

OPERATION & INSTALLATION INSTRUCTIONS



Leaf Home Water Solutions, LLC		
SYSTEM RATED FLOW		
LW5-UV-R1B	8 gpm	
LW5-UV-R2B	15 gpm	



Congratulations on purchasing this ultraviolet disinfection system. By purchasing a Leaf Home Water Solutions, LLC UV Disinfection system, you are receiving not only a high quality product but also peace of mind. Protecting your water supply with a UV system gives you reassurance that your family will have access to safe drinking water throughout your entire home with no chance of microbiological contamination. This is chemical free process which is simple in its concept and effective in its abilities to inactivate microorganisms present in the water supply. Simple maintenance, continuous disinfection and ultimately safe water, Leaf Home Water Solutions, LLC makes it that easy.

TABLE OF CONTENTS

SAFETY CONSIDERATIONS	4
BEFORE YOU BEGIN	5
WATER QUALITY PARAMETERS	5
ASSEMBLY	ó
SYSTEM SIZING	7
LOCATION	7
ORIENTATION	3
INSTALLATION	9
SYSTEM DISINFECTION1	1
CLEANING THE QUARTZ SLEEVE12	2
OPERATION13	3
CONTROLLERS13	3
POWER-UP SEQUENCE13	3
OPERATIONAL SCREENS	4
LAMP COUNTDOWN SEQUENCE14	4
SYSTEM SERVICE SUGGESTED15	5
LAMP REPLACEMENT1	5
QR CODES15	5
SYSTEM TROUBLESHOOTING16	ó
SYSTEM SDECIFICATIONS 15	0

SAFETY CONSIDERATIONS

Although your UV system has been manufactured to the highest safety standards, care must be followed when operating and/or maintaining your system.

Please read the instructions

- Before servicing this equipment, disconnect the power cord from the electrical outlet.
- Energy given off by the UV lamp is harmful to your eyes and skin. NEVER look directly at an illuminated UV lamp without adequate eye protection and always protect your skin from direct exposure to the UV light.
- 3. For complete disinfection, use ONLY genuine replacement parts.
- 4. Do not operate the unit if it has any damaged or missing components.
- To avoid possible electrical shock, use only with a properly grounded electrical outlet.
- 6. It is highly recommended that any maintenance be performed by a certified Leaf Home Water Solutions technician.
- 7. Do not use this system for any purpose other than what it was intended for. Misuse of this system could potentially cause harm to the user or others.
- 8. Your system is intended to be installed indoors and away from leaking plumbing. DO NOT plug the unit in if the system or any of the components are wet.
- 9. The disinfection system should be directly installed into a ground fault circuit interrupter (GFCI). If the use of an extension cord is required, the cord must be manufactured with a minimum of 16 gauge wire and care should be taken to avoid potential tripping hazards.
- 10. This system should only be installed by a certified Leaf Home Water Solutions technician.

This product is not to be used for general lighting / illumination.

BEFORE YOU BEGIN

The following will be needed for installing the UV system:

Tools

- Pipe cutter, hacksaw or other specialized tools required to cut into your existing plumbing (e.g. if you have PEX piping)
- Soldering tools (torch, flux, emery cloth and solder)
- Wrench (for tightening fittings)

Other Materials

- Inlet/outlet connections
- Teflon[™] tape

WATER QUALITY PARAMETERS

UV disinfection is extremely effective against microorganisms but only if the UV light can pass through the water it needs to treat. This means that the quality of your water is very important in order to ensure complete disinfection.

Treated water should be tested for at the least the parameters listed below. If the water exceeds the listed parameters Leaf Home Water Solutions, LLC strongly recommends that appropriate pretreatment equipment be installed (equipment required will depend on parameters being treated):

Hardness: <7 gpg (120 mg/L) - if hardness level is 7 gpg or slightly

below the quartz sleeve must be cleaned periodically in order to ensure efficient UV penetration; if above the water must be

softened.

