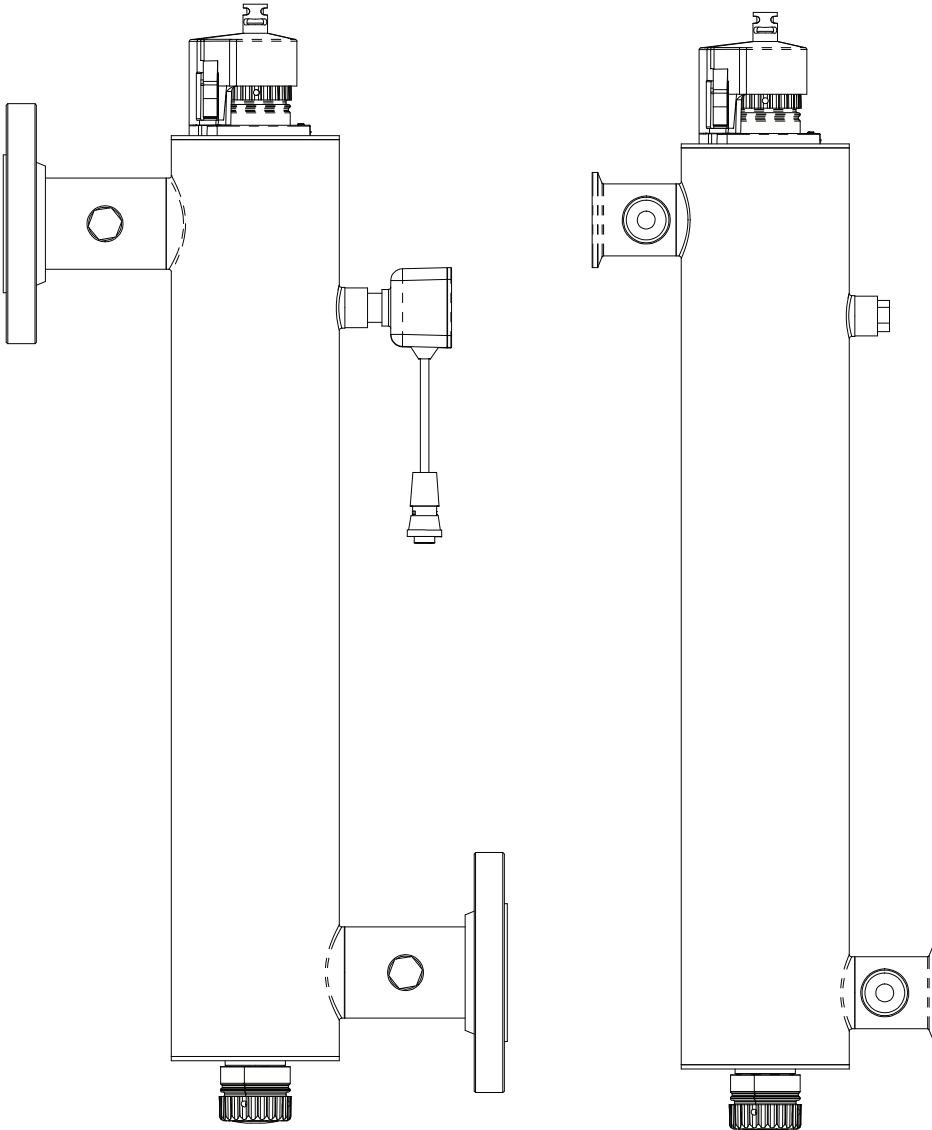


# Owner's Manual



**Models:**  
VL200, VL410 Series



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# Congratulations

 on the purchase of your ultraviolet (UV) water system! This system uses the most advanced UV technology on the market and is designed to provide you with years of trouble free operation with minimal maintenance.

To ensure ongoing optimal operation, UV lamps need to be replaced annually with AQUAFINE factory-supplied replacements. AQUAFINE lamps are the result of extensive development resulting in a highly efficient platform with extremely stable UV output over the entire 9000 hour lifetime. Its success has led to a proliferation of non-genuine copies in the market.

The UV lamp is the heart of the UV system, and there should be no compromise when it's time for a replacement.

Why should you insist on genuine factory supplied AQUAFINE replacement lamps?

- Use of widely available, non-genuine, replacement lamps has been shown to damage the control module of AQUAFINE UV equipment.
- An increasing number of calls to AQUAFINE Technical Support are connected with non-genuine lamps being used (unknowingly) as replacements.
- Damage arising from the use of non-genuine lamps poses a safety risk and is not covered by equipment warranty.
- Unless the UV equipment is equipped with a UV sensor (monitor), it is not possible to verify the UV (invisible) output of replacement lamps.
- Similar appearance to the original lamp and the presence of (visible) blue light does not mean equivalent performance.
- AQUAFINE replacement lamps undergo rigorous performance testing and strict quality control processes to ensure that the safety and performance certifications of the original equipment are not compromised.
- For alternative languages please visit [www.aquafineuv.com](http://www.aquafineuv.com).
- 有关替代语言，请访问 [www.aquafineuv.com](http://www.aquafineuv.com)。
- 如需其他語言，請參閱 [www.aquafineuv.com](http://www.aquafineuv.com)。
- 他の言語については、[www.aquafineuv.com](http://www.aquafineuv.com) をご覧ください。
- 대체 언어를 확인하시려면 [www.aquafineuv.com](http://www.aquafineuv.com) 을 방문하십시오 .
- Fassungen in anderen Sprachen finden Sie unter [www.aquafineuv.com](http://www.aquafineuv.com).

So, you can see that it's simply not worth the risk! Insist on genuine AQUAFINE replacement lamps.


















# Section 1 Safety Information

These are the original instructions. Please read this entire manual before operating this equipment. Pay attention to all danger, warning, and caution statements in this manual. Failure to do so could result in serious personal injury or damage to the equipment.

Make sure that the protection provided by this equipment is not impaired. DO NOT use or install this equipment in any manner other than that specified in the installation manual.



## 1.1 Potential Hazards:

Read all labels and tags attached to the system. Personal injury or damage to the system could occur if not observed.

	Waste electrical and electronic equipment (WEEE). This symbol indicates that you should not discard wasted electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.		This symbol indicates not to store any combustible or flammable material close to the system.
	This symbol indicates there is Mercury present.		This symbol indicates that the contents of the transport package are fragile and the package should be handled with care.
	This is the safety alert symbol. Obey all safety messages that follow this symbol to avoid potential injury. When on the equipment, refer to the Operational and Maintenance manual for additional safety information.		This symbol indicates safety glasses with side protection is required for protection against UV exposure.
	This symbol indicates a risk of electrical shock and/or electrocution exists.		This symbol indicates gloves must be worn.
	This symbol indicates the marked equipment may contain a component that can eject forcibly. Obey all procedures to safely depressurize.		This symbol indicates safety boots must be worn.
	This symbol indicates the system is under pressure.		This symbol indicates the operator must read all available documentation to perform required procedures.
	This symbol indicates there is a potential UV hazard. Proper protection must be worn.		This symbol indicates the plumber must use copper piping.
	This symbol indicates the marked item could be hot and should not be touched without care.		This symbol indicates that the system should only be connected to a properly grounded, grounding-type controller receptacle that is protected by a Ground Fault Circuit Interrupter (GFCI).
	This symbol indicates there is a potential for VERY hot water when flow is started.		

## 1.2 Safety Precautions:

### ⚠ DANGER

  	<p>Failure to follow these instructions will result in serious injury or death.</p> <ul style="list-style-type: none"> <li>• <b>Electric Shock:</b> To avoid possible electric shock, special care should be taken since water is present near the 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.</li> <li>• <b>GROUNDING:</b> This product must be grounded. If it should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electrical shock. This system is equipped with a cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances. Improper connection of the equipment-grounding conductor can result in a risk of electrocution. Check with a qualified electrician or service personnel if you are in doubt as to whether the outlet is properly grounded. DO NOT modify the plug provided with this system – if it does not fit in the outlet, have a proper outlet installed by a qualified electrician. DO NOT use any type of adapter with this system.</li> <li>• <b>GROUND FAULT CIRCUIT INTERRUPTER PROTECTION:</b> To comply with the National Electrical Code (NFPA 70) and to provide additional protection from the risk of electric shock, this system should only be connected to a properly grounded, grounding-type controller receptacle that is protected by a Ground Fault Circuit Interrupter (GFCI) or to a residual current device (RCD) having a rated residual operating current not exceeding 30 mA. Inspect operation of GFCI as per manufacturer's suggested maintenance schedule.</li> <li>• DO NOT operate the UV system if it has a damaged cord or plug, if it is malfunctioning or if it has been dropped or damaged in any manner.</li> <li>• DO NOT use this UV 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.</li> <li>• DO NOT install this UV system where it will be exposed to the weather or to temperatures below freezing.</li> <li>• DO NOT store this UV system where it will be exposed to the weather.</li> <li>• DO NOT store this UV 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.</li> </ul>
--	--

## Safety Information

### ⚠ WARNING



- During extended periods of no water flow, the water in your chamber can become very hot (Approx. 60 °C) and potentially lead to scalding. It is recommended to run your water until this hot water has been purged from your chamber. Do not allow water to contact your skin during this time. To eliminate this condition, a temperature management valve can be installed at the outlet of your UV system.



