# UV Locker User's Guide

Model#: UVL432

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10082021

## Disclaimer

The UV Locker is not a medical device. It does not treat nor prevent any diseases. Effects of UVC rays on microorganisms are based on publicly available white paper scientific publications. Do not place live animals in chamber. It is illegal to use this device for other purposes than described by the manufacturer, in accordance with regulations set forth by the Environmental Protection Agency.

## EPA Registration

MiKa Digital is registered with the EPA.

Company Number: 99374

Establishment Number: 99374-TX-1

## Contact Information

MiKa Digital Services, Inc.
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## Unpacking your UV Locker

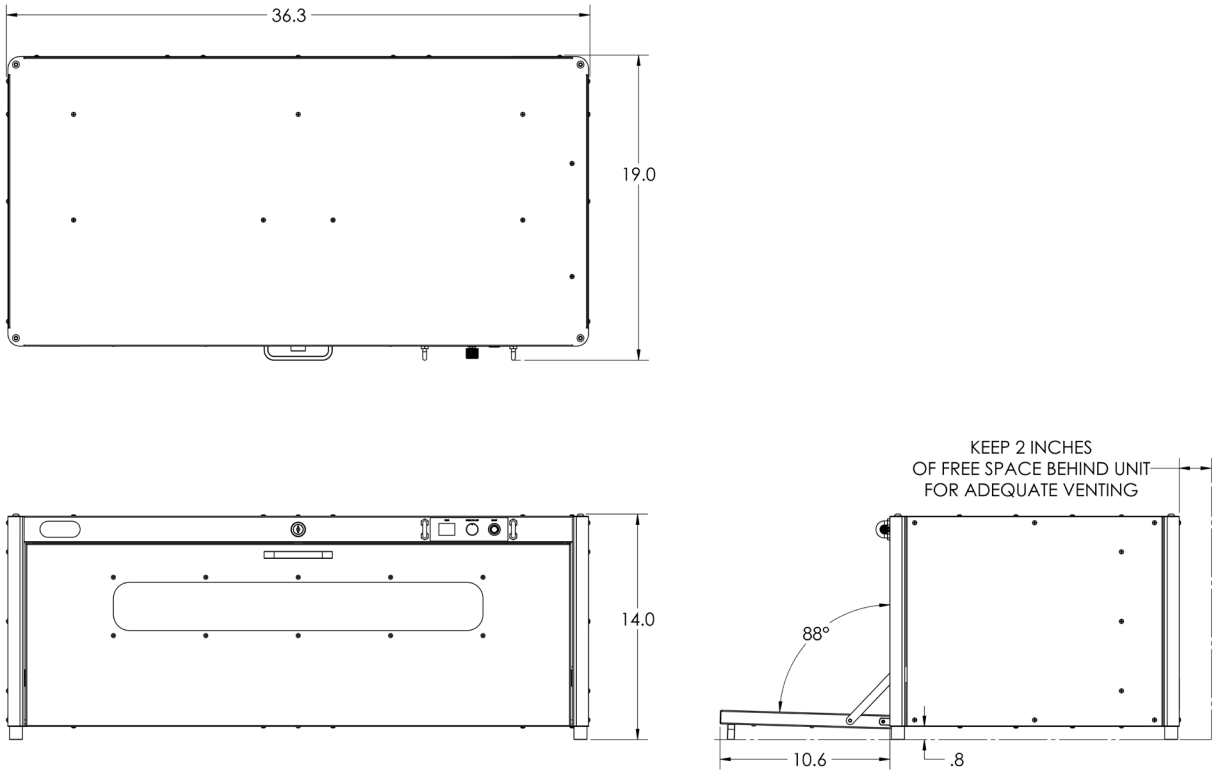
Save all the packing materials until you have inspected and tested the UV Locker, verifying that it suffered no damage in transit.

