






High Output Ultraviolet Sterilization System
Installation Instructions & Owner's Manual



UVA-418HO / UVA-630HO / UVA-946HO

WARNING!

	<p>Read and understand product manual completely before use, installation or service. Failure to follow all guidelines could cause personal injury or property damage.</p>
	<p>UV Radiation is harmful to eyes and skin. DO NOT look at UV lamp when turned on without safety goggles.</p>
	<p>Disconnect power before servicing.</p>
	<p>Disconnect water flow and unplug the disinfection system before performing cleaning or maintenance activities.</p>
	<p>DO NOT use with water that is microbiologically unsafe or of unknown quality without proper disinfection before or after the equipment.</p>

NOTE: Failure to comply with these instructions will void equipment warranty and the installer will be responsible for service, damages and repairs.

SECTION 1.	SAFETY INSTRUCTIONS	
-	1.1 Potential Hazards	4
-	1.2 Safety Precautions	4
-	1.3 Water Chemistry	5
SECTION 2.	IDENTIFYING SYSTEM COMPONENTS	
-	2.1 System Components	6
SECTION 3.	INSTALLATION INSTRUCTIONS	
-	3.1 UV High Output System Installation	7
-	3.2 Disinfection Procedure	10
SECTION 4.	MAINTENANCE	
-	4.1 Replacing the Germicidal UV Lamp.....	11
-	4.2 Cleaning and Replacing Quartz Sleeve	12
SECTION 5.	OPERATION	
-	5.1 Lamp Life Remaining (Days).....	13
-	5.2 Lamp Alarm Silencing (7 Days)	13
-	5.3 Resetting Lamp Life	13
-	5.4 Total Days of Operation	13
-	5.5 Lamp Failure	13
SECTION 6.	TROUBLESHOOTING	
-	6.1 Troubleshooting Guides	14
SECTION 7.	SPECIFICATIONS	
-	7.1 Manufacturer's Dose Flow Chart	15
-	7.1 UV System Specifications	15
SECTION 8.	WARRANTY / TERMS AND CONDITIONS	
-	8.1 Manufacturer's Warranty	16
-	8.2 General Conditions and Limitations	16

1.1 POTENTIAL HAZARDS

Read all labels, tags and warnings 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 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 a risk of electrical shock and/or electrocution exists.



This symbol indicates there is Mercury present.



Eject Hazard. This symbol indicates the marked equipment may contain a component that can eject forcibly. Obey all procedures to safely depressurize.



This symbol indicates the system is under pressure.



This symbol indicates there is a potential UV hazard. Proper protection must be worn.



This symbol indicates there is a potential for VERY hot water when flow is started



This symbol indicates not to store any combustible or flammable material close to the system.



This symbol indicates the marked item could be hot and should not be touched without care.



This symbol indicates that the contents of the transport package are fragile and the package should be handled with care.



This symbol indicates safety glasses with side protection is required for protection against UV exposure.



This symbol indicates gloves must be worn.



This symbol indicates safety boots must be worn.



This symbol indicates the operator must read all available documentation to perform required procedures.



This symbol indicates the plumber must use copper piping.



This symbol indicates that the system should only be connected to a properly grounded, grounding-type ballast controller receptacle that is protected by a Ground Fault Circuit Interrupter (GFCI).

Please read this entire manual before operating this equipment. Personal injury or damage to the system could occur if safety precautions and potential hazards are not observed.

Pay attention to all danger, warning, and caution statements listed in this manual. Failure to do so could result in serious personal injury or damage to the equipment. Be sure that the protection provided by the system is not impaired. DO NOT use or install this equipment in any manner other than that specified in the installation manual.

1.2 SAFETY PRECAUTIONS

Failure to follow these instructions will result in serious injury or death.

DANGER



Electric Shock: 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.



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



DO NOT use this disinfection 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.



DO NOT install this disinfection system where it will be exposed to the weather or to temperatures below freezing



DO NOT store this disinfection system where it will be exposed to the weather.



DO NOT store this disinfection 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.



GROUNDING: 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.



GROUND FAULT CIRCUIT INTERRUPTER PROTECTION: 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 ballast 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.

Warning: This product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

WARNING



During extended periods of no water flow, the water in your chamber may become very hot (Approx. 140 °F, 60 °C) and can potentially lead to scalding. It is recommended to run your water until very hot water has been purged from the systems 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 10 minutes after connecting and applying power (including after power interruptions). This will avoid passing under-treated water that may, in rare instances, pose health hazards.



The system contains a Germicidal 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 small doses, cause harm to the eyes and skin.



Changes or modifications made to this system without the consent of the manufacturer may render the system unsafe for operation and will void the manufacturer's warranty.

CAUTION

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



Carefully examine the disinfection system after installation. It SHOULD NOT be plugged in if there is water on parts not intended to be wet such as, the ballast 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, 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 lamp inside the disinfection system is rated at an effective life of approximately 365 days or 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 people who 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 plug and 3-pole cord connectors that accept the plug from this system. Use only extension cords that are intended for outdoor use. Use only 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. An extension cord from the receptacle before disconnecting this system from the extension cord. Never yank cord to pull plug from outlet. Always ground the plug into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.



1.3 WATER CHEMISTRY (WATER QUALITY)

Water quality plays an extremely important role in the transmission of germicidal ultraviolet rays. It is recommended that the water does not exceed the following maximum concentration levels.

MAXIMUM CONCENTRATION 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%)

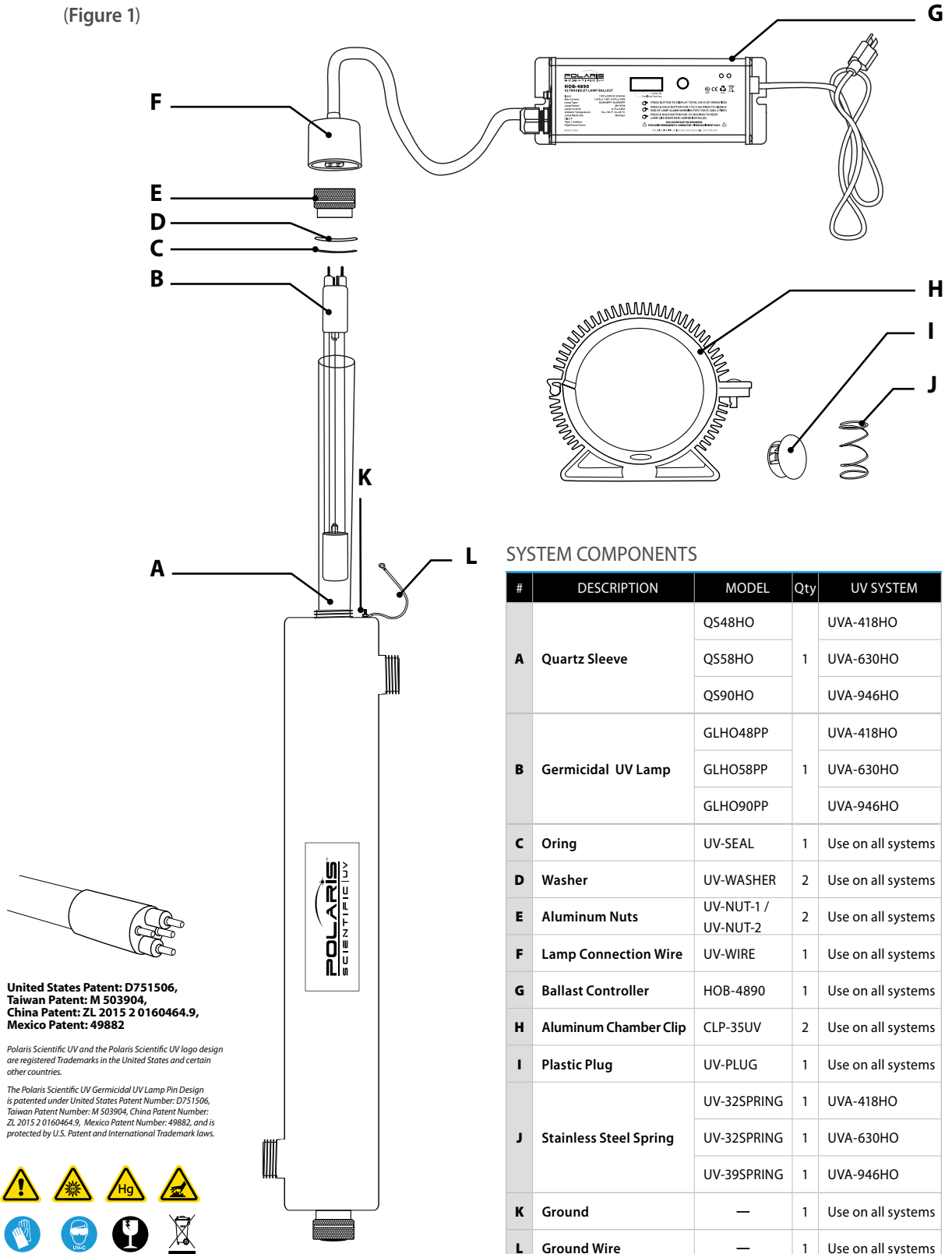
Effectively treating water with higher concentration levels than listed above can be accomplished, but may require added measures to improve water quality to treatable levels.

