Installation and Operation Instructions
Lamp Replacement
For UV Resources

CAUTION! Never Expose Eyes or Skin to UV-C

READ ALL MATERIALS BEFORE STARTING.

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, or your supplier for information or assistance. The qualified installer or agency must use factory kits or accessories when installing this product. Refer to the individual instructions packaged with kits or accessories when installing them. Follow all safety codes, wear safety glasses and work gloves. Read all instructions thoroughly and follow any warnings or cautions attached to any accessed area. Consult local building codes and the National Electrical Code (NEC) for all applicable requirements.

Understand the signal words **DANGER**, **WARNING** or **CAUTION**. These words are universally used for overall safety. **DANGER** identifies the most serious hazards, which will result in severe personal injury or death. **WARNING** signifies hazards, which could result in personal injury or death. **CAUTION** is used to identify unsafe practices, which would result in minor personal injury or product and property damage.

WARNING:

Before installing or servicing this unit, turn off all power. There may be more than one (1) switch. Electrical shock can cause injury or death.

CAUTION-UV Exposure Precautions:

1. Doors and covers that give direct access to Ultraviolet (UV-C) lamp systems shall be equipped with an interlocking mechanism that removes power from the Ultraviolet (UV-C) lamp system.
2. It is recommended that access panels and components that are removable for cleaning and servicing and that provide access to other areas inside a unit be equipped with an interlock switch.
3. Never expose eyes or skin to UVC light from any source. Wear gloves, face shield/glasses (per ANSI Z87.1) and cover all exposed skin.
4. Do not touch Emitter glass without gloves. Damage to Emitter may result. Oil from fingerprints will permanently etch glass of Emitter and weaken structure. If necessary, clean Emitter using a UV Resources cleaning kit (isopropyl alcohol and a lint-free wipe may be substituted).
5. Emitter contains a small quantity of mercury. If an Emitter breaks, clean and dispose of with care.
6. At some UV-C system installations locations, installers might require protective barriers (not supplied) and/ or PPE (Personal Protective Equipment) to protect installers & users (operational), service personnel and non-metallic parts from UV energy.

BARRIERS (if required, not supplied):

1. Barriers should be constructed of material that will not be affected by UV-C energy (e.g. metal).
2. Non-Metallic materials may be protected by directly attached barriers such as aluminum coated tape.
3. Both the unit inlet and outlet should be considered as possible Ultraviolet (UV-C) radiation paths when determining barrier locations.
4. The HAVC unit air filters are not considered Ultraviolet (UV-C) radiation barriers.
5. *Removable barriers shall be marked with the words "Caution" and the following or equivalent:* ***"UV LIGHT SOURCE - KEEP PROTECTIVE BARRIER IN PLACE.***

CAUTION-Material Exposure / Degradation:

1. Materials subjected to irradiance from a UV-C lamp system shall be shielded from the UV-C light or be constructed of a material that is capable of withstanding expected UV-C exposure levels without degrading. Materials shall include, but not limited to, wiring, polymeric cabinets, structural components, gaskets, and filters.
2. Protective materials can include barriers (referenced above), conduit, aluminum tape, etc. Please reference ASHRAE® 2020-Systems and Equipment handbook for additional information[1].
3. Inorganic materials such as glass, glass fibers, and metal are not affected by UV-C exposure[1][2][3].
4. Shield all organic material components within 5 ft **(**1.5 m) of the UV-C lamp[1]

WARNING: **Eye damage may** result from directly viewing the light produced by these lamps. To reduce the risk of exposure to UV-C radiation, take UV-C radiation protective measures for personnel during installation & servicing.

WARNING: There shall not be any supply or return air openings or any other openings that are in direct line of sight of the UV lamp.

WARNING: There shall not be any openings in the duct that would emit light.

WARNING: UV Light Hazard. To Prevent exposure to ultraviolet light, be sure the ultraviolet air treatment system is disconnected before servicing any part of the HVAC system or removing any access panel or the equivalent.

CAUTION: Personal Injury Hazard. Power supply can cause electrical shock. Disconnect power supply before servicing or beginning installation.

CAUTION: Risk of exposure to excessive ultraviolet (UV-C) radiation - Do not operate without complete lamp enclosure in place or if sight lens is damaged.

