patient. They provide a barrier to falling pieces of those assemblies should they experience a physical failure. In addition, they contribute to a cooler task site by absorbing certain light rays which could dissipate into heat when incident on the task surface. They can be cleaned with any commercial glass cleaner. The metal components are powder coated for long life, while providing another layer of insulation. They too can be cleaned with a damp cloth of mild soap and water solution, mineral spirits or, isopropyl alcohol.



**CAUTION! DO NOT USE EXCESSIVE AMOUNTS OF ANY FLUID WHEN CLEANING. DO NOT INTRODUCE ANY FLUIDS TO THE INSIDE OF THE LAMP HEAD HOUSING.**

**SUGGESTION:** Periodically dust the backside louvers to ensure uninterrupted convection of ambient air and filtered infra red rays through them. This air movement also cools the three lamp/reflector assemblies, further extending their effectiveness and useful life. A suggested frequency of cleaning and maintenance is one month.

## 7.2 HANDLE STERILIZATION

The Delrin handles may be sterilized as you would any of your stainless steel instruments. However, it is of sufficient diameter to engage a disposable sleeve.

The Delrin handle is an accessory for use with the Celestial Star (CS2050C/M-MRI) Specialty light. It is recommended that it is treated as a stainless steel item when submitting it to sterilization process.

Two options are recommended:

1. A flash cycle at 275 – 279<sup>o</sup> F (135 – 137<sup>o</sup> C), for 16 minutes
2. A standard cycle at 275 – 279<sup>o</sup> F (135 – 137<sup>o</sup> C), for 4 minutes

(Above flash cycle and standard cycle are according to sterilization method in AAMI TIR No. 12-1994: Designing, Testing, and Labeling Reusable Medical Devices for Reprocessing in Health Care Facilities: A Guide for Device Manufacturers.)



**CAUTION ! ANY DEVIATION FROM THESE GUIDELINES MAY RESULT IN DAMAGE OF THE PRODUCT AND YOUR EQUIPMENT.**

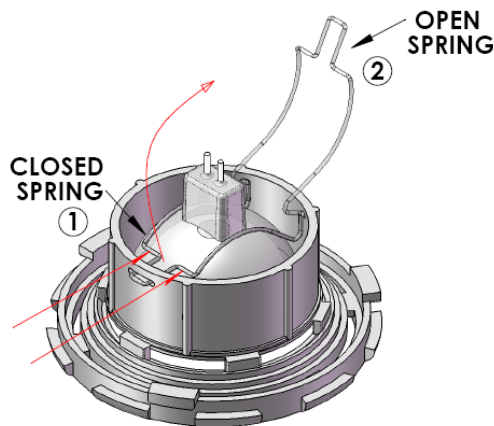
## 7.3 BULB REPLACEMENT

Only use the following bulbs:

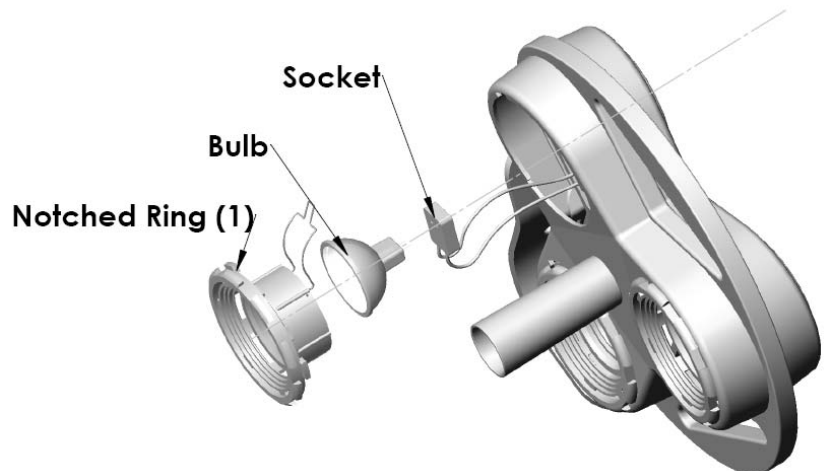
**Sunnex part# 18560**

3x35W: Sylvania Tru-Aim Titan FRB 35MR16Q/10/NSP/T

3x35W: Osram IRC 35W 10°



**Bulb replacement - 1**



**Bulb replacement - 2**

**Figure 8**

**CAUTION: ONLY USE OSRAM/SYLVANIA TRU-AIM TITAN BULBS, ANY DEVIATION FROM THE DIRECTIONS MAY SERIOUSLY DAMAGE YOUR LIGHT. 35W IS MAXIMUM ALLOWED.**

