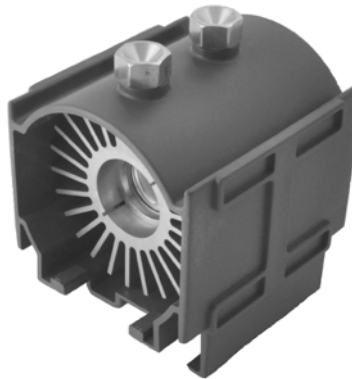


# XENON ARC BULB

(FOR LAMBDA LS AND  
LAMBDA DG-4 & DG-5 (PLUS)  
SERIES SYSTEMS)

## REPLACEMENT INSTRUCTIONS

REV. 1.03 ( 20210128)



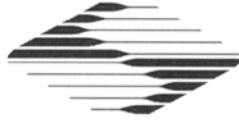
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# CE EU Declaration of Conformity

Application of Council Directives:  
2014/30/EU (EMC), 2014/35/EU (LVD), and 2015/863/EU (RoHS 3)

**Manufacturer's Name:** Sutter Instrument Company

**Manufacturer's Address:** One Digital Drive  
Novato, CA. 94949 USA  
Tel: +1 415 883 0128

**Equipment Tested:** Lambda LS Xenon Arc Lamp Light Source System

**Model(s):** LB-LS/30 and LB-LS/17

**Conforms to Standards:** EMC Emissions: EN 61326-1:2013, including:  
EN 55011: 2009 Class B;  
EN 61000-3-2:2015, & EN 61000-3-3:2014  
EMC Immunity: EN 61000-4-2:2009, EN 61000-4-3:2011,  
EN 61000-4-4:2012, EN 61000-4-5:2014,  
EN 61000-4-6:2014, EN 61000-4-8:2010, &  
EN 61000-4-11:2004  
LVD (Safety): EN 61010-1:2010  
Photobiological Safety of Lamps & Lamp Systems:  
EN 62471: 2008 / IEC 62471, Ed 1.0 (2006-07)

**Tested/Verified By:** ITC Engineering Services, Inc.  
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Sutter Instrument

**Test Report(s):** 20150212-02F, 20150129-01A, SI\_EMC\_LBLS\_20160713;  
20200520\_REACH and RoHS Compliance Statement

Sutter Instrument Company hereby declares that the equipment specified above was tested and conforms to the EU Directives and Standards listed above, and further certifies conformation to the requirements of the European Union's Restriction on Hazardous Substances in Electronic Equipment Directive 2015/863 (2011/65/EU Annex II) for RoHS 3.

Project Engineer: Mark Flaming  
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# CE EU Declaration of Conformity

Application of Council Directives:  
2014/30/EU (EMC), 2014/35/EU (LVD), and 2015/863 (2011/65/EU Annex II) (RoHS 3)

**Manufacturer's Name:** Sutter Instrument Company

**Manufacturer's Address:** One Digital Drive  
Novato, CA. 94949 USA  
Tel: +1 415 883 0128

**Equipment Tested:** Lambda DG-4/Lambda DG-5/Lambda DG-4 Plus/Lambda DG-5 Plus Ultra-High-Speed Wavelength Switching Illuminator/Light Source System

**Model(s):** DG-4, DG-5 (175W and 300W lamp versions)  
DG4Plus/30 and DG5Plus/30 (300W lamp version)

**Conforms to Standards:** EMC Emissions: EN 61326-1:2013, including:  
EN 55011: 2009 Class B;  
EN 61000-3-2:2015, & EN 61000-3-3:2014  
EMC Immunity: EN 61000-4-2:2009, EN 61000-4-3:2011,  
EN 61000-4-4:2012, EN 61000-4-5:2014,  
EN 61000-4-6:2014, EN 61000-4-8:2010, &  
EN 61000-4-11:2004  
LVD (Safety): EN 61010-1:2010  
Photobiological Safety of Lamps & Lamp Systems:  
EN 62471: 2008 / IEC 62471, Ed 1.0 (2006-07)

**Tested/Verified By:** Lambda DG-4/DG-5: TUV Product Service  
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All: Sutter Instrument

**Test Report(s):** AC107763E01, 20101122-01/SI\_EMC\_LBDG-4P\_201503, 20150212-02F,  
20150129-01A, SI\_EMC\_LBDG-4P\_20160713, 20200520\_REACH &RoHS  
Compliance Statement

Sutter Instrument Company hereby declares that the equipment specified above was tested and conforms to the EU Directives and Standards listed above, and further certifies conformation to the requirements of the European Union's Restriction on Hazardous Substances in Electronic Equipment Directive 2015/863 (2011/65/EU Annex II) for RoHS 3.

