Stryker Visum® Surgical Lights & StrykeCam® In-Light Camera
Operations and Maintenance Manual

This Operations and Maintenance Manual contains confidential information that shall not be disclosed or duplicated for any reason other than to use and maintain a STRYKER VISUM SURGICAL LIGHT AND STRYKECAM IN-LIGHT CAMERA. This restriction does not limit the right to use information contained in this manual if it is obtained from another source without restriction. The information subject to this restriction is contained in all pages of this manual.

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Stryker Visum Surgical Lights & StrykerCam In-Light Camera Operations and Maintenance Manual
## Contents

1. Indications for Use .......................................................................................................................... 8  
   1.1 Stryker Visum® Surgical Light ................................................................................................. 8  
   1.2 StrykeCam® In-Light Surgical Camera ...................................................................................... 8  
2. General Warnings and Cautions .................................................................................................... 9  
   2.1 Warnings .................................................................................................................................... 9  
   2.2 Cautions ..................................................................................................................................... 9  
3. Product Symbol Definition ............................................................................................................ 11  
   3.1 EMC Precautions ....................................................................................................................... 13  
4. System Components ....................................................................................................................... 14  
5. Stryker Visum® Hardware Overview ............................................................................................. 15  
   5.1 Safety ....................................................................................................................................... 15  
   5.2 The Touch Panel Interface: Surgical Lighting ........................................................................... 15  
6. Installation and Start Up .................................................................................................................. 16  
   6.1 Installation Instructions ................................................................................................................ 16  
   6.2 Prior To Use .............................................................................................................................. 16  
   6.3 Adjusting the Field Diameter Size ............................................................................................. 16  
   6.4 Positioning the Lights ............................................................................................................... 16  
7. Camera .......................................................................................................................................... 18  
   7.1 Attaching the Camera Head ........................................................................................................ 18  
   7.2 White Balance ............................................................................................................................ 18  
   7.3 Auto Focus ............................................................................................................................... 18  
   7.4 Iris ............................................................................................................................................ 18  
8. Camera Controls ............................................................................................................................. 19  
   8.1 The Touch Panel Interface: In-Light Camera ............................................................................. 19  
9. Changing the Bulb .......................................................................................................................... 20  
   9.1 Light Bulb Replacement .............................................................................................................. 20  
   9.2 Preparation ............................................................................................................................... 20  
   9.3 Removing the Bulb ..................................................................................................................... 21  
   9.4 Replacing the Bulb ..................................................................................................................... 21
10. Attaching the Sterilizable Light Handle Cover ............................................................... 22
11. Cleaning and Disinfecting .............................................................................................. 23
   11.1 Cleaning and Sterilization of the Reusable Handles .............................................. 23
12. Verification Procedure .................................................................................................. 28
   12.1 Emergency Power Usage Verification Procedure ................................................. 28
13. Service/Troubleshooting .............................................................................................. 29
   13.1 If Both Lights Are Down ....................................................................................... 30
      13.1.1 Checking Your Connections ......................................................................... 30
      13.1.2 Replacing the Wall Control Panel ................................................................. 30
      13.1.3 Replacing the Power Supply Box ................................................................. 30
   13.2 If a Single Light is Down ....................................................................................... 31
      13.2.1 Bulbs ........................................................................................................... 31
      13.2.2 Connections ............................................................................................... 31
      13.2.3 Replacing the Circuit Board in Light Head ................................................... 31
   13.3 If the Light Drifts ................................................................................................... 33
      13.3.1 Setting the Horizontal Arm Brakes .............................................................. 33
      13.3.2 Spring Arm ................................................................................................. 33
      13.3.3 Cardanic Suspension .................................................................................. 34
14. Stryker Visum® Specifications ...................................................................................... 35
   14.1 Lighting Data ......................................................................................................... 35
   14.2 Electrical Data ....................................................................................................... 35
   14.3 Mechanical Data .................................................................................................. 35
   14.4 Operating and Storage Conditions ...................................................................... 35
15. StrykeCam® Specifications .......................................................................................... 36
   15.1 Physical and Electrical Data ................................................................................ 36
   15.2 Operating and Storage Conditions ...................................................................... 36
16. Stryker Visum® Maintenance Schedule ...................................................................... 37
   16.1 Quarterly ............................................................................................................. 37
   16.2 Semiannually ..................................................................................................... 37
   16.3 Annually ............................................................................................................ 37
17. Maintenance, Service, Claims, and Warranty .............................................................. 38
   17.1 Fuse Replacement .............................................................................................. 38
1. Indications for Use

1.1 Stryker Visum® Surgical Light
The intended use of the Stryker Visum® Surgical Lighting system is to illuminate the operative site during surgical procedures with high intensity light.

The Stryker Visum® Surgical Light is designed to eliminate shadows, provide a large depth of field, and reduce unwanted radiant heat. Light functions can be controlled from a wall mounted control panel in the OR, through the Stryker SIDNE® voice activation platform, or through future Stryker touch panel control devices.

The light heads are fixed to a ceiling mounted, single point suspension support. They can be rotated, swiveled, and tilted in any direction. The height is adjusted via the 360° rotating vertical spring arm. The spatial position of the light heads are adjusted through rotating horizontal arms.

1.2 StrykeCam® In-Light Surgical Camera
The intended use of the StrykeCam® In-Light Surgical Camera System is to monitor and record the operative site during surgical procedures.

The Stryker Visum® Surgical Light can be ordered with an optional integrated Stryker camera system. The camera system can be installed in one of the light heads in a dual system in the future with minimal effort. Each dual wall control unit comes standard with a microprocessor for future camera addition.

The Stryker camera system allows the surgical staff to record or display the various phases of a surgical procedure for documentation or teaching purposes. In the Stryker system the camera is an integral part of the light handle assembly in the center of the surgical light. The surgeon can manipulate the camera via a sterile handle that covers the camera head.

The use and characteristics of the Stryker Visum® Surgical Light are unvaried whenever a camera is used. The light field width cannot be adjusted when the camera function is being used. Use and installation of the camera system are illustrated separately in the “Operating Instructions” camera system.
2. General 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.

**Caution**  Special service procedures or precautions must be followed to avoid damaging the instrument.

**WARNING**  A lightening bolt within a triangle is intended to warn of the presence of hazardous voltages. Refer all service to authorized personnel.