The contents of the box will be:

- The UV Locker
- Keys for the door lock
- Dosimeter cards

## Placing your UV Locker

The UV Locker requires approximately 18" x 36" (46cm x 92cm) of tabletop surface. In addition, at least 11" (30cm) in front of the UV Locker must be clear to allow the door to open. The UV Locker should be placed on an even and level surface with at least 2" of clearance around the sides and back for adequate ventilation.




## Cleaning the UV Locker

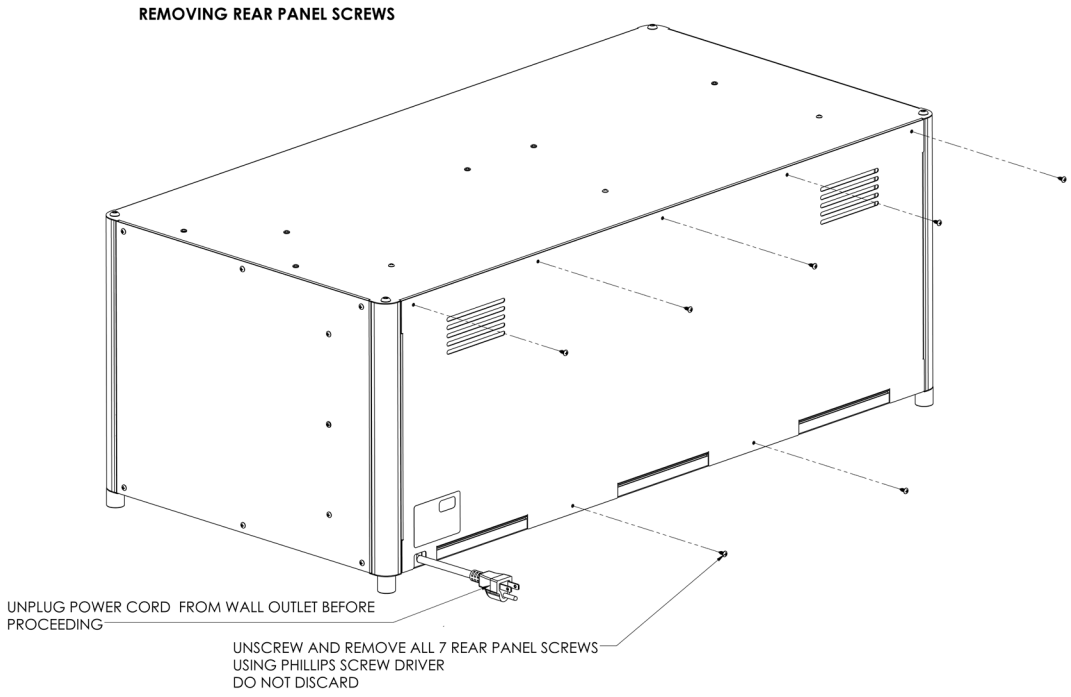
The outside surfaces of the UV Locker may be cleaned with any household cleaning product. Avoid any abrasive cleaners that might scratch the viewing window. Periodically clean the inside with compressed air or vacuum to remove any dirt or debris that might accumulate. Pay specific attention to the area around the LEDs where dust and debris can easily accumulate and affect their performance.

