Installation, Operation and Maintenance Manual

SmartStream™ UV
254 Nanometer Germicidal UV Disinfection Systems

Models
WA002 WA006 WA008 WA012

SmartStream™ UV
Chemical Free Disinfection of Water

⚠ WARNING

Read this Manual BEFORE using this equipment. Failure to read and follow all safety and user information can result in death, serious personal injury, property damage, or damage to the equipment. Keep this Manual for future reference.

NOTICE

This system should only be installed and maintained by a qualified professional. The system MUST be installed in accordance with all applicable national, state and local codes.

Introduction

The Watts SmartStream™ line of ultraviolet disinfection systems provide protection against microbiological contamination in water for residential and commercial applications.

Disinfection of water with SmartStream™ is a simple, rapid physical process. When contaminated water is exposed to SmartStream's™ 254 nanometer UV light, the UV light penetrates the cell walls of microorganisms and disrupts their genetic deoxyribonucleic acid (DNA) material. This quickly inactivates microorganisms by destroying their ability to replicate and infect.

⚠ WARNING

DO NOT rely solely on this system to make water safe to drink. SmartStream™ UV disinfection systems are intended to be used as part of a well designed water treatment system. Water that contains microbiological contamination should be tested regularly to ensure its quality and safety at the point of use.

⚠ WARNING

DO NOT look directly at the UV lamp while it is ON. Permanent serious eye injury could occur.

SmartStream™ UV is certified by the Water Quality Association (WQA) to NSF/ANSI Standard 372 for lead free.

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NOTICE

- **DO NOT** let the system freeze. System damage may result.
- Install the system on a flat, and level surface.
- The quality of the water to be treated must meet the feed water guidelines within this manual. Failure to ensure proper pretreatment will result in inadequate disinfection. Watts SmartStream™ UV systems are engineered with the highest quality components. If at anytime a component needs to be replaced, use only parts recommended and supplied by Watts. **DO NOT** add components to or remove components from this system.

The UV lamp is rated for 9000 hours under normal operating conditions and should be replaced annually to keep the UV intensity at the highest possible output. Quartz sleeves should be cleaned as needed or replaced as needed to guarantee the highest possible UV transmittance into the water.

Use only Watts supplied UV lamps and quartz sleeves for your specific model. Failure to do so may result in system failure, injury, death, property damage and will void all warranty.

DO NOT use this system in a manner that it is not intended for. This purifier is only for use in water applications where the feed water, installation environment and installation method meets the requirements within this manual.

The system must be properly sized. **DO NOT** exceed the rated flow rate capacity of the system. Flow controllers are available from Watts to ensure system's rated flow is not exceeded.

Failure to comply with any and all written instructions for this product may result in system failure, injury, death, property damage and will void all warranty.

Follow all product safety labeling.

⚠ WARNING

Using SmartStream™ with other water treatment equipment.

SmartStream™ UV units can be installed as a final disinfection method within a water treatment system train or as pretreatment to protect sensitive components, such as reverse osmosis membranes, from bio-films.

The injection of chemicals into the water should be done on the outlet of the SmartStream™ system to ensure UV light degradation of the chemical or the introduction of turbidity within the UV feedstream does not occur.

A 5 micron particle filter should always be installed immediately before the SmartStream™ system.

Be certain that the feed water meets all criteria within the Feed Water Specifications section of this manual.

