



Ultraviolet (UV) Water Disinfection System

Models - R519/R830 Installation & Maintenance Instructions

(Please save for future reference)

INTRODUCTION

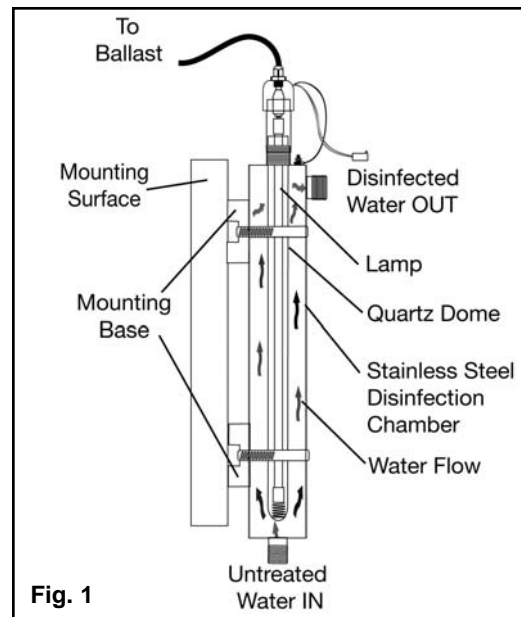
Rainfresh water disinfection systems utilize the proven properties of ultraviolet light (UV). UV emitted at 254 nm wavelength kills/inactivates harmful bacteria (i.e. coliforms, fecal coliforms & E.Coli), viruses, fungi, algae, spores and other microorganisms in water. UV purification is a natural, non-chemical, environmentally safe technique which does not form any harmful disinfection by-products.

HOW YOUR UV DISINFECTION WORKS

Your Rainfresh UV system consists of a low-pressure UV lamp enclosed in a transparent quartz dome, housed in a stainless steel disinfection chamber. As untreated water enters the chamber from one end, microorganisms like bacteria, viruses, fungi, algae etc in the water are exposed to ultraviolet light being emitted by the UV lamp. The UV light kills/inactivates these microorganisms and treated water flows out of the chamber and is ready for consumption. See Fig. 1

SAFETY INSTRUCTIONS

- * **To avoid** possible electric shock, extra care should be taken since water may be present near electrical equipment. Unless specifically referred to in these instructions, do not attempt repairs yourself. Contact the manufacturer for service advice.
- * **Do not** plug the unit in if any electrical surfaces or electrical parts are wet.
- * **DO NOT LOOK DIRECTLY AT UV LAMP WHEN LAMP IS ON.** UV light can cause serious burns to unprotected eyes and skin.
Do not operate the UV lamp outside the UV disinfection chamber.
- * **Do not** use this unit for any purpose other than its intended use for potable water disinfection. The use of attachments not recommended, approved or sold by the manufacturer may result in improper performance of the unit or an unsafe condition.
- * **Do not** operate the system if it has a damaged electrical cord or plug, is malfunctioning, or has been damaged in any way.
- * **Do not touch** the lamp or quartz dome with dirty or moist hands. Hold the lamp and dome by the ends with **soft dry gloves** or cloth.
- * Before any cleaning or maintenance on the system, always unplug the unit from the power source. Disconnect from the power outlet by holding the plug. Never pull the cord.
- * You must connect your UV unit to a grounded (3-pronged) receptacle (a GFI is preferred) and ensure that the lamp connector ground wire is connected to the stainless steel end of the main chamber. Use of extension cords is not recommended.
- * Installation of the UV disinfection system and water filter will interrupt electrical grounding continuity of your plumbing system. For directions on restoring the electrical grounding continuity, consult your local electrical inspector.
- * Power source for applications outside North America must match requirements of the unit (For example 220V, 50Hz or other).
- * Protect your unit from freezing. Drain all water from the unit if freezing temperatures exist.
- * The UV lamp inside of the disinfection system is rated at an effective life of approximately 9000 hours. To ensure continuous protection, **REPLACE UV LAMP ANNUALLY.**

