

GENERAL INSTALLATION INSTRUCTIONS - X-Plus™



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 pre-evaluation, installation or servicing the X-Plus, turn off all power, there may be more than one (1) switch.



CAUTION-UV Exposure Precautions:

1. Doors, covers, lamp mounting brackets, access panels, and removable components that give direct access to Ultraviolet (UV) lamp systems shall be equipped with an interlocking mechanism that removes power from the Ultraviolet (UV) lamp system
2. There should be no openings, holes or joints that allow UV light leakage
3. Drain pans shall be metallic
3. Some UV installations may require protective barriers (not supplied) to protect users, service personnel and non-metallic parts from UV energy.

Barriers (if required, not supplied):

1. Barrier should be constructed of a material that will not be affected by UV 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) radiation paths when determining barrier locations.
4. The unit filters are not considered Ultraviolet (UV) 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. Any non-metallic parts exposed to UV shall be shielded
Note: Metallic barriers, and aluminum tape are appropriate means of shielding. Non-metallic parts include, but not limited to, conductors, connectors, enclosures, housings, drain pans, support pieces, gaskets and filters.
2. Protective materials can include barriers (referenced above), conduit, aluminum tape, etc. Please reference ASHRAE® 2016-Systems and Equipment handbook for additional information¹.
3. Inorganic materials such as glass, glass fibers, and metal are not affected by UV-C exposure¹²³.
4. Shield all organic material components within 5 ft (1.5 m) of the UV lamp¹

General:

1. The X-Plus fixture is NEMA 4X rated for outdoor use and can be used on the exterior of air handlers and/or ducts to bathe surfaces, moving air or both with UV-C energy. For surfaces locate the X-Plus at known growth areas such as the coil and drain pan first, then other moist areas around humidifiers, etc. They can also be placed in return, supply and mixed air plenums or any combination thereof. Perfect for all rooftop A/C equipment applications.
2. Check for power availability and probable service access.

¹ ASHRAE-2016. UV-C Photodegradation of Materials. Systems and Equipment Handbook. 17.5-17.6

² 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

³ Kauffman, R. 2011. Study the degradation of typical HVAC materials, filters and components irradiated by UVC energy. ASHRAE Research Project RP-1509, Final Report.

Power Ratings:

The X-Plus is rated for 120-240Vac 50-60Hz, single phase. NOTE: Grounding should be neutral-to-ground.

Note: Use only: "400mA" (standard output) T5 diameter, 4- pin single ended lamps – sizes 17" – 61" with this product



The health aspects associated with the use of this product and its ability to aid in disinfection of environmental air have not been investigated by UL.

- WARNING:** Eye damage may result from directly viewing the light produced by these lamps. To reduce the risk of exposure to UV radiation, take UV-radiation protective measures for personnel during servicing.
- WARNING:** This fixture is designed for use with germicidal UV-C lamps and must be installed in compliance with competent technical directions so that user's eyes and bare skin will not be subjected to injurious rays.
- 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) radiation - Do not operate without complete lamp enclosure in place or if sight lens is damaged.

Power Consumption:	Electrical			
MODEL #	Watts*	Amps at 120V	Max °F	Lamp Watts
X-PLUS 17" (120-240V)	11	0.09	150°F	20W
X-PLUS 22" (120-240V)	26	0.22	150°F	25W
X-PLUS 33" (120-240V)	41	0.34	150°F	36W
X-PLUS 36" (120-240V)	46	0.38	150°F	40W
X-PLUS 45" (120-240V)	61	0.51	150°F	50W
X-PLUS 60" (120-240V)	73	0.61	150°F	75W

*To calculate amps, divide watts by supplied voltage

Compliance:



Underwriter Laboratories (UL) ABQK, Accessories, Air Duct Mounted. Tested in accordance with ANSI/UL 1995, ANSI/UL 153, ANSI/UL 1598 and ANSI/UL 867.

