stryker®

CHROMOPHARE®

Surgical Lights, Single and Combination Lights

Service and Parts Manual

BERCHTOLD

Table of Contents

1. Warnings and Cautions

Please read this manual and follow its instructions carefully. The words WARNING, CAUTION, and Note carry special meanings and should be carefully reviewed:

WARNING: The personal safety of the patient or user may be involved. Disregarding this information could result in injury to the patient or user.

CAUTION: Special service procedures or precautions must be followed to avoid damaging the instrument.

WARNING: A lightening bolt is intended to warn of the presence of hazardous voltages. Refer all service to authorized personnel.

WARNING: Potential explosion hazzard.

WARNING: A yellow box with a hand within a triangle is intended to warn the user of the presence of an electrostatic sensitive device. Follow ESD prevention procedures.

Note: Special information to make maintenance easier or important information more clear.

To avoid potential serious injury to the user or the patient or both and to avoid damage to this device, the user must adhere to the following warnings and cautions.

- Do not add additional weight to the surgical lights.
- Do not place anything over the surgical lights.
- Do not look directly into the surgical light while powered on.
- Do not operate the surgical light if any component of the light (such as the glass) is damaged.

1. Stryker trained personnel are the only personnel authorized to install the equipment described in this manual.
2. Attempt no repairs or adjustments, unless specifically instructed to do so in this manual.
3. Disconnect the unit from the electric outlet before inspecting or servicing system components. Note that more than one electrical supply may be used. Disconnect all power sources before inspecting.
4. The electrical installation of the operating room must comply with any applicable IEC, CEC, NEC requirements as well as the local codes and pre-installation manual.
5. Do not use accessories or cables other than those provided or recommended. Such use may result in increased electromagnetic emissions or decreased electromagnetic immunity of the equipment or system. Use of components or accessories not recommended by Stryker/Berchtold may result in reduced performance or system breakdown.

Note: Test Equipment after servicing.

2. Product Symbols

An exclamation mark within a triangle is intended to alert the user to the presence of important operating and maintenance (service) instructions in the literature accompanying the product.

A lightning bolt within a triangle indicates the presence of hazardous voltage. Refer all service to authorized personnel.

Denotes oxygen explosion hazard.

Denotes usage tips and useful information.

Denotes compliance to European Community Directive 93-42-EEC.

Indicates hot surfaces.

Denotes compliance to UL 60601-1, CAN/CSA C22.2 No. 601.1, CAN/CSA C22.2 NO. 601.2XX

Denotes the date the equipment was manufactured.

Denotes the manufacturer of the device.

A yellow box with a hand within a triangle is intended to warn the user of the presence of an electrostatic sensitive device. Follow ESD prevention procedures.

In accordance with European Community Directive 2002/96/EC on Waste Electrical and Electronic Equipment, this symbol indicates that the product must not be disposed of as unsorted municipal waste but should be collected separately.

Note: The device does not contain any hazardous materials.

Legal regulations may include specifications regarding the disposal of this product. Please contact Stryker/Berchtold to withdraw this device from service for discard.

3. ESD Procedure

3.1. Electrostatic Discharge

Static electricity is a stationary form of electrical charge. This charge is due to the transfer of electrons within a body or from one body to another. The magnitude of the charge depends on the size, shape, composition and electrical properties of the substance that make the bodies.

Once a body develops a static charge, it will look for a conductive surface to discharge. This is called Electrostatic Discharge (ESD). This discharge is only felt when the charge is larger than 3500 volts, yet many components are sensitive well below this level.

Potentially dangerous levels of ESD can generate from the following common manufacturing sources:

- Plastic (bags, containers, binders)
- Paper (procedures, DHRs, pick slips)
- CRT Monitors
- Clothing

Subassemblies and equipment that contain ESD sensitive devices (without adequate circuitry) are also ESD sensitive.

Avoid sliding ESD sensitive components across other materials. Sliding materials together can create the build up of an electrostatic charge.

3.2. Electrostatic Dissipative Wrist-Straps

Wrist-straps should be worn during the handling of ESD sensitive devices. The wrist-strap should contain an internal 1Mohm resistor to protect the operator in the case of accidental high voltage being applied to the workstation surface.

4. Comprehensive Tools

4.1. Required Tools

- Genie lift or equipment lift, SLC-12 or equivalent
- Torpedo level
- Metric allen set
- Wrench Set
- Small and large phillips head
- Small and Large flat head screw driver
- Snap ring plier
- Torque Wrench
- Spreader Forceps
- Screw Removal Tools
- Digital Level
- Wire Strippers
- Soldering Iron

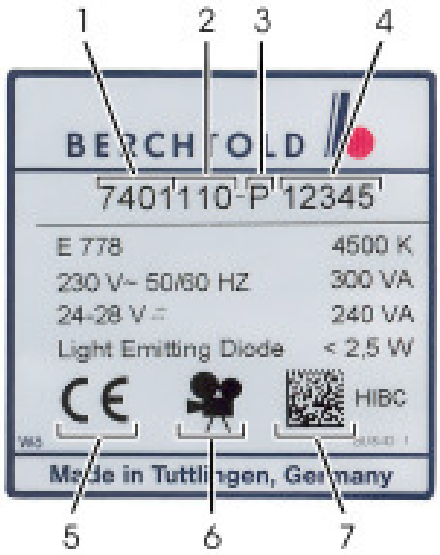
4.2. Optional Tools

- Porta band saw
- Large hand file
- 1/2 inch Drill/Driver
- Tape measure
- Drill bit set
- Hand tool pouch
- Adjustable wrench
- Roofer's square
- Hammer

5. System Architecture

5.1. Model Plate

The Model Plate is located next to the suspension installation point on the housing of the Light Head or the VPA Pod.



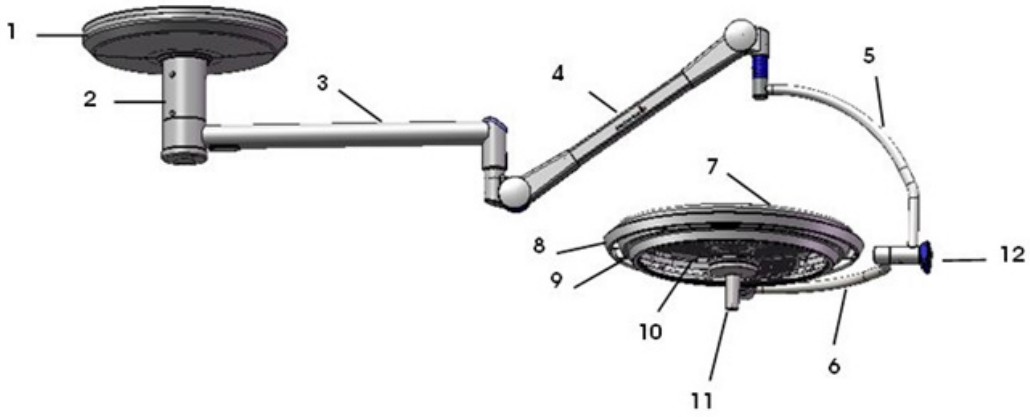
1. Version Number
2. Model Number
3. Year of Manufacture (A=1993, B=1994, etc.)
4. Sequential Numbering
5. CE Mark
6. Symbol for Camera Preparation (optional)
7. Health Industry Bar Code

5.2 CHROMOPHARE (Ceiling)

The following sections apply to models E 520, E 550, E 558, E 650, E 655, E 668, E 778, E 800, E 805, F 528, F 628.

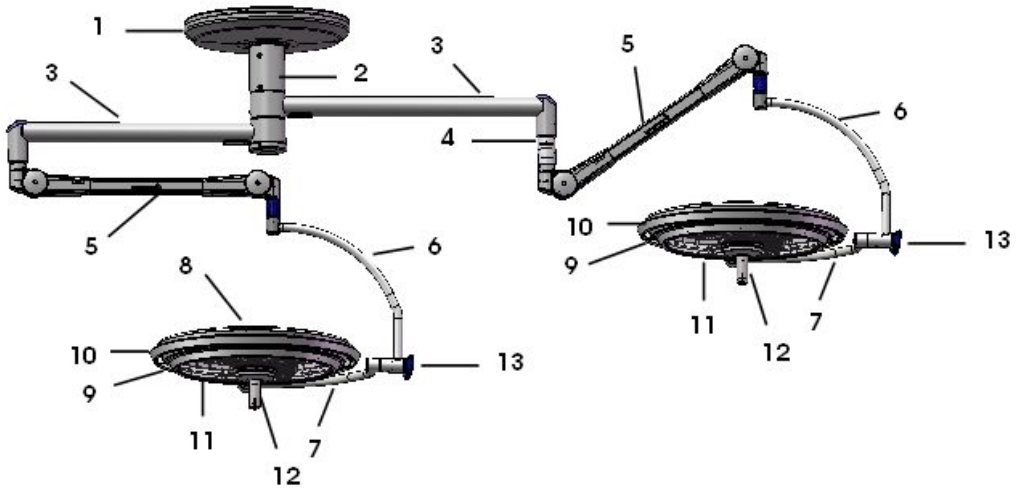
Note: Suspension in use applies to both E and F series Lights.

5.2.1 Single Light, Classic Cardanic Unit (A.C)



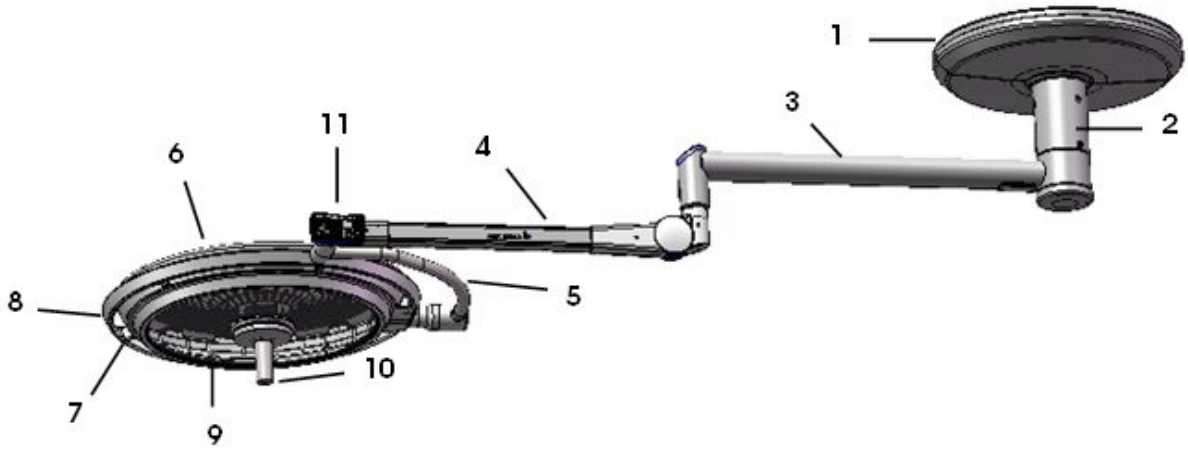
1. Ceiling Cover	5. Vertical Gimbal Joint	9. Panel Frame
2. Ceiling Tube Ø 125 mm	6. Horizontal Gimbal Joint	10. Light-Output Surface (Facing)
3. Horizontal Arm	7. Light Head Hood Support	11. Handle Assembly
4. Spring Arm	8. Rail	12. Control Unit

5.2.2 Light Combination, Classic Cardanic Unit (A.C)



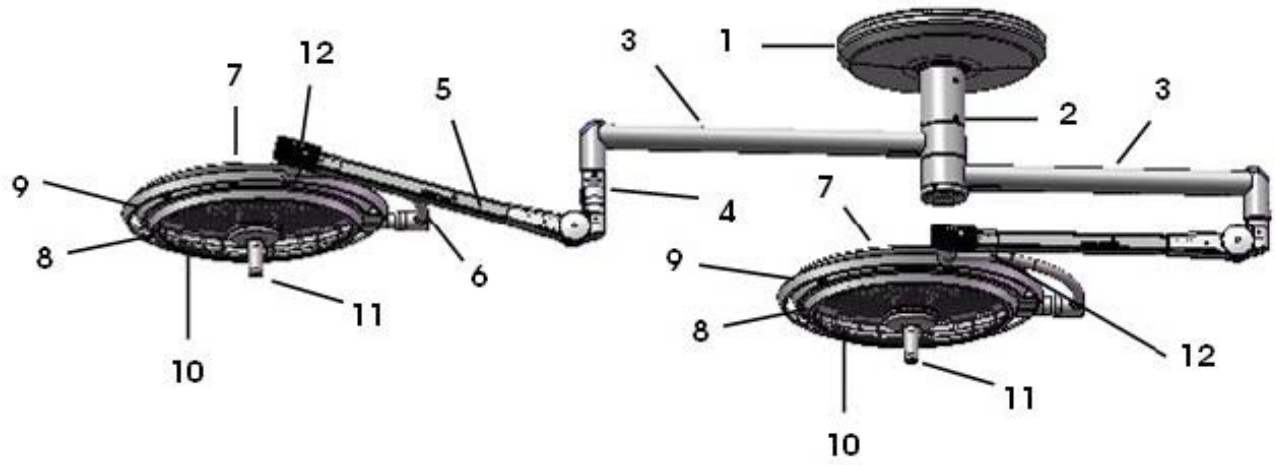
1. Ceiling Cover	6. Vertical Gimbal Joint	11. Light-Output Surface (Facing)
2. Ceiling Tube Ø 125 mm	7. Horizontal Gimbal Joint	12. Handle Assembly
3. Horizontal Arm	8. Light Head Hood Support	13. Control Unit
4. Height Adjustment Tube	9. Panel Frame	
5. Spring Arm	10. Rail	

5.2.3 Single Light, Flat Cardanic (N.C.)



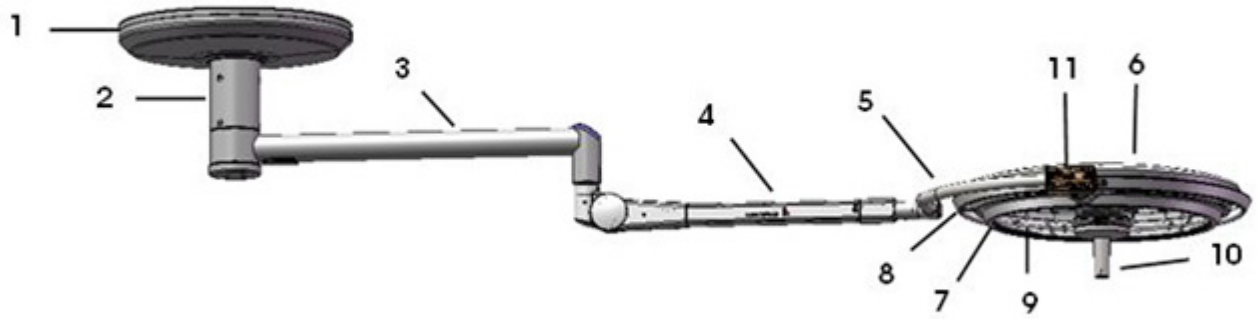
1. Ceiling Cover	5. Horizontal Gimbal Joint	9. Light-Output Surface (Facing)
2. Ceiling Tube Ø 125 mm	6. Light Head Hood Support	10. Handle Assembly
3. Horizontal Arm	7. Panel Frame	11. Control Unit
4. Spring Arm	8. Rail	

5.2.4 Light Combination, Flat Cardanic (N.C)



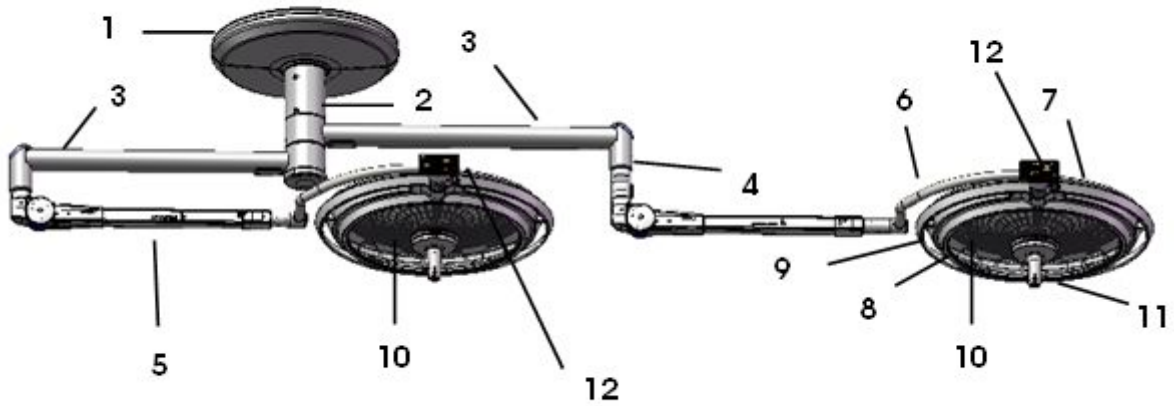
1. Ceiling Cover	5. Spring Arm	9. Rail
2. Ceiling Tube Ø 125 mm	6. Horizontal Gimbal Joint	10. Light-Output Surface (Facing)
3. Horizontal Arm	7. Light Head Hood Support	11. Handle Assembly
4. Height Adjustment Tube	8. Panel Frame	12. Control Unit

5.2.5 Single Light, New Flat Cardanic (N.F.C)



1. Ceiling Cover	6. Panel Frame
2. Ceiling Tube Ø 125 mm	7. Rail
3. Horizontal Arm	8. Light-Output Surface (Facing)
4. Spring Arm	9. Handle Assembly
5. Horizontal Gimbal Joint	10. Control Unit

5.2.6 Light Combination, New Flat Cardanic (N.F.C)

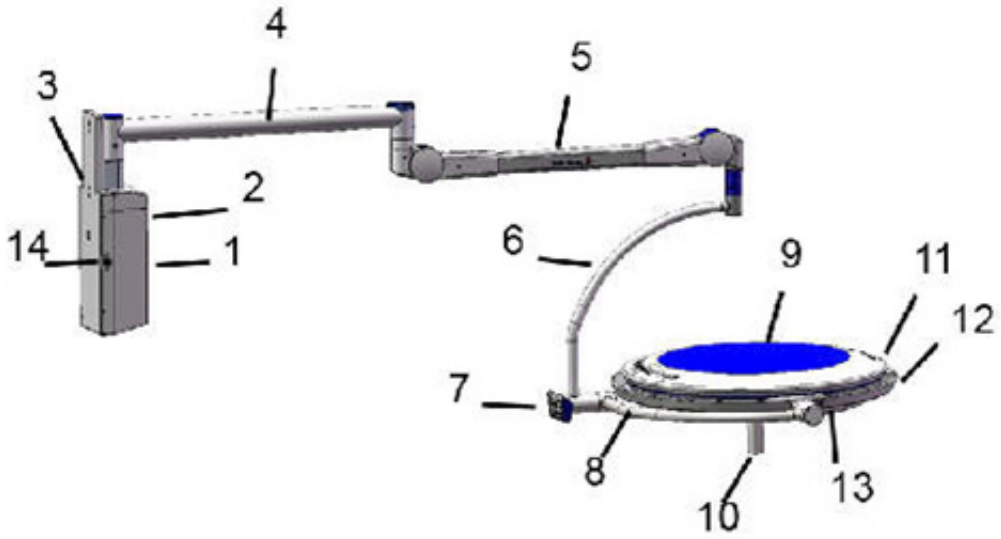


1. Ceiling Cover	7. Light Head Hood Support
2. Ceiling Tube Ø 125 mm	8. Panel Frame
3. Horizontal Arm	9. Rail
4. Height Adjustment Tube	10. Light-Output Surface (Facing)
5. Spring Arm	11. Handle Assembly
6. Horizontal Gimbal Joint	12. Control Unit

5.3 CHROMOPHARE E 520, E 550, E 558, F 528, F 628 (Wall)

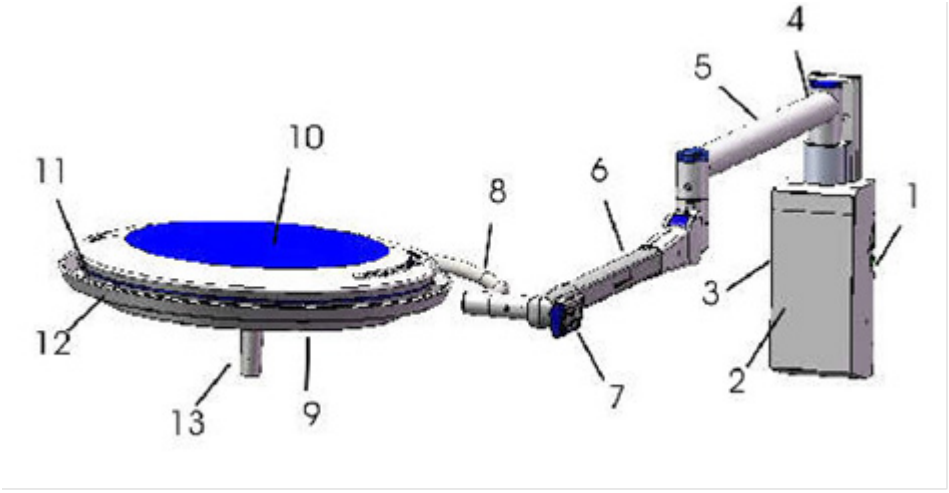
Note: Suspension in use applies to both E and F series Lights.

5.3.1 Single Light, Classic Cardanic (A.C)



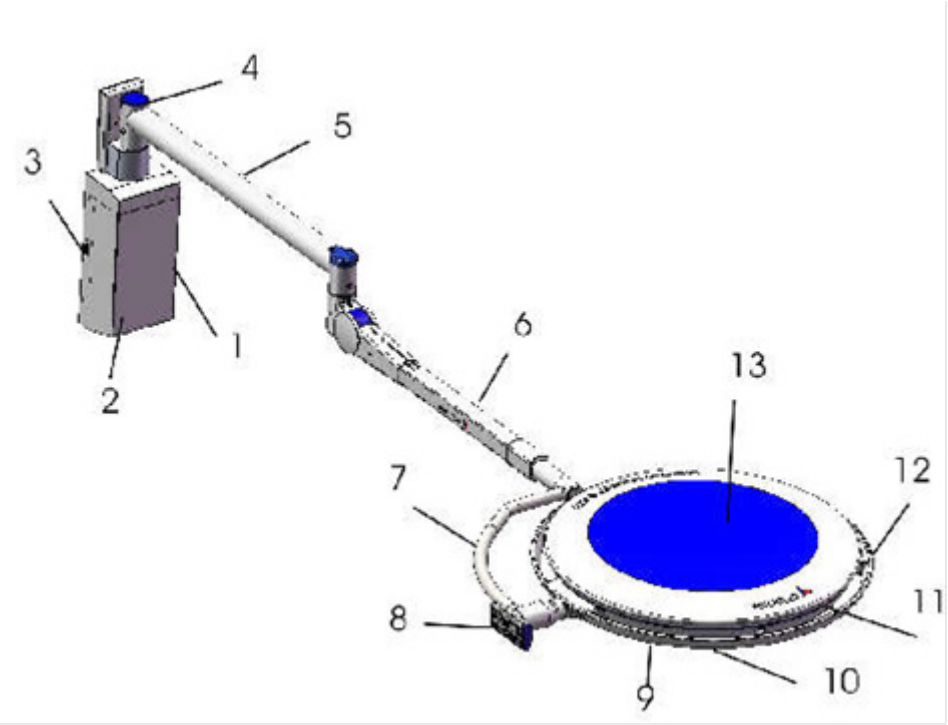
1. Transformer Housing	6. Vertical Gimbal Joint	11. Panel Frame
2. Mains Switch	7. Control Unit	12. Rail
3. Wall Bracket	8. Horizontal Gimbal Joint	13. Underglass
4. Horizontal Arm	9. Light Head Hood Support	14. Camera Cable Connection Socket
5. Spring Arm	10. Handle Assembly	

5.3.2 Single Light, Flat Cardanic (N.C)



1. Transformer Housing	6. Vertical Gimbal Joint	11. Panel Frame
2. Mains Switch	7. Control Unit	12. Rail
3. Wall Bracket	8. Horizontal Gimbal Joint	13. Underglass
4. Horizontal Arm	9. Light Head Hood Support	14. Camera Cable Connection Socket
5. Spring Arm	10. Handle Assembly	

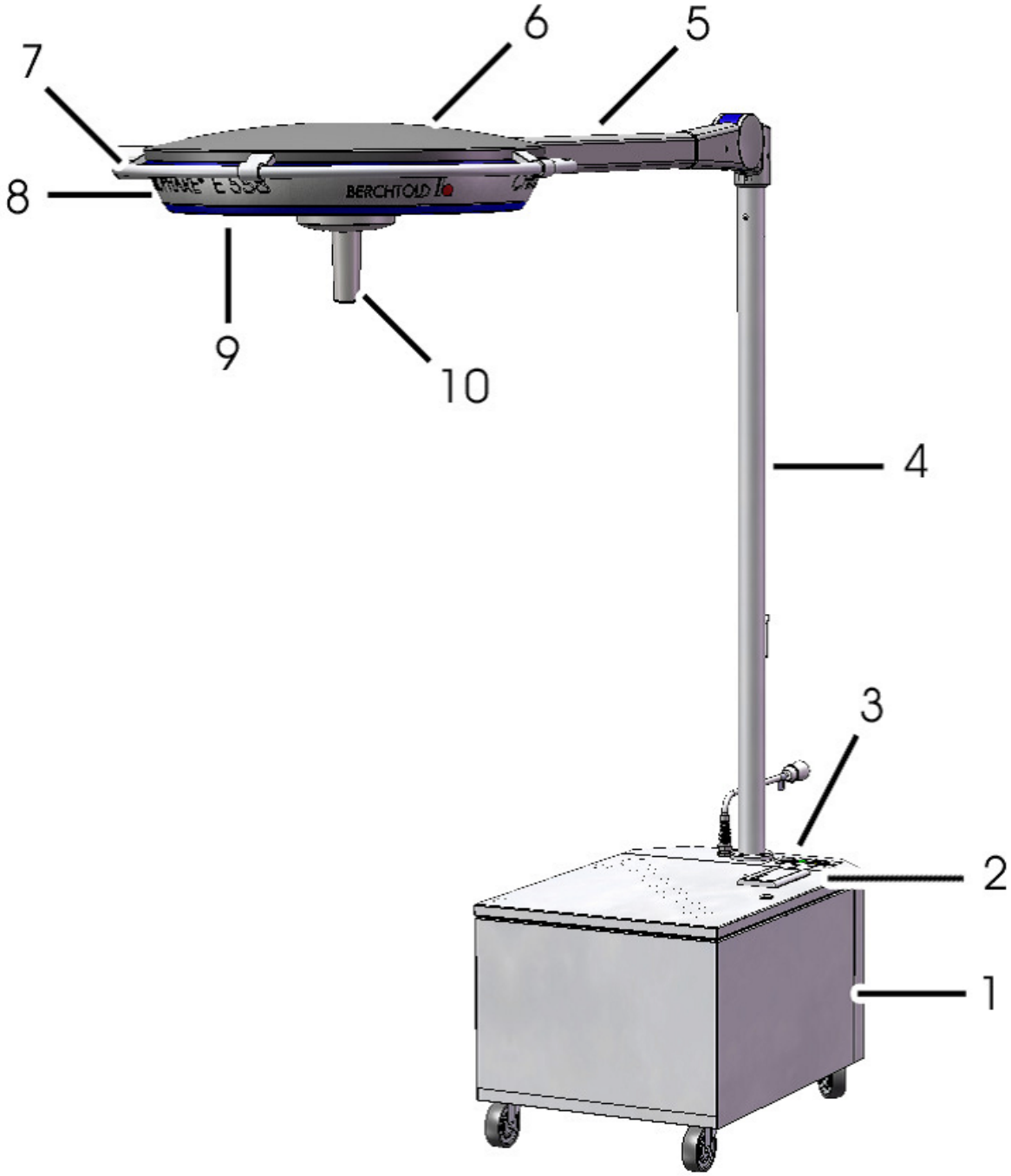
5.3.3 Single Light, New Flat Cardanic (N.F.C)



1. Mains Switch	6. Spring Armt	11. Panel Frame
2. Transformer Housing	7. Horizontal Gimbal Joint	12. Rail
3. Camera Cable Connection Socket	8. Control Unit	13. Light Head Hood Support
4. Wall Bracket	9. Underglass	
5. Horizontal Arm	10. Handle Assembly	

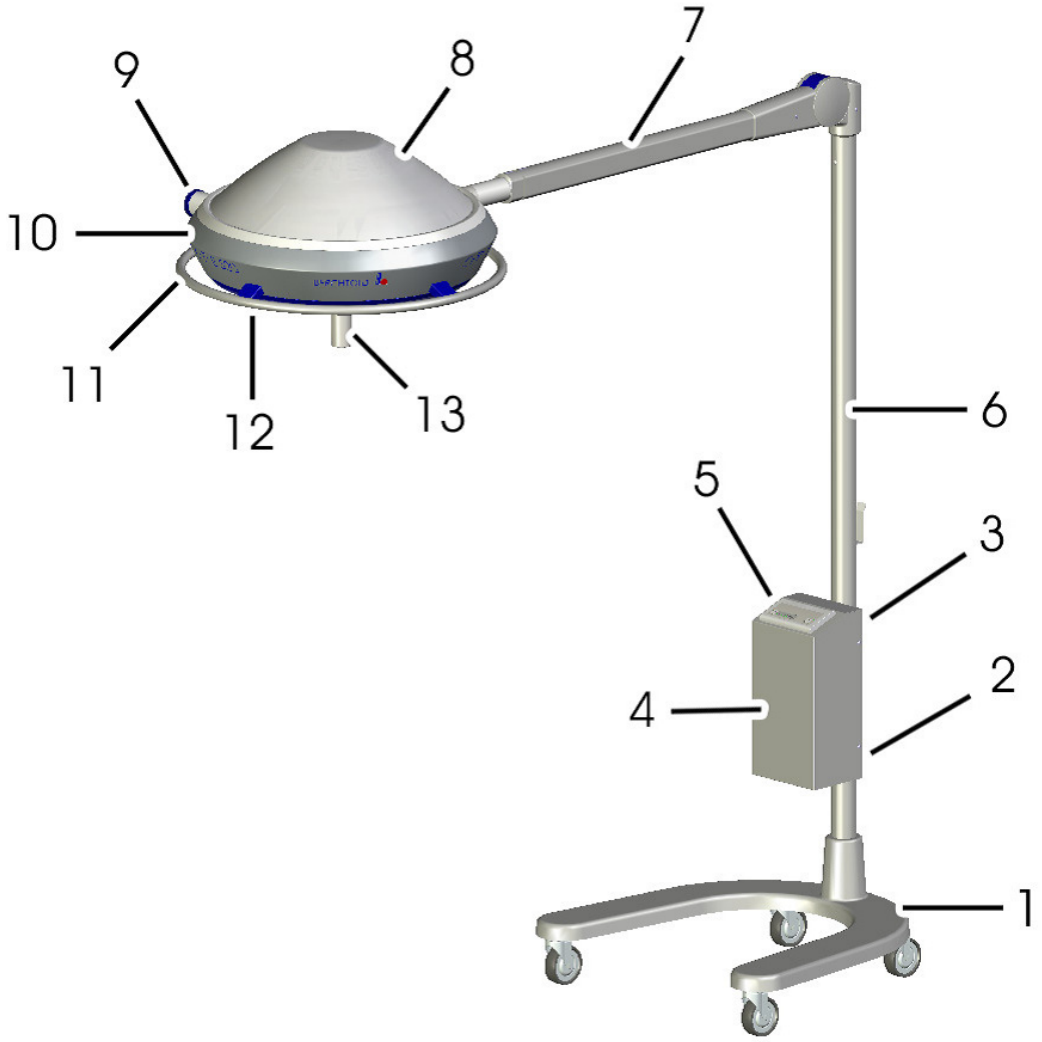
5.4. CHROMOPHARE E 520, E 550, E 558, F 528, F 628 (Mobile)

5.4.1 E Series With Emergency Power



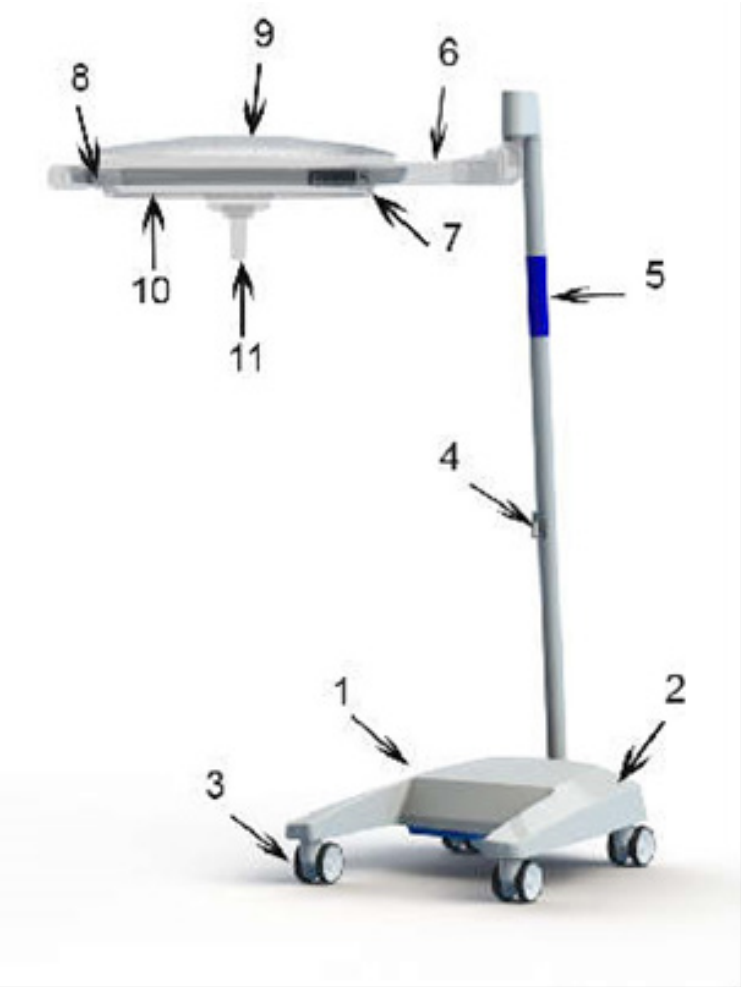
1. Stand Base (control unit, main fuses, batteries, charger)	7. Side Shaft Control Panel
2. On/OFF Switch	8. Lamp Frame
3. Control Unit	9. Rail
4. Stand Pillar	10. Light-Emission Lens
5. Spring Arm	11. Hand Grip
6. Light Head Hood Holder	