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

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

### 2.1 Warnings

1. Read this manual thoroughly, and be familiar with its contents prior to using this equipment.
2. Be qualified medical personnel, having complete knowledge of the use of this equipment.
3. Test this equipment prior to a surgical procedure. This product was fully tested at the factory before shipment.
4. To avoid electric shock, do not remove product covers.
5. To avoid the risk of electric shock, disconnect all remote supplies before servicing, as more than one supply may be used to feed this equipment.
6. Do not perform internal repairs or adjustments unless specifically instructed to do so in this operating manual.
7. Disconnect the unit from the electric outlet before inspecting system components.
8. Oxygen for ms explosive mixtures with oils, greases, and lubricants. The compressed oxygen presents an explosion hazard.
9. Exposure to overlapping light fields from multiple lamps may cause excessive heat generation.
10. Read the entire instruction manual before assembling or connecting the unit.
11. Allow the bulb to cool before replacing, as it may be hot.
12. Do not look directly into the surgical light while powered on.

**Note**  The warranty on this product is void if any of these warnings are disregarded.

### 2.2 Cautions

1. Pay close attention to the care, cleaning, sterilization, and disinfection instructions in this manual. A deviation may cause damage. DO NOT STERILIZE OR DISINFECT THE CONTROL UNIT OR THE TOUCH PANEL DISPLAY.
2. Incorrect operation and negligence of safety measures may cause serious incidents. Please thoroughly read the Stryker Visum® Surgical Lights and StrykeCam® In-Light Camera Operations and Maintenance Manual.

3. Do not add additional weight on the surgical lights.

4. The light is not intended for operation in areas where there is danger of explosion.

5. Do not place anything over the hoods of the surgical lights.

6. The distance between the light emission surface area of the operating light and the patient surface should not be less than 24 inches (610mm) in order to ensure proper illumination.

7. The surgical light must not be operational if any component of the light, i.e. glass or filter, is damaged.

8. For U.S. audience only - Caution: Federal Law (USA) restricts this device to use by or on the order of a physician.
### 3. Product Symbol Definition

The following symbols may be found on the Stryker Visum LED Surgical Light and StrykeCam 2 In-Light Camera:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="CE" /></td>
<td>Denotes compliance to European Community Directive 93-42-EEC.</td>
</tr>
<tr>
<td><img src="image" alt="Hot" /></td>
<td>Indicates hot surfaces.</td>
</tr>
<tr>
<td><img src="image" alt="CSA" /></td>
<td>Denotes compliance to CSA Standard C22.2, 60601.1 - M90, AS 3200, IEC 60601, IEC 60601-2-41, UL 60601, EN 60601</td>
</tr>
<tr>
<td><img src="image" alt="Lightning" /></td>
<td>A lightning bolt within a triangle indicates the presence of hazardous voltage. Refer all service to authorized personnel.</td>
</tr>
<tr>
<td><img src="image" alt="Exclamation" /></td>
<td>When this symbol appears on a device, it refers the user to the Operations and Maintenance manual for important safety information. When it appears in the manual, it is meant to alert the user to the presence of important safety, operating, and maintenance instructions.</td>
</tr>
<tr>
<td><img src="image" alt="Man" /></td>
<td>Denotes Class 1 Equipment. Class 1 Equipment: equipment in which the protection against electric shock does not rely on Basic Insulation only, but includes an additional safety precaution in such a way that means are provided for the connection of Accessible Conductive Parts to Protective (ground) Conductor in the fixed wiring of the installation in such a way that Accessible Conductive Parts cannot become Live in the event of a failure of the Basic Insulation.</td>
</tr>
<tr>
<td><img src="image" alt="Temperature" /></td>
<td>Denotes temperature limits.</td>
</tr>
<tr>
<td><img src="image" alt="Humidity" /></td>
<td>Denotes humidity limits.</td>
</tr>
<tr>
<td><img src="image" alt="Pressure" /></td>
<td>Denotes relative pressure limits.</td>
</tr>
<tr>
<td><img src="image" alt="Part" /></td>
<td>Denotes product/part number.</td>
</tr>
<tr>
<td><img src="image" alt="Serial" /></td>
<td>Denotes product/serial number.</td>
</tr>
<tr>
<td><img src="image" alt="Lot" /></td>
<td>Denotes lot or batch number.</td>
</tr>
<tr>
<td><img src="image" alt="EC-REP" /></td>
<td>Denotes European Representative.</td>
</tr>
<tr>
<td><img src="image" alt="Date" /></td>
<td>Denotes the manufacturing date.</td>
</tr>
<tr>
<td><img src="image" alt="Manufacturer" /></td>
<td>Denotes the manufacturer of the device.</td>
</tr>
<tr>
<td><img src="image" alt="Quantity" /></td>
<td>Denotes quantity.</td>
</tr>
<tr>
<td><strong>Surgical Light</strong></td>
<td>Surgical Light</td>
</tr>
<tr>
<td></td>
<td>Suspension</td>
</tr>
<tr>
<td><strong>Power Supply</strong></td>
<td>Power Supply</td>
</tr>
<tr>
<td><strong>Drop Tube</strong></td>
<td>Drop Tube</td>
</tr>
<tr>
<td><strong>Cover</strong></td>
<td>Cover</td>
</tr>
<tr>
<td><strong>Handle</strong></td>
<td>Handle</td>
</tr>
<tr>
<td><strong>EBM</strong></td>
<td>Battery Module</td>
</tr>
<tr>
<td><strong>UPS</strong></td>
<td>Charger</td>
</tr>
<tr>
<td><strong>Cable Kit</strong></td>
<td>Cable Kit</td>
</tr>
<tr>
<td><strong>Repair Kit</strong></td>
<td>Repair Kit</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>Accessories</td>
</tr>
<tr>
<td><strong>Camera</strong></td>
<td>Camera</td>
</tr>
<tr>
<td><strong>Manual</strong></td>
<td>Instructions for Use</td>
</tr>
<tr>
<td><strong>Touch Panel</strong></td>
<td>Wall Control/Touch Panel</td>
</tr>
<tr>
<td><strong>Halogen Bulb</strong></td>
<td>A Halogen type bulb is used in this light.</td>
</tr>
<tr>
<td><strong>Rated</strong></td>
<td>The acceptable wattage input range for this product.</td>
</tr>
</tbody>
</table>
### 3.1 EMC Precautions

This device is considered medical electrical equipment and requires special precautions regarding EMC and needs to be installed and put into service according to the information provided.