**Figure 9**



When a lamp/reflector burns out, ALLOW SUFFICIENT TIME FOR IT TO COOL BEFORE ATTEMPTING A REPLACEMENT. Once cool, you should:

- i. Ensure the power to the lamp is off.
- ii. Refer to figure 8. Turn the lamp head over so the three glass assemblies face upward.
- iii. With one hand supporting the backside of the lamp, grasp the notched ring assembly (1) and twist it

- counter clockwise.
- iv. Grasp the bulb with one hand and unplug socket connector with the other.
  - v. The notched ring assembly may now be removed from the lamp head and placed face down on a flat surface.
  - vi. Hold the notched ring assembly with thumbs and place two index fingers at flat part of spring (two red lines in figure 8), pull the spring towards you pulling it out from the slot (Keep two ends of spring inside it's holes)
  - vii. Remove old bulb
  - viii. Install New bulb \*\* Do not touch inside reflector surface of bulb, always grasp from bulb outside edges \*\*
  - ix. Replace the retainer spring on the bulb by inserting the front part of spring in the slot (using index fingers), so that it fits properly. Check to ensure proper seating of the spring, by pulling on the bulb. [Position (1) in figure 8 is "CLOSED SPRING"]. Ensure that two open ends of spring are properly seated into holes in the notched ring assembly.
  - x. Reconnect plug socket to bulb.
  - xi. Replace the notched ring assembly in the lamp head by aligning the three guide projections into the slots on the lamp head. Refer to figure 9. Press gently inward as you twist the assembly clockwise. You will hit a stop and set in place. Before turning the lamp head over, BE POSITIVE THE ASSEMBLY IS PROPERLY SEATED by comparing it with the other two.
  - xii. Your light is now ready for use.

**CAUTION! Use specified bulb only as the replacement, the power supply is developed to operate the specified bulb. Any deviation from using this bulb may cause the light to not operate properly.**

**CAUTION! Be sure the bulb housing is properly seated once it is attached!**

### 7.3 FUSE REPLACEMENT

1. Locate fuse holders (2) on the side of the electrical box. Push the fuse holder while turning it counter clockwise and remove the fuse holder from the fuse block by pulling it out.

2. Replace fuse with proper replacement fuse.

Fuse Replacement Specifications:

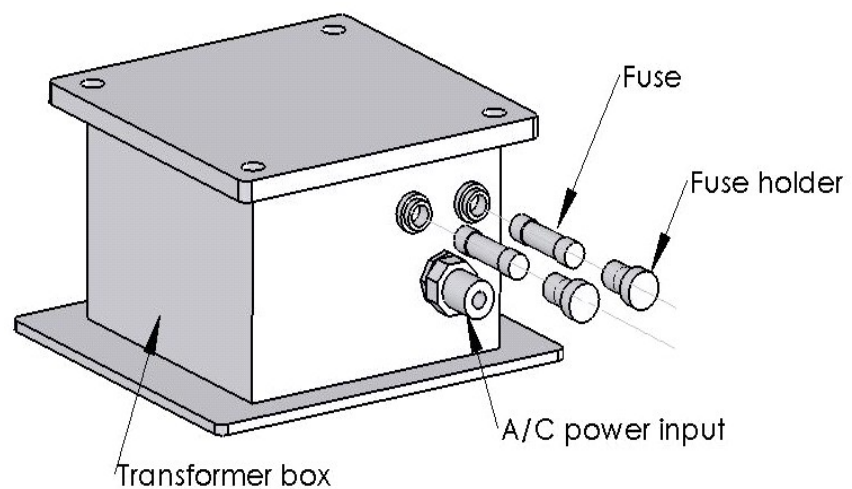
USA : 250V, 2.5A,

Busmann MDA-2-1/2

Europe: 250V, 1.5A,

Busmann – MDA-1-1/2

3. Follow procedure in reverse to return lamp to operating condition.



**Figure 15. Fuse Replacement**

## **7.4 PREVENTIVE INSPECTION AND MAINTENANCE**

Lens in lamp head to be inspected once a month for cleanliness.