5.4.2 E Series Without Emergency Power



1. Base	6. Stand Pillar	11. Rail
2. Main Fuse Mount	7. Spring Arm	12. Light-Emission Lens
3. Connector Port for Camera Cable	8. Light Head Hood Holder	13. Handle
4. Transformer, Electronics	9. Side Shaft Control Panel	
5. Control Unit	10. Lamp Frame	

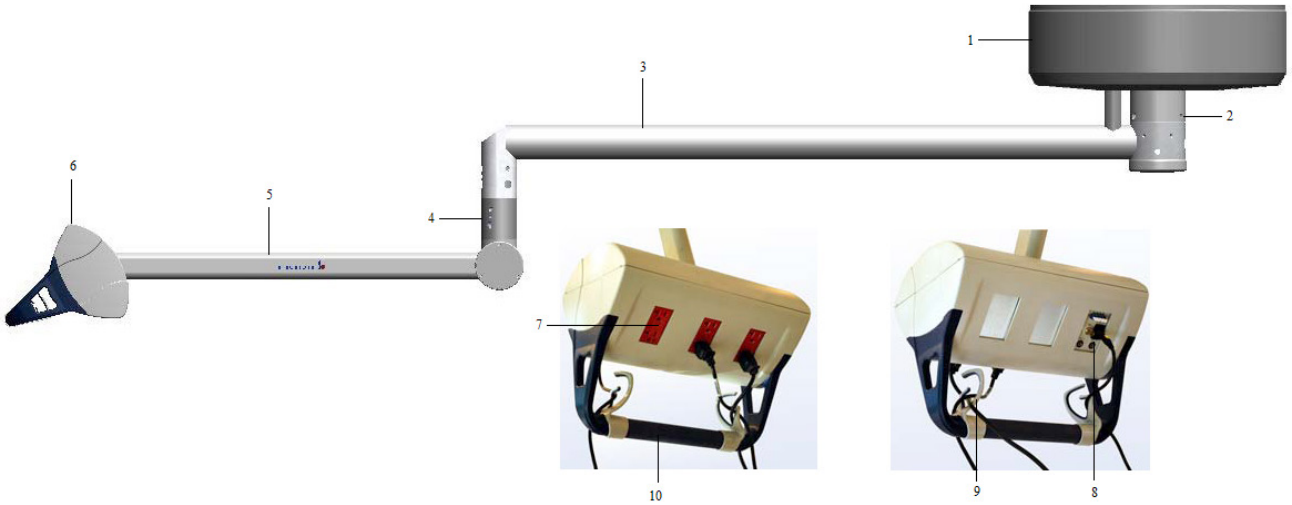
5.5 F Series (Mobile)



1. Stand Base	7. Light Fram
2. Charge Level Display and On/OFF Switch	8. Rail
3. Double Castors with Parking Brake	9. Light Head Cover Casting
4. Cable Hook	10. Underglass
5. Tubular Stand	11. Replaceable Sleeve
6. Spring Arm	

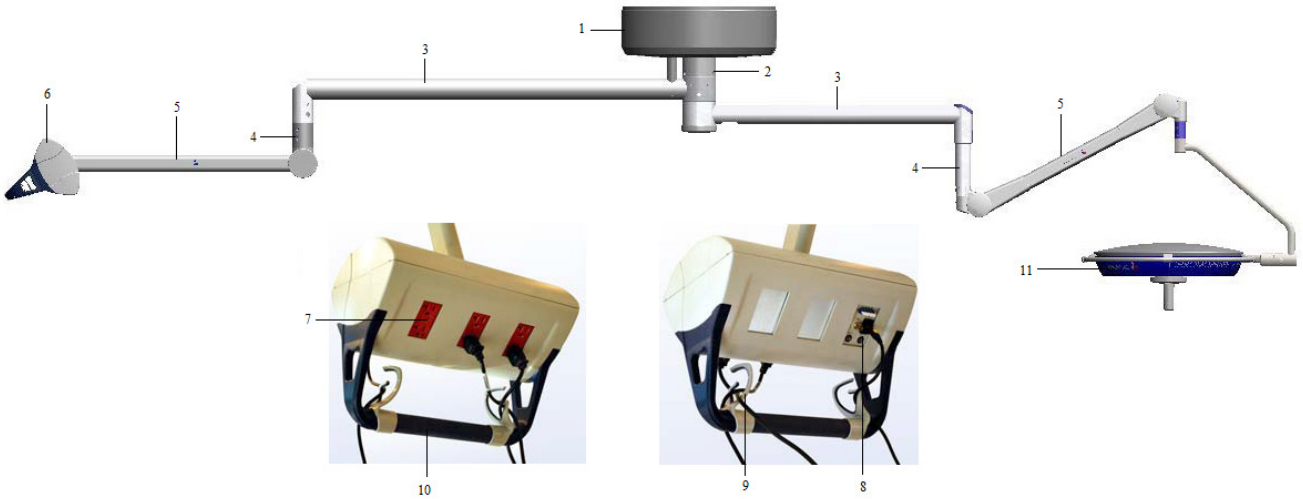
5.6. Chromophare VPA Video/Power Arm

5.6.1 VPA Single (Stand-Alone) Mount



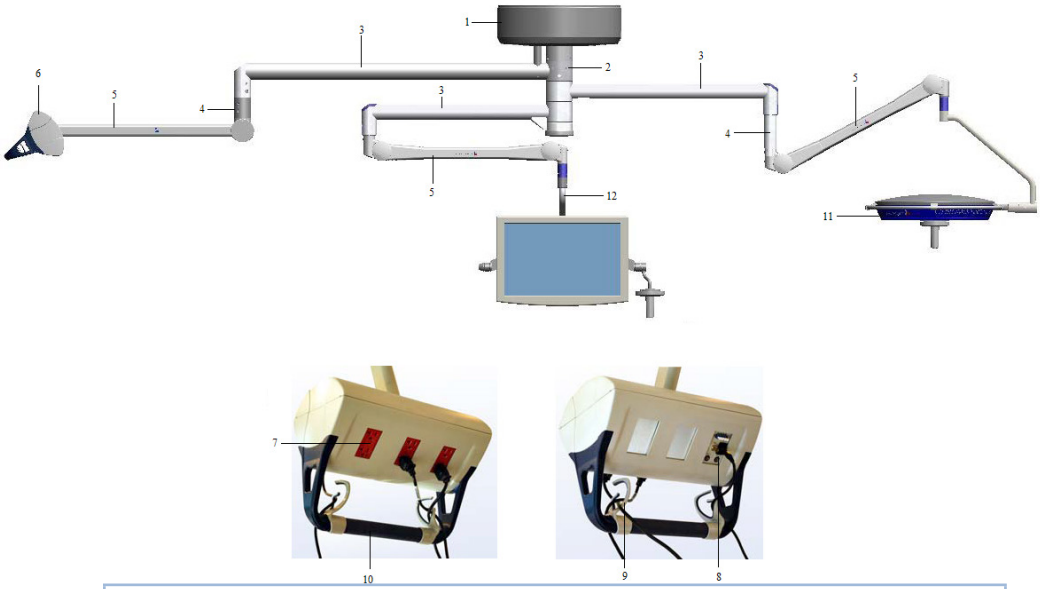
1. Ceiling Cover	6. Service Pod
2. Ceiling Tube Ø 125 mm	7. 115V Duplex Power Outlet
3. Horizontal Arm	8. Data Plates
4. Height Adjustment Tube	9. Cord Management
5. Spring Arm	10. AccessHandle

5.6.2 VPA Video Power Arm/Light Combination



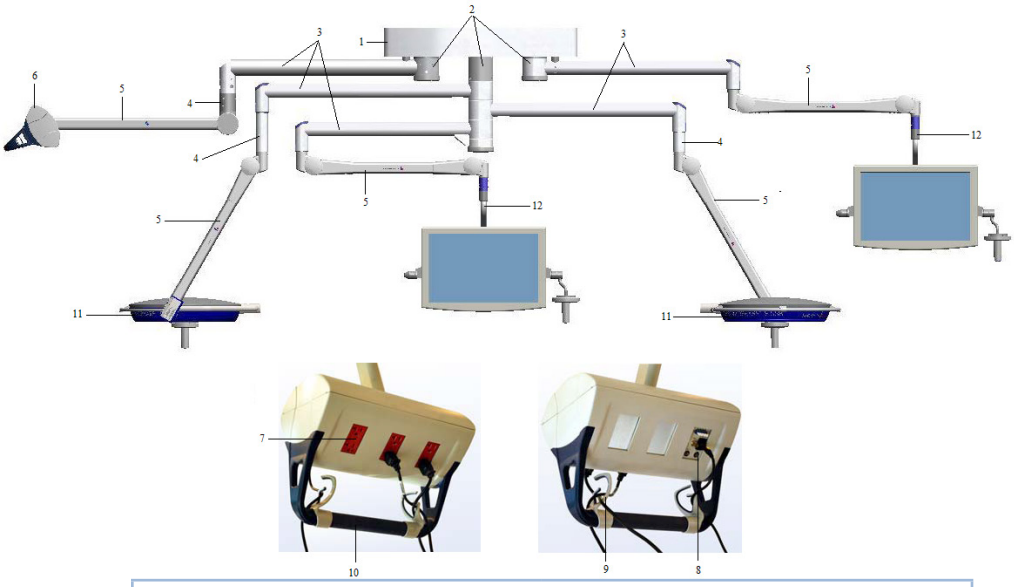
1. Ceiling Cover	7. 115V Duplex Power Outlet
2. Ceiling Tube Ø 125 mm	8. Data Plates
3. Horizontal Arm	9. Cord Management
4. Height Adjustment Tube	10. Access Handle
5. Spring Arm	11. Light Head

5.6.3 VPA Video Power Arm/Light/Flat Panel Combinatio



1. Ceiling Cover	7. 115V Duplex Power Outlet
2. Ceiling Tube Ø 125 mm	8. Data Plates
3. Horizontal Arm	9. Cord Management
4. Height Adjustment Tube	10. Access Handle
5. Spring Arm	11. Light Head
6. Service Pod	12. Monitor Yoke

5.6.4 Shoulder Mount VPA Video Power Arm/Light/Light/Flat Panel/Shoulder



1. Ceiling Cover	7. 115V Duplex Power Outlet
2. Ceiling Tube Ø 125 mm	8. Data Plates
3. Horizontal Arm	9. Cord Management
4. Height Adjustment Tube	10. Access Handle
5. Spring Arm	11. Light Head
6. Service Pod	12. Monitor Yoke

5.7. ChromoView Monitor Supports(Yoke)

5.7.1 Single Monitor Support Arm

5.7.2 Dual Monitor Support Arm

6. Unpacking/Packing

6.1 Transport Inspection

> ⚠ **Warning:** Use caution when lifting heavy objects to avoid serious bodily injury or damage to the equipment.

Check the delivery immediately for completeness and any damage during transport.

For obvious damage to the component delivered contact technical support for proper disposition and replacement component.

To limit damage, use the original packaging when returning a product to Stryker/Berchtold. Provide the following information: Account's Name and Address, Serial Number(model plate), and a description of the defect.

> ⚠ **Caution:** The Light Head may sustain damage during transport as a result of inadequate packaging.
>
> 1. Secure the Light Head using the carton segments and cushioning provided.
> 2. Place the cushioning into the corresponding recesses.
> 3. Observe the following handling procedure.

1. Place two carton segments into the carton with the cut-out facing upwards.

2. Place the sterilizable replaceable sleeves into the corresponding recesses provided.

> ☞ **Note: If 2 replaceable sleeves are sent together the focusing unit must be placed into the recess with one replaceable sleeve attached.**

3. Place the cushioning into the corresponding recesses as shown in the illustration.

4. Position the Light Head in accordance with the cut-out and in accordance with the diagram.

5. The cardanic suspension MUST be pressed into the cushioning.

6. Place the carton segment onto the light head such that the recesses match the cushioning.

⚠ **Caution:** If the cushioning is not placed into the correct cut-outs and the cardanic suspension is not pressed firmly into the cushioning, there is a risk that the Light Head could sustain damage during transport.

1. **Place the cushioning into the appropriate recesses.**
2. **Ensure that the light head is held securely by the cushioning.**

7. Suspension Maintenance

7.1. Leveling Suspensions

1. Single or dual light or any combination on suspension, place the light head of flat panel under the center of the mount.

Example:

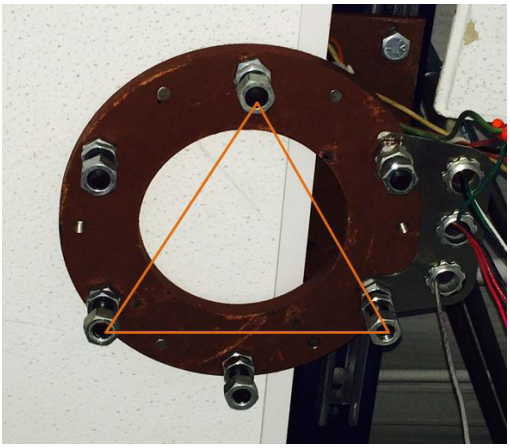
Dual Suspension with Lightheads Under Center

Single Suspension with Lighthead Under Center

2. Once the light heads are under center, place a level on the top of the suspension arm and attach with wire ties or any other means available.

3. Remove the ceiling cover.

4. Loosen the top nuts about two turns each and pick 3 of the studs which is every other one as per the following example.



5. This illustrates using ever other stud for leveling purposes. Make a triangle for less adjustment points.

6. With the arms in opposite directions to distribute the weight equally make the adjustments, with the level or levels attached to the arms slowly turn the bottom nuts until the arm is level and if doing a dual check the other arm for level and make adjustments as necessary.

7. Tighten the top nuts on the three studs used for leveling and rotate the arm or arms 90 degrees and recheck level. If they display level then tighten the other three top and bottom nuts.

8. Recheck level in both directions and adjust if necessary

9. Reinstall the ceiling cover.

7.2. Replacing the Ceiling Tube

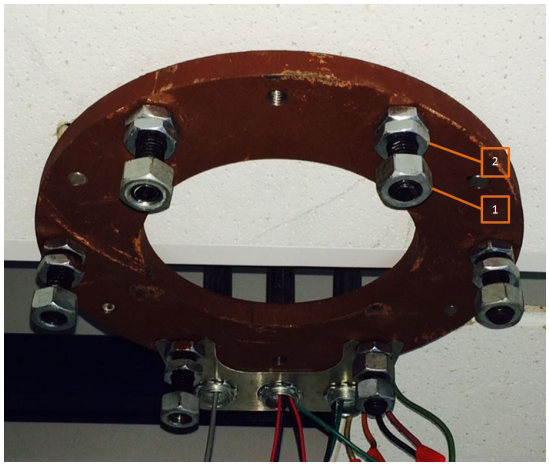
> ⚠ **WARNING: Before performing the following steps, the electricity for the Lights and/or Monitors has to be powered OFF.**

☞ **Note: If suspension has a Flat Panel Arm, the cables shall be back pulled from the doc station.**

1. Remove Light Head or Monitor Yoke, Spring Arm, Suspension, and Ceiling Cover.

2. Unscrew all six securing nuts (1) with flat washers from the ceiling anchor plate/ceiling ring/ceiling void assembly. The adjusting nuts onthe ceiling side (2) remain on the threaded bolts.

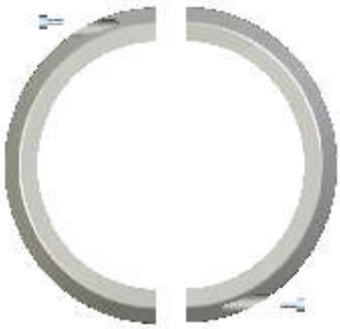
3. Remove the flange tube.



4. Pass the flange of the ceiling tube over the six free threaded bolts of the ceiling anchor plate.

Note: Ensure ceiling tube is level using a digital level.

5. Apply flat washers and mounting nuts to three threaded bolts by hand, spaced at 120° intervals.
6. Align the ceiling tube vertically in the room using a level and the adjustment screws on the ceiling side.
7. Little by little, tighten the mounting nuts ensuring that the alignment of the ceiling tube is maintained.
8. Screw the mounting nuts with washers from step 1 onto the other three threaded bolts, and with tighten torque to 34 N-m.
9. Attach both halves of the securing ring to the ceiling tube using a rubber gasket for ceiling cover.

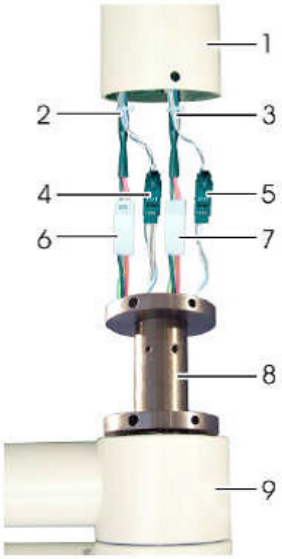


10. Adjust the ceiling cover flush with the ceiling.
11. Screw the ceiling cover tight using the securing ring(3).

7.3 Replacing a Suspension for Lights and Light/Flat Panel Combination Suspensions

> ⚠ **WARNING:** Before performing the following steps, the electricity for the Lights and/or Monitors has to be powered OFF.

☞ **Note: When replacing a Suspension with a Flat Panel Arm the cables shall be back pulled from the doc station.**



1	Ceiling Tube
2	Connection cable for light 1
3	Connection cable for light 2
4	4-pole connection plug for light 1, 4 poles used, 2-pole CAN bus (black/white)/2-pole video(brown/white)
5	4-pole connection plug for light 2, 2 poles used, 2-pole CAN bus(black/white)/2-pole-video not used
6	Light 1 connector, power supply
7	Light 2 connector, power supply
8	Central Bearing Shaft
9	Horizontal Arm

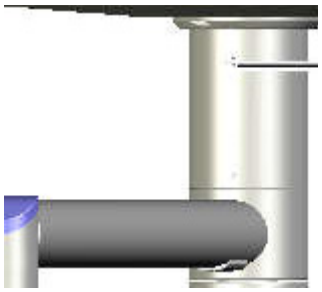
1. Remove Light Head or Monitor Yoke and Spring Arm as instructed in section 7.9.

2. Disconnect plug in connectors 4-7.

3. Remove the five countersunk bolts with 5mm Allen wrench (1) leaving the shoulder screw attached.

> ⚠ **WARNING:** The suspension WILL fall if the safety screw is removed at this time. Ensure suspension is secure on lift prior to proceeding to the next step.

4. Remove the safety shoulder screw (1) and tighten to 5 N-m using 5mm hex key.

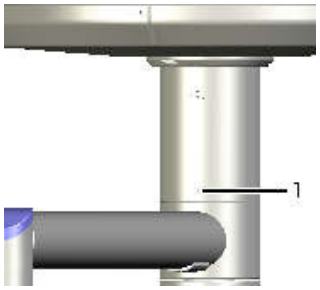


5. Lower arm and attach replacement arm to lift for installation.

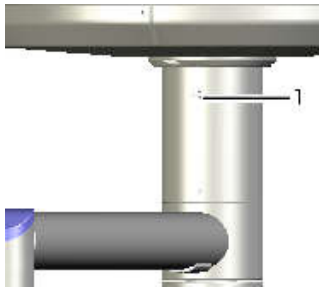
6. Raise arm up to the ceiling tube and attach plug-in connectors 4-7.

7. Push the central bearing shaft into the ceiling tube. In so doing, make sure the mounting holes are lined up with the holes in the ceiling tube.

8. Insert the safety shoulder screw(1) and tighten to 5 N-m using 5mm hex key.



9. Apply five countersunk bolts with hexagonal sockets (1) into the remaining slots and tighten to 12 N-m using a 5mm hex key.



7.4. Replacing the Horizontal Arm on a Wall Single Light

> ⚠ **WARNING:** Before performing the following steps, the electricity for the Lights and/or Monitors has to be powered OFF.

> ⚠ **CAUTION:** There is a risk of injury from spring-loaded joints. If the spring arm is released under tension, it will move quickly and uncontrollably, possibly causing injury or damage to equipment.
> 1. Hold onto the spring arm when installing or removing the light head.
> 2. Avoid putting pressure on the spring arm and releasing it suddenly.
> 3. Spring arm should always have the stop set for the spring arm to be parallel

1. Remove Light Head as instructed in section 7.9.
2. Remove Spring Arm as instructed in section 7.6.
3. Loosen cap screws(2).
4. Remove the cover cap(1).

5. Remove Brake Screw(3).
6. Locate terminal block on the bearing journal.
7. Disconnect the cables from the terminal block.

8. Pull up squarely on Horizontal arm and remove (horizontal arm is held on by gravity).
9. Install new arm.

10. Reconnect the cables to the terminal block.

Cantilever		Wall bracket
green/yellow	connect to	green/yellow
white	connect to	red
black	connect to	black

11. Reinstall the cover cap (1).

12. Reinstall cap screws (2).

13. Install brake screw (3).

14. Install Spring Arm as instructed in section 7.6.

15. Install Light Head as instructed in section 7.9.

7.5. Replacing a Spring Arm for Light Head or Flat Panel Support Arm (Ceiling Suspension)

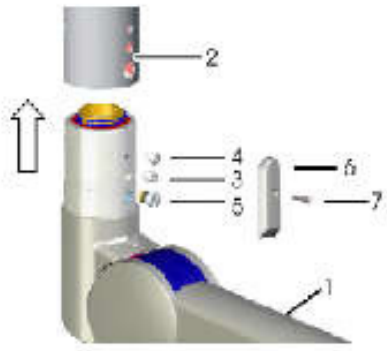
> ⚠ **WARNING: Before performing the following steps, the electricity for the Lights and/or Monitors has to be powered OFF.**

> ⚠ **CAUTION: There is a risk of injury from spring-loaded joints. If the spring arm is released under tension, it will move quickly and uncontrollably, possibly causing injury or damage to equipment.**
> **1. Hold onto the spring arm when installing or removing the light head.**
> **2. Avoid putting pressure on the spring arm and releasing it suddenly.**
> **3. Spring arm should always have the stop set for the spring arm to be parallel.**

1. Remove the Light Head or Monitor Yoke as instructed in section 7.9.

2. Remove the round-headed screw (7) from the thread of the safety screw and cover (6).

3. Remove the brake screw (5), round screw (4), and safety screw (3).



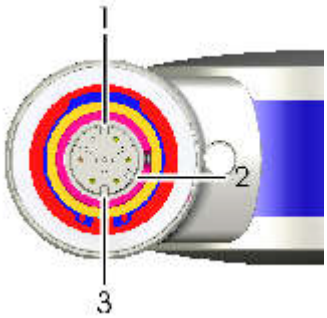
> **WARNING:** Before performing the following steps, the electricity for the Lights and/or Monitors has to be powered OFF.

4. Remove the spring arm.

5. Insert the spring arm (1) into the horizontal arm (2) in the direction of the arrow.

Note: Ensure that the holes in the spring arm are lined up with the bore holes on the horizontal arm.

For Light Head installation ensure that the contact pins line up and connector connects securely.



Failure to plug in the contacts correctly may result in permanently damaged or destroyed connectors.

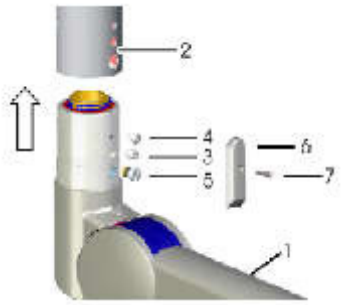
6. Insert the safety screw (3) into the central bore hole and tighten to a torque of 4 N-m.

7. Insert round-headed screw (4) into the upper screw thread and tighten to a torque of 5 N-m.

8. Insert brake screw (5) far enough into the lower thread that the spring arm does not drift away independently.

9. Install cover (6).

10. Screw a round-headed screw (7) into the thread of the safety screw (3).



11. Reinstall the Light Head or Monitor Yoke as instructed in 7.9.

7.6. Replacing Spring Arm for Wall Mounted Single Light

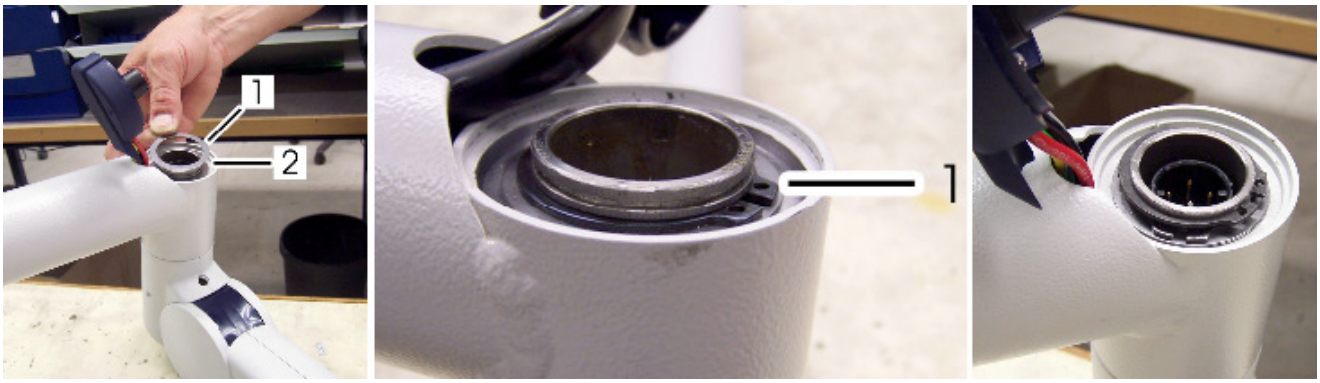
> ⚠ **WARNING:** Before performing the following steps, the electricity for the Lights and/or Monitors has to be powered OFF.

> ⚠ **CAUTION:** There is a risk of injury from spring-loaded joints. If the spring arm is released under tension, it will move quickly and uncontrollably, possibly causing injury or damage to equipment.
> 1. Hold onto the spring arm when installing or removing the light head.
> 2. Avoid putting pressure on the spring arm and releasing it suddenly.
> 3. Spring arm should always have the stop set for the spring arm to be parallel.

1. Remove the Light Head as instructed in section 7.9. Remove the Brake Screw (3).
2. Remove Contact Holder (1) by removing the two Philips screws (2).

> ⚠ **WARNING:** The spring arm WILL fall once the two Circlips are Removed.

3. Remove the two Circlips using Circlip Pliers.
4. Remove Shim rings.
5. Remove the Spring Arm.
6. Push New Spring Arm onto the Horizontal Arm.
7. Install Brake Screw.
8. Install the two Shim Rings removed above in Step 5.



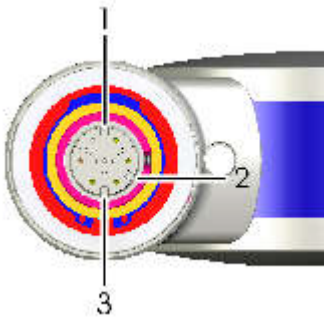
9. Install two Circlips in the grooves (1) and ensure that the Ciirclips are completely snapped into their corresponding groove.

Note: Ensure that the holes in the spring arm are lined up with the bore holes on the horizontal arm.

10. Align the plug connector contacts.

11. Attach Contact Holder (1) by installing the two Philips screws (2).

12. Adjust the brake screw (3) in order to achieve the desired braking action.



Note: Failure to plug in the contacts correctly may result in permanently damaged or destroyed connectors.

13. Reinstall the Light Head as instructed in section 7.9.

7.7. Replacing Spring Arm for VPA

> ⚠ **WARNING:** Spring arm for VPA is a DEPOT Level Repair.

7.8. Replacing VPA POD

> ⚠ **WARNING:** VPA POD is a DEPOT Level Repair.

7.9. Replacing the Light Head or Monitor Yoke

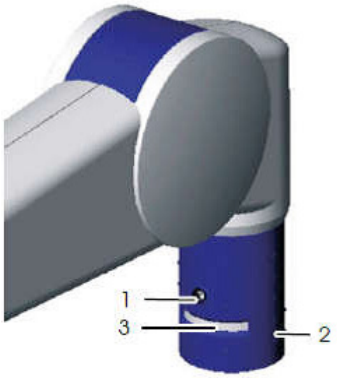
> ⚠ **WARNING:** Before performing the following steps, the electricity for the Lights and/or Monitors has to be powered OFF.

> ⚠ **CAUTION:** There is a risk of injury from spring-loaded joints. If the spring arm is released under tension, it will move quickly and uncontrollably, possibly causing injury or damage to equipment.
> 1. Hold onto the spring arm when installing or removing the light head.
> 2. Avoid putting pressure on the spring arm and releasing it suddenly.
> 3. Spring arm should always have the stop set for the spring arm to be parallel.

7.9.1 Classic Cardanic for Light Head or Monitor Yoke

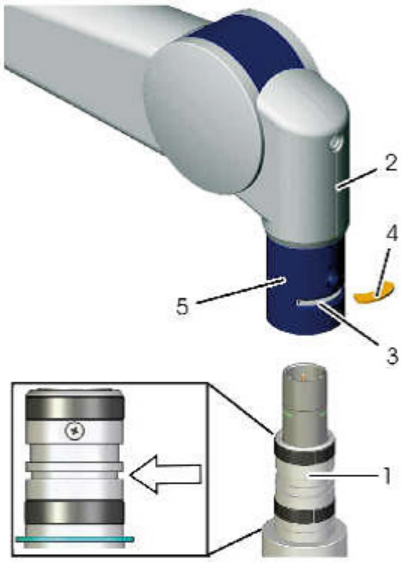
Note: When replacing the Monitor Yoke the cables shall be back pulled from the doc station.

Note: The following steps apply to all E and F Series Light Heads being installed on a Classic Spring Arm.



1. Remove screw (1) from the lock bushing.
2. Turn lock bushing 180° (2) exposing the locking segment and the journal groove (3).
3. Remove the locking segment from the journal groove (3).

WARNING: Before performing the following steps, the electricity for the Lights and/or Monitors has to be powered OFF.



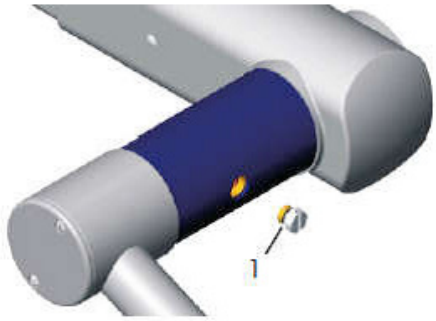
4. Remove the Light Head or Monitor Yoke.
5. With replacement Light Head or Monitor Yoke, advance the journal of the light bow (1) into the spring arm (2) until the journal groove(as seen by the arrow) appears in slot 3.
6. Insert the locking segment (4) into the journal groove (3).
7. Turn the lock bushing (5) 180° to lock the locking segment in lace.
8. Insert the lock bushing screw (1) into the lock bushing and tighten.

WARNING: Failure to install the locking segment WILL result in the Light Head or Monitor Yoke falling.
Failure to secure the lock bushing with the screw may result in the locking segment to disengage resulting in the Light Head or Monitor Yoke falling.

7.9.2 Flat Cardanic

> ⚠ **WARNING: Failure to install the locking segment WILL result in the Light Head or Monitor Yoke falling.**
> **Failure to secure the lock bushing with the screw may result in the locking segment to disengage resulting in the Light Head or Monitor Yoke falling.**

1. Remove the brake screw (1).

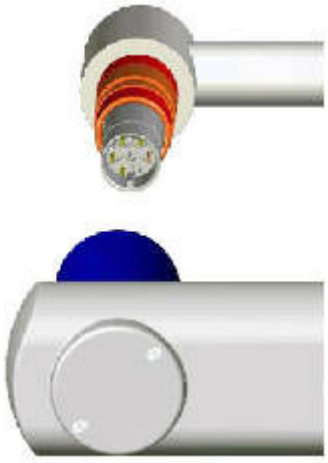


2. Turn the locking bushing (4) 180° exposing the shoulder screw (3).

3. Remove the shoulder screw (3).

4. Remove the Light Head.

5. With the replacement Light Head, align the contact pins inside the journal of the light bow.



> **WARNING: Failure to plug in the contacts correctly may result in permanently damaged or destroyed connectors.**

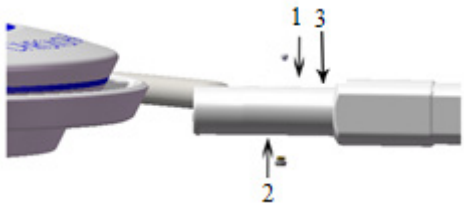
6. Insert the journal of the light bow (1) until it reaches the spring arm (2).
7. Screw in the shoulder screw (3) in until the light head is just un-braked.
8. Turn the lock bushing (4) 180° securing the shoulder screw.
9. Install the brake screw (1) into the free thread.

10. Adjust the braking force with the brake screw as such that the Light Head is easy to move but remains stationary in the desired position.

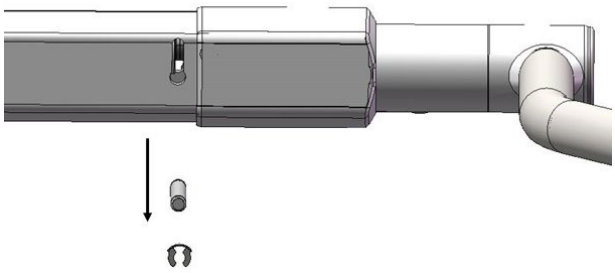
7.9.3 New Flat Cardanic (N.F.C)

> **WARNING: When installing brake screws on a NC or NFC springarm, screw it in until it stops then back it out ¼ turn (90°). Check to see if the component is stable. Loosen or tighten accordingly, but never back this screw out more than 1 turn (360°) to prevent it from falling out inadvertently.**

1. Remove flat head brake screw (2).
2. Loosen the second allen head break screw but DO NOT remove.
3. Turn the locking bushing (3) 180° exposing the shoulder screw(1).
4. Remove the shoulder screw(1).

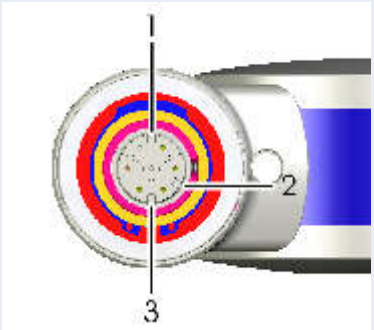


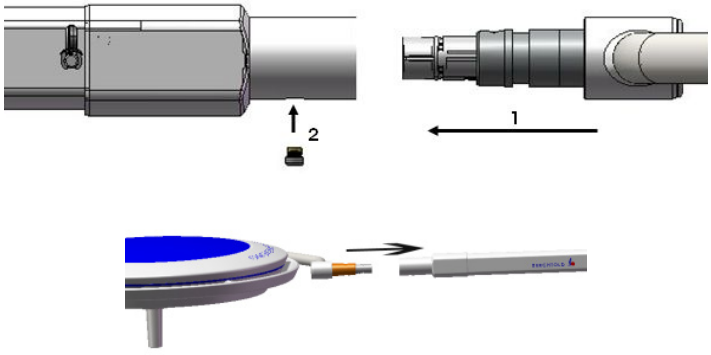
5. Install shipping lock to keep the spring arm at 90 degrees.
   a. Slide the plastic sleeve forward and install the pin through arm.
   b. Install circlip retainer.



