



AQUATIC ECO-SYSTEMS®

SMART UV SYSTEMS™

UV STERILIZER



INSTALLATION AND USER'S GUIDE

IMPORTANT SAFETY INSTRUCTIONS
READ AND FOLLOW ALL INSTRUCTIONS
SAVE THESE INSTRUCTIONS

CUSTOMER SERVICE / TECHNICAL SUPPORT

If you have questions about ordering Pentair Aquatic Eco-Systems replacement parts and products, please use the following contact information:

Customer Service

Monday to Thursday: 8 AM to 7 PM EST

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TABLE OF CONTENTS

Important Warning and Safety Instructions	ii	Maintenance	15
Warranty Information	iii	Quartz Sleeve Cleaning	15
Pre-Installation Inspection	1	Lamp Connector Removal	15
SMART UV Features	1	Winterizing	16
Component Diagrams	1	Troubleshooting	17
Power Supplies	2	Replacements Parts	18
Quartz Sleeve and UV Lamp Inspection	2	SMART UV Replacement Parts	18
When Packed in Tube	2	SMART HO UV Replacement Parts	19
When Packed in Triangle Box	4		
Installation	5		
Quartz Sleeve Assembly	5		
Mounting the Unit	7		
Mandatory Water Test	8		
Electrical Requirements	8		
GFCI Protection	9		
UV Lamp Installation	9		
Lamp Styles	9		
Power Cord Adjustment	9		
Optional Quartz Sleeve Wipers	10		
SMART UV Installation and Operation	12		
Pond Installation Configurations	12		
Aquarium Installation Configurations	13		

IMPORTANT WARNING AND SAFETY INSTRUCTIONS



IMPORTANT NOTICE

This guide provides installation and operation instructions for the SMART UV System. Consult Pentair with any questions regarding this equipment.

Attention Installer: This guide contains important information about the installation, operation and safe use of this product. This information should be given to the owner and/or operator of this equipment after installation or left on or near the pump.

Attention User: This manual contains important information that will help you in operating and maintaining this product. Please retain it for future reference.

IMPORTANT SAFETY INSTRUCTIONS! PLEASE READ PRIOR TO INSTALLATION AND OPERATION!

Strictly follow the instructions within this manual to ensure the health and safety of both, yourself and the UV system. The installation, operation and maintenance of the UV system can only be carried out after reading and understanding the information contained in this manual.

The installation of the UV system must be carried out in accordance with local regulations and codes.

READ AND FOLLOW ALL INSTRUCTIONS SAVE THESE INSTRUCTIONS



This is the safety alert symbol. When you see this symbol on your system or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

DANGER

Warns about hazards that can cause death, serious personal injury, or major property damage if ignored.

WARNING

Warns about hazards that may cause death, serious personal injury, or major property damage if ignored.

CAUTION

Warns about hazards that may or can cause minor personal injury or property damage if ignored.

NOTE

indicates special instructions not related to hazards.

Carefully read and follow all safety instructions in this manual and on equipment. Keep safety labels in good condition; replace if missing or damaged.

When installing and using this electrical equipment, basic safety precautions should always be followed, include the following:

WARNING

Ultraviolet light is damaging to your eyes and skin! Do not handle or stare at an operating UV lamp.

Note that the UV light rays are invisible to the human eye and precautions should be taken to prevent UV energy from entering the eyes.

CAUTION

The quartz sleeve and or the UV lamp shipped with this product may have been broken or damaged during transit. It is therefore essential that the unit be carefully inspected before connecting to electric power.

WARNING

DO NOT allow system to exceed 50 PSI (Pounds Per Square Inch).

DANGER

To avoid possible electric shock, special care should be taken since water is employed is the use of aquarium and pond equipment. For each of the following situation, DO NOT attempt repairs yourself. Call Pentair Aquatic Eco-Systems, Inc. customer service department at 877-347-4788 for services or discard the appliance.

DANGER

If unit falls into the water, DO NOT REACH FOR IT! First unplug it and then retrieve it. If the internal electrical components of the unit get wet, unplug the unit immediately.

DANGER

If the unit shows any sign of water leakage, immediately unplug it from the power source.

CAUTION

Carefully examine the unit after installation. It should not be plugged in if there is water on any part not intended to be wet.

DANGER

DO NOT operate this unit if it has a damaged cord or plug, if it is malfunctioning, or if it has been dropped or damaged in any manner.

WARNING

Close supervision is necessary when any appliance is used by or near children, and our equipment is no exception.

WARNING

Always unplug the unit from an electrical outlet when not in use or before servicing, cleaning or removing parts. Never yank the cord to pull the plug from the outlet. Grasp the plug and pull to disconnect.

WARNING

SMART UVs are designed for low-pressure water applications with or without aquatic livestock. DO NOT use these units for any application outside of their intended use. The use of attachments not recommended or sold by Pentair Aquatic Eco-Systems, Inc. may cause unsafe conditions and may void any warranty.

WARNING

This unit must be wired in conjunction with a properly grounded, Ground Fault Circuit Interrupter (GFCI). Only three (3) wire grounded cables suitable for outdoor use should be used to connect this unit. If joining cables for outdoor use, a suitable watertight cable connector must be used. If an extension cord is necessary, a cord with a proper rating should be used. A cord rated for less amperes or watts than the appliance's rating may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled. If in doubt consult a qualified electrician.

WARNING

Warping of the UV body may occur when left in direct sunlight without water inside to help dissipate the heat.

WARNING

DO NOT operate the unit in "no-flow" situations.

WARRANTY INFORMATION

Pentair Aquatic Eco-Systems, Inc. warrants to the original purchaser, its Ultraviolet Sterilizers to be free from defects in workmanship or materials for a period of 2 years from the date of purchase on the power supply and all gaskets seals. A 3-year warranty on the UV sterilizer's plastic body housing due to failure of the plastic from UV light exposure. Water leaks caused by failing to follow proper assembly & protection procedures void warranty. There is a 90-day warranty on the UV lamp for electrical operation only. The UV lamps and the Quartz Sleeve are not warranted against breakage due to being made of glass. This warranty is only in effect provided that the equipment is installed in accordance with the factory instructions & recommendations & when operated within the environment and limitations for which it was designed.

PRE-INSTALLATION INSPECTION

All SMART UV Systems™ UV Sterilizer models are packaged complete, with all necessary components that are required to operate the unit. When unpacking your SMART UV, we recommend that a complete component inventory be taken to ensure that all components are included and accounted for, prior to installation.

The serial number of your UV unit is located on a small white label near the electrical end of the unit's vessel. Smart HO UV units have their serial number labels located on the UV vessel and on the power supply (ballast) label.

The model number of your UV unit can be found in two locations:

1. On the bar code label at the end of the box.
2. On the label placed in the middle of the UV Vessel, with a hole punch indicating the model number.

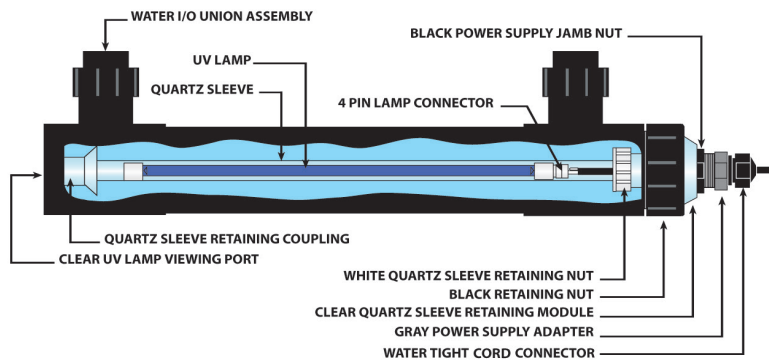
SMART UV Features

Our GPH T-5 and T-6 low pressure mercury vapor germicidal amps, convert approximately 40% of their electrical input watts into UV-C output watts within the germicidal action spectrum (meaning 40% of electricity used is converted into useful germicidal UV light), the highest UV-C output conversion among all UV lamps.