Project Engineer:



  
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President

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## SAFETY WARNINGS AND PRECAUTIONS






### Avoiding Electrical Shock and Fire-related Injury

-  Always use the grounded power supply cord set provided to connect the system to a grounded outlet (3-prong). This is required to protect you from injury in the event that an electrical hazard occurs.
- Do not disassemble the system. The only user serviceable parts are the line fuse, the xenon bulb, and the filter wheel (if installed). The line fuse is accessible from the outside of the system. The bulb and the filter wheel are accessible via separate panels on the top of the unit. Bulb replacement and filter wheel installation/removal are covered in separate sections of the manual and should only be attempted with the power cord disconnected.
-  To prevent fire or shock hazard do not expose the unit to rain or moisture.

### Operational

- Operate only in a location where there is a free flow of fresh air on all sides. **NEVER ALLOW THE FREE FLOW OF AIR TO BE RESTRICTED.**
- Do not operate the lamp in an orientation where the output of the CERMAX lamp faces within 45° of straight upward. To do so may cause arc instability and the possibility of damage to the front window of the CERMAX lamp. Note that the lamp output is towards the heat sink mounted on the side of the cabinet.

### Avoiding Physical Injury while System is Powered up and Emitting Light

-  **WARNING: DO NOT LOOK DIRECTLY INTO THE LIGHT GUIDE!** The output of the light aperture or the light guide should be directed into the microscope using the appropriate adapters, directed away from anyone's eyes, and not directed toward any reflective surface.
-  **INFRARED RADIATION:** The infrared radiation (and ultraviolet radiation) generated by this lamp can cause significant skin burns and eye damage.
-  **EXPLOSION:** High internal pressure exists in any xenon arc lamp.
-  **HIGH VOLTAGE:** High ignition voltages, which exist inside the cabinet, can be lethal.
-  **WARNING – OZONE:** The UV-enhanced (“full spectrum”) version of the xenon arc bulb generates significant amounts of ozone, which is toxic. A Lambda-LS or Lambda SG-4-series system installed with a full spectrum bulb must be connected to a ventilation or ozone-removing system (also known as an “ozone eater”) for the evacuation of the ozone produced during operation. Please contact Sutter Instrument (+1-415-883-0128 or [info@sutter.com](mailto:info@sutter.com)) for further information. There are no ventilation requirements for the ozone-free bulb.

For further safety issues, please refer to the safety information on the next page, provided by the original manufacturer of the xenon arc bulb used in the Lambda-LS or Lambda DG-4-series system.

#### Avoiding Physical Injury and Equipment Damage while Replacing the Xenon Bulb



*Before removing the xenon arc lamp bulb housing assembly from a Lambda LS or Lambda DG-4-series system, make certain that the system is powered down (single switch for the Lambda LS or both MAIN and LAMP switches for the Lambda DG-4-series) and disconnect the power cord from the source. Wait at least half an hour for the lamp to cool before removing the lamp bulb housing.*



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## OPERATING HAZARDS

**CERMAX® Lamps**  
 Read the following instructions and take all necessary precautions

### SHORT ARC XENON LAMPS AND SYSTEMS

Proper use and safe operating practices are the responsibility of equipment manufacturers who incorporate the lamp into equipment and users of such lamps and equipment. The supplier of this lamp provides information on its products and associated hazards, but it assumes no responsibility for after-sale operating and safety practices. All lamps are under pressure and must be handled with care. Take appropriate action through baffles, light shields, interlock switches or other safeguards to protect personnel from harm due to operation and/or failure of the lamp.

### SAFE OPERATING INSTRUCTIONS

Do not operate this lamp except in accordance with proper operating instructions and within recommended operating specifications. Direct questions regarding lamp operation or safety to your lamp supplier.

### LAMP DISPOSAL

CERMAX lamps do not have reclaimable parts. Before disposal, it is recommended to relieve a lamp's gas pressure by squeezing the tip-off with pliers until the gas escapes. If gas pressure is not relieved, care should be taken to discard the lamp in a landfill and not an incinerator.

