

SANITRON®

ULTRAVIOLET WATER PURIFIERS

**Models S2400C, S5,000C–S25,000C
High Capacity Systems**

Read and Follow All Safety Instructions. Save These Instructions.



Installation, Operation & Maintenance



SINCE 1963

*Manufacturers / Engineers / Sales / Service
Germicidal Ultraviolet - Equipment & Lamps*

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Certified to
NSF/ANSI 61 & 372

Our S2400C water purifier, used to build Model S5,000C and up, is certified to NSF®/ANSI Standard 61 & 372.



Owner's Manual

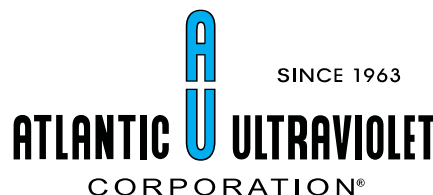
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These instructions generally describe the installation, operation and maintenance of the **SANITRON®** Model S2400C line of water purifiers. Models S5,000C and S10,000C through S25,000C High-Capacity Systems utilize the Model S2400C single lamp water purifier in various configurations. Questions that are not specifically answered by these instructions should be directed to the Factory. Atlantic Ultraviolet Corporation® takes all possible precautions when packaging equipment to prevent damage. Carefully inspect and report all damages. Do not install damaged equipment. Follow all instructions on any labels or tags. Carefully inspect all packing materials before discarding to prevent the loss of accessories, mounting hardware, spare parts or instructions.


NSF/ANSI 61 is a set of national standards that relates to water treatment and establishes stringent requirements for the control of equipment that comes in contact with either potable water or products that support the production of potable water. NSF/ANSI 372 was set in 2011 to establish procedures to meet the 0.25% lead content requirement of the RLDWA (Reduction of Lead in Drinking Water Act) using a wetted surface area average calculation or just simply using all no-lead materials for areas in contact with drinking water. NSF/ANSI 372 includes a broader scope of drinking water products covered by the law which may not be covered under NSF/ANSI 61 and enables large or complex products and assemblies to achieve certification.


The information and recommendations contained in this publication are based upon data collected by the Atlantic Ultraviolet Corporation® and are believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. Specifications and information are subject to change without notice.





SAFETY WARNINGS


- All personnel should be alerted to the potential hazards indicated by the product safety labeling on this purifier.
- The following conventions are used to indicate and classify precautions in this manual and on product safety labeling. Failure to observe precautions could result in injury to people or damage to property.

 This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

 **DANGER** Danger indicates an **IMMINENTLY** hazardous situation, which, if not avoided, **WILL** result in death or serious injury.


 **WARNING** Warning indicates a **POTENTIALLY** hazardous situation, which, if not avoided, **COULD** result in death or serious injury.


 **CAUTION** Caution indicates a **POTENTIALLY** hazardous situation, which, if not avoided, **MAY** result in minor or moderate injury.


 **CAUTION** Caution used without the safety alert symbol indicates a potentially hazardous situation, which, if not avoided, may result in property damage.


 This symbol/pictorial is used to identify an **ELECTRICAL SHOCK** or **ELECTROCUTION** hazard.

 This symbol/pictorial is used to identify an **ULTRAVIOLET LIGHT** hazard.

 This symbol/pictorial is used to identify the need to wear approved ultraviolet blocking eyewear.





 This symbol/pictorial is used to identify the need to wear approved ultraviolet blocking face shield.

 This symbol/pictorial is used to identify the need to wear protective gloves.

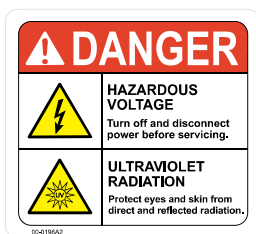
 This symbol/pictorial is used to identify components which must not be disposed of in trash