- Do not pass water through the UV system for a minimum of 5 minutes after applying power (including after power interruptions) to avoid passing under-treated water that may, in rare instances, pose health hazards.
- This system contains a UV Lamp. Do not operate the UV Lamp when it is removed from the chamber. Unintended use or damage of the system may result in the exposure of dangerous UV radiation. UV radiation may, even in little doses, cause harm to the eyes and skin.
- Changes or modifications made to this system without the consent of the manufacturer could render the system unsafe for operation and may void the manufacturer's warranty.



**WARNING:** This product can expose you to chemicals including phthalates, which is known to the state of California to cause cancer, and mercury, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

### ⚠ CAUTION



Failure to follow these instructions could result in minor or moderate injury.



- Carefully examine the UV system after installation. It should not be plugged in if there is water on parts not intended to be wet such as, the controller or lamp connector.
- Due to thermal expansion concerns and potential material degradation due to UV exposure, it is recommended to use metal fittings and at least 10" of copper pipe on the outlet of your UV chamber.
- **Hg EXPOSURE:** The UV lamp contains mercury. If the lamp breaks, then avoid inhalation or ingestion of the debris and avoid exposure to eyes and skin. Never use a vacuum cleaner to clean up a broken lamp as this may scatter the spilled mercury. Obey local regulations and guidelines for the removal and disposal of mercury waste.

### NOTICE



- The UV systems disinfect 99.9% of the following pathogens: Cryptosporidium, Giardia, E.Coli and Fecal Coliform, except for the VL410-AT, VL410-ATS, VL410-TT, and VL410-TTS UV water systems which destroy the following trace chemicals: ozone, chlorine, total organic carbon.

- The UV lamp inside the UV system is rated at an effective life of approximately 9000 hours. To ensure continuous protection, replace the UV lamp annually.
- The UV system is not to be used or played with by children. Persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, are also not to handle the UV system unless they have been given supervision or instruction.
- This system is intended to be permanently connected to the water lines.
- This system is not intended to be used in or above water or outdoors or used in swimming pools when persons are in the pool.
- **EXTENSION CORDS:** If an extension cord is necessary, use only 3-wire extension cords that have 3-prong grounding-type plugs and 3-pole cord connectors that accept the plug from this system. Use only extension cords that are intended for outdoor use. Use only extension cords having an electrical rating not less than the rating of the system. A cord rated for less amperes or watts than this system rating may overheat. Exercise caution when arranging the cord so that it will not be tripped over or pulled. DO NOT use damaged extension cords. Examine extension cord before using and replace if damaged. DO NOT abuse extension cord. Keep extension cord away from heat and sharp edges. Always disconnect the extension cord from the receptacle before disconnecting this system from the extension cord. Never yank cord to pull plug from outlet. Always grasp the plug and pull to disconnect.
- If the supply cord is damaged, it must be replaced by a special cord or assembly available from the manufacturer or its service agent.
- **SYSTEM PROTECTION:** To protect your Controller, a UL1449 certified (or equivalent) transient voltage surge suppressor is strongly recommended.
- The UV lamp in this system conforms to the applicable provisions of the Code of Federal Regulations (CFR) requirements including, Title 21, Chapter 1, Subchapter J, Radiological Health.
- Read and understand the Owner's Manual before operating and performing any maintenance on this equipment.

## 1.3 Water Chemistry

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

Water Quality and Minerals	Level
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 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 system to operate as intended.*

## Section 2 General Information

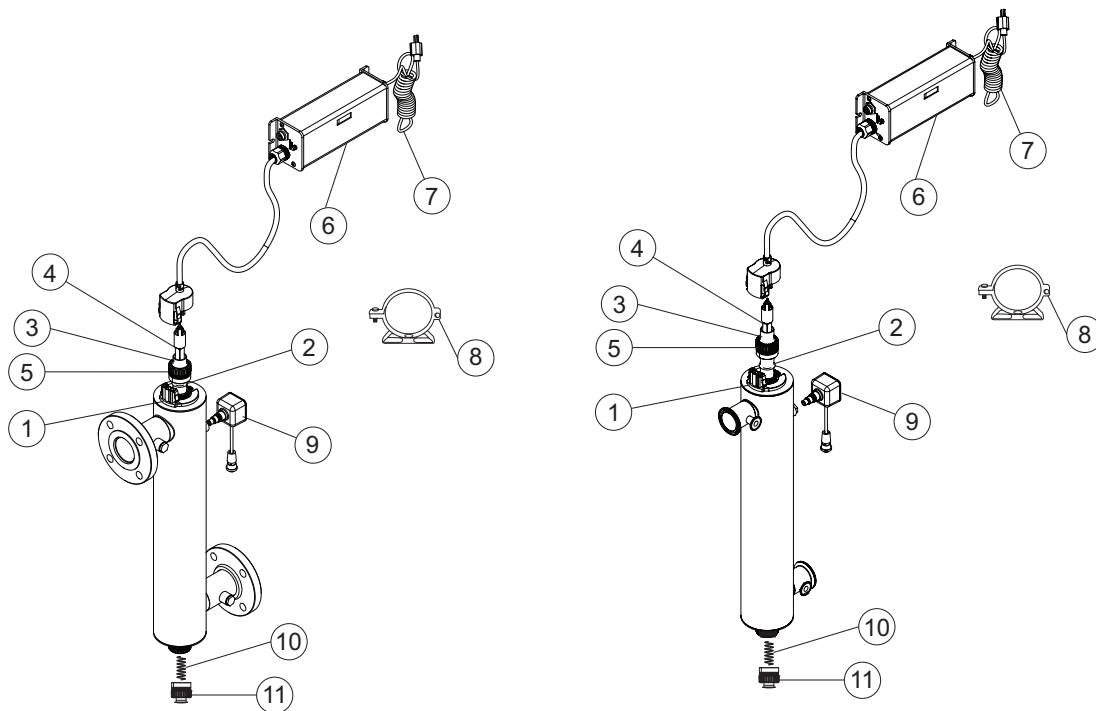


Figure 1 System Components

Item	Description	Part Number	UV Systems
1	Lamp connector base	270276-R	Used on all systems
2	O-ring	411096-R	Used on all systems
3	Open-ended, GE 214 fused quartz sleeve with fire polished ends	250015-13	VL200-ADS, VL200-AD, VL200-TDS, VL200-TD
		250015-21	VL410-ADS, VL410-AD, VL410-TDS, VL410-TD, VL410-ATS, VL410-AT, VL410-TT, VL410-TTS
4	Hard glass, coated UV lamps for long, consistent life (9000 hours)	250449-DS20	VL410-ADS, VL410-AD, VL410-TDS, VL410-TD
		250449-DS12	VL200-ADS, VL200-AD, VL200-TDS, VL200-TD
		250450-TS20	VL410-ATS, VL410-AT, VL410-TT, VL410-TTS
5	Retaining Nut	RN-001	Used on all systems
6	Controller (for 100-240V/50-60Hz models only)	210153	VL200-AD, VL410-TD, VL200-AD, VL200-TD, VL410-AT, VL410-TT
		210154-M	VL200-ADS, VL200-TDS, VL410-ADS, VL410-TDS, VL410-ATS, VL410-TTS
7	IEC replacement power cords for controller (sold separately)	602636	NEMA 5-15P, 120V
		602637	CEE 7/7, 230V
		260012	BS1363, 230V
		260013	AS3112, 230V
8	Mounting Brackets/Clamp Assembly	410076	Used on all systems
9	UV Sensor	270306-AQ	VL200-ADS, VL200-TDS, VL410-ADS, VL410-TDS, VL410-ATS, VL410-TTS
10	Spring	SP008	Used on all systems
11	Retaining nut with the plug	RN-001/1	Used on all systems

## Section 3 Installation

### 3.1 UV System

#### ⚠ CAUTION



Electronic controller must be connected to a Ground Fault Protected Circuit (GFCI) receptacle and the lamp connector ground wire connected to the stainless steel chamber.

