



UV Pure Technologies Inc.
ULTRAVIOLET WATER DISINFECTION SYSTEM

INSTRUCTION MANUAL

MODEL:
SERIAL #:
Installation Date:



Hallett 500PN & 750PN are
NSF/ANSI 55 CLASS A
CERTIFIED by NSF



NSF/ANSI 61 Section 8 for
material safety only and NSF/ANSI
372. Not certified by WQA for
contaminant reductions or
structural integrity.



LR1382

INSTRUCTION MANUAL

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NOTICE

THANK YOU

By purchasing a UV system with Crossfire Technology, you can now be certain that your application is receiving world-class treatment.

UV Pure units are designed to outperform conventional systems by delivering highly effective UV dosage rates for the inactivation of pathogens, including:

- viruses
- bacteria
- cryptosporidium
- giardia
- legionella
- E. coli
- Total coliforms

UV Pure products conform to the applicable provisions of the Code of Federal Regulations (CFR) requirements including, Title 21, Chapter 1, Subchapter J, Radiological Health.

1. ABOUT THE HALLETT

The Hallett system, manufactured by UV Pure Technologies, is the world's only ultraviolet water disinfection device with patented Crossfire Technology.

Patented in US 6,707,048, Canada 2,463,503, Australia
2,002,333,084, Mexico 248805
Patent Pending in Japan, UK, Europe, & Eurasia

UV Pure's UV systems employ revolutionary Crossfire Technology that is self-cleaning, self-monitoring, and fail-safe. The Hallett system with Crossfire Technology is designed to eliminate the potential risks associated with conventional single lamp UV systems.

Committed to exceeding UV disinfection standards, UV Pure has turned conventional technology inside-out by flowing the water inside the quartz sleeve and including two lamps mounted in air, dual or quad smart sensors, software-designed reflectors and an optional fail-safe solenoid valve.

Crossfire Technology is complete UV disinfection: Crossfire Technology incorporates *two* proprietary high-output UV lamps, with software-designed reflectors, that target pathogens with radiation from 360°, to deactivate pathogens and provide microbiologically safe drinking water or in the case of waste or reuse water, reduces pathogen counts below required discharge limits. Amalgam UV lamp technology has been introduced into the largest units to not only provide higher UV output, but also increased stability over a wider range of operating temperatures. In addition, the amalgam lamps can be cycled more often than conventional low pressure high output (LPHO) UV lamps – See Product Specifications Tables.

Crossfire Technology is capable of treating low UVT water: The Ultraviolet Transmittance (UVT) of water impacts the amount of treatment since UV light is absorbed rather than being available for disinfection. With a shorter path length for the UV light to travel, Crossfire Technology outperforms conventional UV systems and can treat potable applications as low as 50% UVT and also reuse and waste water in low UVT applications.

Crossfire Technology is engineered to be risk-free and fail-safe: Crossfire Technology uses dual or quad smart UV sensors mounted in air, which are designed to not foul and are more reliable indicators of system performance than ordinary systems. The lamps are fan-cooled and maintain consistent levels of UV output for maximum pathogen deactivation. Computerized alarms and an optional auto shutoff fail-safe valve are designed so that only treated water will pass through the unit.

Crossfire Technology is self-cleaning: Crossfire Technology uses a stainless steel wiper to clean the inside of the quartz sleeve eliminating fouling and the need for a water softener making abrasive quartz sleeve cleaning a thing of the past – saving money and the environment. The wiper is automated to cycle for 5 minutes every 4 hours. The cycle begins 5

minutes after power is applied. Self-cleaning not available on the NC models.

Crossfire Technology is virtually maintenance-free: Crossfire technology utilizes two lamps mounted in air, outside the quartz sleeve so maintaining a UV Pure unit is as easy as changing a light bulb with no system draining required. The UV lamps require replacement after 12 or 16 months of operation depending on the lamp type and notification of lamp replacement is given via a warning one month in advance.

Crossfire Technology is easy to install: The units are provided with either 1" or 2" male NPT connections. Optional stainless steel flexible hoses with Female Iron Pipe (FIP) connections are available for purchase for quick and simple installation.

The Hallett has a smart display: The operator interface is a colour touchscreen designed to allow unprecedented access to information such as lamp lifetime, real-time message history and UV dose display. A real-time clock is now available for improved troubleshooting and fault resolution.

The Hallett has a built-in purge valve: The purge valve eliminates the need to shut down the unit in the event of no water flow for hours, or even days (as long as a pressurized water supply is present). It is designed to prevent buildup of metals and minerals on internal components. The purge valve also eliminates nuisance alarms from changing water transmittance conditions. The purge valve is not available on some models.

The Hallett has remote status indication: The units come standard with warning and run contacts to remotely signal a control panel. In addition, the units can be started & stopped via external device.

The Hallett has a built-in surge protection: The power distribution circuit board contains filters and surge protection devices to increase the reliability of the on-board electronics and ballasts for the UV lamp.

The Hallett offers new interfaces: The Hallett units are available with a pair of 4-20mA outputs for UV Intensity, Net UV Transmittance, or UV Dose through an optional add-on device. Modbus, a smart electronic communication protocol, will also be available when the 4-20mA option is purchased.

The Hallett offers data logging: The Hallett units are available with an optional USB drive to continuously record performance on a daily basis.

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2. IMPORTANT SAFETY INSTRUCTIONS

When operating the Hallett unit, basic precautions should always be followed, including the following:

1. Read the entire instruction manual before installing or operating the system.
2. Pay attention to all warning and caution statements, and also safety symbols throughout these instructions. Failure to do so may result in personal injury and/or damage to equipment.
3. To reduce the risk of injury, close supervision is necessary when the UV unit is used near children or infirm persons.
4. Do not contact moving parts.
5. Only use attachments or spare parts recommended or sold by UV Pure.
6. The unit is intended only for indoor use in a dry location.
7. Do not unplug the unit by pulling on cord. To unplug, grasp the plug, not the cord.
8. Unplug the unit from the outlet when not in use and before any servicing or cleaning.
9. The UV chamber contains an interlock to disable the UV lamps if the event the chamber is accessed when the power is on. Do not defeat its purpose or attempt to service without opening the panel completely.
10. Do not operate the unit with a damaged cord or plug, or after a significant malfunction or is dropped or damaged in any manner. Return the unit to the nearest authorized service facility for examination, repair, or electrical or mechanical adjustment.
11. Connect the unit only to a circuit that is protected by a ground-fault circuit-interrupter (GFCI). See Grounding Instructions.
12. If an extension cord is necessary, the cord should contain a ground and be rated for the same amperage as the unit or combined units.
13. Do not plug in the unit if water is present on the unit or if any nearby piping connections are leaking.
14. Service to the unit does not require the removal of the aluminum endplates and they must remain assembled.
15. In the event of an alarm or shut down of the UV unit and water continues to flow either accidentally or for emergency purposes, or if the UV system is bypassed, it is recommended that any water used for drinking be boiled.
16. Do not operate the unit dry.
17. SAVE THESE INSTRUCTIONS and the purchase receipt for the unit.

GROUNDING INSTRUCTIONS

This UV unit must be grounded. In the event of a malfunction or breakdown, grounding will reduce the risk of electric shock by providing a path of least resistance for electric current. This unit is equipped with a cord having an appliance-grounding conductor and a grounding plug. The plug must be plugged into an appropriate outlet that is installed and grounded in accordance with all local codes and ordinances. The piping connected to the

UV unit must also be properly grounded. Install a grounding lug or strap as required.

WARNING - Improper connection of the equipment-grounding conductor can result in a risk of electric shock. Check with a qualified electrician or service representative if you are in doubt whether the unit is properly grounded. Do not modify the plug provided with this unit; if it will not fit the outlet, have a proper outlet installed by a qualified technician.

WARNING: If connection is made to a potable water system, the system shall be protected against backflow.

GROUND-FAULT CIRCUIT-INTERRUPTER

To comply with National Electrical Code, NFPA 70, the circuit where the UV unit(s) is connected must be protected by a ground-fault circuit-interrupter (GFCI). UV Pure recommends the use of Hubbell GFCIs.

Safety Symbols



WARNING: Potential Shock Hazard

Shutdown and unplug the unit before servicing.



DANGER: Ultraviolet Radiation

Disconnect power before replacing lamps. The lamps in the unit emit ultraviolet (UV) light that can cause permanent damage to the skin & eyes. **Never look at the lamp when it is operating.** Do not plug the unit in unless it is properly installed and all the panels are closed and secured. Do not open a panel or perform any service unless the unit has been unplugged. Never look into the unit or place any exposed skin into the illuminated areas when it is operating. Do not operate a unit that has been damaged or missing any components or safety devices. If a part is missing from your unit, contact your dealer.



CAUTION: Safety Alert

Pay attention to warning or caution statements in the instructions.



CAUTION: UV Lamps Contain Mercury

The UV lamps are fragile and must be handled with care. If lamp breakage occurs, avoid inhalation or ingestion of debris and avoid exposure to skin and eyes. Do not use a vacuum cleaner or broom for cleanup. Follow local guidelines and regulations to remove and dispose of old UV lamps or mercury debris.



CAUTION: Wear appropriate safety equipment

Wear safety glasses when performing maintenance on the unit.



For non-potable applications, do not handle wetted parts with bare hands - use latex or vinyl gloves or equivalent.



CAUTION: Quartz sleeves are fragile

The quartz sleeve can break or chip if mishandled. Always handle it with care and keep it in a safe place if it is removed from the unit. Do not strike the quartz sleeve with any tool, since even the smallest chip can cause it to break under pressure.

3. PRODUCT SPECIFICATIONS

Specifications & Features common to all units

Operating Pressure ¹	5-100 psig (34-690 kPa)
Water Temperature Range ²	34-104° F (1-40° C) ⁵
Air Temperature Range ²	34-104° F (1-40° C)
Maximum Relative Humidity ³	70%
Voltage Input	120 Vac 50/60Hz
Manifold materials	316 Stainless Steel
External Contact	2 available - Standard
Remote Start/Stop	Standard
Data Logging to USB Drive	Optional on all units
Automatic Solenoid Shutoff Valve	Optional on all units
Wetted Parts ⁴	Meets NSF/ANSI 61 & NSF/ANSI 372

¹ Purging requires pressure to work properly. The optional shutoff valve requires min. 10psig to operate.

² An optional UV lamp heating kit is available for LPHO lamp systems to allow continuous operation in low water and air temperatures.

³ For continuous flow potable applications, it is recommended to dehumidify the room where the UV unit is located.

⁴ The Hallett 400NC does not meet NSF/ANSI 61 or 372

⁵ Certified by WQA to 73° F or 23° C

Flow restrictors are devices that limit the water flow through the UV unit despite the demand or the amount of supply pressure. A flow restrictor is mandatory for an NSF/ANSI 55 Class A system but optional for other units.



Warning: Removal of this device may allow the water flow to exceed the validated performance of the system which therefore may not provide the necessary UV dose to inactivate all pathogens.

Potable Water

Hallett Models	Hallett 1000P	Hallett 750PN	Hallett 750P	Hallett 500PN	Hallett 500P
Max. Flow Rate ¹	100 gpm 378 L/min 22.7 m ³ /hr	27.4 gpm 104 L/min 6.2 m ³ /hr	30 gpm 114 L/min 6.8 m ³ /hr	16.5 gpm 62 L/min 3.8 m ³ /hr	20 gpm 75.7 L/min 4.5 m ³ /hr
Performance Certifications ²	USEPA UVDGM 2006	NSF/ANSI 55 Class A	3 rd Party	NSF/ANSI 55 Class A	3 rd Party
Min. UVT ³	95%	80%	50-75%	75%	50-75%
Flow Restrictor	No	Yes	Optional	Yes	Optional
Pressure Drop	4.4 psig (30 kPa)	22.7 psig ⁴ (156 kPa)	7.4 psig (51 kPa)	22.7 psig ⁴ (156 kPa)	3.2 psig (22 kPa)
Lamp Type	Amalgam	LPHO	LPHO	LPHO	LPHO
Lamp Life ⁵	16 months	12 months	12 months	12 months	12 months
Cycles/day ⁶	6-12	2	2	2	2
UV Sensor	Quad	Dual	Dual	Dual	Dual
Built-in Purge Valve	Standard	Standard	Standard	Standard	Standard
Automatic Quartz Sleeve Cleaning Device	Standard	Standard	Standard	Standard	Standard
Wiper Position Switch	Standard	Standard	Standard	Standard	Standard
Lamp Heaters	No	Standard	Standard	Standard	Standard
4-20mA Output	Optional	Optional	Optional	Optional	Optional
Modbus connectivity	Optional	Optional	Optional	Optional	Optional
Power Draw	403W	222W	222W	196W	196W
Inlet & Outlet Port size	2" MNPT	1" MNPT	1" MNPT	1" MNPT	1" MNPT
Nominal Dimensions (L x W x D)	56x11x9" (142x29x 22cm)	40x10x9" (103x24x 22cm)	40x10x9" (103x24x 22cm)	36x10x9" (93x24x 22cm)	36x10x9" (93x24x 22cm)

¹ Based on UV Dose of 40mJ/cm² at alarm setpoint.