SAFETY INSTRUCTIONS

 **WARNING** To guard against injury, basic safety precautions should be observed, including the following:

1. Read and follow **ALL** safety instructions.
2. Do not use this water purifier for other than its intended purpose as described in this manual.
3. Do not alter design or construction.
4. Do not remove any labels or devices.
5.  **DANGER** To prevent the risk of severe or fatal electrical shock, special precautions must be taken since water is present near electrical equipment. **Always disconnect power before performing any service or maintenance.**
6.  **WARNING** Avoid exposure to direct or reflected germicidal ultraviolet rays. Germicidal ultraviolet rays are harmful to the eyes and skin.
7. Intended for indoor use only. The water purifier should be protected from the elements and from temperatures below freezing.
8. Do not operate water purifier if lamp cable, lamp connection, power cord and/or plug are damaged, or if any other damage to the water purifier is visible or suspected
9. Electrical power supplied, to the water purifier, **MUST** match power requirements listed on the water purifier.
10.  **WARNING** Plug the water purifier only into an approved ground fault circuit interrupt (GFCI) receptacle.
11.  **WARNING** Do not operate without proper electrical ground.
12. Do not exceed water purifier's maximum rated flow capacity.
13. Do not exceed maximum operating pressure of 100 PSI.
14. Read and follow all notices and warnings on the water purifier.
15. **SAVE THESE INSTRUCTIONS.**

SAFETY LABELS



Danger Label: Hazardous Voltage and Ultraviolet Radiation (00-0196A2)



Location of Danger Label (00-0196A1)

CAUTION

It is the user's responsibility to determine and validate the suitability of this equipment for use in the user's system or process.

No warranty or representation is made by the manufacturer with respect to suitability or performance of this equipment or to the results that may be expected from its use.

The user should periodically inspect, clean as necessary and confirm the presence and good legibility of the product safety labels. Contact the factory for replacement labels in the event that any of the labels are missing or illegible.

PRODUCT APPLICATION

CONSTRUCTION

- The water purifier is designed to mount horizontally.
- The water purifier's dual heads are removable and may be rotated independently. (See **Figure 3 – Recommended Positions of Inlet/Outlet Fittings** in the “**Installation**” section.) facilitates ease of installation, maintenance or the retrofitting of an existing system. A drain port on the chamber aids in draining of the purifier.
- The water purifier's chamber and chamber heads are passivated and electropolished type 316 Stainless Steel.
- The ballast housing is a combination of Stainless Steel Type 304 and Aluminum Alloy.
- Coated chambers are available for uses with special applications, consult Factory. Coated chambers are not recommended for use in drinking water applications or in applications where the treated product is consumed.
- The dual-action wiper mechanism allows for quick and easy quartz sleeve cleaning, without interrupting service.
- **EASY-OFF™** End Caps enable quick and easy lamp change, without disconnecting from the water supply or draining the purifier. No tools are required. **Always disconnect electrical power when changing lamp.**

PRINCIPLE OF OPERATION

The **SANITRON®** design has been carefully conceived to provide adequate germicidal dosage throughout the disinfection chamber. The dosage, as it applies to ultraviolet disinfection, is a function of time and the intensity of ultraviolet radiation to which the water is exposed. The exposure time, in seconds, is the total time it takes the water to flow through the disinfection chamber exposing it to the germicidal lamp. Exposure time is related to the flow rate; the higher the flow rate, the lower the exposure time or the lower the flow rate, the higher the exposure time. The ultraviolet intensity is the amount of energy, per unit time, emitted by the germicidal lamp. The dosage is the product of ultraviolet intensity and the exposure time. The operation of the **SANITRON®** is as follows:

- Water enters the purifier and flows into the annular space between the quartz sleeve and the chamber wall.
- Suspended microorganisms are exposed to the ultraviolet rays emitted by the germicidal lamp.
- The translucent sight port, or optional ultraviolet monitor, provides visual indication of germicidal lamp operation.
- The dual action wiper mechanism facilitates periodic cleaning of the quartz sleeve without disassembly or interruption of purifier operation.
- Water leaving the purifier is instantly ready for use, no further contact time is required.

LIMITATION OF USE

The water purifier is intended for the use with visually clear water, not colored, cloudy or turbid. See “**Water Quality**” section below. The water purifier is **NOT** intended for the treatment of water that has an obvious contamination or intentional source, such as raw sewage; nor is the purifier intended to convert wastewater to microbiologically safe drinking water.

WATER QUALITY

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

Table 1 – Maximum Concentration Levels

Turbidity	< 1 NTU
Manganese	0.05 mg/1
Total Suspended Solids	10 mg /1
pH:	6.5 - 9.5
Color:	None
Hardness	6 GPG or 102.6 PPM
Iron	0.3 mg/1
Tannins:	< 0.1 ppm (0.1 mg/l)
UV Transmission	>85% per cm*

Effectively treating water with higher concentration levels than listed on **Table 1** can be accomplished, but may require added measures to improve water quality to treatable levels. If, for any reason, it is believed the ultraviolet transmission is not satisfactory, contact the factory.