Portable and mobile RF communications equipment can affect this device's performance and must be used in accordance with the following information.
4. System Components

List of Components

1. Ceiling cover connected to top of ceiling tube
2. Down tube
3. Horizontal arm #2
4. Horizontal arm #1
5. Spring arm
6. Light handle assembly
7. Sterilizable handle
8. Light facing
9. Hood
10. Cardanic suspensions

Note: The light on the upper horizontal arm is Light 1, and the optional StrykeCam® In-Light Camera will be placed in Light 1.

The light on the lower horizontal arm is Light 2.
5. Stryker Visum® Hardware Overview

5.1 Safety
The Stryker Visum® Surgical Lighting system is available in single and dual light head configurations. Two and three light heads in a surgical suite provide safety for the patient due to the qualities of the reflector providing light from hundreds of different angles. Stryker Visum® light heads provide maximum protection against light failure through their redundant bulb mechanism. This safety is increased when they are connected to an emergency power supply, in addition to the mains supply. Various combinations of the Stryker Visum® lights can be used by all surgical specialties in any area of the hospital where high-quality surgical light is needed.

5.2 The Touch Panel Interface: Surgical Lighting
All controls for the Stryker Visum® lights and StrykeCam® In-Light Camera can be accessed from the control panel located near the documentation station.

Controls:

On: press ON/OFF button.
Off: press ON/OFF button.
Intensity Up: press and hold “Brighter” button.
Intensity Down: press and hold “Dimmer” button.

Indicator:
Reserve bulb indicator: illuminates when light is running on reserve bulb.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Light 2 ON/OFF</td>
</tr>
<tr>
<td>B</td>
<td>Light 2 Brightness Dimmer</td>
</tr>
<tr>
<td>C</td>
<td>Light 2 Brightness Brighter</td>
</tr>
<tr>
<td>D</td>
<td>Light 1 ON/OFF</td>
</tr>
<tr>
<td>E</td>
<td>Light 1 Brightness Dimmer</td>
</tr>
<tr>
<td>F</td>
<td>Light 1 Brightness Brighter</td>
</tr>
<tr>
<td>LED 1</td>
<td>Light 2 Reserve Bulb Indicator</td>
</tr>
<tr>
<td>LEDs 2-8</td>
<td>Light 2 Brightness Indicator</td>
</tr>
<tr>
<td>LED 9</td>
<td>Light 1 Reserve Bulb Indicator</td>
</tr>
<tr>
<td>LED 10-16</td>
<td>Light 1 Brightness Indicator</td>
</tr>
</tbody>
</table>
6. Installation and Start Up

6.1 Installation Instructions
Mounting and installation of the Stryker Visum® lights must only be performed by Stryker employees or by authorized Stryker personnel. The installation of lights on the ceiling of the operating room must be performed in accordance with Stryker’s mounting instructions due to weight and high torque.

Incorrect assembly of the lights can result in ceiling anchorage damage and the light falling down, critically injuring the patient and operating staff in the process. The on-site electric installation must be performed in accordance with IEC 60364-710 and include a fuse protection as well as a mains switch for a simultaneous all-pole separation of the light. For further information, please refer to the Stryker Visum® Surgical Lights and Flat Panel Arms Pre-Installation Guide.

6.2 Prior To Use
The surgical staff can begin to use the light after Stryker:
1. Has carried out a performance check at the place of operation and
2. Has in-serviced the end users on the use of the lights.

6.3 Adjusting the Field Diameter Size
Adjustments to the size of the light field at the surgical site can be made by turning the light handle. Turn the handle in the clockwise direction to make the light field larger. Turn the light handle counterclockwise to make the light field smaller. The ideal person to determine the correct size of the light field is the surgeon or the scrubbed-in surgical technician. Match the size of the light field to the size of the surgical field so that the light illuminates roughly one inch on either side of the incision. This will allow the surgeon and other sterile personnel in the field to see properly. When the user has reached either the smallest light field or the largest light field, the light handle will click.

6.4 Positioning the Lights
Before starting the case, place the surgical lights in the ideal initial position so that they can be easily maneuvered around the table by sterile personnel during the procedure. Position one light at the head of the table and one at the foot, along the medial line of the patient. Keep the two horizontal arms directly opposite each other (as shown in the diagram) with the cardanic suspension to the outside. Keep the light facing approximately one meter (39 inches) from the operative site for ideal shadow resolution and depth of field. Non-sterile personnel may use the rails on the side of the light heads to position the lights. Surgeons or other sterile personnel should use the light handle in the center of the light to move the light heads.
WARNING  Prolonged exposure to lamp light may intensify or accelerate wound drying.

WARNING  Exposure to overlapping light fields from multiple lamps may cause excessive heat generation.
7.1 Attaching the Camera Head

The top light (Light 1) is your camera ready light.

1. Remove the light cover from the light handle assembly.
2. Remove the light handle assembly from the light.
3. Turn the light head vertical so that the light facing is perpendicular to the floor.
4. Align the connector of the handle with that of the light head and insert into the light head.
5. Tighten the three set screws.
6. Place the camera handle cover on to the camera head.

7.2 White Balance

WHITE BALANCE is used to correct slight color differences caused by varying light conditions. Turn on surgical light and point camera at clean white surface. Look at the monitor and make sure that no glare is visible off of the white surface. Ensure that the white surface fills the entire screen before white balancing.

Press and hold the WHITE BALANCE button until the LED begins flashing. Continue pointing the light and camera at a clean, white surface until the LED stops flashing.

7.3 Auto Focus

Auto Focus maintains picture clarity as the lights are repositioned closer or further from the surgical site.

7.4 Iris

The Iris setting automatically adjusts the brightness of the video picture in response to varying light levels without using the up or down buttons. When set on Auto Iris and the intensity of the surgical light is either increased or decreased the camera will automatically adjust.