⚠ WARNING

Installation Guidelines

- **DO NOT** allow this system to remain ON without water in it for extended periods of time.
- **DO NOT** install the system near any source of heat. Also, **DO NOT** install the system near any device or break out area that would be adversely effected by water.
- **DO NOT** install this system higher in elevation than 10,000 feet above sea level.
- **DO NOT** install the system backwards with the feed water line connected to the outlet.
- **DO NOT** install where system is exposed to harsh chemicals or may be subjected to being struck by moving equipment, carts, mops or any other item that may cause damage.
- **DO NOT** install the system outdoors. Keep system away from moisture, rain, and direct sunlight. Ambient air temperature must remain below 122°F and relative humidity must remain below 90%.
- **DO NOT** allow the system to freeze.
- The system **MUST** be mounted on a surface and with mounting hardware that is sturdy enough to support the weight of the wetted system.
- The system **MUST** be plugged into an uninterrupted power supply that matches the rated power requirement of the system.
- The system **MUST** be installed in accordance with all applicable national, state and local codes.
- A prefilter with a 5 micron minimum particle size reduction must be installed on the inlet line to the system. Additional pretreatment may be necessary so that the feedwater conforms to the Feed Water Specifications section on page 5.
- Plumbing materials sensitive to UV light, typically plastic materials, should not be connected directly to the system. To prevent UV degradation at the plumbing connection points on the system, use one foot minimum of copper or stainless steel plumbing material to connect to the inlet and to the outlet of the system.
- **IF** water hammer is evident, install water hammer arrestors before the system.
- Always back-up valves and fittings with a wrench when constructing plumbing to reduce unnecessary stress on the system and its plumbing.

Position the system in a suitable location. Make sure there is enough clearance between the end of UV chamber and any obstructions, to allow for the removal of the lamp and quartz sleeve. SmartStream™ UV disinfection systems should be installed as close as possible to the treated water's point of use.

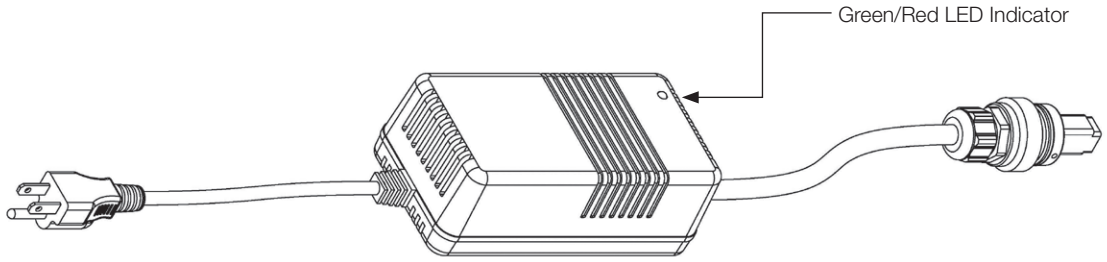
System Specifications

SmartStream™ UV System Part Number Identification Key						
Prefix "W"	"Controller Series"	"GPM"	"Connection Type"	"Pipe Size"	"Plug"	"Accessories"
Watts	Controller Type A: Controller A	GPM of System (3-Digits)	Connection Port Types: A: NPT B: BSP-Tapered	Pipe Size B: 3/8" C: 1/2" D: 3/4" E: 1"	A: North American 120V B: European 220V	Accessories X: No Accessories

Controller Features

SmartStream™ A series UV Controllers are designed with simplicity in mind. Input power is converted to the correct voltage required by the lamp for the production of UV light. During normal operation, the LED indicator will be illuminated green. If the lamp burns out then an audible alarm will sound and the Green/Red LED Indicator will change from Green to Red. This informs the user that the system requires servicing.