² NSF/ANSI 55 Class A certifications substantiated by NSF International only. Third party validations are pending.

³ The Hallett 1000P can operate over a wide range of UVTs with the UV dose EPA validated between 16-200mJ/cm². Consult UV Pure to correctly configure the unit. The Hallett 750P and 500P can be configured to high or low UVT applications by service technicians.

⁴ The flow restrictor adds significant pressure drop so the value presented is at 75% of maximum flow capacity.

⁵ Amalgam lamp lifetime is 12,000hrs/500 days and LPHO lifetime is 9000hrs/375 days

⁶ Exceeding the recommended daily cycles will accelerate the age of the UV lamps.

LPHO lamps perform more reliably when operated 24/7.

Reuse and Waste Water

Hallett Models	Hallett 1000X ¹	Hallett 750X ¹	Hallett 500X ¹
Default Flow Rate ²	70 gpm 265 L/min 15.9 m ³ /hr	22.8 gpm 86 L/min 5.2 m ³ /hr	15.1 gpm 57 L/min 3.4 m ³ /hr
Performance Certifications ³	NWRI / EPA	3 rd Party	3 rd Party
Min. UVT ²	77%	50%	50%
Flow Restrictor	No	Optional	Optional
Pressure Drop ⁴	2.6 psig (18 kPa)	4.4 psig (30 kPa)	1.8 psig (12 kPa)
Lamp Type	Amalgam	LPHO	LPHO
Lamp Life ⁵	16 months	12 months	12 months
Cycles/day ⁶	6-12	2	2
UV Sensor	Quad	Dual	Dual
Built-in Purge Valve	Standard	Standard	Standard
Automatic Quartz Sleeve Cleaning Device	Standard	Standard	Standard
Wiper Position Switch	Standard	Standard	Standard
Lamp Heaters	No	Optional	Optional
4-20mA Output	Optional	Optional	Optional
Modbus connectivity	Optional	Optional	Optional
Power Draw	403W	222W	196W
Inlet & Outlet Port size	2" MNPT	1" MNPT	1" MNPT
Nominal Dimensions (L x W x D)	56x11x9" (142x29x 22cm)	40x10x9" (103x24x 22cm)	36x10x9" (93x24x 22cm)

¹ The suffix X will be either R for Reuse or W for Waste water.

² The maximum flow of the unit will depend on various parameters such as UVT, TSS, BOD and level of UV dose required. The Hallett 1000X is capable of the specific flow and UVT configurations. The peak flow & min. UVT for the unit is indicated in the proposal document prepared by UV Pure.

³ The Hallett 1000X is NWRI validated between 16-200mJ/cm² for Reuse and EPA validated between 5-40mJ/cm² for Waste water. Third party validations are pending.

⁴ Values presented are without the flow restrictor. The flow restrictor adds significant pressure drop.

⁵ Amalgam lamp lifetime is 12,000hrs/500 days and LPHO lifetime is 9000hrs/375 days

⁶ Exceeding the recommended daily cycles will accelerate the age of the UV lamps. LPHO lamps perform more reliably when operated 24/7.

Unregulated Water Applications

Hallett Models ¹	Hallett 1000NC	Hallett 750NC	Hallett 500NC	Hallett 400NC ⁷
Max. Flow Rate ²	90 gpm 341 L/min 20.4 m ³ /hr	34 gpm 129 L/min 7.7 m ³ /hr	29 gpm 110 L/min 6.6 m ³ /hr	21 gpm 79 L/min 4.8 m ³ /hr
Performance Certifications ³	3 rd Party	3 rd Party	3 rd Party	3 rd Party
Flow Restrictor	No	Optional	Optional	Optional
Pressure Drop ⁴	1.9 psig (13 kPa)	6.6 psig (46 kPa)	4.6 psig (32 kPa)	2.3 psig (16 kPa)
Lamp Type	Amalgam	LPHO	LPHO	LPHO
Lamp Life ⁵	16 months	12 months	12 months	12 months
Cycles/day ⁶	6-12	2	2	2
UV Sensor	Dual	Dual	Dual	Dual
Built-in Purge Valve	Yes	No	No	No
Automatic Quartz Sleeve Cleaning Device	No	No	No	No
Wiper Position Switch	No	No	No	No
Lamp Heaters	No	No	No	No
4-20mA Output	No	No	No	No
Modbus connectivity	No	No	No	No
Power Draw	403W	222W	196W	162W
Inlet & Outlet Port size	2" MNPT	1" MNPT	1" MNPT	1" MNPT
Nominal Dimensions (L x W x D)	56x11x9" (142x29x 22cm)	40x10x9" (103x24x 22cm)	36x10x9" (93x24x 22cm)	32x10x9" (82x24x 22cm)

¹ The NC Hallett models require pretreatment for high hardness or iron levels. Review sales literature for pre-conditioning requirements.

² The max. flow is based on UV Dose of 40mJ/cm² at alarm setpoint at UVT of 85%. The max. flow and min. UVT values can be modified to suit applications.

³ Third party validations are pending.

⁴ Values presented are without the flow restrictor. The flow restrictor adds significant pressure drop.

⁵ Amalgam lamp lifetime is 12,000hrs/500 days and LPHO lifetime is 9000hrs/375 days

⁶ Exceeding the recommended daily cycles will accelerate the age of the UV lamps. LPHO lamps perform more reliably when operated 24/7.

⁷ The Hallett 400NC does not meet NSF/ANSI 61 or 372

4. INSTALLATION INSTRUCTIONS

Before Beginning Installation

Water Conditions - Pre-treatment Parameters

Note this section is designed to ensure the optimal performance of your Hallett system. Please review the following pre-treatment parameters prior to installation. If any specifications are of concern or unclear please contact your water treatment dealer or specialist. Note some of the information below is technical in nature and you may want to contact your water treatment specialist to review the parameters.

UNIT (MODEL)	Ø NPT MALE	A inches [mm]	B inches [mm]	C inches [mm]	D inches [mm]	E inches [mm]
Hallett 1000XX	2"	55.9" [1418]	47.9" [1214]	11.5" [291]	18.4" [467]	45.9" [1166]
Hallett 750XX	1"	40.4" [1026]	33.5" [851]	9.6" [244]	16.5" [420]	30.5" [774]
Hallett 500XX	1"	36.5" [926]	29.5" [750]	9.6" [244]	16.5" [420]	28.5" [724]
Hallett 400XX	1"	32.4" [822]	25.4" [646]	9.6" [244]	16.5" [420]	22.4" [570]

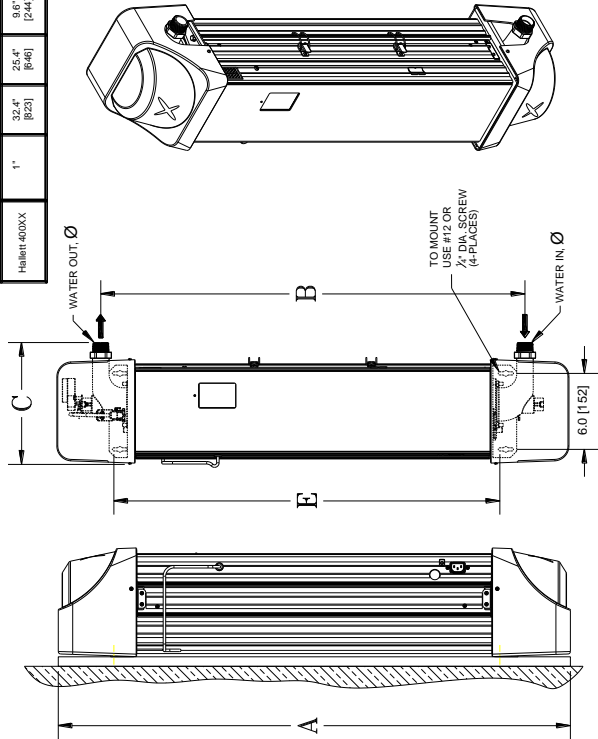
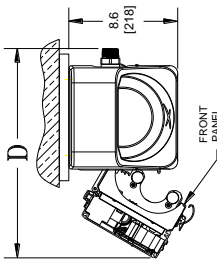


Figure 4.1



IMPORTANT - Should any of the following water parameters exceed the recommended limits; the system will not be serviceable under warranty. **DO NOT INSTALL THE UNIT** until you have confirmed the unit's capabilities matches the application – see Product Specifications Tables.

Water Parameters for Treating Potable Water:

The minimum water requirements are:

- **UV Transmittance (UVT)** – see Product Specification Tables. It is recommended for the water to be tested for UV transmittance in any applications using cisterns, surface water or ground water under the influence of surface water.
- **Total Dissolved solids (TDS)** - must be less than or equal to 1000 mg/L (mg/L=ppm)
- **Level of turbidity** - or cloudiness - of less than or equal to 1 NTU (nephelometric turbidity unit). In a point of entry application, a 5 micron sediment filter is recommended before the unit to reduce turbidity (the presence of a filter will also simplify disinfection of plumbing – see *Disinfecting the Plumbing* section). For surface waters, a dual gradient pre-filter (75x25 or 50x5) is recommended.

Water Parameters for Treating Waste & Reuse Water:

The minimum water requirements are:

- **UV Transmittance (UVT)** – The minimum UVT level is 65% or as indicated in the proposal document prepared by UV Pure.
- **Total Suspended Solids (TSS)** - The amount of suspended solids affect treatment by blocking UV light. The maximum TSS level is 20 mg/L or as indicated in the proposal document prepared by UV Pure.
- **Biological Oxygen Demand (BOD)** - The maximum BOD level is 20 mg/L or as indicated in the proposal document prepared by UV Pure.

Parts Included

- UV system complete with integral wall brackets (1)
- Ultraviolet lamps (2) – installed within the unit
- Instruction manual (1)
- Power cord (1) (located within packaging)
- 20 feet of flexible hose to connect purge valve to drain (if applicable)
- Flow Restrictor (only for NSF/ANSI 55 Class A units, optional for other units)

- Optional**
- Automatic shutoff solenoid valve
 - Stainless flexible hoses (useful for installation & maintenance)
 - Pre-treatment sediment and or carbon filter designed to remove water particles, odor or trace chemicals for improved taste.
 - Strain Relief Kit for external wiring # GD21

Other Materials Needed

The UV Pure unit requires four #12 to 1/4" diameter fasteners (not provided) to mount to a wall. Pipe insulation is recommended for any overhead piping to prevent condensation from dripping onto unit. The unit also requires a drain for the purge valve discharge line.



Warning – Use metal piping such as copper or stainless steel at the **outlet** of the UV unit since water temperatures can reach 176°F (80°C) if the UV unit operates without water flow or the ability to purge. **DO NOT USE PVC.**

These fittings, pipe insulation, and any piping compatible with the plumbing should be on hand before you begin installation. See Figure 4.2 and make a list of all necessary components including solder, paste and thread sealant. Bypass piping and valves that isolate the unit are optional, (but recommended) as is a drain valve for draining the unit.

Tools Needed

- pipe cutter, torch and other typical plumbing tools for modifying piping
- Wrench for tightening hose connections
- Phillips screwdriver
- Slotted screwdriver

Location



Warning - The unit must be positioned vertically on a solid wall (**the performance of the system will be adversely affected if mounted horizontally or is subjected to vibrations**). The installation of the unit (see Figures 4.1 through 4.4) should be done in compliance with all applicable federal, state/provincial, and local regulations. We recommend that the unit be installed by a qualified service technician. Failure to install the system properly may result in property damage (leaks/flooding) or personal injury (electrical shock) and will void warranty.

In a potable water application, the UV Pure unit should be installed downstream of (after) any pre-treatment devices such as filters, water softeners etc and also any pressure tanks. However, it must be installed **before any branches** in the piping so that **all** the water is disinfected before splitting and distributing throughout the home or facility. The unit **must be before** any chlorine injection system or this will void warranty.

Time Required

Please note that full installation of the Hallett requires shutting off the main water supply for a number of hours. If disinfection is necessary, all pipes must be treated and flushed. Once the unit is plugged in, the new UV lamps may take from a few moments to several hours to reach full power depending on the type of lamps. Having a Dose Alarm is normal with a new system (or with newly installed lamps) until the lamps have reached full power.

