# Ultraviolet Indirect Air Disinfection Instruction Guide

**EPA Reg. No 98409-1**
**EPA Est. No. 98409-TX-1**

## SAFETY WARNINGS

- All personnel should be alerted to the potential hazards indicated by the product safety labeling on this unit.
- The following conventions are used to indicate and classify precautions in this manual and on product safety labeling. Failure to observe precautions could result in injury to people or damage to property.

⚠ This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ **DANGER** Danger indicates an IMMINENTLY hazardous situation, which, if not avoided, WILL result in death or serious injury.

⚠ **WARNING** Warning indicates a POTENTIALLY hazardous situation, which, if not avoided, COULD result in death or serious injury.

⚠ **CAUTION** Caution indicates a POTENTIALLY hazardous situation, which, if not avoided, MAY result in minor or moderate injury.

**CAUTION** Caution used without the safety alert symbol indicates a potentially hazardous situation, which, if not avoided, may result in property damage.


This symbol/pictorial is used to identify an **ELECTRICAL SHOCK** or **ELECTROCUTION** hazard.


This symbol/pictorial is used to identify an **ULTRAVIOLET LIGHT** hazard.


This symbol/pictorial is used to identify the need to wear approved ultraviolet blocking eye wear.


This symbol/pictorial is used to identify the need to wear approved ultraviolet blocking face shield.


This symbol/pictorial is used to identify the need to wear protective gloves.


This symbol/pictorial is used to identify components which must not be disposed of in trash

## SAFETY INSTRUCTIONS

⚠ **WARNING** To guard against injury, basic safety precautions should be observed, including the following:

1. Read and follow **ALL** safety instructions.


⚠ **WARNING** **Avoid exposure to direct or reflected germicidal ultraviolet rays. Germicidal ultraviolet rays are harmful to the eyes and skin.**

2. Intended for indoor use only.
3. Do not alter design or construction.
4. Do not use this fixture for other than its intended purpose, as described in this manual.
5. Do not mount under any source of moisture or condensation, such as humidifiers, cooling coils, etc.
6. Do not remove any labels or devices.
7. ⚠ **CAUTION** Germicidal ultraviolet rays may break down plastic, rubber or other non-metallic materials, with inadequate resistance to ultraviolet. Shield all plastic, rubber or other non-metallic parts such as; plastic drain pans, wire insulation, flex ducts, humidifiers, filters, etc. which may be exposed to direct or reflected germicidal ultraviolet rays.
8. ⚠ **WARNING** **Do not operate without proper electrical ground.**
9. Do not operate the unit if there is visible or suspected damage to the unit or, if applicable, there is damage to power cord and/or plug.
10. Utility power supplied, to the fixture, **MUST** match power requirements listed on the fixture label.
11. ⚠ **WARNING** **Always disconnect power to the unit before performing any service or maintenance.**
12. Ultraviolet light must be contained within duct and visible only through supplied sight glass assembly.
13. Read and follow all notices and warnings on the unit.
14. **SAVE THESE INSTRUCTIONS.**

## SAFETY LABELS







Location of Labels

## CAUTION

It is the user's responsibility to determine and validate the suitability of this equipment for use in the user's system or process.

No warranty or representation is made by the manufacturer with respect to suitability or performance of this equipment or to the results that may be expected from its use.

The user should periodically inspect, clean as necessary and confirm the presence and good legibility of the product safety labels. Contact the factory for replacement labels in the event that any of the labels are missing or illegible.

## PRODUCT APPLICATION

### CONSTRUCTION

IND-AH-UVC-DF-24-SF-PND-24VAC is categorized as indirect type germicidal ultraviolet fixtures, which utilize Germicidal Ultraviolet Lamp(s) with a series of louvers to direct germicidal ultraviolet rays to the upper areas of a room, thereby destroying bacteria and viruses that are carried into the ultraviolet field by convection currents or air circulation.

Each fixture is equipped with a Variable Output Ballast which enables on-site adjustment of ultraviolet output.