UV DOSE

The units generate a UV dosage of at least 30,000 microwatt-seconds per square centimeter ($\mu\text{W-s/cm}^2$), even at the end-of-lamp life (EOL), which is more than sufficient to destroy most waterborne microorganisms, such as bacteria, yeasts, algae, etc.

** 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 disinfection 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 disinfection system to operate as intended.*

(Figure 1)



United States Patent: D751506,
Taiwan Patent: M 503904,
China Patent: ZL 2015 2 0160464.9,
Mexico Patent: 49882

Polaris Scientific UV and the Polaris Scientific UV logo design are registered Trademarks in the United States and certain other countries.

The Polaris Scientific UV Germicidal UV Lamp Pin Design is patented under United States Patent Number: D751506, Taiwan Patent Number: M 503904, China Patent Number: ZL 2015 2 0160464.9, Mexico Patent Number: 49882, and is protected by U.S. Patent and International Trademark laws.



SYSTEM COMPONENTS

#	DESCRIPTION	MODEL	Qty	UV SYSTEM
A	Quartz Sleeve	QS48HO	1	UVA-418HO
		QS58HO		UVA-630HO
		QS90HO		UVA-946HO
B	Germicidal UV Lamp	GLHO48PP	1	UVA-418HO
		GLHO58PP		UVA-630HO
		GLHO90PP		UVA-946HO
C	Oring	UV-SEAL	1	Use on all systems
D	Washer	UV-WASHER	2	Use on all systems
E	Aluminum Nuts	UV-NUT-1 / UV-NUT-2	2	Use on all systems
F	Lamp Connection Wire	UV-WIRE	1	Use on all systems
G	Ballast Controller	HOB-4890	1	Use on all systems
H	Aluminum Chamber Clip	CLP-35UV	2	Use on all systems
I	Plastic Plug	UV-PLUG	1	Use on all systems
J	Stainless Steel Spring	UV-32SPRING	1	UVA-418HO
		UV-32SPRING	1	UVA-630HO
		UV-39SPRING	1	UVA-946HO
K	Ground	—	1	Use on all systems
L	Ground Wire	—	1	Use on all systems

CAUTION



The electronic ballast controller **MUST** be connected to a Ground Fault Protected Circuit (GFCI) receptacle.



3.1 UV HIGH OUTPUT SYSTEM INSTALLATION

The disinfection system is designed to be mounted either horizontally or vertically at the point-of-entry or point-of-use.

When installing the system in a horizontal position, the outlet port must be pointing upwards to ensure air is completely purged from the systems chamber. (Refer to Figure 2).

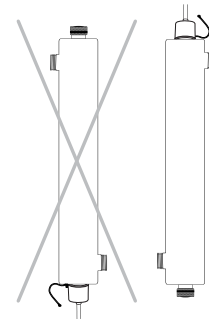
NOTE: The ideal installation type is vertical with the lamp connector and outlet on top. This helps prevent water damage on the lamp pins, lamp connector and prevents water from reaching an electrical zone.

- The ballast controller should be mounted above or beside the chamber. Always mount the ballast controller horizontally to help prevent moisture from running down cord and causing a potential fire hazard. Drip loops on all cords connected to ballast controller are highly recommended. (Refer to Figure 6).
- The complete water system, including any pressure or hot water tanks, MUST be sterilized before start-up. This can be done 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 disinfection system where it may be exposed to the weather.
- Install the disinfection system on cold water line ONLY, before any branched lines.
- A 5 micron sediment filter must be installed before the disinfection system. The UV system should be the last treatment the water receives before it reaches the faucet.

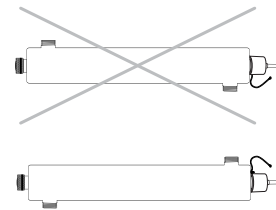
PROPER SYSTEM INSTALLATION

(Figure 2)

VERTICAL INSTALLATION:



HORIZONTAL INSTALLATION:



PROCEDURE:

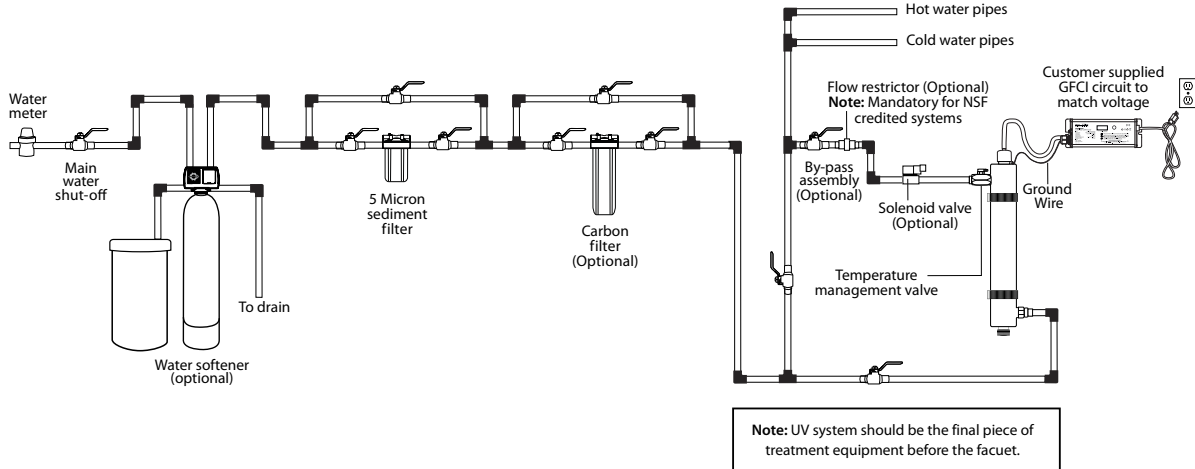
1. **Figure 3 (Next Page)** : Shows the installation of a typical ultraviolet disinfection system and related components that may be used for the installation. The use of a by-pass assembly is recommended in case the system requires "off-line" maintenance.

Please note, the system will require a supplementary disinfection for the distribution system if any water is used during by- pass condition.

NOTE: During by-pass, the water will NOT be disinfected and a "DO NOT CONSUME THE WATER" tag should be physically installed on the by-pass assembly until the system has been sanitized and returned to service. For more information, refer to Section 3.2. If the water is necessary to be consumed while the system is off-line, water must be boiled for 20 minutes prior to consumption.