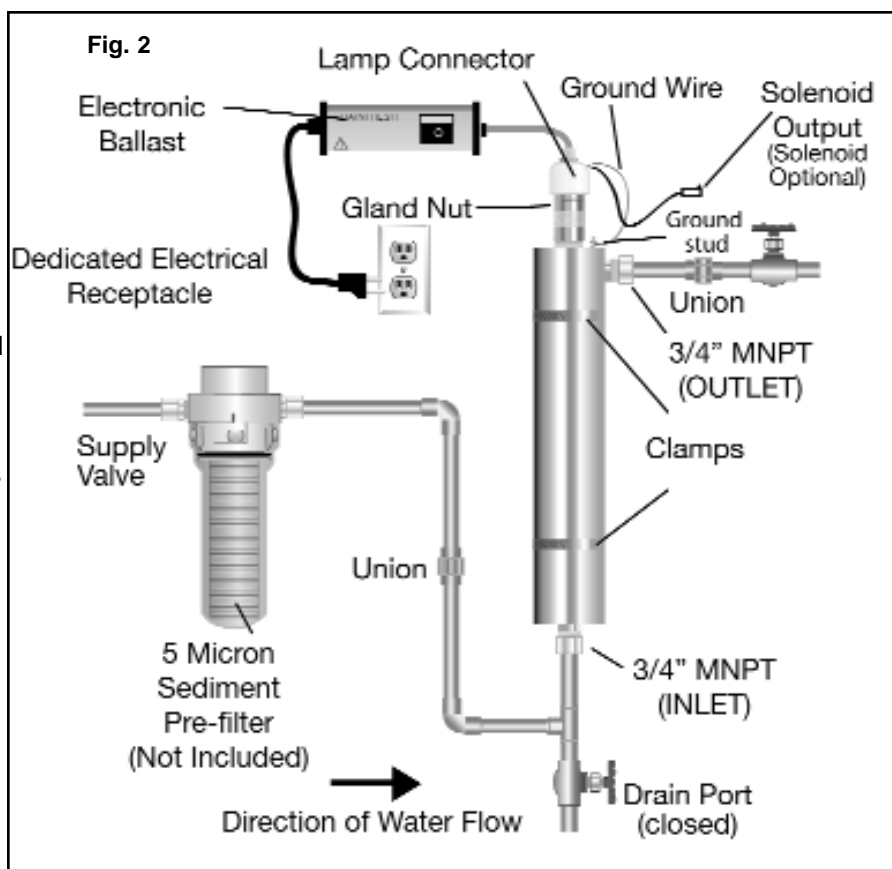


BEFORE YOU INSTALL THE SYSTEM

The unit should only be operated with water that meets the following minimum criteria:

- * **Turbidity/Suspended Solids:** Less than 5 PPM (mg/L). Ideally less than 1 NTU (Nephelometric Turbidity Unit). **A 5 micron sediment filter should be installed before the UV system at all times.** We recommend Rainfresh Model FC150 (5 micron sediment filter and housing assembly) If the feed water has fine sediment, a finer pre-filter (1 micron or smaller) may be used. If the water has very high turbidity, a back-washable multi-media filter is recommended.
- * **Hardness:** Less than 7 gpg (120 mg/L). Hard water causes scale build-up on the quartz sleeves thereby reducing the UV transmittance in the water and in turn reduced performance. For high hardness water, a water softener should be installed prior to the UV system.
- * **Iron & Manganese:** Iron less than 0.3 PPM (mg/L) and Manganese (less than 0.05 mg/L) is desirable. At higher concentrations, a suitable water conditioner (e.g a greensand filter) should be installed prior to the UV system to prevent iron build-up on the quartz dome.
- * **Tannins and Colour:** Water with tannins or colour has low UV transmissivity that reduces UV system performance. A tannin-removal / colour-removal activated carbon system should be installed to improve UV performance.