## Connecting Power

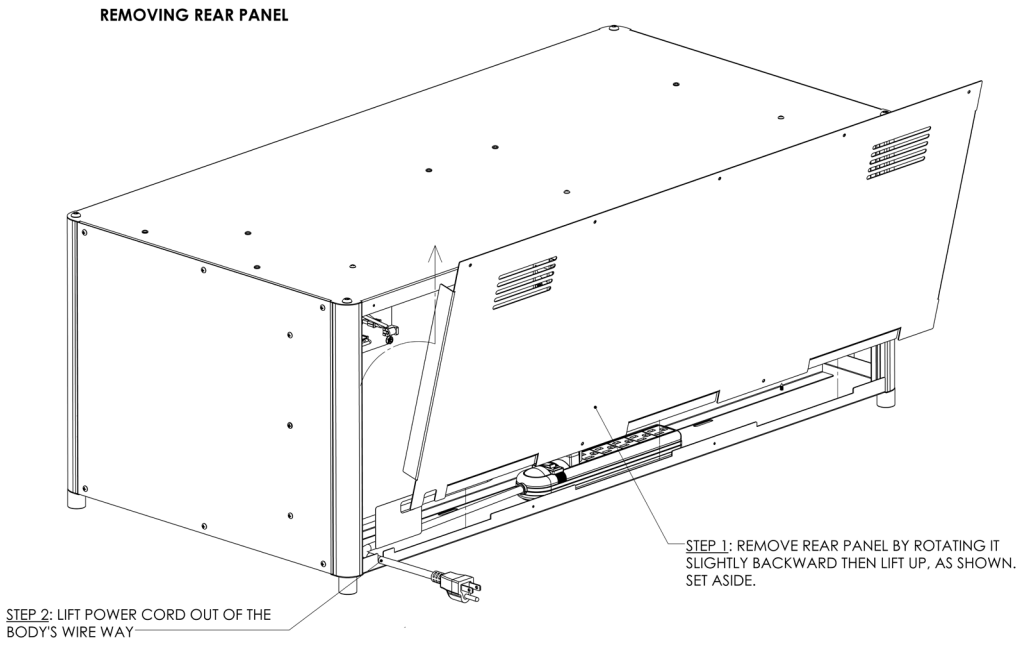
The power cord exits the UV Locker from the back panel.  Plug it into a standard grounded 120VAC wall outlet.

## User Accessible Rear Compartment

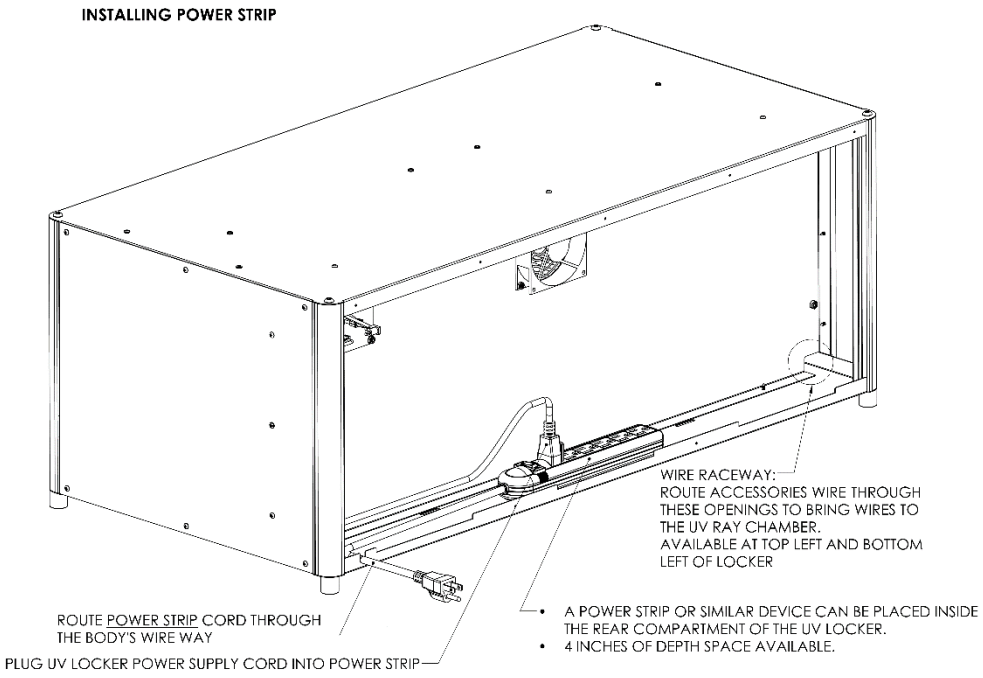
The UV Locker has a user-accessible compartment at the rear, where users may install a power strip and power supplies for charging electronic devices while inside the disinfecting chamber.  To access the rear panel, it is necessary to remove seven (7) Phillips screws from the rear panel.  Note that when replacing the rear panel, it is only necessary to re-install the top screws.  The bottom of the rear panel interlocks with the cabinet bottom.  The bottom two screws are needed only when shipping the UV Locker.