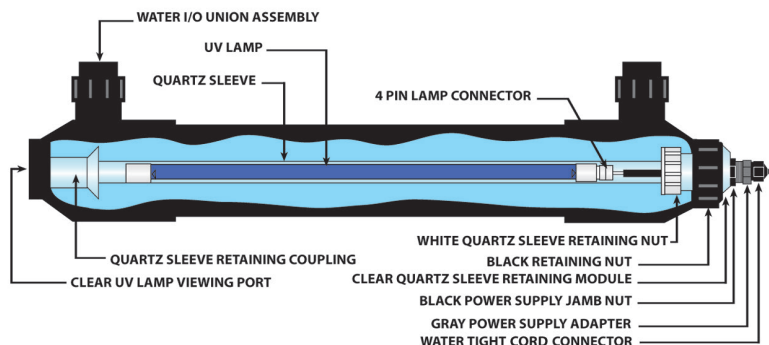
- UL listed for indoor and outdoor use, fresh and salt water use.
- Long lasting GPH/T5 and GPH/T6 UV lamps (9,000 hours to 80% efficiency).
- Protective Quartz Sleeve (maximizes UV lamp output and safety)
- Watertight Design
- Easy-to-Remove Power Assembly
- Remote Power Supply
- UV Resistant High Density Plastic UV Vessel (Lifetime warranty against UV degradation)
- Utilizes the UV lamp to its maximum potential (maximum UV exposure)
- Non-UV Transmitting Clear Lamp Viewing Ports

Component Diagrams

Please review the following SMART UV component diagrams, matching the proper diagram to the individual SMART UV model contained in this package. Unpack your SMART UV and lay out the packaged components for inspection. Please review the information listed in this section to become familiar with the equipment's various parts.



SMART UV Sterilizer Models:
 Part Numbers EU18-U, EU25-U, EU40 & EU65P,
 EU18P-W, EU25P-W, EU40P-W, EU65P-W



SMART HO UV Sterilizer Models:
 Part Numbers E50S, E80S, E120S & E150S,
 E50S-W, E80S-W, E120S-W, E150S-W

Power Supplies

Part Number:

20100 - Models EU18-U, EU-18P-W



Part Number:

20105-MV - Models E50S, E80S & E120S,
E50S-W, E80S-W, E120S-W



Part Number:

20120-MV - Models EU25-U, EU40 &
EU65P, EU25P-W, EU40P-
W, EU65P-W



Part Numbers:

202150-1 - Models E150S, E150S-W



Quartz Sleeve and UV Lamp Inspection -- When Packed in Tube

The Quartz Sleeve Assembly must be removed from the UV vessel and inspected for damage prior to installation. Extreme care should be used while this procedure is being performed.

Quartz Sleeve/UV Lamp Inspection Procedure

1. Carefully unpack the UV lamp(s) from their corrugated packing tubes and inspect for damage including broken glass, cracks, chips, fractures and pin holes. If damage has occurred please contact the place of original purchase immediately.

[Continue on to next page]



Quartz Sleeve/UV Lamp Inspection Procedure [Continued]

2. Carefully, remove the quartz sleeve by unthreading the **A** Black Retaining Nut. Gently slide out the quartz sleeve assembly and inspect for damage including chips, cracks and pin holes. If damage has occurred please contact the place of original purchase immediately.



3. After inspection, reassemble the quartz sleeve back into the UV vessel. If installing the unit, perform the Mandatory Water Test (see page 8).
4. Inspect all other Smart UV components (power supply/power cord, UV vessel and unions) for damage.



Quartz Sleeve and UV Lamp Inspection -- When Packed in Triangle Box

1. Carefully unpack the clear quartz sleeve module/quartz sleeve and UV lamp from the triangle corrugated box and lay on a level, stable surface.



2. The quartz sleeve assembly and UV lamp are packaged inside the triangle box separately. Unpack, remove the packaging material, and inspect for shipping damage.



3. Inspect all other SMART UV components (power supply/power cord, UV vessel and unions) for damage.



After receipt and inspection of the unit, if broken glass is found (including cracks, chips, pin holes and hair line fractures of any kind) please contact the place of original purchase immediately for replacements. Do NOT call the manufacturer (Pentair Aquatic Eco-Systems, Inc.) regarding this problem.

INSTALLATION

Quartz Sleeve Assembly

All SMART UV Systems™ UV Sterilizers utilize the same style quartz sleeve module assembly, with the only exception being the **5** Clear Quartz Sleeve Module

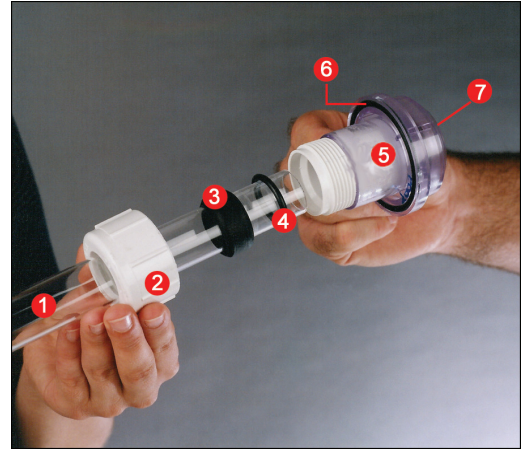


WARNING

Improper assembly may result in water damage to electrical components and unsafe conditions. Pentair Aquatic Eco-Systems, Inc. is not responsible for damage cause by improper re-assembly of these parts.

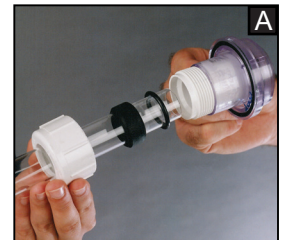
Quartz Sleeve Assembly Includes:

- 1** Quartz Sleeve
- 2** White Quartz Sleeve Retaining Nut
- 3** Rubber Gasket
- 4** Rubber O-ring
- 5** Clear Quartz Sleeve Module
- 6** Clear Quartz Sleeve Module O-ring
- 7** Power Supply Gasket

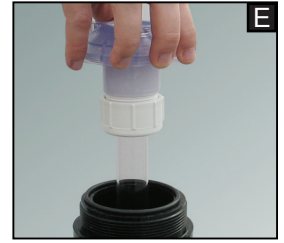


Assembly Instructions

1. Position the white quartz sleeve retaining nut, rubber gasket and rubber o-ring over the open end of the quartz sleeve as shown in **Photo A**.
2. Slide the “open-end” of the quartz sleeve (with nut/gasket and o-ring in position) into the clear quartz sleeve module. See **Photo A**.
3. Thread the white retaining nut onto the clear quartz sleeve module's male threads and hand-tighten. See **Photo B**.
4. While hand-tightening the white retaining nut onto the clear quartz sleeve module, use your index finger to ensure that the open-end of the quartz sleeve mates smoothly with the inside lip of the clear quartz sleeve module; this signifies a good fit. See **Photo C**.
5. With the quartz sleeve positioned inside the clear quartz sleeve module properly, finish hand-tightening the white retaining nut. When the white retaining nut is tight, the quartz sleeve should appear straight inside the clear quartz sleeve module (see **Photo D**).
Note: If the quartz sleeve appears crooked it may leak. Disassemble and try again.



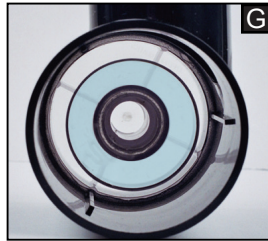
6. Carefully slide the quartz sleeve assembly into the UV vessel (see **Photo E**). The domed-end of the quartz sleeve should slide into the coupling located on the non-electrical end of the UV vessel (see **Photo G** below).



7. With the quartz sleeve assembly properly in place, the quartz sleeve retaining module should sit flush against the top of the UV vessel. See **Photo F**.
Note: Be sure that the clear quartz sleeve module o-ring (item #6 on page 5) is in place.