Series A Controller



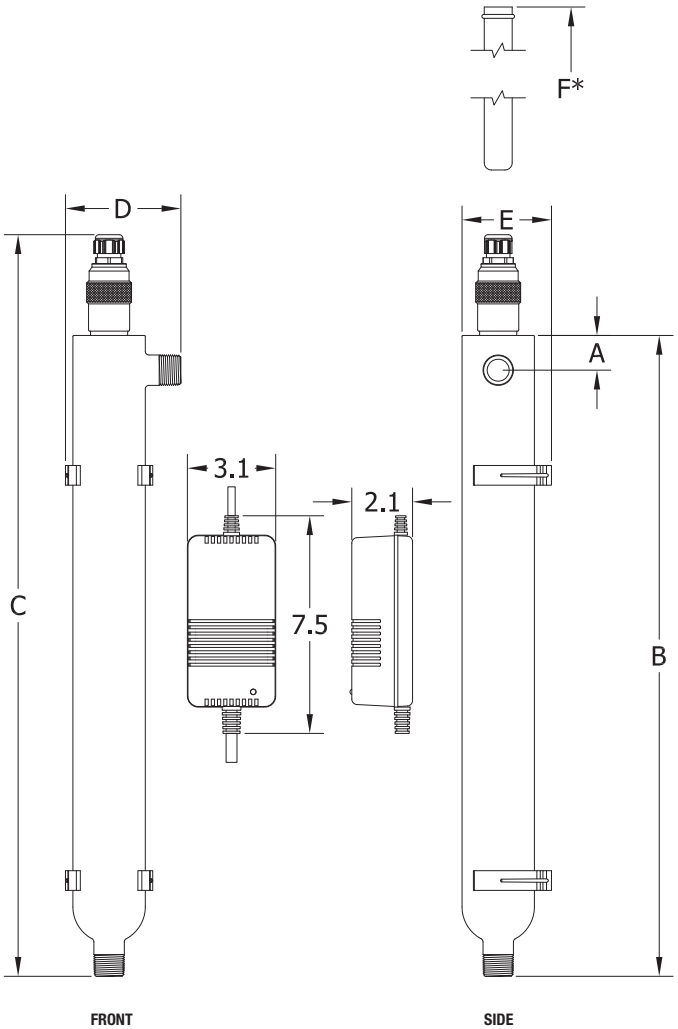
System Features

		A Series Controller With Lamp Out Alarm			
	GPM Rating	2	6	8	12
	Model #	WA002	WA006	WA008	WA012
304 SS Chamber		✔	✔	✔	✔
Lamp Out Audible Alarm		✔	✔	✔	✔
Lamp On Indicator (Green LED)		✔	✔	✔	✔
Lamp Out Indicator (Red LED)		✔	✔	✔	✔
Wall Mounting Clips for Chamber		✔	✔	✔	✔

Product Specifications Table

MODEL		WA002	WA006	WA008	WA012
FLOW RATE @ 30mJ/cm2 (at 1 year)	usgpm liters/min	2 gpm 7.6 lpm	6 gpm 22.7 lpm	8 gpm 30.3 lpm	12 gpm 45.4 lpm
STANDARD NPT INLET / OUTLET PORTS		3/8" NPT-M	3/4" NPT-M	3/4" NPT-M	1" NPT-M
CHAMBER MATERIAL		304 SS			
INPUT VOLTAGE		120 VAC 60 Hz or 230 VAC 50 Hz			
SYSTEM MAX INPUT POWER (Watts)		18.6	26	32	45
LAMP MAX ELECTRICAL POWER (Watts)		14	21	29	40
VISUAL ALARM		Green/Red LED			
AUDIBLE ALARM		Yes			
AUDIBLE ALARM MUTE		No			
MIN/MAX AMBIENT AIR TEMPERATURE / MAX HUMIDITY		32°F (0°C) to 122°F (50°C) / 90% RH (non-condensing)			
INLET WATER TEMPERATURE RANGE		36°F (2°C) to 104°F (40°C)			
MAX WATER PRESSURE		100 psi (689 kPa)			
SHIPPING WEIGHT		4.6 lbs (2.1 Kg)	6.4 lbs (2.9 Kg)	8 lbs (3.7 Kg)	11 lbs (5 Kg)

Dimensions



A Series UV Systems							
Model	GPM	A	B	C	D	E	F
WA002	2	1.1	14.17	17.65	3.83	3.09	14
WA006	6	1.2	22.14	25.62	3.99	3.09	22
WA008	8	1.2	28.06	31.54	3.99	3.09	28
WA012	12	1.35	37.07	40.54	4.01	3.09	39

All dimensions are in inches.

NOTICE

Allow this end clearance (F) for the removal of lamp and quartz sleeve.

Feed Water Requirements

Please review operating pressures, temperatures and water chemistry limitations to ensure compatibility.

Max Water Pressure	100 psi (6.9 bar)
pH	6.5-8.5
Water Temperature	36°F to 104°F (2°C to 40°C)
Turbidity	<5 Nephelometric Turbidity Units (NTU)
Iron (maximum)	0.3 mg/l
Manganese (maximum)	0.05 mg/l
Maximum Ambient Atmospheric Conditions	Temperature 122°F / 50°C 90% Relative Humidity
Oil & H2S	None allowed

⚠ WARNING

Support the Piping

The full weight of the piping and valves must be supported by uni-strut, pipe hangers or other means.

Installation

⚠ WARNING

Inspect wall for hidden wiring before drilling any holes or installing screws.