**Note** Only monitors approved according to IEC 60601-1 may be used in conjunction with StrykeCam®.
8. Camera Controls

8.1 The Touch Panel Interface: In-Light Camera

All controls for the Stryker Visum® lights and StrykeCam® In-Light Camera can be accessed from the control panel located near the Documentation Station.

Controls:

**On**: press ON/OFF button.

**Off**: press ON/OFF button.

**White Balance**: press the “White Balance” button and wait until the LED stops flashing.

**Focus**: press and hold the “Auto” button for Auto Focus. The LED will light up in “auto”. The up and down arrows are available for manual focus.

**Iris**: press and hold the “Iris” button for Auto Iris. The LED will light up in “auto”. The up and down arrows are available for manually setting the iris.

**Zoom In**: press and hold “Up” button.

**Zoom Out**: press and hold “Down” button.

<table>
<thead>
<tr>
<th></th>
<th>Camera ON/OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Camera Focus down (out)</td>
</tr>
<tr>
<td>H</td>
<td>Camera Auto Focus (press and hold for Auto Focus)</td>
</tr>
<tr>
<td>J</td>
<td>Camera Focus up (in)</td>
</tr>
<tr>
<td>K</td>
<td>White Balance (press and release: when LED stops flashing, camera is white balanced)</td>
</tr>
<tr>
<td>L</td>
<td>Camera Iris down</td>
</tr>
<tr>
<td>M</td>
<td>Camera Iris up</td>
</tr>
<tr>
<td>N</td>
<td>Camera Auto Iris (press and hold for Auto Iris)</td>
</tr>
<tr>
<td>P</td>
<td>Zoom Out</td>
</tr>
<tr>
<td>Q</td>
<td>Zoom In</td>
</tr>
</tbody>
</table>

LED 17: Auto Focus ON

LED 18: White Balance ON

LED 19: Auto Iris ON
9. Changing the Bulb

9.1 Light Bulb Replacement

Each Stryker Visum® Surgical Light has two bulbs in the light handle assembly. One bulb is the primary bulb, while the other is the automatic reserve bulb. When the primary bulb fails, the automatic reserve bulb moves into position with 100% power and an identical field. The reserve bulb indicator on the wall control panel will illuminate to let the user know to change the bulb.

Each bulb is rated at 1000 hours: roughly three months of use in an average operating room. When the primary bulb fails in your Stryker Visum® Surgical Light, please change the bulb at the end of the day or between cases. This way, you will always benefit from the safety of the automatic reserve bulb.

Note
The Visum 600 and Visum 450 use different bulbs. Consult the “Re-Order Parts” section of this manual for correct bulb type. Use of incorrect bulb will result in reduced performance and/or overheating.

9.2 Preparation

Prior to changing the bulb, the power to both lights must be turned off.

Warning Risk of Electrical Shock - More than one supply may be used to feed this equipment. Disconnect all remote supplies before servicing.

Warning The bulb may be hot. Please allow the bulb to cool before replacing to avoid burns.

Once the power is turned off, return to the light that is on reserve bulb, and proceed in the following manner:

1. Pull the light head as close to the ground as possible.
2. Turn the light so that the light facing is pointed toward the ceiling.
3. Remove the light handle cover.
4. Loosen the three knurled screws.
5. Remove the light handle assembly, making sure the light head does not rise when the weight is removed.

Note
The Visum 600 and Visum 450 light heads use different light handles. Consult label on light handle to determine correct parts. Use of incorrect light handle could result in decreased performance and/or damage to light.
9.3 Removing the Bulb

The reserve bulb will now be in the center of the light handle assembly and the burned out primary bulb will be to one side. The burned out bulb will most likely have a broken filament.

Remove the bulb in the following manner:

1. While holding the light handle assembly in one hand, remove the burned out bulb and discard.
2. Remove the porcelain bulb holder by removing the two screws with the screwdriver provided in the bulb package.
3. Replace the porcelain bulb holder and tighten the two screws.
4. Unwrap the new bulb and expose the two prongs.

Caution Do not touch the halogen bulb with your bare fingers. If you do, clean off the oils with a tissue.

9.4 Replacing the Bulb

Using the bulb’s plastic wrapper as a holder, replace the bulb in the following manner:

1. While holding the light handle assembly close to your eyes, line up the two bulb prongs with the two holes on the holder.
2. Remove the porcelain bulb holder by removing the two screws with the screwdriver provided in the bulb package.
3. Once lined up, gently insert the prongs into the holes.
4. Using the base of the bulb as leverage, firmly push the bulb into place. Discard the plastic wrapper.
5. Looking at the light from the side, and line up the two Sub-D connectors.
6. Place your hand on the hood and insert assembly into light head.
7. Tighten the three knurled screws.
8. Turn on the light to make certain the new bulb is functioning properly.

Note Replacement bulbs may only be purchased from Stryker. Refer to the “Re-Order Parts” section of this manual for more information.
10. Attaching the Sterilizable Light Handle Cover

1. Align sterile handle and black part of light handle assembly.
2. Push sterile handle onto light handle assembly.
3. Turn clockwise until an audible “click” is heard.
4. Sterile cover is now fixed in place.
5. To remove, push up on center button of light handle and remove.

Note: If a handle is contaminated during a case, immediately have the circulating nurse remove that light handle cover. Have an extra handle sterilized for all cases in the event the handle becomes contaminated.
11. Cleaning and Disinfecting

All parts of the Stryker Visum® light can be cleaned and disinfected with standard medical grade cleaners on all of its exterior surfaces including the control unit.

11.1 Cleaning and Sterilization of the Reusable Handles

**Warning** Handles are shipped non-sterile. For the safety of medical personnel and patients, clean and sterilize handles prior to use.

**Note** Sterilizable handles and aluminum camera covers have been confirmed to last the equivalence of 390 sterilization cycles. The sterilizable handles and aluminum camera covers should be replaced after 390 sterilization cycles has been reached.