EPA™ Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), EPA Establishment No. 92627

What's included:

- X-Plus NEMA 4X Fixture
- X-Plus installation Kit:
 - Installation Operation Manual (IOM)
 - Door Warning Label
 - Self-Drilling Mounting Screws (x4)
 - Dielectric Grease

Installation (designed for metal plenums only):

A. Consult all applicable codes before installing. Check fixture label(s) for the correct power requirements and supply the correct voltage from a suitable, protected (fused or breaker), and grounded power source.

CAUTION: Using other than labeled voltage voids product warranty and may do damage to the entire system. Fixtures should be operated continuously to avoid the growth of mold and bacteria during optimum conditions (i.e. AHU off).

B. All UV-C system accesses must be power-interlocked from the source to turn lamp(s) off when the UV-C system is accessed. Access points should have signs in appropriate languages alerting maintenance personnel to the possible hazard of looking at or exposing skin to UV-C energy (English label provided). Lamp accesses may be equipped with glass or Lexan® windows to safely view their operation. Ordinary glass or Lexan® will typically block UV-C energy. It's recommended that any glass be tested for UV-C transmission

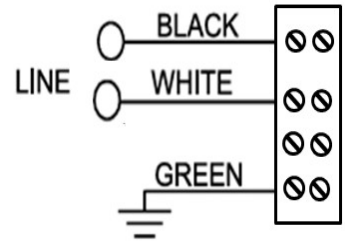
C. Once the mounting location is identified, use the X-Plus fixture housing as a template to mark lamp insertion hole on the metal surface (mounting screw holes can be marked if necessary).



- D. Drill a 1-1/8" lamp hole using proper bit (step drill bit). **CAUTION: Do not drill into refrigerant lines, electrical wires or fan, etc.**
- E. Align and insert the fixture "lamp support" (Pic. 1) into hole and attach to surface using 4 self-tapping/self-drilling screws (provided) (Pic. 3).

Connecting Power:

1. Read fixture label – be sure to sum the power requirements when installing more than one fixture. Wire with the proper 'wire gauge' in accordance with the NEC and local codes. Wire should be run thru acceptable conduit.
2. Power-in must be interruptible at all UV access points using a properly rated, SPST interlock switch to completely de-energize the UV lights when their location is accessed. Note: The X-Plus has its own interlock switch, which is actuated to de-energize the fixture when the fixture is opened.
3. Apply Entry Warning Labels on all access doors/ports/panels as indicated above (one included).

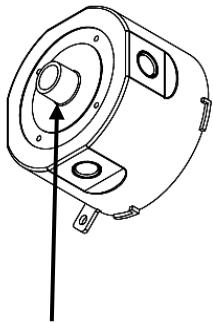


X-Plus Wiring Block

Installing Lamps

CAUTION: 60" lamps installed horizontally may need additional support.

1. Recommended: Before installing lamps they can be cleaned using isopropyl alcohol and a lint free cloth. If using a UV Resources' EncapsuLamp™- this step is not necessary.
2. If the X-Plus is assembled, remove lid, unplug "Molex" connector from top of ballast., remove the power supply screw with a Philips screwdriver (Pic. 2), and then remove the power supply.
3. Hold the Power Supply; unscrew the LampClamp™ from the Power Supply housing (Pic. 4), twisting counterclockwise and remove.
4. Coat the male 4- pin end of the lamp liberally with dielectric grease (supplied) and insert it into the power supply (note pin and plug orientation - rectangle).
5. Slide the LampClamp™ over the end of the lamp – down to the threads. A Firm, finger tight twist holds the lamp secure.
6. Insert the Power Supply, with lamp installed, through the fixture hole and into the cavity (plenum) to be irradiated.
7. Install the Power Supply screw to secure the Power Supply to the fixture and plug the power "Molex" connector back into the power supply.
8. Replace X-Plus's fixture lid and twist firmly until it stops - lock with a padlock if desired.
9. Energize the system and check to make sure that everything is working properly.