6. Remove the Light Head and Cardanic from the spring arm.

7. With the replacement Light Head, align the contact pins inside the journal of the light bow.

> ⚠ **WARNING: Failure to plug in the contacts correctly may result in permanently damaged or destroyed connectors.**
>
> 
>

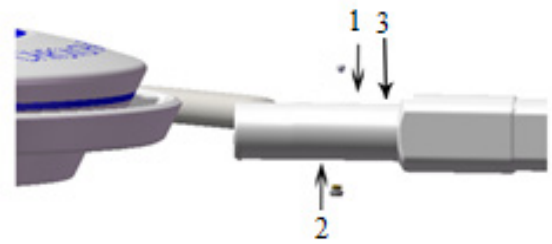


8. Insert the Light Head Cardanic as far as it will go.

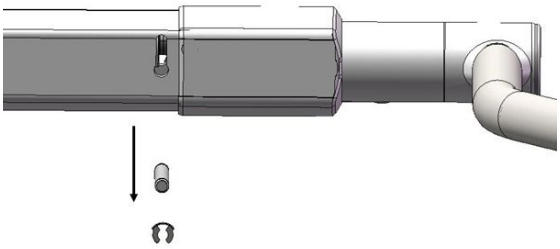
9. Install the shoulder screw (1) until the screw just touches the cardanic.

10. Turn the lock bushing (3) 180° securing the shoulder screw.

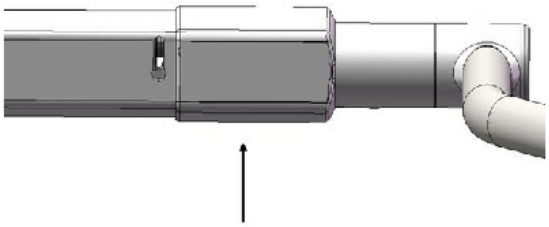
11. Install the flat head brake screw (2) into the free thread.



12. Remove the circlip retainer and the shipping lock.



13. Slide the plastic sleeve into the locked position.



14. Adjust the braking force with the brake screw as such that the Light Head is easy to move but remains stationary in the desired position.

> ⚠ **WARNING: Failure to properly install the shoulder screw and secure the lock bushing with the break screw may result in the Light Head falling.**

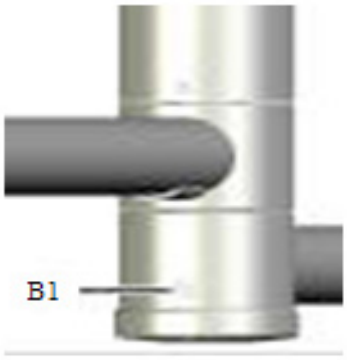
7.10. Adjusting Suspension Brakes for Lights, Flat Panels, and VPA

> ⚠ **WARNING:** Failure to properly install the shoulder screw and secure the lock bushing with the break screw may result in the Light Head falling.

☞ **Note: Turning the brake screw clockwise will increase the braking action and turning the brake screw counterclockwise will decrease the braking action.**

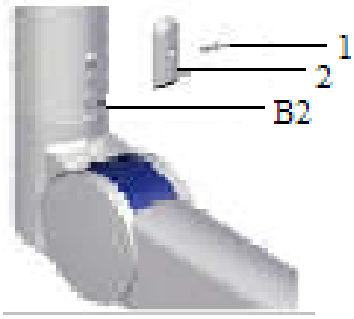
7.10.1 Horizontal Arm Brakes

1. Adjust the braking effect to suit the rotational movement of the horizontal arm using brake screw (B1).



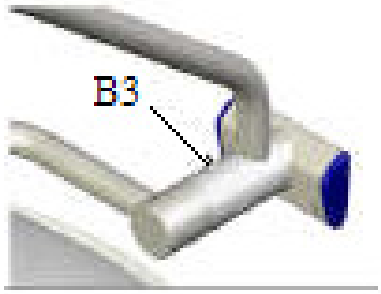
7.10.2 Light/Flat Panel Spring Arm Brakes

1. Remove Screw (1) and the cover (2).
2. Adjust the braking effect to suit the rotational movement of the spring arm using brake screw (B2).
3. Re-attach the cover(2) with the screw (1).



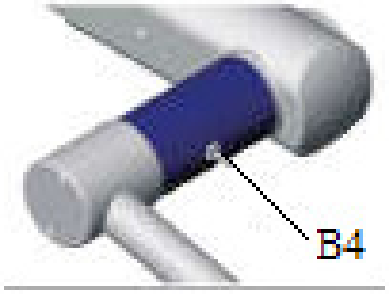
7.10.3 Cardanic Brakes on a Classic

1. Adjust the braking effect on the cardanic joint using brake screw (B3)



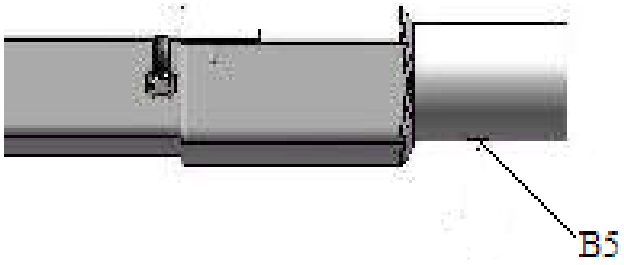
7.10.4 Cardanic Brakes on the Flat Cardanic

1. Adjust the braking effect to suit the cardanic joint using brake screw (B4)



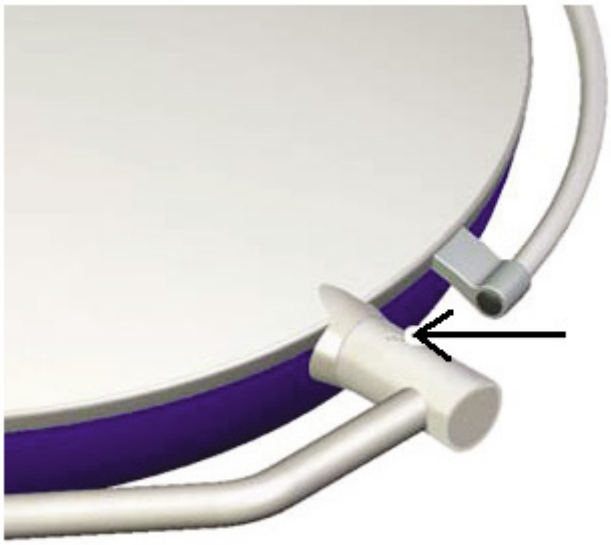
7.10.5 Cardanic Brakes on New Flat Cardanic

1. Adjust the braking effect to suit the cardanic joint using brake screw (B5)



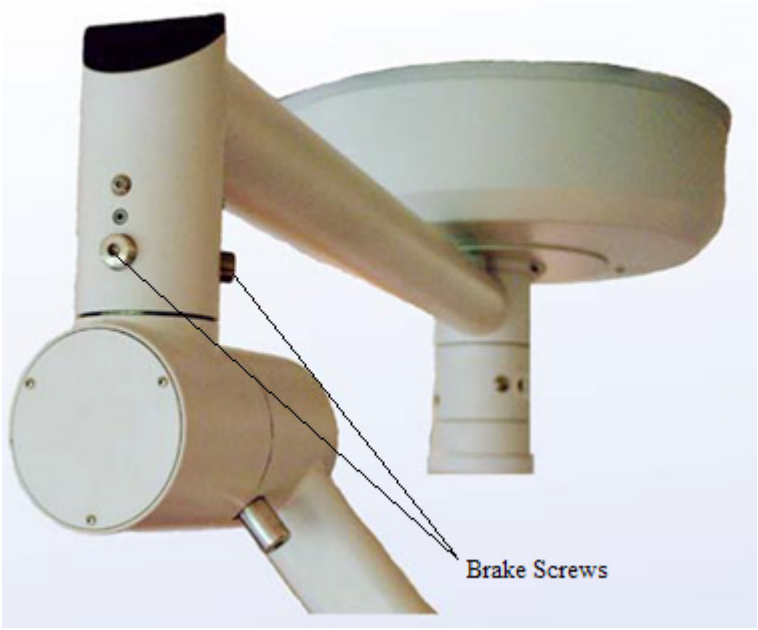
7.10.6 Light Head Brakes

1. Adjust the braking effect to suit the rotational movement of the Light Head.



7.10.7 VPA Spring Arm Brakes

1. Adjust the braking effect to suit the rotational movement of the horizontal arm using brake screws.



7.11. Adjustments for Lights, Flat Panel, and VPA Suspensions

7.11.1 Spring Arm Height Adjustment for Lights and Flat Panel Spring Arms

1. Remove the covering cap using a small screwdriver. The height adjustment screw for the height stop is beneath the cover cap (HB).
2. Put the spring arm in the horizontal position.
3. Adjust the height limitation using the adjustment screw (HB).
4. Re-attach the covering cap.

Note: Turning the height screw in the clockwise direction reduces the height and in a counter clockwise direction increases the height.

7.11.2 Flat Cardanic Height Adjustment

1. Remove the casing shell (1).

2. Pull off the casing shell (1) in the direction of the arrow.
3. Rotate the casing shell (1) downwards as shown.
4. Bring the spring arm to a position whereby the hole nuts (2) are visible in the slot.
5. With a steel pin or equivalent (3) rotate the whole nut until the desired height limitation is achieved.

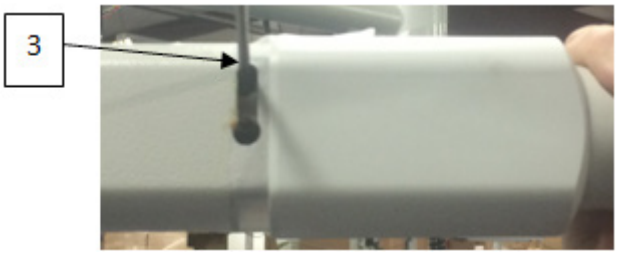
6. Re-attach the casing shell (1).

Note: Turning the height screw in the clockwise direction reduces the height and in a counter clockwise direction increases the height.

7.11.3 Height Adjustment for NFC Spring Arms

1. Slide the plastic sleeve forward; exposing the adjustment slot.

2. Bring the spring arm to a position whereby the adjustment nut (2) is visible in the slot.



3. With a steel pin or equivalent (3) rotate the adjustment nut until the desired height limitation is achieved.

7.11.4 Counter Balancing the Spring Arm for Lights and Flat Panels

1. Remove the cover cap(1) using a small screw driver. Adjustment screw for counterbalancing is beneath the cover cap.

2. Put the spring arm into the closest position to be parallel with the floor.

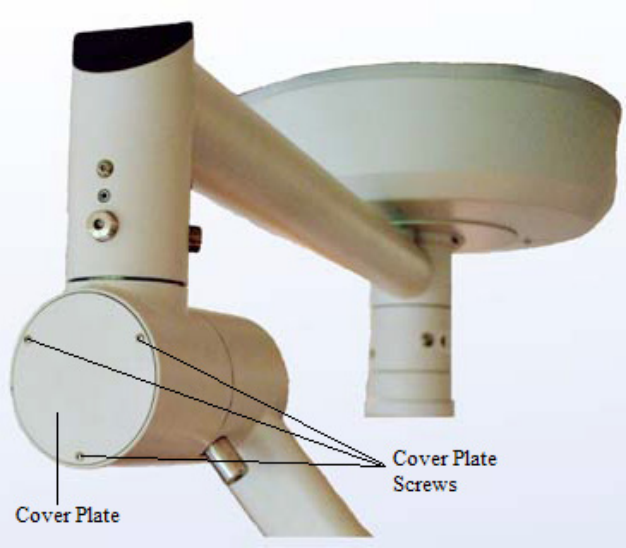
3. Adjust the spring arm tension using the adjustment screw (2).

Note: Turning the height screw in the clockwise direction reduces the height and in a counter clockwise direction increases the height.

7.11.5 VPA Spring Arm Up/Down Brakes

1. The vertical movement of the spring assist arm can be adjusted by increasing or decreasing the brake screws applied to the brake.

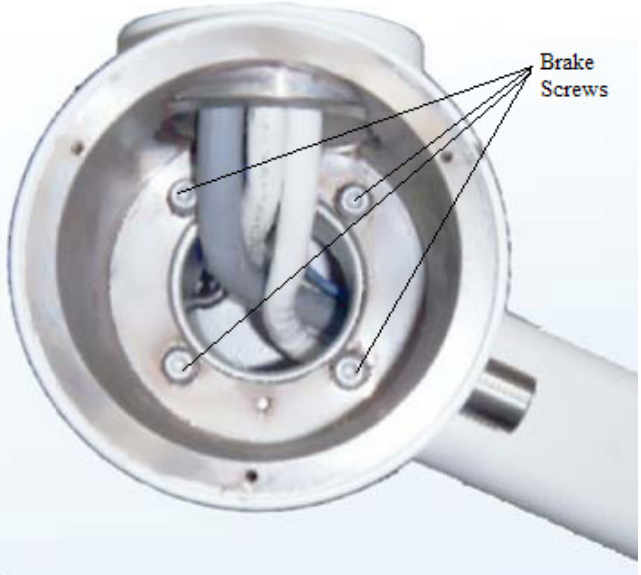
2. First remove the (3) cover plate screws and remove the cover plate.



3. For proper spring assist arm movement, the (4) brake screws will require equal torque.

4. Turn screws clockwise if arm is pulling upward.

5. Turn screws counterclockwise if it is difficult to move arm.



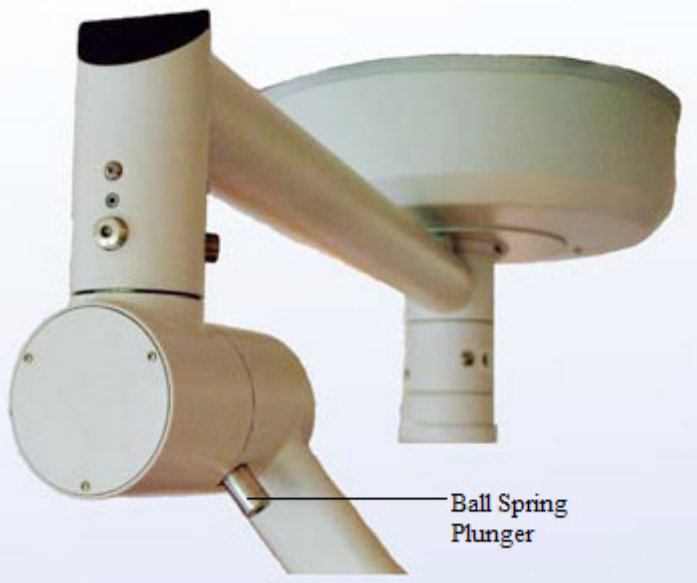
6. Make adjustments to the brake screws until best results are achieved.

7. Replace cover plate and re-fasten the (3) cover plate screws.

7.11.6 VPA Height Stop Detents

1. The Detent System will maintain vertical position of the spring arm at 20 degree increments; a total movement of 60 degrees. The Ball Spring Plunger should be fastened with Loctite applied to threads and inserted completely to function properly.

Note: The Detent Stops are not adjustable.



7.12 Spring Arm Wire Harness Replacement for Lights

CAUTION: There is a risk of injury from spring-loaded joints. If the spring arm is released under tension, it will move quickly and uncontrollably, possibly causing injury or damage to equipment.

1. **Hold onto the spring arm when installing or removing the light head.**
2. **Avoid putting pressure on the spring arm and releasing it suddenly.**
3. **Spring arm should always have the stop set for the spring arm to be parallel**

1. Remove light from spring arm and place on a working surface; remove the spring arm from the suspension place on a solid flat working surface.

2. Remove the bearing housing and spring arm covers.

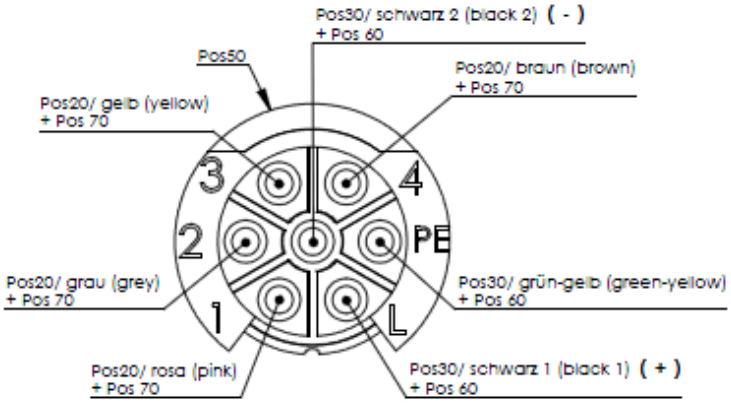
3. Remove the screw holding harness connectors in the spring arm (both front and back). Cut wire set and remove.

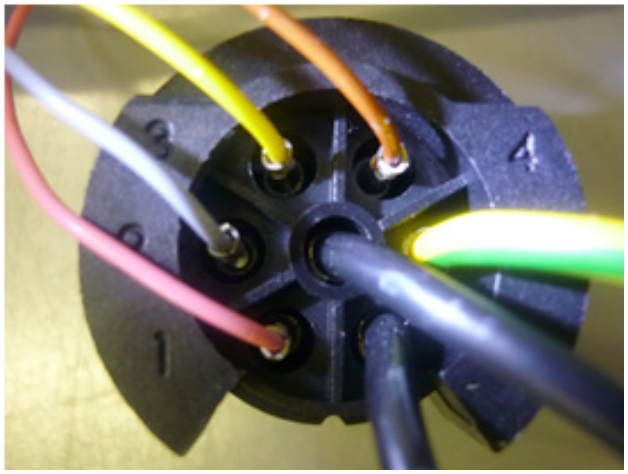
4. Tape pins and end of wires together to keep them protected during assembly.

5. Pull wire set thru spring arm and install female 7 pole connector in front part of arm, install screw by tighten fully then back of ¼ turn.

6. Pin out female connector as follows:

Note: Standard Pinout for 7-Pole Spring Arms.





1) Rose Can-buss high
2) Grey Can-buss low
3) Yellow Y (camera)
4) Brown C (camera)
5) PE Green/Yellow Gnd
6) L black 1 + 24vdc
7) Ctr Black 2 - 24vdc

7. Install the screw holding harness connector in the spring arm back part.

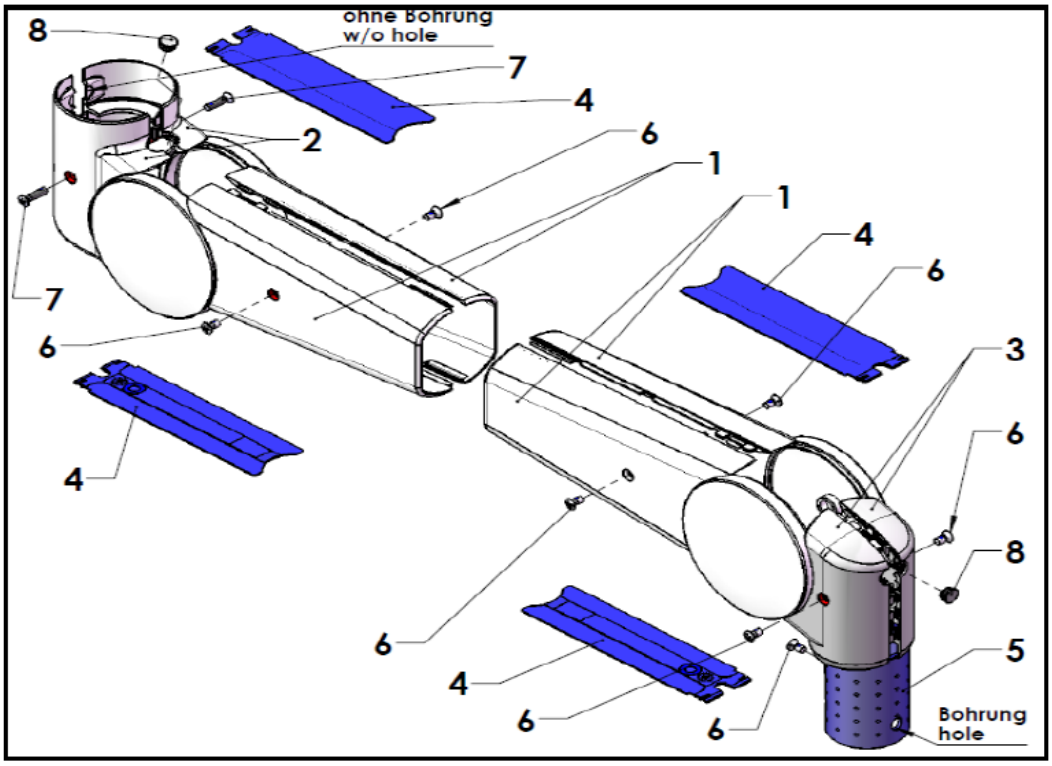
8. Install bearing housing, inspect bearings for proper movement.

9. Install washer over bearings.

10. Install snap ring check for proper operation.

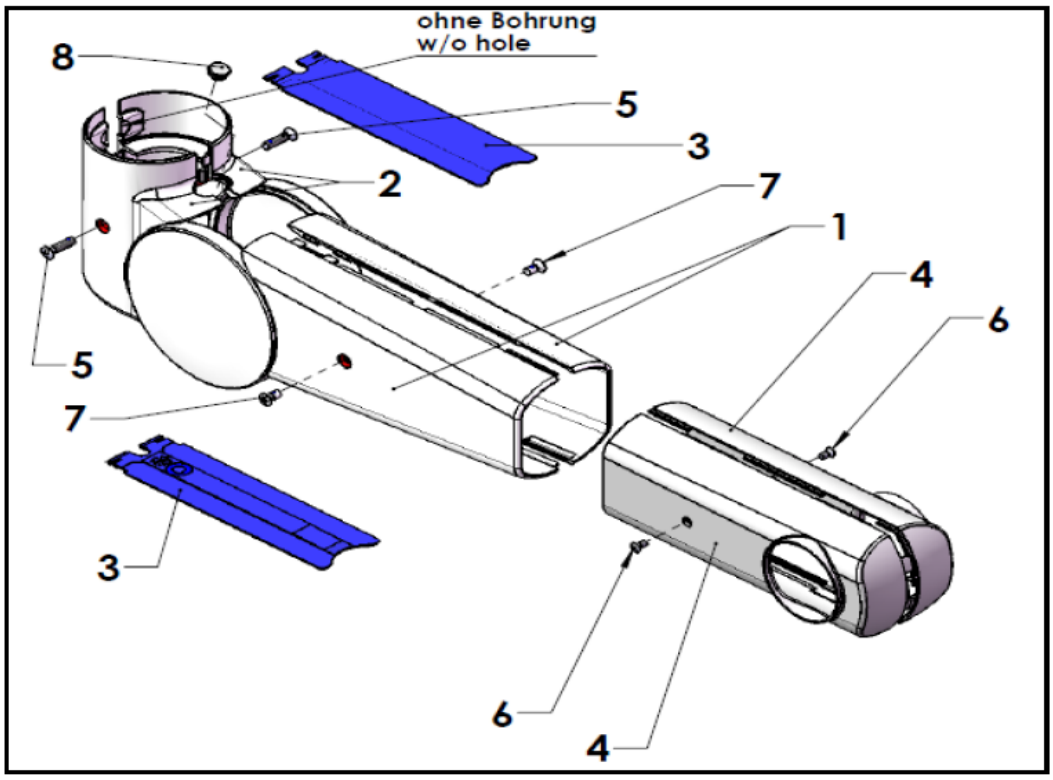
11. Install spring arm and test light as per class requirements.

7.13 Spring Arm Cover Replacement



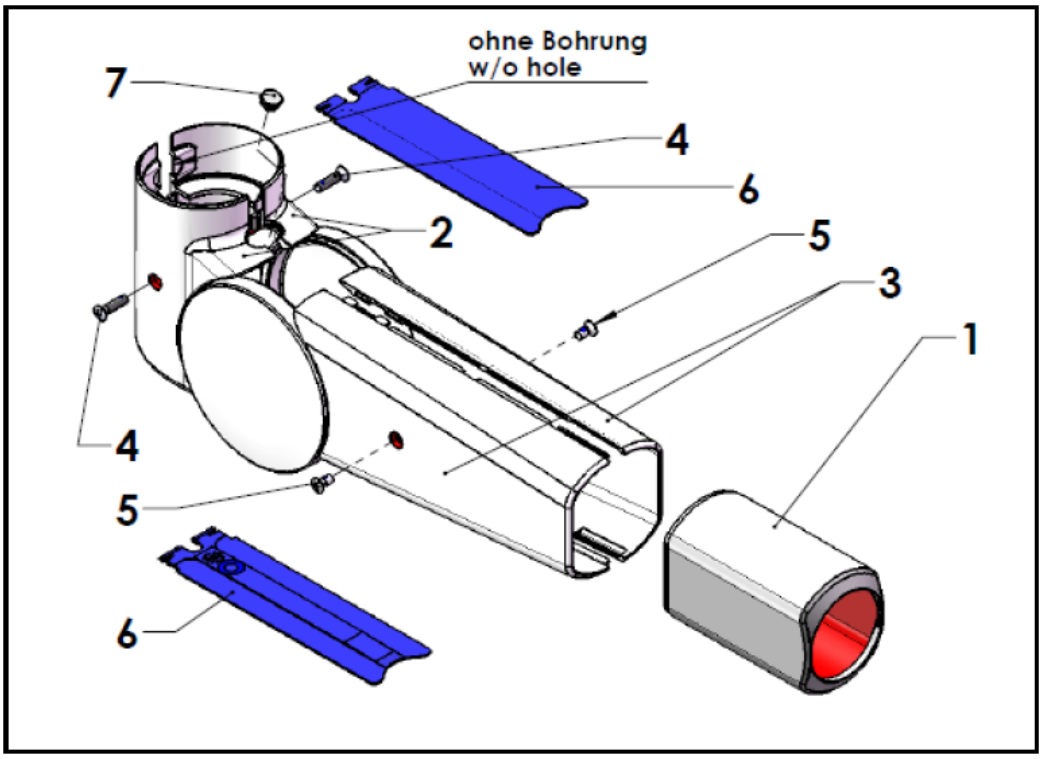
82083 – Classic (AC)

1	79999	Side cover 1 & 2
2	79998	Back Elbow Cover 1 & 2
3	79997	Spring Arm Joint Cover 1 & 2
4	80657	Blue Tab
5	74191	Safety Sleeve
6	77235	Countersunk Screw w/Tuflock, M4X8-A2, Din 966
7	80664	Countersunk Screw Raised Head, M4X16-A2, Din 966
8	N/A	N/A



82084 – Flat (NC)

1	79999	Side cover 1 & 2
2	79998	Back Elbow Cover 1 & 2
3	80657	Blue Tab
4	74182	Spring Arm Cover
5	80664	Countersunk Screw Raised Head, M4X16-A2, Din 966
6	226	Screw, ISO 7047-H M3X0.5X6. CR-OHMS, SS
7	77235	Countersunk Screw w/Tuflock, M4X8-A2, Din 966
8	N/A	N/A



82207 – NFC Standard

1	84398	Front Spring Arm Cover
2	79998	Back Elbow Cover 1 & 2
3	79999	Side cover 1 & 2
4	80664	Countersunk Screw Raised Head, M4X16-A2, Din 966
5	77235	Countersunk Screw w/Tuflock, M4X8-A2, Din 966
6	80657	Blue Tab
7	N/A	N/A

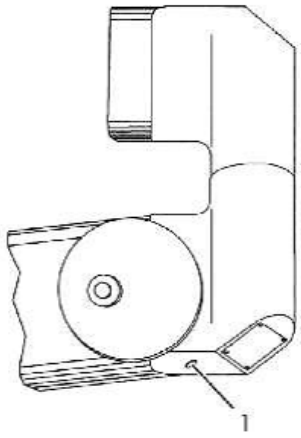
7.15 Dual Flat Panel Arm Maintenance

Note: Only configure the height-adjustment of the Dual Flat Panel Spring Arm after a successful weight counterbalance.

7.15.1 Dual Flat Panel Spring Arm Counterweight Adjustment

1. Insert a 6mm allen wrench into the adjustment opening (1).
2. Bring the Dual Flat Panel Spring Arm into the closest position to be parallel with the floor.
3. Adjust the spring arm tension using the adjustment screw (1).

Note: Turning the tension screw in the counter clockwise direction increases tension and in the a clockwise direction decreases the tension.

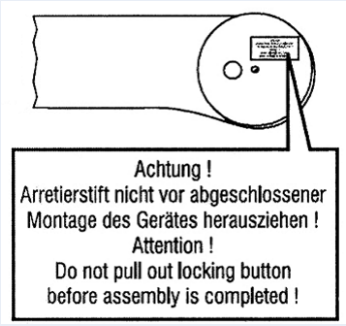


7.15.2 Dual Flat Panel Spring Arm Height Adjustment

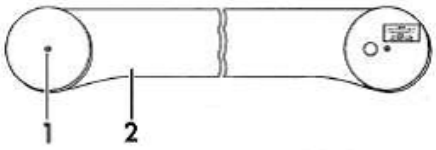
Note: The Dual Flat Panel Arm is configured to have a height-adjustment of 40° upwards and downwards when delivered. The height stop can be set to 20°.

WARNING: The Dual Flat Panel Spring Arm is under a high level of tension. The arm can move uncontrolled and may result in injuries.

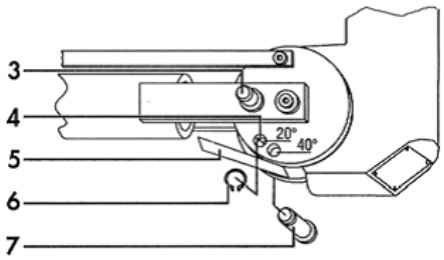
DO NOT set the retaining pin until assembly is complete.



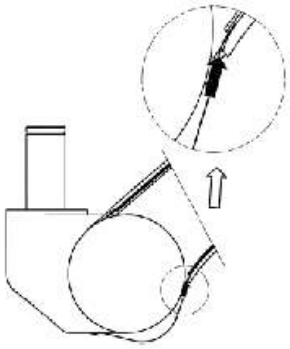
1. Unscrew the Philips-head screws (1) and remove the casing halves (2).



2. Loosen retaining pin (3).
3. Remove the retaining ring (6) with the spreader forceps.
4. Removed the stop pin (7) from the "40°" boreholes.
5. Insert the stop pin into the bore holes at "20°"
6. Secure the stop pin with the retaining ring (6). Ensure the correct positioning of the retaining ring.



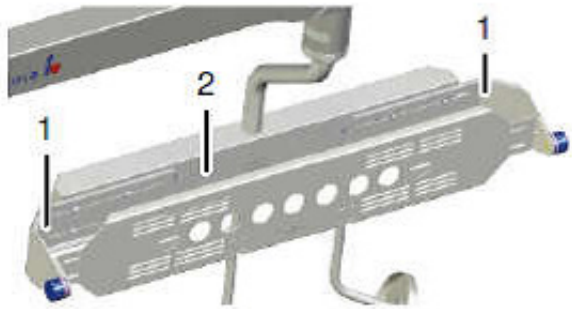
7. Bring the spring arm to its highest position.
8. Apply the 147mm cover strap on the rear hinge, in the lower channel.
9. Apply the 130mm cover strap on the front hinge, in the upper channel.
10. Bring the spring arm to its lowest position.
11. Apply the 130mm cover strap on the rear hinge, in the upper channel.
12. Apply the 130mm cover strap on the front hinge, in the lower channel.
13. Ensure that the cover straps lie completely within the channels.



14. Screw on both casing halves using Philips-head screws. Ensure the secure positioning of the casing halves.

7.15.3 Adjusting the Monitor Bracket, Version II

1. Adjust the side elements to the flat screen bracket (1) to suit the width of the screen. To do so use the scale (2) on the cross-beam.



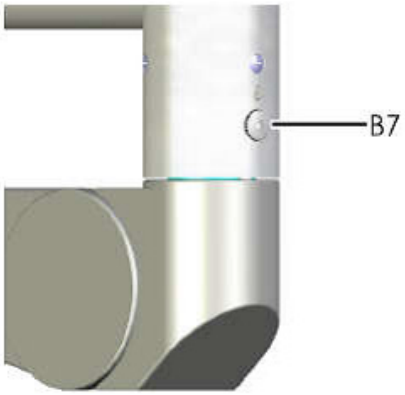
7.15.4 Adjusting the Brakes

> **WARNING: Risk of injury if braking action of joint fails. If the brake screws are lubricated or residual lubrication is left on them, they lose their braking action and the articulated joints will not stop as desired when moved.**

Note: Turning the brake screw in the clockwise direction increases the braking effect and turning in and anticlockwise direction reduces the braking effect.

7.15.5 Brakes, Cross Connector, Versions I and II

1. Adjust the braking effect to suit the rotational movement of the Dual Flat Panel Arm using brake screw (B7)



7.15.6 Brakes, Monitor Suspension, Version I (rotary movement)

1. Adjust the braking effect to suit the rotational movement of the Dual Flat Panel Arm using brake screw (B4)

7.15.7 Brakes, Monitor Suspension, Version I (tilt movement)

1. Adjust the braking effect to suit the rotational movement of the Dual Flat Panel Arm using brake screw (B5)

7.15.8 Brakes, Monitor Suspension, Version I (tilt movement)

1. Adjust the braking effect to suit the rotational movement of the Dual Flat Panel Arm using brake screw (B1).

7.15.9 Brakes, monitor Suspension, Version II (tilt movement)

1. Adjust the braking effect to suit the rotational movement of the Dual Flat Panel Arm using brake screw (B3).

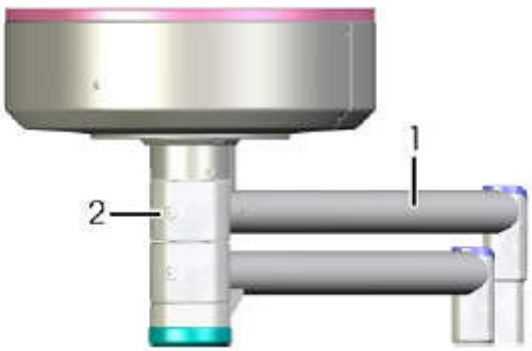
7.16 Servicing Suspension Stop Rotation

7.16.1.1 Changing/Replacing Stop Location

Note: If the Suspension internal stop is broken, perform steps 2 through 7. If the Suspension External stop is broken, perform steps 2 and 8.