Summary of Installation:

- Unpack and install Hallett on a wall
- Prepare connections to inlet and outlet ports
- Install purge valve discharge line to a suitable drain line
- Install optional shutoff solenoid valve
- Install optional bypass & drain plumbing

Check for leaks
Install insulation to overhead piping
Connect system power cord from unit to GFCI

Assembling the Unit

Step 1: Unpack the unit, being careful to remove all packaging material. Inspect the unit for damage particularly the quartz sleeve – See the *Accessing UV Chamber* section. Check if UV lamps are fully inserted. Write model number, serial number, & installation date on front on the Instruction Manual.

Step 2: The UV unit has keyhole slots for convenient mounting – use all four mounts. **Do not mount the unit directly to an outside wall; mount on plywood or shims – See Figure 4.1.** Remove the top and bottom covers of the unit to make the mounting holes accessible. Mounting hole templates are provided to simplify installation.

Step 3: If the optional Stainless flexible hoses have been purchased, connect them now to both the top and bottom of the unit. Make sure that the sealing washer is inside the hose end before making the connection. Hold the stainless manifold with a wrench then tighten the hose securely.

Connecting the Pipes



Warning - Water must flow into the inlet at the bottom of the unit. The outlet is located at the top of the unit. For 1" systems, hold the stainless manifolds with a wrench when tightening mating connections. For 2" systems, the pump flange should be removed and threaded into mating connection then reconnected to UV unit. Do not damage sealing surfaces.



Caution: Always shut off the water supply and relieve the water pressure before beginning any plumbing modifications.

Step 1: See Figure 4.2 on how to arrange the piping and optional devices such as the solenoid valve, bypass line, sample ports and drain. If the pressure tank is downstream of the unit, a purge valve relocation kit is required (# GE3).

Step 2: The optional solenoid valve ensures that should the system fail, due to power loss, low UVT or low UV lamp output, the system will fail in safe mode and shut down the water flow. It is recommended install the solenoid valve just after the UV unit provided that a flood detection device exists at the site – this allows the unit to purge during alarm situations. If a flood detection device is not present, install the solenoid valve ahead of the UV unit. The direction of flow through the solenoid valve is important – verify flow direction with label on the valve. Water will not flow backwards through the valve. Keep the coil of the valve pointing upward (to prevent water from dripping on it). The valve requires minimum 69kPa (10psig) to fully open.

The optional solenoid valve is normally closed and must be powered to open. Some of the solenoid valves offered have a manual override (white lever) that

can be used to force the valve open. In any regulated sites such as municipal applications, the manual override should not be used. For normal operation, always leave valve in automatic position. In the *Advanced Settings* menu, item 2.7.3, toggle the valve to be "Installed" and a monthly reminder will appear to test valve. Please test valve monthly.

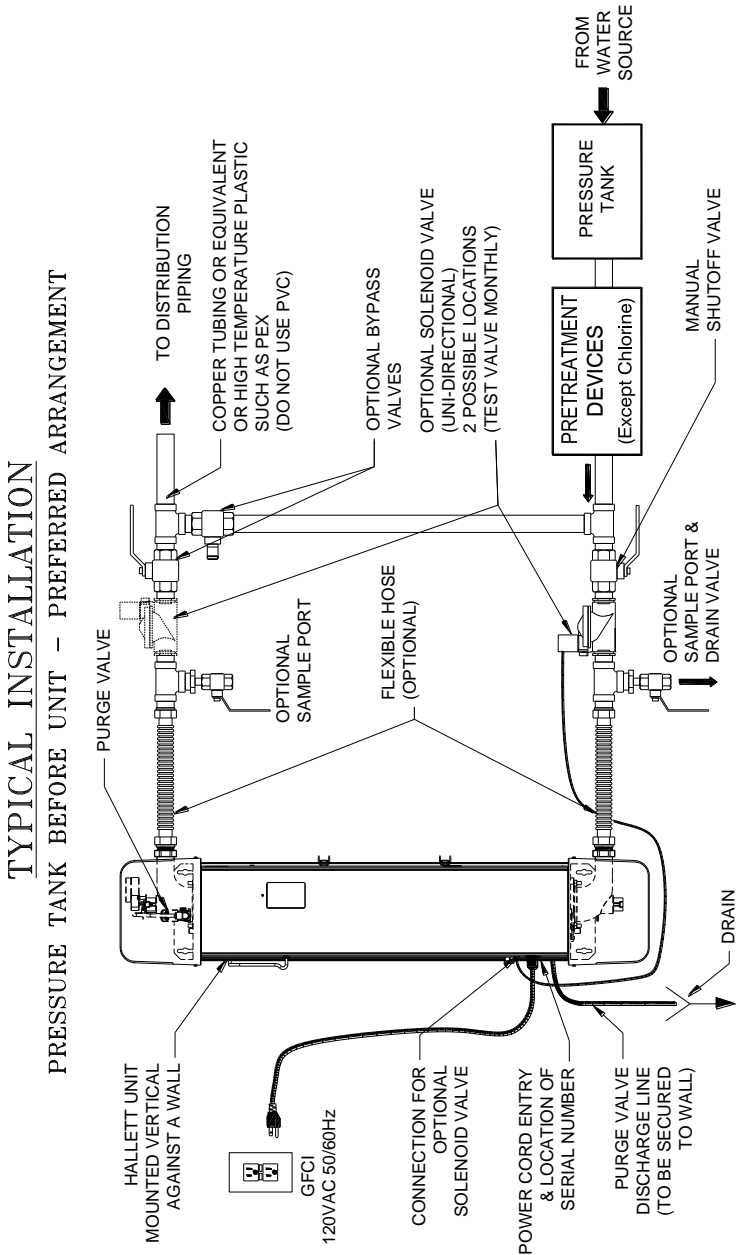


Figure 4.2

Step 3: Connect the purge valve to a drain using the tubing provided – see Figure 4.3. The tubing can be placed down the back side of the unit. The tubing should be secured to the wall or floor to prevent it from moving during the purging cycle. **During startup of the unit, it is strongly recommended to test the purge valve to confirm connections are free of leaks and the water discharges to drain.**



Step 4: Caution: do not allow the inside of the unit to get wet. Before opening the water supply, double check all connections and taps. Slowly turn on the water supply, vent out trapped air and check for leaks. If leaks exist, investigate the cause and repair before plugging in the unit.

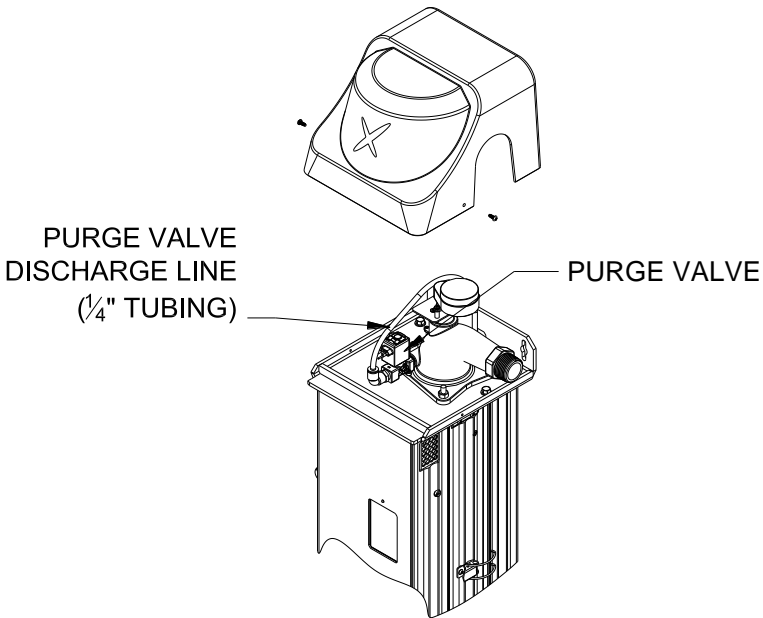


Figure 4.3

Step 5: Once the system is checked for leaks under full system pressure, install pipe insulation to any overhead piping to prevent condensation from falling onto or into the unit.

Important: after the unit has been operating for a few hours, check all connections for leaks (specifically at flexible hoses if purchased). **Repeat this procedure periodically.**

Parallel Installation

When more than one unit is installed in parallel (flow split between units), the units must be installed with manual shutoff valves both upstream and

downstream of each unit. This allows one unit to be serviced without interrupting the flow to the other units. Another requirement is the installation of a check valve downstream of the UV unit (after the UV unit). This will prevent the backflow of water to a unit.

Installation is now complete.

Control Interfaces



WARNING: Shutdown and unplug the unit before installing any external wiring.

External wiring can be introduced through a port in the left side of the unit – see Figure 4.4. By default, a plug is installed into this port in a standard unit and a strain relief (Kit # GD21) can be purchased if connection to remote devices is required. For External Contacts and Remote Start/Stop, 22 gauge wire is recommended and if the 4-20mA option is used, 22 gauge wire with foil and drain wire. Install wires onto spring cage terminals provided.

External Contacts

All Hallett systems provide two “dry” contacts for remote alarms or autodialers – the word “dry” indicates no voltage present at the contact. The first contact labeled RUN is a “System Run” condition – when closed, the unit is treating; if the contact is open, the unit is in alarm, has lost power, or perhaps the wire has been cut. The second contact labeled WARNING is to indicate the existence of an abnormal condition such as high water temperature. When this contact is open, the system is normal; when this contact is closed, a warning condition exists. Both contacts are meant for control purposes only, not to drive devices. The maximum rating of the contact is 24 Vac or Vdc, 2A.

Remote Start/Stop

All Hallett systems have remote start/stop capability which allows them to remain idle without operating the UV lamps. When a signal is given (voltage applied), UV lamps are energized. This is convenient for locations requiring periodic disinfection such as pump houses. The voltage rating range of the contact is 5-24 Vdc or Vac, 0.5W max. The remote start/stop is disabled by default and can be enabled in the Advanced Settings menu.



Caution: Avoid continuously starting and stopping the unit within a 24 hr period, as this will accelerate the aging of the UV lamps and will not be covered under warranty. See Product Specification Tables for permissible lamp cycles.

4-20mA & Modbus Option

A 4-20mA option is available on certain models. This device will provide a continuous analog output signal for UV Intensity and UV Transmittance. Modbus capability will also be available when the 4-20mA option is purchased. For more details, refer to the 4-20mA Instruction Sheets which are supplemental to this manual.

Data Logging on USB Option

Data logging capability is an available option on all Hallett units. A small USB drive is used to record system performance every 30 seconds. The USB drive has the capacity to store up to 4 years' worth of daily records. For more details, refer to the Data Logging Instruction Sheets which are supplemental to this manual.

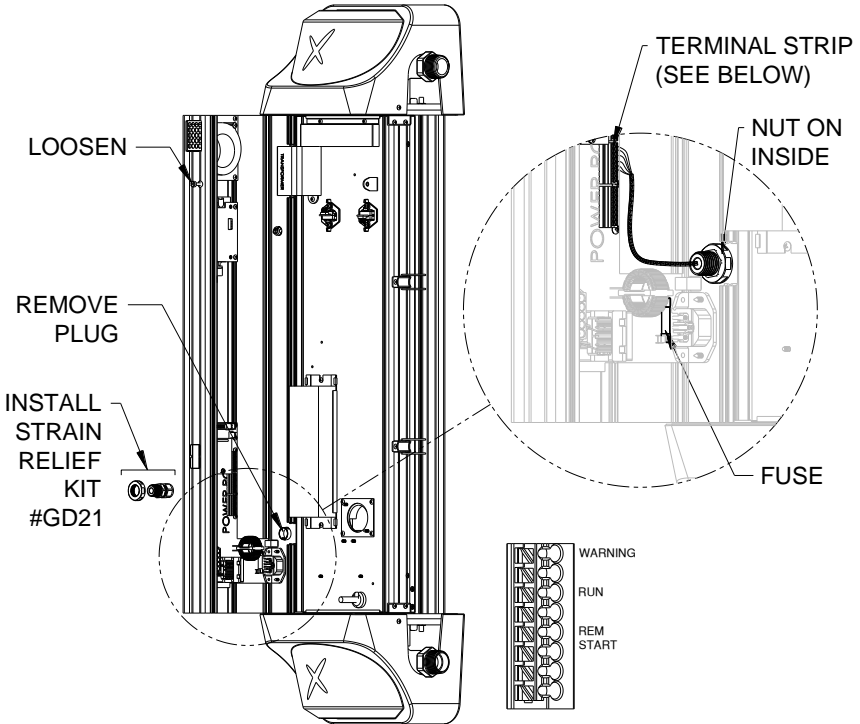


Figure 4.4

5. OPERATING INSTRUCTIONS

The Hallett applies advanced Crossfire Technology yet is simple to operate. The automatic quartz sleeve cleaning technology available on most models has been designed to reduce, and in most cases, eliminate the periodic shutdowns necessary to inspect the cleanliness of the quartz sleeve. The only required maintenance is the replacement of the two UV lamps.