1. Remove all system components from packaging and inspect for any damage. Confirm that the system being installed matches the flow rate for the application.
2. Turn off water heater(s).
3. Turn off the main water supply valve to the pipe the system will be installed in.
4. Relieve pressure within plumbing system by opening then closing both the hot and cold sides of a faucet until water ceases to dispense from faucet.
5. If equipped with isolation valves, isolate the water heater(s) by closing its inlet and outlet valves.
6. Mount the UV system mounting clips on the installation surface using appropriate hardware for your mounting surface type. Mounting screws have been provided for mounting the system to wood. The mounting surface and hardware must be sturdy enough to support the weight of the wetted system.
7. Insert UV chamber through the mounting clips.
8. Connect the water supply pipe to the inlet of the UV system.
9. Install a supply valve in this supply line.
10. Install an adequately sized 5 micron cartridge filter in this supply line after the supply valve. The cartridge filter must have a higher flow rate rating than the UV system.
11. Connect the outlet of the system to the outlet plumbing.
12. Install a flow controller in this outlet plumbing (optional).
13. Install an outlet valve in this outlet plumbing line.

14*. Install the quartz sleeve into the UV chamber closed end first. **DO NOT** touch the quartz sleeve with your fingers. Hold it with a paper towel.

15*. Loosen the Phillips set screw on the side of the quartz sleeve nut and separate the nut from the power cord.

16*. Install the quartz sleeve nut o-ring onto the visible end of the quartz sleeve. Screw the quartz sleeve nut onto the quartz sleeve port thread and tighten hand tight.

17*. Install the ultraviolet lamp into the quartz sleeve. **DO NOT** touch the lamp with your fingers. Hold it with a paper towel.

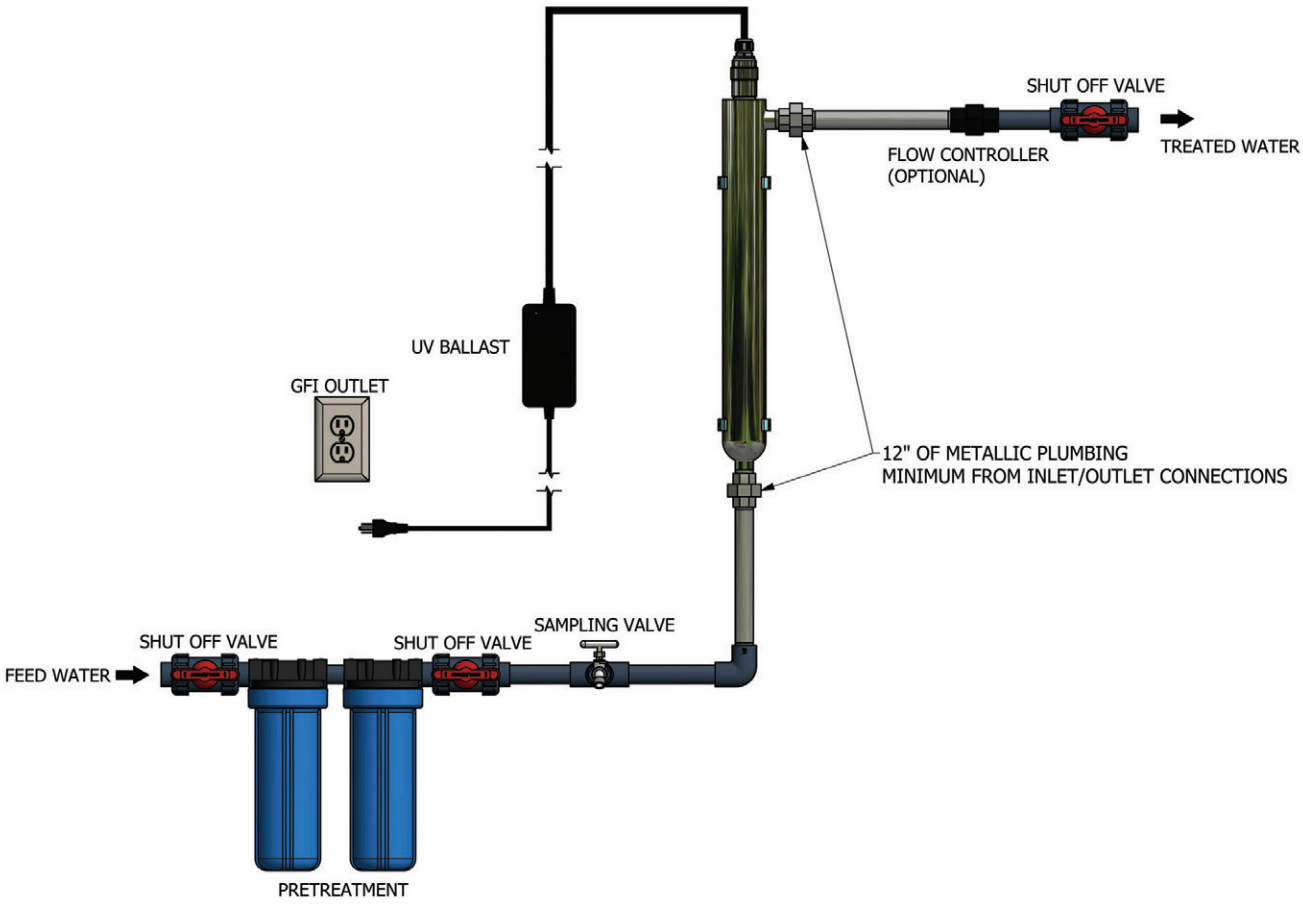
Note: Only the 120 volt system uses the strainrelief and grounding set screw. The 230 volt systems has only the 4 pin plug and rubber cap. See page 8.