To remove the rear panel, simply lift it up and rotate away from the cabinet.




When installing a power strip inside the cabinet, the power cord for the UV Locker power supply must first be plugged into the power strip, then the power strip cord is routed out the cabinet instead of the UV Locker power cord.



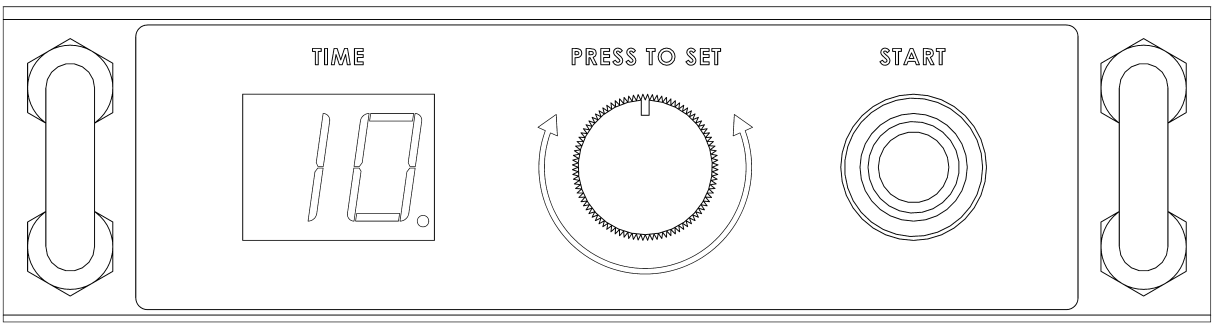
## Operating the UV Locker

It is not required to use the key to operate the UV Locker. The door will stay closed without the lock. However, if using the lock, simply turn the key to free the door and allow it to pivot down.

Place the devices to be disinfected in the UV Locker, on the wire rack. Space the devices out so they are not touching each other, but also not touching the inside walls of the cabinet. Distribute them as equidistantly from each other as possible.

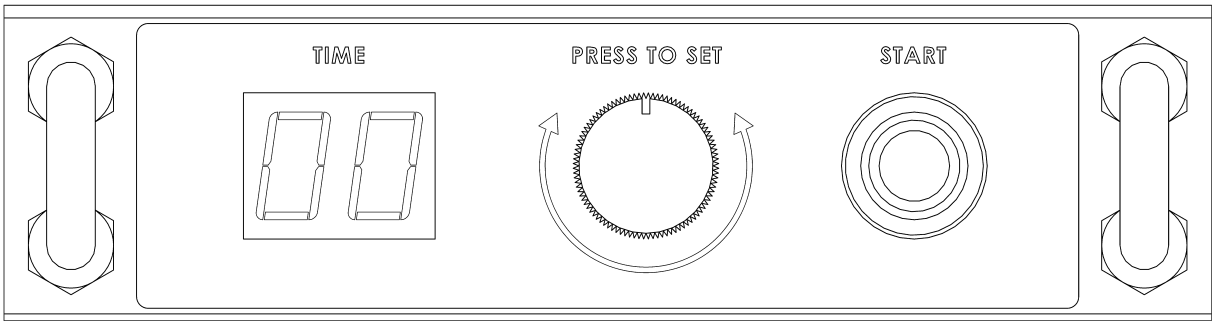
Close the door. (Locking is optional). Note that a safety interlock will prevent the UV Locker LEDs from powering on while the door is open.

Press and hold the rotary dial until a "dot" or decimal point appears just to the right of the numeric indicators. This indicates the timer is in "programming mode" and can be adjusted. Once set to the desired exposure time, press and hold the rotary dial again until the dot or decimal point disappears. This locks in the exposure time.

