

Safety Instructions for 2, 4, or 6 GPM UV Unit: Water Chemistry:

WARNING - to guard against injury basic safety precautions should be observed, including the following:

1. **READ AND FOLLOW ALL SAFETY INSTRUCTIONS.**
2. **CAUTION** - Always disconnect power before servicing.
3. **DANGER** - To avoid possible electric shock, special care should be taken since water is present near electrical equipment. Unless a situation is encountered that is explicitly addressed by the provided maintenance and troubleshooting sections, do not attempt repairs yourself, refer to an authorized service facility.
4. Carefully examine the disinfection system after installation. It should not be plugged in if there is water on parts not intended to be wet such as, the ballast or lamp connector.
5. Do not operate the disinfection system if it has a damaged cord or plug, if it is malfunctioning or if it has been dropped or damaged in any manner.
6. Always disconnect water flow and unplug the disinfection system before performing any cleaning or maintenance activities. Never yank the cord to remove from an outlet; grasp the wall plug and pull to disconnect.
7. Do not use this disinfection system for other than intended use (potable water applications). The use of attachments not recommended or sold by the manufacturer / distributor may cause an unsafe condition.
8. Intended for indoor use only. Do not install this disinfection system where it will be exposed to the weather or to temperatures below freezing. Do not store this disinfection system where it will be exposed to the weather. Do not store this disinfection system where it will be exposed to temperatures below freezing unless all water has been drained from it and the water supply has been disconnected.
9. Read and observe all the important notices and warnings on the water disinfection system.
10. If an extension cord is necessary, a cord with a proper rating should be used. A cord rated for less Amperes or Watts than the disinfection system rating may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled. Circuit breaker must not exceed power cord current rating (ie - 15A for North American NEMA 5-15P).
11. SAVE THESE INSTRUCTIONS.

Warning: The UV light given off by this unit can cause serious burns to unprotected eyes and skin. Never look directly at an illuminated UV lamp. When performing any work on the UV disinfection system always unplug the unit first. Never operate the UV system while the UV lamp is outside of the UV chamber.

Note: The UV lamp inside of the disinfection system IS rated at an effective life of approximately 9000 hours. To ensure continuous protection, replace the UV lamp annually.

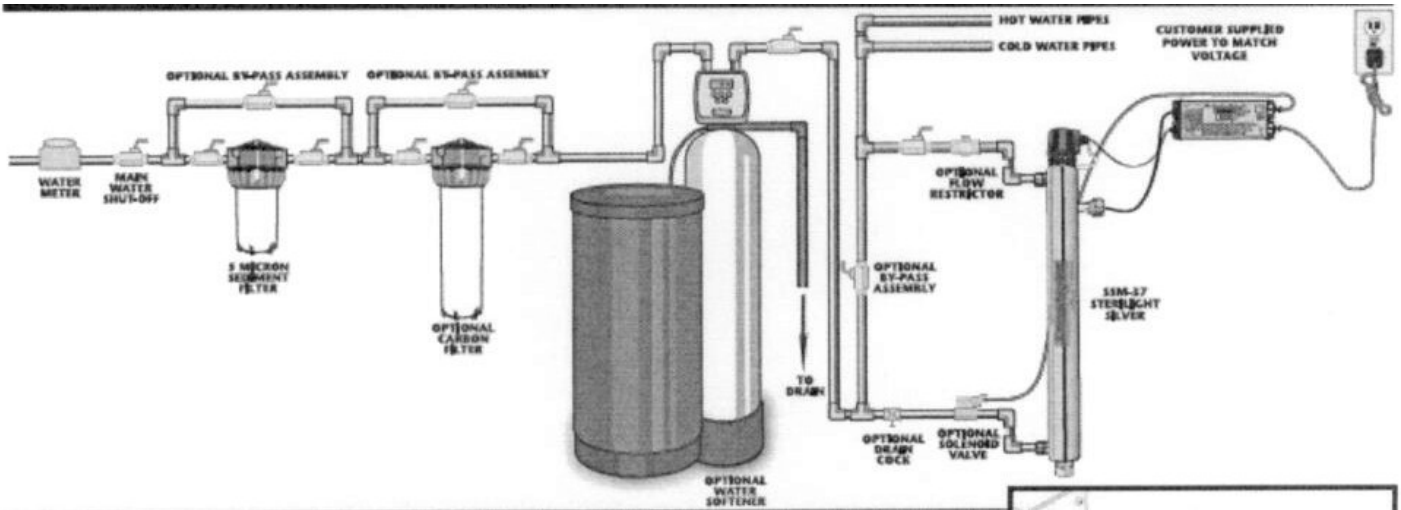
Water quality is extremely important for the optimum performance of your UV system. The following levels are recommended for installation:

- Iron: < 0.3 ppm (0.3 mg/L)
- Hardness*: < 7 gpg (120 mg/L)
- Turbidity: < 1 NTU
- Manganese: < 0.05 ppm (0.05 mg/L)
- Tannins: < 0.1 ppm (0.1 mg/L)
- UV Transmittance: > 75% (call factory for recommendations on
- Applications where UVT < 75%)
- Where total hardness is less than 7 gpg, the UV unit should operate efficiently provided the quartz sleeve is cleaned periodically. If total hardness exceeds 7 gpg, the water should be softened. If your water chemistry contains levels in excess of those mentioned above, proper pre-treatment is recommended to correct these water problems prior to the installation of your UV disinfection system. These water quality parameters can be tested by your local dealer, or by most private analytical laboratories. *Proper pre-treatment is essential for the UV disinfection system to operate as intended.*

Installing your UV Disinfection System:

- **CAUTION**, electronic ballast must be connected to a grounded receptacle and the lamp connector ground wire connected to the stainless steel reactor chamber.
- The disinfection system is designed to be mounted either horizontally or vertically at the point-of-use or point-of-entry depending on the specific flow rate of the unit. *Note:* The ideal installation is vertical with the lamp connector on top. This is to prevent water damage from occurring on the lamp pins and lamp connector.
- The ballast should be mounted either above or beside the reactor chamber. Never mount vertically with AC connector at top of ballast to prevent moisture from running down cordage and causing a potential fire hazard. Drip loops in all cordage connected to ballast controller is highly recommended.
- The complete water system, including any pressure or hot water tanks, must be sterilized before start up by flushing with chlorine (household bleach) to destroy any residual contamination (see page 2).
- For safety purposes, the disinfection system should be connected to a ground fault interrupt circuit.
- The disinfection system is intended for indoor use only, do not install disinfection
- system where it may be exposed to the weather.
- Install the disinfection system on cold water line only.
- If treating the entire house, install the disinfection system before any branch lines.
- A 5 micron sediment filter must precede the disinfection system. Ideally, the disinfection system should be the last treatment the water receives before it reaches the faucet.

1. The following picture shows the installation of a typical disinfection system and the related components that may be used for the installation. The use of a by-pass assembly is recommended in case the system requires off-line" maintenance. If this is the case, it must be noted that the system will require supplementary disinfection of the distribution system if any



water is used during this by-pass condition. If the water is to be consumed while the system is off-line, the water must be boiled for twenty minutes prior to consumption.

2. Select a suitable location for the disinfection system and its related components. As it is recommended to install a ground fault protected circuit (GFCI), make sure that this is taken into consideration prior to any installation. The system can either be installed vertically (inlet port at the bottom) or horizontally however the vertical installation is the most preferred method. When selecting a mounting location, you must also leave enough space to allow for the removal of the UV lamp and/or quartz sleeve (typically leave a space equal to the size of the reactor chamber itself).
3. Mount the system to the wall using the supplied clamps. Various connection methods can be used to connect the water source to the system, however union type connectors are recommended. The use of a flow restrictor device is strongly recommended when installing your system in order to maintain the manufacturers rated flow rate. The flow restrictor should be installed on the outlet port and is designed to be installed in one direction only. Ensure that the flow of the water matches the flow direction as indicated on the flow restrictor (Figure 1 C). **DO NOT SOLDER CONNECTIONS WHILE ATTACHED TO THE SYSTEM AS THIS COULD DAMAGE THE O-RING SEALS.**
4. Ideally place the transformer above the reactor and away from any water connection point, to prevent any water from potentially leaking onto the transformer by means of a leak at a connection point or a "sweating" system. Make sure you allow for a "drip-loop" (Figure 1 D) on the lamp, sensor and power cord, again, to prevent any water from potentially entering the transformer.
5. Install the UV lamp.
6. When all plumbing connections are made, slowly turn on the water supply and check for leaks. The most likely cause for leaks is from the o-ring seal. In case of a leak, shut water off, drain cell, remove the retaining nut, wipe the o-ring and threads clean and re-install.
7. Once it is determined that there are no leaks, plug the system into the ground fault interrupter, and check controller to ensure the system is operating properly. The controller is designed to detect both power to the system and lamp illumination. It is important to **NEVER LOOK DIRECTLY AT THE GLOWING UV LAMP.**
8. Allow the water to run for a few minutes to clear any air or dust that may be in the reactor.