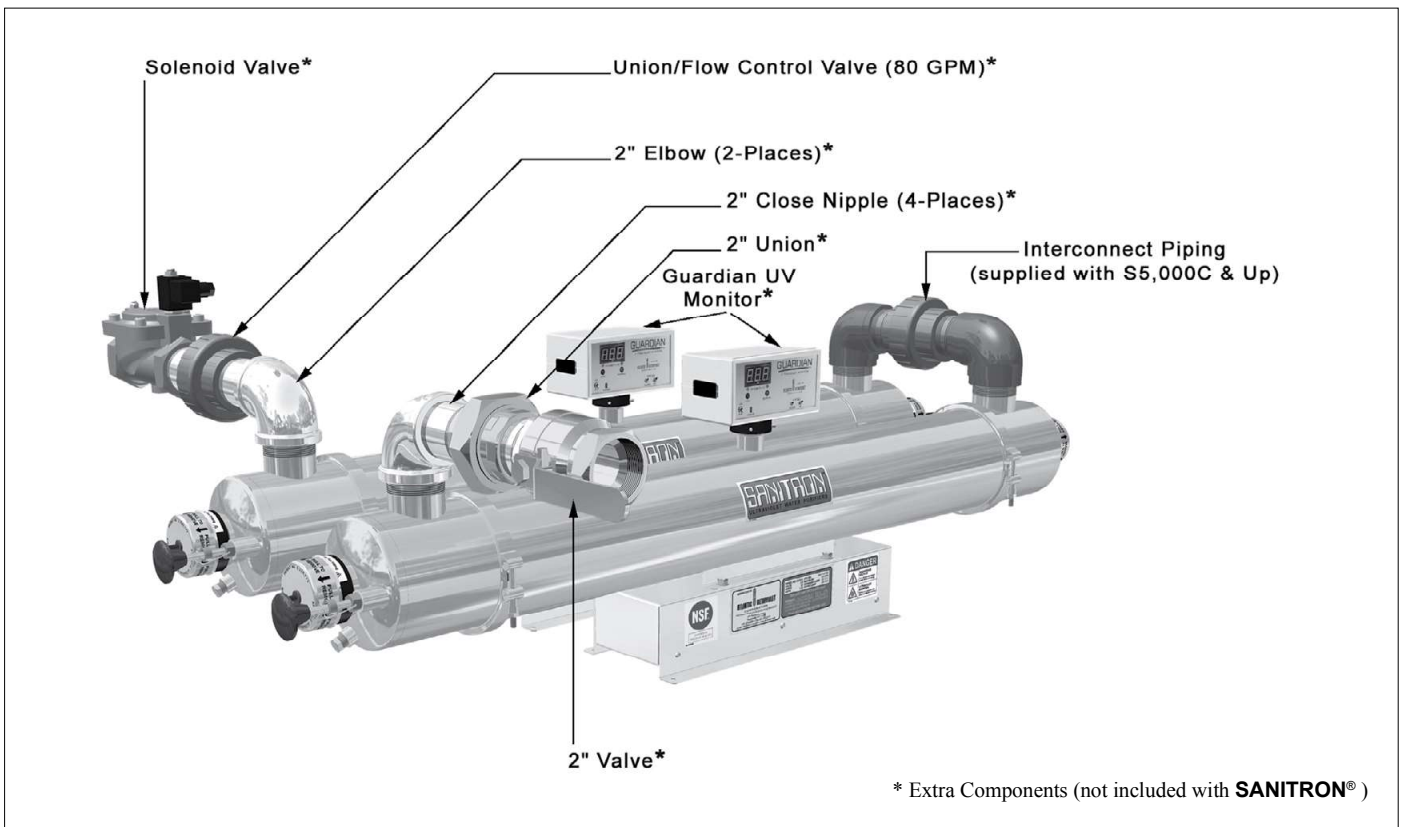
* Contact Factory for recommendations on applications where UV transmission is < 85%

