

# PURO™

UV Disinfection Lighting



*Portable UV Protection*

## User Manual

**Sentry M4 Fixture**  
with two Dual UV Light Engines



## Safety Warnings



WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The lightning flash with arrowhead symbol, within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## Important Safety Notes

Read these instructions prior to operating the fixture. Keep and follow all instructions.

- Heed all warnings. Failure to use the equipment in the manner specified may impair the fixture from providing the desired protection.
- Plug unit into a grounded outlet. Ensure proper conditions for operation. The unit is designed to operate under normal conditions indoors (temperature 5-40 degrees Celsius, RH less than 80% (non-condensing), at an altitude <2000m and main supply fluctuations +/- 10% of nominal voltage, over voltage Category II).
- Allow unit to complete pre-programmed cycles prior to unplugging or shutting off power. This allows it to enter safe mode.
- Do not allow the unit to get wet or use in or near water.
- Do not block any ventilation openings. Use in accordance with these instructions.
- Do not attempt to open or tamper with the unit.
- Do not place or store the unit near any flammable materials or liquids.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the unit.
- Unplug this unit during lightning storms or when unused for long periods of time.
- Refer all servicing to the manufacturer if there is any damage to the unit or it is not operating correctly.
- The fixture is designed to operate only when the room is unoccupied. There are redundant safety systems to ensure the unit does not activate while the room is occupied as the UV light is not recommended for excessive exposure. If the sensor in the system fails, the system will shut down.
- Do not look directly at the unit due to the brightness of the light. UV light does not significantly penetrate standard glass, therefore, incidental exposure on the other side of a window or wall does not present any significant risk.
- KEEP AWAY FROM CHILDREN

## UV Safety Overview

Given the correct combination of user protocols and the built-in safety features of the unit, there are minimal risks of any harmful effects from using the unit.

### Recommendations

- If in the vicinity of the Sentry M4 during operation, do not look directly at the light. This is similar to how one would avoid harmful effects from the sun by not looking directly at it.
- UV light does not significantly penetrate standard glass. It is safe to be behind a window or wall while the unit is operational.
- Per the built-in safety features described below, the unit is designed to not operate while a room is occupied. However, operators are instructed in the user manual to have all persons vacate a space before operation. Further optional protocols, such as signage indicating the UV unit is in operation may be desired.

### Safety Features

The Sentry M4 has four primary aspects to its built-in safety features to ensure the safety of anyone operating or in the vicinity of a unit.

#### Limited Exposure Risk

Due to the nature of the programming on the Sentry M4 unit, over a 30-minute cycle time for the fixture, the actual exposure to UV (if there were no other safety systems in place) would be no more than two seconds of exposure – well below the recommended standards. Furthermore, this is approximately 1800x less time exposure than would occur from the sun if outdoors for 30 minutes.

#### Redundant Safety Systems

Each Sentry M4 unit has a built-in passive infrared (PIR) sensor used to detect motion in a space. The sensor is programmed to detect individuals walking into the deployment space. The unit will not resume operation of the cleaning cycle until it has successfully detected the space is free of motion.

#### Safe Stop

The third layer of protection built into the Sentry M4 unit is to ensure that if the motion sensor or other components experience technical issues, the unit will safe stop by cycling the unit off. The unit will flash red indicating that one should contact PURO Lighting for technical support. The unit will not resume operation until the issue detected has been resolved. If unit is non-responsive (i.e. non-operational or no indicator light), contact PURO Lighting for technical support.

#### Frequency of Flashes

The Sentry M4 unit will flash every 6 seconds during operation. Violet Defense, PURO Lighting's technology partner, collaborated with the Epilepsy Foundation when designing the product to ensure that the frequency of flashes will not cause any issues for someone with photosensitive epilepsy.

**Disclaimer:** The Sentry M4 unit is not intended for use as a medical device and people should not be directly exposed to the light generated by the unit. The actual disinfection rates on a specific space will vary.

## Governmental Guidelines for UV Light Safety

### Occupational Safety and Health Administration (OSHA)

The Occupational Safety and Health Administration (OSHA) does not have any mandated exposure limits to ultraviolet light. OSHA only provides technical guidance regarding protecting employees from ultraviolet laser exposure. While general information about ultraviolet contained in that guidance is described below, it is important to note that PURO Lighting does not currently deploy ultraviolet lasers. For more information on OSHA's guidelines, visit:

<https://www.osha.gov/laws-regs/standardinterpretations/2003-02-26>.