## **7.5 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.**

**Bulbs/fuses:** Bulbs and fuses go in normal waste. All glass parts go in normal waste.

**Plastic parts:** Plastic parts are to be put in recycling bins.

**Transformer box:** 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 bulbs, glass lens and other glass parts.

## 8. MARKINGS

### 8.1 SYMBOLS

The functional earth conductor is not intended for use as a protective earth (chassis) ground.

On/Off Switch Symbols		Caution Symbol	Protective earth terminal symbol	This product must be sorted as Waste from Electrical and Electronic Equipment (WEEE)
				
<b>ON</b>	<b>OFF</b>	<b>Consult User Guide</b>	<b>Protective Earth Terminal</b>	<b>WEEE</b>

Fuse Symbol	Alternating Current Symbol	Direct Current Symbol	Hot Surface Symbol
			
<b>Fuse</b>	<b>A/C</b>	<b>DC</b>	<b>Hot Surface</b>

## 9. WARRANTY

Sunnex warrants that its Products shall be free from defects in material and workmanship and this warranty shall remain in force and effect for a period of three (3) years from and after the date of its Delivery (the "Warranty Period") provided that this warranty shall be subject the following conditions:

- (a) the Sunnex Installation Instructions shall have been strictly complied with in all respects by the party performing the installation of the Product; and
- (b) the Product shall have been used only for the purposes for which it is intended and shall not have been abused, damaged or modified during installation or from usage.
- (c) ordinary wear and tear shall not be covered by the terms of this warranty.
- (d) written notice to Sunnex of the defective Product shall be given within the Warranty Period.

If a Product is found to be defective and the provisions of this Section have been complied with, Sunnex will repair or replace the Product, at its expense. Other than as herein expressly set forth there are no warranties made or given herein with respect to a product and the warranties given in statement are in lieu of all other warranties, which are hereby disclaimed. In particular, there are no express or implied warranties, and no warranty of merchantability or fitness for a particular purpose. Sunnex will not be liable for any special, indirect, incidental or consequential damage, loss, cost or expense whatsoever arising from the installation or use of a product or from any other cause.

When making a claim against your Sunnex warranty, please provide the model number of your product, the date of purchase and a receipt or other proof of purchase to your Sunnex customer service representative.

**Sunnex Customer Service:**

Sunnex Inc, USA	+1 508 651 0009
Sunnex Equipment AB Sweden	+ 46 565 177 00

## 10. TROUBLESHOOTING

Please refer to the following table for troubleshooting.



**CAUTION! 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	Light head is on OFF position	Turn on the ON/OFF switch to ON position
No light from light head, when ON/OFF switch is ON	Bulb has not been installed or it has burned out	Refer to bulb replacement procedure in the manual
	Fuse is blown	Inspect / replace the fuse following the fuse replacement procedure
	No power to the transformer box	Check for facility power to the transformer box
	Transformer box is malfunctioning	Check for 14 V DC output at the transformer box output socket when it is under load. If different voltage, contact Sunnex customer service. There are no user serviceable parts in transformer box.
	Incorrect bulb installed	Install correct bulb
Bulb burns out quickly	Incorrect bulb installed in the light head	Install correct bulb
Light output is irregular in its shape or intensity	Incorrect bulb installed in the light head	Install correct bulb
	Bulb/reflector is not seated in its holder correctly	Adjust the bulb/reflector so it seats in the holder properly.
No light from light head even when the bulb and fuse are in good condition, light head flashes intermittently when light head or arms are moved	Circuit or wiring problem within transformer box, arm assemblies or other part of lighting system	Check wiring connections on arm assemblies. If problem cannot be repaired, call Sunnex Customer Service
Extension arm does not rotate freely or drifts (Ceiling)	Improper installation of the ceiling bracket	Check for excessive flexing of ceiling support structure and check if ceiling plate is level. Readjust if necessary.
Balance arm does not rotate freely or drifts when released in desired position	The nut joining the balance arm and the extension arm is loose	Tighten this nut slightly
Light head does not rotate freely at lamp head/yoke joint	The screw/nut joining lamp head with the yoke is too tight or too loose	Tighten/loosen as appropriate until free movement of lamp head is achieved