INSTALLATION

LOCATION

1. The water purifier is intended for indoor use only. The water purifier is designed to mount horizontally. The water purifier should be protected from the elements and from temperatures below freezing. The ambient temperature, in the area surrounding the water purifier, should be between 35°F and 100°F.
2. Electrical power supplied to the water purifier **MUST** match power requirements listed on the water purifier. Use of a voltage surge protector is recommended.
3. ⚠ **CAUTION** Plug water purifier only into an approved ground fault circuit interrupt (GFCI) receptacle.
4. The water purifier should be located in a dry, well-lit area, which provides enough room to perform routine maintenance. This includes a minimum distance of one chamber length from the wiper end, to allow for cleaning and/or the changing of the lamp and quartz sleeve as well as a minimum of 6" on the opposite end of the water purifier. Minimum clearance to floor 18".
5. The water purifier should always be located closest to the point of use. This reduces the chance of the purified water being re-contaminated by bacteria in the water distribution system after the water purifier.
6. **CAUTION** As with any water handling device, the water purifier should be located in an area where any possible condensation or leakage from the water purifier, any purifier accessory and/or plumbing will not result in damage to the area surrounding the water purifier. **For added protection, it is recommended that a suitable drain pan be installed under the purifier. The drain pan must be plumbed to an adequate, free flowing drain to prevent water damage in event of a leak. There are numerous leak detection/flood stop devices, available on the market today, designed to stop flow of water, reducing the chance of water damage due to leakage. For more details regarding leak prevention and/or limiting damages due to leaks please contact factory.**
7. The water purifier should be located after all other water devices, such as De-ionizers, Water Softeners, Carbon Filters, Pre-Filters, Reverse Osmosis, Pressure Tanks, and Pumps. This eliminates the possibility of the purified water being re-contaminated by bacteria in any of these purifiers.

Figure 1 – SANITRON® Drawing (S5,000C shown) with options and extra components



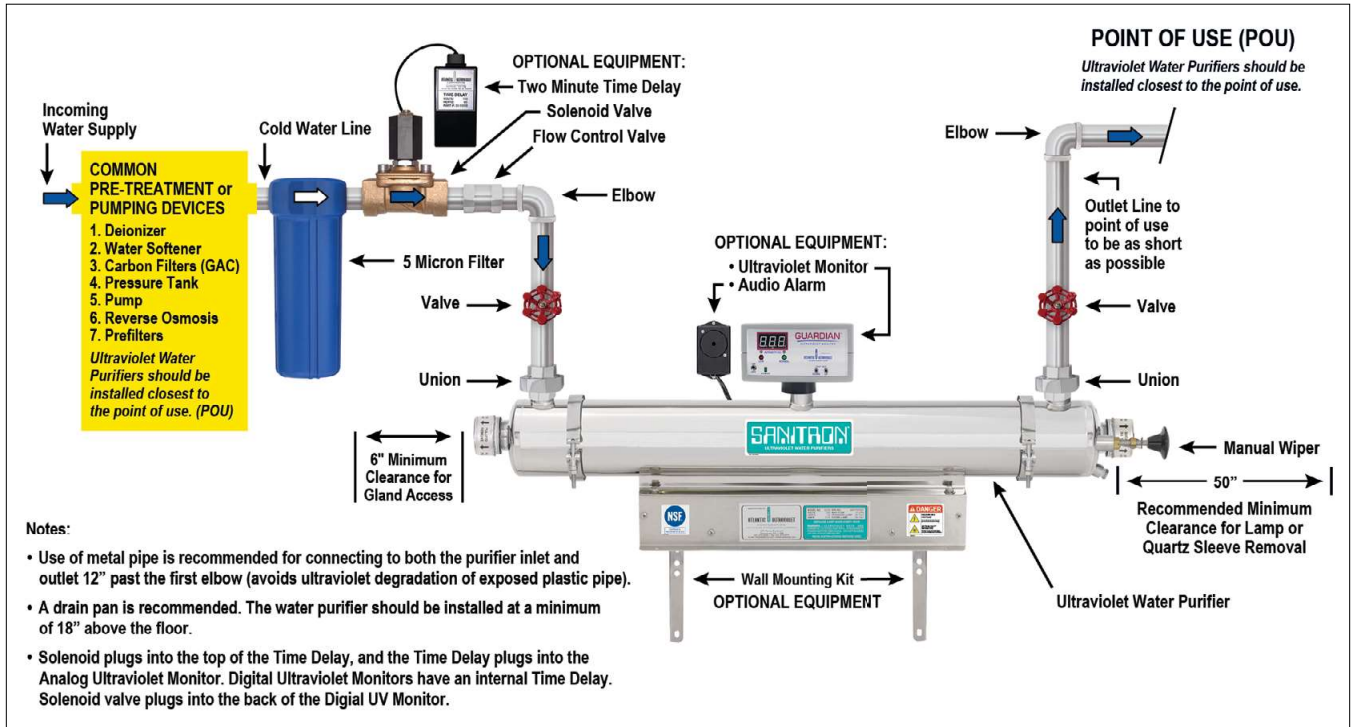
INSTALLATION



IN ORDER TO PERFORM THIS TASK, BE SURE TO WEAR THE FOLLOWING SAFETY EQUIPMENT: SAFETY GLASSES OR A FACE SHIELD, AS WELL AS GLOVES.