1. Turn the horizontal arm (1) to the rotation stop.

2. Unscrew the external stop screw (2) with a 6mm allen wrench.



3. Continue to turn the horizontal arm until the internal stop screw (3) is visible.

4. Unscrew the internal stop screw.

Note: If the internal Suspension stop is broken, a removal tool may be needed to remove the broken screw.

5. Turn the horizontal arm to the desired position.

6. Screw in the unscrewed stop into the appropriate, visible thread (4) and torque to 30 N-m.

7. Continue to turn the horizontal arm until the internal stop screw is no longer visible.

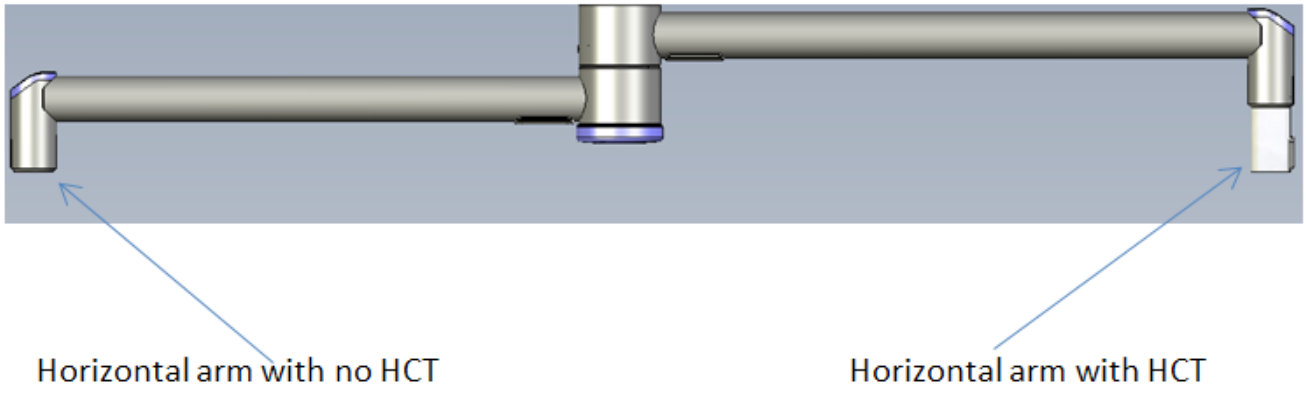
8. Screw in the external stop screw (5) once again.

7.17 Horizontal Arm Maintenance

> ⚠ **WARNING: Before performing the following steps, the electricity for the Lights and/or Monitors has to be powered OFF.**

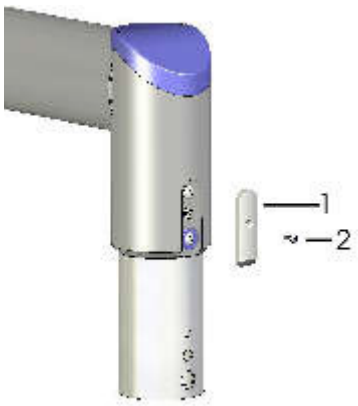
7.17.1 Replacing Height Compensation Tube (HCT) on Horizontal Arm

The HCT is a vertical down tube, available in varying lengths, used to put the spring arms are in an equal horizontal plane.

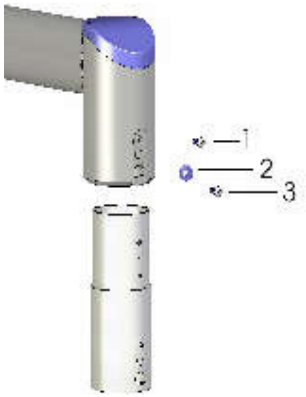


Note: When replacing height compensation tube with Flat Panel arm, the Cables shall be back pulled from the doc station.

1. Remove Light Head or Monitor Yoke per section 7.9.
2. Remove the Spring Arm per section 7.5.
3. Remove plastic cover (1) with round-headed screw (2).



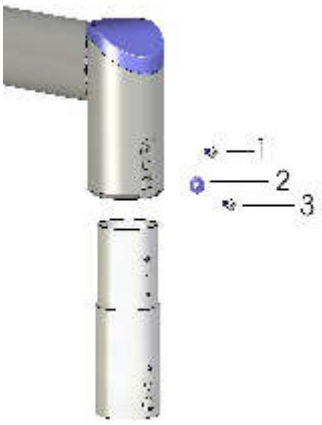
4. Remove the special washer (2) with the round-headed screw (3) from the upper screw thread.
5. Remove the round-headed screw (1) from the upper screw thread.
6. Remove the height Compensation tube from the horizontal arm.



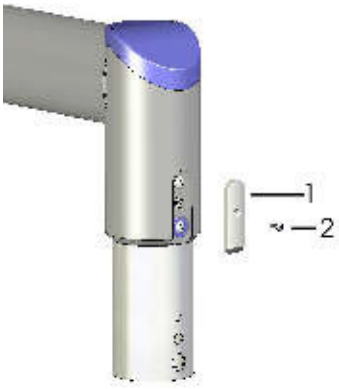
7. Insert the height Compensation tube into the horizontal arm. In so doing, make sure that the holes of the height Compensation tube line up with the holding holes in the horizontal arm.

8. Insert the round-headed screw (1) into the upper screw thread and tighten to 5 N-m.

9. Insert a special washer (2) with the round-headed screw (3) into the upper screw thread and tighten to 5 N-m.



10. Secure plastic cover (1) with round-headed screw (2).

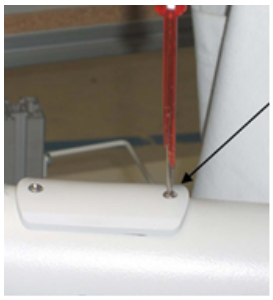


11. Reinstall Spring Arm per section 7.5.

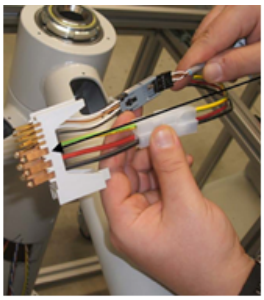
12. Reinstall Light Head or Monitor Yoke per section 7.9.

7.17.2 Replacing internal wiring on Horizontal Arm (light suspension only)

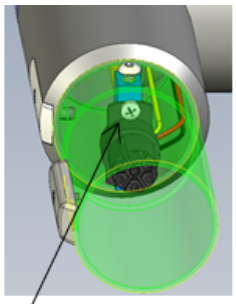
1. Secure power to the system from the circuit breaker.
2. Remove Light Head from Spring Arm per section 7.9.
3. Remove Spring Arm per section 7.5.
4. Remove 2 cross head screws on the bottom of the horizontal arm next to the central shaft to access the contact block.



Remove plastic cap on horizontal arm to access contact block



Remove contact block carefully disconnect wireset



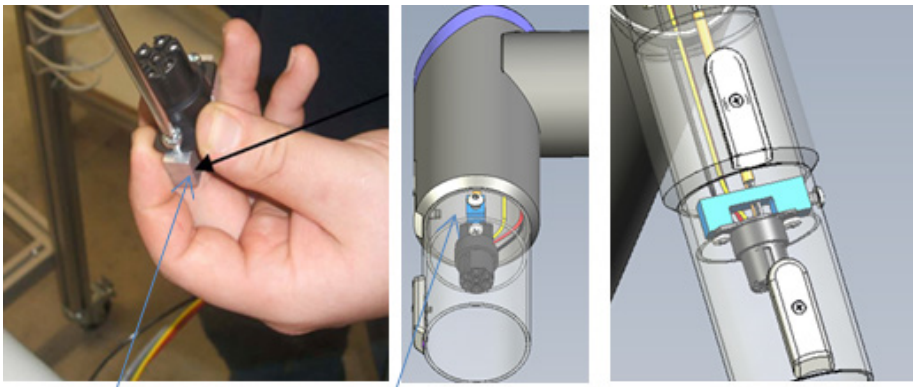
HCT Installed remove Hex screw on side of HCT to remove wireset

No HCT remove upper blue cap to remove wireset

5. Carefully remove contact block with the wire set attached. Disconnect wireset from contact block.

Note: Contact block is fragile and can be damaged if care is not observed.

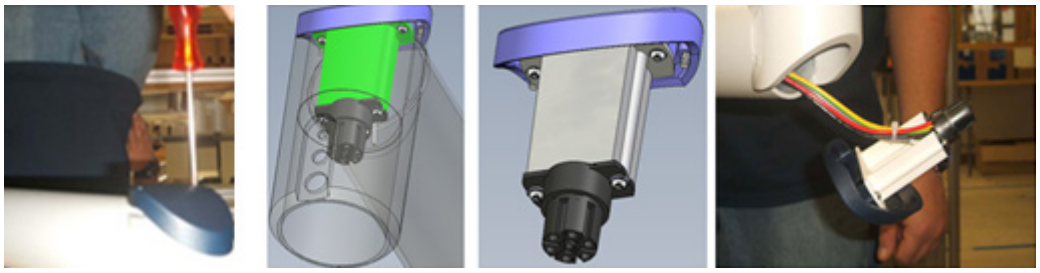
6. <u>For units with HCT</u>
   a. Remove the 5mm hex screw on the side of the HCT,
   b. Remove wireset and bracket from the arm.
   c. Disconnect wireset from bracket by removing the 2 4mm screws.
   d. Attach new wireset to bracket using the 2 screws removed.



Chromophare suspension wiring with HCT

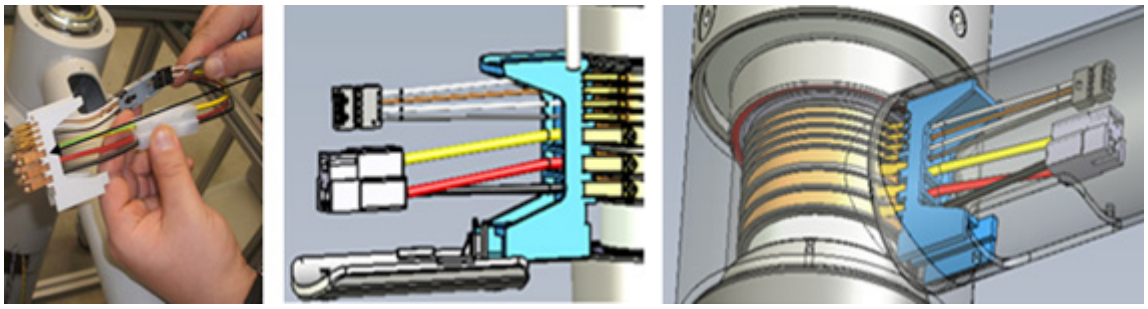
e. Run wires thru the HCT down the horizontal arm and out the access of the contact block.
f. Replace the 5mm hex screw on the side of the HCT and tighten.
g. Proceed to step 8.

7. For units with no HCT
   a. Remove upper front blue cover by removing the 2 3mm screws.



   b. Pull the cover up and carefully remove the wireset from the arm.
   c. Disconnect the wireset from bracket by removing 2 Torx Ejot screws.
   d. Attach new wireset to bracket using the 2 screws removed.
   e. Run wires thru the horizontal arm and out the access of the contact block.
   f. Replace the upper front blue cover by reinstalling the 2 3mm screws and tighten.

8. Attach wireset to contact block and tape the 4 pin connector to ensure it does not disconnect.



9. Place the contact block into the suspension and verify that all prongs are touching the slip ring(see above)

10. Place the plastic cover into place, making sure that the connection end of the cover snaps into place on the contact block.

> ⚠ **CAUTION: If the cover is not snapped into place correctly, the suspension will not function properly.**

11. Replace the 2 cross head screws and tighten.

12. Reinstall Spring Arm per section 7.5.

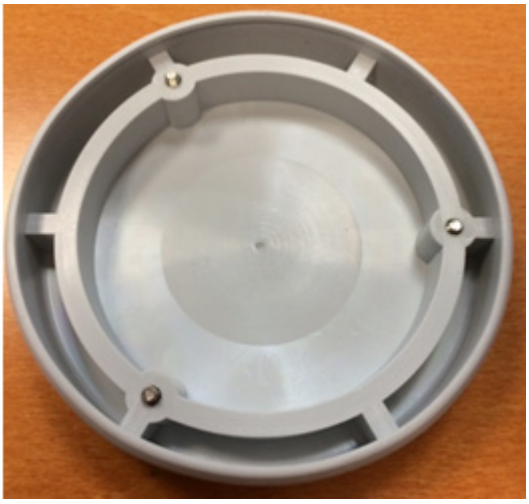
13. Reinstall Light Head per section 7.9.

14. Restore power and check the system for proper operation.

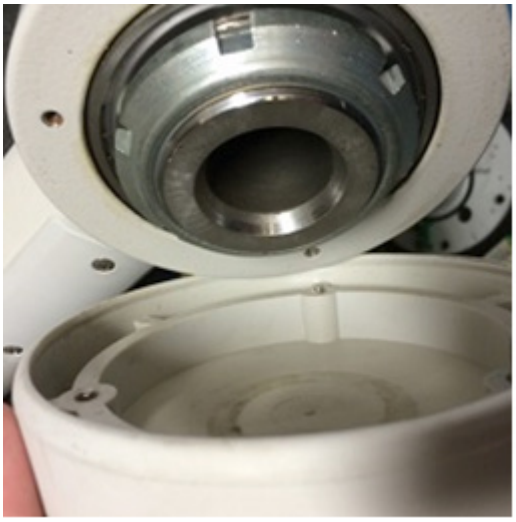
7.18 Replacing Suspension Bottom Cap (Jar Cover)

1. If replacement of the bottom suspension cap (Jar cover) becomes necessary, obtain a replacement kit (pn 107120).

2. Verify that the 3 screws are present in the cap as shown.

3. If applicable, remove the existing cover from the bottom of the suspension.




4. Align the 3 screws with the corresponding holes in the bottom of the suspension. Push the cover into place.

> ⚠ **CAUTION: All 3 screws must be fully tightened to ensure complete thread engagement into the suspension arm. Failure to do this could allow the cover to become inadvertently separated from the suspension arm.**

5. Using a phillips-head screwdriver, attach the cap to the suspension. Tighten the screws until they are fully engaged against the washers that are molded into the cap.

7.19 Suspension Mounted EndoLite

7.19.1 General Information

The ENDO light is an accessory option that mounts to the Chromophare suspension. It is mounted to the central bearing shaft assembly attached to the bottom of a horizontal arm. It provides background light when the full light of a surgical light is not needed.

There are two (2) variants of the suspension mounted Chromophare ENDO light. The first is for suspensions with a surgical light mounted on the bottom arm of the suspension. With this unit, the power and CAN bus are received from the output of the contact block mounted on the bottom arm of the suspension thru a transition cover (Figure 1).

The second variant is used when there is a non-powered bottom arm (single/dual flat panel) on the suspension. With this unit, the power and CAN bus are received from a wireset brought down from the top of the suspension thru the center of the shaft (Figure 2). Both units are functionally the same and are energized from the controller using the ENDO selection.

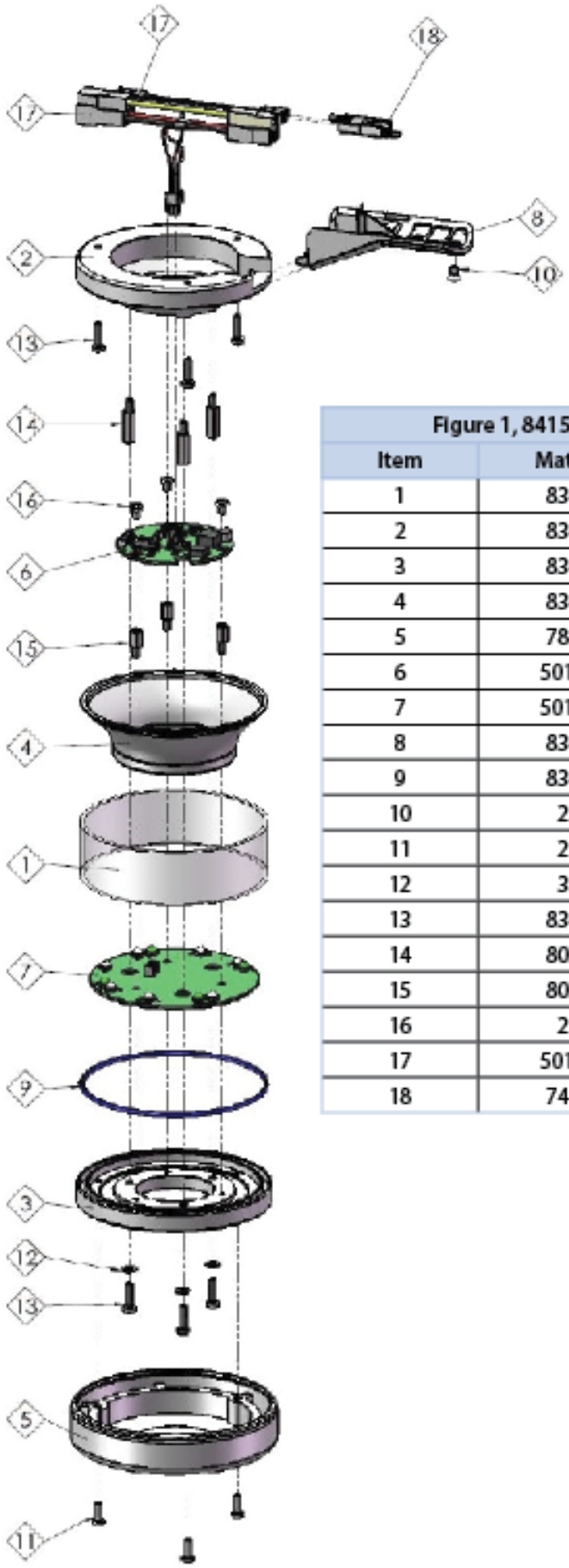


Figure 1, 84156 – EndoLite Powered Arm (light on bottom)		
Item	**Material**	**Description**
1	83446	Window ENDO
2	83444	Cap
3	83447	Cap
4	83448	Reflector ENDO LED
5	78870	Suspension End Cap (Jar Cover)
6	501052	Driver PCB
7	501051	ENDO LED Circuit Board
8	83443	EndoLite cover, standard arm
9	83453	O'ring
10	232	Screw M4 x 8
11	277	Screw M4 x 12
12	338	Washer M 4.3
13	83454	Screw M4 x 16
14	80248	Standoff M4 x 20
15	80250	Spacer M4 x 10
16	274	Screw M4 x 6
17	501186	Wiring set ENDO
18	74715	Connector, Cable

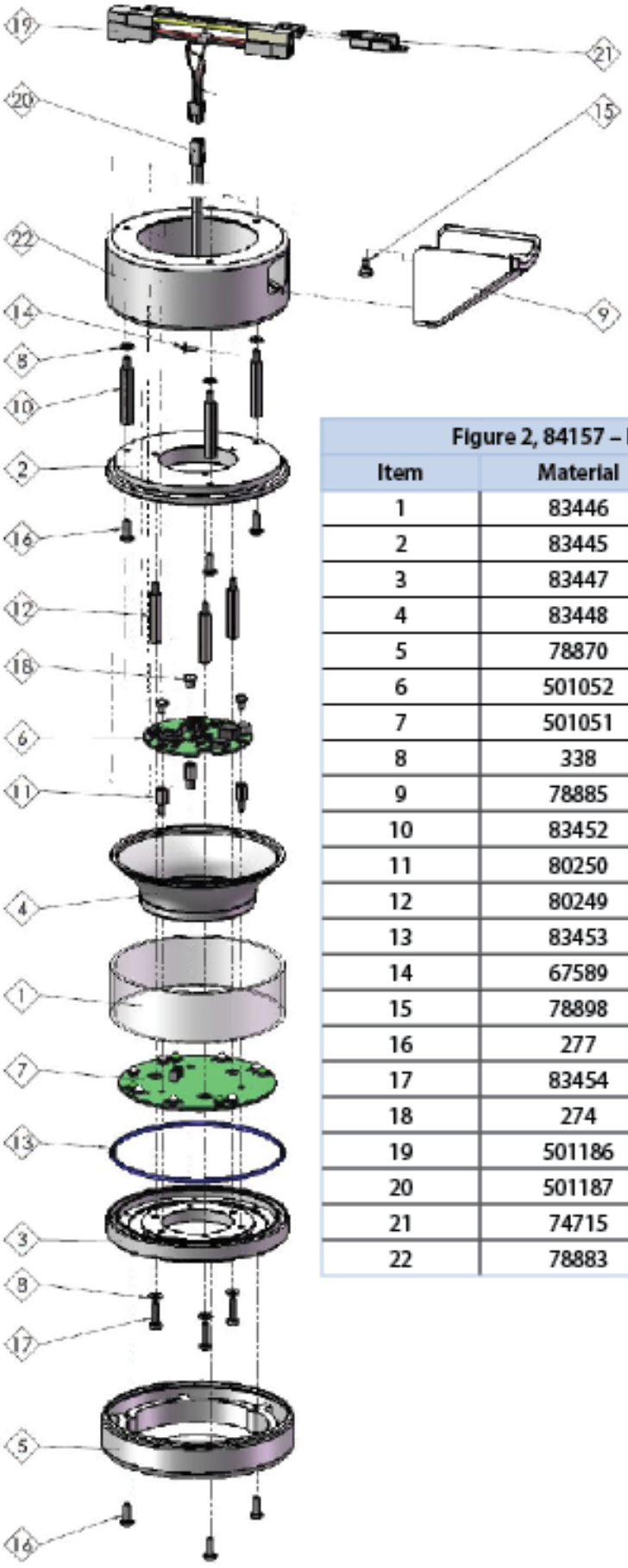


Figure 2, 84157 – EndoLite SFP/DFP Non-Powered Arm		
Item	Material	Description
1	83446	Window ENDO
2	83445	Adapter Disk, EndoLite
3	83447	Cap
4	83448	Reflector ENDO LED
5	78870	Suspension End Cap (Jar Cover)
6	501052	Driver PCB
7	501051	ENDO LED Circuit Board
8	338	Washer M 4.3
9	78885	Down wiring cover 70mm
10	83452	Standoff M4 SW7 x 40
11	80250	Spacer M4 x 10
12	80249	Standoff M4 SW7 x 35
13	83453	O'ring
14	67589	Screw Ejot Torx
15	78898	Screw M4 x 3
16	277	Screw M4 x 12
17	83454	Screw M4 x 16
18	274	Screw M4 x 6
19	501186	Wiring set ENDO
20	501187	Cable set, EndoLite Extension
21	74715	Connector, Cable
22	78883	Cable Lining

7.19.2 Endo Repair

> ⚠ **WARNING: Disconnect all power supplies before removing the EndoLite assembly. Failure to do so will result in damage to the circuit board.**

1. Determine if the issue is circuit board related or cable connection issue by verifying all connections and checking voltages. All circuit boards are interchangeable between units.

2. Remove transition cover on lower arm and check to ensure there is 24vdc going to the ENDO circuit from the contact block, if voltage is present and ENDO is not working the board/s will have to be replaced.

3. Remove soffit cover locate Endo light cable set and check to ensure there is 24vdc going to the ENDO circuit, if voltage is present and ENDO is not working the board/s will have to be replaced.

4. If voltage(24vdc) was present, secure power and proceed with replacing driver and led boards.

5. Access the Circuit boards by removing the 3 screws, from the bumper. Remove the rubber safety bumper by pulling down gently; remove 3 screws and washers holding ENDO LED assembly to the plate Piece 2.

6. Remove lower cap assembly slowly until cable is exposed; disconnect power/control cable 4 pin Molex connector see (Figure3/4) from the Driver board, set assembly aside for rework. The assembly includes circuit boards (2), window, reflector, bottom cap.

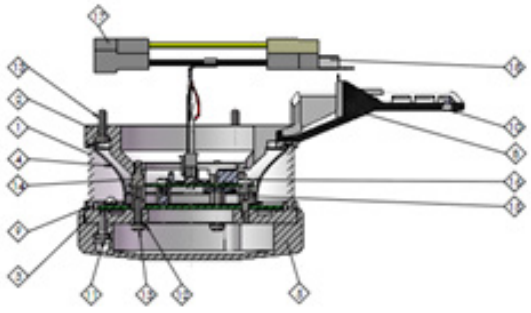


Figure 3 wireset to driver board, 4 pin Molex light on bottom

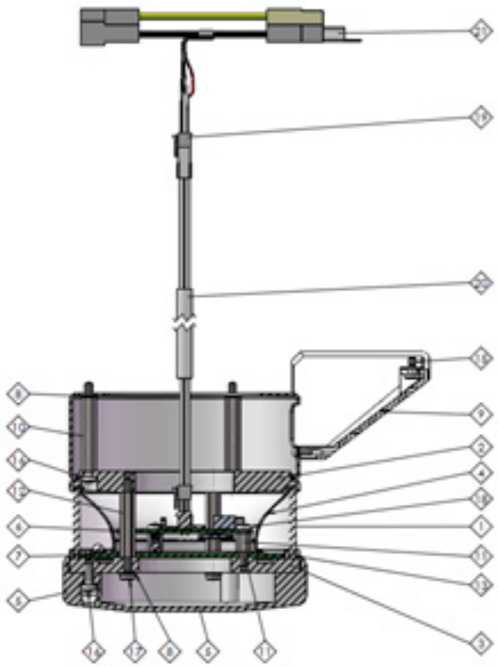


Figure 4 single/dual flat panel bottom arm mounted on the bottom to driver board, 4 pin Molex light on bottom

Note: Both LED units have identical circuit boards .

7. To remove Driver PCB circuit board, piece 6, remove three (3) screws and pull up gently to unseat the 8 pin socket connected to the LED circuit board, remove and place aside Driver board. To remove the LED Circuit board, Piece 7, remove the 3, 10mm standoffs.

8. Replace bad LED Circuit board and reinstall the 3 standoffs are installed thru the reflector and tighten. Line up 8 pin socket and pins and reinstall Driver PCB, replace the 3 screws, and tighten. Select the same color on the driver board as the color taken off, either Green or White.

9. Reassemble assembly taking care to ensure the window and the gasket are correctly in place, seen in Figures 1 and 2.

10. Reinstall assembly onto suspension, slowly place the lower cap assembly onto the suspension lower arm until power/control cable 4 pin Molex can be reconnected to the Driver PCB, seen in figures (Figure 3/4). Replace 3 screws and washers and tighten.

11. Reinstall bumper Piece 5 with the 3 screws removed.

12. Restore power and check for proper operation.

7.20 Replacing the Slip Ring (Commutator) on an F Gen Light

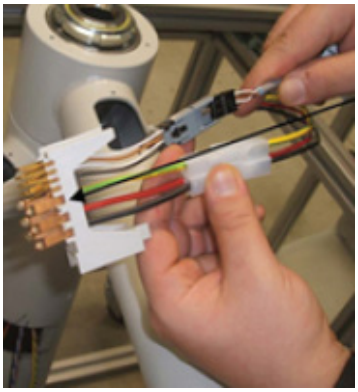
WARNING: Make sure that the Lights are powered off prior to performing service.

Note: If it is suspected that the slip ring is damaged, make sure that the issue is not due to a damaged wire set or contact block before completing this repair (see Step 3).

1. Remove the light head or monitor yokes as instructed in Section 7.9.
2. Remove the spring arm as instructed in Section 7.6.
3. Remove the two Phillips screw on the bottom of the horizontal arm next to the central shaft to access the contact block.

4. Carefully remove the contact block with the wire set attached. Disconnect the wire set from the contact block.

CAUTION: Use extreme care when handling the contact block, as it is very fragile.



5. Remove the three screws from the Endo light or jar cover and set them aside.

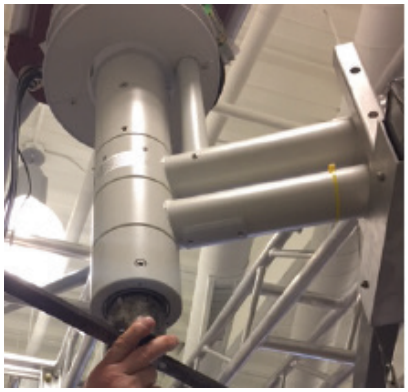
> ⚠ **WARNING: To prevent electrocution and burns, make sure the power to the light system is turned off.**

6. If you have an Endo light:
   a. Unplug the 4 pin molex connector.
   b. Remove the three screws from the internal plate and pull the plate away.
   c. Disconnect the cable.

7. If the suspension has more than one arm, use an equipment lift to support the other extension arms.

> ⚠ **WARNING: To prevent injury or damage, do not proceed unless multi-arms are supported by an equipment lift.**

8. Use the castlenut driver to remove the jammer nut.



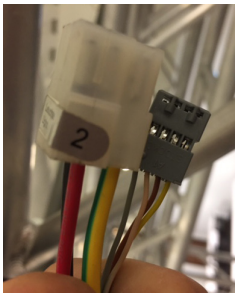
9. Remove the c-clip with the correct c-clip pliers.

10. Use a #6 Allen wrench to remove the brake screw of the extension arm.

11. Use a rubber mallet or your hand and tap down on the top of the extension arm to remove the central axis.

12. Remove the set screw from inside the slip ring (Commutator).

13. Disconnect the cabling for the slip ring at the ceiling. Cut off the end of the connectors and pull the cabling down and out of the system.



14. Remove the slip ring.
15. Slide a new slip ring onto the system and feed the wiring through the system in the same way as it was before.
16. Install the set screw. If the old set screw is damaged, use the new one included with the repair kit.
17. Use the connectors from the kit and re-terminate the cabling at the tip of the ceiling.
18. Slide the central axis up over the slip ring and install the brake screw.
    a. Reinstall the c-clip.
    b. Reinstall the jammer nut.
    c. Reinstall the plate and Endolight light or jar cover. If reinstalling the Endolight, make sure to reconnect the molex connector.
19. Reinstall the spring arm according to Section 7.5.
20. Reinstall the light head according to Section 7.9
21. Turn on the power and check the system to make sure it operates correctly.

8. Cardanics

> **WARNING:** Ensure Lights are powered off prior to performing service.

8.1 Cardanic Replacement

8.1.1 Cardanic Replacement for EXX0/EXX5 Light Heads (Halogen/HID)

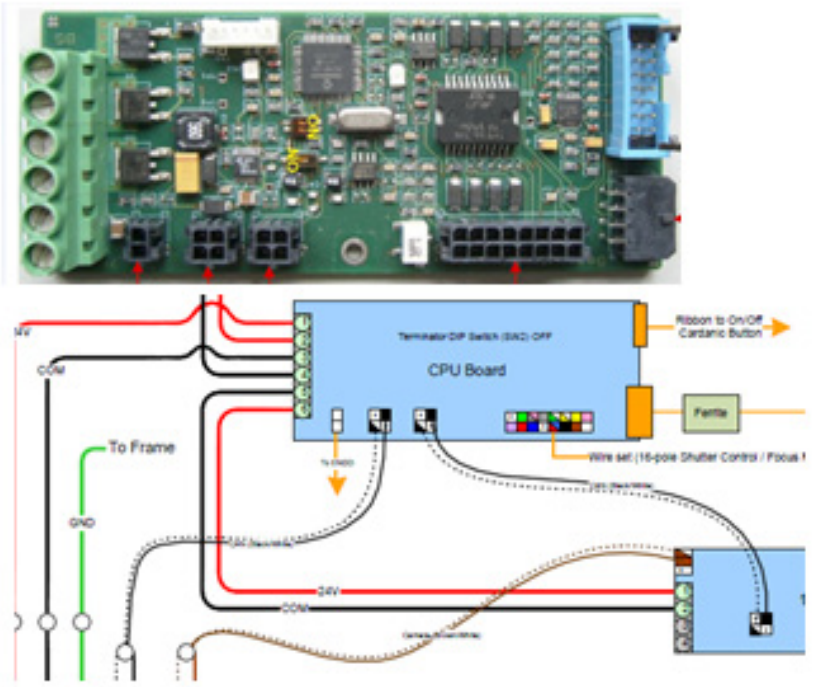
> **CAUTION** There is a risk of injury from spring-loaded joints. If the spring arm is released under tension, it will move quickly and uncontrollably, possibly causing injury or damage to equipment.
>
> 1. Hold onto the spring arm when installing or removing the light head.
> 2. Avoid putting pressure on the spring arm and releasing it suddenly.
> 3. Spring arm should always have the stop set for the spring arm to be parallel with the floor when servicing.

Note: This procedure applies to Classic, Flat, and NFC Cardanic replacement.

1. Remove Light from Spring Arm and place on a working surface.
2. Remove the flat head brake screw (2) and retainer screw (1).

Note: There are 3 flat head screws on the Cardanic to light fixation, two brakes and one retainer all must be removed.

3. Remove light dome using gasket removal tool set to allow access to wire sets.
4. Disconnect input power, can-bus, ribbon cable and camera wire set (if installed).



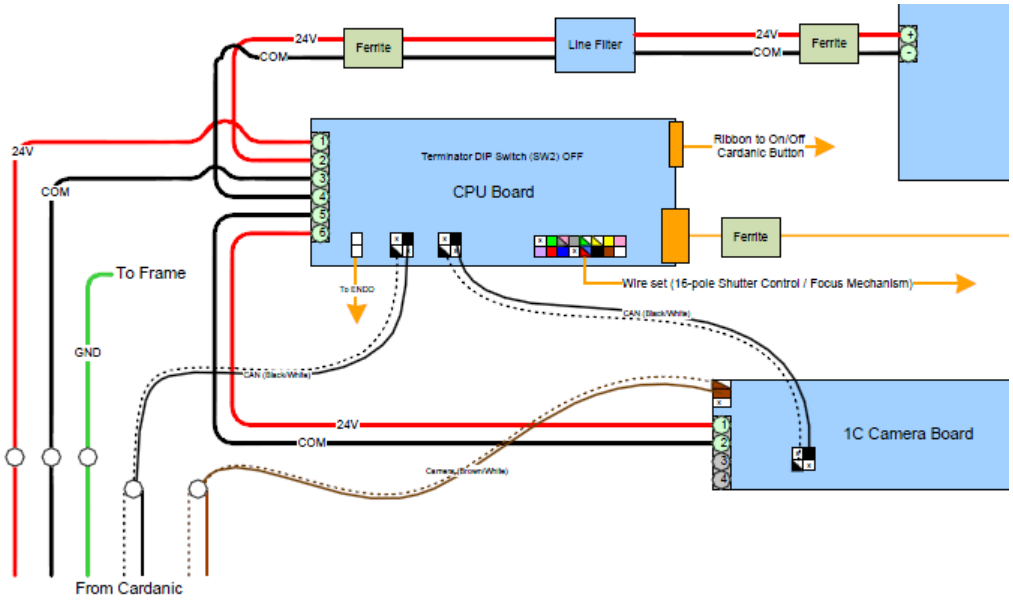
5. Remove the Cardanic from the light body by gently rotating back and forth while pulling cardanic away from light body.