### SAFETY HAZARDS

The operation of lamps involves one or more of the following hazards. In the absence of safe operating practices and precautions, any one of these hazards could result in injury.

**I. EXPLOSION** - The lamps are filled with xenon gas at very high pressure. Lamps must be handled with the same care and caution given any vessel containing these levels of pressure. A hazard exists if the window or ceramic fractures and may cause explosive mechanical failure. Face shields or proper safety glasses are recommended during all handling operations.

**II. HIGH VOLTAGE** - Ignition voltage of some lamp models is very high and can be deadly. If portions of the circuit are exposed, caution must be used in setup and operation of the system. The input power must be disconnected from the power source before attempting any service to the lamp.

**III. INFRARED AND ULTRAVIOLET RADIATION** - Do not look directly at operating lamps or reflected light. Infrared and ultraviolet radiation generated by the lamp can cause skin burns and permanent eye damage.

**IV. OZONE** - Some UV type lamps generate ozone, a toxic gas, by virtue of the ultraviolet radiation. A lamp which gives off ozone must be operated in a well-ventilated area.

**V. HOT SURFACES** - Portions of the lamp can reach temperatures of several hundred degrees centigrade and cause serious burns if touched even after the lamp is turned off.

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## 1. BULB ASSEMBLY

The bulb assembly has the following components:

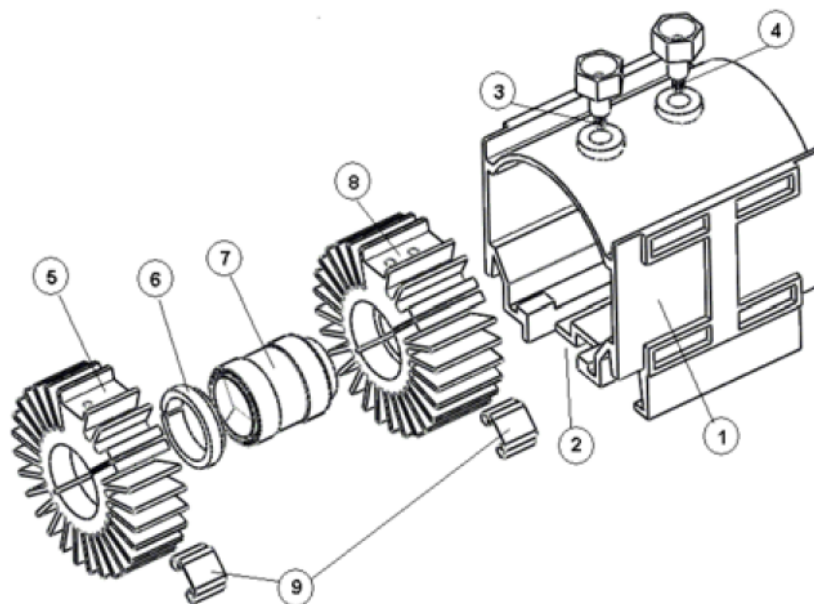


Figure 1. Bulb assembly components.

1. Blue lamp housing
2. Notch indicating the front (light output) side
3. Front terminal (smaller threads)
4. Rear terminal (larger threads)
5. Front (thinner) heat sink
6. Bulb mounting ring
7. Xenon Bulb
8. Rear (thicker) heat sink
9. Heat sink retaining clips

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## 2. REMOVING THE LAMP ASSEMBLY FROM THE SYSTEM



**WARNING:** Before removing the xenon arc lamp bulb housing assembly from a Lambda LS or Lambda DG-4-series system, make certain that the system is powered down (single switch for the Lambda LS or both MAIN and LAMP switches for the Lambda DG-4-series) and disconnect the power cord from the source. Wait at least half an hour for the lamp to cool before removing the lamp bulb housing.

### 2.1 Lambda LS

1. Locate the four thumbscrews that secure the lamp housing cover to the top of the lamp cabinet. This is the cover on which is affixed a warning label.
2. Unscrew the four screws and remove the cover panel to expose the blue plastic lamp housing assembly.
3. Grasp the sides of the housing and carefully pull it straight up and out of the cabinet.