Ultraviolet radiation is divided into three regions: UV-A: 315-400 nanometers (nm), UV-B: 280-315 nm, and UV-C: 200-280 nm. UV can be associated with adverse health effects due to prolonged exposure and the wavelength of light.

According to OSHA's guidelines, "exposure in the shorter UV-C and longer UV-A ranges seems less harmful to human skin. The shorter wavelengths are absorbed in the outer dead layers of the epidermis and the longer wavelengths have an initial pigment-darkening effect followed by erythema if there is exposure to excessive levels."

"The hazards associated with skin exposure are of less importance than eye hazards." Exposure to light may cause photokeratitis or cataracts.

### National Institute for Occupational Safety and Health (NIOSH)

The National Institute for Occupational Safety and Health (NIOSH) recommends limits to exposure determined by the wavelength of UV light and intensity. NIOSH recommends that the time of exposure to an intensity of 100 microwatts per square centimeter at wavelength 254 nm not exceed 1 minute. Per the programming, UV exposure from Sentry M4 units for a 30-minute cycle is less than two seconds. For more information, view the recommended standards from NIOSH at:

<https://www.cdc.gov/niosh/docs/73-11009/pdf/73-11009A.pdf>.

### Environmental Protection Agency (EPA)

The Environmental Protection Agency (EPA) is the governmental agency responsible for regulating ultraviolet light products. It regulates chemical disinfectants along with devices, such as equipment that generates UV light, used to control pests like bacteria and making antimicrobial claims. The manufacturer of PURO Lighting products is an EPA-registered company (Facility No. 92142) and is in full compliance with all regulations. For more information about EPA guidelines, visit:

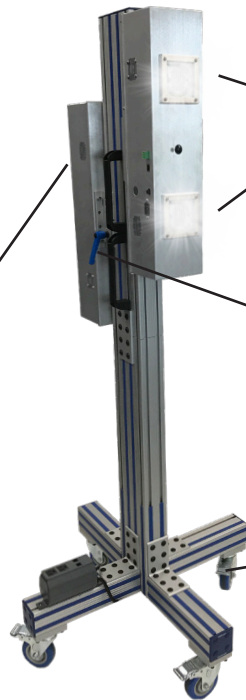
<https://www.epa.gov/safepestcontrol/pesticide-devices-guide-consumers>.

### Food and Drug Administration (FDA)

The Food and Drug Administration (FDA) only regulates devices that are classified as medical instruments, machines, and devices used to treat diagnosed medical conditions. Therefore, PURO Lighting does not fall under FDA guidelines. Furthermore, PURO Lighting products do use materials approved by the FDA for use in food and medical applications.

## Operation of Unit

Each mobile stand comes with two Helo F2 units. These may be deployed on opposite sides (as shown) or may be repositioned to have two on the same side of the stand.



Sentry M4 Unit - Uses Pulsed Xenon technology to deploy powerful bursts of UV-C, UV-B, UV-A, and violet-blue light with 340° of coverage.

The height of each unit may be repositioned along the rail to optimize the cleaning of your space. The blue clamp locks each of the units into place.

Caster wheels allow for easy mobility of unit and will lock in place. Simply step on the metal brake to lock each wheel in place once it's in position.

### 1. Position the unit in the targeted cleaning area.

- It is recommended that you place the unit approximately 2 meters (~6 1/2 feet) or less away from the priority areas. Note that the unit can effectively kill pathogens up to 4 meters (~13 feet) away, but the length of time necessary to run the unit increases proportionately to the distance from targeted area.
- Leverage reflective surfaces in your space, including standard glass, as the UV light will reflect off of these surfaces increasing their germ-killing effects. However, surfaces such as paint will absorb the photons, minimizing effects of the unit, so avoid placing the unit too close to walls in your area.

### 2. Adjust the height of the unit to optimize effects of the unit, minimizing any shadowed areas (unit can only kill germs where the light touches, either directly or by reflection). See page 6 for how to adjust height of unit.

### 3. Plug in the unit, which runs at 120V AC and 60 Hz. Once powered on, at its peak, the unit will draw up to 14 amps for 4 second intervals. Ensure the breaker has available amp draw during operation.

### 4. While the unit is operational, all personnel should leave the room during the cleaning cycle. Exit the room within 60 seconds for optimal functioning of the unit. The unit is programmed to operate for 30 minutes per cycle. The unit's redundant safety systems will stop the unit from operating if motion is detected in the space. The unit will resume operation approximately 60 seconds after room is unoccupied and no additional motion is detected.