6. When cardanic is off pull wire sets out of the light body ensuring all connectors are protected.

7. With the replacement Cardanic, fish wire sets thru side of the light body, then align the cardanic bow onto the light body journal and install cardanic by gently rotating back and forth while pushing cardanic onto the light body journal.

8. Install brake screws and retainer removed in step 2.

9. Attach wire sets to correct locations as removed.



10. Install dome onto Light Head ensuring gasket is not damaged.

11. Install Light Head on to Spring Arm.

12. Adjust brakes in order to achieve the desired braking action.

13. Complete operational check of Light, Cardanic and Spring Arm.

8.1.2 Cardanic Replacement for EXX8 Light Heads (E LED)

⚠ **CAUTION There is a risk of injury from spring-loaded joints. If the spring arm is released under tension, it will move quickly and uncontrollably, possibly causing injury or damage to equipment.**

1. **Hold onto the spring arm when installing or removing the light head.**
2. **Avoid putting pressure on the spring arm and releasing it suddenly.**
3. **Spring arm should always have the stop set for the spring arm to be parallel with the floor when servicing.**

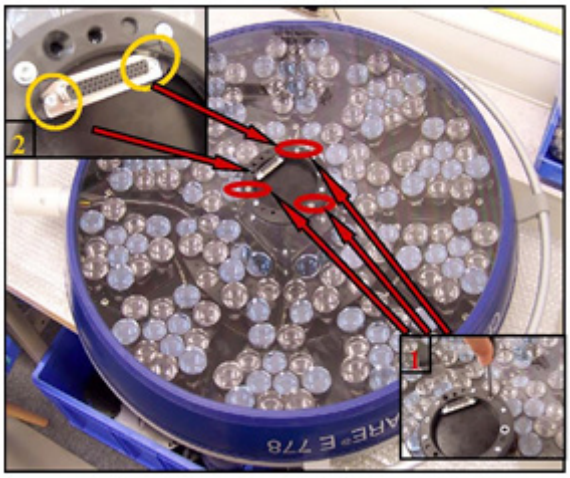
☞ **Note: This procedure applies to Classic, Flat, and NFC Cardanic replacement.**

1. Remove light from spring arm and place on a working surface.

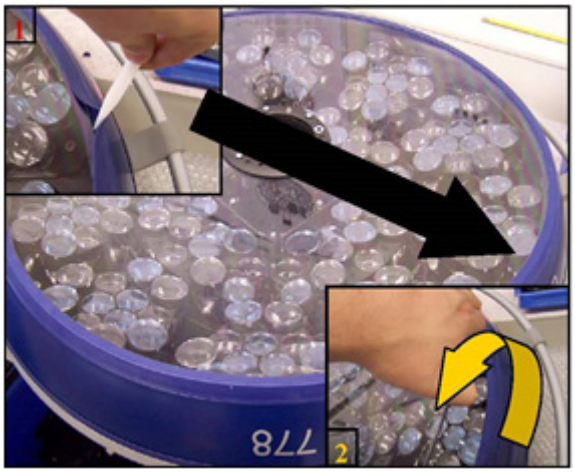
2. Remove the flat head brake screw (2) and retainer screw (1).

☞ **Note: There are 3 flat head screws on the Cardanic to light fixation, two brakes and one retainer all must be removed.**

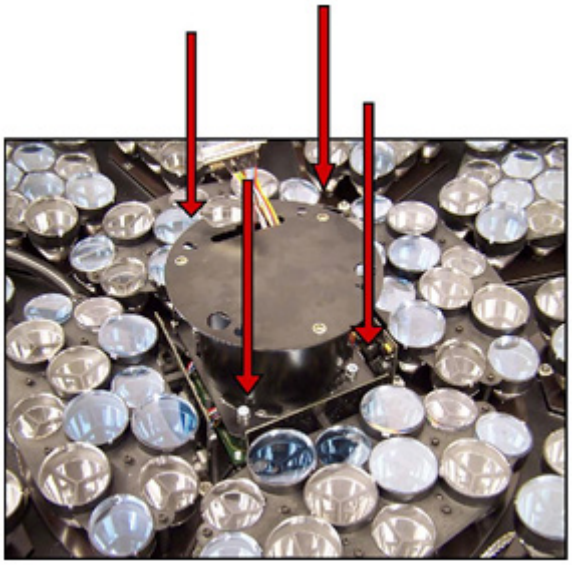
3. Remove screws holding in the focus mechanism plastic ring in place.



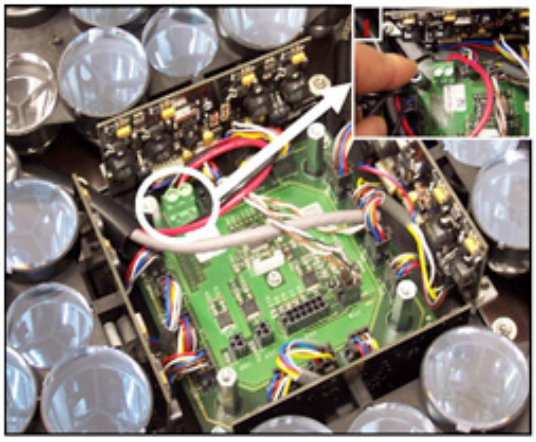
4. Remove LED face glass using gasket removal tool set to allow access to wire sets.



5. Remove the four screws holding the tube in place.



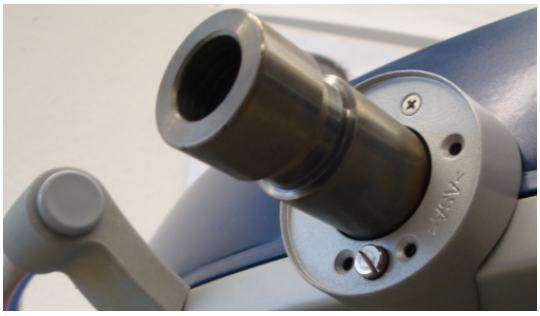
6. Disconnect wiring red and black 24vdc and 4 pin Molex can/camera and ground from inside of cardanic.



7. Remove the Cardanic from the light body by gently rotating back and forth while pulling cardanic away from light body.

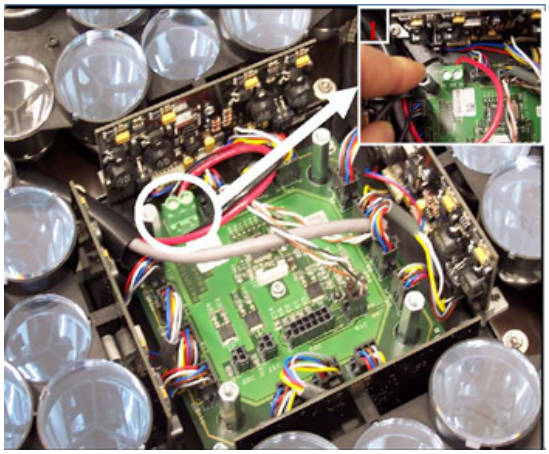
8. When cardanic is off pull wire sets out of the light body ensuring all connectors are protected.

9. With the replacement Cardanic, fish the wires thru side of the light body, then align the cardanic bow onto the light body journal and install cardanic by gently rotating back and forth while pushing cardanic onto the light body journal.



10. Install brake screws and retainer removed in step 2.

11. Attach wire sets to correct locations as removed.



12. Reinstall tube using the four screws removed in earlier step.

13. Install Led face glass using gasket tool.

14. Install plastic ring for focus mechanism.

15. Install light head on to spring arm.

16. Adjust brakes in order to achieve the desired braking action.

17. Complete operational check of light, cardanic and spring arm.

8.1.3 Cardanic Replacement for FXX8 Light Heads (F-Gen)

⚠ **CAUTION There is a risk of injury from spring-loaded joints. If the spring arm is released under tension, it will move quickly and uncontrollably, possibly causing injury or damage to equipment.**

1. **Hold onto the spring arm when installing or removing the light head.**
2. **Avoid putting pressure on the spring arm and releasing it suddenly.**
3. **Spring arm should always have the stop set for the spring arm to be parallel with the floor when servicing.**

☞ **Note: F Generation lights have a newly designed cardanic. To change or replace the cardanic will require the removal and reinstallation of an internal blind single snap ring. This requires a special tool shown below. This tool is only for use by factory trained service technicians.**

8.1.4 F-Generation Cardanic Security Tool:

F-Gen Complete Tool:

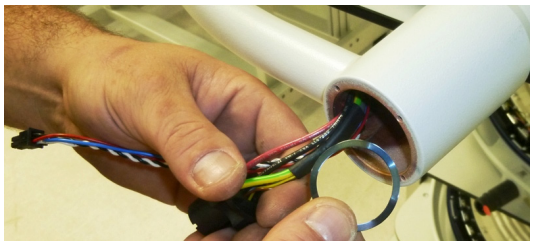
F-Gen Tool with 1-1 on the left and 1-2 on the right:

1. Remove Light from Spring Arm and place on a working Surface.

2. Remove the joint cover and 7-pole rotating connector from the end of the cardanic.

3. Utilizing outer straight tipped slip ring pliers; remove Internal Blind Snap Ring.

4. Remove the two spring washers 83222 from the cardanic.



5. Remove the cardanic from the light head.

Note: Step 6 is only for Variants 83469, 83470, and 83289. Step 7 is for only Variants 83471 and 83472.

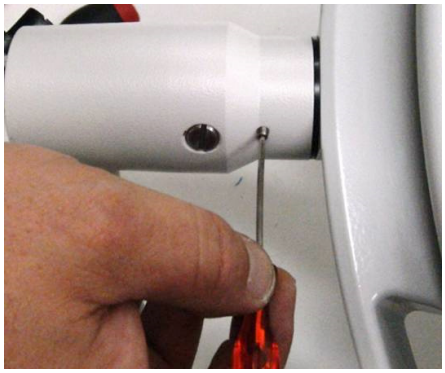
6. Attach the connector 77612 to the cover 83232 with (1) 83253 EJOT PT screw.

7. Screw the 83273 coupling for the light control with the connector 77612 with (1) 83523 screw.

8. Slide cardanic onto the side bearing.

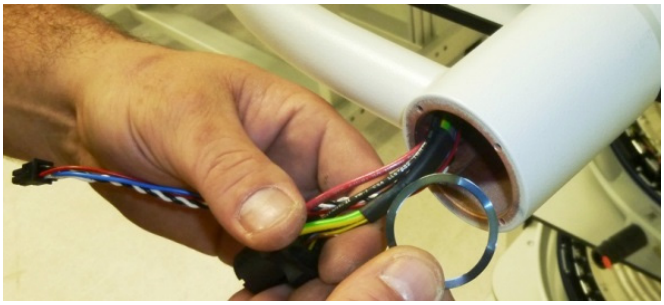
9. Secure the safety screw 83217.

10. Secure the brake screw 83264.



WARNING: The following steps are critical to the security of the cardanic to the Light Head.

11. Place two spring washers 83222 into the back of the interior joint.



12. Place the snap ring 83224 onto the tool "FGEN 1-1".

13. Slide the snap ring up the tool until it nears the end.

14. Slide the tool "FGEN 1-2" up to make contact with the snap ring. Ensure that the snap ring is oriented as shown.

> ⚠ **WARNING: Wiring can be damaged. Be careful when inserting the fixture into the joint.**

15. Align the tool to allowing guiding of the wiring along the slot as shown.

16. Fully seat the tool into the joint. Ensure that the cardanic is seated flush with the side bearing.

17. With the palm of the hand, deliver a moderate blow to the tool to seat the snap ring onto the side bearing.

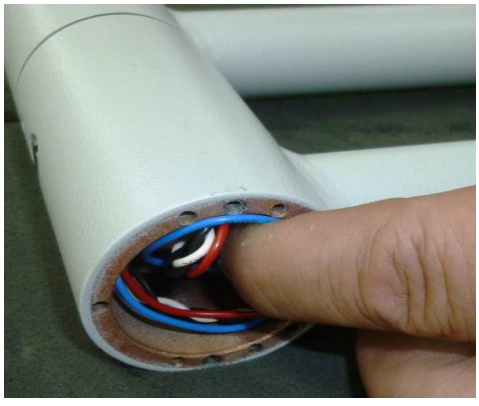
18. Remove the tool from the joint area. It should disengage freely. Visually verify the snap ring is lodged symmetrically.

> ⚠ **WARNING: The snap ring MUST be fully engaged. Failure to ensure it is fully seated may result in the Light falling.**

19. Ensure instructions for proper Variant are being followed.

> ☞ **Note: Skip to Steps 20-21 for Variant 83468(AC Cardanic, Cover Only) and Variant 83289 (NC/NFC Cardanic, Cover Only)**
>
> **Skip to Steps 22-25 for Variants 83468(AC Cardanic, Cover with 7-Pole)**
>
> **Skip to Steps 26-32 for Variant 83469(AC Cardanic Control from Light Head Keypad**
>
> **Skip to Steps 33- for Variant 83471(NC or NFC Cardanic Control from Light Head Keypad)**

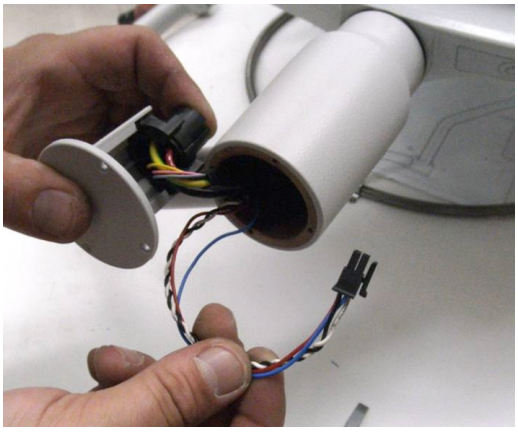
20. Tuck the cables into the cardanic joint area.



21. Attach the cover 83467 to the middle joint and secure with the two screws 223.

Note: Steps 22-25 for Variants 83468(AC Cardanic, Cover with 7-Pole).

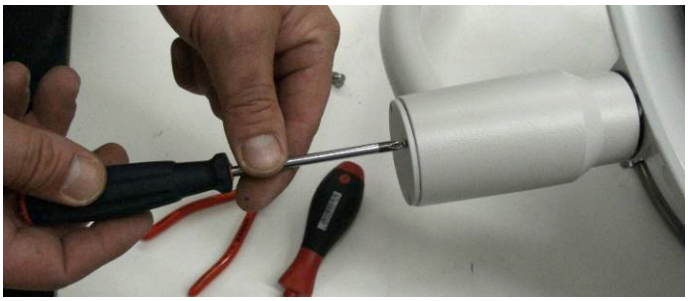
22. Tuck the connector cable back into the cardanic joint area.



23. Ensure that the 7-pole rotating connector is aligned so that it mates with the plug.

24. Insert the plug and seat into the connector.

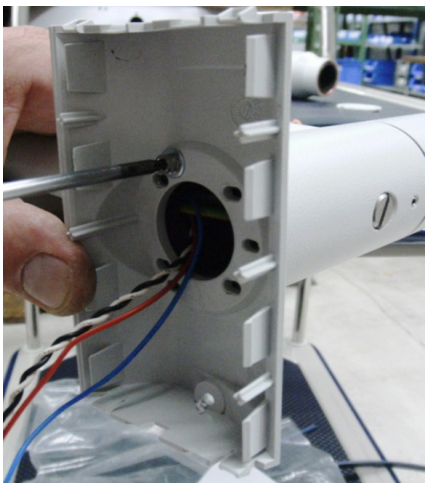
25. Secure the connector cap with (4) 64662 screws.



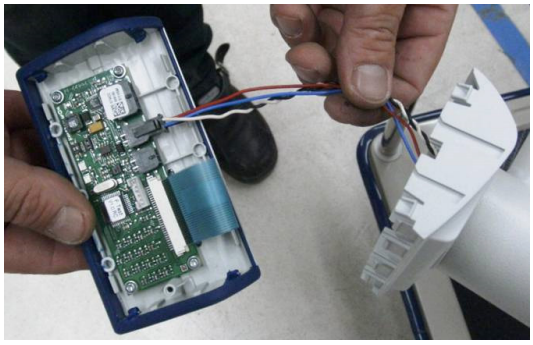
Note: Steps 22-25 for Variants 83468(AC Cardanic, Cover with 7-Pole).

26. Put wiring through the housing.

27. Secure the housing with (3) 87200 screws, (3) 378 washers, and (3) 1229 washers.

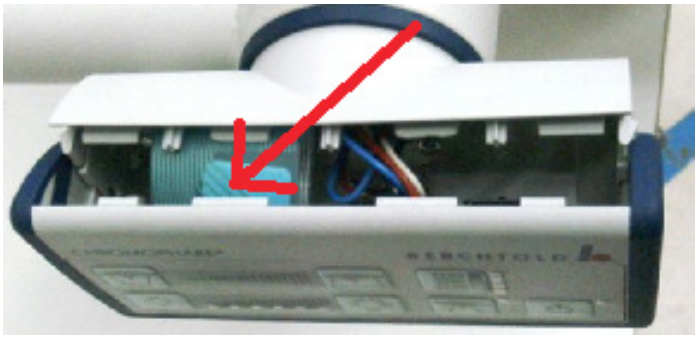


28. Plug in the programmed light control set.



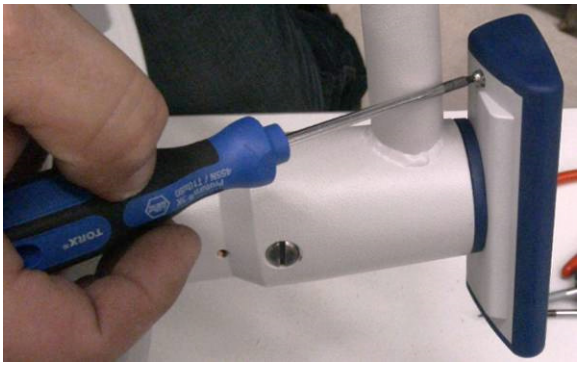
29. Tuck the wiring for the control pad into the cardanic.

30. Ensure the blue ribbon cable is not caught during the connection.



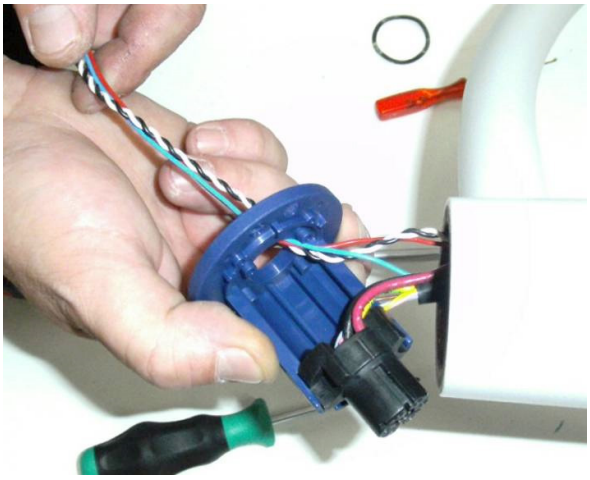
31. Secure the front cover to the housing.

32. Secure (1) 67589 screw into the rear of the assembly.



Note: Steps 22-25 for Variants 83468(AC Cardanic, Cover with 7-Pole).

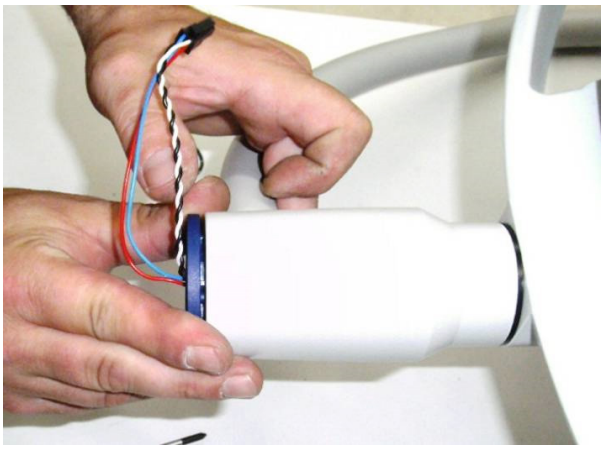
33. Pull the cable through the coupling 83273 as shown.



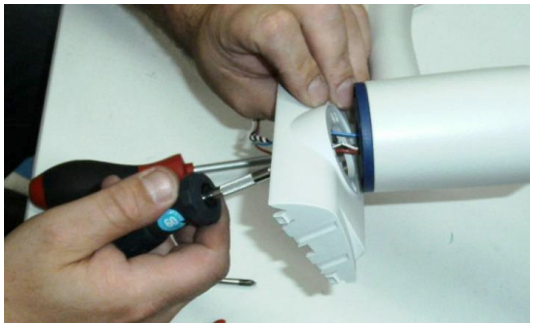
34. Ensure that the 7-pole rotating connector is aligned so that it mates with the plug.

35. Insert the plug and seat into the connector.

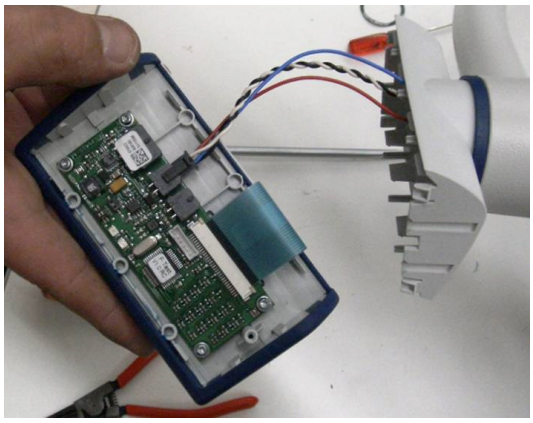
36. Secure the coupling with (4) 64662 screws.



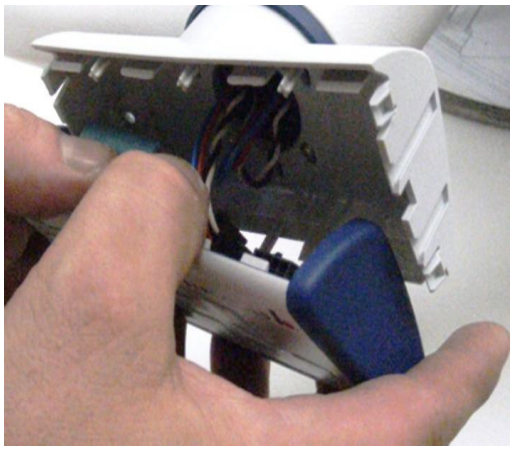
37. Screw the housing 83287 into the cardanic coupling using (4) 84486 screws.



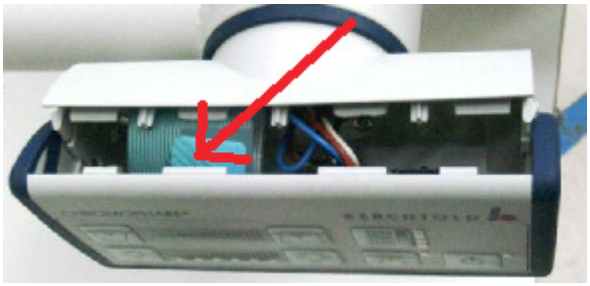
38. Plug in the programmed light control set.



39. Tuck the wiring for the control pad into the cardanic.

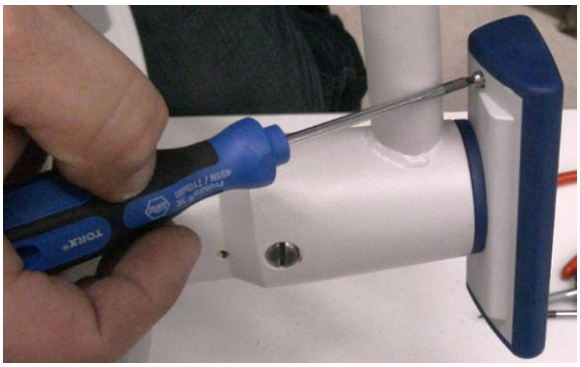


40. Ensure the blue ribbon cable is not caught during the connection.



41. Secure the front cover to the housing.

42. Secure (1) 67589 screw into the rear of the assembly.



9. Light Head Maintenance

9.1 Light Handles / Focus Mechanism

Chromophare E 558, E 668, E 778, F 528, F 628 Light Handle Assembly (LED)

1. Handle

2. Sleeve

Chromophare E 655, E 805 Light Handle / Focus Mechanism Assembly (HID)

1. Handle

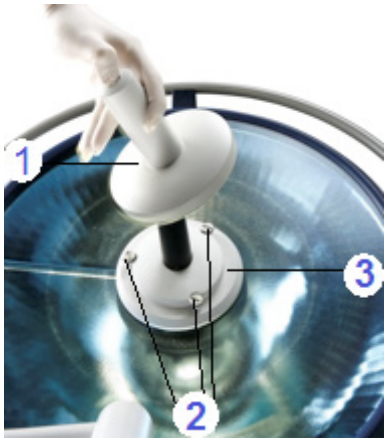
2. Sleeve

Chromophare E 550, E 650 Light Handle / Focus Mechanism Assembly (Halogen)

1. Handle

2. Sleeve

9.1.1 Light Handle Replacement



Note: For HID and Halogen lights, the handle has glass bulbs on the distal end. Use caution not to damage bulbs during removal and installation

1. Position the light head so that the face glass is facing upwards.
2. If present, remove the sterilizable handle from the handle (1).
3. Loosen the three thumbscrews located at the base of the Handle (2).
4. Pull the Handle assembly directly away from the Light Head to remove (3).

Note: For HID and Halogen lights, the handle has glass bulbs on the distal end. Use caution not to damage bulbs during removal and installation.

5. To install, center the Handle (3) on Light Head and line up thumbscrew locations. Ensure the D-sub connector is also aligned.
6. Install Light Handle (3) and tighten thumbscrews (2).
7. Check the light for proper operation.

9.2 F 528/628 (F-Gen) Light Head Maintenance

Note: With the exception of the light handle assembly, all repairs to the F-generation light heads must be performed at the factory repair facility. Contact Technical Support to arrange a loaner or replacement light head.

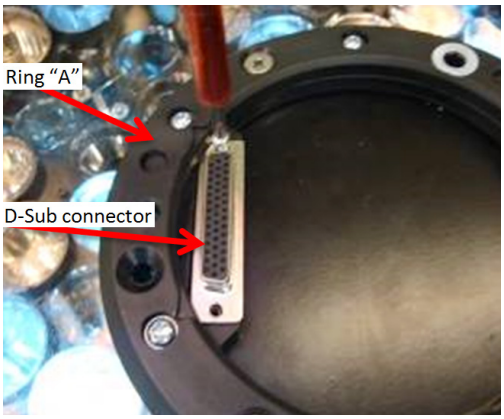
9.3 E558/668/778 (E LED) Light Head Maintenance

9.3.1 Accessing the light head internals

1. Remove the light head from the spring arm per section 7.9 and place it on a clean dry surface with the glass facing up.

2. Remove focus handle assembly and place in safe place.

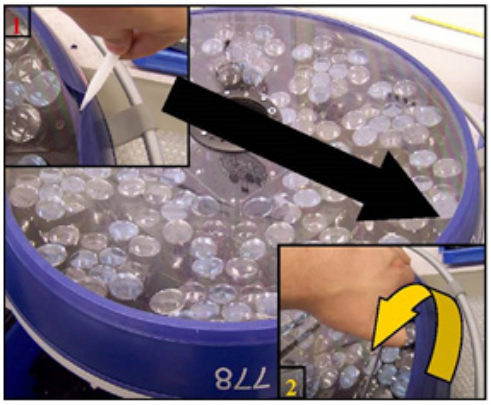
3. Remove the 2 Screws for D-Sub connector and remove from outer black ring (Ring A).



Ring "A" and Light Handle (D-Sub) Connector

4. Loosen and remove the 6 screws and remove ring A.

5. Release glass from gasket using gasket removal tool.



6. Carefully set the glass aside.

7. Refer to the appropriate section below for the corresponding internal component(s) needing service:

Section	Component /Procedure
9.3.2	Lower Glass Replacement
9.3.3	Frame, Frame seal and/or glass seal
9.3.4	Distribution Board
9.3.5	LED Module(s)

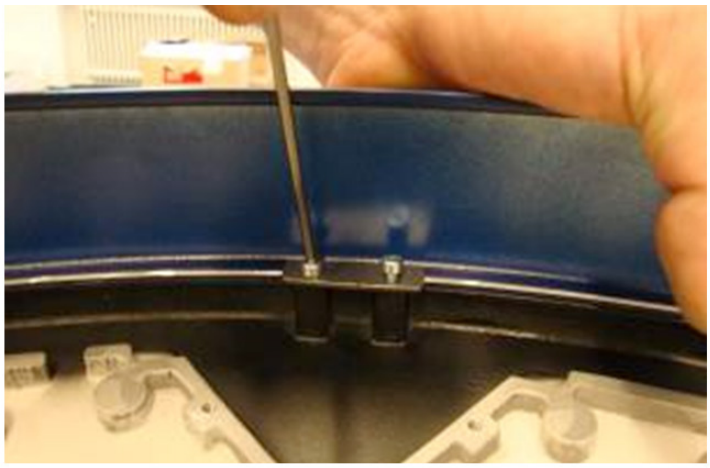
9.3.2 Lower Glass Replacement

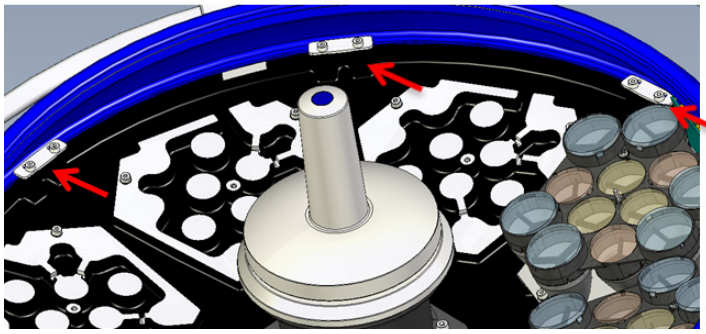
1. Remove protective film from new outer glass.

2. Proceed to section 9.3.6 to reassemble the light head.

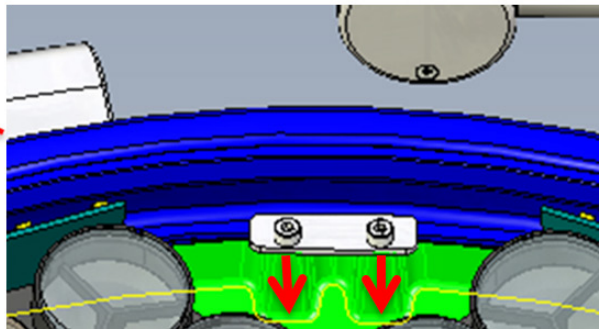
9.3.3 Frame/Frame Seal/Glass Seal Replacement

1. Loosen but do not remove the retaining screws on fixing plates and slide them toward the center of the light head for removal of the frame and seal gasket.



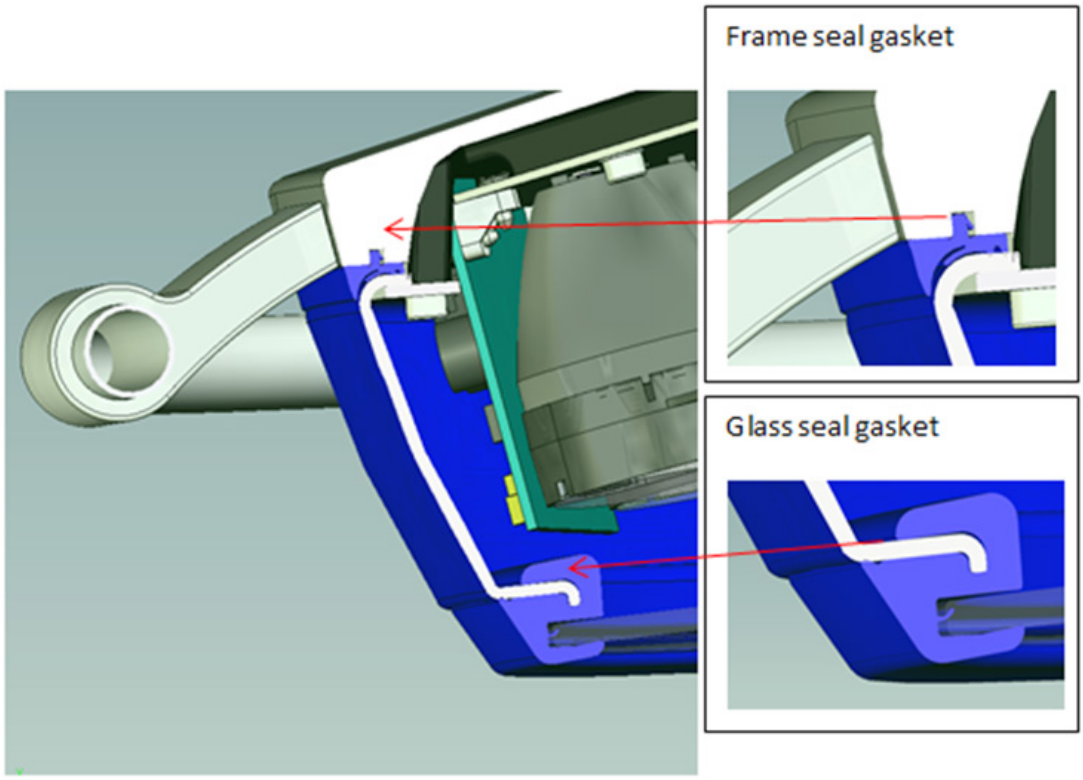


Fixing plates



Slide the plates towards the center to allow removal of the frame and seal gasket

2. Carefully remove damaged frame or gaskets being replaced



3. Install frame to dome gasket onto frame.

4. Ensure profile is fully engaged then place frame onto dome center.

5. Place fixing plates onto side of frame in a crisscross pattern. Tighten each one only slightly (Do not tighten fully on this step).