The IND-AH-UVC-DF-24-SF-PND-24VAC consists of: a Louver Panel, Parabolic Reflectors with specular aluminum inserts, Electronic Variable Output Ballast, Germicidal Lamp, and Stainless Steel Housing.

## PRINCIPLE OF OPERATION

The IND-AH-UVC-DF-24-SF-PND-24VAC design has been carefully conceived to provide germicidal ultraviolet rays to disinfect the upper room air of occupied spaces in order to reduce the risk of cross infection and exposure of occupants to infectious airborne microbes.

The dosage, as it applies to ultraviolet disinfection, is a function of time, and the intensity, of ultraviolet radiation, to which the air is exposed. The exposure time, in seconds, is the total time it takes the air to move through the ultraviolet field, produced by the germicidal lamp(s). Exposure time is related to the airflow rate; the higher the airflow, the lower the exposure time or the lower the airflow, the higher the exposure time.

The operation of IND-AH-UVC-DF-24-SF-PND-24VAC is as follows:

1. Ultraviolet rays project across the upper room air.
2. Bacteria and virus are destroyed that are carried into the ultraviolet field by convection currents or air circulation.
3. The air in the room is continuously being purified.

## PRINCIPLE OF OPERATION

IND-AH-UVC-DF-24-SF-PND-24VAC requires knowledgeable planning for: location, installation, and continued supervision to prevent exceeding the ultraviolet radiant exposure incident Threshold Limit Value (TLV) set by the American Conference of Governmental Industrial Hygienists.

IND-AH-UVC-DF-24-SF-PND-24VAC requires professional installation so all wiring complies with applicable local and national electrical codes. Installation is permanent, and relatively inflexible.

Safety and maintenance procedures **MUST** be implemented to prevent accidental exposure of personnel and other persons who might enter the irradiated space (Electricians and other trades people in particular). All work performed (painting, new ceilings, equipment or fixture installation, etc.) in the irradiated space must be monitored to ensure that they do not adversely impact the safety or effectiveness of the installation.

As long as installation procedures are followed – unit installed 7 feet above ground level at minimum – the unit is safe to leave on 24/7 while people are around.

## UNPACKING



**IN ORDER TO PERFORM THIS TASK, BE SURE TO WEAR THE FOLLOWING SAFETY EQUIPMENT: SAFETY GLASSES OR A FACE SHIELD, AS WELL AS GLOVES.**

- Remove the IND-AH-UVC-DF-24-SF-PND-24VAC from its shipping carton.
- Larson Electronics takes all possible precautions when packaging this unit to prevent damage. Carefully inspect the unit, power cord and plug for damage and report all damage immediately. Do not assemble or operate if there is any damage, visible or suspected.
- Germicidal lamp(s) are packed separately, to ensure maximum protection for the lamps. Keep the lamp(s) aside until ready for installation.
- Carefully inspect all packing materials to prevent the loss of accessories, mounting hardware, spare parts or instructions.
- Do not discard packing materials until unit is assembled and start up is complete.

The IND-AH-UVC-DF-24-SF-PND-24VAC fixture includes:

- 1 - Model IND-AH-UVC-DF-24-SF-PND-24VAC single lamp fixture
- 1 - Germicidal Ultraviolet Lamp
- 1 - Operating Instructions