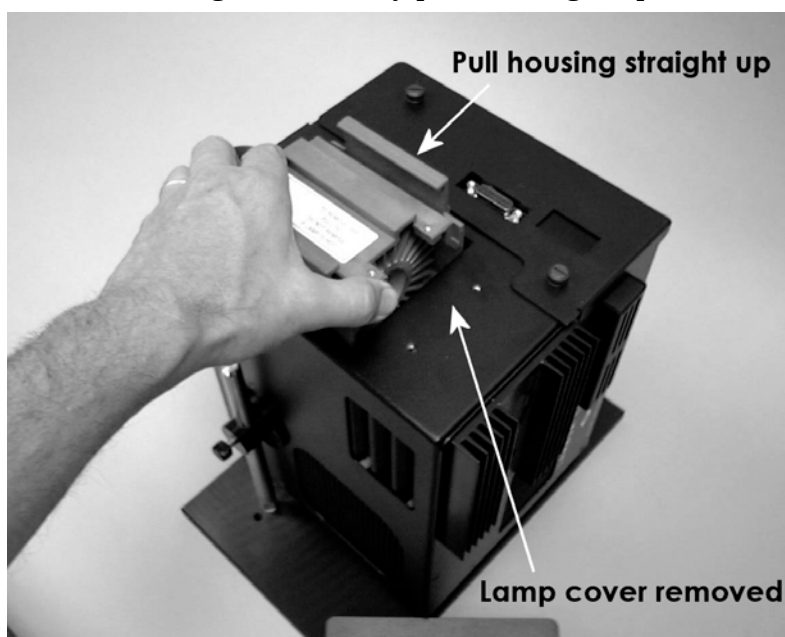


Figure 2. Removing the bulb assembly from the Lambda-LS.

## 2.2 Lambda DG-4/DG-5 and DG-4/DG-5 Plus

1. Remove the five screws at the lower left corner of the left side panel (indicated by the arrows in Figure 3) and remove the lamp access door. This will expose a black cover panel with four knurled screws.
2. Unscrew the four knurled screws and remove the black cover panel. This will expose the blue plastic lamp housing assembly.
3. Grasp the top and bottom handles of the blue plastic housing assembly and, carefully, pull the assembly straight out of the cabinet.

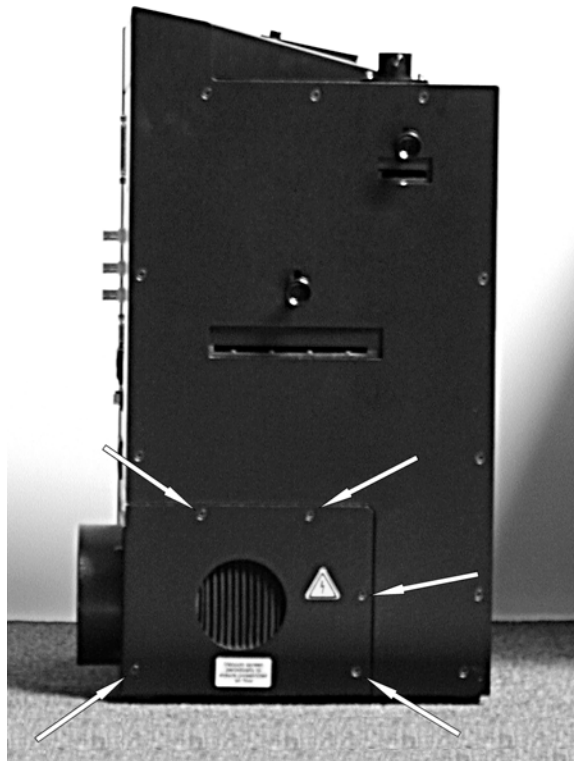


Figure 3. Left side panel of the Lambda DG-4-series system.

## 3. BULB REPLACEMENT

### 3.1 Removing the Existing Bulb

1. Remove both terminals (see Figure 1) from the blue housing.
2. Slide the bulb/heat sink assembly out from the blue housing.
3. Pry one of the retaining clips off one of the heat sinks and remove the heat sink. If the heat sink does not come off the bulb, insert a flat screw driver in the side slit of the heat sink and widen the gap (Figure 4) to remove the bulb. Repeat with the second heat sink.