Unit Functions

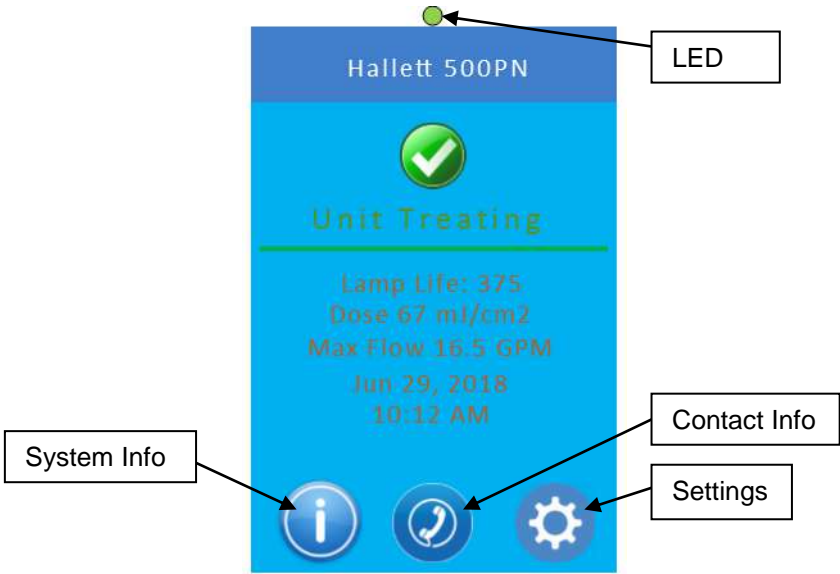


Figure 5.1

The user interface consists of a color touchscreen and a single multi-color LED. See Figure 5.1. The LED will always be illuminated when the UV unit is plugged in and powered up. The touchscreen enters sleep mode after 10 minutes and requires the user to touch it to wake it up. The touchscreen will change colors if any significant event occurs such as warnings or alarms. See the section on *Navigating the Menu* for a complete layout of the screens.

Indicating LED

Green Light – an illuminated green light indicates the unit is treating normally. A slow flashing green light means the UV lamps are not yet at full power or the unit is in standby mode awaiting a remote start. A fast flashing green light means the wiper is cycling.

Red Light – an illuminated red light indicates either a warning or an alarm has occurred. A warning is a condition that, if not addressed, could impact the unit’s performance. Warnings should be addressed as soon as possible. Warnings are accompanied with a flashing red LED, a single beep, a message, and a yellow screen. An alarm is a condition that has significantly impacted the unit’s performance and it must be addressed immediately. Alarms are accompanied with a solid red LED, continuous beeping, a message, and a red screen.

Audio Alarm

The audio alarm or beeper, will alert the operator to any conditions out of the ordinary. A single beep will sound if a warning occurs; continuous beeping will sound if an alarm occurs. The audio alarm may be disabled temporarily or permanently in the Settings Menu, item 2.3.

Navigating the Menus**0** Home

- 0.1 Model name
- 0.2 Treatment Status
- 0.3 Lamp Life
- 0.4 UV Dose
- 0.5 Max Flow or Flow Signal (Optional)
- 0.6 Date & Time

0A Contact Info

Text: Company, Phone, Installation date

1 System Info

- 1.1 UVT
- 1.2 UVI
- 1.3 Left Lamp UV
- 1.4 Left Water UV
- 1.5 Right Lamp UV (If available)
- 1.6 Right Water UV (If available)
- 1.7 PCB Temp
- 1.8 Sys Temp
- 1.9 Water Temp
- 1.10 Lamp Temp
- 1.11 Wiper Countdown
- 1.12 Daily Starts
- 1.13 Firmware Version
- 1.14 Total Starts
- 1.15 Power-ups
- 1.16 Life-time counter
- 1.17 CH1 - Analog Output
- 1.18 CH2 - Analog Output

- 2 Settings
 - 2.1 Date & Time
 - 2.2 Power Down
 - 2.3 Audible Alarm
 - 2.4 Units
 - 2.5 Reset Lamp Counter
 - 2.6 Message History (Last 100 messages)
 - 2.6.1 {Message 1}
 - 2.6.1.1 UV Dose
 - 2.6.1.2 Water Temp
 - 2.6.1.3 Estimated UVI
 - 2.6.1.4 Estimated UVT
 - 2.6.1.5 Left Lamp UV
 - 2.6.1.6 Left Water
 - 2.6.1.7 Right Lamp UV
 - 2.6.1.8 Right Water
 - 2.6.1.9 Lamp Temp
 - 2.6.2.0 PCB Temp
 - 2.6.2.1 System Temp
 - 2.6.2 {Message 2}
 - 2.6.3 ...

- 2.7 Advanced Settings
 - 2.7.1 Force Outputs
 - 2.7.1.1 Lamps
 - 2.7.1.2 Wiper
 - 2.7.1.3 Purge Valve
 - 2.7.1.4 Shutoff Valve
 - 2.7.1.5 Fan UV
 - 2.7.1.6 Fan PCB
 - 2.7.1.7 Warning Contact
 - 2.7.1.8 Run Contact
 - 2.7.1.9 Buzzer
 - 2.7.1.10 Heaters
 - 2.7.1.11 C1-4-20mA signal
 - 2.7.1.12 C2-4-20mA signal
 - 2.7.1.13 Interlock for UV door
 - 2.7.1.14 Wiper Positioner switch
 - 2.7.1.15 Remote Start/Stop Signal
 - 2.7.1.16 Fault 1
 - 2.7.1.17 Fault 2
 - 2.7.1.18 Lamp Temp
 - 2.7.1.19 Water Temp
 - 2.7.1.20 Analog In
 - 2.7.1.21 System Temp
 - 2.7.1.22 PCB Temp
 - 2.7.1.23 DC Volts
 - 2.7.1.24 L Lamp Sensor
 - 2.7.1.25 L Water Sensor
 - 2.7.1.26 R Lamp Sensor
 - 2.7.1.27 R Water Sensor
 - 2.7.1.28 CAL - L Lamp
 - 2.7.1.29 CAL - L Water
 - 2.7.1.30 CAL - R Lamp
 - 2.7.1.31 CAL - R Water
 - 2.7.2 Remote Start
 - 2.7.3 Shutoff Valve
 - 2.7.4 Set Defaults
 - 2.7.5 Language
- 2.8 Password for Advanced Menus

Starting the Unit

Plugging in the Hallett for the first time

Step 1: Ensure that all external wiring is complete (see *Control Interfaces* section) and all the panels of the unit are closed before connecting the power cord.

Step 2: Plug the female end of the power cord into the power entry module located on the left side of the front panel. Plug the male end of the power cord into a ground-fault circuit-interrupter (GFCI).



Caution: Avoid continuously starting and stopping the unit within a 24 hr period, as this will accelerate the aging of the UV lamps and will not be covered under warranty. See Product Specification Table for permissible lamp cycles.



Caution: Do not operate unit dry. There must be water in the treatment chamber to prevent damage to internal components.

In the event of a lack of water or water supply being turned off, shutdown the unit until the water supply can be restored. In the event of a power failure, the unit will shut down and the optional solenoid valve will close, preventing water from flowing. When the power returns, the unit will automatically restart and perform a self-test. If no faults are detected, the unit will return to normal operation and the optional solenoid valve will open. Note that even during a brownout, the supply voltage may drop low enough to cause the unit to shut down. If the unit does not automatically restart as described above, shutdown and unplug the unit and plug it in again.

Step 3: Once the unit is plugged in, the LED illuminates, an audible tone is issued and the display becomes active to confirm all three devices are functional. The unit then performs a self-diagnostic. The user/installer should enter the date of installation in the Settings Menu, and treatment parameters if required.

Step 4: When the UV Lamps have started, (lamp ignition for amalgam lamps may take up to 30 seconds) the unit will wait at 10 - 15 minutes depending on the model to allow the lamps to stabilize before transitioning into Treating mode. This will occur every time the UV lamps are powered up. During this warm up, the green LED will flash, the unit will display the countdown to startup, and the optional shutoff valve will remain closed. **New LPHO lamps may take from a few moments to several hours to reach full power. Continue to operate the unit until the lamps reach full power – this may last 24 hours. It is recommended for new LPHO lamps to be operated initially 3-4 hours as a burn-in to achieve lamp stability.** When the warm up process is complete, a solid green light appears and the message “Unit Treating” will be displayed. The optional solenoid valve will be allowed to

open only if treatment levels are adequate, otherwise it will remain closed. This is the normal operating mode of the unit.

During normal operation if a power outage occurs, upon return of the power, the unit will start up automatically and perform a diagnostic check. After a 10-15 minute stabilization period, the unit will begin treating if treatment levels are adequate, otherwise an alarm will be issued if the unit is not treating.

Test the wiper motor and purge valve - see Advanced Settings menu, items 2.7.1.2 and 2.7.1.3.

Flushing Instructions

Flushing the system is required after installation or after any disassembly and cleaning. Flushing may also be required to remove colored or contaminated water from the unit. Most filters (if installed) also require flushing prior to use – follow the manufacturer's recommendations.

The system may be flushed in two ways. It can be done manually by disassembling the unit and filling and draining the unit by hand (see *In-place Cleaning* section). Flushing may also be done while the unit is operating. Plug in the unit and open a tap closest to the unit and have the water flow for a minimum of 15 minutes.

Shutting Down of Unit and Seasonal Use

To shut the unit down, initiate the Power Down procedure located as the second item in the Settings Menu. When this procedure is complete, simply unplug the unit.

The Hallett can operate for extended periods of time without water usage **as long as pressurized water is present to allow for purging**. The unit may be shutdown in the case of seasonal residences or during a vacation. If the possibility of freezing exists, the unit and any valves and filters must be drained. (See *Draining the Unit* section.)

Disinfecting the Plumbing

Disinfection of the household or facility plumbing should be performed after the Hallett has been installed and is operating. This procedure should also be done if the unit is not functioning normally; if a bypass has been used; or if there has been a high background bacteria count in a water sample. UV Pure has found that disinfecting the plumbing will ensure that any potential bacteria or contaminants in the distribution system are treated prior to system use.

Please note that this procedure is ineffective against protozoa that can be found in surface water or shallow wells under the influence of surface water. Under these circumstances, it is important to perform the disinfecting procedure and then operate the Hallett. UV Pure has found that this procedure does not work with sediments or heavy biofilm and encrustations, which must be removed mechanically.

UV Pure recommends sanitizing the household or facility plumbing by adding



50 ppm chlorine from bleach for 12 hours and then flushing. This can be achieved by doing the following:

Step 1: Shutdown and unplug the unit.

Step 2: Shut off the water supply and relieve the water pressure by opening a tap.

Step 3: Remove the filter from its housing and fill the housing with bleach

Step 4: Re-mount the housing (but not the filter) and plug in the unit to turn it on.

Step 5: Once the unit is operating, turn on the water supply and have the water flow to all taps (hot and cold), toilets, the washing machine and other water-using appliances – the bleach must fill every inch of plumbing. The Dose Alarm may arise due to low UVT after the introduction of bleach. If this occurs, use the manual override on the optional solenoid valve to keep valve open during procedure. **Return override to auto position afterward.**

Step 6: When you detect the odor of chlorine at each spot, turn off the water and let the bleach remain in the lines for at least 12 hours and **turn off** the UV unit during this time.



Caution: Do not allow corrosive chemicals to remain in the unit for more than 12 hours – Do not operate unit during this time period as heating the water will increase corrosive nature of chemicals.

Step 7: After the waiting period is over, plug in the unit. Once stable, flush every line for at least five minutes or until the odor of chlorine is gone. See local regulations for proper disposal of chlorine residual, especially in the case of discharge into a septic system.

Step 8: Now that the disinfection procedure is complete you will need to return the filter to its housing. Shut off the water supply, relieve water pressure by opening a tap, and return the filter to the housing. Allow a few days after a disinfection procedure before getting a sample since residual chlorine may affect the results.

Have the water tested by a local recognized testing agency prior to any water consumption. UV Pure partners with water testing organizations in select locations throughout North America. Contact UV Pure for potential water testing partners: 1-888-407-9997. The testing should be performed on a regular basis as required by local regulations.

Automatic Quartz Sleeve Cleaning Device (available on most models)

The self-cleaning feature of the Hallett system involves a wiper turning inside the quartz sleeve. The wiper operates soon after power up of the lamps and then every 4 hours it will cycle for 5 minutes. The wiper can be enabled anytime in the Advanced Settings menu, item 2.2.1.2. The LED will flash

quickly during a wiper cycle.