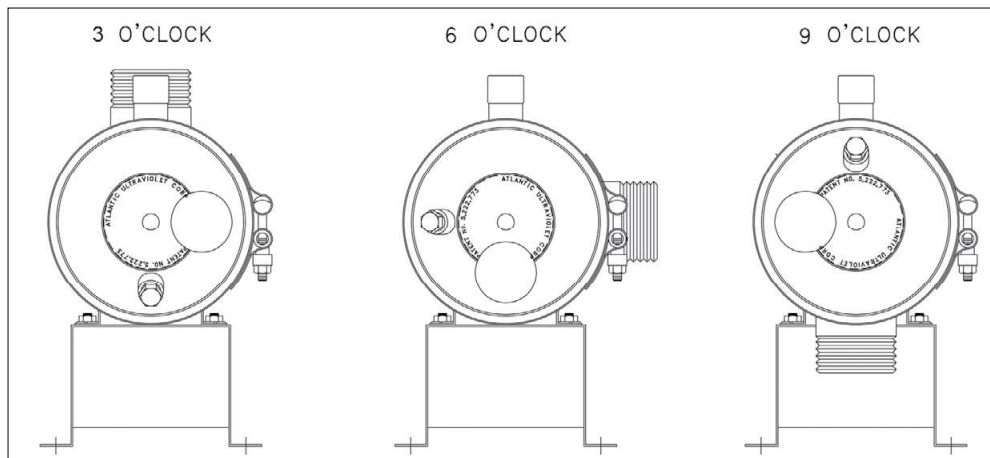
1. Remove water purifier from shipping carton. Inspect water purifier, power cord and plug for damage. Do not operate if there is any damage to the purifier, power cord or plug. **SANITRON®** Model S2400C is shipped with the lamp packed separately. Keep the lamp aside for installation once the purifier has been properly installed.
2. Purifiers occasionally experience damage in shipment due to the fragility of the quartz sleeve. It is, therefore, recommended to inspect the water purifier for damage to the quartz sleeve after it has been removed from the shipping carton. Each end of the purifier as well as the inlet and outlet should be viewed to see if the quartz sleeve has experienced damage. If the quartz sleeve shows signs of damage it should be replaced before the purifier is pressurized. See “**Quartz Sleeve Installation or Replacement**” in the “**Maintenance**” section for the proper method of replacing the quartz sleeve in your water purifier.

Figure 2 – Recommended Installation



3. The water purifier’s dual chamber heads are removable and may be rotated independently, which aids in the installation, maintenance or the retrofitting of an existing system.

Figure 3 – Recommended Installation



Note: DO NOT rotate head so wiper knob is at 12 o'clock position

4. The water purifier should be mounted horizontally on a flat dry surface. Secure the water purifier using the mounting holes in the ballast housing or with the optional wall mounting kit. The purifier should not be solely supported by its plumbing connections.

5. The water purifier must be connected to the cold water line only. Inlet water temperature should not exceed 100°F.
6. Installation requires that a 5-micron sediment filter or finer be installed, in line, prior to the water purifier. The sediment filter will stop or trap large particulates from entering the water purifier. Particulates may cause deposits on the quartz sleeve, as well as interfere with the purifier's ability to disinfect the water. The sediment filter may also help to reduce the amount of routine cleanings of the quartz sleeve.
7. Shut off valves should be installed on both the inlet and outlet sides of the water purifier. **The use of bypass valves is not recommended.** The shut off valves allow the purifier to be isolated from the water supply, which is required when removing the quartz sleeve.
8. Unions should be installed on both the inlet and outlet of the water purifier; this will allow easy removal of the water purifier from the plumbing, if required. Apply Teflon® tape to threads of inlet and outlet ports to ensure a tight seal.
9. When all plumbing connections are complete, allow water to enter the water purifier at a low flow rate, until the purifier is full. **NOTE: Close the purifier outlet valve to pressurize the chamber.** With the purifier pressurized, it should be checked for leaks. Once it is determined that there are no leaks, the inlet valve can be fully opened.
10. For Models with lamps packed separately, install lamp following the steps in "Lamp Installation or Replacement" section.