**Sterilizable Handle Cover**

**WARNING** Blind holes require particular attention during cleaning.

<table>
<thead>
<tr>
<th>Limitations on reprocessing</th>
<th>Not applicable.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Point of use</td>
<td>Wipe excess soil from the device using disposable paper towels.</td>
</tr>
<tr>
<td>Containment and transportation</td>
<td>Reprocess the device as soon as reasonably practical following use.</td>
</tr>
</tbody>
</table>
| Preparation for cleaning    | 1. Prepare an enzymatic detergent according to the manufacturer’s recommendations.  
2. Dip a clean cloth into the detergent and wipe the entire device.  
3. Immerse the device in the detergent.  
4. Soak the device in the detergent for at least 15 minutes. |
| Cleaning: Manual method     | 5. Remove debris from all surfaces using a soft brush dipped in the enzymatic solution.  
6. Rinse the handle thoroughly under running lukewarm water; flush water through all passages.  
7. Dry the handle with a lint free cloth. |
### Cleaning: Automated method

1. Rinse the device with treated water at ambient temperature until there is no visible detergent residue. Continue to rinse the device for a minimum of 30 seconds after all detergent residue has been removed.
2. Place the device in the washer on an incline to facilitate drainage.
3. Program the washer using the following parameters:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Recirculation Time</th>
<th>Water Temperature</th>
<th>Detergent Type and Concentration (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Wash</td>
<td>2 minutes</td>
<td>Cold</td>
<td>N/A</td>
</tr>
<tr>
<td>Enzyme Wash</td>
<td>2 minutes</td>
<td>Hot</td>
<td>Enzymatic Detergent</td>
</tr>
<tr>
<td>Wash 1</td>
<td>2 minutes</td>
<td>Set Point (66°C)</td>
<td>Regular Detergent</td>
</tr>
<tr>
<td>Rinse 1</td>
<td>2 minutes</td>
<td>Hot</td>
<td>N/A</td>
</tr>
<tr>
<td>Dry Phase</td>
<td>7 minutes</td>
<td>115°C</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* If necessary, use pressurized air to aid in drying. Visually inspect each device for cleanliness.

### Disinfection

Not applicable

### Drying

If necessary, use pressurized air to aid in drying.

### Maintenance, Inspection, and Testing

Inspect handles before and after use. Discard the handle if it is damaged.

### Packaging

When filling the autoclave, ensure that the open sides of the handles are facing down. Make certain the handles are not touching any other items while being sterilized.

### Sterilization**

1. Individually wrap in two layers of polypropylene wrap, (Kimguard KC600) or similar.
2. Place in sterilizer with the following parameters:

<table>
<thead>
<tr>
<th>Sterilization Type</th>
<th>Preconditioning Pulses</th>
<th>Minimum Temperature</th>
<th>Full Cycle Time</th>
<th>Minimum Dry Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-vacuum steam sterilization (wrapped)</td>
<td>3</td>
<td>132°C</td>
<td>4 minutes</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Gravity-displacement steam sterilization (wrapped)</td>
<td>NA</td>
<td>132°C</td>
<td>10 minutes</td>
<td>20 minutes</td>
</tr>
</tbody>
</table>

### Storage

Keep in instrument tray until use.

** Handle must be sterilized according to ISO17665-1.
<table>
<thead>
<tr>
<th>Sterilizable Camera Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Point of Use</strong></td>
</tr>
<tr>
<td><strong>Containment and Transportation</strong></td>
</tr>
</tbody>
</table>
| **Preparation for Cleaning** | 1. Properly prepare an enzymatic detergent according to the detergent manufacturer's recommendations.  
2. Dip a clean soft cloth into the detergent and wipe the entire surface of the sterilizable camera cover for a minimum of 2 minutes each.  
3. Immerse the sterilizable camera cover in the detergent.  
4. Soak the sterilizable camera cover in the detergent for at least 15 minutes. |
| **Cleaning: Manual Method** | 1. Remove debris from all surfaces of the articles using a soft bristled brush that has been dipped in the enzymatic solution for a minimum of 2 minutes.  
2. Use a pipe cleaner that has been dipped in the enzymatic solution to remove debris from hard to reach areas for a minimum of 2 minutes.  
3. Thoroughly rinse the articles under running lukewarm tap water for a minimum of 2 minutes. During the minimum 2 minute rinse, use a syringe to flush all hard to reach areas with a minimum of 50 mL of lukewarm tap water.  
4. Dry the sterilizable camera cover with a lint free cloth. |
Cleaning: Automated Method

1. Rinse the sterilizable camera cover with treated water at ambient temperature until there is no visible detergent residue. Continue to rinse the sterilizable camera cover for a minimum of 30 seconds after all detergent residue has been removed.

2. Place the sterilizable camera cover in the washer on an incline to facilitate drainage.

3. Program the washer using the following parameters:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Recirculation Time</th>
<th>Water Temperature</th>
<th>Detergent Type and Concentration (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Wash</td>
<td>2 minutes</td>
<td>Cold</td>
<td>N/A</td>
</tr>
<tr>
<td>Enzyme Wash</td>
<td>2 minutes</td>
<td>Hot</td>
<td>Enzymatic Detergent</td>
</tr>
<tr>
<td>Wash 1</td>
<td>2 minutes</td>
<td>Set Point (66° C)</td>
<td>Regular Detergent</td>
</tr>
<tr>
<td>Rinse 1</td>
<td>2 minutes</td>
<td>Hot</td>
<td>N/A</td>
</tr>
<tr>
<td>Dry Phase</td>
<td>7 minutes</td>
<td>115° C</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* If necessary, use pressurized air to aid in drying. Visually inspect each sterilizable camera cover for cleanliness.

Disinfection

Not applicable

Drying

If necessary, use pressurized air to aid in drying.

Maintenance, Inspection, and Testing

Inspect sterilizable camera cover before and after use. Discard the sterilizable camera cover if it is damaged. Damage includes cracks, chips, holes, tears, or anything else that might interfere with the integrity of the sterilizable camera cover.

Packaging

When filling the autoclave, ensure that the open sides of the sterilizable camera covers are facing down for pre-vacuum sterilization cycles and are placed on their side for gravity sterilization cycles (AAMI ST79). Make certain the sterilizable camera covers are not touching any other items while being sterilized.
Sterilization**

Individually wrap in two layers of polypropylene wrap, (Kimguard KC600) or similar.