8. Thread the black retaining nut (see **Photo H**) onto the male threads of the UV vessel. Hand tighten only!



Mounting The Unit

Note: The way UVs are mounted/positioned plays a very important role in the unit's performance and degree of safety. We **STRONGLY RECOMMEND** that you follow these instructions and guidelines precisely. Any deviation from these mounting instructions will void any warranty associated with the UV and all its components and may cause unsafe conditions.



Trapped air inside the UV vessel during operation may create excessive heat, thus damaging the UV's internal components.

Vertical Mounting

Mount the SMART UV Systems™ UV Sterilizer with the electrical end up. Use the bottom post as the inlet with the top port as the outlet.

Note: The UV vessel should be installed with a vertical clearance 1-1/2 times the vessel length. This will allow sufficient room for servicing the unit and replacing the UV lamp.



Both the inlet and outlet plumbing **MUST** be supported when the vessel is installed in the vertical orientation. Failure to support the outlet plumbing will lead to damage to the vessel.

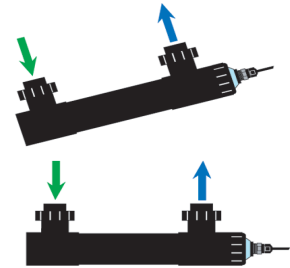


Example of Vertical Installation

Horizontal Mounting

Mount the SMART UV horizontally with the inlet/outlet facing up. If the unit is mounted horizontally but not level, the electrical end of the unit should be positioned higher than the non-electrical end. Choose the lower port for the inlet.

Note: The UV vessel should be installed with a horizontal clearance 1-1/2 times the vessel length. This will allow sufficient room for servicing the unit and replacing the UV lamp.



Example of Horizontal Installation

Mounting the Power Supply

The Bioshield UV system's power supply can be mounted in several different ways. The power supply should always be mounted to a surface that is sheltered from rain, splashing, heavy condensation or any other kind of prolonged contact with water.

Note: DO NOT mount the power supply in an extremely confined space where heat and moisture can be retained.

Your UV system will include one of two different power supplies based on the wattage of your unit:

- **18W to 120W UV systems** include a rectangular power supply. Four screws, one in each corner of the power supply, secure the power supply to the wall or shelf.



- **150W UV systems** include a cylindrical power supply that must be mounted with the two pipe clips packaged with the unit.

A single screw at the base of the pipe clip secures it to the wall or shelf. The power supply is then locked into the pipe clip by securing the retaining strap onto the clip.



Mandatory Water Test

A water test should be performed each time the quartz sleeve(s) is installed inside the unit's vessel or when the quartz sleeve or gaskets and o-rings are replaced. [Once annually] Performing a water test is a precautionary measure that will determine whether or not the critical seal between the quartz sleeve and quartz sleeve module has been achieved.

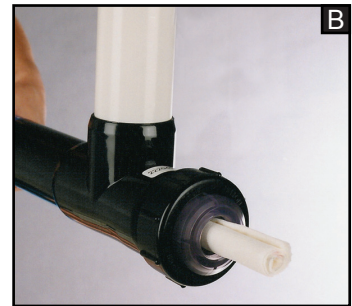
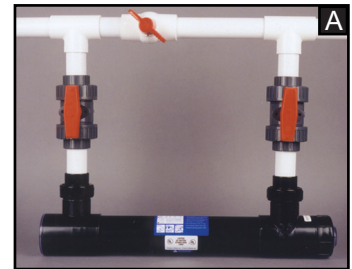
Failure to achieve a proper quartz sleeve/quartz sleeve module seal during SMART UV Systems™ UV Sterilizer operation will allow water to leak into the inside of the quartz sleeve, potentially damaging the UV lamp and other electrical components, which could develop into dangerous situations.

IMPORTANT NOTE: Failure to perform a water test could lead to conditions that will void your product warranty.

To Perform SMART UV Water Test:

1. Prepare the SMART UV for permanent operation by plumbing it in-line, into a filter system using the plumbing hardware of your choice. If PVC glue is used, follow the glue manufacturer's instructions. Use a bypass assembly for greater water flow control. See the **Image A**.
2. With the unit plumbed for operation and the clear quartz sleeve module securely in place, remove the UV lamp from the quartz sleeve module.
3. Roll-up a few paper towels creating a core approximately $\frac{3}{4}$ " in diameter, 10" long then slide into the open quartz sleeve module port. Insert about six inches of the paper towel core down into the quartz sleeve, as shown in **Image B**.
4. With the paper towel in place, turn on the pump and recirculate water through the UV for at least thirty (30) minutes.
5. After thirty (30) minutes of recirculating water through the UV, remove the paper towels from the quartz sleeve module. Inspect closely for moisture. If the paper towels are completely dry, your water test is complete and successful.

If moisture is detected on the paper towel the quartz sleeve's rubber gasket and o-ring have failed to achieve a seal and must be re-assembled; repeat the water test until a seal is achieved. See page 5 for assembly instructions.



Electrical Requirements

The electrical requirements for the UV sterilizer are marked on the unit's power supply label (Ex. 120VAC 50/60Hz.). The unit must be plugged into a well-grounded electrical outlet.

⚠ WARNING Do not attempt to cut the ground post off of the 3-prong plug, doing so will void the unit's warranty.

This product must be grounded. If the unit should fail electrically, grounding provides a path of least resistance for electric current to pass to reduce the risk of electric shock. This product's cord is equipped with 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. If in doubt consult a qualified electrician.

⚠ WARNING DO NOT operate this equipment with timing devices.

⚠ DANGER Improper connection of the equipment-grounding conductor can result in a risk of electrocution. Check with a qualified electrician or service personnel if unsure that the outlet is properly grounded. Do not modify the product's plug. If it will not fit into the electrical outlet, have a proper outlet installed by a qualified electrician. Do not use any type of plug adapter with this product.

Electrical Requirements (Continued)

Ground Fault Circuit Interrupter (GFCI) Protection

⚠ WARNING This unit must be wired in conjunction with a properly grounded, Ground Fault Circuit Interrupter (GFCI). Only three (3) wire grounded cables suitable for outdoor use should be used to connect this unit. If joining cables for outdoor use, a suitable watertight cable connector must be used. If an extension cord is necessary, a cord with a proper rating should be used. A cord rated for less amperes or watts than the appliance's rating may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled. If in doubt consult a qualified electrician.

GFCI's are designed to sense an imbalance in electrical current flow within the main electrical leads (leakage current). When this imbalance (maximum 5 ma per UL) occurs in the main leads, a comparator within the GFCI outlet generates a trip signal which is applied to a coil that trips the main (normally closed) contacts. These contacts open and break the circuit.

Ghost Trips

Consider that all GFCI's must trip at a leakage current of 5 ma. GFCI "Ghost Trips" are caused by electrical devices that have small electrical leakage current to ground. Multiple outlets protected by one GFCI allow for potential cumulative leakage currents caused by multiple appliances each leaking small amounts of current.

Example: One pump plugged into a outlet that is part of a four outlet branch protected by one GFCI will not trip the GFCI with its 2 ma leakage current. However, two pumps and a UV with a cumulative leakage current of 7 ma will trip the GFCI. This is a common problem.

The solution to the GFCI "Ghost Trip" problem is to operate the device on its own GFCI protected outlet, or, remove other devices from the GFCI protected branch of outlets. If the GFCI is over ten years old, you may want to consider replacing it.

UV Lamp Installation

Lamp Styles

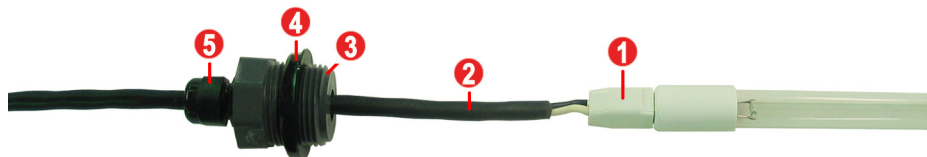
UV lamps are manufactured with color coded ceramic bases. White-capped UV lamps signify a Standard-Output UV lamp while red-capped UV lamps signify a High-Output UV lamp.