18*. Insert the lamp power lead wire into the receptacle on the lamp and rejoin the two halves of the quartz sleeve nut. Tighten the Phillips set screw on the side of the quartz sleeve nut.

19. Open water supply valve.
20. Check for leaks and repair as needed.
21. Plug power cord into an outlet that is protected by a ground fault interrupt.
22. Open outlet valve.
23. Purge air from plumbing system out of the nearest cold water faucet to the UV system.
24. Open inlet and outlet isolation valves on water heaters(s) and turn water heaters back on.
25. Perform the sterilization procedure within this manual.

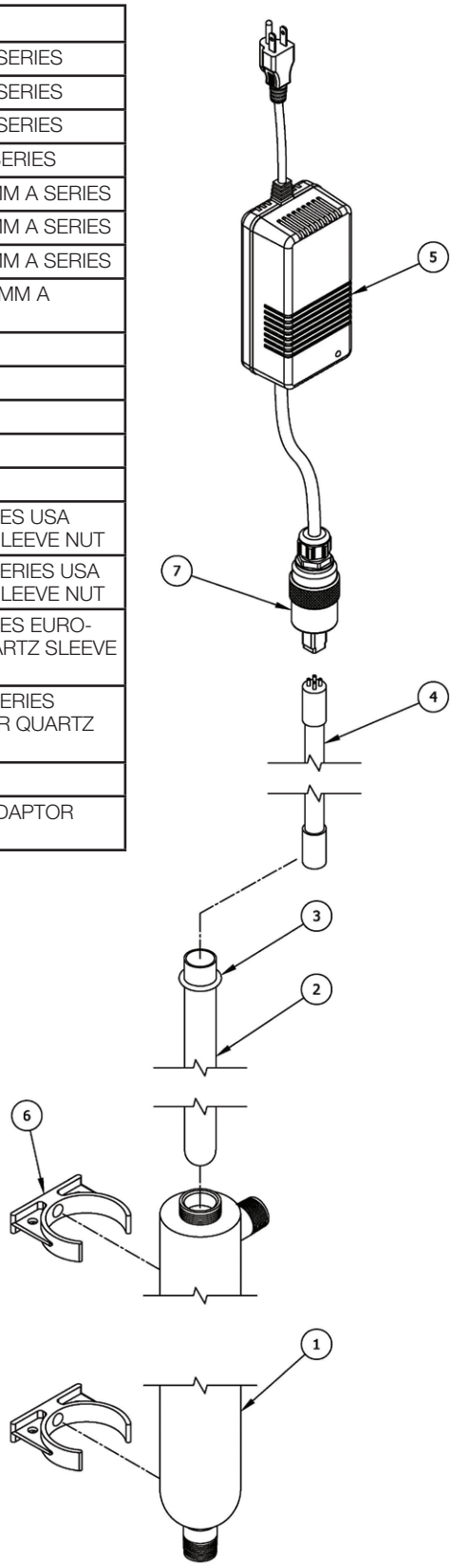
*For assistance with installation steps 14-18 see replacement procedures for lamp and quartz sleeve within this manual.