Place in sterilizer with the following parameters:

<table>
<thead>
<tr>
<th>Sterilization Type</th>
<th>Preconditioning Pulses</th>
<th>Minimum Temperature</th>
<th>Full Cycle Time</th>
<th>Minimum Dry Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravity-displacement Steam Sterilization – US (wrapped)</td>
<td>N/A</td>
<td>132°C</td>
<td>15 minutes</td>
<td>45† minutes</td>
</tr>
<tr>
<td>Gravity-displacement steam sterilization – EU (wrapped)</td>
<td>N/A</td>
<td>134°C</td>
<td>10 minutes</td>
<td>45† minutes</td>
</tr>
<tr>
<td>Pre-vacuum steam sterilization --US (wrapped)</td>
<td>3</td>
<td>132°C</td>
<td>4 minutes</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Pre-vacuum steam sterilization --EU (wrapped)</td>
<td>3</td>
<td>134°C</td>
<td>3 minutes</td>
<td>20 minutes</td>
</tr>
</tbody>
</table>

Storage

Keep in instrument tray until use.

** Sterilizable camera cover must be sterilized according to ISO17665-1.

† The validated gravity dry times exceed the AAMI ST79 standard dry time range for wrapped devices by 15 minutes.

Note

Any modifications to these parameters should be based on standard hospital cleaning/sterilization protocol, and are performed at the discretion of the user, who assumes the risk for modifying these parameters.

Note

These cleaning and sterilization instructions are only recommended instructions and may vary among hospitals depending upon the type of cleaning/sterilization equipment and possible pathogens in the particular area. These instructions represent exposure time and not total cycle time. The recommended cleaning/sterilization parameters may be modified based on standard hospital cleaning/sterilization protocol.
12. Verification Procedure

12.1 Emergency Power Usage Verification Procedure

European Union customers will have power supply boxes equipped with a 24 V DC inlet for emergency power backup in case of mains power loss. When the mains power loss occurs, the light system will blink off momentarily and back on again within 5 seconds. This blink indicates the switch over to emergency power.

If your facility does not have an alarm to notify the user that emergency power is engaged, perform the following steps:

1. Locate power supply box
2. Unplug power cord from wall outlet

Note: If the lights do not blink, the light system is operating off of emergency power.
13. Service/Troubleshooting

One Light:
- Bad bulbs
- Connection loose
- Power supply issue
- Control board in light head

Both Lights:
- Power to lights
- Power supply issue
- Connections
- Bad bulbs

One light or both?

One Light
- Replace bulbs
- Check connections

Both Lights
- Check connections

Not resolved

Check connections:
Turn off power at the supply breaker for the Surgical Lights starting at the power supply box. Check the connections, ensuring they are secure. Check the wall plate. Check the connections near the ceiling plate.

Not resolved

Replace control board in the Light Head

Resolved

Call Stryker Technical Support

In all cases except simple bulb replacement, document your course of action. Please contact Stryker Communications Technical Support so we can update our records.

Note: This is intended to be performed by either a qualified bio-medical engineer or a Stryker Communications Field Support Engineer.

Note: For specific information on each step, refer to the pages of this manual.
13.1 If Both Lights Are Down
First, make sure there is power to the power supply box. If the lights are still not working, then check the connections, wall control box, and the power supply box.

13.1.1 Checking Your Connections
1. Turn off breaker that supplies power to the surgical lights.

   ¡WARNING! Risk of Electrical Shock - More than one supply may be used to feed this equipment. Disconnect all remote supplies before servicing.

2. Starting with connections at power supply box, check all connections and make certain they are secure.
3. Check all connections near ceiling plate of light. Are they all secure?
4. Check all connections at wall control panel.

Turn on breaker and see if lights come on. If not, move to “Replacing the Wall Control Panel”.

Contact Technical Support at (866) 841-5663 for any needed replacement parts.

13.1.2 Replacing the Wall Control Panel
1. Turn off breaker that supplies power to the surgical lights.

   ¡WARNING! Risk of Electrical Shock - More than one supply may be used to feed this equipment. Disconnect all remote supplies before servicing.

2. Turn off mains switch on power supply box.
3. Disconnect the wall control cables from the power supply box.
4. Remove the four screws that hold the wall control panel in place and place them in a safe location.
5. Remove wall control panel and disconnect two connectors.
6. Replace wall control panel and reconnect the two cables.
7. Reconnect the two cables at the power supply box.
8. Turn the breaker on.
9. Turn on the lights and see if they come on. If not, move to “Replacing the Power Supply Box.”

13.1.3 Replacing the Power Supply Box
1. Turn off breaker that supplies power to the surgical lights.

   ¡WARNING! Risk of Electrical Shock - More than one supply may be used to feed this equipment. Disconnect all remote supplies before servicing.

2. Turn off mains switch on power supply box.
3. Unplug the power supply box.
4. Remove all the cables connected to the power supply box.
5. Remove current power supply box.
6. Insert new power supply box.
7. Reconnect all the cables.
8. Plug in the power supply box.
9. Turn on the mains switch.
10. Turn on breaker that controls the surgical light.

Turn on the lights and see if they come on.

13.2 If a Single Light is Down
First, verify that there is power at the main supply box.

13.2.1 Bulbs
If there is power at the wall control panel and the reserve bulb indicator is lit, it is possible that both the primary and reserve bulb in the light are defective. Check both the primary and reserve bulbs of the non-working light. Replace both bulbs if they are burned out and see if the light turns on.

13.2.2 Connections
1. Turn off breaker that supplies power to the surgical lights.

![WARNING Risk of Electrical Shock - More than one supply may be used to feed this equipment. Disconnect all remote supplies before servicing.]

2. Starting with connections at power supply box, check all connections and make certain they are secure.
3. Check all the connections near ceiling plate of light. Verify that they are all secure.
4. Check all connections at the wall control panel.

Turn on breaker and see if the light comes on. If not, move to “Replacing the Control Board”.

Contact Technical Support at (866) 841-5663 for any needed replacement parts.

13.2.3 Replacing the Circuit Board in Light Head
1. Turn off breaker that supplies power to the surgical lights. Unplug power cord to the power supply box.

![WARNING Risk of Electrical Shock - More than one supply may be used to feed this equipment. Disconnect all remote supplies before servicing.]

2. Pull light heads as close to the floor as you can.
3. Carefully peel back black gasket and uncover the screws.
4. Remove the screws and place them in a safe place.
5. Remove hood being careful that the spring arm does not carry the light head up when the weight changes from removing the hood.
6. If light is camera ready, there are two boards inside. The light board looks like following figure.
Caution Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It occurs when electronic printed circuit boards are improperly handled and can result in complete or intermittent failures.