Power Cord Adjustment

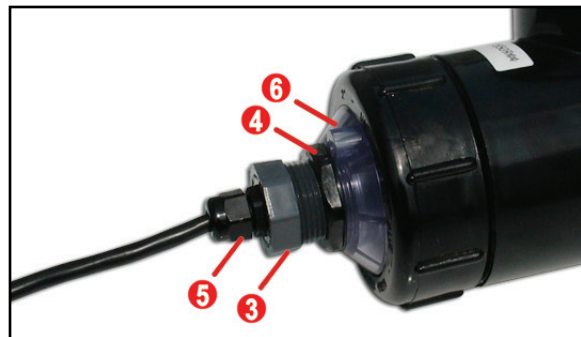
There should be four (4) inches of cord between the Gray Adapter **3** and the 4-pin Lamp Connector **1**. The four (4) inch cord distance **2** positions the lamp properly inside the quartz sleeve.

1. The 3/8 inch Threaded Watertight Cord Connector **5** is adjustable. Loosen it gently move the cord through it. Care must be taken when retightening. If the Connector's Rubber Gasket Seal **4** is dislodged during cord adjustment please make sure that it is properly re-seated inside the male threaded portion of the connector.



2. After a successful water test and without the power supply plugged into an electrical receptacle, attach the lamp's 4-pins to the power cord's white 4-pin Connector **1**. Then slide the UV lamp back into the UV sterilizer's quartz sleeve.

3. Whether the SMART UV Systems™ UV Sterilizer vessel is mounted horizontally or vertically, care should be taken when installing the UV lamp into the vessel's quartz sleeve. Vertical installations require extra attention to eliminate the chance of the lamp dropping into the quartz sleeve and breaking.



4. With the UV lamp/power cord connection complete and the lamp entirely inside the quartz sleeve, carefully screw down the Gray Power Supply Adapter **3** onto the Clear Quartz Sleeve Module **6**; hand tighten only.
5. Screw down the Black Power Supply Jam Nut **4** until it makes contact with the Clear Quartz Sleeve Module **6**.
- Note:** By loosening the 3/8 inch Threaded Watertight Cord Connector **5**, Power Cord **2** adjustments can be made. Make sure the 3/8 inch Threaded Watertight Cord Connector's gasket is properly in place before retightening.
- Note:** If you do not have the Black Power Supply Jam Nut **4** back far enough before tightening the Gray Power Supply Adapter **3**, the gray adapter will not make contact with the power supply gasket and will enable outside moisture to enter the quartz sleeve assembly system failure.

Optional Quartz Sleeve Wipers

Quartz Sleeve Wipers are recommended for freshwater applications only. If you did not purchase a wiper model skip to the next section on page 12.

The quartz sleeve wiper seal for all SMART UV Systems™ Wiper models is located on the clear quartz sleeve module. Two rubber seals create a seal between the clear quartz sleeve module and the quartz sleeve wiper rod. Both are easily replaced.

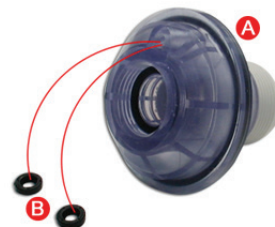
Replacing Rubber Seals

To replace rubber seals, use a small screwdriver to pry the old seals out of the Clear Quartz Sleeve Module. Replace with new seals, ensuring the flat portion of the seals are facing into the Clear Quartz Sleeve Module.

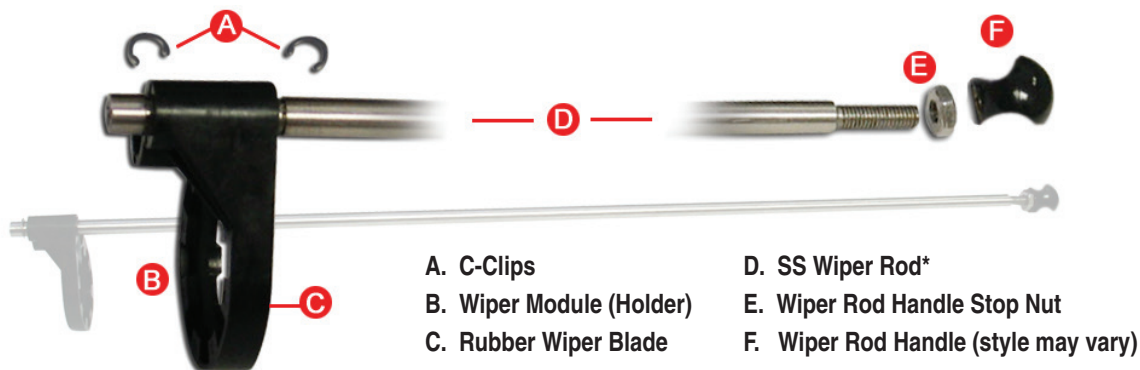
Note: Wetting the seals before installation will assist in creating a watertight seal.

ITEM# 02051-VC

- A. Clear Quartz Sleeve Module
B. Replacement Rubber Seals



Wiper Assembly Parts Breakdown

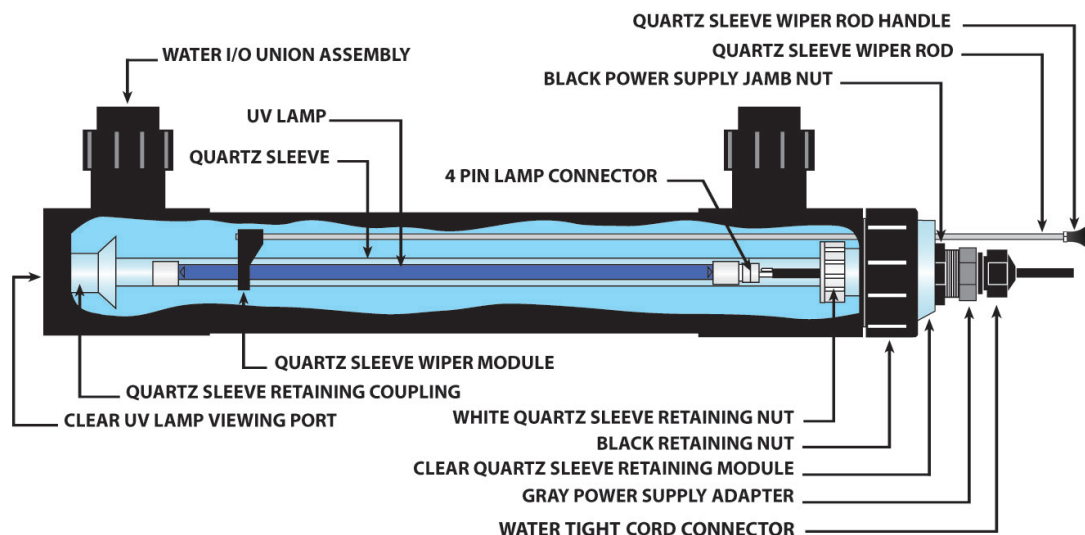


***Larger units use additional wiper modules on a single rod.**

Quartz Sleeve Wiper Assembly

To install the quartz sleeve wiper:

1. Place the non-threaded side of the Wiper Rod through the top hole of the Wiper Module and line up the Wiper Module in between the two grooves.
2. Push the C-Clips onto the rod (one into each groove, opposite sides of the wiper module).
3. Push the domed end of the Quartz Sleeve through the Wiper Module that is attached to the Wiper Rod.
4. Slide the Wiper Module, with Rod attached, two-thirds of the way up the Quartz Sleeve.
5. Push the threaded end of the Wiper Rod completely into and through the Quartz Sleeve Module 1/4 inch hole with Rubber Seals.
6. Thread on the Wiper Rod Stop Nut and Wiper Handle.
7. Push the Quartz Sleeve (open end) with White Retaining Nut, Quartz Sleeve Rubber Gasket and O-ring into the Quartz Sleeve Module respectively, line-up properly and tighten down white nut by hand.
8. Gently slide the entire Quartz Sleeve/Wiper Assembly into the UV vessel. Ensure the domed end of the Quartz Sleeve slides into the Quartz Sleeve Coupling.
9. Thread the Black Retaining Nut onto the UV vessel with the Clear Quartz Sleeve Module/Assembly in place. Hand tighten only.
10. Follow the "Mandatory Water Test" instructions on page 8.