The UV system is designed to be mounted either horizontally or vertically.

If installing the chamber in horizontal position the outlet port must be pointing upwards to ensure all air is fully purged from the chamber.

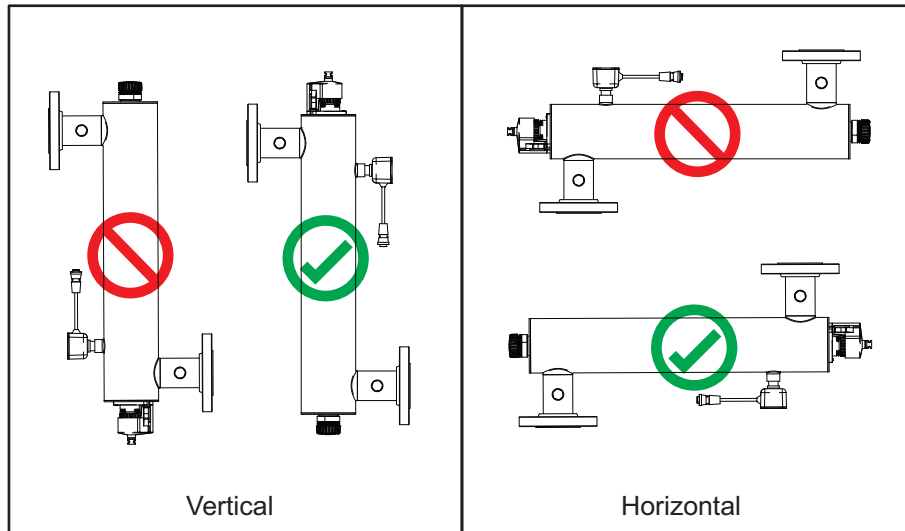


Figure 2 UV System Installation - Vertical and Horizontal

**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 controller should be mounted either above or beside the chamber. Always mount controller horizontally to prevent moisture from running down cordage and causing a potential fire hazard. Drip loops in all cordage connected to controller is highly recommended. Refer to [Figure 5](#).
- The complete water system, including any pressure or hot water tanks, must be disinfected before start up by flushing with chlorine (household bleach) to destroy any residual contamination. Refer to [Section 3.2](#).
- The UV system is intended for indoor use only, do not install UV system where it may be exposed to the weather.
- A 5 micron sediment filter must precede the UV system. Ideally, the UV system should be the last treatment the water receives before it reaches the faucet.

#### Procedure:

1. Connecting or attached piping to the UV System should be supported to avoid any undue load bearing strain on the UV Chamber. Additional bracing and supports must be installed on any additional piping and valves to reduce the stress on the treatment chamber and manifold Inlet/Outlet connections.
2. [Figure 3](#) shows the installation of a typical UV 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. In this case, note

the system requires a supplementary disinfectant for the distribution system if any water is used during by-pass condition.

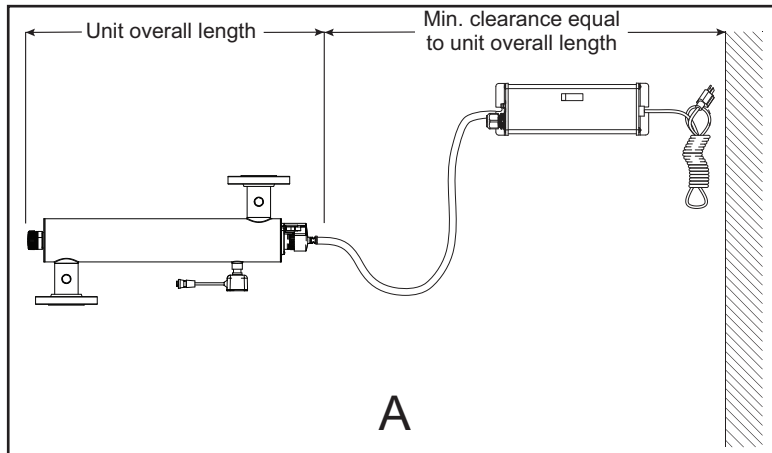


Figure 3 UV System Installation - Vertical and Horizontal

3. Select a suitable location for the UV system and its related components. As it is recommended to install a 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 as shown in [Figure 3 A](#). However, the vertical installation is the most preferred method. When selecting a mounting location, leave enough space to allow the removal of the UV lamp and/or quartz sleeve (typically leave a space equal to the size of the chamber itself).
4. For flanged systems mount the clamps to the rail using the supplied hardware, then the assembly to the wall using the screws and washers provided. The system is now ready to mount to the wall.

**Note:** DO NOT solder connections while attached to the system as this could damage the O-ring seals.

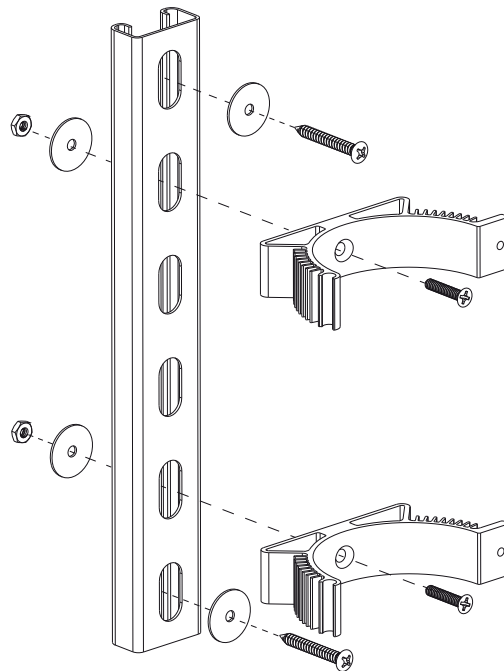


Figure 4 Wall Mounting Bracket

5. Mount the controller horizontally to a wall near the chamber. Ideally place the controller above the chamber and away from any water connection point, to prevent any water from potentially leaking onto the controller by means of a leak at

## Installation

a connection point or a “sweating” system. Make sure you allow for a “drip-loop” as shown in [Figure 4](#) on the lamp, sensor, and power cord, again, to prevent any water from potentially entering the controller.

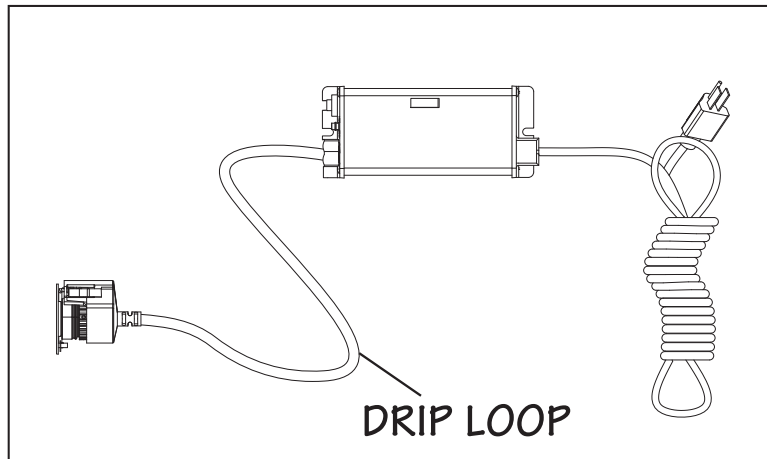


Figure 5 Drip Loop

6. Install the UV lamp. Refer to [Section 4.1](#).
7. When all plumbing connections are complete, slowly turn on the water supply and check for leaks. The most likely cause of 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.
8. 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 should illuminate without any alarms.

**Note:** *DO NOT look directly at the glowing UV lamp.*

9. Allow the water to run for a few minutes to clear any air or dust that may be in the chamber.

**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.*

## 3.2 Cleaning Procedure

It is imperative that the entire distribution system located after the UV be chemically cleaned to ensure that the plumbing system is free from any contaminants. This 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.



## Section 4 Maintenance

### ⚠ WARNING



- Always disconnect power before performing any work on the UV system.
- Always shut-off water flow and release water pressure before servicing.
- Regularly inspect your UV 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 performance.
- Always drain the chamber when closing a seasonal home or leaving the unit in an area subject to freezing temperatures.