Caution Always follow ESD prevention procedures when removing and replacing boards. Ensure that the light head is electrically connected to earth ground. Wear an ESD-preventive wrist strap (see picture), ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to safely channel unwanted ESD voltages to ground. To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of the light head.

7. Remove the light control board and replace it with a new board. Make sure all connections are secure.

8. Ground the upper filter segment with the reflector as shown in the following picture.

9. Move the ribbon cable above the power control board as shown in the picture below.

10. Replace the hood, screws, and rubber gasket. Power up the light and see if this corrects the problem.

Warning Avoid touching the light circuit board with an open hood and power applied as this may result in electric shock.

If the light works, contact Technical Support at (866) 841-5663 for an RMA number to send the defective board to Stryker.

If none of the solutions above work, contact Stryker Technical Support.
13.3 If the Light Drifts

From the top down, adjust the brakes in the following order:

1. Top horizontal arm
2. Bottom horizontal arm
3. Spring arm
4. Both cardanic suspension screws

The goal when adjusting the brake screws is to make certain the lights are easy to move, yet they stay in place when positioned. Check with your Technology Consultant or Project Manager when adjusting the brakes.

13.3.1 Setting the Horizontal Arm Brakes

1. To increase brake force turn slotted screw in.
2. Set the brakes to prevent drift, but so they can still be easily moved.

To set the two horizontal arms, pull each one all the way extended so that both arms are in a straight line and you are looking down that line. You should be able to move the lower (spring) arm before the upper arm “brakes”. If not, tighten the Allen head screw on the upper arm until you are able to do this. Also, when fully extended, the arms should not move. If they do move, tighten the Allen head screw.

13.3.2 Spring Arm

The test for the spring arm brake is as follows:

1. If you push the light head all the way to the ceiling, it should stay there and not come down when you remove your hand. If it does come down, you must increase the spring tension.
2. If you pull the light head all the way to the floor, it should not drift up towards the ceiling. If it does, you must decrease the spring tension.
3. Test the light head in three positions: at the top, in the middle, and at the bottom. Make certain that it remains in place in all three positions.

To increase or decrease the spring tension, use the 5mm hex key. At the rear (proximal) of the spring arm, there is a hole where the wrench will fit. It is easier to insert the wrench and find the tension screw when the spring arm is pushed slightly up. To tighten the tension (and stop the light head from drifting down), turn the screw clockwise. To reduce the tension (and stop the light head from drifting towards the ceiling), turn the screw counterclockwise.
13.3.3 Cardanic Suspension

There are two 5mm socket head screws on the cardanic suspension to tighten and loosen the tension. You should be able to do easy figure eights with the light heads using only one hand if the screws are set properly. If not, loosen the screws a small amount and continue to try the figure eights.

Once you have made the light heads easy to move, test to see if the cardanic screws are set tightly enough. Rotate the light head on its side and see if it drifts. If so, tighten the screw. Turn the light head the opposite direction and tighten if necessary.
## 14. Stryker Visum® Specifications

### 14.1 Lighting Data

<table>
<thead>
<tr>
<th></th>
<th>Visum 450</th>
<th>Visum 600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Illuminance (at 1m from light) [1x]</td>
<td>40,000 - 94,000</td>
<td>60,000 - 135,000</td>
</tr>
<tr>
<td>Light Field Diameter (d10 at 1m) [mm]</td>
<td>155 - 210</td>
<td>160 - 240</td>
</tr>
<tr>
<td>Light Field Diameter (d50 at 1m) [mm]</td>
<td>80 - 130</td>
<td>85 - 140</td>
</tr>
<tr>
<td>Depth of Illumination (L1/L2) [mm]</td>
<td>1100</td>
<td>1000</td>
</tr>
<tr>
<td>Shadow Dilution with: [% Residual Illumination]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Shadow Caster</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>2 Shadow Casters</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>1 Tube</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1 Tube and 1 Shadow Caster</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>1 Tube and 2 Shadow Casters</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Color Temperature [K]</td>
<td>4000 - 4400</td>
<td>4000 - 4400</td>
</tr>
<tr>
<td>Color Rendering Index</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>Total Irradiance [w/in²]</td>
<td>350</td>
<td>540</td>
</tr>
<tr>
<td>R9</td>
<td>77.1</td>
<td>83.8</td>
</tr>
</tbody>
</table>

### 14.2 Electrical Data

<table>
<thead>
<tr>
<th>Rated Input</th>
<th>115-230 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50-60 Hz</td>
</tr>
<tr>
<td></td>
<td>4-2 A</td>
</tr>
</tbody>
</table>

### 14.3 Mechanical Data

<table>
<thead>
<tr>
<th></th>
<th>Visum 450</th>
<th>Visum 600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Force required to move light up/down</td>
<td>14 N</td>
<td>14 N</td>
</tr>
<tr>
<td>Max load capacity of spring arm</td>
<td>15 kg</td>
<td>21 kg</td>
</tr>
</tbody>
</table>

### 14.4 Operating and Storage Conditions

**Operating/Storage Conditions:** 41°F to 100°F (5°C to 38°C); 10% to 95% relative humidity, no condensation; 20.7 inHg to 31.3 inHg (70.0 kPa to 106.0 kPa)
15. **StrykeCam® Specifications**

### 15.1 Physical and Electrical Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCD sensor</td>
<td>¼” Interline CCD with integrated mosaic filter</td>
</tr>
<tr>
<td>Pixel/effective pixels</td>
<td>768 (H) x 494 (V)</td>
</tr>
<tr>
<td>Video Format</td>
<td>NTSC</td>
</tr>
<tr>
<td>Resolution</td>
<td>470 lines</td>
</tr>
<tr>
<td>White-set</td>
<td>5700K or manual</td>
</tr>
<tr>
<td>Signal to Noise Ratio</td>
<td>&lt;50 dB</td>
</tr>
<tr>
<td>Min. illumination</td>
<td>&lt; 1 lx at F1.4</td>
</tr>
<tr>
<td>Lens</td>
<td>30 x zoom (combined)</td>
</tr>
<tr>
<td>Features</td>
<td>Automatic iris, automatic focus, automatic white balance, &lt;95% humidity</td>
</tr>
<tr>
<td>Power Supply</td>
<td>Through light/max. 12 Watt</td>
</tr>
<tr>
<td>Video Output</td>
<td>S-Video and Composite</td>
</tr>
<tr>
<td>Control</td>
<td>RS 232, TCP/IP, and Touch Panel on wall control</td>
</tr>
</tbody>
</table>