- * The Rainfresh UV Water Disinfection System is designed for installation on the cold water line only, either at the point of entry (POE) or at the point of use (POU). For installation in the Province of Quebec, install the R519 to serve a max of 1-2 outlets and the R830 to serve a max of 2-3 outlets only, but not serving majority of the premises.
- * The system should be installed indoors in a protected area where the temperature does not fall below 4°C (40°F).
- * It is strongly recommended to have a **dedicated electrical circuit** for the UV system. Where power fluctuations or surges are anticipated, it is recommended that a surge protector be installed. We recommend a CSA or equivalent certified **surge protector** rated for a clamping voltage of less than 400 Volts, response time of less than one nanosecond, and energy absorption of at least 600 Joules.
- * The R830 & R519 UV systems have been designed for maximum water flow rates of 8 US GPM (30 liters per minute) and 5 US GPM (19 liters per minute) respectively. If higher flow rates exist, it is recommended that an 8 US GPM flow restrictor (Rainfresh model FR8K) be installed at the inlet port of model R830, so that the flow rate through the UV does not exceed the rated flow rate. Likewise, for UV model R519, a 5 US GPM flow restrictor (Rainfresh model FR5K) is recommended.
- * For optimum performance, the system should be wall-mounted in a vertical position with the lamp connector at the top. The water inlet is at the bottom and the outlet at the top, as shown in Fig. 1.
- * It is highly recommended to install **bypass piping** with a shut-off valve around the unit. This way you can still have water in case you need to remove the UV unit for service.
- * Provide a minimum clearance of 2 feet above the unit for lamp replacement.
- * Use only Teflon tape for all connections. Do not use any other sealant.
- * The UV Disinfection unit should be the last step of your water treatment system. If your water comes from a well or a lake/river etc, the UV should be installed after your pump, pressure tank, softener/iron filter/water conditioner. Otherwise the UV should be installed just after the water meter and any water conditioner that you may have.



INSTALLATION

Fittings Required for Installation

Fittings required for a typical install on 3/4" copper pipe are 3/4" FNPT female adapters, 3/4" Tee, 3/4" Elbows, 3/4" copper pipe, 3/4" union couplings and 3/4" ball valves. You may need different fittings if your pipe size or material is different. If you are unsure of what fittings to use, please call Envirogard/Rainfresh.

Note: UV light can degrade plastics. If your plumbing pipes are in plastic, it is recommended that you use at least 6 to 12 inches of UV-resistant material (e.g copper) on the inlet and outlet of the UV unit to prevent damage.

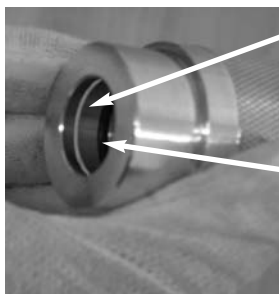
Installing the pre-filter

It is highly recommended that a 5 micron or finer filter be installed before the UV system. Pre-filter is NOT included with this system, but is available from the same retailer. We recommend Rainfresh model FC100 or FC150 with solderless installation kit model CK1. Refer to fig(2) for location of filter and follow installation instructions included with filter.

Installing the UV unit.

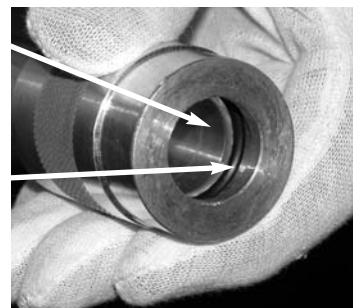
1. Slide a mounting clamp (4033) under a mounting base (4034) and screw the base on to the wall with base screws (4035) as shown in Fig. 1. Using a level, vertically align other mounting base at a distance of about 11-12 inches below the first base. Mount the other base with the second mounting clamp (clamp screws should be in opposite directions).
2. Mount the UV disinfection chamber (4000/4010) on the two bases and holding it with one hand, tighten the mounting clamps using a flat-head screwdriver.
3. Mount the ballast (R830B/R519B) on the wall slightly above the chamber with ballast mounting screws (4044) (See Fig. 2).
4. Install new plumbing as per Fig 2. The inlet and outlet connections on the UV are 3/4" MNPT.
5. If you intend to drain the UV during winter to prevent freezing, install a 3/4" copper tee at the inlet of the UV and plumb in a ball valve and a piece of copper pipe (See Fig 2)