UV DISINFECTION SYSTEM
TYPICAL INSTALLATION

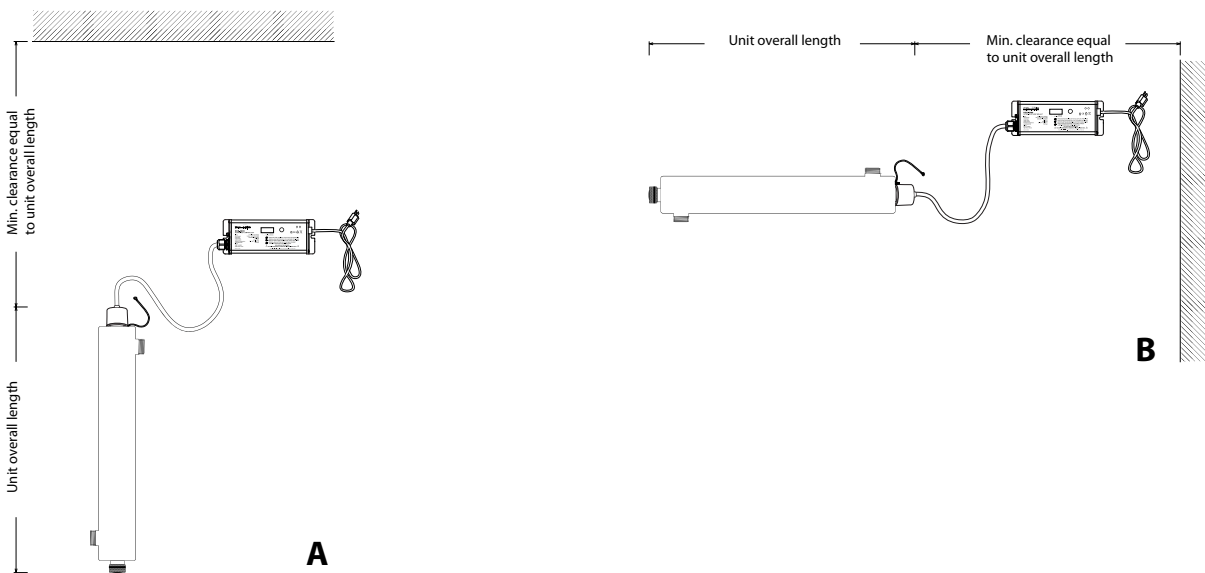
(Figure 3)



2. Select a suitable location for the disinfection system and its related components. Since it is recommended to install a GFCI, make sure that suitable location is taken into consideration prior to installation.

SUGGESTED VERTICAL
AND HORIZONTAL INSTALLATION

(Figure 4)



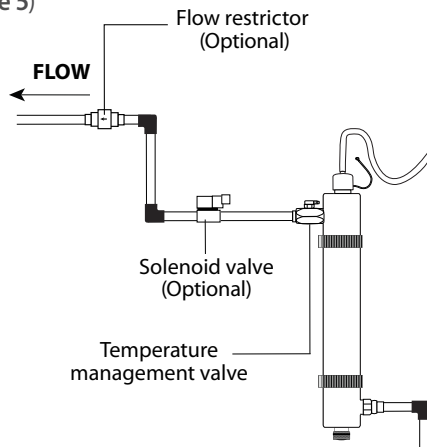
The UV system can be installed vertically (inlet port at the bottom) as shown in **Figure 4 A**, or horizontally as shown in **Figure 4 B**.

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 a space equal to the size of the chamber is appropriate).

3. Mount the system to the wall using the supplied clamps. Various connection methods can be used to connect the water source to the UV system, but Union Type connectors are recommended. The installation of a flow restrictor device will help to maintain the manufacturers rated flow. The flow restrictor should be installed on the outlet port and is designed to be installed in one direction only. Please ensure that the flow of the water matches the flow direction as indicated on the flow restrictor. Refer to **Figure 5**.

FLOW RESTRICTOR INSTALLATION

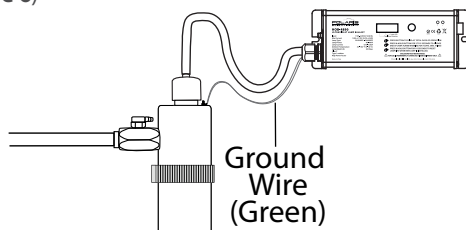
(Figure 5)



4. GROUNDING

To properly ground the system, attach the green wire coming from the power source (ballast) to the grounding lug on the UV chamber. Remove the nut and slide the eyelet connector onto the screw. Fasten the nut to the screw with a wrench.

(Figure 6)



- Connect the green ground wire to the chamber using the grounding screw.

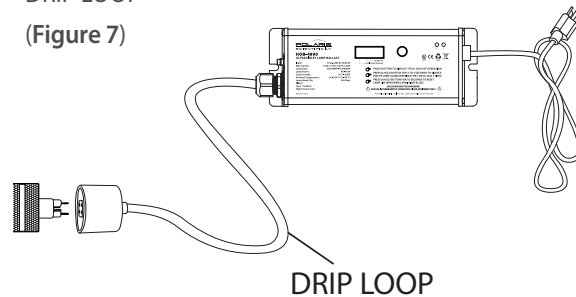
NOTE: Flow Restrictor installation is optional but mandatory when required to meet NSF certification.

NOTE: DO NOT solder connections while attached to the system, this could damage the O-ring seals.

5. Mount the ballast controller horizontally to the wall above the chamber and away from any water connection point, to prevent any water from potentially leaking onto the ballast controller by means of a leak at a connection point or because of a "sweating" system. Make sure you allow for a "drip-loop" as shown in **Figure 7** on the lamp, sensor, and power cord, this will aid to prevent any water from potentially entering the ballast controller.

DRIP LOOP

(Figure 7)



6. Install the POLARIS High Output UV lamp. Refer to Section 4.1.

7. When all plumbing connections have been completed, 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 (GFCI outlet) and check ballast controller to ensure the system is operating properly. The ballast controller will illuminate without any alarms.

CAUTION: DO NOT look directly at a powered up, 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 chamber will become warm, this is because 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.

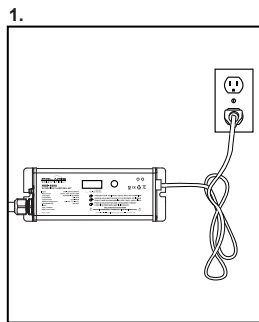
3.2 UV DISINFECTION

Ultraviolet (UV) disinfection is a physical disinfection process which does not add any potentially harmful chemicals to the water. As UV does not provide a disinfection residual, it is imperative that the entire distribution system located after the UV be chemically disinfected to ensure that the plumbing system is free from any bacteriological contaminants.

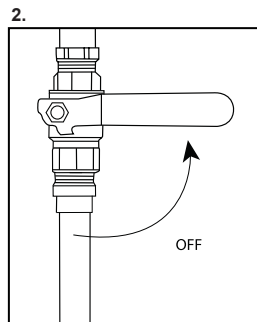
The disinfection process must be performed immediately after the UV unit is installed and repeated thereafter whenever the UV is shut down for service, without power, or inoperative for any reason.

The procedure for sanitizing the plumbing system is readily accomplished as follows:

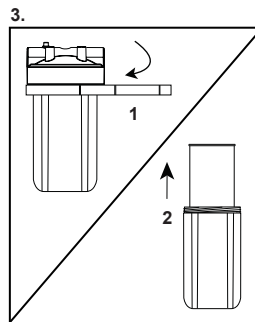
UV DISINFECTION PROCESS



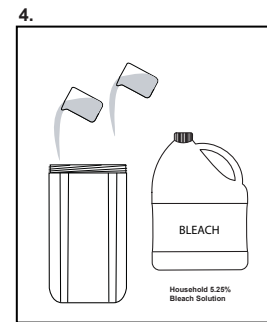
1. - Ensure the ballast controller is plugged in for entire disinfection process.



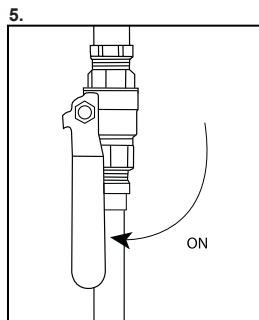
2. - Shut off the water supply.
- Close each faucet.



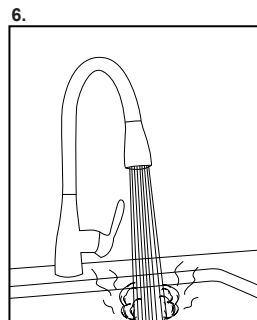
3. - Remove filter cartridge(s).