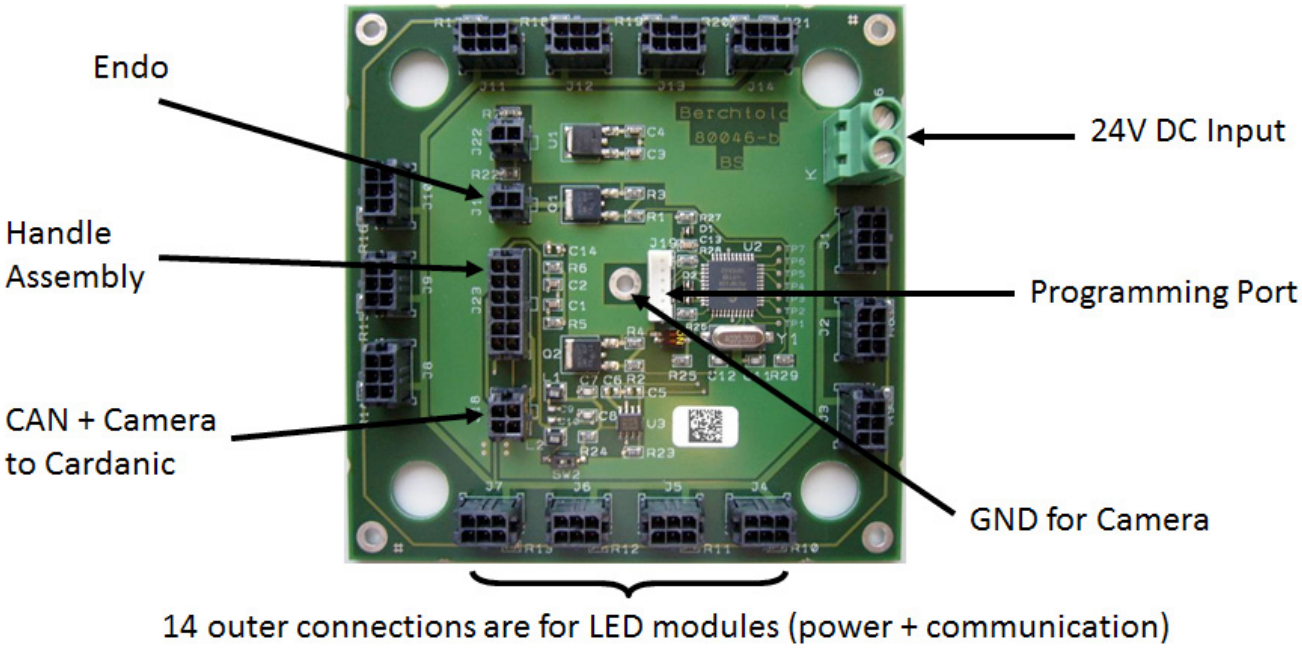
6. Once frame is centered tighten all screws in a crisscross pattern until lower gasket is secure.

7. Install frame to glass gasket onto frame ensuring gasket is fully engaged onto frame.

8. Proceed to section 9.3.6 to reassemble the light head.

9.3.4 Distribution Board

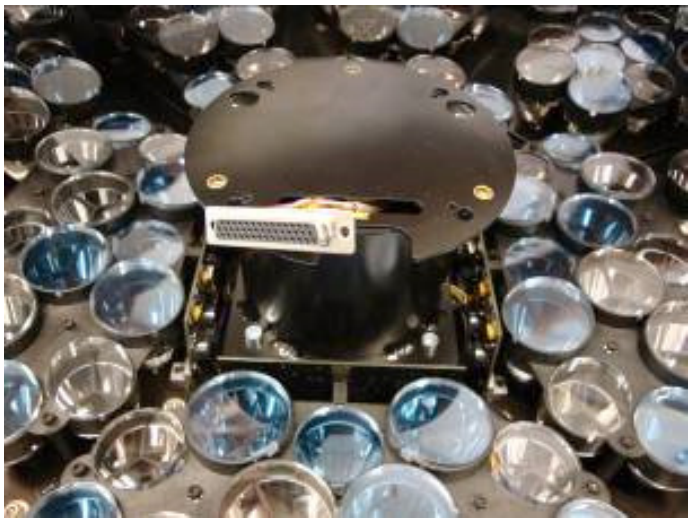
The distribution board sends power to the LEDs and directs the Can-bus communications to and from each module location.



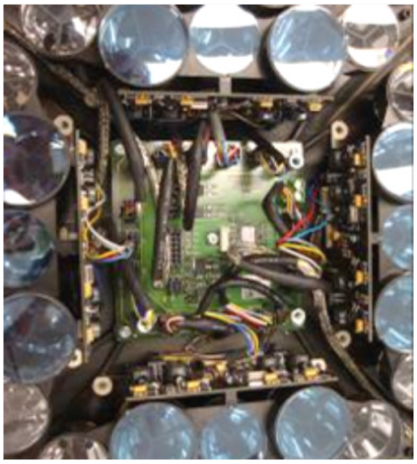
Distribution board showing connection points

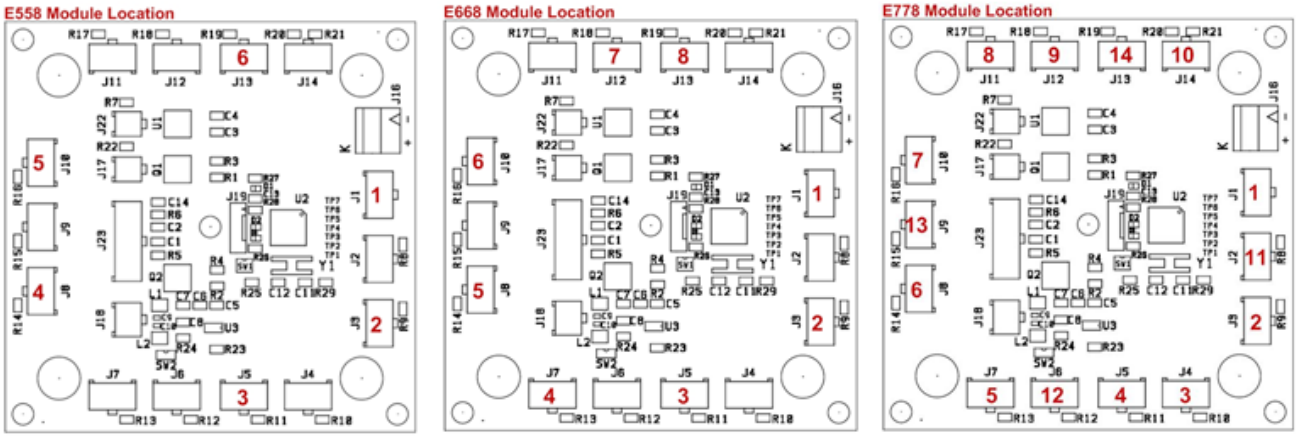
1. To access the distribution board, remove the 4 screws holding the center housing in place.

2. Lift the center housing and the D-Sub connector up and disconnect the D sub connector from the distribution board.



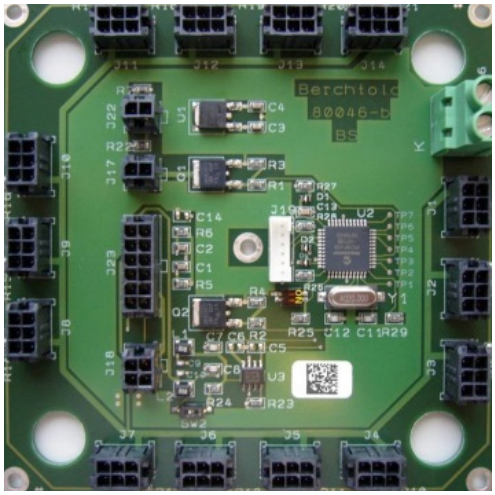
3. Note and record the position of all the wiring on the distribution board. Remove all remaining connectors.





Module wiring locations on distribution board

4. Remove the 5 screws (4 corners and 1 in the center) holding the distribution board in place and lift the distribution board out of the light head.



5. Place the new board with the same orientation and secure with the 5 screws removed in step 4 above.

Note: Grounding screw.

6. Replace all of the connectors removed in step 3. Ensure all connections are firmly seated.

7. While holding the center housing assembly above the distribution board, replace the D-Sub connectors removed in step 2. Ensure all connections are firmly seated.

8. Secure the center housing assembly with the 4 screws removed in step 1.

9. Refer to section 9.3.6 to reassemble the light head.

9.3.5 LED Module replacement

Failure of individual LEDs does not necessarily require module replacement. Measurements utilizing lux calibrating cameras have shown that multiple single LEDs can fail within one or more modules with no noticeable effect on the light field.

E 778 - Up to 5 single LEDs may fail; either 5 in one module or one in 5 different modules (or any combination) per the truth table below. When the 6th single LED fails, modules must be replaced until the truth table is satisfied.

E558/E668 - Up to 2 single LEDs may fail; either 2 in one module or 1 in 2 different modules. When the 3rd single LED fails, modules must be replaced to satisfy the truth table (below).

CHROMOPHARE® E 778

Module / LEDs	1	2	3	4	5	6	7
1	O	O	O	O	O	X	X
2	O	O	X	X	X	X	X
3	O	X	X	X	X	X	X
4	O	X	X	X	X	X	X
5	O	X	X	X	X	X	X
6	X	X	X	X	X	X	X
7	X	X	X	X	X	X	X

CHROMOPHARE® E 668/558

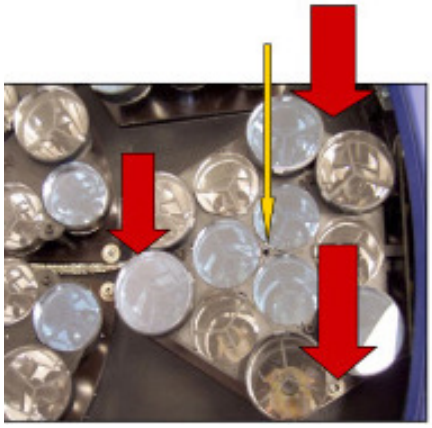
Module / LEDs	1	2	3	4
1	O	O	X	X
2	O	X	X	X
3	X	X	X	X
4	X	X	X	X

GREEN Light field not affected. No module replacement required.
YELLOW Light field minimally affected. Module replacement required.
RED Light field adversely affected. Module replacement required.

> ⚠ **CAUTION: If the LED Modules are replaced incorrectly by an unqualified technician, significant damage may result to the Light Head.**

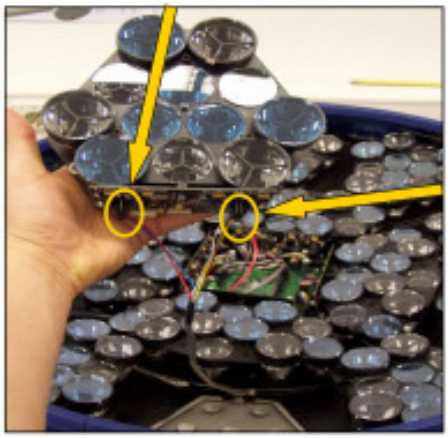
> ⚠ **WARNING: Secure power to the lighting system prior to completing the steps below.**

1. Remove bad module by removing the three perimeter screws and loosening the center post screw.

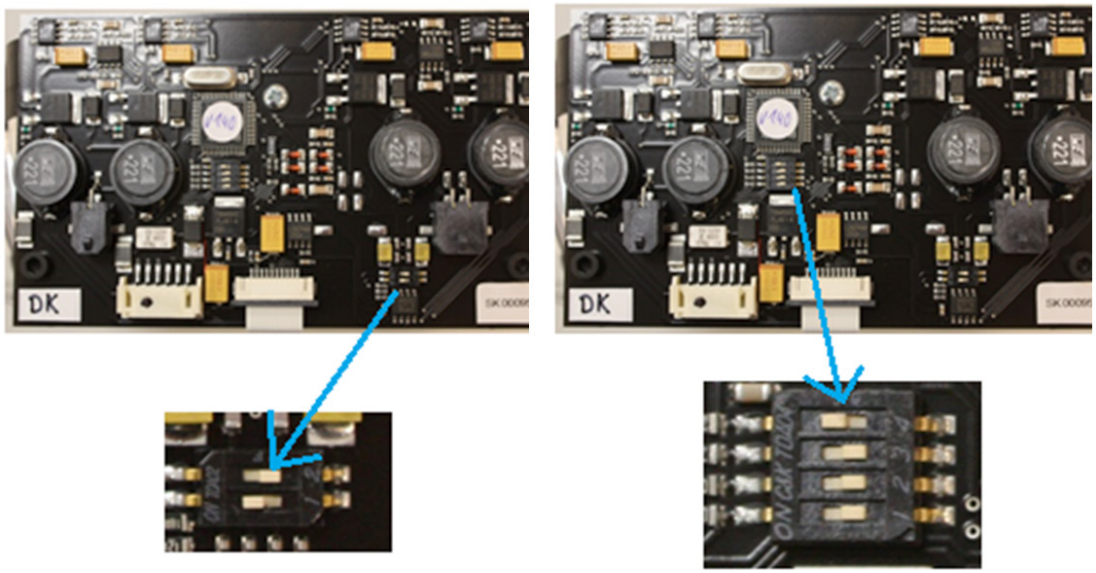


Module Fastener locations

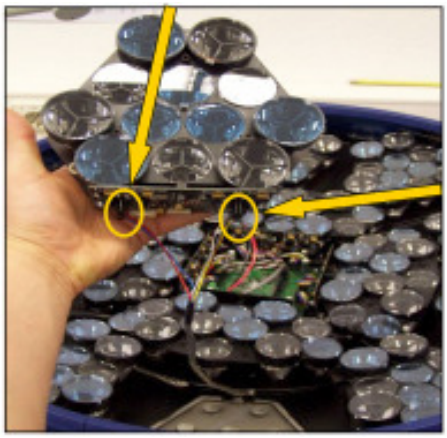
2. Pull out the LED module and disconnect the two plugs on the LED control boards.



3. On the new module set the 6 DIP switch settings to match the module being removed.

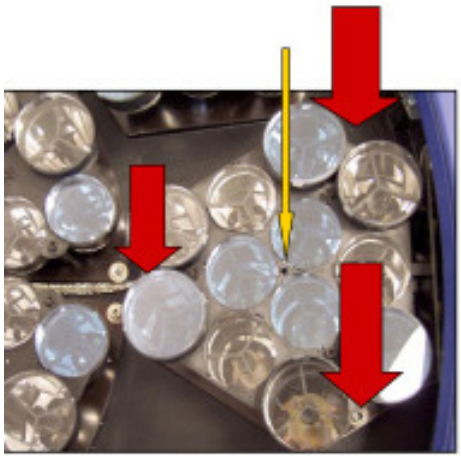


4. Connect the 2 plugs to the new module as before.



5. Place the new module routing the wiring underneath using the same path as previously used.

6. Install the perimeter screws and the center post screw.



7. Proceed to section 9.3.6 to reassemble the light head.

9.3.6 Light Head Reassembly (Refer to 9.3.1 for Illustrations)

1. Inspect the inside of the light head to insure there is not debris. If necessary, clean the LED modules with a clean, lint-free cloth.

2. Inspect the lower glass for cleanliness. If necessary clean glass with a lint-free cloth prior to installation.

3. Place glass on the outside of the gasket, using gasket tool gently work the glass into the gasket without damaging gasket.

4. Reinstall ring A using 6 the screws removed do not tighten in this step, firmly push down on the face glass when re-attaching the screws.

5. Reinstall the D-Sub connector into ring A using the 2 screws removed insure sub D connector is aligned to the hood access hole.

6. Tighten all screws on Ring A and install focus handle.

7. Clean face glass prior to installing light.

8. Reinstall the light head onto the spring arm per section 7.9.

9. Restore power to the system. Insure all modules illuminate and that all controls operate properly.

9.4 E550/650 (Halogen) and E655/805 (HID) Light Head Maintenance

HID Technology – E805/E655
HID Primary bulb
BRITe Halogen Backup bulb

BRITe Technology – E650/E550
BRITe Halogen Primary bulb
BRITe Halogen Backup bulb

9.4.1 Dome Removal and Replacement Exx0/Exx5

1. Secure power at circuit breaker prior to proceeding.

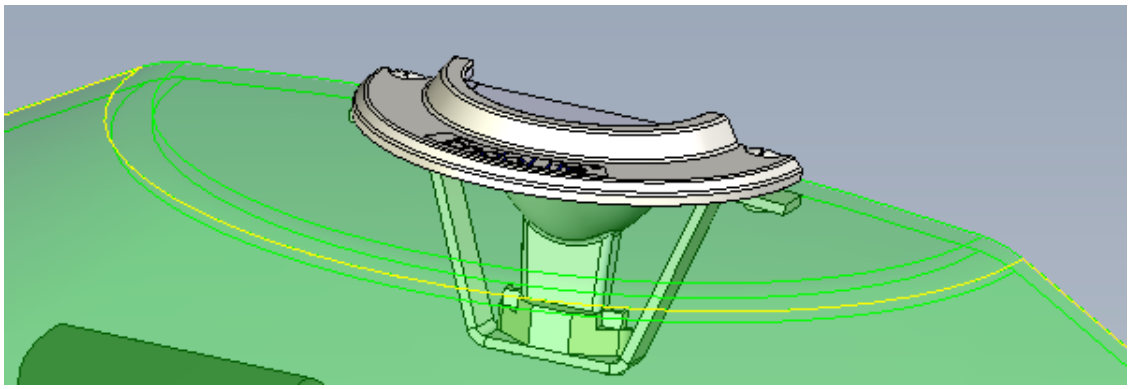
2. Using gasket removal tool gently insert flat side of tool under gasket and pry the dome up far enough to get the tool under the dome. Gently rotate the light frame while moving the tool until the dome is able to be extracted from the gasket.

3. If EndoLite option is installed (see section 9.4.2), disconnect the EndoLite socket wiring from the CPU board connector J8.

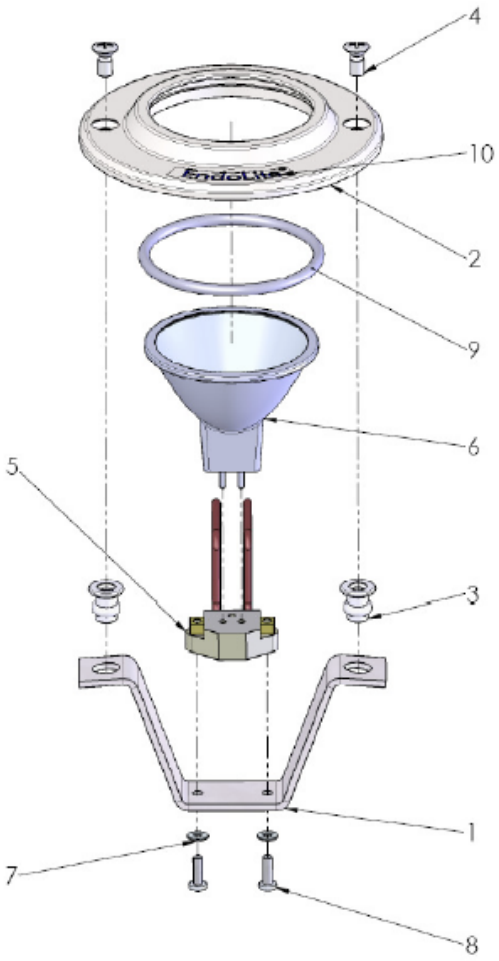
4. Remove the dome assembly. If gasket is to be replaced, remove the old gasket now.

5. To install the dome:
   (a) Fit new gasket onto edge of frame (if needed), making sure the gasket is not stretched. To keep the gasket from stretching, push back on the gasket every 3-4 inches until the complete unit is installed.
   (b) If present, connect the EndoLite wiring back to CPU connector J8.
   (c) Place the dome on top of the light and fit into gasket on one side of the light.
   (d) Place pressure on the side of the dome pulling toward the portion that is in the gasket.
   (e) Slide the gasket tool under the side of the gasket and work around until gasket is sealed on the entire dome.

9.4.2 EndoLite



The EndoLite is an optional 20 watt halogen light mounted to the center of the dome on E HID and Halogen series lights.



Parts List	
1	64696 – Endo Bracke
2	64698 – Endo Cover Ring
3	66437 – Pivot for Endo Dome (Rivnut)
4	232 – M4 x 0.7 x 8 screw
5	64771 – Endo Socket
6	59833 – Endo Bulb 12V/20W
7	33 - Washer
8	39409 – M2.5 x 45 screw
9	62408 – Silicone Gasket
10	EndoLite label

1. The replace the bulb:
   a) Remove the two fasteners (4), the cover ring (2) and the gasket (9).
   b) Pull gently up on the bulb (6) to dislodge.
   c) Install new bulb into socket (5).
   d) Install the two fasteners (4), the cover ring (2) and the gasket (9).

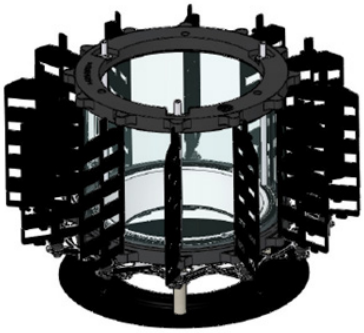
2. To replace the socket assembly:
   a) Remove the dome per section 9.4.1.
   b) Remove the two screws (8) and washers (7) from the Endo bracket (1). Remove the socket assembly (5).
   c) Attach the new socket assembly with the same washers and screws.
   d) Reinstall the dome per section 9.4.1.

9.4.3 Lower Glass Assembly

The lower glass assembly and the associated gasket are not field replaceable parts. Contact Technical Support for a replacement light head.

9.4.4 Replacing the Filter Glass Assembly

FILTER GLASS ASSEMBLY E655/805 E550/650



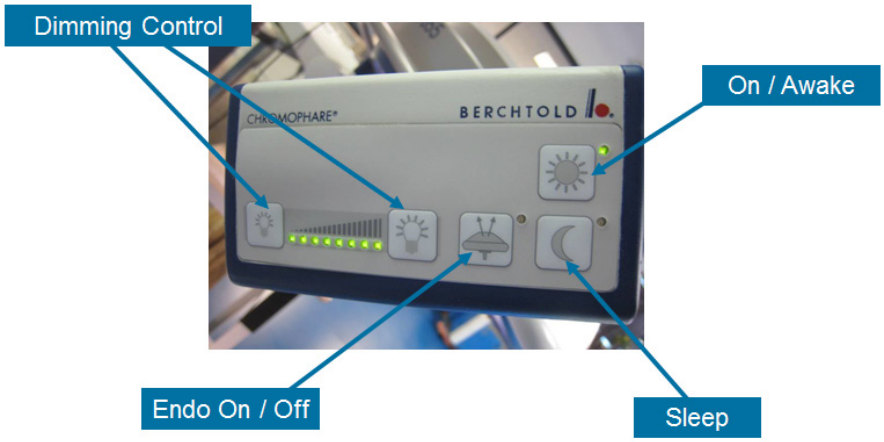
Shutters Open

Shutters Closed

Filter Glass w/ Heat Plate

Note: For E655 and E805, the shutters must be fully closed for the following steps. (E650 is a halogen light and has no shutters).

1. On the wall control, place the light into the sleep mode to ensure shutters are closed (E655/805).



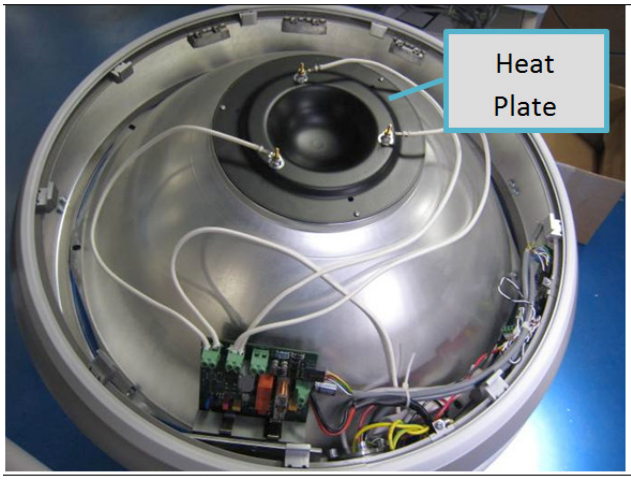
2. Secure power at circuit breaker.

3. Remove the light head from the spring arm per section 7.9 and place it on a clean dry surface with the glass facing up.

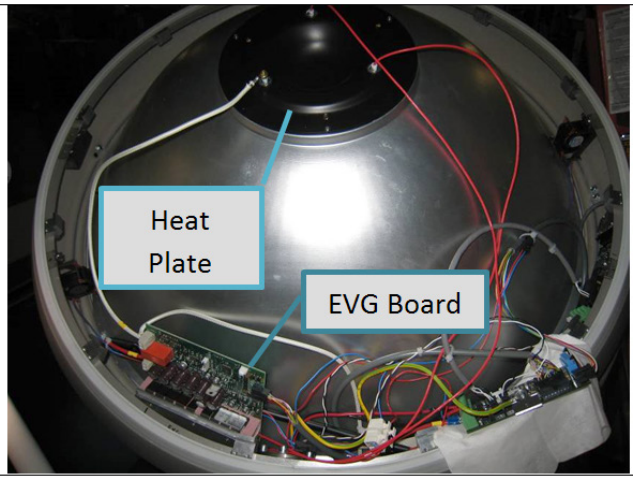
4. Remove focus handle assembly per section 9.1.1.

5. Remove the dome per section 9.4.1.

6. For E550/650, mark and remove the 3 wires from the top of the heat plate.

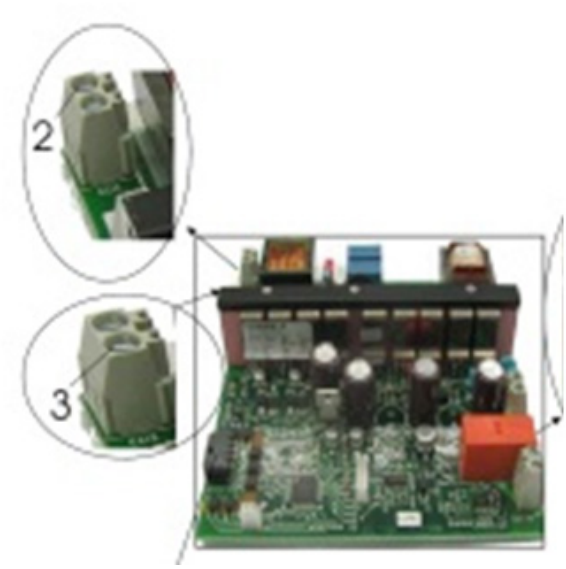


E 550/650 Arrangement

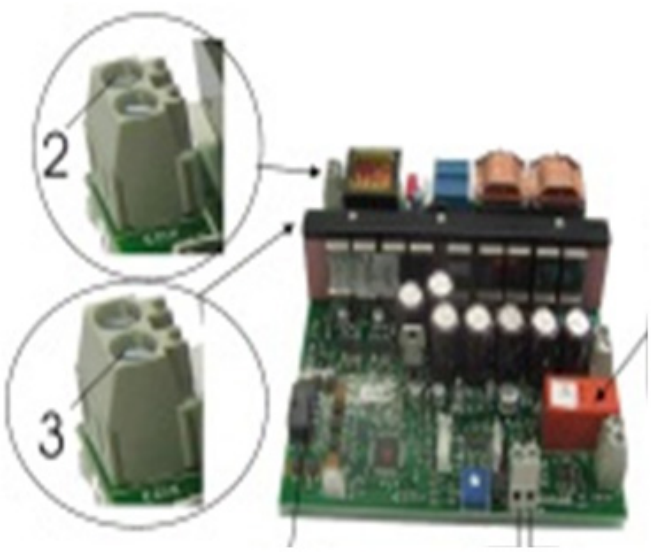


E655/805 Arrangement

7. For E655/805, mark and remove the white wire from the top of the heat plate. The 2 red wires must be disconnected at terminals 2 and 3 on the EVG board.



EVG E655



EVG E805

8. Remove heat plate screws and carefully remove heat plate to access the filter glass assembly.

9. Pull filter glass assembly up about 1 inch to expose the 6 pin wiring harness for the shutter motor.

10. Disconnect this connector and remove the filter glass from the reflector assembly. Match mark the reflector assembly to indicate the position of the shutter motor assembly.

11. Inspect new filter glass damage and cleanliness ensure all shutters are straight and free for operation, this can best be done by disconnecting the shutter motor resistor by removing the 2 screws holding it to the assembly and manually exercising the shutters. Once testing is complete reinstall shutter motor assembly onto filter glass assembly.

12. Insert the filter glass assembly into the light, matching the position of the shutter motor with the match mark on the reflector. Connect the 6 pin quick connector for the shutter motor assembly on the way in.

13. Reinstall heat plate carefully insert screws and tighten.

14. Connect wires removed in steps 6 and 7 above.

15. With dome still removed, install light onto spring arm per section 7.9.

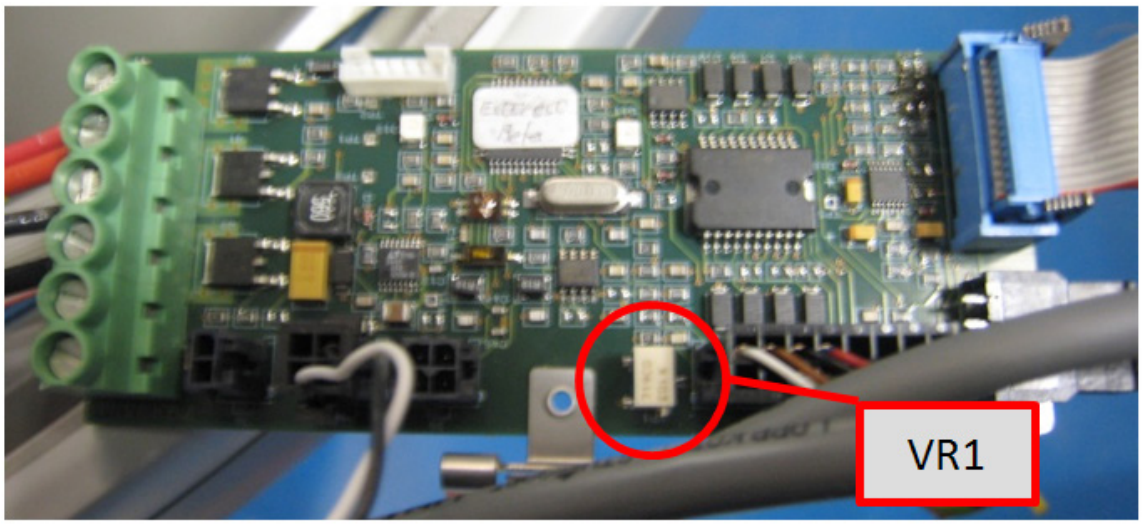
16. Install the focus handle per section 9.1.1.

17. Restore power to the system. Turn light on from wall control and check to ensure HID bulb is on. Allow 2 minutes for bulb to come to power.

18. On wall control take the light out of the sleep mode if it is still in that mode.

19. Verify shutter travel from fully closed to full open (~87 degrees).

Note: If shutters are not traveling fully adjustment is required. Adjust by turning potentiometer VR1 on the CPU. Adjust in one turn increments - clockwise for open (counter clockwise for close). After each adjustment, activate the shutter 10-15 degrees and return to closing point. This may have to be done multiple times before the shutter is adjusted.



20. Secure power to the system.

21. Install the dome per section 9.4.1.

22. Reinstall the light head onto the spring arm per section 7.9.

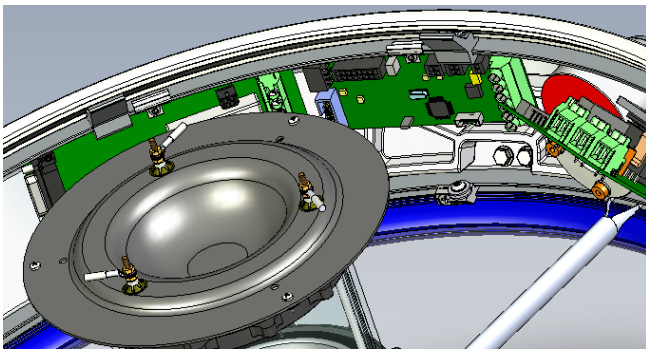
23. Restore power to the system. Insure the light illuminates and that all controls operate.

9.4.5 Circuit Boards

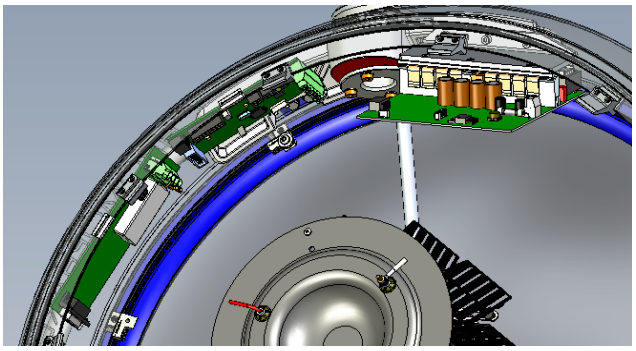
1. Secure power to the system at the circuit breaker prior to proceeding.

2. To gain access to the circuit boards, remove the dome per section 9.4.1.

3. The boards are clipped to the inside of the light frame. These illustrations show the location of the boards for the HID and Halogen lights.



E650/550 Boards mounted in frame Dimmer, CPU and Camera board



E655/805 Boards mounted in frame EVG, CPU and Camera board

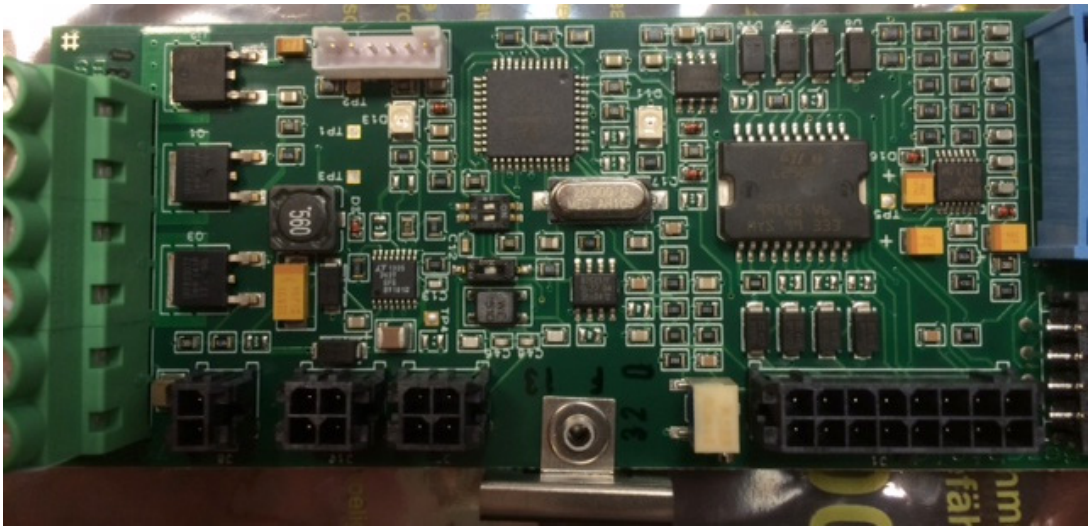
9.4.6 Cuircuit Board Replacement

The following briefly describes each of these boards and how to replace them.

9.4.6.1 CPU Board

The CPU board controls the shutters for HID lights and the dimming control board for Halogen lights. It also provides for voltage adjustment and has dip switches for addressing and Can-bus termination.

a. To replace, locate the CPU board.