Built in Purge Valve (available on most models)

The Hallett contains a flushing or purge valve that cycles water through the unit during long periods of no water usage. The unit monitors water usage by measuring the rise in water temperature within the treatment chamber. During periods of no water flow, the purge valve on the small units can expel 1 gallon (4 liters) of water every 60-90 minutes; the largest unit can expel up to 3 gallons (12 liters). If the largest unit fails to purge and the water temperature exceeds 122°F (50°C), the unit will shutdown to prevent overheating.

6. TROUBLESHOOTING

The Hallett will operate unattended until a fault arises.

If an **alarm** occurs, the solenoid valve (optional) will close, preventing water from flowing; the LED turns red; the audio alarm will beep continuously; the touchscreen turns red and displays a message; the RUN contact will open to indicate the unit is no longer treating. The fault should be corrected to return the unit to normal operation and have the water flow again.

If a **warning** occurs, the solenoid valve (optional) remains open; the LED flashes red; the audio alarm will beep once; the screen turns yellow and displays a message; the warning contact will close to indicate the unit is still treating but in an abnormal state. The warning should be addressed as soon as possible and if left unattended, could turn into an alarm.

The Message History, available in the Settings menu, item 2.6, is very useful in troubleshooting since it contains up to 100 messages/events with associated recorded data such as times, UVI, UVT, UV sensor values, and temperatures.

In the event of an alarm, in many cases, a physical inspection of the unit with the power off should be done to try to identify a cause. A slow water leak for instance, near the top of the unit could stain lamps or reflectors and may not be uncovered without a full system inspection.

Dose Alarm

The Dose Alarm occurs when there is insufficient UV dose to treat the maximum flow rate prescribed by the unit. The Dose Alarm could be a result of low UV intensity or low UV Transmittance (UVT) or a combination of both. Review both values in the System Info Menu to determine which is causing the alarm and take corrective action. It is highly recommended to have a UVT sample taken to confirm system prediction.

The Advanced Settings menu under Force Outputs conveniently provides the ability to manually turn on and off devices to confirm their operation. Devices return back to their automatic position after 10 minutes.

Cycling the power is also useful to occasionally reset the software.

Troubleshooting Guide

System Status	Possible Cause	Corrective Action	
No Power (LED is off, touchscreen is off)	Ground-fault circuit-interrupter (GFCI) tripped.	Check for water leaks. Reset GFCI.	
	Fuse Blown.	Check for water leaks. Replace fuse (see Fig. 4.4 for fuse location)	
	Touchscreen pcb not connected to power pcb.	Ensure ribbon cable is connected at both ends.	
	Circuit Board is damaged.	Confirm if Power pcb has any illuminated LEDs. If so replace Touchscreen pcb (LCD).	
UV Lamps not starting (occurs after 6 unsuccessful attempts)	UV Chamber interlock not engaged.	Check that each latch is correctly positioned and secure UV chamber door.	
	# of lamp starts have exceeded specification.	Review Total Lamp starts in System Info Menu. Replace lamps but reduce future lamp cycles.	
	UV lamp failure	Replace lamps	
	UV Ballast Failure	Replace ballast	
	Over temperature condition.	Either the system, pcb or water temperature has occurred. Allow to cool off and investigate cause by reviewing Message History.	
UV Lamps on but UVi is low	Lamps are warming up after a power interruption.	Allow lamps up to 15 minutes to reach full power	
	New LPHO lamps installed.	First time LPHO lamps are turned on it may take 3 to 4 hours to reach full power. After this initial "burn-in", warmup time will be a few minutes.	
	The UV output of the lamps have diminished.	Lamps have exceeded their lifetime. Replace lamps. # of lamp starts have exceeded specification. Replace lamps but reduce future lamp cycles.	
	UV sensor requires recalibration/replacement.	Install reference sensor to confirm status of unit sensor.	
	UV Lamps operating outside of recommended temperature conditions.	Check if UV blower is operating correctly.	
		For cold water applications, increase room temperature or install LPHO lamp heater kit.	
Water Temperature High Warning & Alarm	Warning issued when water temperature within the UV chamber exceeds 104°F (40°C).	Check if sufficient water pressure to operate purge valve. Check for blockage in purge discharge tubing. Check for debris in purge valve.	
	Alarm issued when water temperature within the UV chamber exceeds 122°F (50°C) – UV Lamps are turned off (applies to Hallett 1000 models)		
System Temperature High Warning & Alarm	The system temperature has exceeded a safe operating level causing the UV lamps to be turned off.	Check if water flow has been turned off. Check if operating temperatures have exceeded specifications. Check if both system blowers are operating correctly.	
Circuit Board Temperature High Alarm	The temperature within the electrical chamber has exceeded a safe operating level causing the UV lamps to be turned off.	Check if operating temperatures have exceeded specifications. Check if the pcb blower is operating.	
Wiper Not Turning Warning	The system has failed to detect wiper motion during the routine wiper cycle.	Check wiper motor operation	
		Check wiper position switch & cam.	
		The UVT is too low for detection. The Wiper Position Switch option is recommended.	

7. MAINTENANCE

The disinfection of water will occur as long as the unit is properly maintained with genuine parts in accordance with the instructions set out in this manual. Operating a malfunctioning unit or defeating any system sensors may jeopardize the safety of the water. Online videos are available to help with typical maintenance tasks.

Test Shutoff Valve Monthly

The optional solenoid shutoff valve should be tested monthly to confirm it opens and closes. Unplug valve from unit to confirm water stops flowing. Plug the valve in again to confirm water continues to flow.

Clean Air Filter Periodically

The Hallett contain a washable air filter in the located at the air inlet port (See Figure 7.1). Periodically check and clean the filter to ensure blower operation is not impeded.

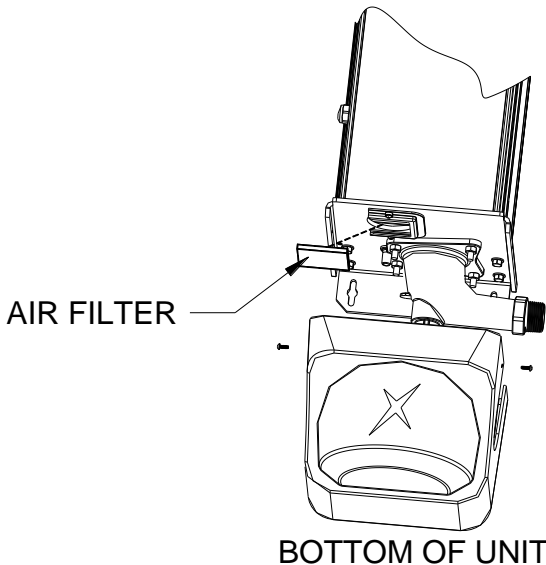


Figure 7.1



Accessing the UV Chamber



The UV chamber can easily be opened for lamp replacement or quartz sleeve inspection without having to drain the unit and without any tools.



Caution: Always shutdown and unplug the unit before accessing the

UV chamber.

Step 1: Shutdown and unplug the unit then wait 5 minutes before opening the UV chamber to allow the lamps to cool. The lamps heat up after continuous use and can burn your skin if touched.

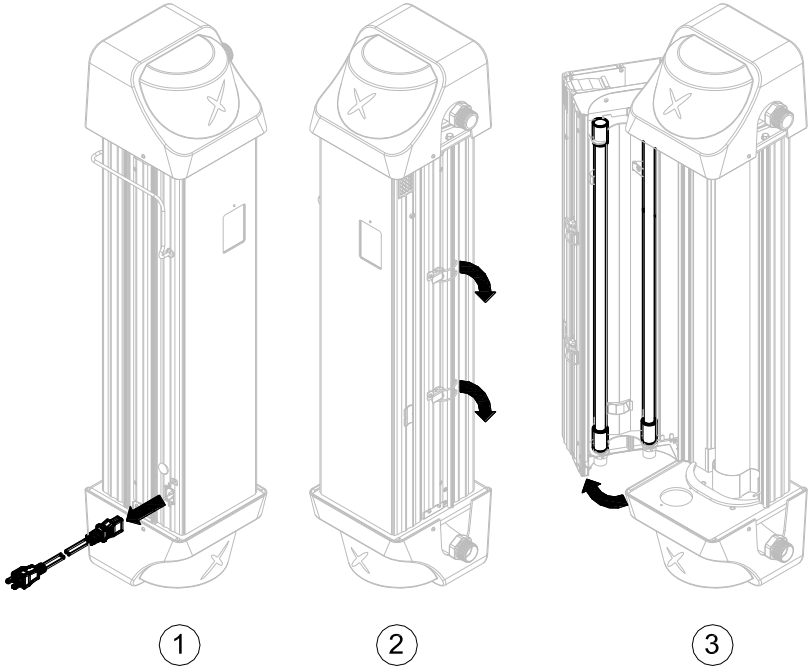


Figure 7.2

Step 2: See Figure 7.2. Open the UV Chamber by undoing the over-the-center latch (may be more than 1). Note where the latch wire engages the extrusion feature – it must be re-latched in same manner.

Step 3: Slowly swing the door completely to the left to reveal the two UV lamps installed in the front half of the UV chamber. Note that the quartz sleeve can be easily inspected.

Step 4: To close the UV chamber, slowly swing the door back towards the back half of the UV chamber. Close all over-the-center latches ensuring the wire correctly grabs the extrusion feature.

Step 5: Plug the unit in again.

Replacing and Cleaning UV Lamps

The Hallett contains two ultraviolet (UV) lamps that emit high-intensity UV light in the germicidal range, providing effective disinfection of the water flowing through the unit. The lamps in the unit will decay over time and they

should be replaced every 12 or 16 months for optimum performance – see Product Specification Tables for lamp lifetimes. Note that lamps will only decay while in operation. Shutting down the system for seasonal use will extend lamp life.

The unit has an internal timer to keep track of the lifetime of the lamps. The Hallett will issue a warning when the end of lamp lifetime approaches and it will warn again when the lamp lifetime is exceeded. The amount of life remaining on the lamps is measured in days and can be seen in the Home menu.

The lamps can be replaced in a few minutes. See Figures 7.3-7.5.



Caution: Do not allow water to flow until new lamps have been installed and reach full power.



Never touch the bulb (quartz portion) of a lamp with your fingers. Handle the lamp by its ends only. If the surface of the lamp becomes dusty or dirty, use a clean lint-free cloth and some rubbing alcohol to remove the dirt. For more difficult stains such as water spots, use a scale remover to remove the stain and then rubbing alcohol afterwards.



Tools Needed

- Slotted screwdriver



NOTE: Resetting the Lamp Lifetime counter will clear the Message History, Lamp Starts counter and Power Ups counter. If this information is required, review it first before proceeding to Step 1.

Step 1: Open the UV chamber as described in *Accessing UV Chamber* section.

Step 2: Use a slotted screwdriver and pry the lamps up between lamp base and ceramic socket.

When the bottom pins have disengaged the socket, lift the lamp up, then swing the lamp base away from socket. Lower the lamp to disengage it from the top lamp holder. With the lamp free from the unit, carefully place it aside and remove the other lamp.

Dispose of the old lamps in the same way as you would dispose of ordinary fluorescent tubes. Note that old lamps should be disposed of at a household waste management depot or transfer station; contact your local recycling and waste management authority for proper disposal procedures in your area.