## INSTALLATION

### FIXTURE PLACEMENT

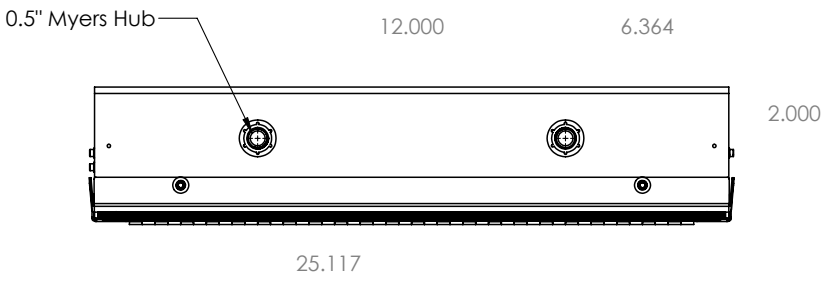
- The fixture is recommended for use in rooms with good ventilation, with a ceiling height of 9 feet or more and where occupants remain for prolonged periods.
- Access to the room does not need to be controlled while the fixture is operating.
- The louver panels of the fixture protects room occupants from ultraviolet exposure, by directing germicidal ultraviolet radiation into the upper areas of the room.
- Any plans for the installation of the fixtures, should take into account the reflectance of the ceiling. Some finishes may have reflectances that are objectionably high, making exposure of more than a few hours unsafe. If any help is needed in determining the reflectance of a surface, please contact the factory.
- Ultraviolet energy, produced by the germicidal lamp(s), can fade some colors and/or alter the surface of some materials especially those directly irradiated by the lamp(s). If any help is needed in determining the ultraviolet resistance of any material, please contact the factory.
- The  fixture is designed to mount horizontally on a vertical surface, or wall, at a **minimum** height of 7 feet above the floor.
- If the fixture includes pendent mount hardware, suspend fixture from the ceiling at a minimum height of 7 feet above the floor. Standard stem pipe length is 18 inches. Other lengths are available, contact the factory with requirements.

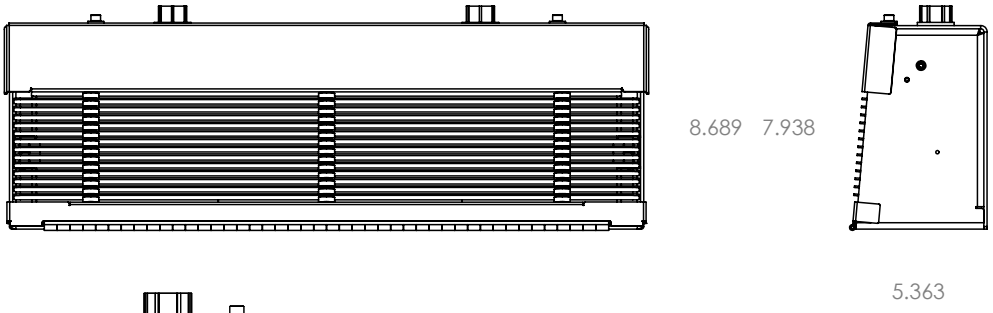
## PRECAUTIONS

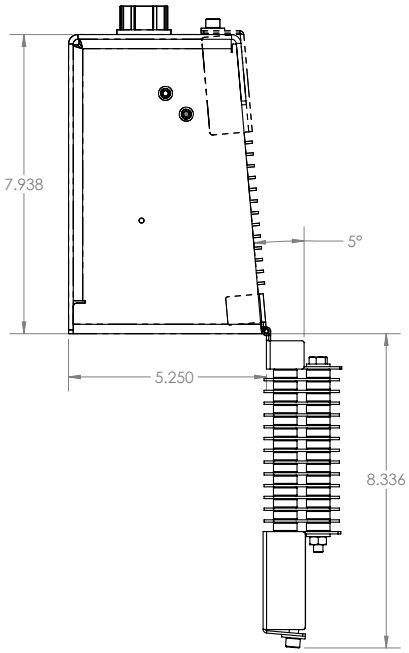
Immediately following initial installation of the  fixture, the occupied area, of the room, should be surveyed with the UV-C Detector, to ensure that the ultraviolet radiant exposure of personnel is within acceptable limits. Thereafter this procedure should be repeated whenever any maintenance is performed, including lamp changes or whenever maintenance or repairs are performed in the vicinity of the fixture. In addition, procedures should be adopted to ensure that the fixture is powered off whenever personnel are working above the 6-foot level. Personnel who work in and around the treated area should be briefed on the benefits and the precautions to be observed.