6. Carefully unpack UV lamp (R519L/R830L) and quartz dome (R519QD/R830QD). **Note: Hold lamp and dome by the ends with soft, dry gloves or cloth.** The gland nut "O" ring (515) is in the groove of the gland nut (factory-installed) and the dome "O" ring (4032) is in a separate plastic pack.



Dome

"O" ring
515



7. Gently slide the dome "O" ring (4032) over the top (open end) of the quartz dome to about 1" from the open end.

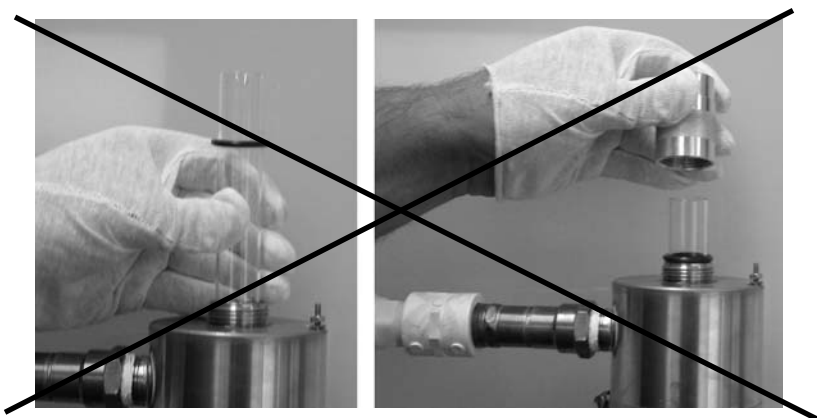
8. Gently insert the quartz dome (4030) until it goes past the nut O-ring (515) and touches the inside top end of the gland nut.

CORRECT

Quartz dome is past gland nut O-ring (515) and is touching the inside top end of the gland nut. **Caution:** Do not push hard as it can break the quartz dome.

WRONG

Quartz dome is NOT past gland nut O-ring (515) and is NOT touching the inside top end of the gland nut.



9. Carefully slide the quartz dome with gland nut attached into the opening at the top of the UV chamber and hand-tighten the gland nut into place. Do not overtighten the gland nut as it can break the quartz dome.

Note: Broken quartz domes are not under warranty.

WRONG

Do not insert quartz dome in chamber without first attaching gland nut as per instructions. This can cause a leak.

10. Slowly open supply-valve and valves before and after UV system. **Check for leaks. Do not proceed to next step until leaks are fixed.**

11. Slide the lamp spring (4036) into the quartz dome followed care fully by the lamp. Holding the top end of the lamp, attach the lamp to the lamp connector. The lamp connector fits over the pins in only one configuration. Slide the lamp connector cover over the gland nut and tighten the black screw on it.



12. Remove the nut from the ground stud at the top of the unit. Next place the ground wire (green wire with yellow stripes) over the stud and tighten the nut.
13. Connect the ballast to the AC supply. The green lamp-on LED will light, followed by three buzzer beeps and three red timer LED flashes. **Your Rainfresh UV Disinfection System is now ready for service.**

DISINFECTION PROCEDURE

Before service begins, all household plumbing lines should be disinfected to prevent the possibility of re-contamination after UV disinfection. You should also disinfect your plumbing system if the power goes out for several hours or more or if the unit has been accidentally shut-off for several hours or more. It is advisable to disinfect the plumbing lines at least once a year.