Typical Installation Diagram



Parts List

ITEM	QTY.	ORDERING CODE	DESCRIPTION
1a	1	-	UV CHAMBER 2.5" OD 2 GPM 3/8" MNPT FOR A SERIES
1b	1	-	UV CHAMBER 2.5" OD 6 GPM 3/4" MNPT FOR A SERIES
1c	1	-	UV CHAMBER 2.5" OD 8 GPM 3/4" MNPT FOR A SERIES
1d	1	-	UV CHAMBER 2.5" OD 12 GPM 1" MNPT FOR A SERIES
2a	1	WUVQS2	UV QUARTZ SLEEVE FOR 2 GPM 330MM X 24.5MM A SERIES
2b	1	WUVQS6	UV QUARTZ SLEEVE FOR 6 GPM 530MM X 24.5MM A SERIES
2c	1	WUVQS8	UV QUARTZ SLEEVE FOR 8 GPM 680MM X 24.5MM A SERIES
2d	1	WUVQS12	UV QUARTZ SLEEVE FOR 12 GPM 910MM X 24.5MM A SERIES
3	1	HSFSUVOR	UV QUARTZ SLEEVE O-RING FOR A SERIES
4a	1	WUVLAMP2	UV LAMP FOR 2 GPM A SERIES
4b	1	WUVLAMP6	UV LAMP FOR 6 GPM A SERIES
4c	1	WUVLAMP8	UV LAMP FOR 8 GPM A SERIES
4d	1	WUVLAMP12	UV LAMP FOR 12 GPM A SERIES
5a	1	T7402000	UV CONTROLLER ASSEMBLY FOR 2 GPM A SERIES USA 120V PLUG WITH STRAIN RELIEF FOR QUARTZ SLEEVE NUT
5b	1	T7402003	UV CONTROLLER ASSEMBLY FOR 6-12 GPM A SERIES USA 120V PLUG WITH STRAIN RELIEF FOR QUARTZ SLEEVE NUT
5c	1	T7402001	UV CONTROLLER ASSEMBLY FOR 2 GPM A SERIES EUROPEAN 220V PLUG WITH STRAIN RELIEF FOR QUARTZ SLEEVE NUT
5d	1	T7402004	UV CONTROLLER ASSEMBLY FOR 6-12 GPM A SERIES EUROPEAN 220V PLUG WITH STRAIN RELIEF FOR QUARTZ SLEEVE NUT
6	2	-	UV MOUNTING CLIPS FOR 2.5" CHAMBER
7	1	T7402006	QUARTS SLEEVE NUT 2 PIECE WITH GROUND ADAPTOR AND TEFLON WASHER



NOTICE

Maintenance

UV Lamps have a **1 year (9000 Hour) life span** under normal operating conditions.

Quartz sleeves should be cleaned with vinegar, citric acid, or a lime scale removing chemical annually, and replaced no less than once every 3 years. If the quartz sleeve can not be cleaned, or if it is discolored, is must be replaced.

Pre filters should be maintained according to the manufacturer's instructions to ensure feed water requirements within this manual are met.

Lamp and Quartz Sleeve Replacement Procedure

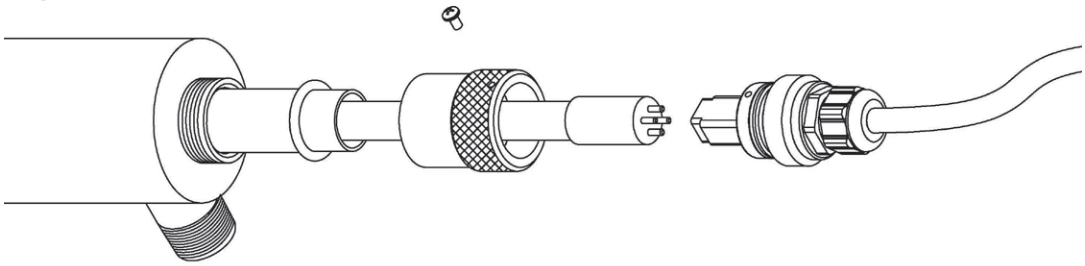
⚠ WARNING

If any water comes in contact with any electrical components, dry the components immediately. **DO NOT** energize a system with damp or wet electrical components.