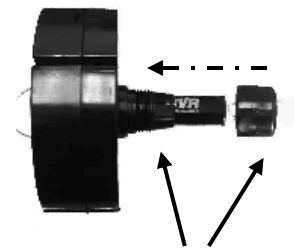
Lamp Support
Pic. 1



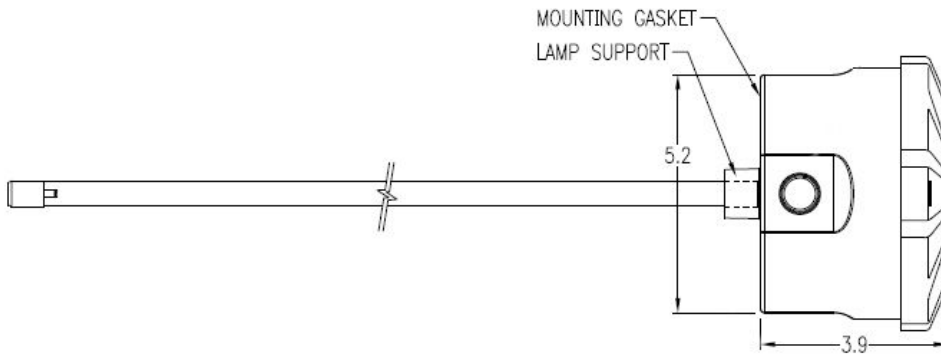
Power Supply Screw
Pic. 2



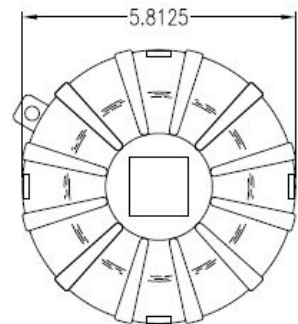
Mounting Screw
Locations (Typ. x4)
Pic. 3



LampClamp™ Assembly
Pic. 4



PLAN VIEW



END VIEW

Maintenance:

The intensity of the ultraviolet energy emitted from the UV lamps is dependent on the cleanliness and age of lamp. The surface of the lamp should be kept as clean as possible for optimum UV 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 remove lid from X-Plus fixture, unplug "Molex" connector from ballast, unscrew the power supply screw, then remove the ballast and lamp.
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. Reinstall lamp into X-Plus fixture.

Replacing the Lamps

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 from the factory.

1. Follow above instructions for **Cleaning Lamps** and **Installing Lamps** to remove power supply and lamp.
2. Remember to apply dielectric grease to 4 pins on end of lamp before inserting into Power Supply

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

Lamp Disposal:

UV lamps should be treated the same as other mercury-containing devices, such as fluorescent lamps, according to local regulations. Most lamps must be treated as hazardous waste and cannot be discarded with regular waste. Low-mercury lamps 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

EQUIPMENT WARRANTY

UV Resources™ (UVR) warrants to the original buyer that its Products shall be free from defects in material or workmanship under normal use and service for the periods of time set forth below. This warranty is contingent upon proper use of Products and will not apply if adjustment, repair or parts replacement is required because of an accident, unusual physical, electrical or electro-mechanical stress, neglect, misuse, failure of electric power, humidity control, transportation, unauthorized repair actions, or not installed or maintained in accordance with UVRs' specifications hereunder, or where Product serial numbers have been altered, defaced, or removed. UVRs' obligation under this warranty shall not arise until the Purchaser of the Product returns the defective part to UVR. This warranty is limited to the repair and/or replacement of parts. This warranty does not cover any labor or subsequent damage incurred as the result of Product failure or indirectly arising from the design, construction, installation, servicing, or operation of Products. UVR and its resellers' liability under this warranty shall in no event exceed the cost of goods sold under the original sale contract.

Under the conditions specified above, UV Resources warrants all X-Plus fixtures for a period of one (3) years from date of purchase and all lamps for a period of 12 months from date of installation provided lamps are installed within 3 months from date of purchase. Buyer must provide proof of purchase. This is UVRs' sole warranty. No warranties are extended beyond those described herein and it is expressly agreed that this warranty will be in lieu of all warranties of fitness and merchantability. UVR neither assumes, nor authorizes any person to assume for it, any obligation in connection with the Products. Buyer shall not return to UVR any allegedly defective goods without UVRs' prior written authorization. This warranty may not be assigned or transferred.

UV Resources™

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