PLEASE NOTE: When there is no flow, the water in the cell will become warm, as the UV lamp is always on. To remedy this, run a cold water tap anywhere in the house for a minute to flush out the warm water.

Disinfection Procedure:

UV disinfection is a physical disinfection process and does not add any potentially harmful chemicals to the water. As UV does not provide a disinfection residual, it is imperative that the entire distribution system located after the UV be chemically disinfected to ensure that the water is free from any bacteriological contaminants. The disinfection process must be performed immediately after the UV unit is installed and repeated thereafter whenever the UV is shut down for service, without power, or inoperative for any reason. The procedure for sanitizing the plumbing system is readily accomplished as follows:

1. Shut off the upstream water supply that feeds water into the reactor chamber and depressurize water system. Remove the pre-filter cartridge and fill the sump with 1-2 cups of household (5.25%) bleach (chlorine) - **Do NOT use hydrogen peroxide.** At all times during this process, make sure the UV unit (and lamp) is turned on and operational!
2. Repressurize water system, open each faucet and allow cold water to run until you smell chlorine, shut the faucet off and then repeat the process for each faucet, including hot water. You must ensure that all taps, including outside faucets, dishwashers, shower heads, washing machines, connections to refrigerators, toilets, etc., pass chlorinated water.
3. Once all the locations have passed the chlorine disinfection solution, you will need to leave the solution sit for a period of 20 - 30 minutes. Reinstall the pre-filter cartridge into the filter and then flush the chlorine solution from the system until no chlorine smell is detectable. Make sure that each fixture that was disinfected in step two is completely flushed of the chlorine solution as the consumption of this water is not advised due to the extremely high concentrations of chlorine. It is important to remember that in the event that a UV is briefly shut down for routine cleaning or during power interruptions where water could have passed through the system, the aforementioned procedure must also be followed. Note A: The addition of chlorine (bleach) to a hot water tank that has in the past been fed with untreated raw water with high levels of other contaminants (iron, manganese, hydrogen sulphide organics, etc.) will result in oxidation of these contaminants and may require repeated flushing of the hot water tank. This contingency must be dealt with independently under the start-up procedure for any other conditioners that may form a part of the pre-treatment for the UV unit. Note B: The above procedure (Steps 1 to 3)

will result in a massive chlorine residual far in excess of the 0.5 to 1.0 mg/L typically present in municipally chlorinated water and of a magnitude consistent with the minimum 50 mg/L chlorine solution recommended for the disinfection of distribution systems known to be contaminated. Do not consume water until complete system has been flushed.

OPERATION

- Always disconnect power before performing any work on the disinfection system.
- Regularly inspect your disinfection system to ensure that the power indicators are on and no alarms are present.
- Replace the UV lamp annually (or biennially if seasonal home use) to ensure maximum disinfection.
- Always drain the reactor chamber when closing a seasonal home or leaving the unit in an area subject to freezing temperatures.

Operating & Maintenance Instructions

Caution: prior to performing any work on the disinfection system, always disconnect the power supply first.

UV lamp Replacement:

1. To replace the lamp, there is NO need to disconnect the system from the water supply, nor to drain the water from the reactor chamber DO NOT USE WATER DURING THIS PROCEDURE. Lamp replacement is a quick and simple procedure requiring no special tools. The UV lamp must be replaced after 5,000 hours (for a 1 GPM unit) or 9,000 hours (for a 4 or 6 GPM Unit) of continuous operation or once a year in order to ensure adequate disinfection.
2. Disconnect main power source and allow the unit to power down for 30 sec. Remove the lamp connector away from the body of the connector. Remove connector and lamp from the reactor chamber. Separate the lamp from the connector. Do not twist the lamp from the connector, simply slide the two apart. Avoid touching the lamp on the glass portion. Handling the lamp at the ceramic ends is acceptable, however if you must touch the lamp glass, please use gloves or a soft cloth. Fully remove the lamp from the reactor chamber being careful not to angle the lamp as it is removed from the chamber. If the lamp is removed on an angle, pressure will be applied on the inside of the quartz sleeve, causing the sleeve to fracture,
3. To install a new lamp, first remove the lamp from its protective packaging, again being careful not to touch the lamp glass itself, Carefully insert the lamp into the reactor vessel (actually inside the quartz sleeve) Insert the lamp fully into the chamber leaving about two inches of the lamp protruding from the chamber. Next, attach the connector to the UV lamp The connector is "keyed" and will only allow correct installation in one position. Ensure the connector is fully seated onto the UV lamp
4. Once the lamp is fully seated on the connector, slide the connector over the aluminum retaining nut. Make sure the metal retaining ring on the connector is pulled away from the body of the connector in order that the connector may slide fully over the retaining nut.