⚠ CAUTION Lamp and quartz sleeve are easily damaged. Exercise care when handling.

11. **⚠ WARNING** Plug water purifier into approved ground fault circuit interrupt (GFCI) receptacle. Confirm lamp operation indication at sight port.
12. Once the plumbing hook ups are made, it is a good practice to disinfect the "downstream" plumbing between the purifier and point of use. This is done by introducing chlorine or other disinfectant solution into the purifier chamber, a 100-ppm of chlorine is suggested. With the disinfectant in the purifier chamber, turn the ultraviolet purifier on. Open the "downstream" outlet until a chlorine or disinfectant solution odor is noticed. Close the outlet and allow the disinfectant to remain in the plumbing for three (3) hours. Flush the plumbing with ultraviolet purified water; allow the water to run for a minimum of 5 minutes prior to use (to ensure no chlorine or disinfectant smell can be detected). This will allow the chlorine or disinfectant solution to be flushed from the pipes.

RECOMMENDED OPTIONS

1. **GUARDIAN™ Ultraviolet Monitor***: Visually indicates the level of germicidal ultraviolet energy that penetrates the quartz sleeve and the water within the water purifier. The ultraviolet monitor is capable of operating an optional **Promate™** Audio Alarm and/or **Promate™** Solenoid Valve. The ultraviolet monitor will detect reduction of ultraviolet levels due to:
 - Fouling or deposits on the quartz sleeve.
 - Poor ultraviolet transmission through the water; color, turbidity, and organic or other impurities in the water can reduce or interfere with the transmission of ultraviolet rays.
 - Lamp outage or component failure. (Monitor will not function in power outage.)
 - Depreciation of the lamp output due to usage or other cause. Lamp output gradually depreciates with use. Lamp replacement is recommended once each year.
2. **GUARDIAN™ ASSIST Ultraviolet Monitor Extension**: Designed to remotely indicate the intensity level displayed on the **GUARDIAN™** Ultraviolet Monitor.
 - The **GUARDIAN™ ASSIST** converts a 4–20mA signal from the **GUARDIAN™** Ultraviolet Monitor to an intensity level displayed on the top panel. A 4 mA signal would read 0 and a 20mA signal would read 120.
 - The **GUARDIAN™ ASSIST** intensity reading will be the same as the **GUARDIAN™** Ultraviolet Monitor +/- 2%.
3. **SENTRY™ Safety Sensor**: Indicators provide constant visual monitoring of normal operation. In the event of ballast or lamp failure the safety sensor indicates an alarm condition. The safety sensor is capable of operating an optional **Promate™** Audio Alarm and/or **Promate™** Solenoid Valve.
4. **STERALERT™ Lamp Status Alarm**: Produces a high pitched, pulsed tone when the water purifier is no longer functioning when visible light fails.
5. **SureFLO™ Flow Control Valve***: Limits water flow to the rated capacity of the purifier. The flow control valve is located in line prior to the water purifier, and should be protected from ultraviolet exposure by the use of a 90-degree elbow fitting between the flow control valve and the water purifier.
6. **Promate™ Audio Alarm***: Activated by the Ultraviolet Monitor or Safety Sensor, alerts the user to any malfunction detected.
7. **Promate™ Solenoid Valve***: Operated in conjunction with the Ultraviolet Monitor, Safety Sensor or Time Delay Mechanism, this valve prevents water flow through the water purifier when an abnormal condition is detected or in the event of power failure. (**"Recommended Options" Continued on Page 8**)

8. **Promate™ Elapsed Time Indicator:** A non-resettable display of the water purifier operating hours. Useful for scheduling and recording maintenance and lamp replacement.
9. **Promate™ Time Delay Mechanism*:** Provides a 2-minute warm up period during which the ultraviolet lamp achieves its full germicidal output before the water is allowed to flow through the water purifier. The time delay mechanism is used in conjunction with, and is electrically connected to the Solenoid Valve.
10. **Promate™ Wall Mount Kit:** Model S2400C Stainless steel wall brackets provide quick and easy installation and professional finish. Pre-drilled and ready to install. Optimizes free air circulation to cool ballast housing.
11. **QUANTUM™ Thermal Optimizer:** Thermal relief valve used to help regulate the water temperature inside the water purifier's disinfection chamber. Since the relative ultraviolet output, of a germicidal lamp, is affected by temperature it is important to keep the lamp's temperature within the peak output temperature range.
12. **Promate™ Safety Glasses:** Safety eyewear should be used as general-purpose safety protection and for additional shielding from ultraviolet rays.
13. **Promate™ Face Shield:** Adjustable headgear and lightweight visor provides eye and face protection from germicidal ultraviolet rays.