Iron (Fe): <0.3 ppm (0.3 mg/L)

Manganese (Mn): < 0.05 ppm (0.05 mg/L)

Turbidity: < 1 NTU

Tannins (organics): <0.1 ppm (0.1 mg/L)

UVT (transmittance): >85% (Please contact Leaf Home Water Solutions, LLC if

water has a UVT that is less than 80% for pre-treatment

recommendations)

It is always recommended to install pre-filtration of at least 5 microns prior to a Leaf Home Water Solutions, LLC UV disinfection system.

ASSEMBLY

The rack-mount UV system is designed with a single inlet and outlet port. Unpack the system and ensure all the components are included in the box. Your system is shipped with the following components:



1. CONTROLLER

LW-UV-C2

(LW5-UV-R1B series)

LW-UV-CC2 (LW5-UV-R2B series)

2. GLAND NUT 320006

3. O-RING

310038

4. UV LAMP

LW-UV-RRLS

(LW5-UV-R1B series)

LW-UV-15CRLS (LW5-UV-R2B series)

5. SLEEVE SPRING

310039

6. QUARTZ SLEEVE

LW-UV-Q420

7. UV REACTOR 300100

8. CLAMPS 390071 (each)

9. FLEXIBLE HOSE

310130

10. MOUNTING PLATE

310122

11. FILTER CARTRIDGES

LW-UV-105S

(10" sediment cartridge)

LW-UV-205S

(20" sediment cartridge)

12. FILTERS

160014 (10" sump) 160015 (20" sump)

13. MOUNTING SCREWS

390077

14. FILTER WRENCH 160011

15. IEC POWER CABLE

260004

North American NEMA 5/15, 3 prong grounded

16. LAMP KEY

Comes with new UV lamps (not sold separately)

SYSTEM SIZING

All UV systems are rated for a specific flow rate in water that meets the quality parameters on page 5. **PLEASE NOTE** increasing the flow above the system rating or disinfecting water that does not meet the quality parameters will decrease the dose and therefore compromise the microorganism inactivation. To determine the flow rate, follow these simple steps using a stopwatch and a 2 gallon bucket:

- 1. Be sure no water is being used in the home.
- 2. Open a faucet or tap nearest the pressure system.
- 3. Using a stopwatch or a means of measuring in seconds, time how long it takes to fill the 2 gallon bucket.

LOCATION

Choose a location where the main cold water line is accessible. The system must be installed after other water treatment equipment (i.e. softener), but before any branches (See Figure 1).

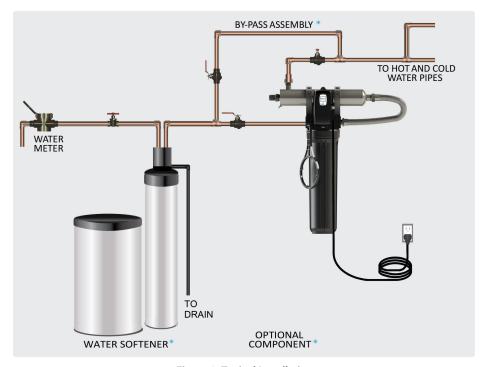


Figure 1. Typical Installation

PLEASE NOTE: All UV disinfection systems are intended for indoor use only as they should not be exposed to the elements. The controller will require a ground fault circuit interrupter (GFCI or GFI) outlet and should be mounted beside or above the reactor.

ORIENTATION

This system has the capability of being able to have the main water inlet enter from either the left hand side or right hand side of the unit. The units comes pre plumbed from the factory for a left hand water inlet. To change to a right hand water inlet follow these simple steps (See Figure 2):

- **Step 1:** Remove the black filter sump housing from the filter head and set aside.
- **Step 2:** Remove the filter head screws from the top mounting plate.
- **Step 3:** Carefully lower the filter head from the rack assembly and rotate 180 degrees. Reassemble onto the rack assembly and take note of the arrows located on the top of the filter head indicating water flow (which now should be indicating a flow direction of right-to-left).