The following is a general method for disinfection of plumbing lines. If you are uncertain about the efficacy of this procedure you are advised to contact your local health authority responsible for water safety.

1. Shut off the supply valve and de-pressurize the lines by opening a tap until it runs dry.
2. Remove the filter in the filter housing and add about 1-2 cups (250-500ml) of unscented household bleach (5 to 6% sodium hypochlorite) to the empty filter housing and put it back on the filter head.
3. Open the supply valve and slowly open a faucet and let the water run until you can smell the chlorine and then shut the faucet off. Repeat the procedure for all hot and cold outlets in the house. Add more bleach as required. Run hot faucets longer to allow the chlorine to come through the hot water tank.
4. Leave the bleach solution in the plumbing system for about 6 to 8 hours preferably overnight.
5. Take off aerators (if any) on the faucets and thoroughly flush all outlets until the chlorine smell is minimal.
6. Shut-off the supply valve again and open a faucet to deppressurize the system. Open the filter housing and re-install the filter cartridge.
7. Open the supply valve slowly. You are ready to use the water now.

UV BALLAST FEATURES

The micro-processor controlled electronic UV ballast supplied with your Rainfresh UV system has both audio and visual alarm indicators to indicate the lamp operation and an integral annual lamp change reminder timer.

UV Power Source Initialization Sequence: When AC power is applied to the UV ballast, the lamp is ignited as indicated by the green lamp-ON LED and alarm buzzer consisting of three buzzer beeps and three red timer LED flashes.

NOTE : If a solenoid is connected to the UV it will activate on completion of the self-test sequence.

Normal Operation: During normal operation only the green lamp-ON LED is illuminated.

Lamp-Change Timer Operation: At the end of one year, the red lamp-change timer LED will flash and the buzzer will sound indicating that the timer is in a **28-day grace period**. You can silence the buzzer for seven days by pushing the timer button, but the LED will continue to flash. At the end of the 28-day period, the red timer LED illuminates continuously and the buzzer sounds. Pressing the timer button at this point will not silence the buzzer until the lamp is replaced. **The UV lamp is not shut down in this alarm mode and the solenoid valve (if connected) is not closed.**

Re-Setting the Lamp-Change Timer: The lamp-change timer is reset after installing a new lamp by depressing timer button while reconnecting ballast to electrical outlet and keep the button depressed until the ballast emits a solid three-second beep. This will re-set the lamp-change-timer to zero and the 3-second beep will confirm that the re-set was successful.

NOTE : It is not possible to reset the lamp-change-timer unless the timer is in the grace period or lamp-change alarm mode or lamp-failure mode.

Time Remaining: When the lamp-change-timer is not in the grace period or lamp change alarm mode, the number of months of lamp life remaining can be determined by pressing the timer push button and counting the number of times the red LED flashes.

Lamp Failure: When the UV ballast detects a lamp failure or enters the auto-shut down mode due to abnormal operating conditions, the alarm buzzer sounds and the green lamp-ON LED switches OFF. If connected, the solenoid valve will shut off the water flow to the house.

Note: The UV ballast is designed to shut down if the AC input voltage is outside the operating limits. When this happens, a lamp failure alarm will become active. You should unplug the unit from the AC power source wait for fifteen seconds and then reconnect. If the failure was due to out-of-limit AC power, the unit will re-ignite the lamp and operate normally. If not refer to trouble-shooting.

Solenoid Valve Output: The UV ballast is capable of directly powering a solenoid valve (Model R830S - optional), which will shut off water flow during lamp failure alarm conditions or power failure.

OPERATION AND MAINTENANCE

Your UV system is ON continuously during normal use. **Caution:** During periods of not using water, for example overnight, water inside the UV unit (approx 2 liters) can become hot. It is, therefore, recommended that after such periods of non-use, the cold water line be flushed for about 30-45 seconds prior to use.