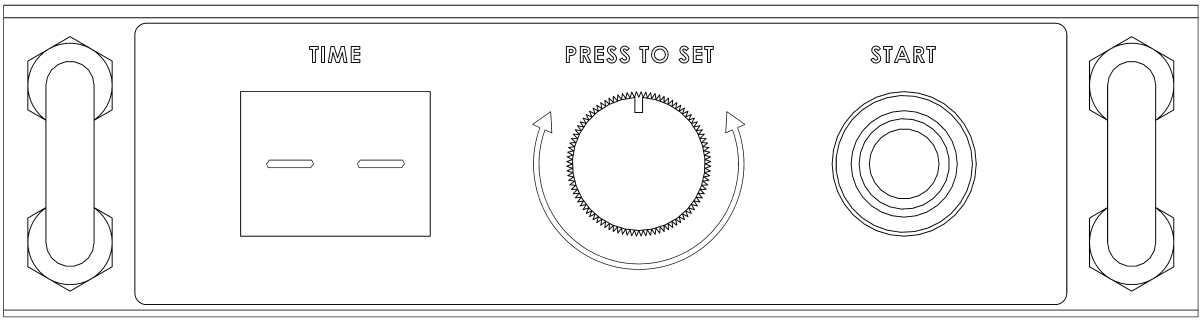



Press the START button and, if the door is properly closed, the UVC lights inside the cabinet will illuminate. The UV-resistant sight window will block 100% of the UV rays.

When the sanitizing cycle is complete, the display will flash double-zeros.




If the door is opened during a cycle, the unit will automatically shut off the UVC LEDs, and the screen will display two bars as shown below. The START button will flash as well.




Close the door and press START and the exposure time will reset to the original time programmed. For example, if you program in a 5-minute exposure time, and at the 3-minute mark open the door, once you close the door and hit START, the time begins at 5 minutes again.

## Exposure Time

Exposure time to achieve target disinfection depends on which model of UV Locker you have and what bacteria/virus is targeted for irradiation. The goal is to reduce the population of microorganisms to a level where they are no longer infectious.

First, it is important to know which model of UV Locker you are using.

- Model UVL432-1000 has the standard LED configuration with one row of LEDs on the bottom of the cabinet and one row on the top.

- Models UVL432-2000 and UVL432-2100 have a dual-LED configuration with two rows of LEDs on the bottom of the cabinet and two rows on top. These models are specifically designed to increase light coverage and shorten exposure time, particularly when a complete fill of the available space is needed.

The table below shows the approximate recommended irradiation times based on models and disinfection goals. See the next chapter to learn how to use the Dosimeter card (ACC-UVDOSE) to accurately establish the required irradiation time specific to your application.

| TARGET DISINFECTION | UVC Dosage | UVL432-1000 | UVL432-2000<br>UVL432-2100 |
|---|---|---|---|
| **GOOD**<br>Inactivates the Coronavirus | 6 mj/cm$^2$ | 2 minutes | 1 minute, 15 seconds |
| **BETTER**<br>Kills a broad range of bacteria and viruses. | 15 mj/cm$^2$ | 5 minutes | 3 minutes, 10 seconds |
| **BEST**<br>Comprehensive disinfection. | 25 mj/cm$^2$ | 8 minutes, 15 seconds | 5 minutes, 10 seconds |