SMART UV Installation and Operation

SMART UV Systems™ UV Sterilizers are used in a variety of applications to control waterborne pathogens. Pentair Aquatic Eco-Systems, Inc. encourages the consideration of the installation/operation recommendations provided here.

Suspended solid waste will absorb UV light and reduce the UV transmittance through water. By operating the SMART UV after the mechanical filter, the unit's overall performance will be increased.

When operating SMART UV sterilizers please consider the recommended water flow rates.

Pond Installation Configurations

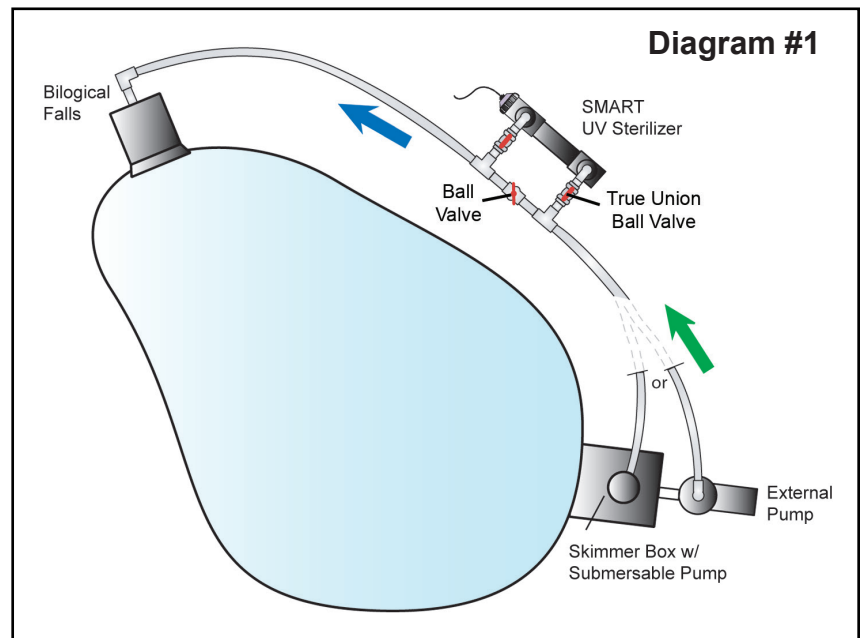
Small to Moderately Sized Ponds (up to 5,000 Gallons) Using Skimmers and Falls

Placing the UV between the skimmer box and the filter ensures that pre-filtered water reaches the UV, increasing its performance while reducing maintenance.

Often the capacity of the pump exceeds the capacity of the UV. If this is the case, install a bypass manifold. Be sure that the skimmer is equipped with mechanical filtering capacity. See **Diagram 1**.

Note: Before gluing piping or reducer bushing into the UV's union or socket, remove the quartz sleeve assembly to prevent glue from dripping onto the quartz sleeve.

Note: Use threaded seal tape on all threaded connections.



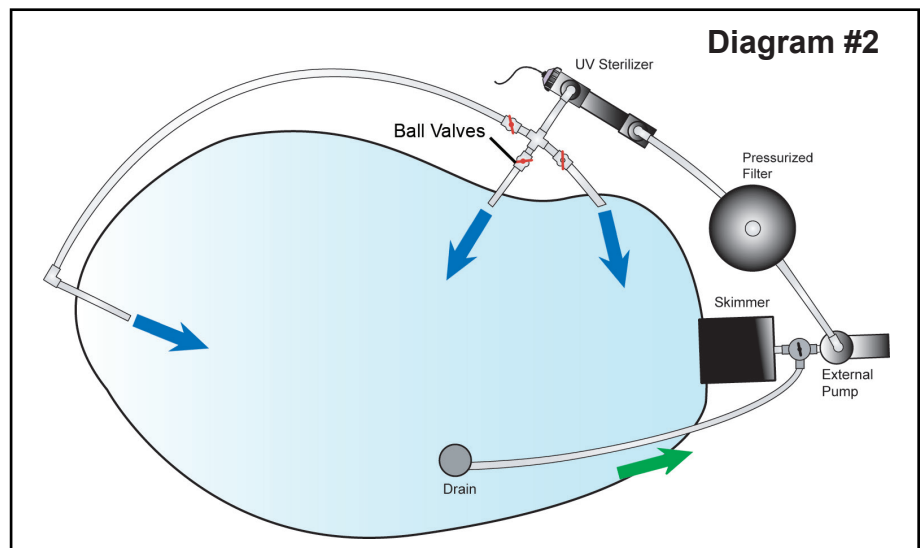
Larger Sized Ponds (above 5,000 Gallons) Using Surface Skimmer and Pressurized Filter

This system is simple yet it achieves critical filtering goals, such as good water circulation for increased solid waste suspension. The bottom drain/surface skimming capabilities ensure maximum waste removal. See **Diagram 2**.

The SMART UV Systems™ UV Sterilizer is positioned after the mechanical filter where it can receive only solid waste free water, optimizing UV transmittance/performance. Notice the 3-way valve that regulates suction from the skimmer and drain to the pump, allowing flow control. Next, multiple “clean water returns” improve circulation, suspending solid waste and helping it to find the filter. If you have a flow rate that exceeds the UV's, install a by-pass manifold. See **Diagram 1**.

Note: Before gluing piping or reducer bushing into the UV's union or socket, remove the quartz sleeve assembly to prevent glue from dripping onto the quartz sleeve.

Note: Use threaded seal tape on all threaded connections.



Aquarium Installation Configurations

Canister Filter/Aquarium Installation

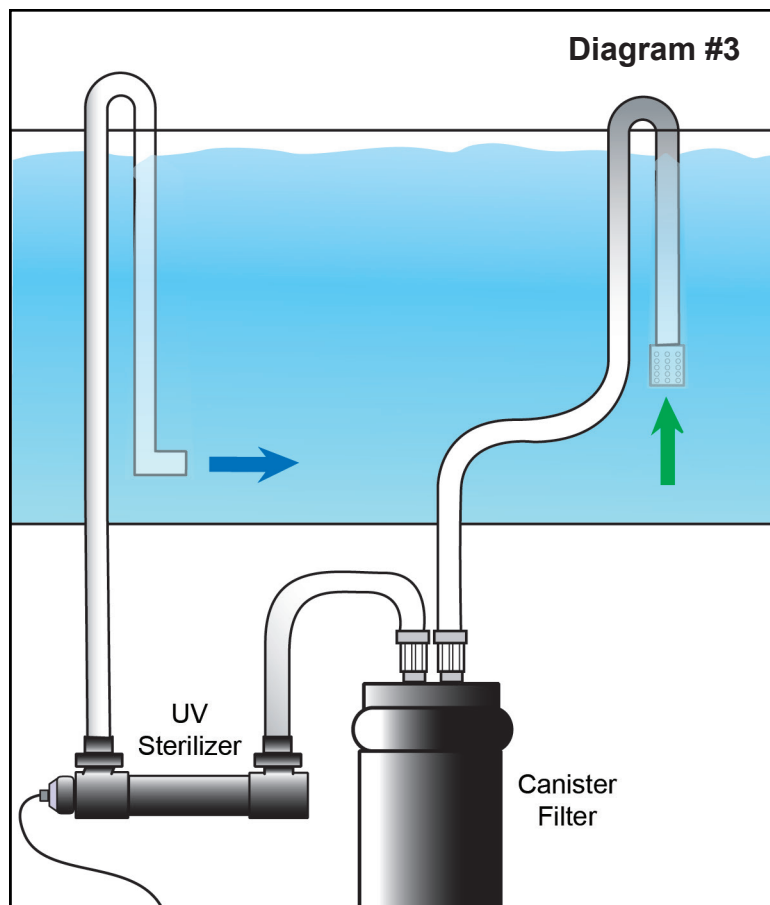
Pressurized Canister filters are commonly used with small freshwater/saltwater aquariums.