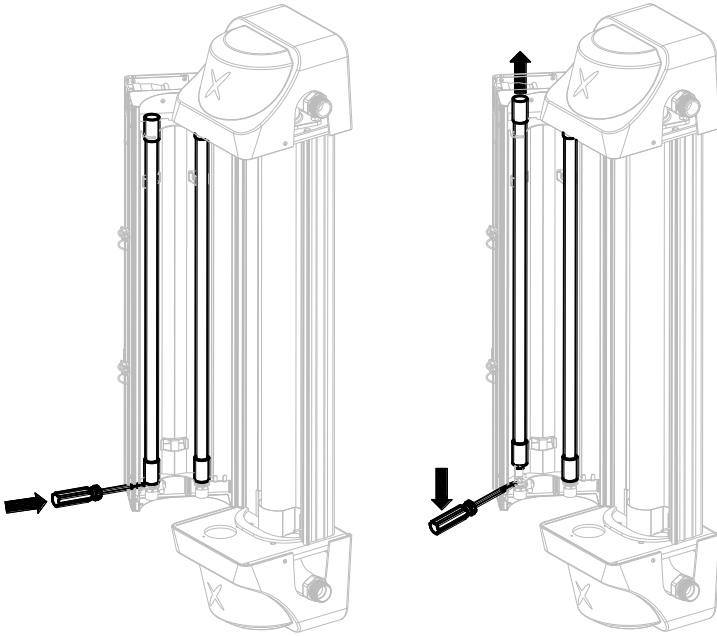


Figure 7.3

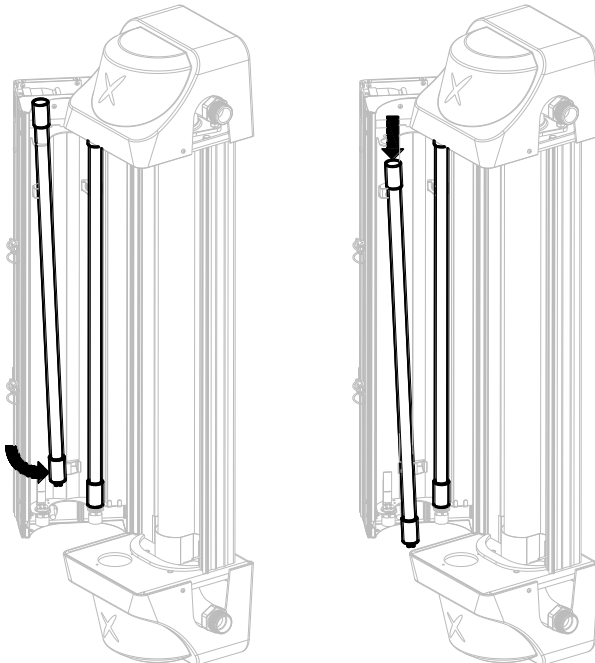


Figure 7.4

Step 3: Install the new lamps into the unit, one at a time being careful not to touch the bulb. Insert the top end of the lamp through the top lamp holder then swing lamp base in over the socket. For a LPHO lamp, rotate it until the “Stop Sign” symbol printed on the top ceramic is towards the left. See Figure 7.5. For an amalgam lamp, rotate it until the wires running down the lamp are facing the back of the unit. The proper orientation of the LPHO and amalgam lamp has the lamp wires opposite the UV sensors.

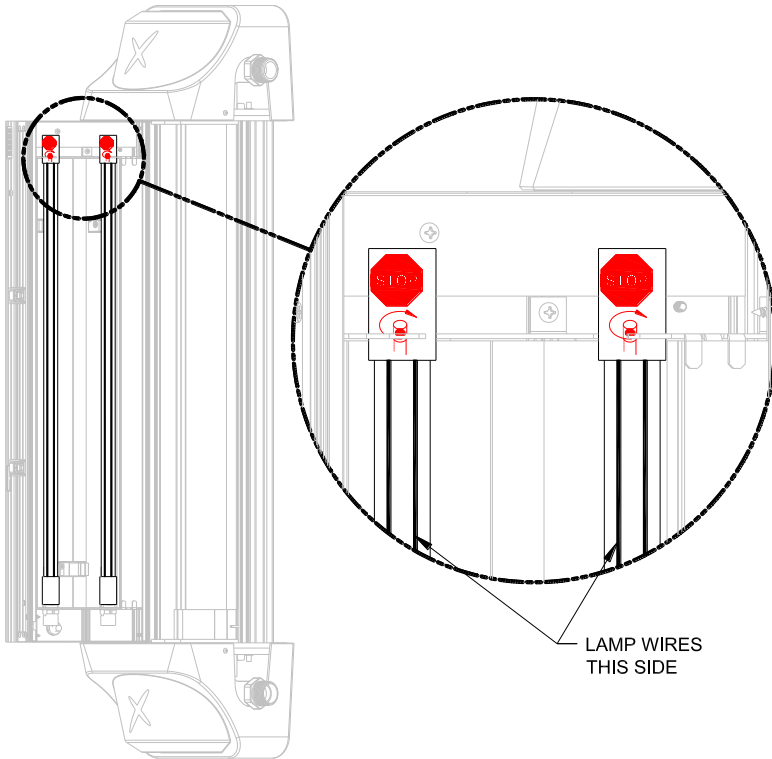


Figure 7.5

After the lamp has been rotated correctly, allow the 4 pins of the lamp to engage into the socket, push firmly down on the top of the lamp. **Do not twist the lamps when they are inserted.** Observe the base of the lamp to confirm the pins are fully seated into the socket. Repeat for other lamp.

Step 4: Close the UV Chamber and secure door.

Step 5: Record the date of the lamp replacement in your Service Record Sheet.

Step 6: Plug in the unit. The lamp lifetime counter can be reset in the Settings menu, item 2.5 (365 days for LPHO lamps, 500 days for amalgam lamps). **New LPHO lamps may take from a few moments to several hours**

to reach full power. Continue to operate the unit until the lamps reach full power. The UV intensity value can be observed to confirm output levels. It is recommended for new LPHO lamps to be operated initially 3-4 hours as a burn-in to achieve lamp stability.

Draining the Unit

The Hallett does not normally require draining for routine operation or lamp replacement. Draining is necessary to disassemble the system, to protect against freezing, or to remove poor-quality water.

Tools Needed

- Pipe wrench

Step 1: Shut off the water supply and relieve the pressure.

Step 2: Shutdown and unplug the unit.

Step 3: Place a bucket under the unit to collect the water.

Step 4: Open a tap downstream of the unit to vent.

Step 5: If you have installed an optional drain valve, open the drain valve. If you do not have an optional drain valve, disconnect the flexible hose or piping at the bottom port to allow the system to drain for a few minutes. Note that the water will not flow backwards through the optional automatic valve.

Step 6: When draining is complete, close the drain valve or reconnect the flexible hose or pipe connections.

Step 7: Close any taps that were previously opened.

Cleaning the Unit

UV Pure has designed the automatic quartz sleeve cleaning device within the Hallett systems to virtually eliminate the disassembly and cleaning of the quartz sleeve - the quartz sleeve will remain clear and transparent as glass. If a component of the cleaning device fails, such as the wiper motor, or in extreme water cases with unique water chemistry, the quartz sleeve may become fouled and require manual cleaning. In this situation the Dose Alarm will arise and alert you to the unsatisfactory conditions. Follow the steps below to inspect the quartz sleeve and disassemble the unit for cleaning.



Determining the Need for Cleaning



Step 1: Shutdown and unplug the unit.

Step 2: Open the UV chamber as described in *Accessing UV Chamber* section.



Step 3: Examine the quartz sleeve both inside and out – See Figure 7.2. If it



is clean, no disassembly is required and the unit can be closed. Restart the unit by plugging it in.

Step 4: If the quartz sleeve is dirty on the outside, proceed to wipe it down with a clean lint-free cloth and rubbing alcohol to remove the dirt. If the quartz sleeve is dirty on the inside, proceed with in-place cleaning or disassembly.

In-place cleaning

This procedure will clean the quartz sleeve without its removal from the unit. This is a quick and easy procedure that works well in most cases.

Tools Needed

- slotted screwdriver
- Philips screwdriver
- Pipe wrench



Step 1: Fill a bucket or container with 1 gallon (4 liters) of clean water - this will be required later to clean the quartz sleeve. A squeeze bottle is useful for applying water or cleaning solution to the inside of the quartz sleeve.



Step 2: Shutdown and unplug the unit.



Step 3: Shut off the water supply and relieve the pressure.

Step 4: Open the UV Chamber as described in *Accessing UV Chamber* section.

Step 5: Place another bucket under the unit and drain the unit until there is about 1" (3cm) of water left in the quartz sleeve (see *Draining the Unit* section).

Step 6: Disconnect the fitting at the top outlet port of the UV unit. If the stainless flexible hose was installed, disconnect the hose opposite from the UV unit then bend the open end upwards – this will make the next step easier.

Step 7: Add about 2 oz. (60cc) of cleaning solution to the top hose/manifold. The cleaning solution can be a citric acid, vinegar or other non-hazardous solutions. **Any solution used should be thoroughly rinsed out afterwards.** Fill the rest of the quartz sleeve with water.

Step 8: Let the cleaning solution remain in the quartz sleeve for at least 10-20 minutes.

Step 9: Manually turning the wiper may greatly assist the cleaning process. To do this, remove the top plastic cover then remove the motor and turn the wiper shaft with a slotted screwdriver (counterclockwise while looking at the shaft). If the optional wiper positioner switch is installed, leave the trigger cam in place.

Step 10: Drain the unit and inspect the quartz sleeve. If clean, flush the unit with clean water. If fouling remains, repeat procedure or proceed to disassembling the unit.

Step 9: Once the unit is clean, reassemble the system including the motor, plastic cover, top port connection(s) and UV chamber door.

Step 10: Slowly open the water supply and check for leaks.

Step 11: Restart the unit by plugging it in.

Disassembling the Unit



NOTE: This procedure is not recommended for untrained users - please contact your certified water specialist to assist should disassembly be required.



Tools Needed

- slotted screwdriver
- Philips screwdriver
- Pipe wrench
- 7/16" (11mm) wrench or nut driver
- Bottle clean brush with long handle



Step 1: Fill a bucket or container with 1 gallon (4 liters) of clean water - this will be required later to clean the quartz sleeve. A squeeze bottle is useful for applying water or cleaning solution to the inside of the quartz sleeve.

Step 2: Shutdown and unplug the unit.

Step 3: Shut off the water supply and relieve the pressure.

Step 4: Place another bucket under the unit and drain the unit completely (see *Draining the Unit* section). Note that piping connections to the inlet and outlet ports will have to be removed in order to disassemble the unit's stainless manifolds. Perform these disconnections now.

Step 5: Open the UV Chamber as described in *Accessing UV Chamber* section. It may be necessary to have the UV chamber door held open for this procedure.

Step 6: Remove top plastic cover.

Step 7: Disconnect wires to wiper motor, purge valve, and water temperature sensor (thermistor).

Step 8: Remove the wiper motor by removing the two screws holding it to the plate.

Step 9: Remove the motor mounting plate from the top manifold by removing the two screws and nuts. Removing this plate will allow top manifold to come

free from the wire bundle.



Caution: Do not damage the sealing surfaces of the manifolds or the shaft adapter for the wiper - handle these parts with care to prevent water leaks. The wiper assembly must also be handled with care to prevent damage to cleaning edges. **The wiper blades are sharp, handle them with care.**

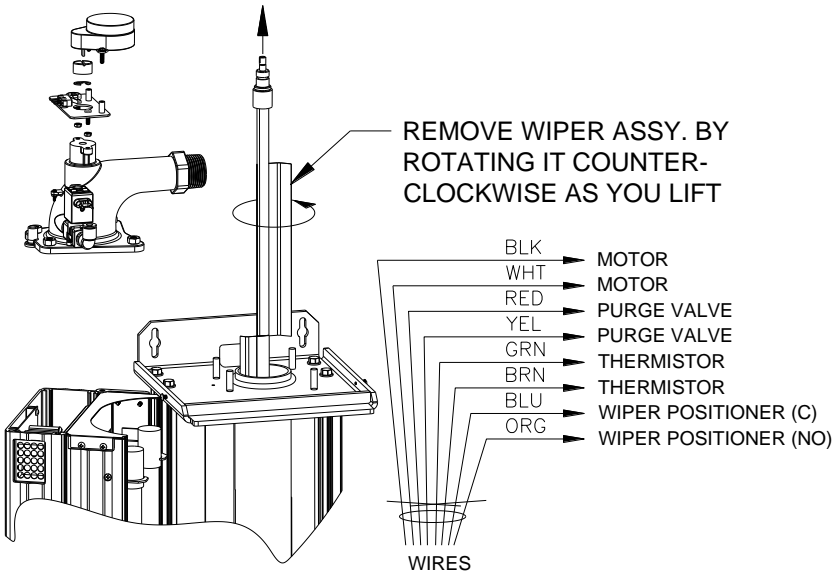


Figure 7.6

Step 10: Remove the retaining ring (E-ring) holding the wiper shaft.

Step 11: Use the 7/16" (11mm) wrench or nut driver to remove the four nuts of the top manifold in an alternating pattern (top left, bottom right, bottom left, then top right). The bottom manifold does not require removal to clean the quartz sleeve, so leave it in place. This will support the quartz sleeve during cleaning and simplify the overall process.

Step 12: Press down on the wiper shaft and remove the top manifold (Figure 7.6) by lifting it straight up to disengage the wiper shaft. The shaft adapter should remain on the top of the wiper shaft. Note the orientation of the slot to the wiper blades – the slot is aligned to the wiper blades.

Step 13: Remove the wiper assembly by carefully lifting it up and out of the quartz sleeve. Rotating it counter-clockwise as you lift will help. Prevent the shaft adapter from falling off the wiper assembly. Note that the shaft adapter sits on the top end of the wiper shaft - the top end of the shaft has a hole, the bottom end of the shaft does not.

Cleaning/Removing the Quartz Sleeve

Step 1: Use a bottle cleaning brush with a long handle to scrub the inside of the quartz sleeve. Scrub and flush it with water repeatedly to clean the quartz sleeve. Use a squeeze bottle to apply water or solution to the quartz sleeve to keep the area tidy. **Note: Keep the rest of the unit free from moisture.** Examine the quartz sleeve.