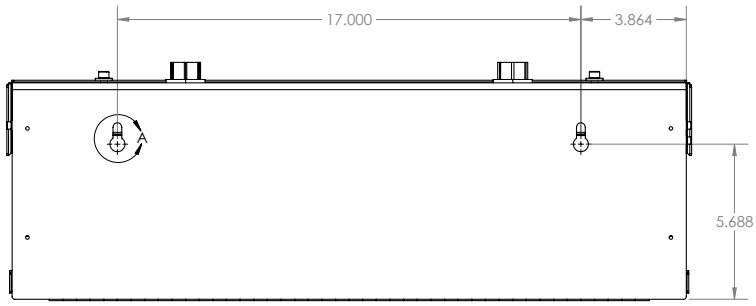
If there are any doubts or questions about the safety or the effectiveness of the installation, or if a sensitive ultraviolet meter is required, please contact the factory.

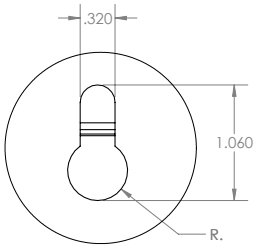





## SETUP INSTRUCTIONS

- The fixture is to be mounted on a plumb, vertical surface, at a **minimum** height of 7 feet from the floor.[To ensure fixture is mounted to a secure vertical surface, installation location must be able to safely support 16 pounds.]
- Remove thumbscrews and open fixture to expose interior lampholders and reflectors.
- Remove one mounting screw from each end of the reflector so that the reflector will be able to pivot toward the lampholder.
- Pivot reflectors, on remaining screws, to expose the rear mounting holes and 7/8-inch wire access hole.
- All wiring should conform to state and local electrical codes as well as the current National Electrical Code (NEC).
- After mounting and wiring, pivot reflectors back into place and replace mounting screws, install lamp(s) following the steps in **"Lamp Installation, Replacement, or Cleaning"** in the **"Maintenance"** section.
- Close fixture and replace thumbscrews.

## MAINTENANCE

**CAUTION** Personal protection equipment, such as gloves; long sleeves with no gaps between cuffs and gloves, and ultraviolet resistant face shield, is **required** when entering the irradiated space, above 6 ½ feet from the floor, with the germicidal lamp operating.

**WARNING** Always disconnect power to the fixture before performing any service or maintenance. The IND-AH-UVC-DF-24-SF-PND-24VAC is equipped with a safety interlock switch that will shut down the germicidal lamp when the louver panel is opened.

**CAUTION** Do not override safety interlock switch. Operation of the fixture with the override of the interlock switch and louver panel open will expose personnel to direct or strongly reflected germicidal ultraviolet rays. Germicidal ultraviolet rays are harmful to the eyes and skin.

- The IND-AH-UVC-DF-24-SF-PND-24VAC is designed to operate with a minimal amount of maintenance. Occasional ultraviolet measurements **MUST** be made to ensure that germicidal ultraviolet intensities in the treated areas remain within the allowable exposure limits and above minimum levels.
- A regular cycle of cleaning the Germicidal Lamp and interior reflectors **MUST** be established based on visual inspection and experience. The frequency of cleaning will vary with the conditions surrounding each installation. It is recommended that the Germicidal Lamp(s) and interior reflectors be cleaned at least once every three (3) months.
- The Germicidal Ultraviolet Lamp(s) used in the fixture have a manufacturer's rated average effective life of 10,000 hours. Lamps may operate longer than the rated effective life, but the reduction in ultraviolet output will make it impractical to use past the manufacturer's rated life. For maximum efficiency lamp replacement is recommended every 10,000 hours of operation or about one (1) year of continuous use.
- Unless lamp replacement is due to failure or breakage, it is recommended that all lamps be replaced at the same time.

## UNIT AND LAMP INSTALLATION, REPLACEMENT, OR CLEANING



**IN ORDER TO PERFORM THIS TASK, BE SURE TO WEAR THE FOLLOWING SAFETY EQUIPMENT: SAFETY GLASSES OR A FACE SHIELD, AS WELL AS GLOVES.**