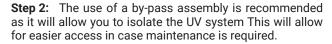
Figure 2. System Orientation (water inlet)

Step 4: Remove the stainless steel UV reactor from the two plastic clamps located on the top of the rack. Carefully remove the top straps securing the reactor with the aid of a standard (slot) screwdriver. Rotate the reactor 180 degrees (with the inlet now facing to the left and the lamp connections located towards the right) and place back into the cell clamps and re affix the two top straps.

In either the left or right configurations, to facilitate lamp removal, ensure there is enough space at the lamp connector end to safely remove the UV lamp and/or quartz sleeve (See Figure 3).

INSTALLATION

Step 1: Once both the orientation and location have been selected, securely fasten the rack to a suitable backing. As the rack system is extremely heavy when filled with water, it is imperative that the rack be mounted with suitable fasteners for the particular installation. Mounting to a drywall backing is not suitable, unless the rack is fastened directly to the wall studs.



Step 3: For water supplies where the maximum flow rate is unknown, a flow restrictor is recommended so that the rated flow of your particular UV system is not exceeded. The flow restrictor should be installed on the inlet port of the reactor.

Step 4: It is recommended to have a licensed plumber connect the UV reactor to the water supply and may be a requirement depending on where you are located.

Step 5: Connect both the inlet and outlet to the rack system with the applicable connections based on your particular plumbing requirements. The inlet port of the filters is a 1" FNPT connection and the outlet port of the UV reactor is a 1" MNPT connection.

Step 6: Once the system has been plumbed in, gently remove the quartz sleeve from its packaging being careful not to touch the length with your hands. The use of cotton gloves is recommended for this procedure as oils from the hands can leave residue on the sleeve and lamp which can ultimately block the UV light from getting to the water.



Figure 3. Lamp Removal Spacing



Figure 4. Quartz Sleeve Installation



Figure 5. IEP Connection



Figure 6. Cartridge Removal

Carefully slide the sleeve into the reactor until you can feel it hit the opposite end of the reactor. Align the sleeve so it centered along the length of the reactor, then gently push it in to lock it into the internal centering springs in the far side of the reactor. **CAUTION:** Pushing too hard when the sleeve is not aligned can damage the centering springs. Slide the o-ring onto the sleeve until it is butted up against the reactor (See Figure 4).

Step 7: Hand tighten the provided gland nut over the quartz sleeve onto the threaded end of the reactor. It has a positive stop to prevent over-tightening. A firm force may be required to fully tighten the gland nut, but DO NOT USE TOOLS for this step. Insert the provided stainless steel compression spring into the quartz sleeve. The spring works with the lamp and lamp connector to create the proper lamp alignment. **PLEASE NOTE:** DO NOT install a UV lamp inside the quartz sleeve without the sleeve spring in place.

Step 8: Install the filter cartridge. Once the cartridge is in place, use the supplied filter wrench to "snug" the filter housing onto the filter head (See Figure 6).

Step 9: The system is now ready for water flow. When all plumbing connections have been completed, slowly turn on the water supply and check for leaks. Make sure the bypass valves are functioning properly and that the water is flowing through the system. The most common leak is from the o-ring not making a proper seal on the reactor. For new installations, review steps 6 and 7. For older systems drain the reactor, remove the o-ring, dry it and reapply silicon grease. Reinstall the o-ring ensuring that it is properly sealed against the reactor and check again for leaks. To help vent the pressure from the system while the system is filling up with water, it is a good idea to twist open the pressure relief valve located on the top of the filter head. Close the valve once water appears at the port.

Step 10: Always hold UV lamps by their ceramic ends, not by the lamp quartz. Remove the lamp from its packaging. Again, the use of cotton gloves is recommended. Remove the lamp key from the lamp's connector and set it aside for the next step. Be careful to not touch the key's exposed contacts. Insert the UV lamp into the reactor, being careful not to drop it.