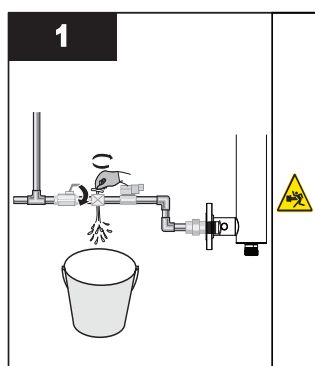
### 4.1 Replacing UV Lamp

### NOTICE

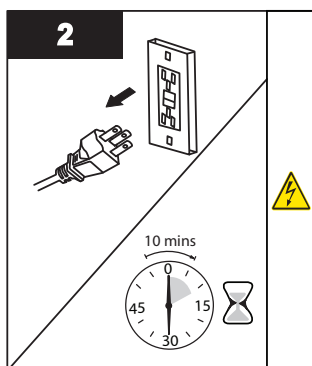
- Reset lamp life timer after lamp replacement. Refer to [Section 5.1.3](#). Refer to [www.lamprecycle.org](http://www.lamprecycle.org) for lamp disposal.
- Do not use water during replacement of UV lamp.

Lamp replacement is a quick and simple procedure requiring no special tools. The UV lamp must be replaced after 9000 hours of continuous operation (approximately one year) in order to ensure adequate performance.

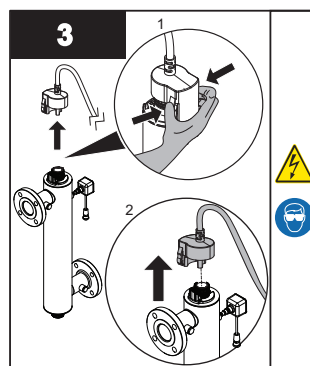
#### Procedure:



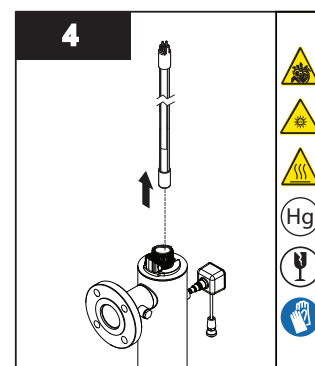
- Shut off the water line to chamber and release system pressure before servicing.



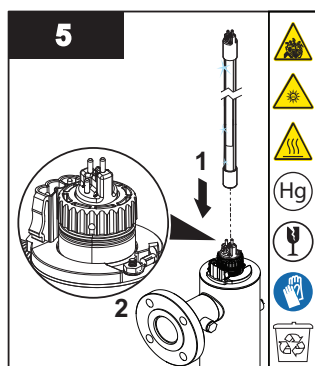
- Disconnect main power source and allow the unit to cool for 10 minutes.



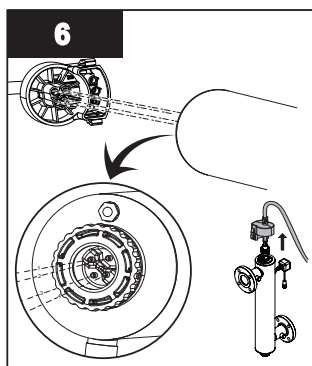
- Remove the lamp connector by squeezing the plastic locking tabs on the side of the connector.



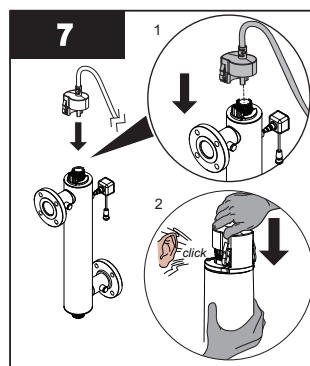
- Remove the lamp in upward direction from the chamber and lamp connector base.
- Always hold the lamp at the ceramic ends.



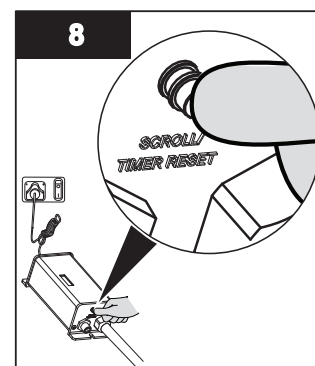
- Insert the new lamp fully into the chamber leaving about two inches of the lamp protruding from the chamber.



- Attach the connector to the lamp and note that the connector will only allow correct installation in one position.



- Push the lamp connector against lamp connector base together until an audible click is heard.
- Re-pressurize the system to check for leaks.



- Hold down the timer reset button and reapply power to the controller until you see **E5E**, then release timer reset button.
- A 5 second delay will occur until you hear an audible tone and LED display will read once again **365**.

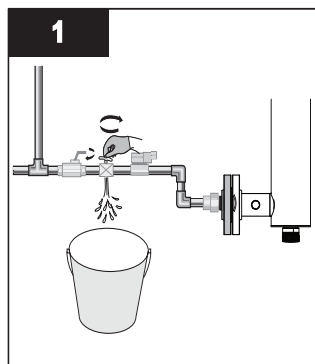
## 4.2 Cleaning and Replacing Quartz Sleeve

**Note:** Minerals in the water slowly form a coating on the lamp sleeve. This coating must be removed because it reduces the amount of UV light reaching the water, thereby reducing performance. If the sleeve can not be cleaned, it must be replaced.

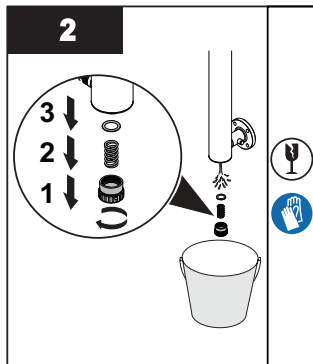
### Prerequisites:

- Shut off water supply and drain all lines.
- Remove the UV lamp. Refer to [Section 4.1](#).

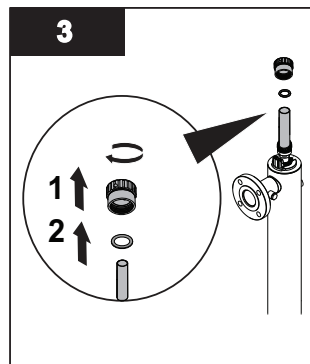
### Procedure:



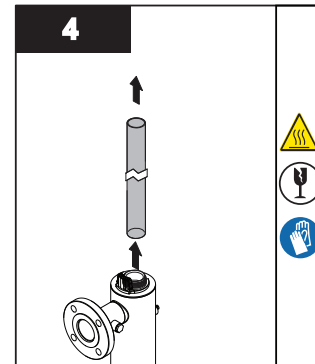
- Drain the chamber by using the drain port.



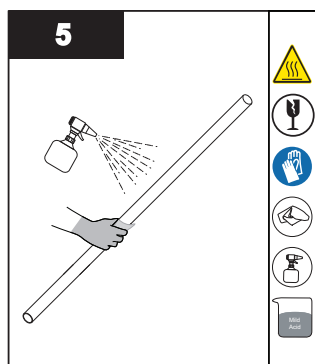
- Remove the bottom retaining nut, floating spring, and O-ring.



- Remove the top retaining nut and O-ring.

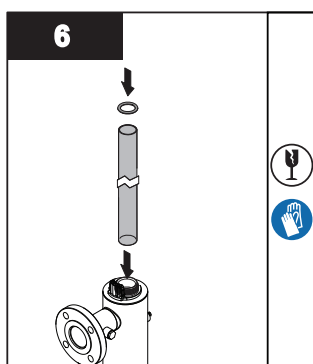


- Remove the quartz sleeve.

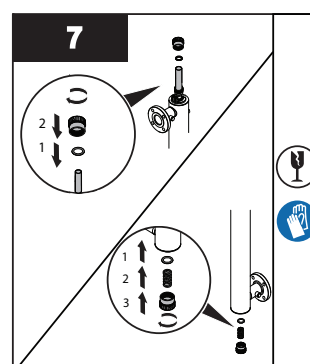


- Clean the quartz sleeve with a cloth soaked in CLR, vinegar or some other mild acid and then rinse with water.

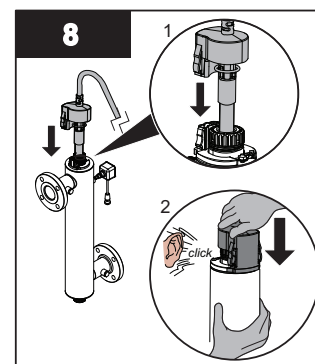
**Note:** If sleeve cannot be cleaned completely or it is scratched or cracked, then replace the sleeve.