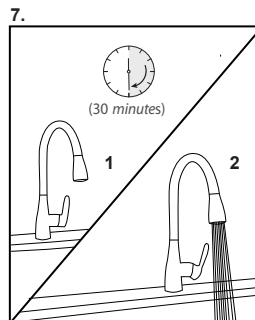
4. - Pour 2 cups of household 5.25% bleach solution into the filter housing(s).
NOTE: DO NOT use Hydrogen Peroxide.



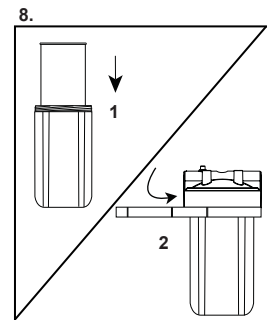
5. - Re-install the housings.
- Turn on the cold water supply.
- Open each faucet and all water openings until you smell the bleach and then close the faucets.



6. - Turn on the hot water supply.
- Open each faucet and all water openings until you smell the bleach and then close the faucets.



7. - DO NOT use water for 30 minutes.
- Flush the system until no chlorine smell is detectable and reinstall the filters.





8. - Reinstall filter cartridge(s).

NOTES:


- The addition of chlorine (bleach) to a hot water tank that has in the past been fed with untreated raw water with high levels of other contaminants (iron, manganese, hydrogen sulphide, organics, etc.) will result in oxidation of these contaminants and may require repeated flushing of the hot water tank. This contingency must be dealt with independently under the start-up procedure for any other conditioners that may form a part of the pre-treatment for the UV unit.

- The above disinfection procedure will result in a massive chlorine residual far in excess of the 0.5 to 1.0 mg/L typically present in municipally chlorinated water and of a magnitude consistent with the minimum 50 mg/L chlorine solution recommended for the disinfection of distribution systems known to be contaminated. DO NOT consume water until complete system has been flushed.

WARNING!

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

NOTICE

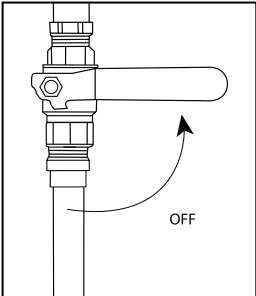
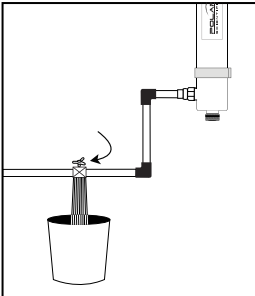
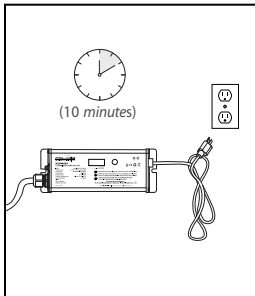
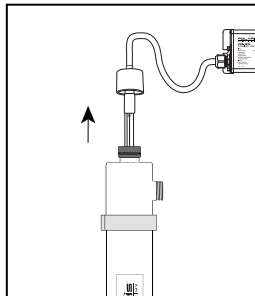
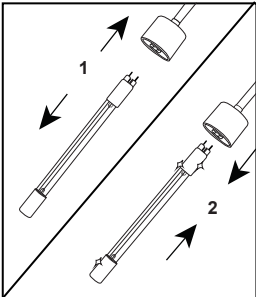
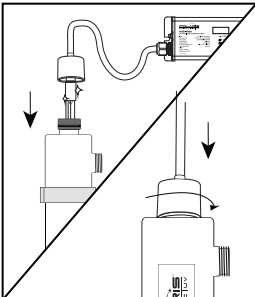
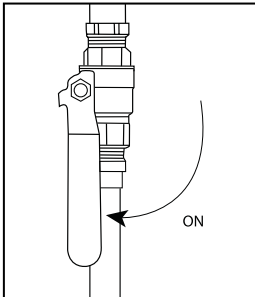
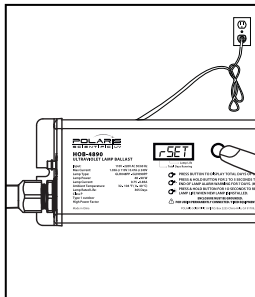
	Reset lamp life timer after lamp replacement. Refer to Section 5.3.
	Refer to www.lamprecycle.org for lamp disposal.
	DO NOT use water during replacement of UV lamp.

4.1 REPLACING THE UV LAMP

UV lamp replacement is a quick and simple procedure that requires no special tools. The UV lamp must be replaced after 365 Days (9000 hrs) of continuous operation in order to ensure adequate disinfection.



LAMP REPLACEMENT PROCESS

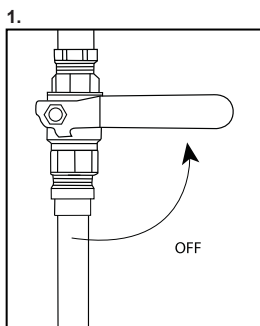
<p>1.</p>  <p>- Shut off the water line to the chamber.</p>	<p>2.</p>  <p>- Release system pressure before servicing.</p>	<p>3.</p>  <p>- Disconnect main power source and allow the unit to cool for 10 minutes.</p>	<p>4.</p>  <p>- Remove the lamp connector by pulling the hermetical sealing rubber cup.</p>
<p>5.</p>  <p>- Remove the lamp in upward direction from the chamber and lamp connector base. - Attach the connector to the new lamp.</p>	<p>6.</p>  <p>- Insert the new lamp fully into the chamber. - Push and twist the ballast cup against nut to secure the connection.</p>	<p>7.</p>  <p>- Re-pressurize the system to check for leaks.</p>	<p>8.</p>  <p>- Hold down the button until you see r-SET, and press the button for 10 seconds until you hear an audible tone and LED display will read once again 0365.</p>

NOTICE

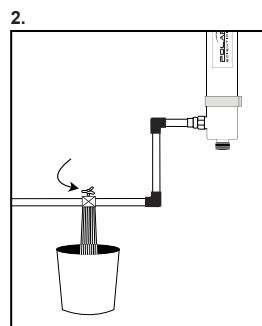
▶ Minerals in the water slowly form a coating on the quartz sleeve. This coating must be removed because it reduces the amount of UV light reaching the water, thereby reducing disinfection performance. If the quartz sleeve cannot be cleaned, it must be replaced.

4.2 CLEANING AND REPLACING THE QUARTZ SLEEVE

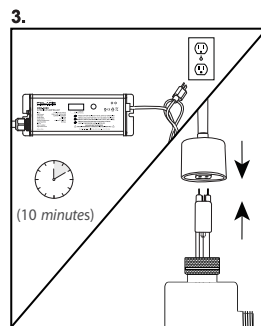
THE CLEANING AND REPLACING THE QUARTZ SLEEVE PROCESS



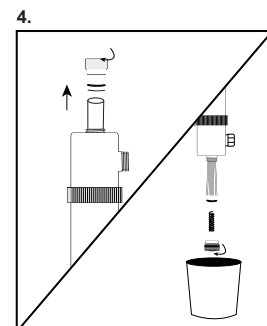
- Shut off water supply and drain all lines.



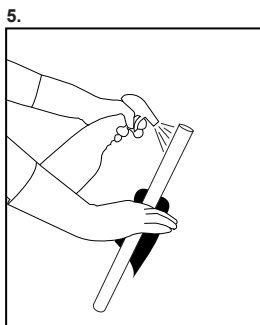
- Drain the chamber by using the drain port.



- Remove the UV lamp. Refer to Section 4.1. (Steps 1 -5.1)

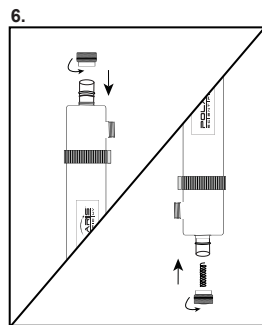


- Remove the top retaining nut.
- Carefully, remove washer and O-ring adhering to the quartz sleeve.
- Remove the quartz sleeve.
- Remove the bottom retaining nut, floating spring, and O-ring.



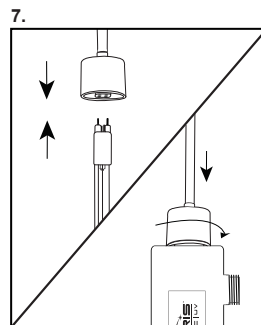
- Clean the quartz sleeve with a cloth soaked in CLR, vinegar or some other mild acid and then rinse with water.