Diagram 3 shows a SMART UV model.

It is important to match the Canister Filter's flow rate to the capacity of the SMART UV. If this is not feasible, use a bypass manifold (see **Diagram 5** on page 14). To prevent back-siphoning, consider installing a check valve or ball valve (see filter instructions/recommendations). See **Diagram 3**.

Note: Before gluing piping or reducer bushing into the UV's union or socket, remove the quartz sleeve assembly to prevent glue from dripping onto the quartz sleeve.

Note: Use threaded seal tape on all threaded connections.



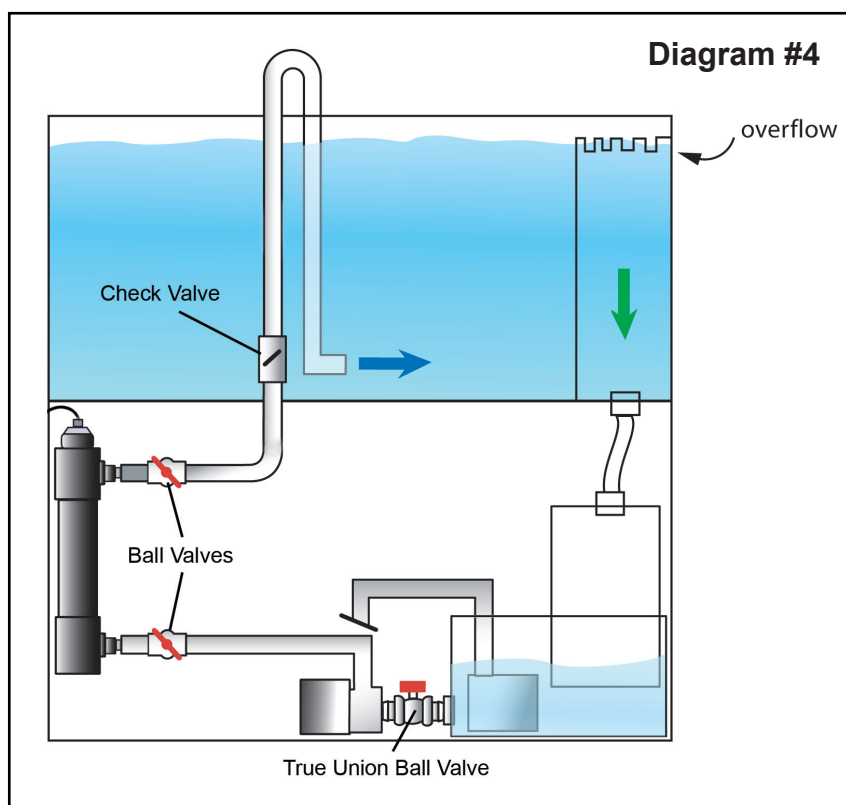
Wet-Dry With External or Submersible Pump Installation

This installation configuration shows the SMART UV Systems™ UV Sterilizer capacity matched to the recirculating flow rate performance of the pump. We recommend mechanical filter media being used inside the over-flow and at the top of the wet-dry filter.

Installing a check valve after the UV will eliminate back siphoning. Installing true-union ball valves will allow flow adjustments and UV removal. For best results, install a saddle-style water flow meter, mounted horizontally on the outlet side of the UV. Follow the water flow meter manufacturer's instructions for proper installation and operation. See **Diagram 4**.

Note: Before gluing piping or reducer bushing into the UV's union or socket, remove the quartz sleeve assembly to prevent glue from dripping onto the quartz sleeve.

Note: Use threaded seal tape on all threaded connections.



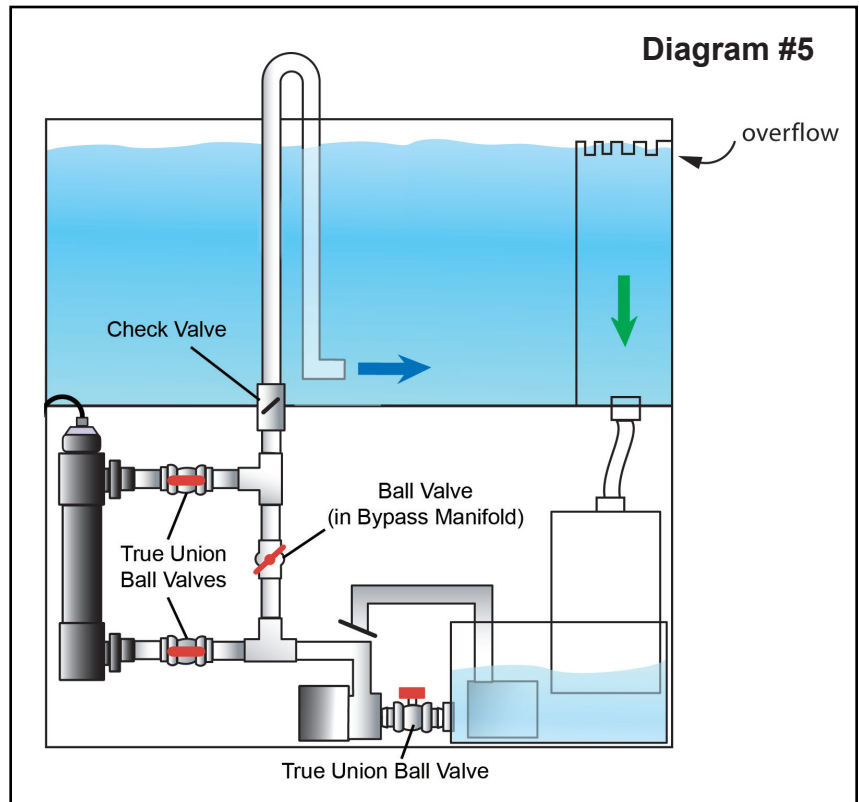
12-2C Wet-Dry w/External or Submersible Pump Installation

This installation configuration is identical to **Diagram 4** with the addition of a bypass manifold. The bypass is used to deliver a precise water flow to the SMART UV when the overall clean water return flow rate exceeds the UV's capacity.

Installing a check valve after the UV will eliminate back siphoning. Installing true-union ball valves will allow flow adjustments and easy UV removal for servicing. For best results, install a saddle-style water flow meter, mounted horizontally on the outlet side of the UV. Follow the water flow meter manufacturer's instructions.

Note: Before gluing piping or reducer bushing into the UV's union or socket, remove the quartz sleeve assembly to prevent glue from dripping onto the quartz sleeve.

Note: Use threaded seal tape on all threaded connections.



Quartz Sleeve Cleaning

It is recommended that the UV's quartz sleeve be visually inspected for cleaning once every three months of operation. Even the slightest layer of material (slime/dirt) coating the outside of the quartz sleeve can have a substantial affect on UV-C light transmittance through the glass and into the water.

Cleaning frequency is also dependent on how well water is being filtered before reaching the SMART UV Systems™ UV Sterilizer. Water that contains solid waste will deposit greater amounts of material onto the quartz sleeve and will increase the frequency of necessary cleaning.

To Clean the Quartz Sleeve:

1. Unplug the UV sterilizer and disconnect power to the water pump at the circuit breaker.
2. Unthread the Black Retaining Nut and gently remove the Quartz Sleeve Assembly and lamp from the UV vessel.
3. Inspect the Quartz Sleeve and clean as needed with a soft, clean cloth.
4. If calcium deposits are present use vinegar or muriatic acid to dissolve the deposits. Be sure to remove any cleaners or acid from the quartz sleeve assembly before reassembling.