- Reinstall the quartz sleeve in the chamber allowing the sleeve to protrude an equal distance at both ends of the chamber.
- Slide supplied O-rings onto each end of the quartz sleeve.



- Reinstall the top and bottom retaining nuts, floating spring, and O-rings respectively.
- When service is complete, assemble the prerequisites in the reverse order of disassembly.
- Plug in controller and verify the POWER-ON LED display is illuminated and controller power-up sequence operates.



- Push the lamp connector against lamp connector base together until an audible click is heard.
- Re-pressurize the system to check for leaks.

**Note:** After replacing the UV lamp or quartz sleeve perform the cleaning procedure, refer to [Section 3.2](#).

## 4.3 Cleaning and Replacing UV Sensor

### ⚠ WARNING



The UV sensor is very delicate instrument. Extreme care is required when handling and cleaning. The sensor window itself is constructed from quartz which is extremely fragile, be careful you do not chip or break this quartz window. Manufacturer's warranty does not cover damage due to neglect or misuse.

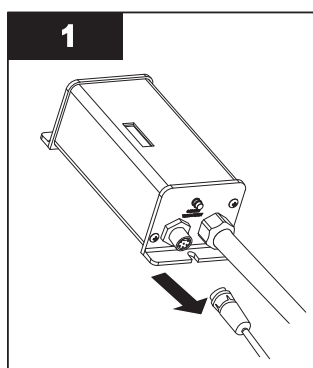
Mineral deposits and sediment may accumulate on the sensor window decreasing the UV energy detected. Good maintenance of pre-treatment equipment will reduce the accumulation of residues. If the system indicates that the UV intensity is low, one cause may be a stained quartz sleeve and/or sensor window.

#### Prerequisites:

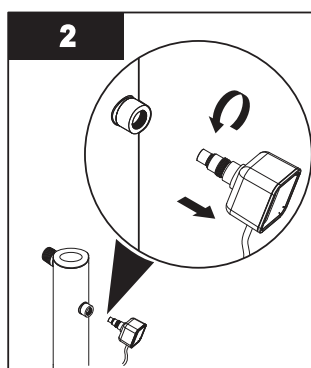
- Remove and clean the quartz sleeve.

**Note:** The quartz sleeve and UV sensor should be cleaned at the same time.

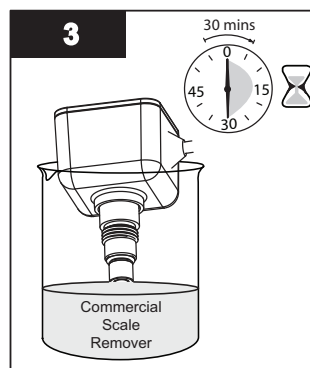
#### Procedure:



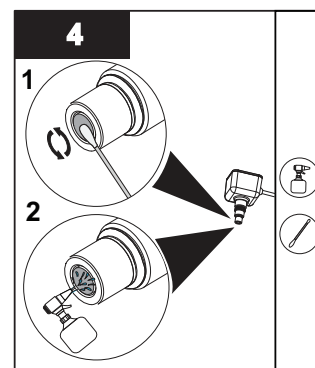
- Disconnect the UV sensor from the controller by disconnecting the sensor cable.



- Remove the UV sensor by grasping the body of the sensor and rotating it counter-clockwise.



- Submerge only the end of the sensor in the commercial scale remover for 30 minutes.



- Clean the sensor with a cotton swab and spray with water.
- Re-insert the UV sensor until a water-tight seal is achieved.

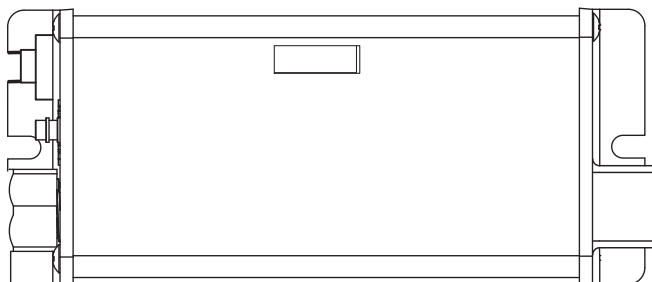
## Section 5 Operation

### ⚠ WARNING



The advanced warning system has been installed to provide the optimum protection against microbiological contamination in water. **DO NOT** disregard the warning signals. The best way to ensure optimum UV performance is to have the water microbiologically tested by a recognized testing agency on a regular basis.

## 5.1 Basic Systems Incorporating 210153 Controllers



### 5.1.1 Lamp Life Remaining (days)

**365** The controller tracks the number of days of operation of the lamp and the controller. The default screen will display the total lamp life remaining (in days). The controller will count down the number of days remaining until the lamp requires changing (365 days to 1 day). At “0” days, the controller will display **A3** and sound an intermittent audible chirp (1 second on, 5 seconds off), indicating the need to change the lamp.

### 5.1.2 Understanding your “A3” Code

**A3 DEFERRAL** - Once the “A3” or end of lamp life message is shown on the LED display, the audible alarm can be deferred up to 4 separate times. The delay is designed to allow you time to address the alarm while you obtain a new UV lamp. This can be done by simply depressing the timer reset button for 5 seconds, which is located on the left side of the controller. Each time the timer reset button is pressed the controller alarm is deferred seven days. Once the final 7 day deferral has been reached the alarm can only be silenced by changing the UV lamp and manually resetting the controller timer, refer to [Section 4.1](#).

### 5.1.3 Resetting Lamp Life

Refer to [Section 4.1](#).

**Note:** *Even though the alarm on the system can be deferred for a period of time, it is important to address each and every alarm condition as they are indicating that there is a potential problem with the system and should be remedied.*

### 5.1.4 Total Days of Operation

**1680** The controller also displays the total running time of the controller. To obtain this reading, press the push-button once. The total running time of the controller will be numerically displayed in days. This information will remain displayed for ten seconds and will then revert back to the lamp life remaining default screen. It should be noted that this value cannot be reset.

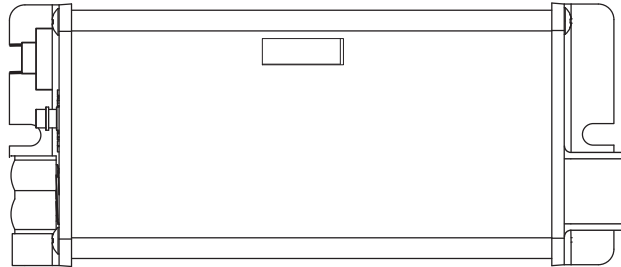
### 5.1.5 Lamp Failure (Blank Screen)

**[Blank]** When the system recognizes UV LAMP FAILURE (no current running through the lamp), the display will be blank **[Blank]** (no default UV LAMP LIFE REMAINING screen) and the system will sound an intermittent audible tone (1 second on, 1 second off). The system will remain in this state, until this condition is remedied.

### 5.1.6 Auxiliary and Solenoid Output

The AQUAFINE controller provides a powered (line voltage) IEC solenoid output connector. (Note: this is not a dry contact) This solenoid output is protected with a replaceable 2 amp isolated fuse. The Auxiliary output can be used as a lamp out alert (LOA) to drive power to either a solenoid or other electrical device to signal a lamp ON/OFF state. Connection from this output to the solenoid can be done using the IEC solenoid power cable PN 260135.

## 5.2 Monitored Systems Incorporating 210154-M Controller



### 5.2.1 UV Intensity (%)

**99** The AQUAFINE monitored systems incorporate a UV sensor which detects the discrete 254 nm wavelength of the UV lamp. This information is relayed to the AQUAFINE controller and is the default display shown in “% UV output”. The system will display the UV output between 80 to 99 percent. When the system drops below 80%, a low UV warning is displayed as **R2** and alternately flashes (at 2 second intervals) back to the actual UV level. Eg. **79**. Additionally, the system will sound an intermittent audible tone (2 seconds on, 2 seconds off), during low UV conditions.

**Note:** UV levels of

- 85** to **99** Indicates the system is functioning within a normal operating range.
- 82** to **84** Indicates the UV level is still within a safe level, however cleaning or lamp/sleeve replacement may soon be required.
- 80** to **81** Indicates the UV level is nearing the point of unsafe UV intensity, UV system should be immediately serviced.
- < **79** Indicates the UV level has now reached a level that is unsafe. At this level the water should not be consumed. The system/water supply should be examined to determine the reason for the low UV level of the UV intensity. At this level, the solenoid output has been activated and if a solenoid is installed, water will cease to flow.