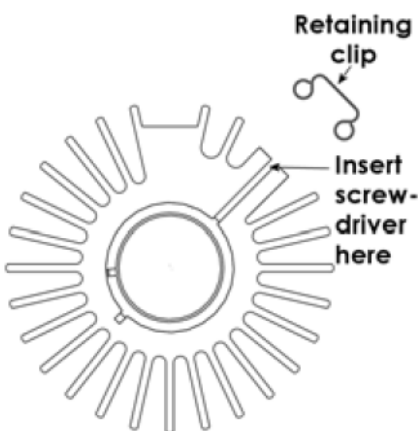


Figure 4. Heat sink retaining-clip removal.

4. Wipe off the white thermal compound from inside the heat sinks.
5. The mounting ring (see Figure 1) might still be inside the front heat sink. Remove it and set it aside. You will need it if the new bulb does not have one.

### 3.2 Installing the New Bulb

1. Without removing the protective cap from the new bulb, apply a thin, even layer of thermal compound to the side surfaces of the anode shell as shown in Figure 5.

**⚠ CAUTION:** *Avoid touching the sapphire window. If heat transfer compound is smeared on the window, it can be removed by gently wiping it off with a dry, lint-free tissue (lens paper or lens cloth).*

2. Slide the rear heat sink on the anode shell and press on or lightly tap the retaining clip, positioning it flush with the inside edge of the heat sink.

**⚠ CAUTION:** *Once the retaining clips are in place, the heat sinks should be tight enough not to slide around the bulb. If they still slide, remove the retaining rings, tighten them using a vice or adjustable pliers, and then reattach them on to the heat sinks.*

3. Remove the protective cap from the new bulb. If there is no mounting ring attached, use the ring from the old bulb. Apply a thin, even layer of thermal compound on the cathode shell on the surface shown in Figure 5. Slide on the front heat sink, align it with the rear

heat sink (Figure 6) and press on the retaining clip positioning it flush with the inside edge of the heat sink.

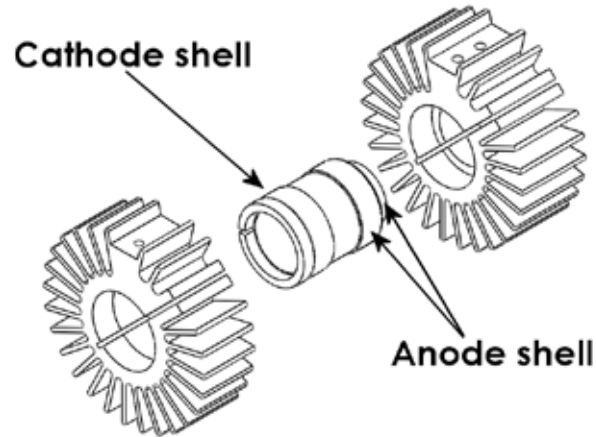


Figure 5. Bulb surfaces requiring they be covered with thermal compound.

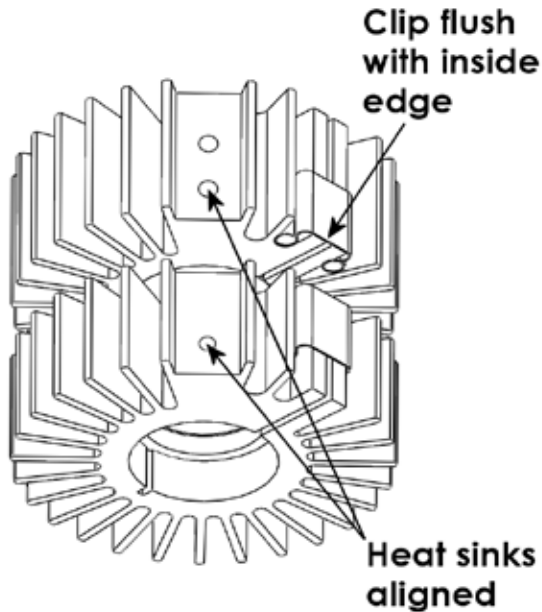


Figure 6. Heat sink alignment and positioning of the retaining clips.

4. Insert the heat sink/bulb assembly into the blue housing. Make sure the SAPPHIRE WINDOW side (output) is the same side as the notch in the blue housing (Figure 7). Screw in the terminals (the one located closer to the sapphire window has smaller threads than the other) slightly more than hand tight to complete the bulb installation in the blue housing.