Note: Under humid conditions, water droplets (condensation) may appear on the outside of the UV disinfection chamber. This is normal.

Caution: Protect your unit from freezing. Drain all the water from the UV if freezing temperatures exist.

Annual UV Lamp Replacement: The UV lamp has an effective life of 9000 hours of continuous operation, after which it should be replaced regardless of its apparent condition. As a good maintenance procedure it is recommended that the quartz dome also be cleaned at the time of lamp replacement. Hold the lamp and dome by the ends with soft dry gloves or cloth.

How to replace the UV Lamp:

1. Unplug UV unit from electrical outlet and turn off supply valve before the unit. Open a faucet to depressurize the UV system and turn off the valve at the UV outlet to isolate UV unit. Wait several minutes for the lamp to cool down.
2. Unscrew the ground nut and remove the ground wire (green wire with yellow stripes).
3. Loosen the black screw on the lamp connector cover and remove cover from the gland nut.
4. Carefully slide UV lamp slightly out of chamber and hold the lamp end with one hand. **CAUTION:** The lamp end can be very hot. Gently pull off the connector with your other hand to disconnect the lamp completely. Slowly remove lamp from the disinfection chamber completely.
5. Remove the quartz dome by loosening the gland nut and carefully extracting from the unit. Remove dome absolutely vertically from its position until the other end comes out. **CAUTION:** If you bend the dome mid-way, it can break easily and pieces of quartz can fall into the UV chamber. Do not lose the spring.
6. Remove & discard used dome "O" ring. Clean dome gently with a vinegar solution or a household scale-removal product.
7. Using a small pointed tool carefully take the gland-nut "O" ring out of the gland nut. Take care not to scratch the gland nut.
8. A dome "O" ring (thicker) and gland nut "O" ring (thinner) are included with the replacement lamp. Slide gland nut "O" ring into the internal groove of the gland nut.
9. Replace dome "O" ring on to quartz dome about 1" from the open end. Gently push the quartz dome into the gland nut until it touches the top. Carefully replace quartz dome into UV chamber and hand-tighten gland nut.
10. Carefully unpack the new lamp and slide into the disinfection chamber. Holding the lamp end, gently lamp connector on to the pins. Slide the lamp connector cover over the gland nut and tighten the black screw. Re-connect ground wire.
11. Slowly open supply-valve and valves before and after the UV and check for leaks.
12. Depress timer button while reconnecting ballast to electrical outlet and keep the button depressed until the ballast emits a solid three-second beep. This will re-set the lamp-change-timer to zero and the 3-second beep will confirm that the re-set was successful.
13. Flush water through the UV for 2-3 minutes. The unit is ready for service.

Cleaning the Quartz Dome: Some water conditions may require cleaning of the quartz dome more than once a year. To clean quartz dome, follow the lamp-replacement instructions. **NOTE:** Do not depress timer-button when reconnecting ballast to electrical outlet. The green lamp-ON LED will light, followed by three buzzer beeps and three red timer-LED flashes. The quartz dome should be replaced every three years.

TECHNICAL SPECIFICATIONS

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Ballast is in alarm	1. UV Lamp is out 2. Time to change UV Lamp.	1. Check Lamp connections. Tighten if necessary 2. Replace Lamp
UV Lamp will not light	1. Input voltage may be below or above 120 Volts rated voltage 2. UV Lamp is defective 3. Ballast is defective	1. Disconnect power source for 15 seconds and plug back in. If problem persists install a voltage regulator 2. Check UV lamp. Replace if required 3. Replace Ballast
Leak at gland nut	1. Gland nut is loose 2. Defective O-rings	1. Hand-tighten gland nut firmly in place. 2. Replace O-ring set.
Bad Water Test	1. Lamp has not been replaced on time 2. Quartz dome is dirty 3. Re-contamination in plumbing lines	1. Replace lamp every year 2. Clean quartz dome more often if water has high hardness or iron. 3. Disinfect plumbing lines.