**DEFERRAL** - To temporarily defer the audible alarm and re-activate solenoid valve (if fitted) during a low UV alarm, press the timer reset button and hold for five seconds. This will mute the audible alarm condition and activate solenoid output for 12 hours.

**Over Temperature** - When the water temperature inside the UV reactor chamber exceeds the maximum rating for the UV system (40 °C) the Controller will show “Ot” on the display. This is usually caused by extended periods of no water flow. To clear this condition simply open a faucet and allow water to flow through the system.

### Possible causes for low UV alarm conditions:

- a. The UV lamp has perhaps reached a level whereby it can no longer adequately provide a sufficient level of performance due to age (> 9000 hours). The lamp should be replaced with a new lamp from the manufacturer of the same size and type.
- b. The quartz sleeve and/or the sensor window have become stained or dirty. Mineral deposits or sediment in the water that was not detected during the original water analysis may be the cause for this. Refer to [Section 4.2](#).
- c. Intermittent voltage drop in the household controller reducing the lamp output. The lamp will return to normal when the power is restored to full voltage.

**Note:** *The monitoring system will not operate during power failures.*

- d. The quality of the influent water has changed and is no longer within the acceptable operational range of the UV system. Perform a water analysis to determine the exact constituents and concentration levels.
- e. The UV sensor is not installed correctly.

### 5.2.2 Lamp Life Remaining (Days)

To obtain this reading, press the timer reset button a single time and follow the steps as outlined in [Section 5.1.3](#), regarding the operation of this feature.

### 5.2.3 Total Days of Operation

To obtain this reading, press the timer reset button two times in succession and follow steps as outline in [Section 5.1.3](#), regarding the operation of this feature.

### 5.2.4 Lamp Failure (Blank Screen)

Refer to [Section 5.1.5](#) for explanation of this feature.

**Note:** *On the AQUAFINE systems, the audible tone provided for lamp failure is a continuous alarm, rather than the intermittent (1 second on, 1 second off) condition on the basic AQUAFINE systems.*

### 5.2.5 Auxiliary and Solenoid Output

Working in conjunction with the UV intensity monitor, the AQUAFINE controller provides a powered (line voltage) IEC solenoid output connector. (Note: this is not a dry contact) This solenoid output is protected with a replaceable 2 amp isolated fuse. The Auxiliary output can be used as a lamp out alert (LOA) to drive power to either a solenoid or other electrical device to signal a lamp ON/OFF state. Connection from this output to the solenoid can be done using the IEC solenoid power cable PN 260135. When the UV intensity monitor senses that the water is not adequately being treated and drops to 79% UV intensity or below, the internal relay is opened thereby stopping AC power flowing to the normally closed solenoid valve. The valve will remain closed (no power) until the UV level rises above 79%, at which time the solenoid will open, allowing for water to pass through. (To temporarily enable the operation of this solenoid output for up to 12 hours, please refer to the instructions outlined in [Section 5.2.1](#)).

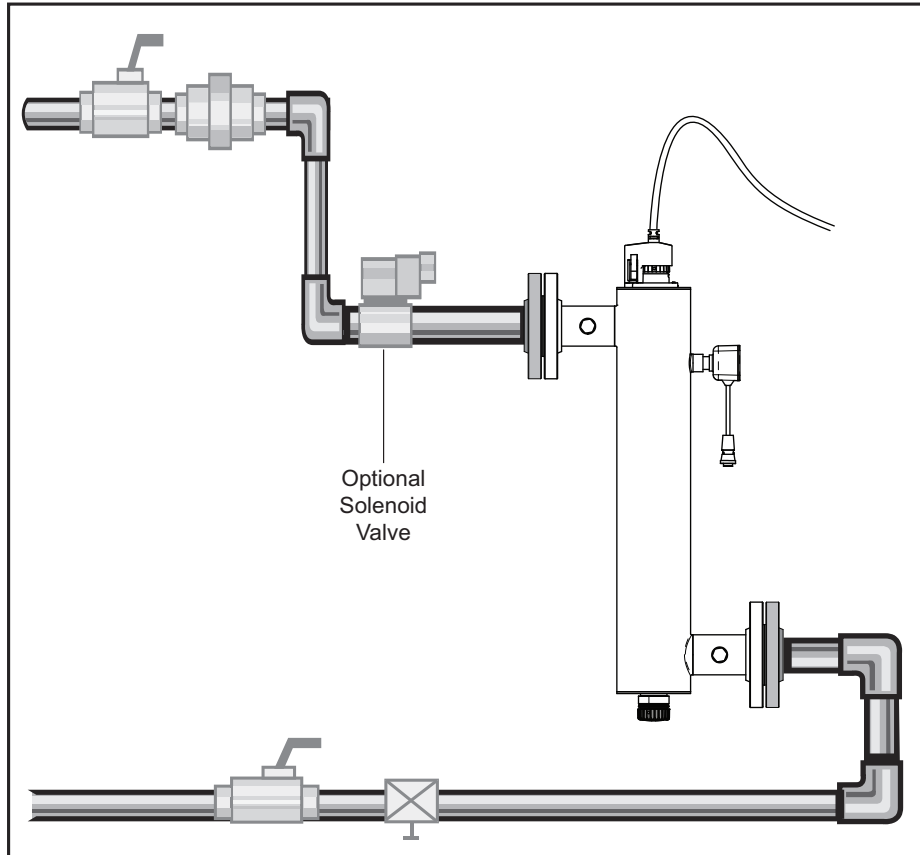


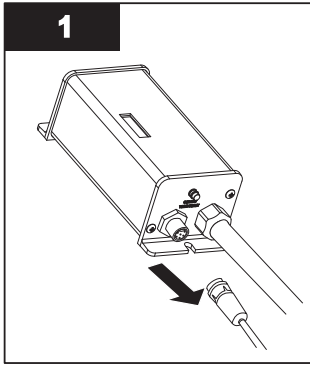
Figure 7 Solenoid Installation

### 5.2.6 4-20mA Output (Optional)

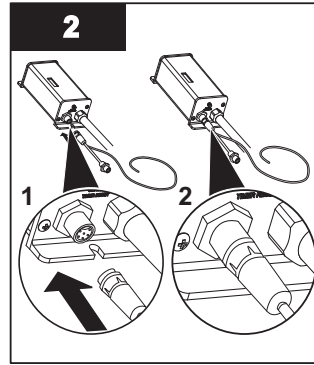
To achieve the capability to transmit the UV intensity data to a remote location via a 4-20 mA signal, use an optional “Y” cable (PN 260134) is available from your dealer. The “Y” cable comes with 20 meters (65’) of cable for the 4-20 mA signal.

## Troubleshooting

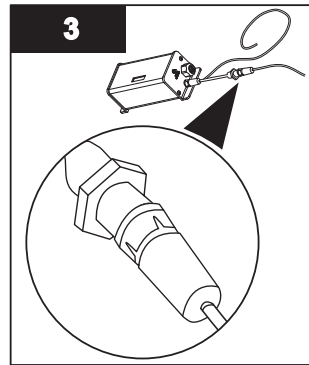
### Procedure:



- Disconnect the existing sensor cable from the controller.



- Connect the 'Y' cable to the controller.



- Attach the "male" end of the removed sensor cable to the "female" end of the new "Y" cable.
- Appropriately attach the 4-20 mA cable to the applicable equipment and ensure all connections are hand-tighten.


## Section 6 Troubleshooting

Symptom	Possible Causes	Solutions
Pressure Drop	Sediment pre-filter clogged	Replace filter cartridge. <b>Note:</b> Check source water supply as fluctuations may occur in source pressure.
High Bacteria Counts	Quartz sleeve is stained or dirty	Clean sleeve with scale cleaner and eliminate source of staining problem (ie. softener hard water, refer to <a href="#">Section 4.2</a> ).
	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 - UV system must have a bacterial free distribution system to work effectively. Refer to <a href="#">Section 3.2</a>
	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 (20 micron filter followed by a 5 micron filter 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.
Unit Leaking Water	Problem with O-ring seal (on retaining nut and/or UV sensor)	Ensure O-ring is in place, check for cuts or abrasions, clean O-ring, moisten with water/ lubricant and re-install, replace if necessary (410867).
	Condensation on chamber caused by excessive humidity & cold water	Check location of UV system and control humidity.
System Shutting Down Intermittently	Interrupted controller	Ensure system has been installed on its own circuit, as other equipment may be drawing power away from UV (ie. pump or fridge).
Lamp Failure Alarm on - New Lamp	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



## 6.1 Maintenance Schedule

Scheduled maintenance and inspections can extend the life of the system and prevent problems. Routine maintenance may include partial disassembly to access components for cleaning and visual evaluation. Table 1 shows the maintenance schedule. During any maintenance activity, the manufacturer recommends inspection of all components that can be seen. Some of the preventative maintenance tasks may also need to be done to remove a condition that caused a system alarm. Refer to Figure xx for components that are accessible for maintenance.