Figure 7a. Standard Output UV Lamp Connection



Figure 7b. High Output UV Lamp Connection



Figure 8. Lamp Key Installation



Figure 9.
Lamp Connector



Figure 10. Ground Screw Connection

- **Step 11:** Install the lamp key into the controller. The key always comes packaged with the lamp and sits on the connector. With the key removed from the lamp, orient it so the label is upright and facing you. The key will plug into the lamp key port on the right side of the controller (Figure 8).
- **Step 12:** Plug the lamp connector into the lamp. Note the keying for proper alignment (see Figure 7a, 7b). Insert the lamp connector into the gland nut and turn the connector approximately ¼ turn to lock the connector to the gland nut as in Figure 9.
- **Step 13:** Tighten the captive ground screw to the ground lug on the UV reactor to ensure proper grounding (Figure 10).
- **Step 14:** Your system is now ready to be plugged into the appropriate GFCI protected outlet. Refer to the following section before any water is allowed to flow through the system.

NOTE: INSTALLATION OF YOUR DISINFECTION SYSTEMS SHALL COMPLY WITH APPLICABLE PROVINCIAL/STATE & LOCAL REGULATIONS.

SYSTEM DISINFECTION

With a new installation, or any time the UV system is shut down for service, without power, or is inoperative for any other reason, the lines in the home or facility could be contaminated. Use the following steps to fully disinfect the lines throughout the entire home or facility.

- **Step 1:** Check for and remove any "dead ends" in the lines throughout the home as these can harbor bacteria. Plug in the UV system and wait until it is ready for operation.
- **Step 2:** Remove the filter cartridge from the last sump and fill it with 1-2 cups of household bleach (most are 5.25% chlorine). Replace the sump and slowly turn on the water supply.
- **Step 3:** At a water outlet, run the water until bleach can be smelled. Repeat this for all faucets, toilets, shower heads, refrigerators, outdoor taps, the washing machine, dishwasher, etc. at the home or facility. Once finished, wait a minimum of 30 minutes before continuing.
- **Step 4:** Reinstall the filter cartridge into the sump and flush the chlorine solution by opening all faucets until chlorine can no longer be detected. Your home has now been completely disinfected with your UV system ready to inactivate any microorganisms that enter the home.

CLEANING THE OUARTZ SLEEVE

Depending on the water quality, the quartz sleeve may require periodic cleaning. At a minimum, the quartz sleeve should be cleaned on an annual basis. The following steps outline a basic cleaning procedure.

- **Step 1:** If a by-pass assembly is installed, shut the inlet valve off to prevent water flow through the system. Otherwise, turn off main water inlet valve (and/or turn off the water pump).
- **Step 2:** Disconnect power cord of UV system from electrical outlet.
- **Step 3:** Release water pressure by opening a downstream faucet and then close the outlet shut-off valve (if any). If there is no outlet shut-off valve, expect water to drain from the system as the head pressure in the system will cause the water to flow back down.
- Step 4: Remove the captive ground screw from the ground lug on the UV reactor.
- **Step 5:** Remove the lamp connector from the reactor (gland nut) by pushing the lamp connector in and turning it ¼ turn counter-clockwise. Disconnect the lamp connector from the lamp. CAUTION: the lamp may be hot!
- Step 6: Being careful to touch only the ceramic ends, remove the lamp out of the reactor.
- Step 7: Unscrew the gland nut from the reactor exposing the end of the quartz sleeve.
- **Step 8:** Remove the quartz sleeve and o-ring by **gently twisting and pulling** the quartz sleeve.
- **Step 9**: Using a soft, lint-free cloth or towel wipe the sleeve down using a commercial scale cleaner (i.e. CLR® or LIME-A-WAY®). This removes scaling or iron deposits that may be on the outside of the quartz sleeve. Be careful not to get any moisture or liquids inside of the sleeve.
- **Step 10:** Dry the sleeve with separate cloth.
- **Step 11:** Replace the o-ring and slide the sleeve back into the reactor following step 7 from the installation section of the manual.