Quartz Sleeve Replacement / Cleaning:

If the water contains any hardness minerals (calcium or magnesium), iron, or manganese the quartz sleeve will require periodic cleaning. To remove the quartz sleeve first remove the UV lamp as outlined in step 1-4 (in previous "Operating and Maintenance Instructions) then perform the following steps:

1. Shut off water supply and drain all lines.
2. Remove the lowest connection on the disinfection system and drain the UV chamber (use a small bucket under the unit to prevent a spill).
3. Remove aluminum gland nuts from both ends of the reactor chamber checking for the free floating spring inside sleeve at the opposite end to the lamp connection (do not allow quartz sleeve to fall).
4. Carefully remove o-rings from the quartz sleeve As the o-ring may tend to adhere to the quartz sleeve. it is recommended to replace the o-rings annually. Remove quartz sleeve carefully from chamber.
5. Clean the outside of the quartz sleeve with a cloth soaked in CLR, vinegar or some other mild acid and then rinse.
6. Re-assemble the quartz sleeve in the UV chamber allowing the sleeve to protrude an equal distance from both ends of the UV chamber.
7. Wet the o-rings and slide onto each end of the quartz sleeve and reassemble the gland nuts (hand tight is sufficient). Use new o-rings supplied.
8. Re-tighten all connections. turn on water slowly and check for leaks.
9. Re-install the UV lamp and lamp connector as per UV Lamp replacement instructions previously.
10. Plug in ballast and verify the POWER-ON LED display is illuminated and ballast power-up sequence operates.

Note: If the system is put on a temporary by-pass or if it becomes contaminated after the disinfection system. it will be necessary to shock the system with household bleach for a full 20 minutes before resuming the use of the water.

Troubleshooting

Sympton	Possible Cause	Solutions
Pressure Drop	Sediment pre-filter clogged	Replace filter cartridge with appropriate micron cartridge. NOTE: check source water supply as fluctuations may occur in source pressure
	Flow regulator	Flow regulator will result in pressure drop when approaching full flow
	Quartz sleeve is stained or dirty	Clean sleeve with scale cleaner and eliminate source of staining problem (ie. Soften hard water)
High Bacteria Counts	Change in feed water quality	Have source water tested to ensure that water quality is still within allowable limits for this system
	Contamination in water lines after UV system	It is imperative that effluent water stream be shocked with chlorine (bleach) before water leaves UV system—disinfection system must have a bacterial free distribution system t work effectively
	Possible break through of sediment through pre-filter	Have source water tested for turbidity—may need stepped filtration in order to catch all sediment entering water system (25 micron sediment followed by 5 micron carbon followed by UV system)
Heated product water	Common problem caused by infrequent use of water	Run water until it returns to ambient temperature
Water appears milky	Caused by air in the water lines	Run water until air is purged
	Problem with o-ring seal (on gland nut and/or UV sensor)	Ensure o-ring is in place, check for cuts or abrasions, clean o-ring, moisten with water/food grade grease lubricant and re-install, replace if necessary
Unit leaking water	Condensation on reactor chamber caused by excessive humidity & cold water	Check location for disinfection system and control humidity
	Inadequate inlet/outlet port connections	Check thread connections, reseal with Teflon tape and re-tighten
System shutting down intermittently	Interrupted power supply	Ensure system has been installed on its own circuit, as other equipment may be drawing power away from the UV (ie. Pump or fridge) UV system should not be installed on a circuit which is incorporated into a light switch
Lamp failure	Loose connection between lamp and connector	Disconnect lamp from connector and reconnect, ensuring that a tight fit is accomplished
	Moisture build up in connector may keep lamp and connector from making a solid connection	Eliminate chance of any moisture getting to the connector and/or lamp pins