### 5. The unit will run a safety test to ensure unit is functioning properly and that there is no motion detected in the space. If successful, unit will run its pre-programmed operational cycle as described in step 4.

### 6. Allow the unit to complete its entire cycle before unplugging the unit. This allows the unit to enter safe mode. If necessary to unplug the unit prior to completion of cleaning cycle, be sure to keep unit away from water for optimal safety.

### 7. Once the cycle is complete reposition the unit within the space, as necessary, to account for any shadowing that would have occurred during the first cycle.

\*It is recommended that after every 30-minute run that you allow the unit to cool down for a 15-minute period of time, in order to maximize the life expectancy of your PURO Lighting Sentry M4 product.

## Operational Mode

By default, your unit will be configured in single cycle mode for a 30-minute run time.

- **Single Cycle Mode:** In this method, users will manually activate the unit to start a disinfection cycle. The unit will then run its pre-programmed cycle (i.e. 15 or 30 minutes) one time before entering safe mode until power is cycled on and off again. Users may select the timeout time, which determines how long the unit will wait until resuming operation after motion is detected.

## POSITIONING OPTIONS

The Sentry M4 unit was designed with maximum flexibility to help you target areas of concern. The Sentry M4 may be deployed with both Helo F2 units on the same side, where each side may be independently adjusted high or low. The Sentry M4 may also be adjusted to have both units on the same side to maximize the germ-killing power to one specific area or side of a room.

For more information about how to adjust the units to these positioning options, see page 7.



The Helo F2 units may be placed high on opposing sides of stand to focus on cleaning high-touch surfaces located in upper portions in the room.

The height of units on each side can be adjusted independently depending on what areas of concerns are in the space, such as under a table.

Both units may be placed on the same side of the stand to optimize cleaning power in the upper and lower portions of a room (i.e. above/below a bed).

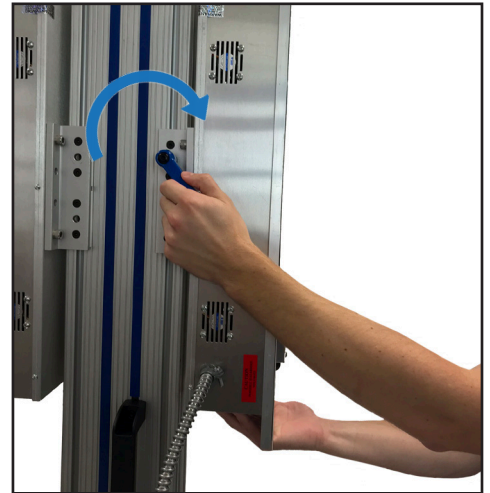
## Adjusting Height of Sentry M4 Unit



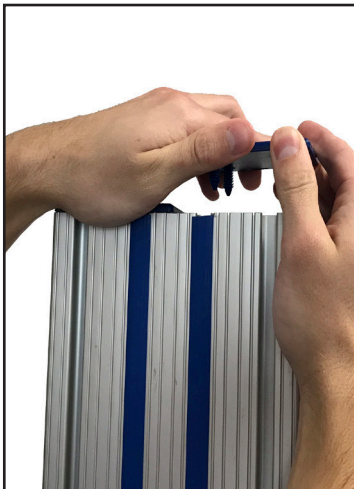
1. While supporting the unit with one hand, rotate blue clamp counterclockwise to release.



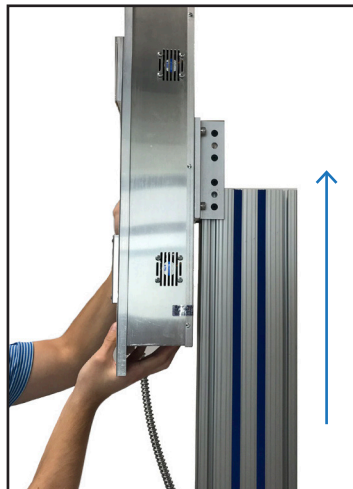
2. Raise or lower unit to desired height.



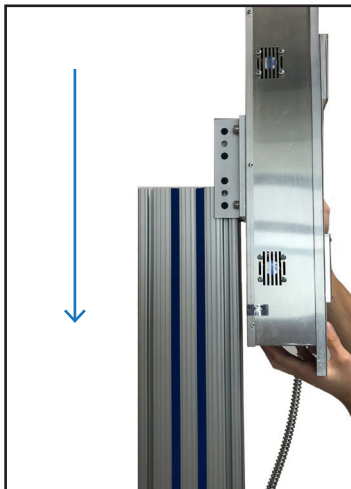
3. While still supporting unit, rotate clamp clockwise to lock into place.