Product Specification	MODEL R519
Rated Flow Rate	5 US gpm (19 lpm)
AC Supply Voltage	120V, 50/60Hz, 0.7A (OR) 240V, 50/60Hz, 0.35A
Disinfection Chamber Material	Stainless Steel 304
Maximum Operating Pressure	100 psi
Maximum Ambient Temperature	50 C (122 F)
Water Temperature Range	4 - 37 C (40-99 F)
Lamp Service Life	9000 hours
Chamber Dimensions (LxD)	19" x 3.5"
Controller Dimensions (LxDxW)	7" x 1.7" x 2.3"
Isolated Solenoid Output	12 Volt DC
Inlet/Outlet port Size	¾" MNPT inlet ¾" MNPT outlet

Product Specification	MODEL R830
Rated Flow Rate	8 US gpm (30 lpm)
AC Supply Voltage	120V, 50/60Hz, 0.7A (OR) 240V, 50/60Hz, 0.35A
Disinfection Chamber Material	Stainless Steel 304
Maximum Operating Pressure	100 psi
Maximum Ambient Temperature	50 C (122 F)
Water Temperature Range	4 - 37 C (40-99 F)
Lamp Service Life	9000 hours
Chamber Dimensions (LxD)	23" x 3.5"
Controller Dimensions (LxDxW)	8.75" x 1.7" x 2.3"
Isolated Solenoid Output	12 Volt DC
Inlet/Outlet port Size	¾" MNPT inlet ¾" MNPT outlet

Limited Warranty

The Ultraviolet Water Disinfection Systems stainless steel housing is warranted to the original Consumer purchaser for a period of seven (7) years, from the date of purchase, against defects in materials or workmanship. The Ultraviolet Water Disinfection Systems miscellaneous hardware, seals and electrical system are warranted to the original Consumer purchaser for a period of one (1) year, from the date of purchase, against defects in material or workmanship. The Ultraviolet lamp is warranted for a period of six (6) months from the date of purchase against defects in materials and workmanship. The company's obligation under this warranty shall consist of repair or replacement, at its option, of any part found by company inspection to be defective, provided that the product has not been misused, abuse, altered or damaged by Consumer with respect to the original installation, as determined by the company. This warranty will not apply if water passing through the Ultraviolet Disinfection System has a) Turbidity / Suspended Solids :More than 5 ppm (mg/l). b) Hydrogen Sulphide concentrations greater than 0.05 ppm (0.05 mg/l). c) Iron concentration greater than 0.3 ppm (0.3 mg/l) or Manganese greater than 0.05 ppm (0.05 mg/l). d) Hardness concentrations greater than 7 grains/gal (119 ppm). e) Tannins or colour. This limited Warranty applies only to a unit when returned to the Warrantor at the owners expense and in accordance with shipping instructions received from the Warrantor. This warranty does NOT cover, and is intended to exclude, any liability on the part of Envirogard for any incidental damages, consequential damages, labour charges or any other costs incurred in connection with the purchase, installation, use, maintenance or repair or the water filter whether under this warranty or any other warranty implied by law. Some provinces/states do not allow the exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights, which vary from province/state to province/state. This warranty applies only to water filter/systems purchased in Canada or the U.S.A.