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

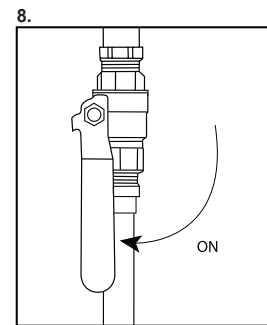


- Reinstall the quartz sleeve in the chamber allowing the sleeve to protrude an equal distance at both ends of the chamber.
- Slide supplied O-ring and washer onto the top quartz sleeve twist on the retaining nut.
- Insert the washer and spring at the bottom end of the quartz sleeve. Insert spring into the plug that is on the other retaining nut and twist on.

Note: Tight by hand only. DO NOT over tight.



- Reinstall the UV lamp.
- Plug back in the ballast and verify the POWER-ON LED display is illuminated and ballast controller power-up sequence operates.



- Turn on water supply, to re-pressurize the system and check for leaks.

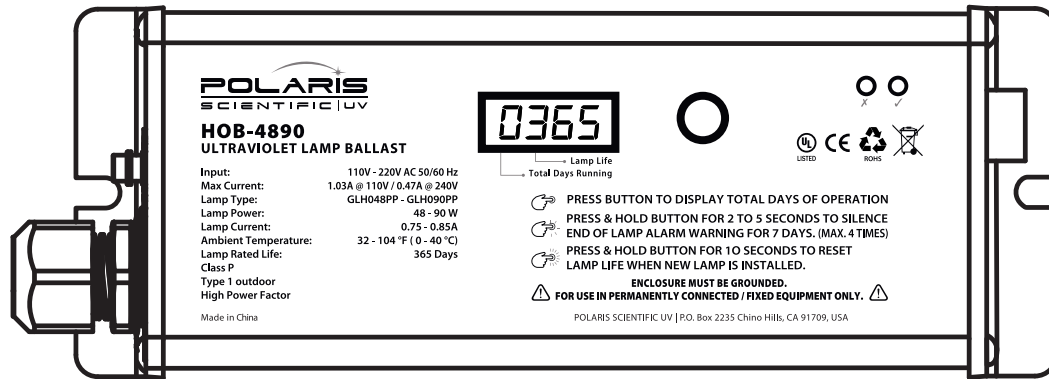
NOTE:

- After replacing the UV lamp or quartz sleeve perform the disinfection procedure, refer to Section 3.2.

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 LAMP LIFE REMAINING (DAYS)

- The default screen will display the total lamp life remaining (in days). The ballast controller will count down the number of days remaining until the lamp requires changing from 365 days to 1 day (0365 to 0001).

- At "0" days, the ballast will display 00 and sound an intermittent audible buzzer (1 second on, 5 seconds off), indicating the need to change the lamp.

5.2 LAMP ALARM SILENCING (7 DAYS)

- Once the 00 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 button for 5 seconds. Each time the timer reset button is pressed the ballast controller alarm is deferred 7 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 ballast controller timer.

5.3 RESETTING LAMP LIFE

- Hold down the button until you see r-SET and press the button for 10 seconds until you hear an audible tone and LED display will read once again 0365.

5.4 TOTAL DAYS OF OPERATION

The ballast controller also displays the total running time of the ballast. To obtain this reading, press the button once (less than 2 seconds). The total running time of the ballast controller will numerically displayed in days. This information will remain displayed for 10 seconds and will then revert back to the lamp life remaining default screen.

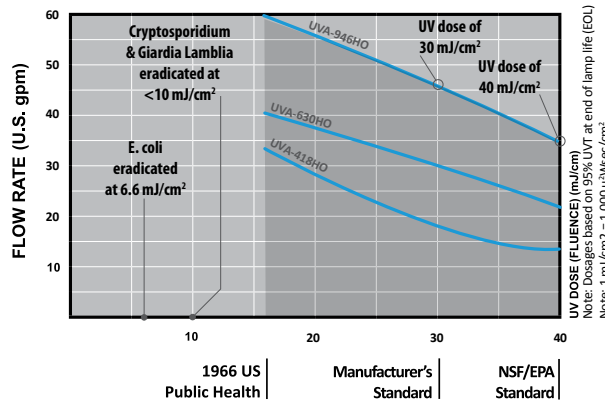
5.5 LAMP FAILURE

- The system will sound an intermittent audible buzzer (1 second on, 1 second off) and the red indicator lights intermittently. The system will remain in this state, until this condition is remedied.

TROUBLESHOOTING

SYMPTOMS	POSSIBLE CAUSES	SOLUTIONS
PRESSURE DROP	Sediment pre-filter is clogged	Replace filter cartridge with a new 5 micron cartridge. <i>Note: Check source water supply as fluctuations may occur in source pressure.</i>
	Flow regulator (if installed)	Flow regulator will result in pressure drop when approaching full flow.
HIGH BACTERIA COUNT	Quartz sleeve is stained or dirty	Clean sleeve with scale cleaner and eliminate source of staining problem (soften hard water if necessary), refer to Section 4.2.
	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 essential and imperative that the effluent water stream be shocked with chlorine (bleach) before water leaves UV system disinfection system must have a bacterial free distribution system to work effectively. Refer to Section 3.2
	Possible break-through of sediment through pre-filter	Have source water tested for turbidity - may need Step filtration (20 micron filter followed by a 5 micron filter followed by UV system) in order to catch all sediment entering water 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 and/or abrasions, clean O-ring, moisten with water, lubricant and re-install, replace if necessary.
	Condensation on chamber caused by excessive humidity and cold water	Check location of disinfection system and control humidity.
	Inadequate inlet/outlet port connections	Check thread connections, reseal with Teflon® tape and re-tighten.
SYSTEM SHUTTING DOWN INTERMITTENTLY	Interrupted ballast controller	Ensure system has been installed on its own circuit, as other equipment may be drawing power away from UV . (i.e. pump or fridge).
		UV system should not be installed on a circuit which is incorporated into a light switch.
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
DISPLAY FAULT MODE	LED display reads "A3" 	Lamp life expired - countdown is at "0" days. Refer to Section 5.2.
		Press reset button for a deferred alarm, replace UV lamp.