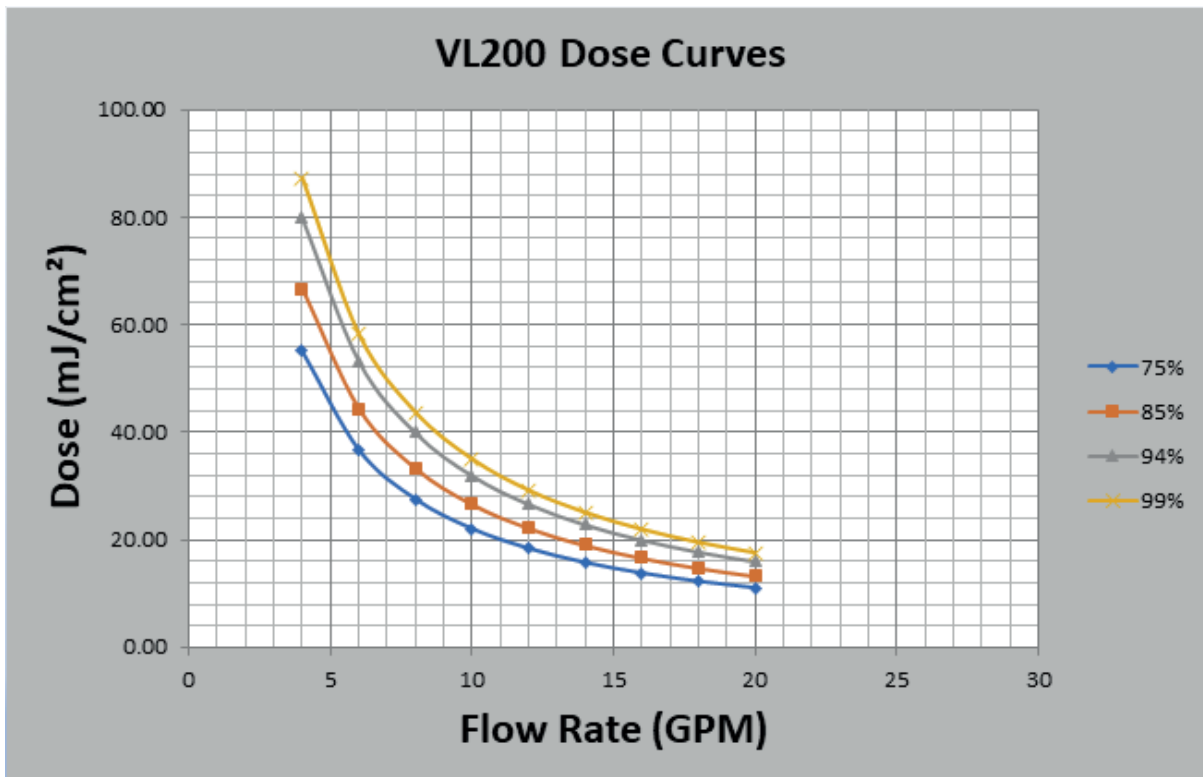
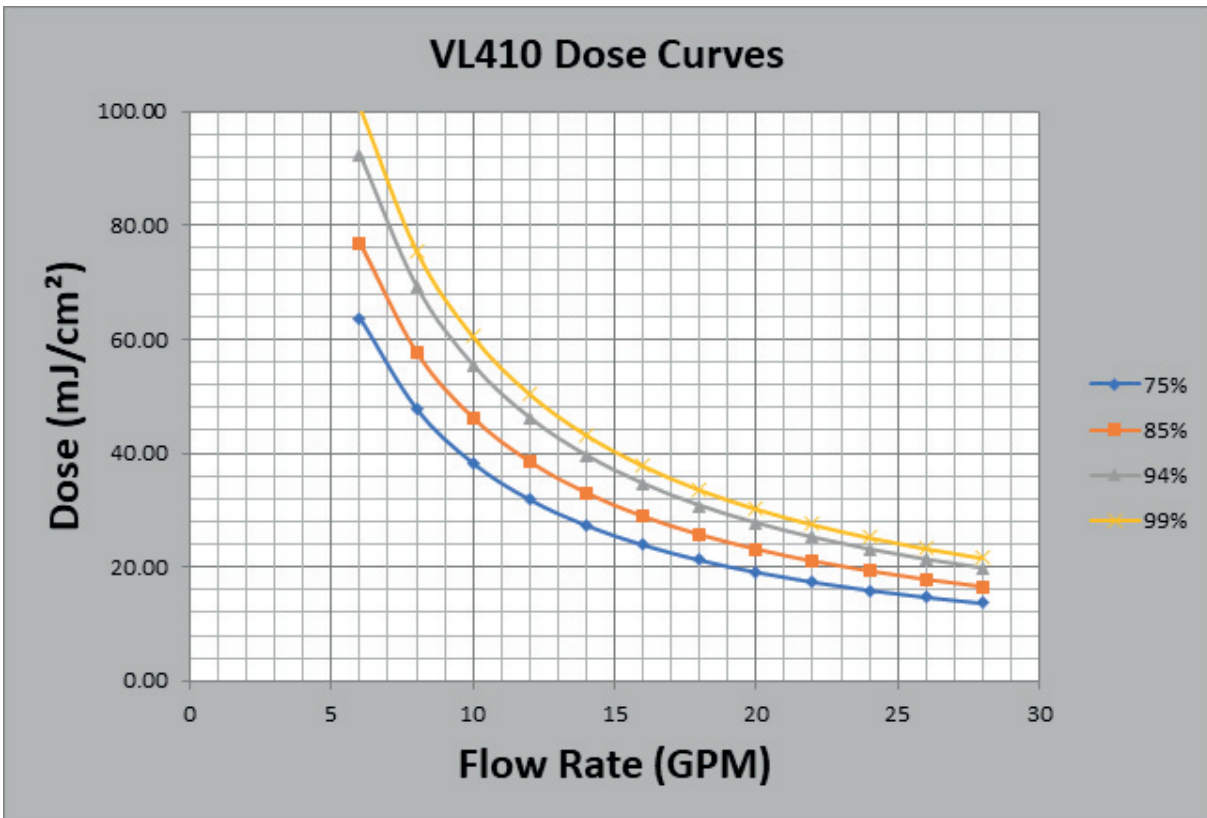
<b>NOTICE</b>	
	<ul style="list-style-type: none"> <li>• Always using genuine Aquafine parts keeps your warranty, UL &amp; CE certifications valid.</li> <li>• Obey all warning and caution statements. Refer to <a href="#">Section 1 on page 3</a>.</li> <li>• Read and understand the Operation and Maintenance Manual before operating this equipment.</li> <li>• Read all user documentation before performing operations, inspections, repair, or maintenance on this equipment.</li> <li>• Only competent personnel should undertake operation, repairs, maintenance, or servicing of equipment described in this section of the manual. If you do not understand the information or procedure explanations in this manual, STOP and contact your Service Provider for assistance.</li> <li>• Read and understand the Owner's Manual before operating and performing any maintenance on this equipment.</li> </ul>

System Component	Maintenance Requirement	Monthly	Semi-Annually	Annually	9000 Hours	As Needed
Evidence of Leakage	Check for evidence of water leaks, particularly on compression nuts	X				
UV Detector	Clean the UV detector	X				
	Replace UV detector					X
Quartz Sleeve	Remove a representative sample (i.e. 10%) of lamp sleeves. Check the lamp quartz sleeve O-rings for UV Decay and brittle parts. Replace O-rings as needed. Remove any condensation inside the lamp sleeve. Inspect lamp sleeves for physical damage. Inspect for build-up on lamp sleeves.		X			
UV Lamp	Replacement of UV Lamps every 9000 hours. *				X	

\* Contact your Service Provider.