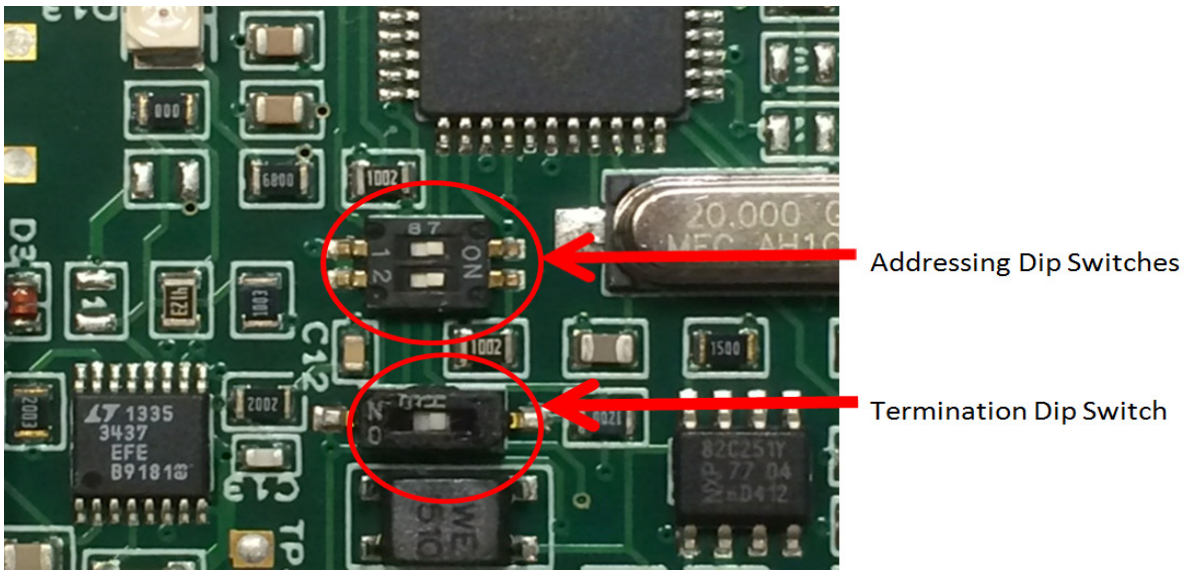
CPU Board

b. The CPU boards are the same for all the HID and Halogen lights but each type has a different program installed. Make sure to use the correct part number per the table below or the light will not work.

Part Number	Light model(s)
79946	E 805
79947	E 655
79948	E 550/650

Note: The wiring arrangement. Label and remove the connectors from the board.

c. Unclip the board from the frame.
d. Each CPU is assigned a unique address based on the configuration of the light in the room. This is done with a series of dip switches in the center of the CPU board.
e. Ensure the dip switches for the new board match those for the board being replaced.



f. Each board also has an end line terminator which is a single dip switch must be put in the on position unless there is a camera board internal to the light head. When there is a camera board, it will serve as the end line terminator.
g. Position the new board and connect the wires removed in step c above.
h. Clip the new board to the frame as before.

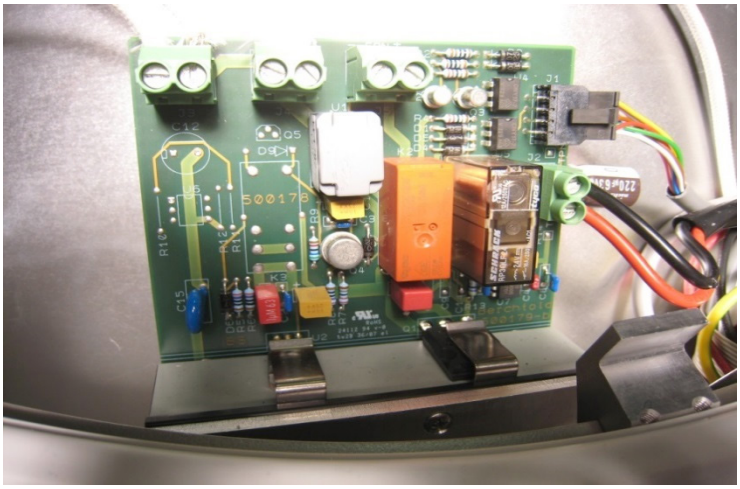
9.4.6.2 Camera Board (only with in-light option)

Camera board (pn 77481)

The camera board routes power and Can-bus communication signals to the in-light camera (if installed). To replace:

a. Locate the camera board.
b. Note the wiring arrangement. Label and remove the connectors from the board.
c. Unclip the board from the frame.
d. Position the new board and connect the wires removed in step c above.
e. Clip the new board to the frame as before.

9.4.6.3 Dimming Control Board (E550/650)

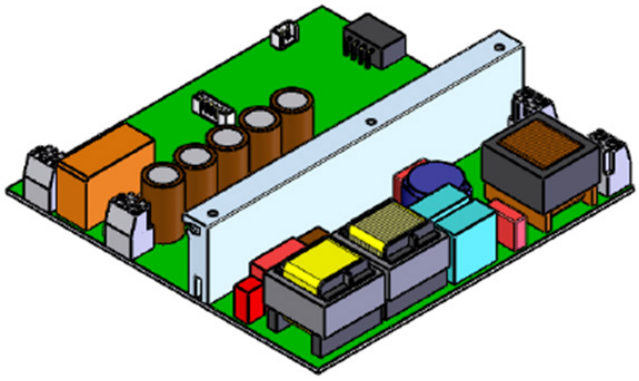


Dimming control board (pn 500179)

The dimming control board adjusts and maintains the output to the two halogen bulbs (primary and backup). It is controlled by the CPU board. The board is attached to the frame of the light with fasteners to allow for heat dissipation. To replace:

a. Locate the dimming control board.
b. Note the wiring arrangement. Label and remove the connectors from the board.
c. Remove the fasteners and dismount the board from the frame.
d. Position the new board and connect the wires removed in step b above.
e. Mount the new board to the frame as before.

9.4.6.4 EVG Board (E655/805)



E805 - 150 Watt EVG board (pn 77867)

E655 – 70 Watt EVG board (pn 77868)

The EVG board provides power to the HID (primary) and Halogen (backup) bulbs. It also provides a high voltage surge to ignite the gas in the HID bulb for starting. The board is attached to the frame of the light with fasteners to allow for heat dissipation. To replace:

a. Locate the EVG board.
b. Note the wiring arrangement. Label and remove the connectors from the board.
c. Remove the fasteners and dismount the board from the frame.
d. Position the new board and connect the wires removed in step c above.
e. Mount the new board to the frame as before.

4. After boards have been replaced, install the dome per section 9.4.1.

5. Reinstall the light head onto the spring arm per section 7.9.

6. Restore power to the system. Insure the light illuminates and that all controls operate.

9.5 Light Head Dome Cover Replacement for F528/F628

Note: Use P/N 83282 for F528

Use P/N 83283 for F628

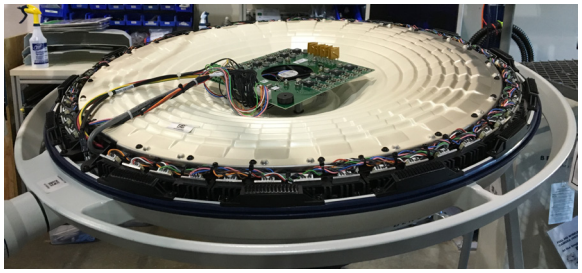
CAUTION: To prevent damage to the equipment, make sure that you are properly grounded.

1. Put the light head in a flat position, either on a protected surface or mounted on a suspension.

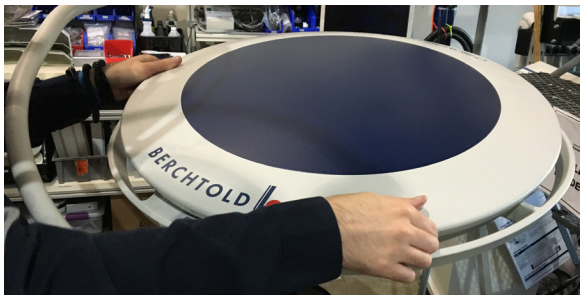
2. Put your thumbs on either side of the light by the cardanic arm connection and press upward to lift the cover.

3. If the cover does not come off, put a plastic wedge pick tool between the light head and cover and lift up.

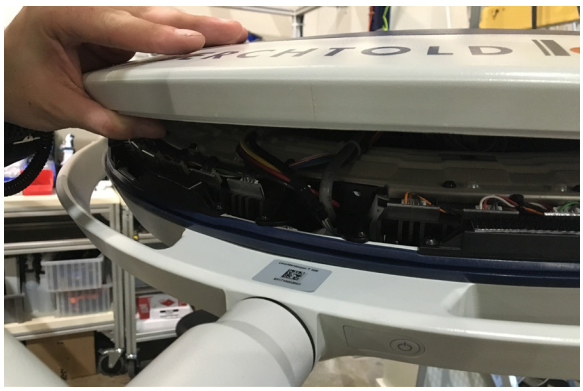
4. Remove the cover from the light head.



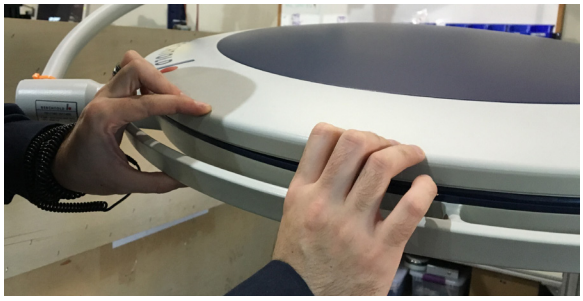
5. Get the replacement light cover.
6. Put the new cover on the light. Make sure the Berchtold logo faces the cardanic arm.



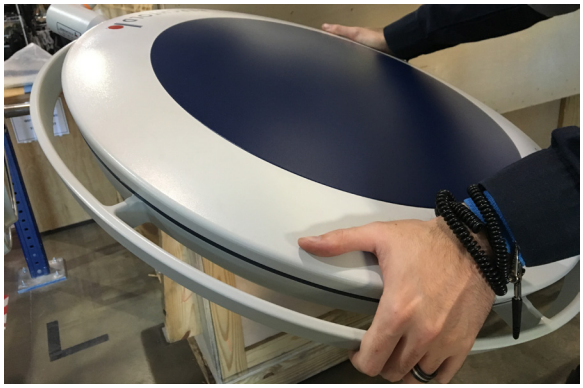
7. Make sure that the seam lines up with the cardanic arm and that the cover goes over the top of all hook and loop tape mounts. Make sure that the hook and loop tape makes a firm connection.



8. Starting at the cardanic arm, gently press the cover onto the light head and continue working around the whole light head.



9. Once the hook and loop tape is fully aligned around the circumference , press down around the edges of the cover to engage the hook and loop tape completely. You should be able to feel and hear when the tape is completely engaged.



10. Visually inspect the cover and make sure there are no gaps between the gasket (blue rubber outer lining) and the dome cover. Grasp the dome on either side and twist to make sure the cover is secure.

10. Control Panels

10.1 Halogen and HID light controls (Exx5/Exx0)

1. Control circuits Cardanic and wall

a) Controller options are available in Single, Double or Triple control, wall mounted box (CFWP), SK (power supply) box mounted or on the individual light head or spring arm. The wall control is available in flush mounted, using a supplied recessed box, or surface mounted on a painted mounting box mounted on the surface of the wall. Component replacement and operation of the controllers are the same for all units no matter how the controller is mounted.

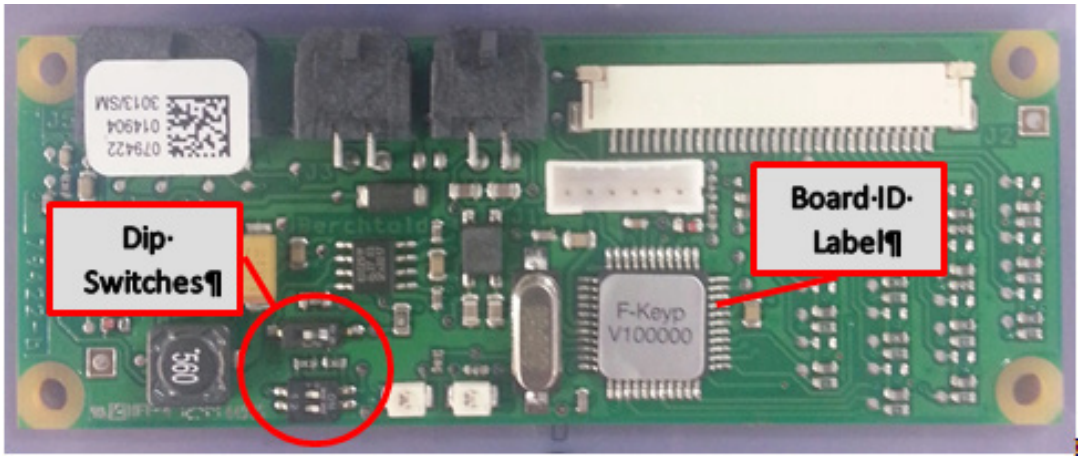
Surface and flush mounted wall control (CFWP)

SK (power supply) box, the individual light head controller

2. Keypad Controller Board replacement

a) Obtain the correct replacement board. Like the light head CPU boards, the boards are identical but have a different program depending on the application. For questions about which keypad controller board to use, contact Technical Support.

WALL CONTROL CFWP BOARDS		
MATERIAL	LIGHTS	BOARD ID
81015	E HID/Halogen E805/655/650/550	Exx0/Exx5 (or KPAD-C)
79422	E LED E 558/668/778	Exx8 (or Keyp)
82138	F LED F 528/628	Fxx8 (or F-Keyp)



b) Secure power to the system
c) Each circuit board is held in with screws and washers and connected to the Can-Bus string with a 4-pole Molex cable for control and power to the wall control.
d) Remove screws and disconnect can-bus cables from board to be replaced.
e) Set the dip switches on the new board to match the board being replaced.
f) Connect the can-bus cables and attach the new board to the panel.
g) Place the panel back into the mounting location and fasten as before.
h) Restore power to the system and check for proper operation.

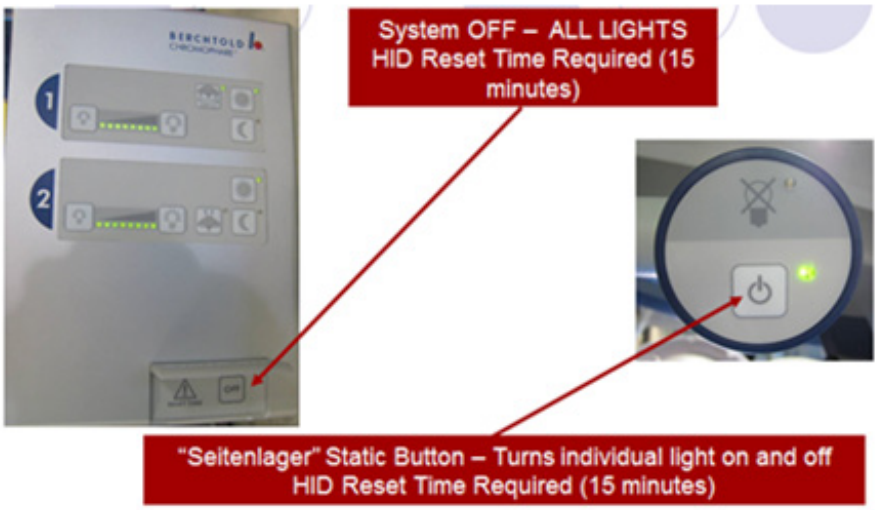
3. HD (Exx5) additional features

a) Unlike the Halogen light (Exx0) control panel, the HID has a shut off switch on the bottom of the wall controller. The HID light is designed to be turned on and stay on through the work day. If no light is needed the light will placed into the sleep mode.
b) The lights work 3 ways – Wallbox "awake", Control from Lighthead "awake", and the "Seithlager" static button. The lights can be put to sleep 3 ways – Wallbox "sleep", Control from Lighthead "sleep", or by putting the lights into "Endo" mode. To bring all lights back to "awake", press "Endo" again. If "awake" is pressed on any individual light, only that light will waken. The others will remain in "sleep". The lights can be turned off 2 ways. Wallbox "system off" turns ALL lights off. "Seithlager" static button will turn each off individually. Both options require the HID to cool down. This will take 15 minutes.

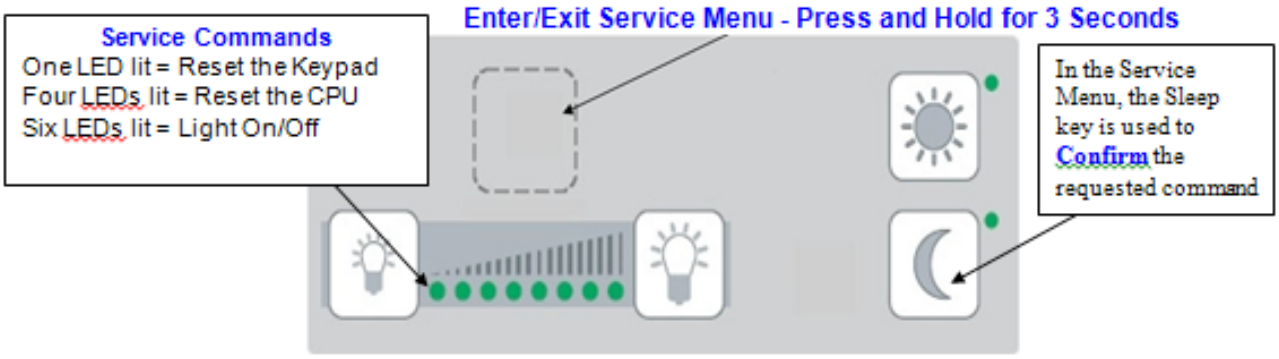
Definitions:

- On / Awake – The lights are on. "Sun" indicator and Seitenlager static button is solid green
- Sleep – The lights are on, but shutters are closed. "Moon" indicator is solid green. Seitenlager static button is green.
- Off – The lights are off. No indicators on wallbox or cardanic control. Seitenlager static button is solid amber.

- Switching from awake to sleep
  - Sleep LED blinks, Intensity indicators descend
- Switching from sleep to awake
  - Awake LED blinks, Intensity indicators ascend



4. HID (Exx5) Keypad Service menu



a) To access the service menu, press and hold the hidden Service Menu button for until the Standby LED blinks green and the first LED of the brightness display lights up green.
b) Use the brighten (large bulb) button to select menu item 1, 4 or 6. This is displayed by the lighting 1, 4 or 6 LEDs of the brightness display and pressing the Sleep (moon) key to confirm.
c) One LED is the command to reset the keypad. If the reset is successful, the keypad will cycle.

Note: This command would be used if experiencing intermittent issues with any of the keypad commands to control the light head. This could include erratic keypad indicator behavior or the inability of the keypad to display the correct state of the light.

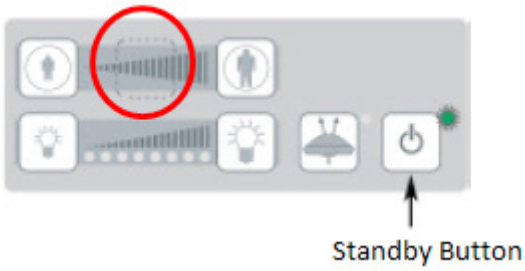
d) Four LEDs is the command to reset the CPU. If the reset is successful, the amber indicator on the cardanic will go out for 1-2 seconds.

Note: This will clear the internal memory of the light head CPU. This will reset the 15 minute cool down timer for the HID bulb. The light must be off to clear the timer. When attempting to turn on a "hot" bulb after a CPU reset, the green "Sun" indicator will flash green, indicating that the HID is attempting to ignite. The HID will continue attempts to ignite for 5 minutes.

e) Six LEDs is the command for on/off function test of the bulb circuits. When in this mode press the sleep (moon) key 1 time the HID bulb comes on. Press the key a second time the HID bulb is turned off. Press the key a third time the HID backup bulb comes on. Press the key a fourth time and the HID backup bulb turns off.

5. Halogen (Exx0) Keypad Service Menu

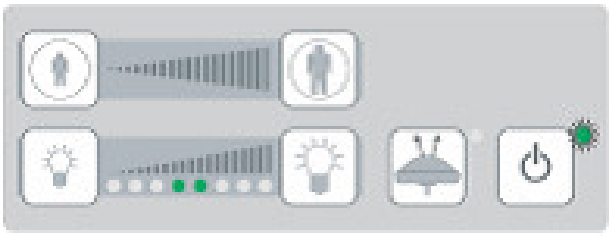
a) To access the service menu, press and hold the hidden Service Menu button for until the Standby LED blinks green and the first LED of the brightness display lights up green.



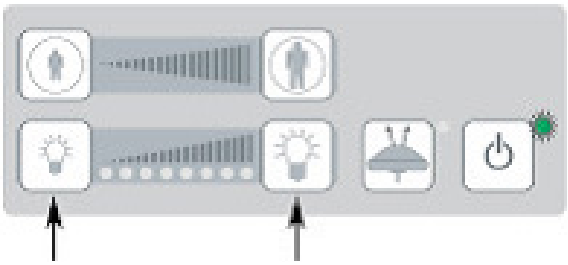
b) Use the Brighten (large bulb) button to select menu item 1, 4 or 7. This is displayed by the lighting 1, 4 or 7 LEDs of the brightness display and pressing the standby key to confirm.
c) One LED is the command to reset the keypad. If the reset is successful, the keypad will cycle.

Note: This command would be used if experiencing intermittent issues with any of the keypad commands to control the light head. This could include erratic keypad indicator behavior or the inability of the keypad to display the correct state of the light.

d) Four LEDs is the command to reset the CPU. If the reset is successful, the amber indicator on the cardanic will go out for 1-2 seconds. This will clear the internal memory of the light head CPU.
e) Seven LEDs is the command for the bulb voltage adjustment mode, when in this mode press the confirm button. This will place the unit in the voltage adjust mode. The light will go to full intensity and the keypad will display lights 4 and 5 to confirm.



f) Press the Brighter and Darker buttons to adjust the bulb voltage to the target value of22.8 V ± 0.5 V.



Note: By pressing the Darker button, the bulb voltage is reduced in about 0.1 V increments. By pressing the Lighter button, the bulb voltage is increased in about 0.1 V increments.

g) When 22.8 vdc has been reached press confirm to set voltage in memory. Press service hidden button to exit the service menu.

Note: Pressing the hidden service button before pressing the standby button to confirm will exit the menu without accepting the change.

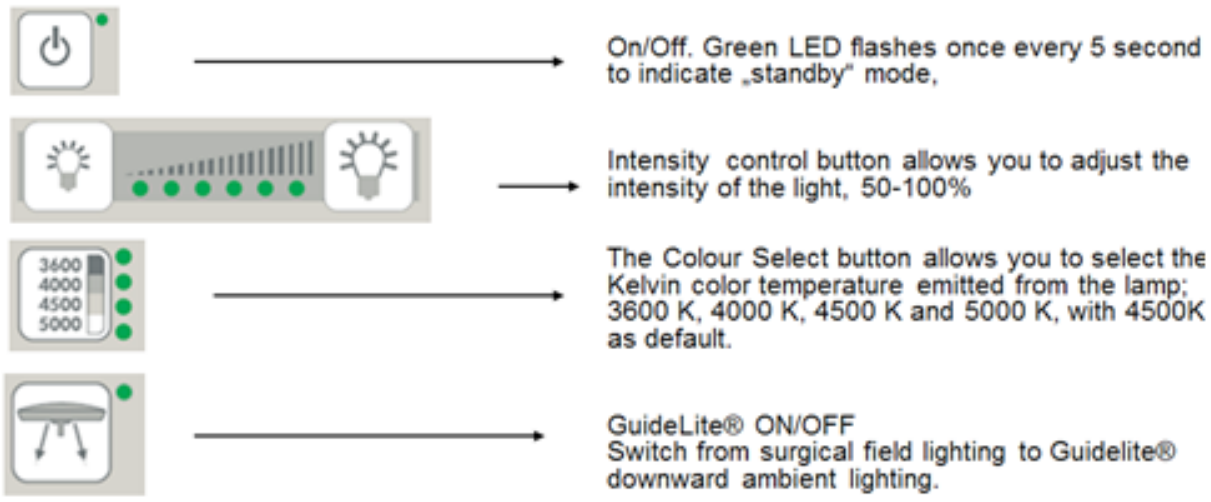
10.2 LED Light controls - E LED and F-Generation (Exx8/Fxx8)

1. Control circuits Cardanic and wall

Controller options are the same as HID/Halogen with the exception of the Touch capability on the F series. All are available in Single, Double or Triple control, wall mounted box (CFWP), SK (power supply) box mounted or on the individual light head or spring arm. The wall control is available in flush mounted, using a supplied recessed j-box, or surface mounted on a painted mounting box mounted on the surface of the wall. Component replacement and operation of the controllers are the same for all units no matter how the controller is mounted.

Surface and flush mounted wall control (CFWP) LED E & F

2. Controller functions



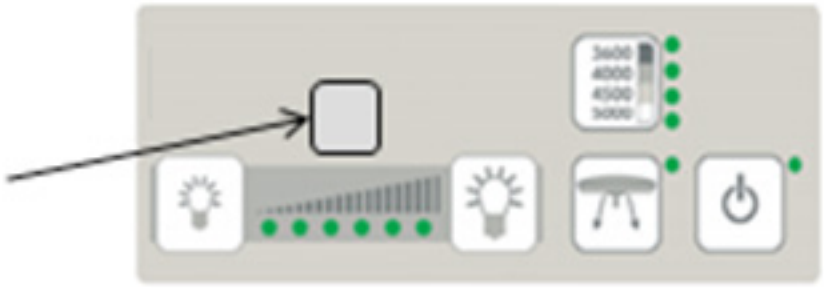
a) The On/Off button on the keypad will blink once every 5 seconds when the light is off. This is the normal "standby" behavior.
b) When utilizing any touchpad function; press and hold the button for 2-5 seconds to accomplish activation of that function.
c) When switching to GuideLite, all lights in the configuration should dim to GuideLite mode.
d) When changing the Color Temperature, all lights in the configuration should change.
e) If any of the above is not occurring, a communication problem is the most likely cause.
f) Service Functions, there is a hidden service menu, as with all lights. Access the Service Menu by pressing and holding the hidden button for 3 seconds. The only functioning keys when in the service menu are „On/Off" and the Intensity keys.

3. Keypad controller board replacement

a) Replacement of Keypad controller boards is the same as for HID and Halogen lights. Refer to section 10.1 for instructions.

4. E- LED (Exx8) Keypad Service Menu

a) To access the service menu, press and hold the hidden Service Menu button until the Standby LED blinks green and the first LED of the brightness display lights up green.



b) Use the Brighten (large bulb) button to select menu item 1, 3 or 6. This is accomplished by the lighting 1, 3 or 6 LEDs of the brightness display and pressing the standby key to confirm.

c) One LED is the command to reset the keypad. If the reset is successful, the keypad will cycle.

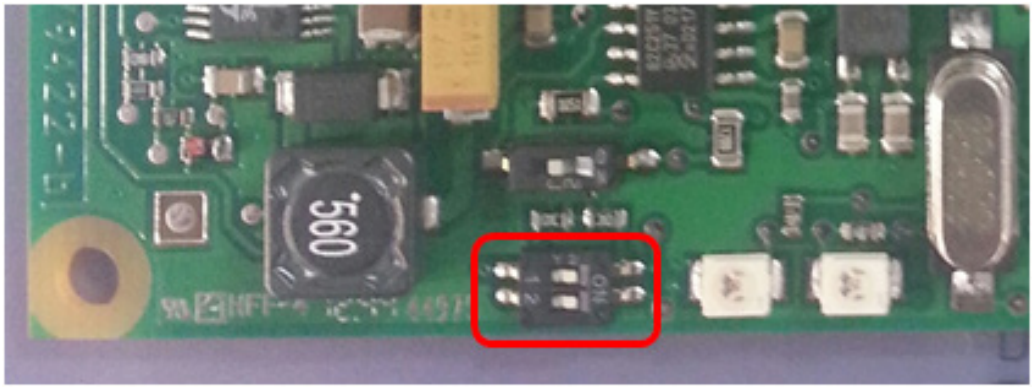
Note: This command does not alter software programmed addressing.

d) Three LEDs is the command for Can-bus ID addressing. This sets the can-bus ID of the light. The procedure is in step 5 below.
e) Six LEDs is the command for module testing. This is not used in the field.

5. E LED Can-bus ID Addressing (Self Addressing)

Can-bus ID addressing is software controlled and is done from the keypad service menu. All lights are addressed for the installation configuration when they leave the factory (same as other E Series). Only re-address when moving light heads or replacing a damaged light head or component. The addressing DIP switches on the LED Module and Distribution Board are irrelevant once the self-addressing has been completed. The change is stored in the software permanently.

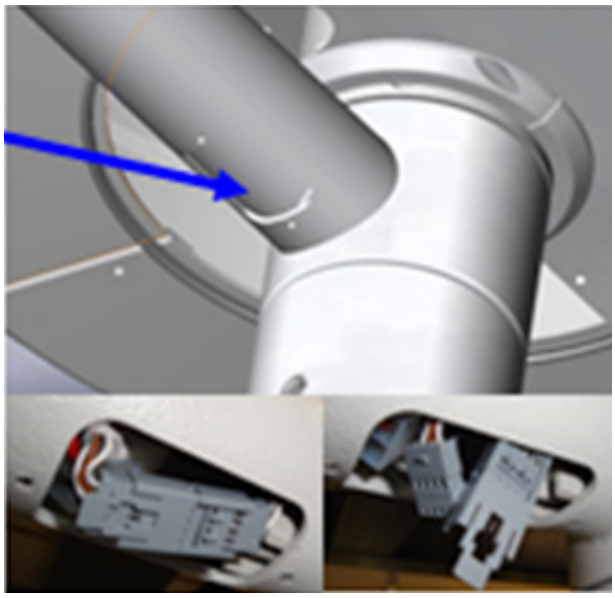
a) Using the Addressing DIP switches on the keypad, set the ID for the corresponding light head to be addressed.



Dip Switch Addressing:
Off-Off = Light 1, On-Off = Light 2, - Off-On = Light 3

b) Isolate all lights except the one being addressed from the can-bus circuit.

Note: There are several ways to isolate the lights from the can-bus circuit. They can be disconnected at the suspension, at the tube, at a distribution board, etc. In most cases, the suspension connections will be the easiest to access.



Disconnecting Can-bus at the suspension

c) Using the Service Menu on the keypad of the light you want to address, go to option 3, and press the On/Off button to confirm.

Note: This will then send a signal on the can-bus to the light head distribution board and all its LED modules changing their can-bus ID to match the keypad.

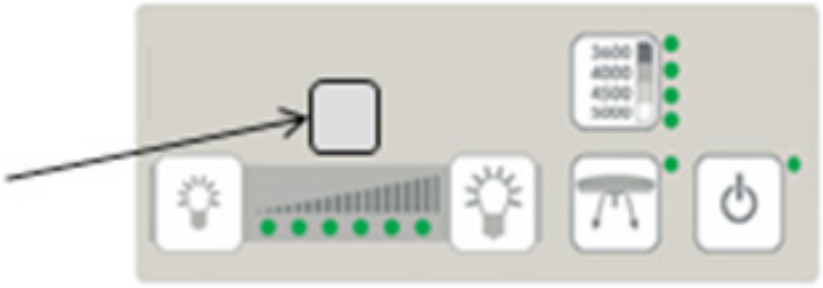
d) Exit the Service Menu. Turn on the light to make sure all modules received the command.
e) Repeat steps a) through d) for all light heads to be addressed.

6. F-Generation (Fxx8) – Keypad Control Service Menu

The F-Generation lights use the same Can-bus network as the E-series light heads and the operation of the light is the same as E LED.

- Intensity, Color Temperature and GuideLite all function the same
- Spot size is adjusted from the handle

a) To access the service menu, press and hold the hidden Service Menu button until the Standby LED blinks green and the first LED of the brightness display lights up green.



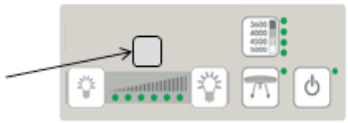
b) Use the Brighten (large bulb) button to select menu item 1, 2, 3 or 4. This is accomplished by the lighting 1, 2, 3 or 4 LEDs of the brightness display and pressing the standby key to confirm.
c) One LED is the command to reset the keypad and light head. If the reset is successful, the keypad

will cycle.

Note: This command does not alter software programmed addressing.

d) 2 LEDs is the command for Keypad Addressing. The graphic below describes its functionality.

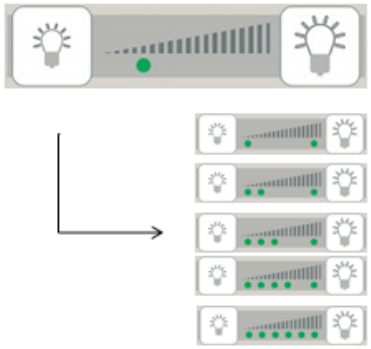
Option 2 – Keypad Addressing



Function: Sets the CANBus ID of the keypad through software.

Sub Menus: ID Selection

LEDs 1,6	=	ID 1
LEDs 1,2,6	=	ID 2
LEDs 1,2,3,6	=	ID 3
LEDs 1,2,3,4,6	=	ID 4
All LEDs	=	Use DIP setting (default)



Select option two by having the 2nd LED lit, then select the desired address with the above pattern using the intensity buttons, and then Press „On/Off".

The GuideLite LED will indicate if the DIP or the software is controlling the address.

Exit the service menu be pressing the hidden button.

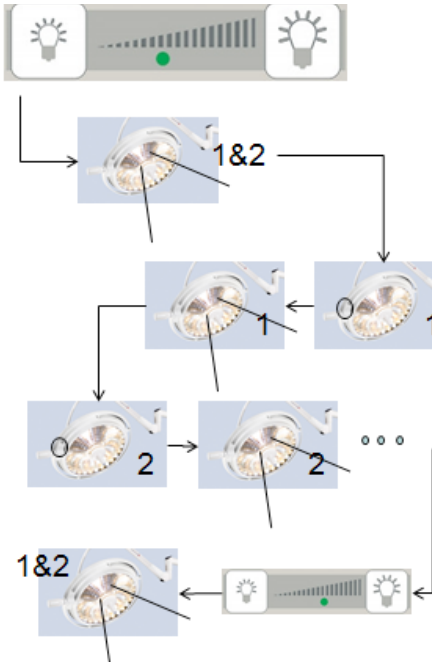
e) The 3 and 4 LED commands are used together for Light Head addressing. The graphic below describes their functionality.