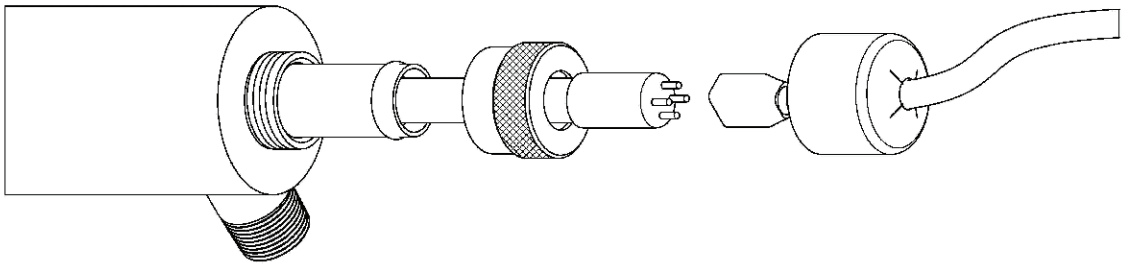
1. Disconnect the power supply from the wall outlet.
2. Turn off the inlet valve and outlet isolation valves.
3. Loosen the Phillips set screw on the quartz sleeve nut and separate the nut into its two halves by pulling on the back half of the nut.
4. Carefully withdraw lamp approximately 2 inches from chamber and disconnect the lamp lead wire from lamp. Remove the lamp from the UV chamber. If not replacing the quartz sleeve proceed to step 11.
5. De-pressurize the system.
6. Grip the quartz sleeve nut with your hand and unscrew counter clockwise until it can be disconnected from the reactor chamber's threaded port.
7. Remove the quartz sleeve from the reactor chamber.
8. Fully insert a new quartz sleeve into the reactor chamber. Be careful not to force the quartz sleeve, breakage may occur. Then install the o-ring over the quartz sleeve.
9. Install the quartz sleeve nut onto the threaded port of the reactor chamber. Screw the quartz sleeve nut on clockwise and tighten hand tight.
10. Turn on the inlet valve and check for leaks. Repair leaks as needed.
11. Insert a new lamp into the quartz sleeve.
12. Reconnect the lamp lead wire to the new lamp and press the chamber nut's two halves back together. Then tighten the Phillips set screw.
13. Restore power to the system.
14. Verify LED Indicator is green.

Immediately after replacement of the UV lamp, and/or quartz sleeve, follow the disinfection procedure within this manual.

120 Volt Lamp Connection



230 volt Lamp Connection



Disinfection Procedure

NOTICE

DO NOT unplug the system.

1. Shut off the isolation valves on the cartridge prefilter.
2. De-pressurize the cartridge prefilter and unscrew the housing.
3. Install a new prefilter cartridge and pour 1 cup of 6% bleach into the housing. If an activated carbon cartridge is part of the prefiltration system it must be removed during the disinfection procedure.
4. Reinstall the filter housing and open up the prefilter isolation valves.
5. Flush 2 reactor chamber volumes of water through the UV system then stop and let the solution remain in the UV system for 30 minutes.
6. After 30 minutes, flow enough water through the system to flush all of the residual chlorine from the system. During this time **DO NOT** exceed the rated flow rate of the UV system. If applicable install a new activated carbon cartridge into the prefilter housing at this time.