Step 2: If the quartz sleeve is still dirty, use a scale remover such as CLR or Lime Away and apply it to the inside of the quartz sleeve. Citric acid, available at a drug store, can also be used. **Always flush with clean water afterwards.**

Step 3: Once the quartz sleeve is clean, reassemble the unit (see Figure 7.8). Replace any seals that appear to have been damaged.

Step 4: If the quartz sleeve is still not clean, it requires replacement. This is done by removing the bottom manifold (see Figure 7.7). Replacing a quartz sleeve is easier when the unit is placed on a horizontal surface – removing the unit from the wall to work on a bench is recommended, especially for the Hallett 1000 models.

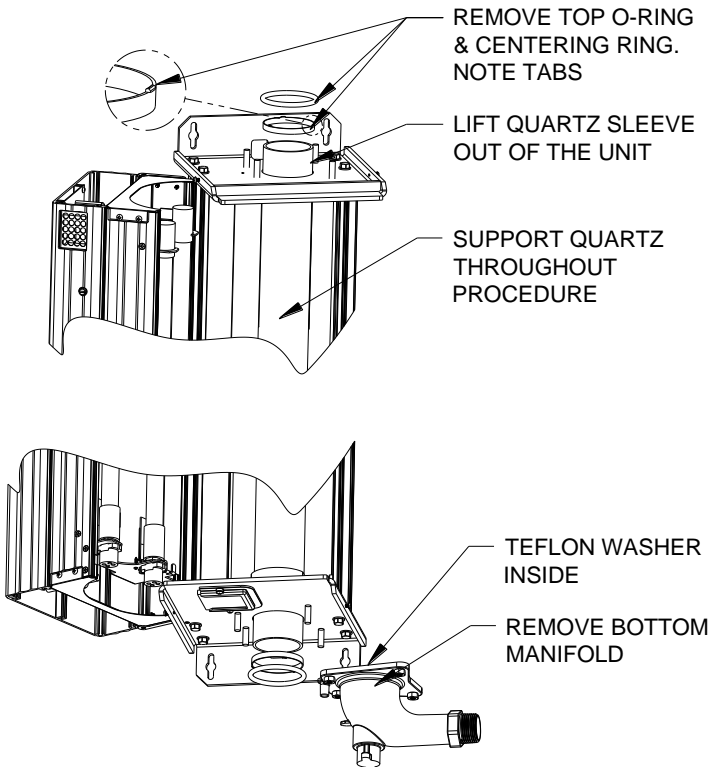



Figure 7.7

Step 5: Remove the bottom plastic cover and then the bottom manifold by undoing the four nuts in an alternating pattern (top left, bottom right, bottom left, then top right). Do not allow the Teflon washer at the lower cavity of the bottom manifold to fall out – the wiper shaft sits on this washer. Support the quartz sleeve as you remove this item.

Step 6: Remove the quartz sleeve by removing the top and bottom O rings and then the quartz centering rings. Lift the quartz sleeve out of the unit.

 **Step 7:** Install the new quartz sleeve into the unit and center it vertically. **Be careful not to chip the ends.** Support the quartz sleeve for the next two actions.

Step 8: Install the quartz centering rings (small tabs face outwards) and then the top and bottom O rings, keeping the quartz sleeve centered vertically in the unit.

Step 9: Replace the bottom manifold (see Fig. 7.7) by installing the four nuts in an alternating pattern (top left, bottom right, bottom left, then top right). Check again for Teflon washer.

Reassembling the Unit

Step 1: Replace the wiper assembly carefully in the quartz sleeve -wetting the inside of the quartz sleeve with water will also make the task easier. Turn the wiper assembly counter-clockwise (looking from the top) as it is being inserted into the quartz sleeve – this will make the task easier and align the wiper blades properly. Ensure the bottom of the wiper is correctly seated into bottom manifold.

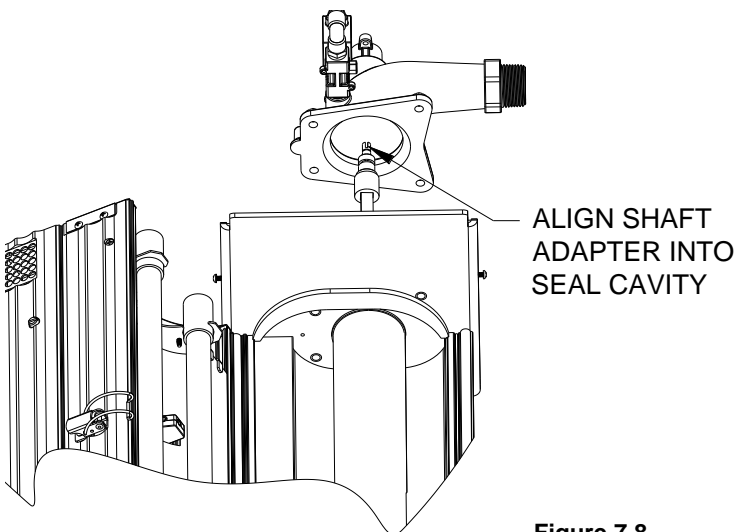


Figure 7.8

Step 2: Ensure the quartz O-ring seal is in place around the quartz sleeve and then replace the top manifold by aligning the shaft adapter into the seal cavity of the top manifold (see Figure 7.8).

Step 3: Tighten the nuts in an alternating pattern. Once top manifold is secure, replace the retaining ring on the wiper shaft. Rotate the wiper assembly CCW to have the top wiper blade facing the back of the unit.

Step 4: Reconnect both top and bottom piping connections. Close the UV Chamber door.

Step 5: Close any taps and slowly open the water supply. Inspect for leaks. Repair any leaks if necessary before plugging in the unit.

Step 6: Reinstall the motor mounting plate by using the trigger cam to center the plate (center hole to be concentric with wiper shaft). With the top wiper blade facing the back, the trigger cam should have the dimple in the 10 o'clock position. Install the wiper motor, then reconnect all the wires.

Step 7: Reinstall the top and bottom plastic covers.

Step 8: Plug in the unit. Check operation of wiper motor, purge valve and water temperature switch.

Step 9: Make an entry in the service record to establish a cleaning schedule.

Replacement Parts

Use only genuine parts from UV Pure Technologies when servicing your Hallett disinfection system. Failure to use genuine replacement parts will void the factory warranty, and any laboratory validation and/or certification for water safety and system operating performance. Figures 7.9A-B shows a complete list of original factory parts.

Replacement parts and service are available from your Installer, a Certified Service Dealer (CSD), or directly from UV Pure Technologies on our e-commerce site: www.uvpure.com . A complete list of Certified Service Dealers and their coverage areas is available on UV Pure's website: www.uvpure.com.

Manufactured by: **UV Pure Technologies Inc.**
455 Milner Avenue, Unit 1
Toronto, Ontario, Canada, M1B 2K4
416-208-9884, 1-888-407-9997
FAX 416-208-5808
e-mail inquires: info@uvpure.com www.uvpure.com

Date of Purchase:

Dealer Name:

Model:

Serial Number:

(S/N located on the left side of the front panel below power cord entry)