Installation & Operation:

NOTE: ENSURE THAT THE EMITTER IS INSTALLED BEFORE POWER IS APPLIED. INSTALLING THE EMITTER AFTER POWER HAS BEEN APPLIED WILL TRIGGER THE "END-OF-LAMP-LIFE CIRCUIT" AND THE EMITTER WILL FAIL TO LIGHT! IF THIS HAPPENS, SHUT OFF POWER FOR 10 SECONDS AND THEN TURN POWER BACK ON. EMITTER WILL THEN LIGHT.

DE[X] Emitters

1. Turn off power to the fixture.
2. Grabbing the ceramic ends only, rotate the Emitter until its pins can freely slide out of the tombstone (socket) slots. Carefully remove the Emitter along with DE boots.
3. Grab a new Emitter from the ceramic ends, align the Emitter pins with the tombstone slots and carefully push the pins into the slots until it is seated.
4. Rotate the Emitter (about 90°) until one distinct click is heard. The Emitter is now safely locked in place.
5. Return power to the fixture.
6. The Emitter should now emit a bright blue hue.

SL[X] Emitters

1. SL[X] only – Toggle the on/off switch on the fixture to the off position.
2. Turn off power to the fixture.
3. Remove the fixture cover.
4. Detach the power supply lead(s) from the Emitter(s).
5. Squeeze the loops from the holding spring toward each other to release them from the lances.
6. Lift the holding spring away from the Emitter ceramic end.
7. Carefully remove the Emitter from the fixture hole.

[1] ASHRAE-2020. UV-C Photodegradation of Materials. Systems and Equipment Handbook. 17.6
[1] Kaufman, R.E. 2017. Study the HVAC System Photodegradation Caused by the Low Level UVC Light Irradiance Used for Coil Maintenance and Air Stream Disinfection. ASHRAE Research Project 1724, Final Report
[1] Kauffman, R. 2011. Study the degradation of typical HVAC materials, filters and components irradiated by UVC energy. ASHRAE Research Project RP-1509, Final Report.

8. Grab a new Emitter from the ceramic end with the pins. Make sure to not graze the Emitter wires against the inner edges of the fixture hole, and carefully insert the Emitter into the hole. Ensure that the attached O-ring will sit between the ceramic end and the fixture base.
9. Lower the holding spring over the ceramic end. Firmly push the spring down until the O-ring is flat against the fixture base.
10. Push down one of the spring loops and attach to the appropriate lance on the fixture base. Repeat for the other spring loop.
11. Attach the power supply lead(s) to the Emitter(s), noting the arrow orientation on the lamp and connector. Do not force.
12. SL[X] – Ensure that the fixture cover tabs properly fit into the fixture base grooves.
13. Reattach the fixture cover and secure with the existing screw(s).
14. Turn on power to the fixture.
15. SL[X] only – The fixture can now operate by toggling the on/off switch to the on position.
16. The Emitter should now emit a bright blue hue.

DLN[X]/SLN[X] Emitters

1. Turn off power to the fixture.
2. Remove the fixture cover.
3. Detach the power supply lead(s) from the Emitter(s).
4. Remove the “thumb nuts” and washers from the lamp mounting studs.
5. Remove the mounting plate and rubber gaskets.
6. Remove the lamp through the hole in the fixture.
7. Repeat with the second lamp (for DLN[X] only).
8. Grab a new Emitter from the ceramic end with the pins. Make sure to not graze the Emitter wires against the inner edges of the fixture hole, and carefully insert the Emitter into the hole.
9. Reattach the mounting plate and rubber gaskets. Finger tighten the mounting plate with the “thumb nuts”.
10. Align the lamp connector with the pins on the lamp and push until the pins are completely inserted into the connector.
11. Reattach the fixture cover and apply the 6 screws.
12. Turn on power to the fixture.
13. The Emitter should now emit a bright blue hue.

RLM[X] Emitters

Note: The RLM Xtreme comes with EncapsuLamp™, an FEP coating for lamp protection and for encapsulation should the lamp break. DO NOT REMOVED THE FEP COATING FROM THE LAMP.