## Dosimeter Testing

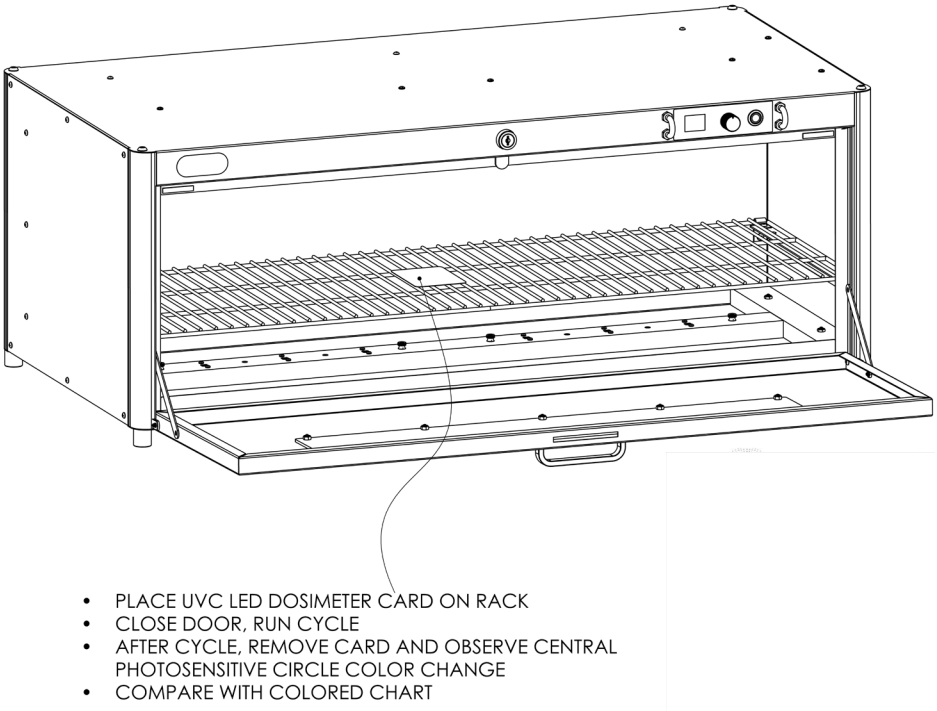
The ideal way to verify an exposure time is to test with the dosimeter card included with your UV Locker.

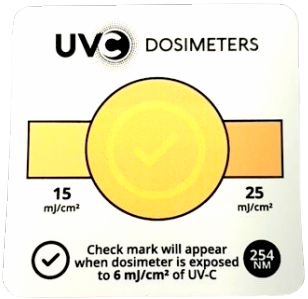
Ultra-violet (UV) rays are invisible (aside from a faint "purple glow" at the point of light emission at the UVC LED's surface). Therefore, the sanitizing effect is not visible. Using the UVC LED Dosimeter card is a quick and easy visual tool that helps confirm the desired level of ultra-violet is achieved.

Periodic checks (e.g. monthly) using a UVC LED Dosimeter Card will confirm the sanitation level is still achieved. Performance might degrade over time, for example, due to dust accumulating on the UVC LED lenses (see cleaning procedures).

In the UV Locker, you can confirm the initial factory-recommended sanitation procedure by placing the card, facing up, in a central location on the rack. When new (unexposed), the card features a bright yellow dot in the middle of it.

At a 6mj/cm$^2$ exposure, a check mark will appear in the yellow circle. At a 15mj/cm$^2$ exposure, the color of the circle will match the band on the left, and at a 25mj/cm$^2$ exposure, the color of the circle will match the band on the right.




Note that a single dosimeter test card can be used for the initial setup testing, but a NEW card should be used for periodic maintenance tests.

## How the UV Locker Works

UV Locker kills bacteria and inactivates viruses by irradiating the contents of its chamber with Ultraviolet UV rays, commonly referred to as UVGI (Ultraviolet Germicidal Irradiation).

UV Locker features an adjustable timer that controls how much UVGI irradiation is delivered to the device's chamber. Irradiation levels, expressed in mj/cm$^2$ (millijoules per square centimeters) are a function of intensity, time and distance, meaning, irradiation levels increase with time, but are also affected by the distance between the light source (the UVC LEDs) and the exposed surface of the object being irradiated (UV light intensity, unlike visible light, decreases exponentially with distance).

UV Locker is carefully designed with these 3 parameters (intensity, time, distance) to provide an effective and adjustable amount of sanitation for a variety of applications. Different microorganisms have varying degrees of resistivity to UVGI, meaning, different microorganisms require different irradiation levels to be killed (bacteria) or inactivated (virus). UV Locker provides adjustable timing from 1 minute up to 99 minutes.