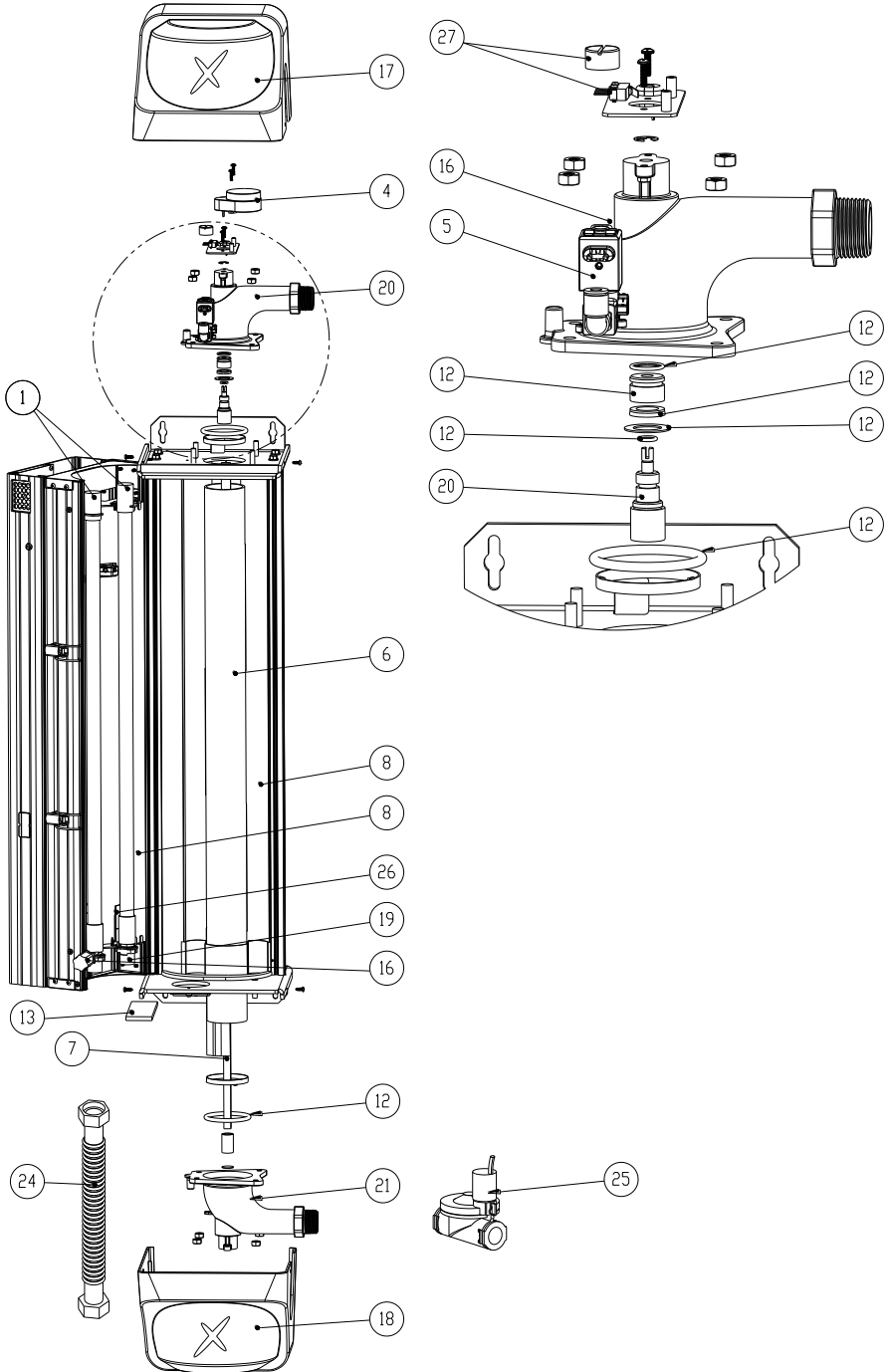


Figure 7.9A

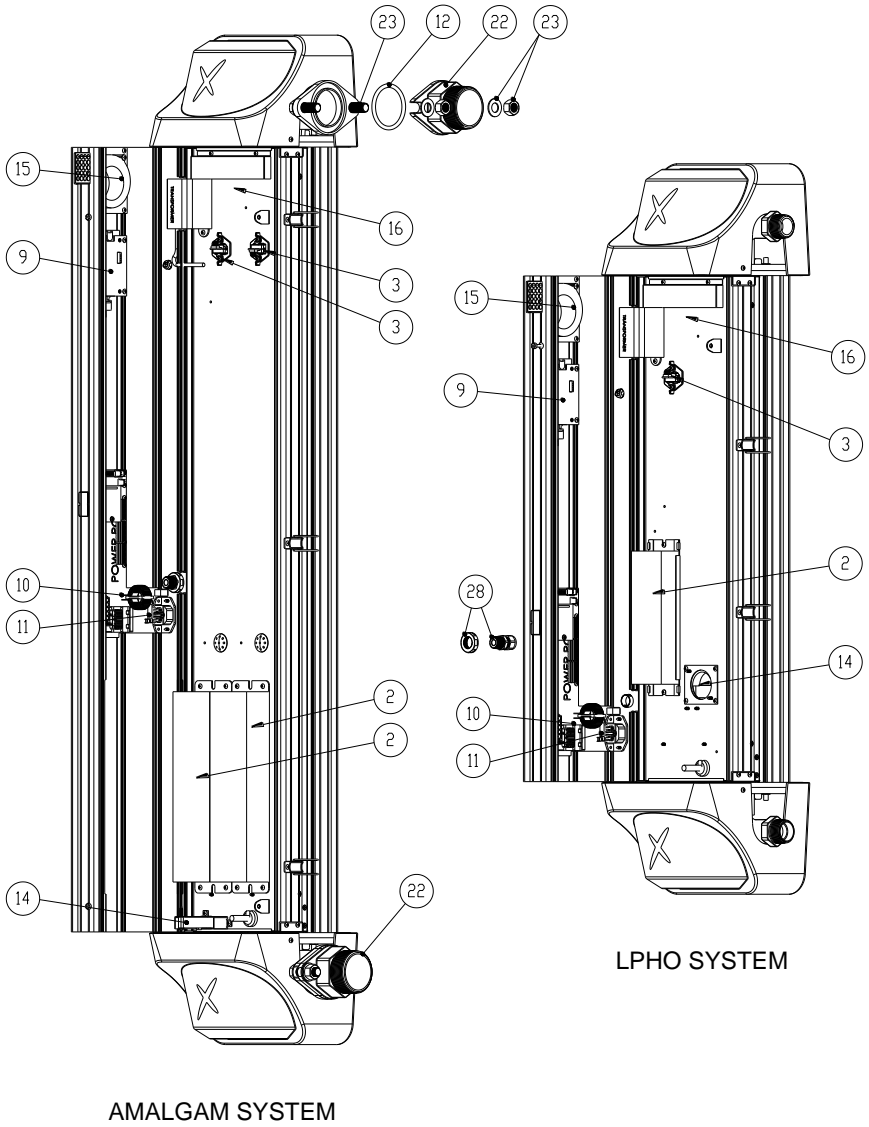


Figure 7.9B

Hallett Spare Parts List

Item No.	Part Name	Model				
		Hallett 1000XX	Hallett 750XX	Hallett 500XX	Hallett 400XX	
1	UV Lamps (Shipped in pairs)	GC19				
			C300065 (single lamp p/n is C300064)			
				E300210 (single lamp p/n is E300209)		
					E300165	
2	Electronic Ballast	GA35 (2 per unit)	GA29 (1 per unit)			
3	UV Sensor Kit	GD1 (some units have 2 - see Product Spec. Table)				
4	Wiper Motor Kit	R400005				
5	Purge Valve Kit	H400000				
6	Quartz Sleeve Replacement Kit (includes 2 O rings)	GDQ-XL	GDQ-L	GDQ-M	GDQ-S	
7	Wiper Assembly Kit	GDW-XL	GDW-L	GDW-M	GDW-S	
8	Reflector Kit (shipped & sold in pairs)	GDR-XL	GDR-L	GDR-M	GDR-S	
9	Circuit Board - LCD	Contact UV Pure				
10	Circuit Board – Power (120V Systems)	GD3				
11	Fuse Pack (5 pcs)	GD4 (for 120Vac systems, fuse is 6A, 250V 3AG)				
12	Seal Kit (complete)	GD5 (2" Port)	GD6 (1" port)			
13	Air Filter	GD7				
14	UV Chamber Blower Kit	GD8				
15	Circuit Board Blower Kit	GD9				
16	Temperature Sensor (Thermistor) Kit	GD10 (3 per unit)				
17	Top Plastic Cap	GD11				
18	Bottom Plastic Cap	GD12				
19	Lamp Socket Wire Harness	GA12 (2 per unit)	GA13 (1 per unit)			
20	Top SS Manifold/ Thermistor/Purge Valve Kit	GD13 (2 inch)	GD14 (1 inch)			
21	Bottom SS Manifold	GD15 (2 inch)	GD16 (1 inch)			
22	2" NPT Adapter (1 pc.)	GC25				
23	Fastener Kit for 2" Adapter (2 per unit)	GD22				
24	Optional Flexible SS Hose	GD17 (2" hose)	R400007 (1" hose)			
25	Optional Solenoid shut-off Valve – Nylon	550213	E500021 (1" ports)			
	Optional Solenoid shut-off Valve – Brass		550195 (1"ports)			
26	Optional Heaters for LPHO Lamps	GD18				
27	Optional Wiper Position Switch Kit	GD19				

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28	Optional Strain Relief Kit	GD21	
-	Purge Valve Relocation Kit	GE3	
-	10gpm Flow R. Kit		GD24
-	13.2gpm Flow R. Kit		GD25
-	15gpm Flow R. Kit		GD26
-	18.5gpm Flow R. Kit		GD27
-	20gpm Flow R. Kit		GD28
-	25gpm Flow R. Kit		GD29
-	26.4gpm Flow R. Kit		GD30

8. SERVICE RECORD SHEET

Record lamp replacement dates and events in the space provided below.

Date (MMM/DD/YYYY)	Action
	System Installed

9. UV PURE TECHNOLOGIES LIMITED WARRANTY

Limited Warranty for UV Pure Technologies'® water disinfection systems and peripheral parts purchased in Canada, the United States, Australia and New Zealand.

What this warranty covers:

Defects in materials and workmanship in Products and Parts manufactured by UV Pure Technologies Inc. (UV Pure) including Hallett® systems, and parts such as replacement UV lamps other original equipment manufacturer components such as manifolds or NEMA cabinets sold or certified by UV Pure Technologies Inc.

What the period of coverage is for UV Pure Products and Parts:

Five-year Limited Warranty for structural, hardware, and mechanical components. Specifically, this includes the following UV Pure Parts: system casing (machined and extruded aluminum parts, stainless steel parts, and plastic molded components), stainless steel manifolds, NEMA cabinets, welded steel skids and structural components, stainless steel self-cleaning mechanism, and mechanical fasteners.

Three-year Limited Warranty for electrical components, reflectors, and quartz sleeve. Specifically, this includes the following UV Pure Parts: wiper motor, air blowers, circuit boards, ballast and micro-processor with digital display, wiring harnesses, lamp sockets, reflectors, and quartz sleeves.

One-year Limited Warranty sensor probes and valves. Specifically this includes the following UV Pure Parts: UV sensors and the circuit board they are mounted in, temperature probes, and purge valves.

12-month Limited Warranty for all replacement LPHO lamps

16-month Limited Warranty for all replacement amalgam lamps

Ninety-day Limited Warranty or Balance of Original Warranty for replacement Parts or Products. Specifically this includes any UV Pure Parts or Products replaced or repaired under this Limited Warranty, and any Parts purchased for routine service or maintenance. This warranty period is for the balance of the original warranty or for 90 days from the date the Product or Part is repaired and/or returned to the first end-user whichever is longer. An exception is all replacement lamps that are covered for 12 or 16 months from date of replacement depending on lamp type.

Who is covered:

This Limited Warranty extends to you only if you are the FIRST END-USER PURCHASER and with respect to the ORIGINAL INSTALLATION; the warranty period shall commence upon the Date of Purchase.

What we will do to correct problems covered by this Limited Warranty:

During the warranty period, as set out above, UV Pure will repair or replace Products or Parts, at its sole discretion and cost, with the exception of shipping and handling charges. UV Pure may require that certain failed part be returned to UV Pure within 45 days for analysis and to facilitate continuous improvement; for example, circuit boards and sensors that fail must be returned to UV Pure. Replacement parts or systems may be functionally equivalent reconditioned/refurbished/pre-owned or new products or parts at UV Pure's sole discretion. UV Pure may provide software updates, at its discretion, but is under no obligation to do so. Based on an agreement between UV Pure and its service providers, Certified Service Dealers, this warranty will be honoured by either UV Pure or a Certified Service Dealer.

In North America, based on an agreement between UV Pure and its service providers, Certified Service Dealers, this warranty will be honoured by either UV Pure or a Certified Service Dealer.

Outside North America UV Pure has appointed Distributors that will honour this warranty and that provide service directly or via local Certified Service Dealers.

How to get help:

Call a Certified Service Dealer (CSD) or UV Pure's Customer Service toll free line: 1-888-407-9997. A complete list of Certified Service Dealers and their coverage areas is available on UV Pure's website: www.uvpure.com. Or, email UV Pure's Customer Service Center: info@uvpure.com.

What this Limited Warranty does NOT cover:

Maintain your original PROOF OF PURCHASE. UV Pure or its Certified Service Dealers reserve the right to deny warranty coverage if you cannot provide proof of original purchase including date of purchase, who you purchased the Product or Part from, and serial number.

USE OF REPLACEMENT UV LAMPS THAT ARE NOT ORIGINAL UV PURE EQUIPMENT WILL VOID THIS WARRANTY.

USE OF REPLACEMENT UV LAMPS THAT ARE NOT ORIGINAL UV PURE EQUIPMENT WILL INVALIDATE CERTIFICATION TO OR BY EPA, NSF, MENV, NWRI AND OTHER VALIDATION PROTOCOLS AND CERTIFYING BODIES.

All UV lamps lose power over their usable lifetime; original equipment UV Pure lamps are engineered and tested to ensure that all of our systems achieve the minimum power for disinfection specified, at the end of lamp life. Lamps that are not made by, or that are not approved by UV Pure may not meet those same high standards. Of course UV Pure performs rigorous testing of its systems and original equipment components to its own high quality control standards, and external testing and certification protocols are

performed with original equipment UV Pure lamps. NON-ORIGINAL EQUIPMENT UV LAMPS have not been approved by certifying bodies, thereby invalidating those tests and certifications. If you have a question as to whether UV Pure lamps are original equipment, please call our Toll Free Customer Service line at: 1-888-407-9997.

UV Pure may source and supply equipment that is manufactured and warranted by other companies (the Original Equipment Manufacturer) and **offered as options** in conjunction with UV Pure's Products and Parts. For example: heaters or AC units used in NEMA cabinets, solenoid shut-off valves, stainless flexible hoses, filter housings and inserts, UPS power supplies, and on-line instrumentation or web-enabling communications equipment. **Warranties for those components are solely the responsibility of the Original Equipment Manufacturer, and NOT UV Pure.** UV Pure uses reasonable efforts to ensure that OEM options are of the highest quality possible and consistent with UV Pure's high standards.

UV Pure is not responsible for Parts or Products that are improperly installed, used and/or not maintained as set out in the Product Manual or as expressly advised by UV Pure. This Limited Warranty does not cover damage caused by accidents, acts of God, minor scratches or imperfections and normal wear and tear. This Limited Warranty is void if the Product is improperly installed, used in conditions that exceed UV Pure's specifications as set out in the Manual or Product Specifications, or if there is water damage due to improper installation or poorly or improperly tightened plumbing connections. This Limited Warranty is void if the Product or Parts have been altered or modified in any way by anyone other than a UV Pure technician or a Certified Service Dealer. Warranty coverage may be void if the Product is operated in combination with ancillary or peripheral equipment not approved by UV Pure for use with the Products.

This Limited Warranty excludes the cost of labour in removing and/or reinstalling any defective Product or Part. In the event that a Product is returned to UV Pure for repair or replacement under the terms of this Limited Warranty, the Product must be returned in its original shipping container and packaging. UV Pure will not be liable for damage to the Product during shipping otherwise.

UV Pure does not assume any liability for personal injury or property damage caused by the use or misuse of any Product or Part. UV Pure is not liable for special, incidental, indirect or consequential damages. UV Pure's liability is limited to repair or replacement of the defective Part or Product and this liability shall terminate upon the expiration of the applicable warranty period as set out above.

This Limited Warranty may be amended or changed at any time, at UV Pure's sole discretion, without notice.

UV Pure offers inspection and refurbishing for older systems.

To assist our customers, UV Pure's certified technicians can provide inspection, recommendations, cost estimates, and complete refurbishing of older systems that may be out of warranty.

TO THE EXTENT PERMITTED BY APPLICABLE CONSUMER PROTECTION LAWS, ANY WARRANTIES PROVIDED FOR HEREIN ARE IN LIEU OF ANY OTHER WARRANTY, AND ALL OTHER WARRANTIES ARE HEREBY DISCLAIMED, WHETHER EXPRESS OR IMPLIED.

10. NSF STATEMENT



The Hallett 500PN and Hallett 750PN systems are Tested and Certified by NSF International against NSF/ANSI Standard 55 for Disinfection Performance, Class A.

Who is the NSF? The NSF is the global gold standard accepted by environmental regulatory agents worldwide for water treatment and disinfection.

This Class A system conforms to NSF/ANSI 55 for the disinfection of microbiologically contaminated water that meets all other public health standards. This system is not intended to convert wastewater or raw sewage to drinking water. The system is intended to be installed on visually clear water.

NSF/ANSI 55 defines wastewater to include human and/or animal body waste, toilet paper, and any other material intended to be deposited in a receptacle designed to receive urine and/or feces (black waste); and other waste materials deposited in plumbing fixtures (grey waste).

If this system is used for the treatment of untreated surface waters or ground water under the direct influence of surface water, a device found to be in conformance for cyst reduction under the appropriate NSF/ANSI Standard shall be installed upstream of the system.

The information contained in this document is subject to change without notice. UV Pure Technologies Inc. shall not be liable for errors contained herein or for consequential damages from improper installation or operation of this unit.



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