7.1 MANUFACTURER’S DOSE FLOW CHART



7.2 HIGH OUTPUT ULTRAVIOLET STERILIZATION SYSTEM SPECIFICATIONS

MODEL		UVA-418HO	UVA-630HO	UVA-946HO
FLOW RATE	Flow Rate @ 95% UVT U.S. Public Health (16 MJ/CM2)	34 gpm (130 lpm)	40 gpm (150 lpm)	60 gpm (230 lpm)
	Flow Rate @ 95% UVT POLARIS STANDARD (30 MJ/CM²)	18 gpm (70 lpm)	30 gpm (113 lpm)	46 gpm (175 lpm)
	Flow Rate @ 95% UVT NSF/EPA (40 MJ/CM2)	14 gpm (54 lpm)	22 gpm (83 lpm)	35 gpm (130 lpm)
PRODUCT SPECS	Chamber Material of Construction	Stainless Steel 304	Stainless Steel 304	Stainless Steel 304
	Chamber Dimensions	23.23" x 3.5" (59*8.89 cm)	27.87" x 3.5" (70.78*8.89 cm)	36.81" x 3.5" (93.49*8.89 cm)
	HOB-4890 / Ballast Dimensions	8" x 2.9" x 2.04" (20.4*7.4*5.2 cm)	8" x 2.9" x 2.04" (20.4*7.4*5.2 cm)	8" x 2.9" x 2.04" (20.4*7.4*5.2 cm)
	Inlet/Outlet Port Size	3/4" FNPT / 1" MNPT	3/4" FNPT / 1" MNPT	1.5" MNPT
	Shipping Weight	13.2 lbs (6 kgs)	15.4 lbs (7 kgs)	17.6 lbs (8 kgs)
ELECTRICAL OUTPUT	Voltage at 50/60Hz	110V / 220V	110V / 220V	110V / 220V
	Maximum Current	1.03 A @ 110V / 0.47A @240V	1.03 A @ 110V / 0.47A @240V	1.03 A @ 110V / 0.47A @240V
	Power Consumption	60 W	78 W	110 W
	Lamp Watts	48 W	58 W	90 W
	Wavelength	254 nm	254 nm	254 nm
OPERATIONAL SPECS	Rated Life	365 days (9,000 hrs)	365 days (9,000 hrs)	365 days (9,000 hrs)
	Maximum Operating Pressure	125 PSI	125 PSI	125 PSI
	Minimum Operating Pressure	15 PSI	15 PSI	15 PSI
	Working Temperature	36° - 104°F (2°-48° C)	36° - 104°F (2°-48° C)	36° - 104°F (2°-48° C)
FEATURES	High Output Lamp	Polaris UV Scientific™ - Patented	Polaris UV Scientific™ - Patented	Polaris UV Scientific™ - Patented
	Number of Lamps	1	1	1
	Counter / Timer	✓	✓	✓
	Visual Warning - "Power-On" LED	✓	✓	✓
	Audible Lamp Failure Alarm	✓	✓	✓
	Lamp Replacement Alarm	✓	✓	✓
REPLACEMENT PARTS	Germicidal UV Lamp	GLHO48PP	GLHO58PP	GLHO90PP
	Electronic Ballast Controller	HOB-4890	HOB-4890	HOB-4890
	Quartz Sleeve	QS48HO	QS58HO	QS90HO
	Aluminum Nuts	UV-NUT-1 / UV-NUT-2	UV-NUT-1 / UV-NUT-2	UV-NUT-1 / UV-NUT-2
	Plastic Plug for Nuts	UV-PLUG	UV-PLUG	UV-PLUG
	Stainless Steel Spring	UV-32 SPRING	UV-32 SPRING	UV-39 SPRING
	Seal for Sleeve and Nut	UV-SEAL	UV-SEAL	UV-SEAL
	Washer for Sleeve and Nut	UV-WASHER	UV-WASHER	UV-WASHER
Aluminum Chamber Clip	CLP-35UV	CLP-35UV	CLP-35UV	

8.1 MANUFACTURER'S WARRANTY

5-YEAR LIMITED WARRANTY

For POLARIS Ultraviolet UV Chamber
POLARIS Ultraviolet warrants the UV chamber on the POLARIS Ultraviolet product to be free from defects in material and workmanship for a period of five (5) years from the date of purchase. During this time, we will repair or replace, at its option, any defective POLARIS Ultraviolet chamber. Please return the defective part to the POLARIS Ultraviolet dealer you purchased your system from, who will return it to POLARIS Ultraviolet. We will either make the necessary repairs or, if it is determined that a replacement is required, we will provide a replacement part. We will then return the part to the dealer. This warranty does not include shipping and handling charges which will be collected from you by the dealer. Parts repaired or replaced under this five (5) year warranty will be covered under warranty to the end of the original five (5) year warranty period. This warranty is also subject to the conditions and limitations outlined under the heading "General Conditions and Limitations" below.

ONE-YEAR LIMITED PRO-RATED WARRANTY

For Structural, Hardware and Electrical Components
POLARIS Ultraviolet warrants the structural, hardware, and electrical components to be free from defects in material and workmanship for a period of one (1) year pro-rated from the date of purchase. During this time, we will repair or replace, at its option, any defective parts covered by the warranty. Defective part(s) should be returned to a POLARIS Ultraviolet dealer, who will return it to POLARIS Ultraviolet. We will either make the necessary repairs or, if it is determined that a replacement is required, we will provide a replacement part. We will then return the part to the dealer. This warranty does not include shipping and handling charges which will be collected from you by the dealer. Parts repaired or replaced under this one (1) year pro-rated warranty will be covered under warranty to the end of the original one (1) year pro-rated warranty period. This warranty is also subject to the conditions and limitations outlined under the heading "General Conditions and Limitations" below.

One-Year Limited Warranty for Lamps, Sleeves and UV Sensors
POLARIS Ultraviolet warrants original lamps, sleeves and UV sensors to be free from defects in material and workmanship for a period of one (1) year from the date of purchase. During this time, we will repair or replace, at its option, any defective parts covered by the warranty. The warranty period for lamps and sleeves may be verified using date codes in addition to purchase receipts and POLARIS Ultraviolet's database of serial number sales date. We will advise you whether the defective item needs to be returned to the POLARIS Ultraviolet dealer you purchased the equipment from for failure analysis. Replacement lamps and sleeves provided under warranty will be sent to your POLARIS Ultraviolet dealer. If the UV sensor experiences a problem which POLARIS Ultraviolet confirms is covered by warranty, please return the sensor to a POLARIS Ultraviolet dealer you purchased the equipment from who will return it to us. We will either repair or replace the sensor and return the sensor to your dealer. This warranty on lamps, sleeves and sensors does not include shipping and handling charges which will be collected from you by the dealer. Parts replaced under this one (1) year warranty will be covered under warranty to the end of the original one (1) year warranty period. This warranty is also subject to the conditions and limitations outlined under the heading "General Conditions and Limitations" below.

General Conditions and Limitations

None of the above warranties cover damage caused by improper use or maintenance, accidents, acts of God or minor scratches or imperfections that do not materially impair the operation of the product. The warranties also do not cover products that are not installed as outlined in the applicable Owner's Manual. POLARIS Ultraviolet System warranty will be deemed null and void if any of the product labels are removed, including the pressure sensitive hologram serial number. The limited warranties described above are the only warranties applicable to the POLARIS Ultraviolet products listed in the "Specific Warranty Coverage" section. These limited warranties outline the exclusive remedy for all claims whether based on contract, tort (including negligence), strict liability or otherwise. Disclaimer of warranties. Except as expressly warranted in writing by POLARIS Ultraviolet, the goods sold by POLARIS Ultraviolet are purchased by the buyer "as is." POLARIS Ultraviolet does not warrant that the goods are of merchantable quality or that they can be used for any particular purpose. Except as expressly warranted in writing by POLARIS Ultraviolet, POLARIS Ultraviolet makes no representation or warranty of any kind with respect to the products.

Limitation of liability. In no event shall POLARIS Ultraviolet be liable to the purchaser or any other entity for more than the invoice price received by POLARIS Ultraviolet for any non-conforming products. POLARIS Ultraviolet shall not be liable to the purchaser or any other entity for personal injury, property damage, or any direct, indirect, special, incidental, consequential, punitive, exemplary, or other damages of any kind, including without limitation the cost of procurement of substitute goods, the loss of profits, products, or production, or the interruption of business, however caused and on any theory of liability, and whether or not POLARIS Ultraviolet has been advised of the possibility of such damages. The essential purpose of this provision is to limit the liability of POLARIS Ultraviolet arising out of the sale of products to the purchaser whether for breach of contract, negligence, or otherwise. These limitations shall apply notwithstanding any failure of essential purpose of any limited remedy and notwithstanding the provisions of any other agreement between POLARIS Ultraviolet and the purchaser.

8.2 GENERAL CONDITIONS AND LIMITATIONS

The products described in this document are hereby offered for sale to be established by Hydrofit Quick Connect Fittings, Polaris Scientific Ultraviolet, Hydron Membranes, Aquatrol, Shok Blok, HydroGuard, Hydronix Water Technology, any of its subsidiaries and its authorized distributors. This offer and its acceptance by any customer (the "Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in this document, when communicated to Hydrofit Quick Connect Fittings, Polaris Scientific Ultraviolet, Hydron Membranes, Aquatrol, Shok Blok, HydroGuard, Hydronix Water Technology, its subsidiaries or an authorized distributor (the "Seller") verbally or in writing, shall constitute acceptance of this offer. Provided, however, that these terms and conditions shall not operate as a rejection of the Buyer's offer unless such offer contains variances in the description, quantity, price, or delivery schedule of the items.

1. Terms and Conditions of Sale.

All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of the Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein (the "Agreement"). The Buyer's acceptance of any offer to sell is limited to the terms and conditions in the Agreement. Any terms or conditions in addition to or inconsistent with those stated in the Agreement, proposed by the Buyer in any acceptance of an offer by the Seller, are hereby rejected. No such additional, different or inconsistent terms and conditions shall become part of the agreement between the Buyer and the Seller unless expressly accepted in writing by the Seller. The Seller's acceptance of any offer to purchase by the Buyer is expressly conditioned upon the Buyer's assent to all the terms and conditions in this Agreement, irrespective of any terms in addition to, or inconsistent with those contained in the Buyer's offer. Acceptance of the Seller's products shall in all events constitute such assent.