Laboratory studies are available detailing what levels of irradiation are needed to kill or inactivate specific microorganisms. Use the link below to determine optimal dosage:

https://cdn.shopify.com/s/files/1/0438/9001/6409/files/Germicidal_Irradiation_dosage_chart.pdf?v=1633707249

UV Locker delivers on average 3mJ/cm2 of UVGI per minute for the standard model and 5.8mJ/cm2 for the models with dual row LEDs. An average figure is provided here as this level of UVGI is affected by distance. For example, areas in the UV Locker directly underneath or close to the UV light source will have higher levels of irradiations, while the far corners will have fewer. Note: UV Locker features reflective surfaces at the sides, specifically formulated for UV rays, to help further distribute the light. Because sanitation is achieved by light, only surfaces exposed to UVGI are treated. If a surface is not exposed to light, it is not disinfected. Surfaces in shadows (indirect light) are still exposed, but the irradiation level desired will take longer to achieve.

## Replacing the UVC LED Light Modules

The UVC LEDs used in the UV Locker have a much longer life span than glass UV bulbs. However, eventually the LEDs will fail, or dim to a point of ineffectiveness, and will need to be replaced. If conducting dosimeter tests on a regular (monthly) basis, once the exposure time has been increased to double the original setting (e.g. from 8 minutes to 16 minutes), to achieve the 25 mj/cm$^2$ irradiation level, it is recommended that the LEDs be replaced. At this point, they are 50% less effective as compared to when they were new.

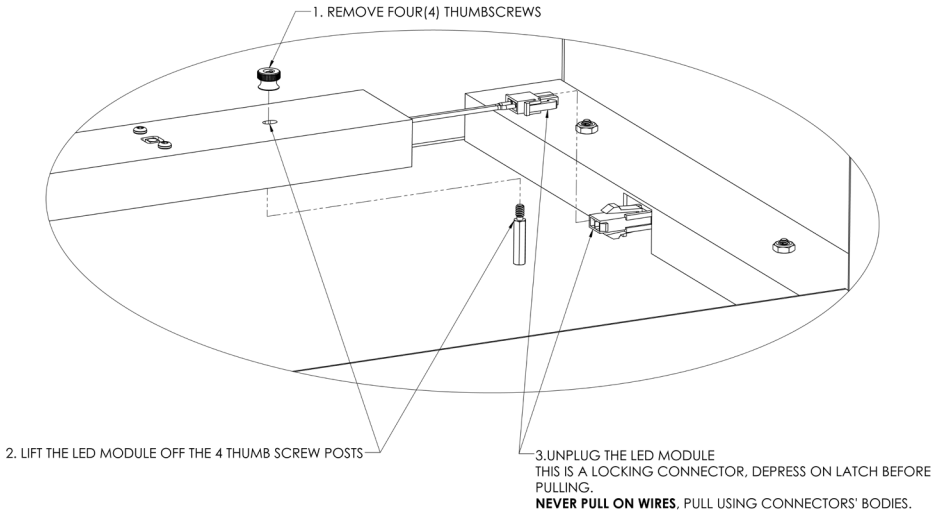
LED modules are available for purchase and come with instructions for installation.

There are two (2) LED modules in the model # UVL432-1000. One is mounted at the top of the cabinet and one is at the bottom, or floor of the cabinet.

Models UVL432-2000 and UVL432-2100 have four LED modules, two attached to the top and two attached to the bottom of the cabinet.

To Remove: First, simply unscrew the four (4) thumbscrews for each module. Lift the module off of the thumbscrew posts to expose the wiring harness. Find the wiring connector and disconnect while pressing the latch and pulling. Never pull on the wires. Always pull using the connector bodies.

To Install: Install the new modules by first connecting the wiring harness, then installing the LED module onto the thumbscrew posts, then re-attaching the thumbscrews.



## UV Locker Laboratory Testing

UV Locker has been independently lab tested by an accredited microbiological laboratory facility, per the Environmental Protection Agency (EPA) requirements for pesticide devices.