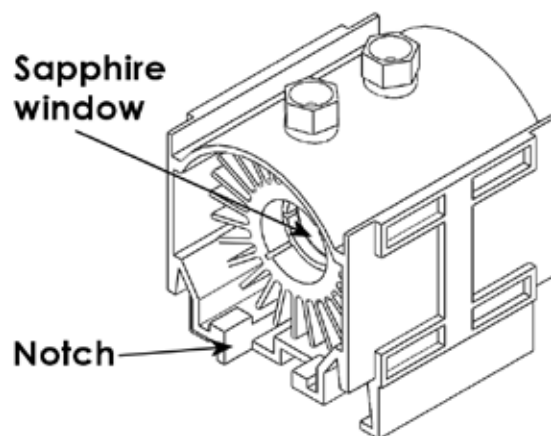


Figure 7. Position of the bulb/heat sink assembly in the blue housing.

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## 4. REINSTALLING THE LAMP/HOUSING TO THE SYSTEM

### 4.1 Lambda LS

1. Grasp the sides of the housing and carefully lower it, terminals forward, into the cabinet. The sapphire window should point away from the lamp fan (Figure 8).
2. Reaffix the cover panel and screw it down with the four thumbscrews previously removed.

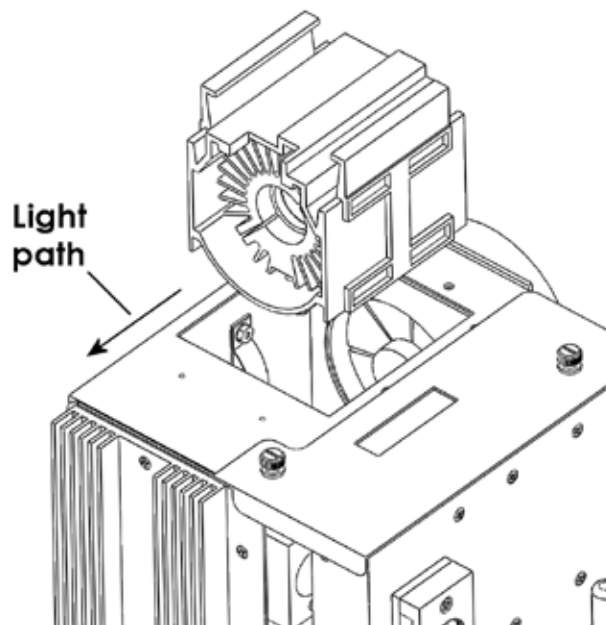


Figure 8. Returning the bulb assembly to the Lambda-LS.

#### 4.2 Lambda DG-4/DG-5 and DG-4/DG-5 Plus

1. Grasp the top and bottom handles of the blue plastic housing assembly and carefully reinsert the assembly into the cabinet (Figure 9) with the bulb window facing away from the lamp fan.

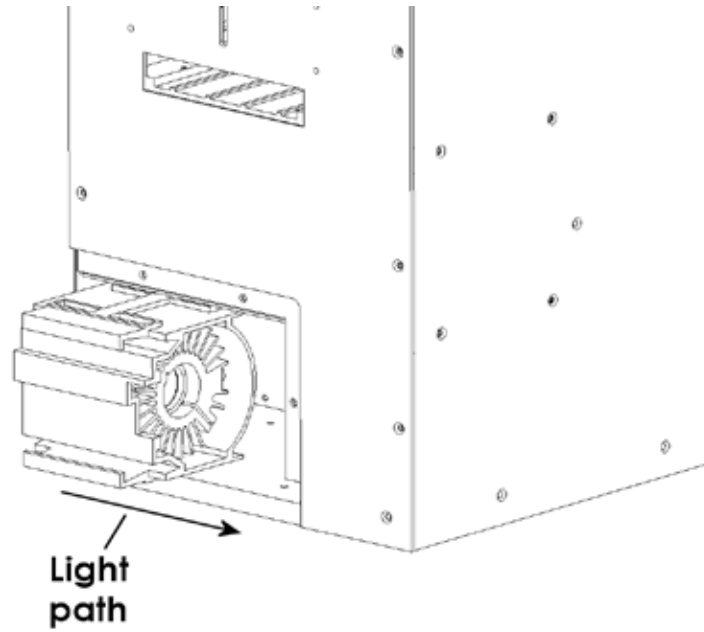


Figure 9. Returning the light bulb assembly to the Lambda-DG-4-series system.

2. Reaffix the black cover panel and screw it in place with the four knurled screws.
3. Screw in the five screws at the lower left corner of the left side panel where the lamp access door is located.

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## NOTES