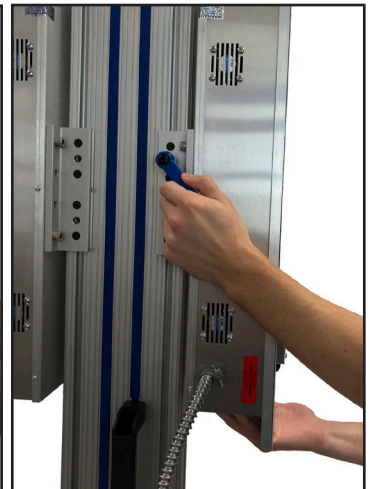
1. Remove blue cover from top of stand.



2. Lift unit off of one side of the stand.



3. Slide unit into slots on opposite side of stand. Lower to desired height.



4. While still supporting unit, rotate clamp clockwise to lock into place. Replace cover on top of stand.

## Guidelines for Cleaning the Fixture

- To clean the unit, wipe down the metal plates with stainless steel polish using a microfiber cloth.
- Do not use abrasive cleaners to clean the unit.

For most situations, the instructions above can be used to clean the unit. However, there are special instructions recommended for blood spills, or when certain organisms, such as *C. diff* are known or suspected to be present.

## GENERAL DISINFECTION GUIDELINES

1. Complete standard cleaning procedures to remove any visible dirt, grease, or other debris from space.
2. Activate unit per operational instructions above.
3. Upon returning to space, look at indicator light. Solid green light indicates cleaning cycle completed. If motion was detected prior to observing the indicator light, the indicator light will turn red. If users want to determine if the unit completed the last cycle, prior to powering off, stand out of range of the motion sensor for 60 seconds. The light will resume solid green if cycle was completed. Otherwise, it will resume operation.

## Cleaning when Blood or Bodily Fluids are Present

UV light has the ability to penetrate liquid blood, which has not formed a dried crust, or bodily fluids up to a 1/16" thickness as long as there is no tissue or solid material present. Therefore, UV light may be used to help protect staff before and after traditional cleaning protocols for your facility.

1. Activate the fixture prior to commencing any cleaning procedures. If the blood has already dried, apply hydrogen peroxide solution prior to running the unit.
2. Utilize normal procedures, including appropriate safety protocols to clean the space, including removal of blood and bodily fluids.
3. Activate a second cycle of the fixture to target any remaining bacteria and viruses.

## Cleaning when *C. diff* is of Concern

*Clostridium difficile* (*C. diff*) is a bacteria that is extremely difficult to kill as it is able to survive in unfavorable conditions. Furthermore, it is an anaerobic, endosporic organism, which means it can survive without oxygen and form dormant spores to survive harsh conditions. With the risk of severe illness associated with *C. diff*, it is recommended that you use a combination of approaches to reduce the risk of contracting *C. diff* in your facility.

1. Utilize your facility's adopted environmental cleaning and disinfection strategy for dealing with *C. diff*.
2. Activate the fixture for two consecutive 30-minute cycles at a range of less than one meter for best results, or up to 2 hours for ceiling mounted units (must have a 30-minute break between two 60-minute cycles).



**Sensor Indicators**



Each unit has an indicator light that helps you determine the status of the unit.

Color of Light	Meaning
Flashing Green	Unit is ready to begin cleaning when room becomes unoccupied.
Solid Green	Unit has successfully completed its cleaning cycle.
Solid Red	Unit was interrupted during the cleaning cycle. Cleaning will resume when room becomes unoccupied again during the programmed times for operation.
Flashing Red	One of the safety sensors has detected an issue. Please see troubleshooting section for further information.

**Troubleshooting**

1. If unit is flashing red, then an issue was detected by the safety sensors. Unplug the unit.
2. Plug the unit back into the wall. Exit the room within 60 seconds.
3. When you return to the room, identify the color of light on the sensor indicator. If unit is green or solid red, the unit is working properly. If unit is still flashing red, contact PURO Lighting technical support.
4. If unit is non-responsive (i.e. no indicator light showing), please contact PURO Lighting technical support.

**Technical Support**

Email us at [support@purolighting.com](mailto:support@purolighting.com) or call (877) 452-8785.