WARNING



Muriatic acid is corrosive and can lead to inflammation or burns to body tissue. ALWAYS wear rubber gloves, safety glasses and an N-95 dust mask when handling acid to prevent serious bodily injury.

To prevent degradation of the acid by UV light, store muriatic acid in an opaque container and away from direct sunlight.

Lamp Connector Removal

In the event that you would need to replace you 4-pin lamp connector, follow these steps:

1. Unplug the UV sterilizer and disconnect power to the water pump at the circuit breaker.
2. Remove UV lamp from the quartz sleeve.
3. Unplug the UV lamp from the connector/power cord.
4. Grasp the white 4-pin lamp connector with a pair of pliers while standing on the power cord itself.
5. Pull hard, while twisting slightly. The connector will disconnect.
6. Check to be sure the ends of the electrical wires are still tinned; they are pre-soldered before they're pushed into the connector. If they are no longer tinned, you will need to dip them in flux and then solder to make them firm enough to push back in the new lamp connector.

Note: Clean away any residual flux off of the wires before assembling them into the lamp connector.

7. Using a "new" 4-pin lamp connector, push the power cord's tinned wires into the holes of the connector making sure that they are firmly attached. Once attached, the wires should not pull out of the connector. See Diagrams below for wire placement.



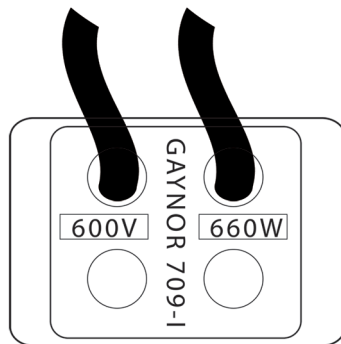
8. Plug lamp back into the connector.
9. When installing the lamp be sure to have Black Power Supply Jam Nut all the way back on gray adapter. Tighten down the Gray Power Supply Adapter first and then secure the black jam nut. See "UV Lamp Installation" on page 9.

Note: If you do not have the Black Power Supply Jam Nut back far enough before tightening the Gray Power Supply Adapter, the gray adapter will not make contact with the power supply gasket and will enable outside moisture to enter the quartz sleeve assembly system failure.

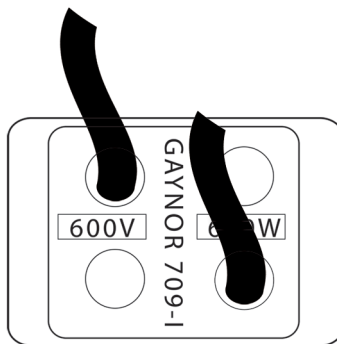


Avoid a configuration where the wires cross directly over the divider. See configuration C.

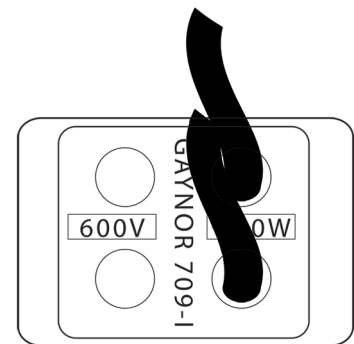
For either style power supply you can use wire configuration A or B.



A



B



C



Winterizing

Using the SMART UV Systems™ UV Sterilizer in extremely cold temperatures can cause damage to the unit, especially if the water is allowed to freeze inside the equipment. Please note that damage to the product by frozen water is not covered under warranty.

Pentair Aquatic Eco-Systems, Inc. recommends shutting the SMART UV down when the temperature consistently falls below 50°F (10°C).

1. Drain and remove the SMART UV from the filtration system.
2. Disassemble the entire unit and carefully clean both the outside and interior of the SMART UV body and components.
3. Once clean and dry, store the SMART UV in a dry place for the winter.
4. Return the SMART UV to service when temperatures consistently return to 50°F (10°C) or greater.

Note: Be sure to replace the quartz sleeve gasket/o-ring and perform a water test prior to operating the equipment.

TROUBLESHOOTING

Paper Towel Test Indicates a Leak

1. Turn off the water pump at the circuit breaker and be sure all flow to the unit has been stopped.
2. Refer to pages 5-6 for “Quartz Sleeve Assembly” and pages 9-10 for “UV Lamp Installation” (in reverse order) to disassemble the unit.
3. Ensure there are no cracks or breakages in the Quartz Sleeve, that the Quartz Sleeve Gasket and O-ring are properly installed, and that the Quartz Sleeve Retaining Nut has been tightened down completely
4. Reassemble the Quartz Sleeve (see page 5-6) and repeat the mandatory water test (see page 8) until there are no indications of a leak.

GFCI/Breaker is Tripping

1. Immediately unplug the SMART UV Systems™ UV Sterilizer.
2. Turn off the water pump at the circuit breaker and be sure all flow to the unit has been stopped.
3. Refer to pages 5-6 for “Quartz Sleeve Assembly” and pages 9-10 for “UV Lamp Installation” (in reverse order) to disassemble the unit.
4. Check for water/moisture inside the quartz sleeve.
5. Multiple appliance plugged into a brand of outlets protected by one GFCI create the potential for cumulative leakage current resulting in a tripped GFCI. Refer to the “Ghost Trips” on page 9 for more detailed information regarding GFCI breakers.

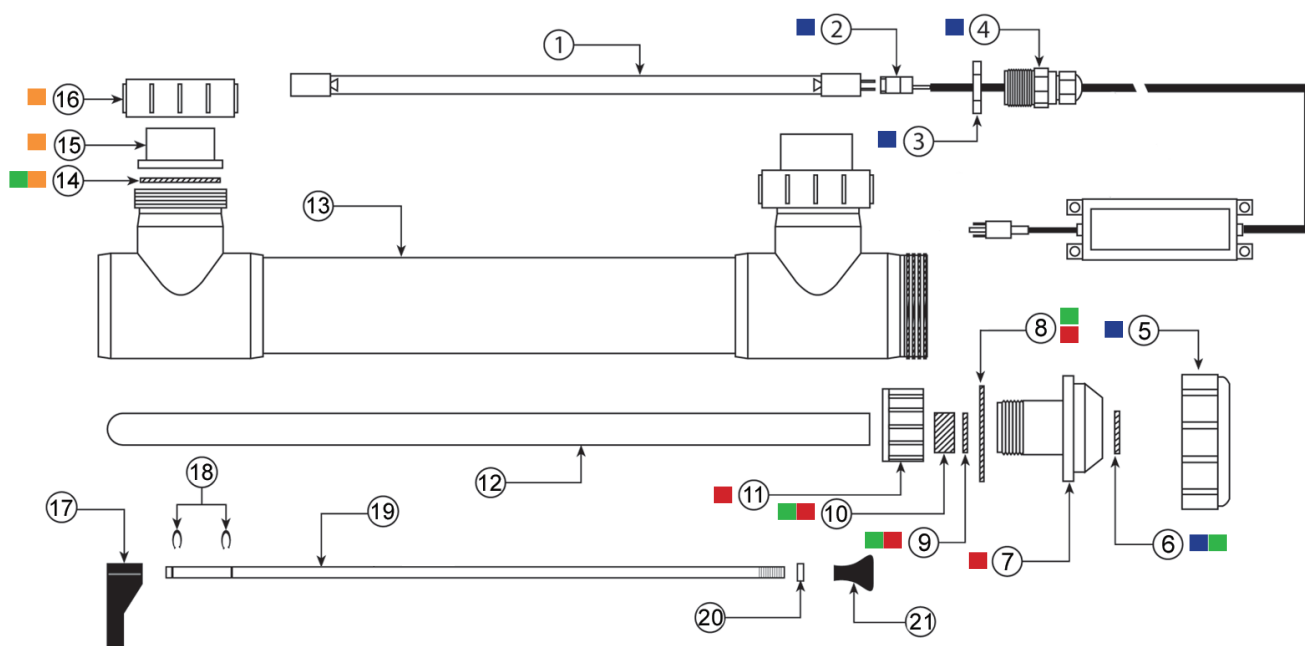
Pond Still Green After a Week of UV Operation

1. Ensure the UV lamp is lit by utilizing the safe viewing port.
2. A dirty quartz sleeve can reduce the UV sterilizer's performance. If the Quartz sleeve is dirty refer to “Quartz Sleeve Cleaning” on page 15 for cleaning procedures.
3. Double check the unit's flow rate and compare to the flow rate chart for your specific UV model.