CONTROLLERS



A full colour LCD screen provides the user with a detailed description of the system's performance in addition to providing any applicable fault messages and system diagnostics.

POWER-UP SEQUENCE

On start up, the controller will run through a diagnostic start-up and the sequence will be displayed as follows:







Next, the controller checks for and initializes any optional modules that may be attached to the system.

OPTIONAL MODULES CHECK

- Solenoid
- 4-20 mA
- WIFI
- Remote Alarm
- Flow Meter









A final module screen is displayed showing which specific modules were initialized.

The controller then displays the lamp optimization screen for 60 seconds to allow the lamp to reach its optimum output. Finally, a final "start-up complete" screen is displayed. The system will now be ready to disinfect water flow.







lamp reaching max output



successful start-up

OPERATIONAL SCREENS

The default screen shows the Home Screen. At any point during operation the user is able to scroll through the Home Screen, Lamp life left, QR Code, Contact Info and Maintenance Parts screens by pressing the button located on the front of the controller.























LAMP COUNTDOWN SEQUENCE

The system counts down the number of days until a lamp change is required.









At seven days remaining, the system will additionally repeat an audible chirp. Past the zero day threshold, the display screen changes to solid red with a continuous buzzer.









At any point during this sequence, the audible chirp or alarm can be deferred for seven days by holding the controller button down for a period of five seconds. The number of deferrals used will be displayed as below. Once the deferral expires, the alarm will sound once again. The deferral can be repeated up to three times. **PLEASE NOTE:** At any point after lamp expiration, the water may be unsafe for consumption and should not be consumed without another form of disinfection.





SYSTEM SERVICE SUGGESTED

Controllers will display the System Service Suggested Screen every 6 months to remind consumers to maintain both their UV and other prefiltration. This will serve as a prompt only and will not put the system into alarm. To clear this condition simply press the button located below the screen.



LAMP REPLACEMENT

After the lamp is expired, it must be replaced with the same part number as indicated on the Maintenance Parts screen or on the label on the reactor. With the system powered down, remove and discard the lamp key from the controller. The replacement lamp is packaged with a lamp key on the connector at the end of the lamp. Remove the key from the lamp and place it in the controller. Refer to *Installation*, starting with step 10 for instructions on installing the new lamp.

OR CODES

A **QR code** (Quick Response code) is a matrix barcode first designed for the automotive industry. Leaf Home Water Solutions, LLC uses the QR code to store a link to a specific page on our website. Users with a camera phone equipped with the correct reader application can scan the image of the QR code and over a wireless network connect to a Leaf Home Water Solutions, LLC web page in the phone's browser. Leaf Home Water Solutions, LLC's QR webpage has information on how to purchase replacement components as well as a helpful video directory on system servicing (i.e. How to change a UV lamp or quartz sleeve). To access the QR code on the controller, press the control button until the QR code screen appears.



SYSTEM TROUBLESHOOTING

Hard Alarms: The following give a constant audible alarm. If present, the solenoid valve is closed, and the 4-20, remote alarm and WiFi modules transmit the alarm.

SYSTEM DISPLAY	PROBLEM	RESOLUTION	
LAMP FAILURE REPLACE LAMP CALL 1-888-320-5497	The system has detected a problem with the lamp.	Reset lamp protection circuit -unplug unit for 10 seconds. Replace the lamp with the part as indicated on the silver label on the reactor or on the Maintenance parts screen.	
CALL 1-888-320-5497	Although the lamp is powered and visibly illuminated, due to the lamp's age its UV output is no longer sufficient for proper disinfection.	Replace the lamp with the part as indicated on the silver label on the reactor or on the Maintenance parts screen.	
UV OUTPUT 50% LOW UV CHECK SYSTEM	Low UV Intensity.	Remove and clean the quartz sleeve and sensor. Check water quality meets requirements on page 5 and add filtration as required. Replace lamp.	
LAMP INCORRECT Required Part: LW-UV-6RLS Installed Part: LW-UV-3RLS	Wrong lamp or sensor installed.	Replace component with proper model as indicated.	
CONNECTION FAILURE C/O CHECK CONNECTION OR SEE MANUAL	A bad connection has been detected in the IEP port.	Ensure all modules are connected properly to the system and to each other. Modules can be tested individually by plugging in one at a time and cycling power to the system. Replace any module that is not detected when plugged directly into the controller.	
LAMP KEY NOT FOUND INVALID CHECK CONNECTION OR SEE MANUAL	Missing or incorrect lamp key.	Ensure the lamp key (packed with the lamp, on the connector) is installed. Unplug and reinstall the key. Ensure the key part number matches Lamp on Maintenance Parts screen.	