* Use of this option is recommended by U.S. Public Health Service "Criteria for Acceptability of an Ultraviolet Disinfection Unit." Originally issued April, 1966.

NOTE: The recommended options above are available from Atlantic Ultraviolet Corporation® or a distributor of their products. For the other devices that may be required for your application, please contact your local water treatment dealer, plumber or plumbing supplier.

MAINTENANCE

The water purifier is designed to operate with a minimal amount of maintenance, providing the water quality does not exceed maximum concentration levels, see "Water Quality" in the "Product Application" section. Ordinary maintenance consists of:

- Lamp replacement is recommended every 10,000 hours of operation, approximately 12 months of continuous service.
- Cleaning of the quartz sleeve, when conditions warrant. It is recommended that the inspection of quartz sleeve be performed after one month of use. If quartz sleeve is found to be coated (not clear), then frequency of cleaning must be done more often. Deposits or discoloration on the surface of quartz sleeve are caused by excessive levels of the subject contaminant within the water that is in contact with the quartz sleeve. Most deposits on the quartz sleeve are caused by an excess of calcium (hardness), iron or manganese. **Table 1 on Page 4** lists the maximum recommended concentration of these minerals in the water that passes through the ultraviolet purifier. If you encounter difficulty due to deposits on the quartz sleeve, your dealer will be able to recommend suitable pretreatment to reduce or eliminate the offending contaminant. If quartz sleeve is clean (clear) then frequency of cleaning may be extended. **NOTE: SANITRON® Ultraviolet water purifiers are equipped with a manual wiping mechanism making the process of routine cleaning easier and therefore, recommended weekly or at the very least monthly to insure your performance. NOTE: The use of optional GUARDIAN™ Ultraviolet Monitor will detect loss of transmission due to coating on the quartz sleeve.**
- Always disconnect the water supply and completely drain the water purifier if it will be subjected to temperatures below freezing.
- Contact factory with questions.

INSPECTION

1. Regularly inspect the water purifier to ensure that the germicidal lamp is still in operation.
 - On purifiers not equipped with the Ultraviolet Monitor, lamp operation can be verified by a visible glow through the translucent sight port. This provides an indication of lamp operation and does not indicate the level of ultraviolet intensity or transmission through the water.
 - On purifiers so equipped, the **GUARDIAN™** Ultraviolet Monitor provides visual indication of the ultraviolet intensity through the quartz sleeve and water in the purifier chamber.
2. To ensure proper operation of the water purifier, regular biological testing of the purifier output water should be performed on a schedule recommended by local public health authorities, or at minimum, at installation, quarterly for the first year of service and annually, at lamp replacement, for the life of the water purifier.
3. Additional testing should be performed whenever modifications, change, or additions are made to plumbing system, pumps, well source water etc. to ensure adequate disinfection under new condition.
4. As with any water purifier installation, routine maintenance is necessary to ensure you equipment is operating correctly. Regular inspection must also include confirmation that approved ground fault circuit interrupt (GFCI) receptacle is still operational and that water purifier is plugged into this GFCI. Any components which are damaged or broken should be replaced.