2. Documents.

Unless provided otherwise in the Agreement, all catalog descriptions, illustrations, drawings and literature or independently submitted estimates of performance, weights and measurements or other specifications provided by the Seller are mere approximations and the Seller reserves the right to alter or amend them at any time. The Seller reserves the right to correct clerical or technical errors in the contract documents. The Buyer shall furnish with his order all necessary specifications and information. The Seller takes no responsibility for goods manufactured, priced or delivered not in accordance with the order or the specifications unless the Buyer's order and specifications are clear and correct.

3. Prices.

Unless otherwise provided, all prices contained in our quotations and written acceptances are ex-works and do not include the cost of packing. All orders are accepted on the condition that all such prices are subject to revision by the Seller at any time before the goods are dispatched to take account of any price change. In the event that the Buyer does not place the entire order quoted by the Seller for the Buyer, the Seller reserves the right to revise its prices. The Seller also reserves the right to revise its prices if the Buyer modifies the specification or quantity of the goods or the delivery requirements after the order has been accepted by the Seller.

4. Advice.

All advice given in connection with the Seller's goods is provided without charge to the Buyer. ANY ADVICE AND ASSISTANCE GIVEN BY THE SELLER TO THE BUYER IS GIVEN AT THE BUYER'S RISK, AND THE SELLER SHALL NOT BE LIABLE FOR ANY LOSS, DAMAGE OR CLAIM ARISING THEREFROM.

5. Payment.

(a) Unless otherwise provided in the Agreement, or explicitly agreed upon in writing by the Seller, payment is due in full 30 days from date of shipment of the items purchased herein under. (b) In the case of an installment contract, deliveries or parts, payment for each installment delivery or part shall be made under sub-clause (a) as if the same constituted a separate agreement. (c) Amounts not timely paid shall bear interest at the rate of 2-1/2% above the Seller's bank's prime rate from time to time in force. (d) In the event that the Buyer fails within one calendar month of the date for payment to effect any payment which may be due under the Agreement or any agreement with the Seller, or if the Buyer commits any breach of the Agreement, or if the Buyer becomes insolvent or commits any act of bankruptcy or contemplation of liquidation, the Seller will be entitled, without prejudice to the Seller's other rights, to terminate the Agreement or any unfulfilled part thereof, or at the Seller's option to make partial deliveries.

6. Modifications and Cancellations.

This Agreement is not subject to oral modification or cancellation. A Buyer's request for modification or cancellation will not be incorporated into the Agreement unless the request is accepted by the Seller in a writing that amends the Agreement. Acceptance of any such requested modification or cancellation shall be at the Seller's discretion and shall be upon such terms and conditions as the Seller may require.

7. Handling Charge.

Goods supplied in accordance with the Buyer's order may later be returned to the Seller at the Seller's discretion provided the return is pre-authorized in writing, and the merchandise is unused, in original packages, unaltered, clean and no older than 60 days from the date of shipment by the Seller. The Buyer will be required to pay to the Seller a handling charge of 25% of the purchase price of the returned goods. A copy of the original invoice for the merchandise must accompany all returns.

8. Delivery.

(a) Any delivery dates quoted are approximate only and the Seller shall have no liability for any delays in delivery. (b) Unless provided otherwise, delivery of the goods shall be made when the Seller has notified the Buyer that the goods are ready for dispatch. Regardless of the method of delivery, delivery shall be made F.O.B. Seller's plant, where the risk of loss shall thereupon pass to the Buyer upon the Seller's delivery to a carrier. Notwithstanding that the Seller's prices are ex-works, the Seller is prepared by special contract to procure carriage or freight and insurance on behalf of the Buyer and at Buyer's cost in which event the Seller shall be under no liability for damage in transit or loss or damage to the goods beyond the point at which the Seller contracts to deliver the same. (c) The Seller will not make drop shipments.

9. Inspection and Rejection.

(a) The following provisions shall apply in relation to all deliveries of goods: the Seller shall not be held liable for any claims of damage in transit, shortage of delivery or loss of goods, unless in the case of shortage of delivery, a separate notice in writing is given to the carrier concerned and to the Seller within three (3) days of the receipt of the goods, followed by a complete claim in writing within five (5) days of receipt of the goods and in the case of loss of goods, a separate notice in writing is given to the carrier concerned and to the Seller and a complete claim in writing made within thirty (30) days of the date of consignment. The Buyer must inspect the goods on arrival from the carrier; however, where goods are accepted from the carrier concerned without being inspected, the delivery book of the carrier concerned must be signed "not examined". The Seller shall have the right to inspect the goods at the Buyer's premises in respect to any such claims made by the Buyer and the Buyer shall retain such goods until the Seller has inspected such goods or until the Seller has notified the Buyer that the Seller does not wish to inspect such goods. Any breach of these conditions in this provision shall serve as a waiver to any claim brought by the buyer. (b) Without prejudice to the Seller's other rights, should the Buyer fail for any reason to send the Seller forwarding instructions within ninety (90) days after the date of the Seller's notification that the goods are ready for dispatch or to accept delivery of the goods, the Seller shall be entitled at the Buyer's risk and expense to store the goods and/or to procure or effect storage of the goods elsewhere. Goods so stored shall be paid for as if they had been dispatched and/or accepted.

10. Special Tooling.

Where it is necessary for the Seller to manufacture or to purchase special tooling, including without limitation tools, dies, jigs, mandrills, fixtures, molds, and patterns, in order to execute a contract, the Buyer will be charged with all or a proportion of the cost of such special tools. Such special tooling shall be and remain the Seller's property notwithstanding payment of any charges made by the Buyer. In no event will the Buyer acquire any interest in apparatus belonging to the Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adopted for such manufacture and notwithstanding any charges paid by the Buyer therefore. Unless otherwise agreed, the Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

11. Test and Performance.

(a) The Seller's goods are, where practicable, submitted to the Seller's standard test before delivery. If special tests are required, these shall be made at the Seller's premises unless otherwise agreed, and will be subject to an extra charge. (b) The Seller accepts no liability for failure to attain any performance figures quoted by the Seller unless the Seller specifically has guaranteed them with an agreed sum as liquidation damages and the Buyer has suffered actual loss by reason of the failure to attain the figures quoted. (c) Any particulars of weights and measurements, power and consumption, power output or performance relating to the goods and like matters furnished by the Seller to the Buyer in the Seller's catalogs, literature or otherwise, are approximate and are intended only to present a general idea of the goods to be supplied and unless previously agreed specifically in writing shall not form part of the Agreement.

12. Buyer's Property.

Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished to the Seller by the Buyer, or any other items which become the Buyer's property, may be considered obsolete and may be destroyed by the Seller after two (2) consecutive years have elapsed without the Buyer placing an order for the items which are manufactured using such property. The Seller shall not be responsible for any loss or damage to such property while it is in the Seller's possession or control.

13. Taxes.

Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by the Seller, or if the Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the item sold. The Buyer agrees to pay all such taxes or to reimburse the Seller therefore upon receipt of its invoice. If the Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, the Buyer shall promptly indemnify and hold the Seller harmless from and against any such tax, as well as any interest or penalties thereon which may be assessed if the items are held to be taxable.

14. Warranty.

EXCEPT AS EXPRESSLY WARRANTED IN WRITING BY THE SELLER, THE GOODS SOLD BY THE SELLER ARE PURCHASED BY THE BUYER "AS IS." THE SELLER DOES NOT WARRANT THAT THE GOODS ARE OF MERCHANTABILITY QUALITY OR THAT THEY CAN BE USED FOR ANY PARTICULAR PURPOSE. EXCEPT AS EXPRESSLY WARRANTED IN WRITING BY THE SELLER, THE SELLER MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND WITH RESPECT TO THE PRODUCTS.