Option 3 & 4 – Light Head Addressing

Function: 3 starts light head addressing mode, 4 ends light head addressing mode.

Sub Menus: None

- In the service menu, select option 3 (3rd LED lit).
- All lights in the configuration will „blink" twice, indicating they are ready for addressing.
- In the desired sequence, go to each light and press the „On/Off" switch on the frame. The light will acknowledge the addressing command by blinking twice.
- Press the up intensity button to go to Option 4 and press „On/Off". All lights will blink once signalling the end of addressing mode. Exit the service menu by pressing the hidden button.



7. F-Generation (Fxx8) - Touch screen

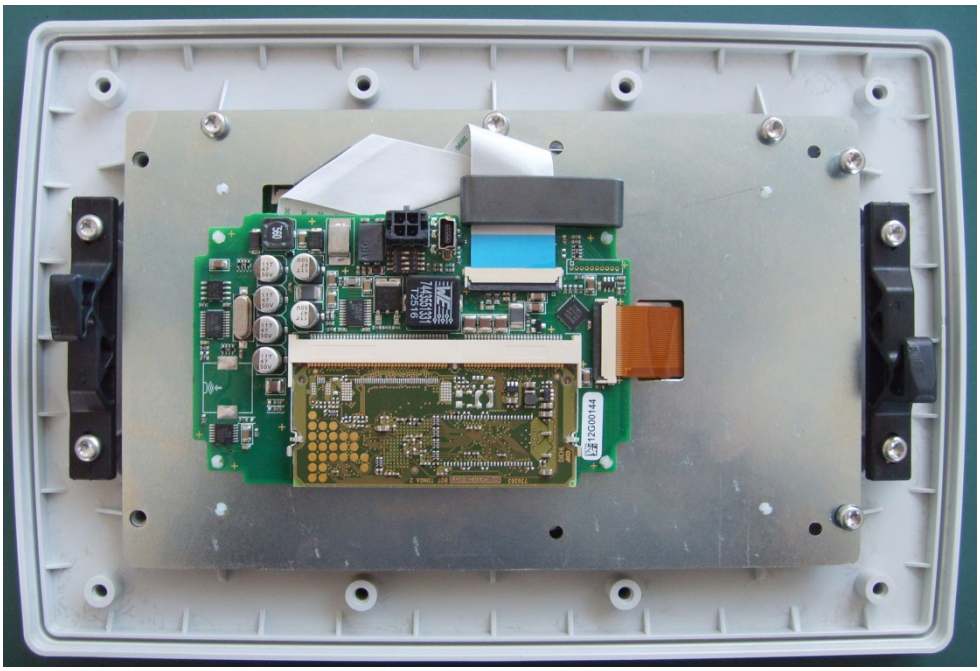
The CHROMOPHARE F-Generation added the option for Interactive Touch Screen controls from the wall, the light head cardanic, or both. The touch screens include controls to adjust:

- Intensity
- Focus
- Color Temperature
- EndoLite ™

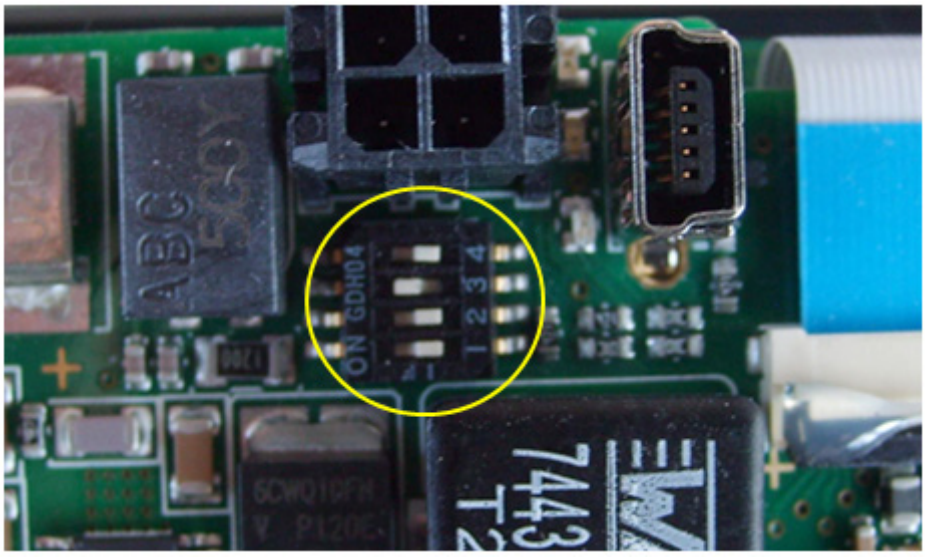
8. Touch Screen calibration

The touch screen can be calibrated if necessary, e.g. when the touch events or touch positions seem to be inaccurate. The procedure is identical for wall and cardanic touch screens.

a) Unplug the device and open the housing



b) Slide the DIP switch no. 3 to ON position as shown below.



Plug in the power / CAN connector and wait until the program "TSLIB calibration utility" starts on the screen.

c) Calibrate the touch controller by pressing the finger on the crosshair positions until the program "TSLIB test program" starts on the screen.

d) Unplug the unit and slide the DIP switch no. 3 to OFF position and reassemble the unit.

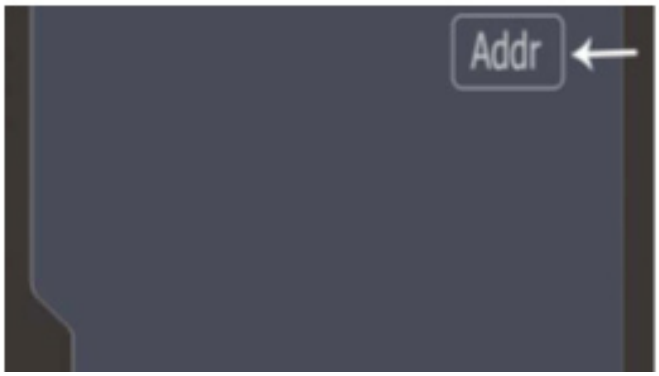
9. Touch Screen Addressing – Cardanic Controls

a) Turn the light on using the rocker switch on the light head frame.

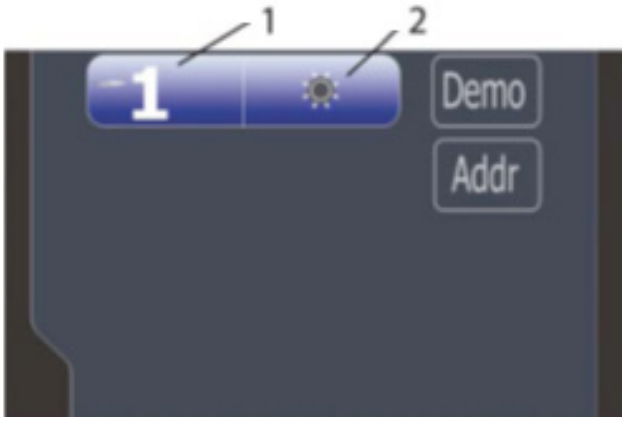
b) To activate the service function, hold down the hidden service field for approximately 3 seconds.

Hidden service field lower left hand corner

c) In the service main menu, press "Addr" to start the addressing mode. All available light heads will be listed.



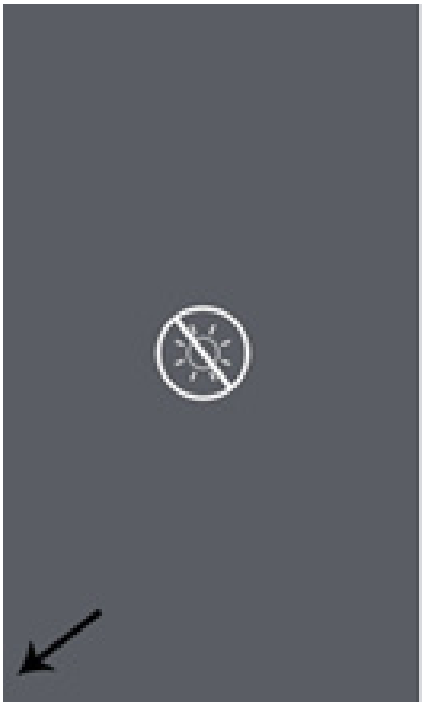
"Addr" button in service main menu



All available light heads listed Select to address

d) Connect the touch display to the dedicated light by pressing the number of the light head.

10. Touch Screen Addressing – Wall Controls



Hidden service field lower left hand corner

"Addr" button in service main menu

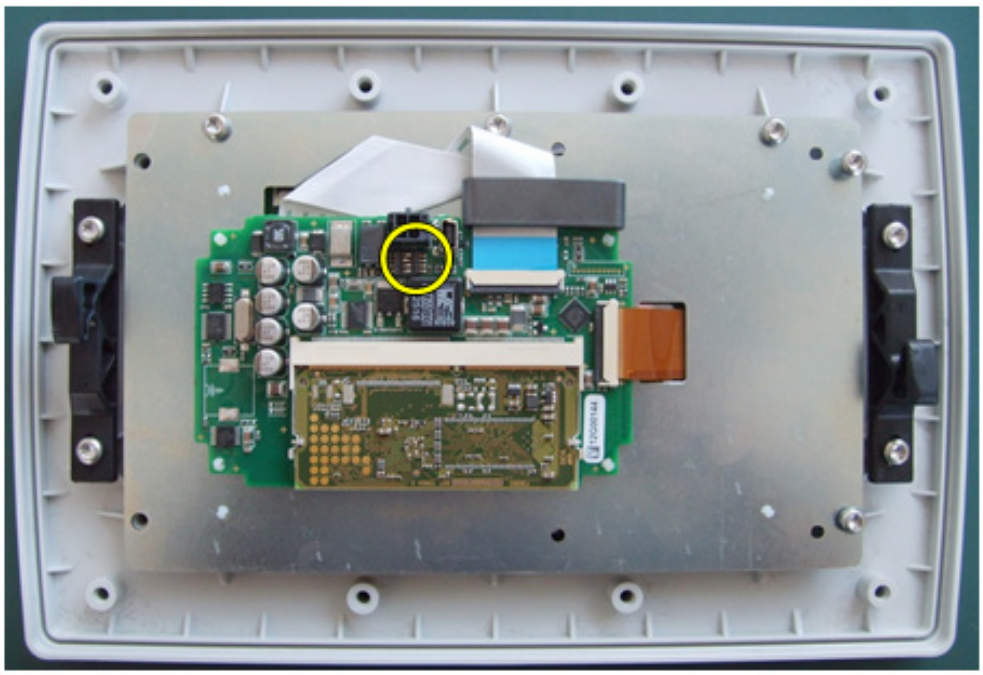
All available lights listed Select to address

a) Turn the lights on using the rocker switches on the light head frames.
b) To activate the service function, hold down the hidden service field for approximately 3 seconds.
c) In the service main menu, start addressing mode via the "Addr" button. All available light heads will be listed.
d) Connect the wall control unit with the selected lamp by pressing the respective number field.

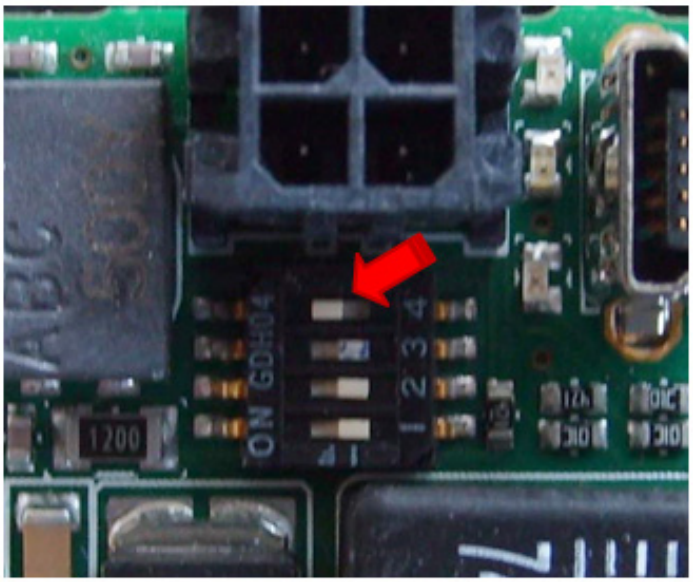
11. Touch Screen CAN bus termination – Wall Controls

The touch screen controls should work properly as configured; however, in cases where the cable length exceeds about 20 meters, the CAN bus system may not properly recognize the controls. In these cases, the CAN Bus connection must be terminated (120 Ohm) by setting DIP switch number 4 on the touch screen circuit board. Newer units will come in this configuration but some older units may need this procedure to operate with the longer cables.

a) Unplug the device and open the housing. DIP switch location is shown by yellow circle below.



b) Slide DIP switch no. 4 to ON position and reassemble the unit. The system should now recognize the touch screen and operate properly.

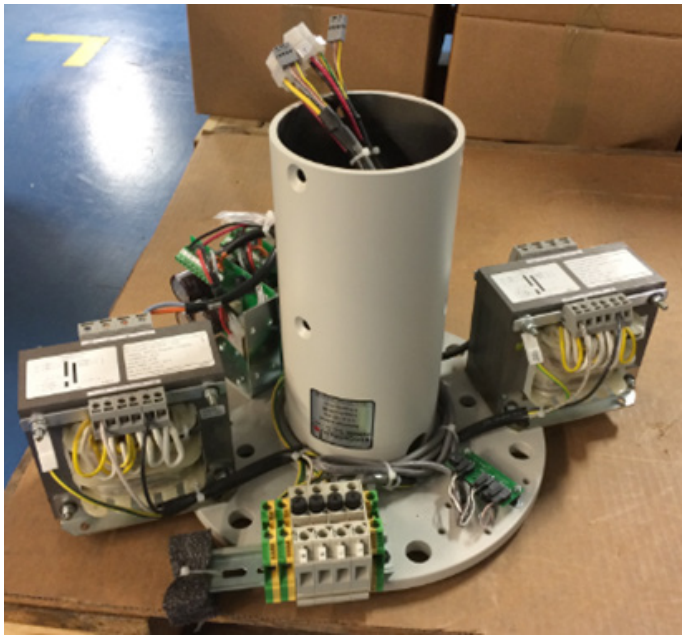


11. Power Supply Service Instructions

11.1 General Information

Chromophare power supplies can be mounted 2 ways depending on the desired configuration:

- Tube mounted – Electrical components are mounted directly to the ceiling tube.



Tube mounted components for 2 lights

- Electrical enclosure (SK Box) – Components for 1 or 2 lights can be mounted in each SK Box.

Each box has two positions. Each position can be used for 1 light's components or for a battery backup (HID lights only).

Single box for single light, single light with battery, double light.

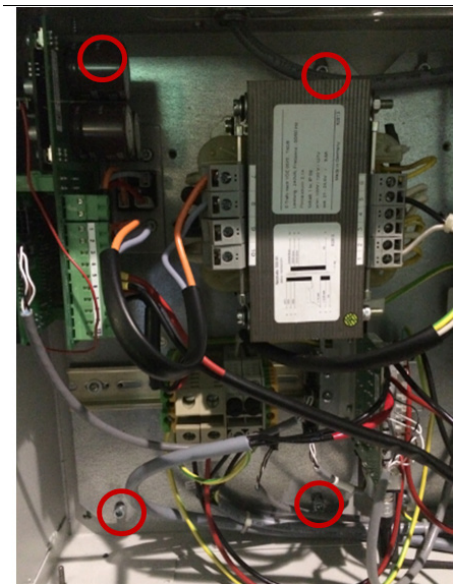
Dual box for double light w/ battery, triple light, triple light w/ battery.

Wall Control can be integrated into SK Box if desired.

11.2 SK Boxes

1. SK Box Layout

Internals of an SK box with components for 2 lights.



Each plate of components may be removed from the SK box by removing the four indicated screws.

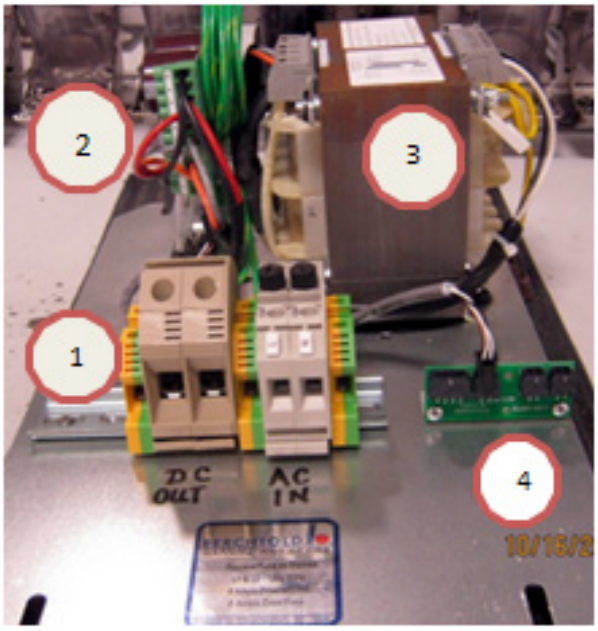
Each plate of electronics contain:

1 – Terminal/Fuse/ Grounding blocks.

2 – Rectifier Board – Converts AC-DC.

3 – Transformer – Step down-120 to 25 VAC.

4- Distribution Board – Can bus connections.



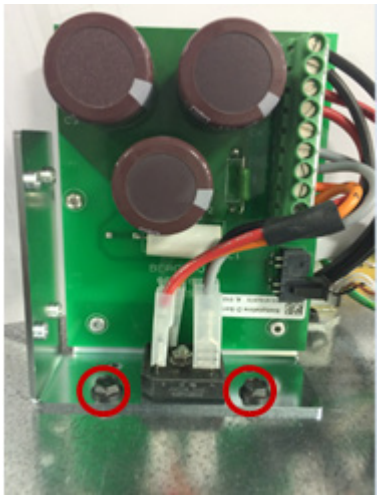
2. Component replacement

To replace the Transformer:

- Turn off the main power at the circuit breaker
- Note and record the location of all wires and disconnect wiring from the transformer.
- Remove the four indicated mounting screws.
- Replace the transformer. Reassemble in reverse order.

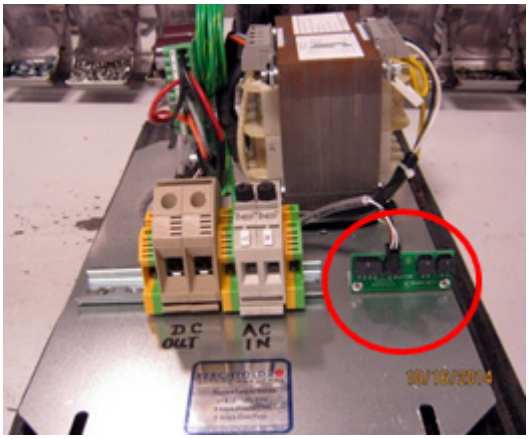
To replace the Rectifier Board:

- Turn off the main power at the circuit breaker
- Note and record the location of all wires and disconnect wiring from the rectifier board.
- Remove the indicated mounting screws.
- Replace the Rectifier Board. Reassemble in reverse order.



To replace the CAN bus distribution board:

- Turn off the main power at the circuit breaker
- Note and record the location of all wires. Disconnect wiring from the CAN distribution board.
- Remove the mounting screws.
- Replace the board.
- Reassemble in reverse order.



Fuse block replacement:

- Turn off the main power at the circuit breaker
- Work with the hospital/electrician to ensure power to the room and the Chromophare system is turned off. Carefully disconnect the Chromophare system from hospital mains.

> ⚠ **WARNING: Failure to turn off the main power to the Chromophare system prior to disconnecting wires can result in electrical shock.**

If the hospital has the **new** fuse block configuration (fused line with unfused neutral), the line fuse alone can be replaced.

- To replace the fuse, turn the fuse cap counterclockwise to remove.
- Install new fuse with same amp rating into cap and turn clockwise to lock in place.

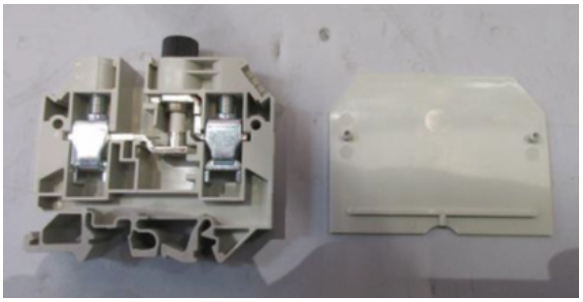
If the hospital has the **old** fuse block configuration (fused line and fused neutral), follow these steps to replace:

- Note where Chromophare wires are attached into the blocks. Disconnect all internal Chromophare wires from the set of blocks requiring replacement.

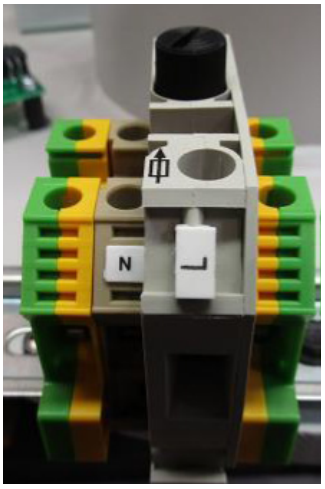
For SK box systems:

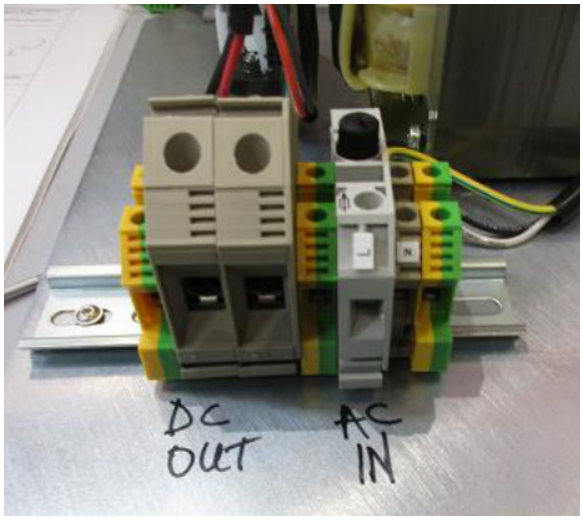
- Remove the current clamps from the mounting rail for the affected light by pinching the front clip for easy release.
  - For SK electronics, the line and neutral must both be replaced for all lights on the suspension.

- Remove existing "N" label from the existing neutral block for reuse.
- Using service kit P41494:
  - Connect the 8 amp fuse (500393) to the fuse clamp (39965) and secure by twisting clockwise. Add end bar (39967) to the fuse clamp.
  - Mount the new Line, Neutral, and Ground blocks to the DIN rail as shown.



- Add label "N" to the terminal block. Add label "L" to the fuse clamp.
- Repeat for all lights in the suspension.
- Reconnect Chromophare system wires to the new blocks: black wire to Line block (fuse clamp), white wire to Neutral block (not fused), each green and yellow wire to a ground block.
- An electrician is required to reconnect hospital mains to the terminal blocks and restore power to the room.



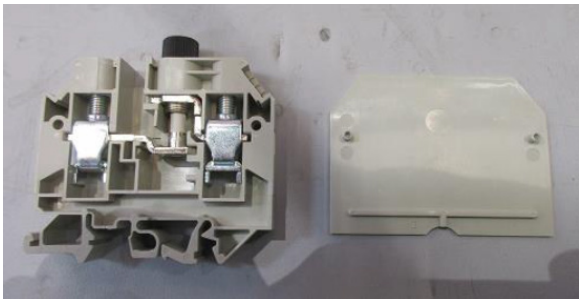


SK Plate

For Tube Mounted electronics:

- Remove the current clamps from the mounting rail for the affected light by pinching the front clip for easy release.
  - For tube mounted electronics, the line, neutral, and ground blocks must all be replaced for all lights on the suspension.
- Remove existing "N" label from the existing neutral block for reuse.

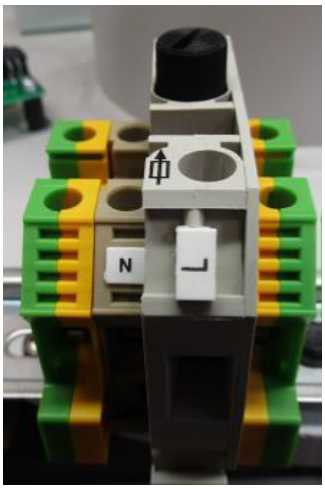
- Using service kit P41494:
  - Connect the 8 amp fuse (500393) to the fuse clamp (39965) and secure by twisting clockwise. Add end bar (39967) to the fuse clamp.
  - Mount the new Line, Neutral, and Ground blocks to the DIN rail as described. The arrows on the fuse clamps must be facing the tube when electronics are tube mounted.



For single light systems

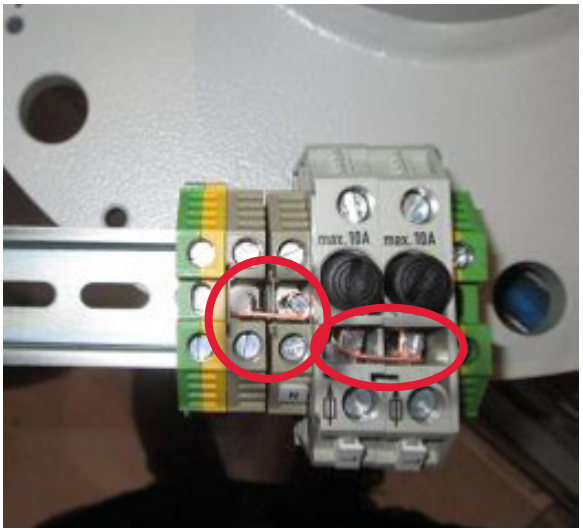
Note: Additional suspension items such as flat panels may result in additional ground blocks on the flange. Mimic the current suspension setup when replacing

- Place the blocks in the order: Ground, Neutral, Line, Ground as shown.



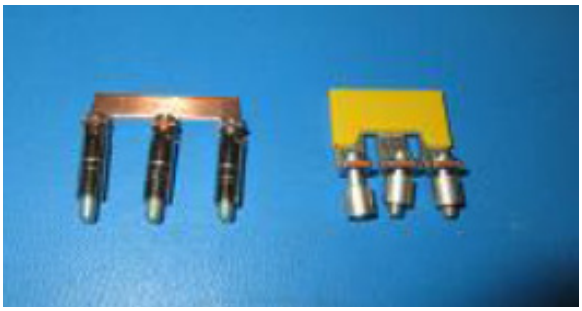
For dual light systems

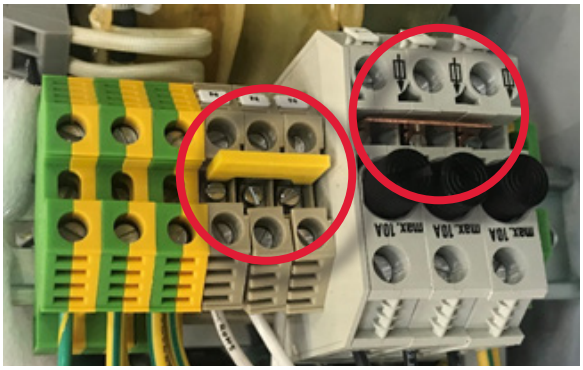
- Place the blocks in the order: Ground, Neutral, Neutral, Line, Line, Ground as shown.
- Install a dual shorting bar across the two neutral blocks and secure with 2 screws. Install a dual shorting bar across the two line blocks and secure with 2 screws.



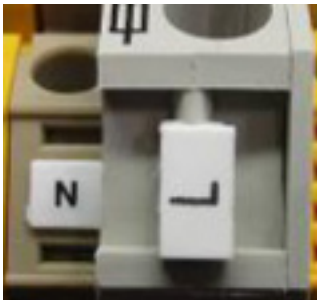
For triple light systems:

- Place the blocks in the order: Ground, Neutral, Neutral, Neutral, Line, Line, Line, Ground as shown.
- Install a yellow colored triple shorting bar across the three neutral blocks and secure with 3 screws. Install a brass colored dual shorting bar across the three line blocks and secure with 3 screws.

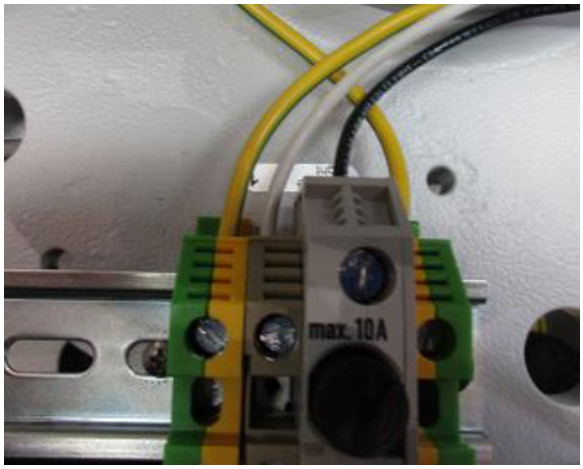




- Add label "N" to each terminal block. Add label "L" to each fuse clamp.
- Reconnect Chromophare system wires to the new blocks: black wire to Line block (fuse clamp), white wire to Neutral block (not fused), each green and yellow wire to a ground block.



Single light example

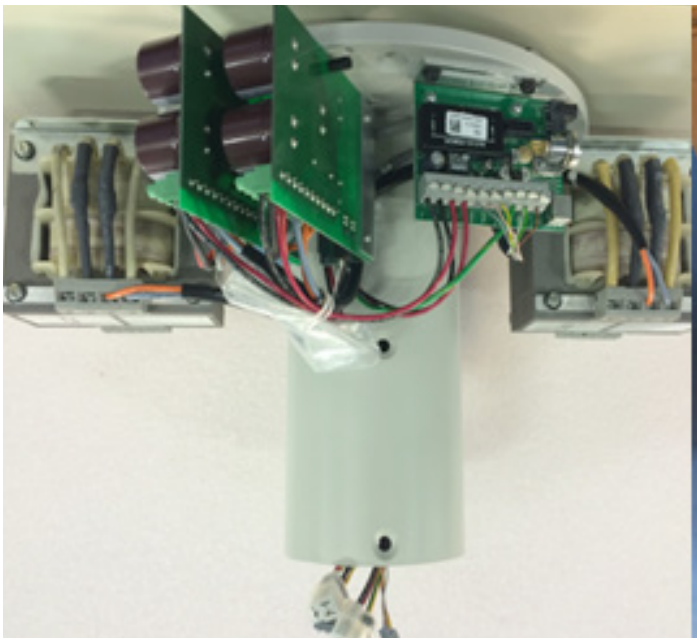


An electrician is required to reconnect hospital mains to the terminal blocks and restore power to the room.

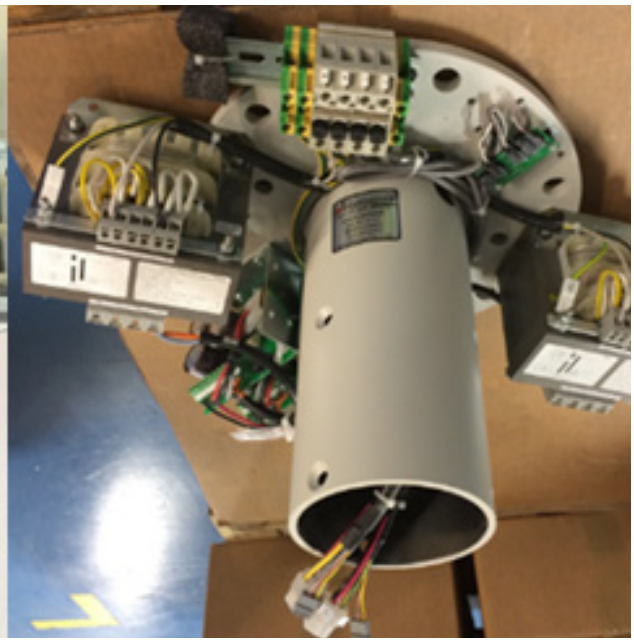
11.3 Tube mounted power supplies

1. Tube mounted Power supply layout

Tube mounted power supplies have the same components and wiring as the SK box version. They are mounted around the base of the ceiling tube flange.



Ceiling tube with components for 2 lights plus a camera distribution board



Tube mounted power supply shown including the fused terminal and grounding blocks

2. Component replacement

Component replacement is the same as for the SK mounted version. Refer to section 11.2.

11.4 Camera distribution board

If the lighting system is configured to utilize a Chromovision® In-line HD Camera system, a camera distribution board may also be installed on the ceiling tube.

1. Component replacement

Turn off the main power at the circuit breaker.

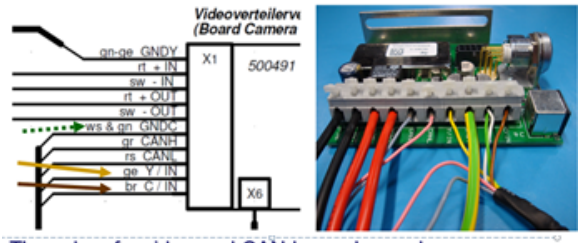
If also replacing the CAN bus cable, note that the wiring colors may have changed.

Note and record the location of all wires and disconnect wiring from the camera distribution board.

Remove the indicated mounting screws.

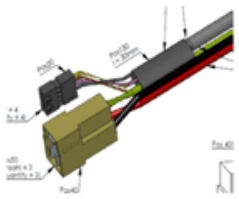
Replace the Camera Distribution Board.

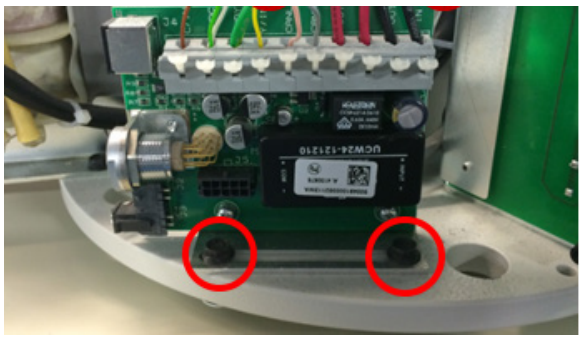
Reassemble in reverse order.



The colors for video and CAN have changed.

CANH	black	->	grey
CANL	white	->	pink
Y	white	->	yellow
C	brown	->	brown
Video GND	(new)		white
Video GND	(new)		green





12. Preventative Maintenance

Preventative Maintenance instructions are located in BWI160314.01 Preventative Maintenance Data Sheet CHROMOPHARE, E-Series and Flat Panel and BWI160314.08 Preventative Maintenance Data Sheet CHROMOPHARE, F-Generation and Flat Panel.

13. Contact Information

Contact Stryker Customer Service with questions or concerns.

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571 Silveron Blvd.
Flower, Mound, TX 75028
Toll Free: (866) 841-5663
1-972-410-7100

For international service locations, refer to the Stryker website at the following URL:
www.stryker.com.

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