<b>DISPLAY FAULT MODES</b>	
LED display reads "A3"	<ul style="list-style-type: none"> <li>• Lamp life expired - countdown is at "0" days. Refer to <a href="#">Section 5.1.2</a>.</li> <li>• Press reset button for a deferred alarm, replace UV lamp.</li> </ul>
LED display is blank	<ul style="list-style-type: none"> <li>• Controller is in lamp failure mode. Refer to <a href="#">Section 5.1.5</a>.</li> <li>• Power system down, allowing it to reset itself; apply power in order to confirm that the controller is able to power lamp.</li> <li>• Check to see if there is sufficient power to the UV system.</li> <li>• Replace lamps.</li> </ul>
Low UV level displayed on screen	<ul style="list-style-type: none"> <li>• Test water supply to see if water quality meets recommended parameter limits.</li> <li>• Clean quartz sleeves and sensor eye.</li> </ul>
LED flashing "A2" and then back to UV level	<ul style="list-style-type: none"> <li>• Low UV alarm deferral has been activated. Refer to <a href="#">Section 5.2.1</a>.</li> <li>• UV level has dropped below 80% and the audible alarm has been muted by pressing the reset switch and holding it for 5 seconds.</li> <li>• This audible alarm deferral will only last 12 hours.</li> </ul>

# Section 7 Manufacturer's Dose Flow Chart



*Note: Not performance tested or certified by NSF.*

## Section 8 Specifications

### 8.1 Performance and TOC Specifications

Model		VL 200 Series	VL 410 Series	VL 410 TOC
General	Performance @ 94% UVT GPM (m <sup>3</sup> /hr) <sup>1</sup>	11 (2.5)	18 (4.1)	Contact for details
	Performance @ 99% UVT GPM (m <sup>3</sup> /hr) <sup>1</sup>	12 (2.7)	20 (4.5)	
	Number of Lamps (Low Pressure High Output)	1	1	1
	Lamp Operating Power (W)	25 W	46 W	46 W
	Total Operating Power (W)	35 W	60 W	60 W
UV Chamber	Chamber Material	Type 316L Stainless Steel	Type 316L Stainless Steel	Type 316L Stainless Steel
	Dimensions	45 cm x 8.9 cm (15" x 3.5")	60 cm x 8.9 cm (23.5" x 3.5")	60cm x 8.9cm (23.5" x 3.5")
	Interior Surface Finish	R32	R32	R32
	Inlet/Outlet Flange Size Inches (mm)	1" (25 mm)	1.5" (37 mm)	1.5" (37)
	Inlet/Outlet Configurations	S-Shape	S-Shape	S-Shape
	IP Rating	33	33	33
Controller	Lamp Replacement Countdown in Days	Yes	Yes	Yes
	Audible Lamp Replacement/Fault Alarm	Yes	Yes	Yes
	Audible Low UVI Alarm	Yes (sensor only)	Yes (sensor only)	Yes (sensor only)
	Aux Output (Lamp Out Alert)	Yes	Yes	Yes
	Dimensions (monitored) (HxWxD) in cm (inches)	22.3 cm x 8.1 cm x 6.4 cm (8.8" x 3.2" x 2.5")	22.3 cm x 8.1 cm x 6.4 cm (8.8" x 3.2" x 2.5")	22.3 cm x 8.1 cm x 6.4 cm (8.8" x 3.2" x 2.5")
	Dimensions (non-monitored) (HxWxD) in cm (inches)	17.2 cm x 8.1 cm x 6.4 cm (6.8" x 3.2" x 2.5")	17.2 cm x 8.1 cm x 6.4 cm (6.8" x 3.2" x 2.5")	17.2 cm x 8.1 cm x 6.4 cm (6.8" x 3.2" x 2.5")
	IP Rating	54	54	54
Other	Standard Elastomers	Viton - USP Class VI	Viton - USP Class VI	Viton - USP Class VI
Operating Conditions	Min and Max Water Temperature Range	2 - 40°C (36 - 104°F)	2 - 40°C (36 - 104°F)	2 - 40°C (36 - 104°F)
	Max Operating Pressure PSI (BAR)	125	125	125

<sup>1</sup> Dose Level: 30 mJ/cm<sup>2</sup> after 9,000 hours of operation.

**Note:** Nomenclature for Models VL200-XXX, and VL410-XXX:

- First letter indicates connection type: A = ANSI; T = Tri-Clamp
- Second letter indicates application: D = Disinfection; T = TOC reduction
- Third letter, if present, indicates the system is provided with a sensor: S = UV Sensor"

## **Section 9 Manufacturer's Warranty**

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### **Customer Service Contacts**

#### **Appendix A Aquafine Equipment Warranty**

#### **AQUAFINE CERTIFICATE OF EQUIPMENT WARRANTY**

The following terms and conditions will govern the equipment warranty provided by Aquafine Corporation Inc. to the Owner/Operator:

Aquafine Corporation ("Aquafine") warrants to the Owner/Operator noted above (the "Customer") that if within 12 months from equipment start-up or 18 months from the date of delivery, whichever comes first, equipment manufactured by Aquafine (the "Equipment") will be free from defects in material and workmanship and will function in accordance with the specifications agreed to by Aquafine for the Equipment.

This warranty shall not apply to any failure or defect which results from the Equipment not being operated and maintained in strict accordance with instructions specified in the Operation and Maintenance manual or which results from mishandling, misuse, neglect, improper storage, improper operation of the Equipment with other equipment furnished by the Customer or other third parties or defects in designs or specifications furnished by or on behalf of the Customer by a person other than Aquafine. In addition, this warranty shall not apply to Equipment that has been altered or repaired after start-up by anyone except: (a) authorized representatives of Aquafine, or (b) Customer acting under specific instructions from Aquafine.

Customer must notify Aquafine in writing within 5 days of the date of any Equipment failure. This notification shall include a description of the problem, a copy of the operator's log, a copy of the Customer's maintenance record and any analytical results detailing the problem. If Customer has not maintained the operator's log and maintenance record in the manner directed in the Operation and Maintenance manual, or does not notify Aquafine of the problem as specified above, this warranty may, in Aquafine's discretion, be invalid.

Customer will fully cooperate with Aquafine, in the manner requested by Aquafine, in attempting to diagnose and resolve the problem by way of telephone support. If the problem can be diagnosed by telephone support and a replacement part is required Aquafine will either, at Aquafine's expense, ship a repaired, reworked or new part to the Customer who will install such part as directed by Aquafine or will direct Customer to acquire, at Aquafine's expense, such part from a third party and then install such part as directed by Aquafine.

In the event that Aquafine determines that the problem cannot be resolved by way of telephone support and/or shipment by Aquafine, or acquisition by the Customer, of a replacement part for installation by the Customer, Aquafine will send one or more persons to make an onsite inspection of the problem. If an onsite visit is made, Aquafine personnel will evaluate the problem and repair or replace any Equipment determined to be in breach of this warranty. If the problem is not attributable to a breach of this warranty, Aquafine reserves the right to invoice the Customer for this service.

Equipment components manufactured by third parties but furnished to Customer by Aquafine are warranted by the original manufacturer, only to the extent of the original manufacturer's warranty, and are not covered by the above warranty.

This warranty is the exclusive remedy for all claims based on a failure of or defects in the Equipment, whether the claim is based on contract (including fundamental breach), tort (including negligence), strict liability or otherwise. This warranty is in lieu of all other warranties whether written, oral, implied or statutory. Without limitation, no warranty of merchantability or fitness for a purpose shall apply to the Equipment.

Aquafine does not assume any liability for personal injury or property damage caused by use or misuse of the Equipment. Aquafine shall not in any event be liable for special, incidental, indirect or consequential damages including, without limitation, lost profits, lost business opportunities, lost revenue or loss or depreciation of goodwill, even if it has been advised of the possibility thereof. Aquafine's liability shall, in all instances, be limited to repair or replacement of Equipment in breach of this warranty and shall not exceed the cost of such repair or replacement. This liability with respect to repair or replacement will terminate upon the expiration date of this warranty.

In addition to the foregoing, in no event shall Aquafine's liability relating to the Equipment, or the agreement between Aquafine and the Customer relating to the Equipment, exceed that portion of the purchase price for the Equipment which is actually paid to Aquafine.

For more information, please contact Aquafine Corporation.

**Email:** [sales@aquafineuv.com](mailto:sales@aquafineuv.com) or go to [www.aquafineuv.com](http://www.aquafineuv.com)

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