(a) The Seller warrants that the items sold hereunder shall be free from defects in material or workmanship at the time of shipment by the Seller. The Seller warrants that if within 12 months of delivery of the goods to the Buyer the Buyer returns immediately to the Seller's premises any of the said goods which the Buyer believes to be defective, carrier paid, properly packed and clearly marked with the Buyer's full name and address and any other information such as serial numbers which may be necessary to enable the goods to be identified, together with a complete description of the alleged defect, they will be repaired or new goods will be supplied in exchange and the goods so repaired or such new goods will be delivered to the Buyer free of charge at the Seller's premises; provided, however, that the foregoing warranty shall be applicable only if upon demand by the Seller, the Buyer proves to the Seller's satisfaction: (i) that the defect was due solely to defective workmanship; (ii) that no alterations or repairs have been made to the goods except with the Seller's written consent; (iii) that the defect was not caused by any act of the Buyer or its agents; and (iv) that the defect was not caused by any matter beyond the reasonable control of the Seller, including, without limitation, accident or normal wear and tear. (b) THIS WARRANTY DOES NOT APPLY UNLESS THE SELLER'S PRODUCTS ARE: (I) USED IN DOMESTIC PLUMBING APPLICATIONS; (II) INSTALLED BY A LICENSED CONTRACTOR, PLUMBER OR QUALIFIED EQUIPMENT INSTALLATION PROFESSIONAL; AND (III) INSTALLED AND OPERATED IN ACCORDANCE WITH PUBLISHED HYDROFIT / HYDRONIX WATER TECHNOLOGY SPECIFICATIONS. (c) All costs and expenses, including freight charges, customs duties, and insurance incurred in returning the goods to the Seller's premises in accordance with this provision shall be paid by the Buyer. The benefit of this warranty shall not be assignable by the Buyer. (d) THIS WARRANTY DOES NOT EXTEND TO ANY GOODS NOT MANUFACTURED BY THE SELLER EVEN THOUGH SUPPLIED BY THE SELLER NOR DOES IT EXTEND TO ANY SECOND-HAND OR RECONDITIONED GOODS NOR DOES IT EXTEND TO COMPONENTS MANUFACTURED BY THE SELLER BUT INSTALLED, ATTACHED OR WELDED BY THE BUYER OR HIS CUSTOMER ON EQUIPMENT NOT MANUFACTURED BY THE SELLER. GOODS NOT MANUFACTURED BY THE SELLER CARRY ONLY THE WARRANTY (IF ANY) OF THEIR MAKERS AND THE BUYER IS ENTITLED TO THE BENEFIT THEREOF ONLY SO FAR AS THE SELLER HAS THE POWER TO TRANSFER IT. (e) THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER; THE SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESSED OR IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING, ARE HEREBY DISCLAIMED. (f) NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY TO THE BUYER'S DESIGNS OR SPECIFICATIONS.

15. Limited Remedy.

THE SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS AGREEMENT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD. IN NO EVENT SHALL THE SELLER BE LIABLE TO THE BUYER OR ANY THIRD PARTY FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ANY ITEMS SOLD, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY. IN NO EVENT SHALL THE SELLER BE LIABLE TO THE BUYER OR ANY OTHER ENTITY FOR MORE

THAN THE INVOICE PRICE RECEIVED BY THE SELLER FOR ANY NON-CONFORMING PRODUCTS. THE SELLER SHALL NOT BE LIABLE TO THE BUYER OR ANY OTHER ENTITY FOR PERSONAL INJURY, PROPERTY DAMAGE, OR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE, EXEMPLARY, SPECIAL, OR OTHER DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION THE COST OF PROCUREMENT OF SUBSTITUTE GOODS, THE LOSS OF PROFITS, PRODUCTS, OR PRODUCTION, OR THE INTERRUPTION OF BUSINESS, HOWEVER CAUSED. THE SELLER SHALL NOT BE LIABLE TO THE BUYER OR ANY OTHER ENTITY ON ANY THEORY OF LIABILITY INCLUDING WITHOUT LIMITATION BREACH OF CONTRACT OR EXPRESS OR IMPLIED WARRANTY, TORT, NEGLIGENCE, FAILURE TO WARN, OR STRICT LIABILITY, AND WHETHER OR NOT THE SELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE ESSENTIAL PURPOSE OF THIS PROVISION IS TO LIMIT THE LIABILITY OF THE SELLER ARISING OUT OF THE SALE OF PRODUCTS TO THE BUYER WHETHER FOR BREACH OF CONTRACT, NEGLIGENCE, OR ANY OTHER THEORY OF LIABILITY. THESE LIMITATIONS SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY AND NOTWITHSTANDING THE PROVISIONS OF ANY OTHER AGREEMENT BETWEEN THE SELLER AND THE BUYER.

16. Indemnity for Infringement of Intellectual Property Rights.

(a) The Buyer shall defend and indemnify the Seller against all actions, claims, demands, penalties and costs by third parties in tort, or for infringement, or alleged infringement, of patents, trademarks, copyrights, trade dress, trade secret or other rights of any third party resulting from the goods manufactured in accordance with the Buyer's specifications or based on any information provided by the Buyer. The Buyer will defend any action against the Seller for title, patent, trademark, copyright infringement, or other claimed by a third party at the Buyer's sole cost and expense. (b) The Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this provision. The Seller will defend and indemnify the Buyer against allegations of infringement of patents, trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). The Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against the Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. The Seller's obligation to defend and indemnify the Buyer is contingent on the Buyer notifying the Seller within 10 days after sole control over the defense of any allegations or actions, including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, the Seller may, at its sole expense and option, procure for the Buyer the right to continue using said item, replace or modify said item so as to make it non-infringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, the Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in combination or use in a system of any item sold hereunder. The foregoing in this provision shall constitute the Seller's sole and exclusive liability and the Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

17. Lien.

In addition to any right of lien to which the Seller may by law be entitled, the Seller shall have a general lien on all goods of the Buyer in the Seller's possession (although such goods or some of them may have been paid for) the unpaid price of any other goods sold and delivered to the Buyer by the Seller under the same or other contracts.

18. Waiver.

The Seller's rights shall not be affected or restricted by any indulgence or forbearance granted to the Buyer. No waiver by the Seller of any breach shall operate as a waiver of any later breach.

19. Force Majeure.

The Seller shall be excused from performing any of its obligations under this Agreement which are prevented or delayed by any occurrence not within the reasonable control of the Seller, including but not limited to, accidents, acts of God, destruction or damage to the goods or the Seller's manufacturing plant, delays or failures in delivery of carriers or suppliers, shortages of materials, strikes or other labor matters, floods, earthquakes, fire, riots, explosions, or any regulations, rules, ordinances or orders of any governmental authority, federal, state or local, whether such cause exists at the date of the order or not.

20. Buyer's Representation of Solvency.

The Buyer hereby represents that as of the signing of this Agreement it was not insolvent within the meaning of the Uniform Commercial Code or any Bankruptcy Laws.

21. Assignment and Delegation.

The rights and obligations of the parties under this Agreement may not be assigned or delegated, except on the express written consent of the other party to the assignment or delegation.

22. Integration.

The rights and obligations of the parties and the terms and conditions set forth herein, together with any amendments, modifications and any different terms and conditions expressly accepted by the Seller in writing, shall constitute a complete and exclusive statement of the terms of this Agreement. This Agreement supersedes not only all prior agreements, but also oral agreements made contemporaneously with the execution of this Agreement. All such materials may not be used to supplement, explain, or contradict the terms of this Agreement.

23. Severability.

If any of these conditions or any part thereof purports to exclude or restrict or limit any liability and such exclusion or restriction or limitation is prohibited or rendered void or unenforceable by any legislation to which it is subject, or is itself prohibited or rendered void or unenforceable by any legislation to which it is subject, then the exclusion, restriction or limitation on the condition or part thereof in question shall be so prohibited or rendered void or unenforceable and the validity or enforceability of any other part of these provisions shall not thereby be affected.

24. Governing Law/Limitation on Actions.

The terms, conditions, rights, and obligations under this Agreement shall be construed under the laws of the State of California, without regard to principles of conflicts of laws. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by the Buyer more than two (2) years after such cause of action accrues.



P.O. Box 2235 Chino Hills, CA 91709 • USA