It was tested according to ASTM E3135 / ASTM 1153-14 (modified): Standard Practice for Determining Antimicrobial Efficacy of Ultraviolet Irradiation Against Microorganisms on Carriers using a Time-Kill Procedure.

The independent laboratory test results show that UV Locker kills 99.9999% of tested bacteria and inactivates 99.99999999% of the SARS-CoV virus.

## Factory Warranty

The UV Locker is warranted against defective parts or workmanship that might result in a failure, for a period of three years from the date of shipment from the factory. Exceptions to this warranty coverage are:

- The UVC LEDs are warranted against a complete failure to illuminate, for one (1) year from the date of purchase.

- The fuse, found on the power distribution board in the rear compartment, is not covered under the warranty. Contact us for replacements.

The customer is responsible for shipping charges to return defective parts, or the entire UV Locker, back to the factory if necessary. MiKa Digital will cover the ground shipping cost to return the parts or the UV Locker back to the customer.

# Frequently Asked Questions

## What can I disinfect in the UV Locker?

- A wide variety of objects can be disinfected, so long as they are not made of photo-sensitive materials (i.e. photography film). If it fits, you can disinfect it.
- Avoid overloading the UV Locker with too many objects at one time.
- Ensure objects are placed and spaced in a manner that the maximum surface area of the objects will be exposed to the top or bottom UVC LEDs.

## Are electronic devices safe in the UV Locker?

- Absolutely.

## Is it safe to look through the UV Locker window while the sanitation cycle is on?

- Yes, the window is made of UV filtering material, blocking 100% of the harmful UV rays.

*Do not tamper with or purposely defeat the safety interlock that prevents the system from operating if the door is not fully closed.*

## Do I need to lock the cabinet?

- The use of the key lock is optional. The door is held shut magnetically. The key lock serves as a "deadbolt" should you choose to securely lock the contents inside the UV Locker. If you lose the key, no worries! Keys are numbered and can be easily replaced. Contact us.

## How do I get additional dosimeter cards?

- Purchase additional dosimeter cards here:

https://www.prolampsales.com/products/uvc-dosimeter-photochromic-measurement-cards-6-15-25mj

# Troubleshooting

## The UV Locker Indicator Display is OFF:

- Check to make sure the unit is plugged into a known-good power outlet. Note: The UV Locker does not have a power switch.
- Look through the rear right vent of the device. A green LED light should be on indicating power is present. If the light is OFF, unplug the power cord and remove the rear panel. Locate the internal power supply in the rear compartment and make sure that the DC line cord is plugged into the connector on the power distribution circuit board. (The DC line cord is not to be confused with the AC line cord which exits the UV Locker and plugs into a wall outlet.)
- If the DC line cord is secure, check the fuse. (Fuse Specifications: 2AG size (5mm x 15mm), 5A Fast Blow). If the fuse is blown, contact us for replacement.

## Sanitation cycle does not start:

- Check to make sure the door is fully closed.
- If the screen displays "00", blinking, the previous cycle is completed, press START to reset the time, then START again to initiate the sanitation cycle.
- If the screen displays "- -", the safety interlock is triggered. Check to see if the door is fully closed, press START to clear the error, then press START to initiate the sanitation cycle.

## How do I know that the sanitation cycle is "working"?

- When the sanitation cycle is on, you might hear a slight humming noise. This is normal. UV Locker features a ventilation fan that helps vent the sanitation chamber and maintains room temperature. Note: the fan will continue to run for 10 seconds after the sanitation cycle ends.
- When the sanitation cycle is on, blue top LED lights are on. This is simply for visual indication the system is currently sanitizing. The blue LEDs themselves do not have a sanitation effect.
- When the sanitation cycle is on, you might notice a slight purple glow at each of the UVC LEDs. This is normal, it is a by-product of the UV generation process at the LED.
- Use the UVC LED Dosimeter card to verify performance.

## Dosimeter Test Log

Record the dates dosimeter testing was performed, and the exposure time required to achieve specific target exposures.

| Date | Exposure Time | Exposure Dosage |
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