## 11. APPENDIX

<b>Guidance and Manufacturer's Declaration — Emissions All Equipment and systems</b>		
<p>The Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) is intended for use in the electromagnetic environment specified below. The customer or user of the Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) should assure that it is used in such an environment.</p>		
<b>Emissions Test</b>	<b>Compliance</b>	<b>Electromagnetic Enforcement — guidance</b>
RF Emissions CISPR 11	Group 1	The Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Emissions CISPR 11	Class B	The Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) is suitable for use in all establishments including domestic, and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonics IEO 61 000-3-2	Complies or Not applicable	Complies
Flicker IEC 61000-3-3	Complies or Not applicable	Complies

## Guidance and Manufacturer's Declaration—Immunity All Equipment and Systems

The Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) is intended for use in the electromagnetic environment specified below. The customer or user of the Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) should assure that it is used in such an environment.

<b>Immunity Test</b>	<b>IEC 60601 Test Level</b>	<b>Compliance Level</b>	<b>Electromagnetic Environment - Guidance</b>
Electrostatic Discharge (ESD) IEC 61000-4-2	±6kV contact ±8kV air	±6kV contact ±8kV air	Floors should be wood, concrete or ceramic tile. If floors are synthetic, the relative humidity should be at least 30%.
Electrical Fast Transient/burst IEC 61000-4-4	±2kV on AC Mains	±2kV on AC Mains	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV Differential ±2kV Common	±1 kV Differential ±2kV Common	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	>95% Dip for 0.5 Cycle  60% Dip for 5 Cycles  30% Dip for 25 Cycles  >95% Dip for 5 Seconds	>95% Dip for 0.5 Cycle  60% Dip for 5 Cycles  30% Dip for 25 Cycles  >95% Dip for 5 Seconds	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Celestial Star MRI light requires continued operation during power mains interruptions, it is recommended that the Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) be powered from an uninterruptible power supply or battery.
Power Frequency 50/60Hz Magnetic Field IEC 61 000-4-8	3A/m	3A/m	Power frequency magnetic fields should be that of a typical location in a typical commercial or hospital environment.

**Guidance and Manufacturer’s Declaration — Emissions Equipment and Systems that are NOT Life-Supporting**

The Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) is intended for use in the electromagnetic environment specified below. The customer or user of the Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) should ensure that it is used in such an environment.