### 15.2 Operating and Storage Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Conditions</td>
<td>32°F to 122°F (0°C to 50°C); 10% to 95% relative humidity, no condensation; 20.7 inHg to 31.3 inHg (70.0 kPa to 106.0 kPa)</td>
</tr>
<tr>
<td>Storage Conditions</td>
<td>-4°F to 140°F (-20°C to 60°C); 10% to 95% relative humidity, no condensation; 20.7 inHg to 31.3 inHg (70.0 kPa to 106.0 kPa)</td>
</tr>
</tbody>
</table>
16. **Stryker Visum® Maintenance Schedule**

16.1 **Quarterly**
- Check maximum intensity of illumination at a distance of 1 m with small luminous field
- Lamp body: check that the hood support screws are properly tightened
- Reserve bulb change
- Brakes (clutch-type brakes)
- Tension of the support arm springs

16.2 **Semiannually**
- Check lamp on/off switch
- Check maximum voltage of bulb
- Intensity adjustment
- Lamp body: check the condition of the cable comb
- Light handle assembly
- Check the contacts of the bulb supports
- Check the power feed cables of the bulb supports
- Check the reflectors of the halogen bulbs
- Check heat filter glass
- Check the collector ring and the strip contacts
- Align the flanged tube
- Check the closing mechanism of the replacement holders
- Check communication to emergency current

16.3 **Annually**
- Support screws of the central positioning shaft/tighten the ceiling tube (min. 204 in-lb [23 Nm])
- Check the means of illumination (the original Stryker halogen bulb: Voltage, Watts)
- Eliminate or cover scratches and damage to the paintwork
- Rubber seals
- Measure the resistance of the security conductor (compliance with VDE standards)

**Note** All maintenance should be performed by Stryker personnel or their customer designate.
17. Maintenance, Service, Claims, and Warranty

17.1 Fuse Replacement
The fuse should be replaced by either biomedical personnel or authorized Stryker personnel.

WARNING To avoid the risk of fire, replace only with a fuse of the value specified on the fuse label on back of the unit.

Warning Risk of Electrical Shock - More than one supply may be used to feed this equipment. Disconnect all remote supplies before servicing.

17.2 Disposal of the Product
The device must be disposed of according to local laws and hospital practices. The device does not contain any hazardous materials.

17.3 Service
If service is needed either during or after the warranty period, contact Technical Support (866) 841-5663 or your Stryker representative.

17.4 Damage Claims
Shipping is FOB Origin. Title transfers to customer upon shipment. Stryker assumes responsibility for loss or damage during shipping. Please contact Technical Support (866) 841-5663 or your Stryker representative if your shipment is lost or damaged.

If you need to return any item, contact Customer Service for an RMA number. After receiving an RMA number, package the item as described by Customer Service. Ship the item to the following address:

Stryker Communications
(RMA#______)
571 Silveron Blvd.
Flower Mound, TX 75028
Toll Free: (877) 789-8106

17.5 Stryker Limited Warranty
This warranty applies to customers in the United States only. Outside of the USA, contact your Stryker sales representative or your local Stryker subsidiary.

Stryker warrants that its products shall be free of defects of material and workmanship for a period of two years after date of installation. Stryker will provide all parts and service required to restore equipment under warranty to good working condition, which may include shipment of replacement parts and phone service consultation to conduct minor repairs.

Any modifications to this warranty policy are not valid unless made with explicit written approval of Stryker.

This warranty covers all Stryker products with the exception of bulbs, sterilizable handles, filters and any other disposable parts.
This warranty does not cover any cosmetic or superficial damage to product. Any modification to product by Customer without the approval of Stryker will immediately void this warranty in its entirety.

This warranty covers only Stryker products and only such products that were installed or, if necessary reinstalled by Stryker personnel.

This warranty is valid only to the original purchaser of Stryker products directly from a Stryker authorized agent. The warranty cannot be transferred or assigned by the original purchaser.

⚠️ Caution
Never open any of the component systems incorporated in the Stryker Visum® Surgical Light or in the StrykeCam® In-Light Camera. If opened, the equipment warranty may be void.

⚠️ Caution
All Stryker devices must be inspected once a year with regard to the following points: damage to paint, cracks on plastic parts, deformation of the system, and loose parts.
## 18. Re-Order Parts

<table>
<thead>
<tr>
<th>Visum 450</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>682-000-013</td>
<td>Bulbs, Visum 450, package of 6</td>
</tr>
<tr>
<td>682-000-180</td>
<td>Handles, Regular, package of 6</td>
</tr>
<tr>
<td>682-000-183</td>
<td>Handle, Camera AL, package of 3</td>
</tr>
<tr>
<td>682-000-190</td>
<td>Handles, Camera, package of 6</td>
</tr>
<tr>
<td>682-000-019</td>
<td>Pkg, Visum 450 Weighted Light Handle Assembly</td>
</tr>
<tr>
<td>682-000-276</td>
<td>Pkg, Devon glove adaptor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visum 600</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>682-000-170</td>
<td>Bulbs, package of 6</td>
</tr>
<tr>
<td>682-000-180</td>
<td>Handles, Regular, package of 6</td>
</tr>
<tr>
<td>682-000-183</td>
<td>Handles, Camera AL, package of 3</td>
</tr>
<tr>
<td>682-000-190</td>
<td>Handles, Camera, package of 6</td>
</tr>
<tr>
<td>682-000-261</td>
<td>Pkg, Weighted Light Handle Assembly</td>
</tr>
<tr>
<td>682-000-276</td>
<td>Pkg, Devon glove adaptor</td>
</tr>
</tbody>
</table>

**Note**  
Consult label attached next to bulb to determine model of light and replacement bulb.
19. Contact Information

Contact Stryker Customer Service with any questions or concerns.

Stryker Communications
571 Silveron Blvd.
Flower, Mound, TX 75028
Toll Free: (877) 789-8106
1-972-410-7100

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