REPLACEMENT PARTS

SMART UV Sterilizer Replacement Parts

Part Numbers: EU18-U, EU25-U, EU40, EU65P, EU18P-W, EU25P-W, EU40P-W, EU65P-W



Item #	Part #	Description
1	See Chart Below	UV Lamp
■	20100	Power Supply Assembly (Incl. #2-6)
2	709-1S	4-Pin Lamp Connector
3	20604-AQ	Black Power Supply Jam Nut
4	20600-AQ	Gray Power Supply Adapter
5	8050B20	Black Retaining Nut
6	20620-AQ	Power Supply Gasket
■	20603-AQ	Quartz Sleeve Retaining Module Assembly (Incl. #7-11)
7	20603-AQ	Clear Quartz Sleeve Retaining Module
8	BN70-232	O-Ring for Clear Quartz Sleeve Retaining Module
8	9557K483	Quartz Sleeve O-Ring
10	22004	Quartz Sleeve Gasket
11	25004	White Quartz Sleeve Gasket/O-Ring Retaining Nut

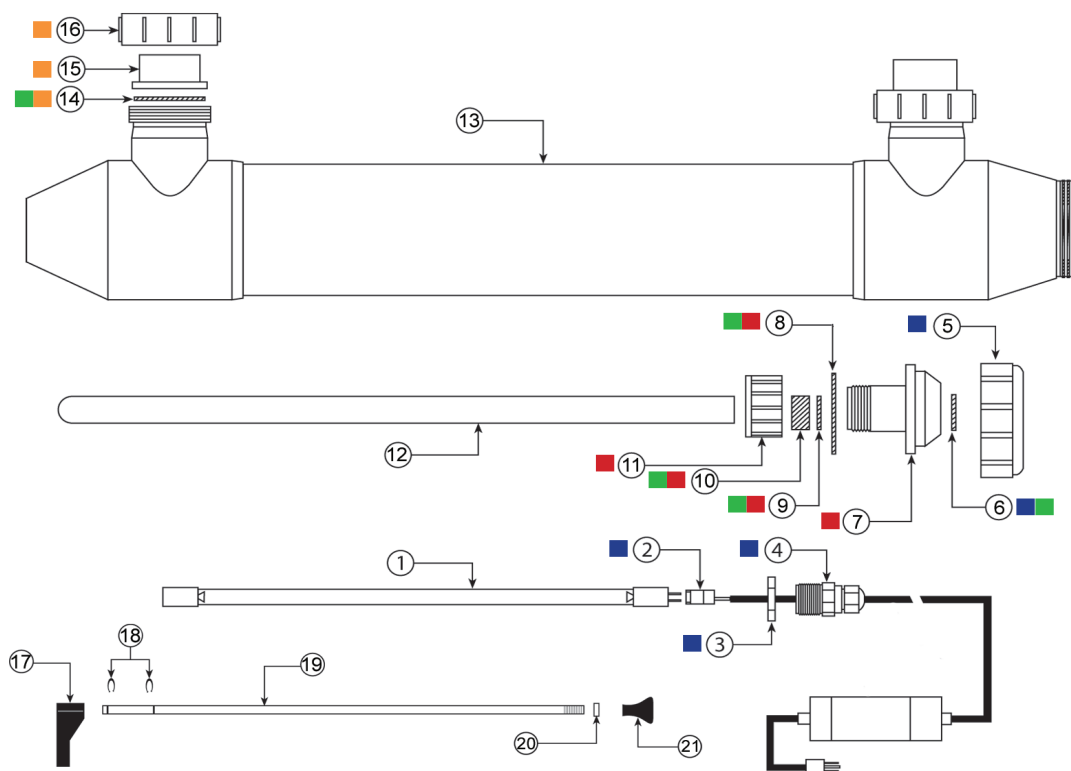
Item #	Part #	Description
12	See Chart Below	Quartz Sleeve
13	See Chart Below	Sterilizer Vessel
■	20630	1.5\" Union Assembly (Incl. #14-16)
14	EP70-228	Inlet/Outlet Union O-Ring
15	20609	Inlet/Outlet Union Socket Half
16	8050-B15	Inlet/Outlet Union Retaining Nut
17	000-012	Wiper Module (wiper models only)
18	C-25SS	C-Clips (wiper models only)
19	See Chart Below	Wiper Rod (wiper models only)
20	91841A195	Wiper Rod Handle Stop Nut (wiper models only)
21	6044K53	Wiper Rod Handle (wiper models only)
■	20375	Seal Kit (Incl. #6, 8-10 & 14)

Bolded parts require annual replacement

Model No.	UV Lamp P/N (#1)	Quartz Sleeve P/N (#12)	Vessel P/N (#13)	Wiper Rod (#21)
EU18-U, EU18P-W	FL-2536-IP	FL-QZ173-IP	20418	18-SSWR
EU25-U, EU25P-W	FL-2542-IP	FL-QZ175-IP	20425	25-SSWR
EU40, EU40P-W	FL-1957-IP	FL-QZ176-IP	20440	40-SSWR
EU65P, EU65P-W	FL-2529	FL-QZ167	20465	65-SSWR

SMART HO UV Sterilizer Replacement Parts

Part Numbers: E50S, E80S, E120S, E150S, E50S-W, E80S-W, E120S-W, E150S-W



Item #	Part #	Description
1	See Chart Below	UV Lamp
■	20105-MV	Power Supply Assembly, 50-120W
■	202150-1	Power Supply Assembly, 150W
2	709-1S	4-Pin Lamp Connector
3	20604-AQ	Black Power Supply Jam Nut
4	20600-AQ	Gray Power Supply Adapter
5	8050B20	Black Retaining Nut
6	20620-AQ	Power Supply Gasket
■	20603-AQ	Quartz Sleeve Retaining Module Assembly (Incl. #7-11)
7	20603-AQ	Clear Quartz Sleeve Retaining Module
8	BN70-232	O-Ring for Clear Quartz Sleeve Retaining Module
9	9557K483	Quartz Sleeve O-Ring
10	22004	Quartz Sleeve Gasket
11	25004	White Quartz Sleeve Gasket/O-Ring Retaining Nut

Item #	Part #	Description
12	See Chart Below	Quartz Sleeve
13	See Chart Below	Sterilizer Vessel
■	20640	2" Union Assembly (Incl. #14-16)
14	BN70-232	Inlet/Outlet Union O-Ring
15	20609-2	Inlet/Outlet Union Socket Half
16	20610-2	Inlet/Outlet Union Retaining Nut
17	000-012	Wiper Module (wiper models only)
18	C-25SS	C-Clips (wiper models only)
19	See Chart Below	Wiper Rod (wiper models only)
20	91841A195	Wiper Rod Handle Stop Nut (wiper models only)
21	6044K53	Wiper Rod Handle (wiper models only)
■	20375-2	Seal Kit (Incl. #6, 8-10 & 14)

Bolded parts require annual replacement

Model No.	UV Lamp P/N (#1)	Quartz Sleeve P/N (#12)	Vessel P/N (#13)	Wiper Rod (#21)
E50S, E50S-W	FL-2538-IP	FL-QZ175-IP	209050	18-SSWR
E80S, E80S-W	FL-2997-IP	FL-QZ176-IP	209080	25-SSWR
E120S, E120S-W	FL-2998-IP	FL-QZ165	209120	40-SSWR
E150S, E150S-W	FL-2999	FL-QZ167	209150	65-SSWR



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