1. Turn off power to the fixture.
2. Carefully wiggle the IP67 connector to disconnect from the lamp.
3. Remove the ceramic end of the lamp from the C-Clip.
4. Slide lamp out of the quick-slip fitting.
5. Grasp the lamp at the ceramic end with the pins.
6. Grab a new Emitter only from the ceramic end with the pins.
7. Slide the ceramic end of the lamp into the quick-slip fitting.
8. Push the ceramic end of the lamp into the C-Clip to hold into place.
9. Push the ceramic end of the lamp into the IP67 connector, noting the arrow orientation on the lamp and connector. Do not force.
10. Turn on power to the fixture.
11. The lamp should now emit a bright blue hue.

Maintenance

Emitters need to be periodically replaced to maintain the designed output. The change-out basis depends upon the application, number of times switched on/off per day, and the hours of operation. Emitters are to be replaced when output falls to 50% of the initial output (or as specified) by actual radiometer measurements. A UV resources Radiometer Kit may be used for such measurements. If a radiometer is unavailable, Emitters should be replaced after 9,000 hrs. of use.

For the U.S., UV Resources Emitters are classified along with fluorescent lamps as Universal Waste. Large fluorescent lamp users should manage spent lamps in accordance with federal and state disposal laws. The recycling of spent lamps is encouraged. For a list of recyclers, please visit Lamprecycle.org. For other countries, please follow local and country guidelines for fluorescent lamp disposal.

REPLACING THE LAMPS ANNUALLY

Ultraviolet lamps should be replaced annually if operated continuously or after 9,000 hours of use if operated intermittently. Replacement lamps must be the specific size and wattage as originally supplied by the factory.

Note: Although the lamps may continue to generate a characteristic blue glow beyond 9,000 operating hours, the ultraviolet energy emitted by the bulbs degrades over time and will no longer provide the intended benefit.

Troubleshooting

Symptom	Recommended Action (in order of priority)
Emitter Does Not Light	1. Ensure that fixture cover is affixed to the base and that it trips the interlock switch. 2. SL[X] fixtures only – Ensure that on/off switch is set to *on*. 3. Turn off power for 10 seconds, and then turn power back on. 4. Replace Emitter with a known working unit. Normal replacements are recommended once per year. 5. Check line voltage. 6. Check wiring to Emitter. 7. Replace the power supply.
Low Output (Radiometer Reading) or Visibly Weak Light	1. Replace Emitter with a known working unit. 2. Check line voltage. 3. Check electrical wiring to Emitter.
Red/Orange Light	1. Check the ambient temperature. If the temperature is below 35°F, the lamp is too cold to operate properly. 2. If the ambient temperature is more than 35°F, follow actions for the Low Output symptom.

The ultraviolet energy emitted from UV lamps is dependent on the cleanliness and lamp age. The surface of the lamp should be kept as clean as possible for optimum intensity. Depending on the filtration level of the HVAC system and the general hygiene of the building, periodic cleaning may be necessary. Before attempting any maintenance procedures, always follow all warnings and cautions as detailed in this maintenance section.

CLEANING LAMPS

Note: If lamps are found to be broken, see the proper warning and cautions below regarding broken lamps and hazardous vapors.

1. Disconnect all electrical power to the unit and the UV lamps.
2. Wearing soft cloth gloves and safety glasses, grasp the lamp with fingers and twist the lamp until it can be removed from tombstone.
3. Wipe down each lamp with a clean cloth and isopropyl alcohol. Avoid touching lamp glass with hands as skin oils can accelerate lamp degradation. (If lamps are coated with Teflon they can be touched with bare hands).
4. Apply dielectric grease to 4 pins. Place the lamp back in the tombstone and twist the lamp until it clicks into place.

LAMP DISPOSAL:

UV lamps should be treated the same as other mercury-containing devices, such as fluorescent bulbs, according to local regulations. Most lamps must be treated as hazardous waste and cannot be discarded with regular waste. Low-mercury bulbs often can be discarded as regular waste; however, some states and local jurisdictions classify these lamps as hazardous waste. The U.S. EPA's universal waste regulations allow users to treat mercury lamps as regular waste for the purpose of transporting to a recycling facility. The National Electrical Manufacturers Association (NEMA) maintains a list of companies claiming to recycle or handle used mercury lamps at www.lamprecycle.org.

LIMITED EQUIPMENT WARRANTY

FOR DETAILED INFORMATION, VISIT https://uvresources/warranty

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