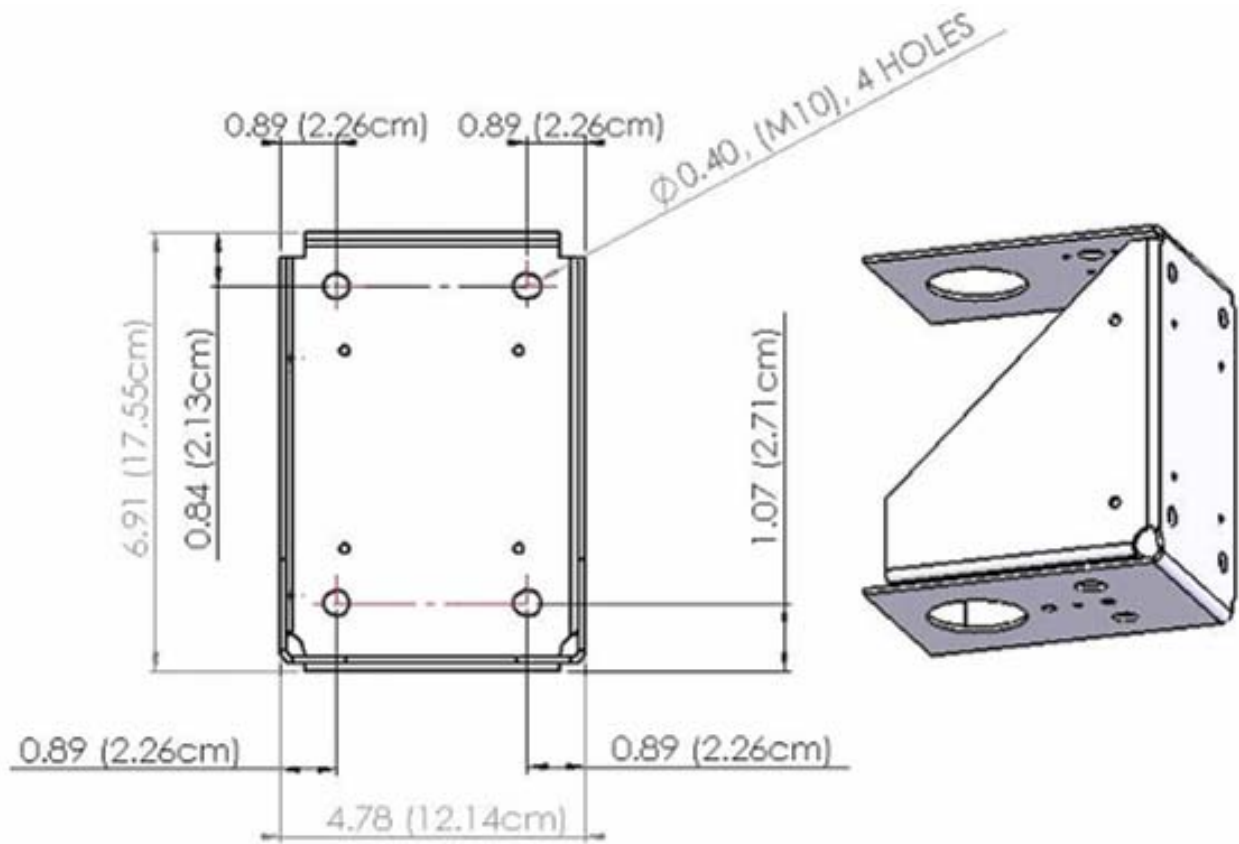
Immunity Test	IEC 60601 Test Level	Compliance Level	Electromagnetic Environment — Guidance
Conducted RF IEC 61 000-4-6	3 Vrms from 150 kHz to 80 MHz	V1 = 3 Vrms	Portable and mobile RF communications equipment should be separated from the Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) by no less than the recommended separation distances calculated/listed below: $D = (3.5/V1)\sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	E1 = 3V/m	$D = (3.5/ E1)/\sqrt{P}$ 80 to 800 MHz $D = (7 / E1)/\sqrt{P}$ 800 MHz to 2.5 GHz  Where P is the maximum power rating in watts and D is the recommended separation distance in meters.  Field strengths from fixed transmitters, as determined by an electromagnetic site survey, should be less that the compliance levels (V1 and E1).  Interference may occur in the vicinity of equipment containing a transmitter.

**Recommended Separation Distances Between Portable and Mobile RF Communications Equipment and the Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) Equipment and Systems that are NOT Life-Supporting**

The Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) is intended for use in the electromagnetic environment in which radiated disturbances are controlled. The customer or user of the Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF Communications Equipment and the Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI) as recommended below, according to the maximum output power of the communications equipment.

Maximum Output Power (Watts)	Recommended Separation Distances for the Celestial Star MRI Light (CS2050M-MRI, CS2050C-MRI, CS2050ME-MRI, and CS2050CE-MRI)		
	150 kHz to 80 MHz	80 MHz to 800MHz	800 MHz to 2.5 GHz
	$d = 1.1667 \sqrt{P}$	$d = 1.1667 \sqrt{P}$	$d = 2.3333 \sqrt{P}$
0.01	0.11667	0.11667	0.23333
0.1	0.36894	0.36894	0.73785
1	1.1667	1.1667	2.3333
10	3.6894	3.6894	7.3785
100	11.667	11.667	23.333

### Celestial Star MRI Ceiling Transformer Box Mounting Bracket



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