Troubleshooting

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Bacteria in outlet water	Low or no UV transmittance into the water	Replace lamp
		Clean or replace quartz sleeve
		Replace prefilter
		Confirm the pretreatment is adequate
		Confirm the feed water meets the feed water requirements within this manual
	Biofilm in outlet plumbing	Plumbing needs to be sterilized
	System not on	Confirm continuous power supply
	Low power to lamp	Replace controller
Low UV intensity	Lamp over 1 year old	Replace lamp
	Fouled quartz sleeve	Clean or replace quartz sleeve
	Fouled prefilter	Replace prefilter
	High turbidity in feed water	Confirm the pretreatment is adequate
		Confirm the feed water meets the feed water requirements within this manual
	Low power to lamp	Replace controller
White or milky colored water	Air in water from new prefilter or quartz sleeve replacement	Flow water through the system until water runs clear
Lamp out alarm ON	Filaments broken in lamp	Replace lamp
	Lamp power wire not fully connected to lamp	Ensure proper connection
Low pressure after system	Clogged prefilter	Replace prefilter
Quartz sleeve nut leaks	Quartz sleeve nut loose	Tighten quartz sleeve nut
	O-ring is defective	Replace o-ring

NOTICE

All problem conditions called out within this troubleshooting chart require the disinfection procedure to be conducted after the corrective action has been completed.

Limited Warranty

Watts Regulator Co. (the "Company") warrants its SmartStream™ ultraviolet disinfection product to be free from defects in material and workmanship under normal usage for the following periods beginning on the date of original shipment:

- Stainless steel reactor chamber – 10 years
- Flow Switch – 3 years
- Electronics and ballast – 5 years prorated
- UV lamp, quartz sleeve, UV sensor and all other components - 1 year

In the event of such defects within the applicable warranty period, the Company will, at its option, repair or replace the product without charge. Defective components are subject to inspection by the Company before any warranty remedy is provided. The Company will cover the cost of shipping any repaired or replaced product to you in the event the original product was found by the Company to be defective. The Company reserves the right to make changes or substitutions in defective parts or components with material of equal quality or value.

A return authorization number, issued by the Company, is required before returning any product to the Company for warranty claim evaluation. You must provide the product model number, serial number, and invoice number when making a warranty claim within the applicable warranty period. The original serial number and model number labeling must be intact on any product at the time any warranty claim is made in order for it to be eligible for a warranty remedy. You are responsible for the cost of shipping any defective product to the Company for inspection. Damage caused by improper handling while the product is in transit is not covered by this limited warranty. This limited warranty is provided by the Company to the original purchaser and is non-transferable.

Conditions

The SmartStream™ product must be installed in applications with water quality adhering to the Feed Water Quality Guidelines set forth in the Company's most recently published installation and operation manual or other published product specification sheet. The product must be installed and operated in compliance with the Company's published installation and operation manual, product specification sheet, and local plumbing codes. This product must be installed in connection with an approved water supply. This product must be operated at water pressures and temperatures that do not exceed the Company's published specifications. This product is limited to use within atmospheric environments indoors that are within ambient temperature limitations, free from external water contact, where relative humidity is below 95% non-condensing, and that are noncorrosive to the product's materials of construction, including its electronic components.

The use of any unauthorized or inappropriate replacement parts will void this limited warranty.

THE WARRANTY SET FORTH HEREIN IS GIVEN EXPRESSLY AND IS THE ONLY WARRANTY GIVEN BY THE COMPANY WITH RESPECT TO THE PRODUCT. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED. THE COMPANY HEREBY SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The remedy described above in this Limited Warranty shall constitute the sole and exclusive remedy for breach of warranty, and the Company shall not be responsible for any incidental, special or consequential damages, including without limitation, lost profits or the cost of repairing or replacing other property which is damaged if this product does not work properly, other costs resulting from labor charges, delays, vandalism, negligence, fouling caused by foreign material, damage from adverse water conditions, chemical, or any other circumstances over which the Company has no control. This warranty shall be invalidated by any abuse, misuse, misapplication, improper installation or improper maintenance or alteration of the product.

Some States do not allow limitations on how long an implied warranty lasts, and some States do not allow the exclusion or limitation of incidental or consequential damages. Therefore the above limitations may not apply to you. This Limited Warranty gives you specific legal rights, and you may have other rights that vary from State to State. You should consult applicable state laws to determine your rights. SO FAR AS IS CONSISTENT WITH APPLICABLE STATE LAW, ANY IMPLIED WARRANTIES THAT MAY NOT BE DISCLAIMED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL SHIPMENT.

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