**WARNING** **Always disconnect power to the unit before performing any service or maintenance.**

**CAUTION** **Ultraviolet lamps are easily damaged and may cause injury if broken. Exercise care when handling.**

1. Shut down power to the fixture, and disconnect fixture from utility power source.
2. Open the louver panel, by removing the two (2) bolts.
3. To remove lamp, push the lamp to compress the spring-loaded lampholder. When the lamp contact/pin clears the lampholder, angle the lamp away from fixture and pull out.
4. Moisten a clean, lint-free cloth with denatured alcohol and wipe down the outer surface of the lamp.
5. When lamp has been removed and cleaned, then safely set aside, remove any loose dust or dirt fromthe interior of the fixture with a soft dry cloth, or vacuum. The reflector of the IND-AH-UVC-DF-24-SF-PND-24VAC is constructed from specular aluminum, a highly reflective mirror like material, used to maximize ultraviolet intensity.
6. To remove any dust, dirt, fingerprints, smears, etc, from the outer surfaces of the reflector, moisten a clean, lint-free cloth with denatured alcohol and wipe down the reflector. Buff out any streaks, left from the cleaning, using a soft dry cloth.
7. Install lamp, push the lamp to compress the spring-loaded lampholder. When the lamp contact/pin clears the lampholder, line up the contact pin on the end of the lamp with the hole in the center of the lampholder and release the lampto allow the contact pin to seat.
8. Verify that lamp is properly seated.
9. Close fixture and replace thumbscrews.
10. Reconnect fixture to utility power, and restart fixture.

**WARNING** **Avoid exposure to direct or reflected germicidal ultraviolet rays. Germicidal ultraviolet rays are harmful to the eyes and skin.**

11. Verify operation by viewing lamp, use of personal protection equipment is required. If the fixture is not operating properly, go to **"Troubleshooting"** section.

## BREAKAGE

**CAUTION** **Broken Quartz is SHARP.**



Wear protective gloves when handling broken ultraviolet lamp(s). In the event of breakage, **DO NOT** use a household vacuum cleaner to pick up quartz fragments. Sweep up debris into a plastic bag and dispose of properly.

## DISPOSAL OF MERCURY ADDED LAMPS



Germicidal ultraviolet lamps, like standard fluorescent lamps contain small amounts of mercury. Mercury added lamps should not be placed in the trash. Dispose of properly. For further information regarding the disposal and recycling of lamps containing mercury, along with Federal and State requirements visit www.lamprecycle.org.

## TROUBLESHOOTING

**WARNING Always disconnect power to the unit before performing any service or maintenance.**



Use personal protection equipment, such long sleeves with no gaps between cuffs and gloves, and ultraviolet resistant face shield, if troubleshooting IND-AH-UVC-DF-24-SF-PND-24VAC.

**IMPORTANT:** This unit is to be serviced **ONLY** by qualified, and appropriately trained and/or licensed personnel.

**Table 1 – Troubleshooting**

| Problem | Possible Cause | Corrective Action |
|---|---|---|
| Fixture not operating | No electrical power | Verify that the unit is connected to a live power source. |
| | Power connections to fixtures, loose or disconnected | Verify power connections to fixture are fully engaged. |
| Germicidal lamp(s) not operating | Lamp(s) not installed | Install lamp(s). |
| | Germicidal Lamp not properly seated | Confirm connection between lamp and lampholder is tight, and that lamp is making full contact with lampholder. |
| | Germicidal Lamp faulty | Swap suspect lamp, with known good. If known good lamp does not operate, replace ballast. |
| | Ballast not functioning | Locate ballast and replace. |
| | Interlock Switch open | Confirm louver panel is closed and secured. |
| | Interlock Switch faulty | Replace Interlock Switch. |

THESE INSTRUCTIONS MAY NOT COVER ALL DETAILS OR VARIATIONS OF THIS PRODUCT FOR YOUR EQUIPMENT OR INSTALLATION REQUIREMENTS. SHOULD FURTHER INFORMATION NOT COVERED BY THESE INSTRUCTIONS BE REQUIRED, PLEASE CONTACT LARSON ELECTRONICS BY EMAIL AT SALES@LARSONELECTRONICS.COM OR BY PHONE AT 1-800-369-6671 FOR FURTHER ASSISTANCE.

PLEASE VISIT LARSONELECTRONICS.COM FOR **WARRANTY** AND **RETURN** INFORMATION.