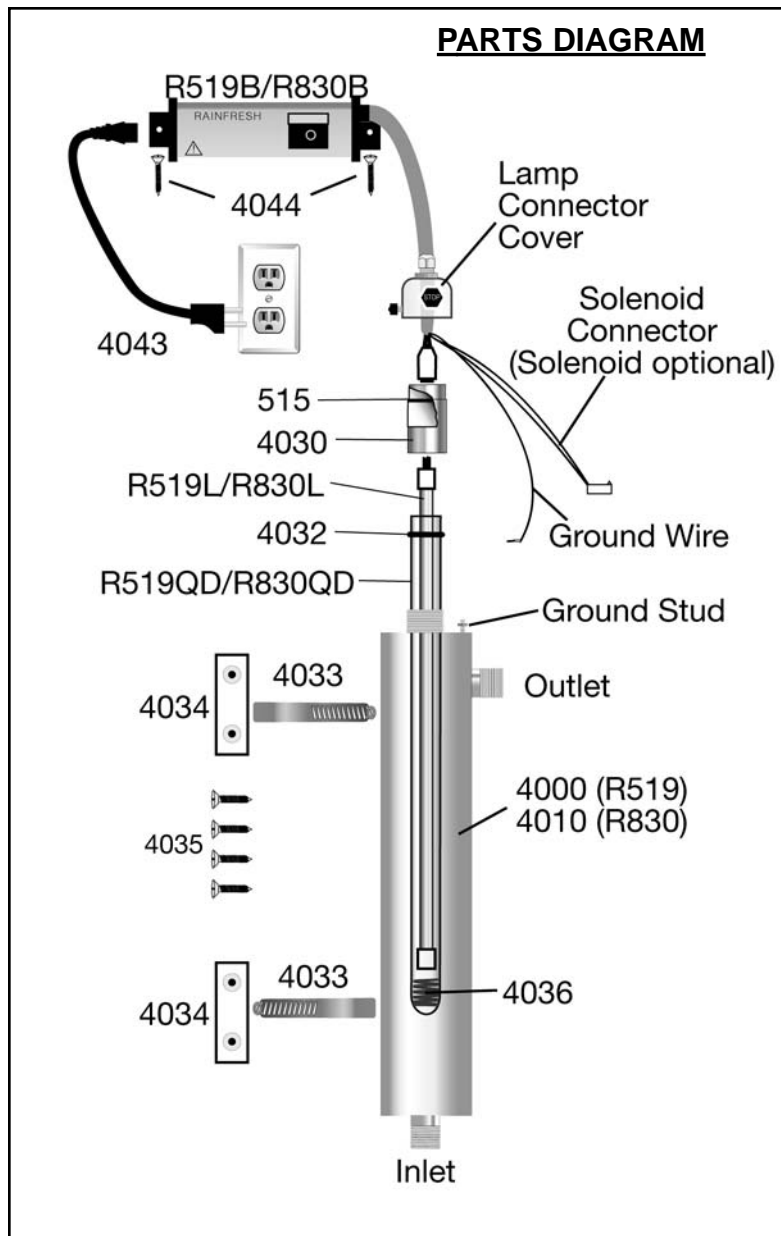
PARTS LIST

Description	Part #	Qty
Gland Nut O-ring (thinner)	515	1
UV Lamp	R519L R830L	1
Ballast and cord assembly	R519B R830B	1
Quartz Dome	R519QD R830QD	1
UV Disinfection Chamber	R519-4000 R830-4010	1
Gland Nut	4030	1
Dome O-ring (thicker)	4032	1
Mounting Clamps	4033	2
Mounting Bases	4034	2
Base Mounting Screws	4035	4
Lamp Spring	4036	1
Ballast Power Cord	4043	1
Ballast Mounting Screws	4044	2



Point of entry system tested and certified by CSA International to standard B483.1 and NSF/ANSI Standard 61 for materials and structural integrity requirements only.

PARTS DIAGRAM



Thank you for purchasing one of our Envirogard / Rainfresh UV Water Disinfection Systems. We are committed to ensuring that you are **totally satisfied. If you have any problems, don't go back to the store - Please contact us !**
Most questions can be answered over the phone. (Mon.-Fri.- 8:00 am to 5:00 pm EST)
Help Line: 1-800-667-8072 Toronto & Area: 905-884-9388 Website: www.rainfresh.ca



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