Soft Alarms: The following remaining errors give a 15 second audible chirp only

SYSTEM DISPLAY		PROBLEM	RESOLUTION	
SOLENOID FAILURE CHECK CONNECTION OR SEE MANUAL REMOTE ALARM FAILURE CHECK CONNECTION OR SEE MANUAL	4-20 mA FAILURE CHECK CONNECTION OR SEE MANUAL WIFI FAILURE CHECK CONNECTION OR SEE MANUAL	The module indicated is no longer communicating to with the system.	Ensure all modules are connected properly to the system and to each other. Modules can be tested individually by plugging in one at a time and cycling power to the system. Replace any module that is not detected when plugged directly into the controller.	
FLOW METER FAILURE CHECK CONNECTION OR SEE MANUAL	FLOW METER ERROR FULL POWER	Refer to flow meter manual for detailed troubleshooting		

Warning: After any hard alarm, the home or facility should be disinfected. Follow the steps under the "System Disinfection" heading.

Boil Water Advisory: If any failure occurs on a UV system, the water must not be used for human consumption until the system is returned to a safe operational mode. If the water is used for human consumption during this period, the water must be boiled (minimum 20 minutes at a full boil) prior to consumption.

SYSTEM SPECIFICATIONS

Model	LW5-UV-R1B	LW5-UV-R2B		
Flow Rate (30mJ/cm² @ 95% UVT)	8 GPM	15 GPM		
	30.3 lpm	56.8 lpm		
(000, 0 (@ 70.0 0 1.)	1.8 m³/hr	3.4 m³/hr		
Filter Housing	5 micron sediment LW-UV-105S	5 micron sediment LW-UV-205S		
Port Size	1"MNPT			
Electrical	90-265V/50-60Hz.			
Plug Type	American, Nema 5/15, 3 wire for all 110V			
Lamp Watts	20	45		
Power (Watts)	23 (21 @ 230V)	57 (48 @ 230V)		
Maximum Current (amps)	1	1		
Replacement Lamp	LW-UV-RRLS	LW-UV-15CRLS		
Replacement Sleeve	LW-UV-Q420			
Replacement Controller	LW-UV-C2	LW-UV-CC2		
Chamber Material	Polished 304 stainless steel, A249 pressure rated tubing			
Reactor Dimensions	3.5 x 20.0" (8.9 x 50.8 cm)			
Controller Dimensions	17.2 x 9.2 x 10.2 cm (6.8 x 3.6 x 4")	21.7 x 10.8 x 10.2 cm (8.6 x 4.2 x 4")		
Operating Pressure	0.7-8.3 bar (10-120 psi)			
Operating Water Temp.	2-40° C (36 - 104°F)			
Lamp Change Reminder	YES			
Visual Lamp Out Indicator	YES			
Audible Lamp Out Indicator	YES			
Shipping Weight	11.3 kg. (25 lbs.)	12.4 kg. (27.4 lbs.)		

NOTES				
		 	· · · · · · · · · · · · · · · · · · ·	
			•	



1-888-320-5497 www.LeafHomeWaterSolutions.com 1595 Georgetown Road | Hudson, OH

****ILHS** A Product of Leaf Home Solutions