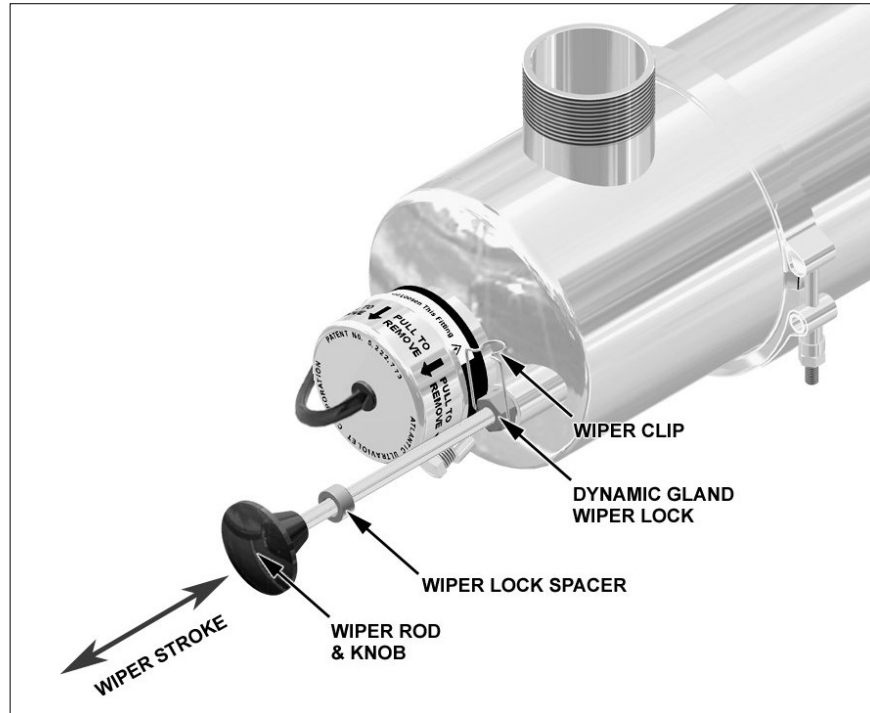
DISPOSAL OF MERCURY ADDED LAMPS



Germicidal ultraviolet lamps, like standard fluorescent lamps contain small amounts of mercury. Mercury added lamps should not be placed in the trash. Dispose of properly. For further information regarding the disposal and recycling of lamps containing mercury, along with Federal and State requirements visit LampRecycle.org. For more information on **STER-L-RAY®** Germicidal Ultraviolet Lamps, visit Ultraviolet.com or BuyUltraviolet.com.

QUARTZ SLEEVE CLEANING USING WIPER MECHANISM

Figure 4 – Quartz Sleeve Cleaning



Step 1 – Lift wiper clip up



Step 2 – Gently pull wiper knob out



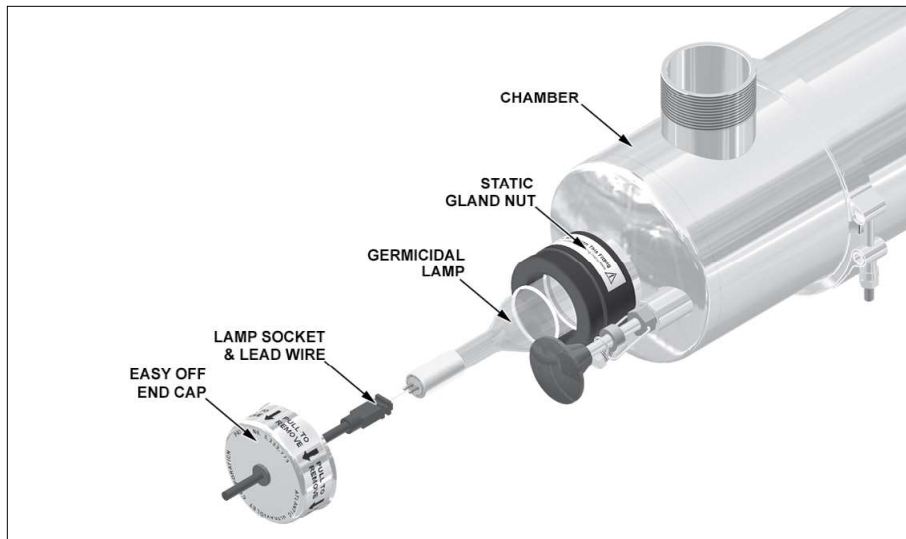
Step 3 – Push wiper back in

Routine cleaning of the quartz sleeve is easily accomplished, using the dual action wiper mechanism.

1. Lift wiper clip up and away from wiper rod.
2. Grasp wiper knob and gently pull out, away, from the purifier until it reaches its stop.
3. Push wiper back in, toward the purifier until it reaches its second stop.
4. Repeat steps 2 and 3 as necessary.
5. Holding wiper in place, return wiper clip and snap over wiper rod, in front of the wiper lock spacer.

LAMP INSTALLATION OR REPLACEMENT

Figure 5 – Lamp Replacement



Step 2 – Remove End Cap



Step 3 – Withdraw Lamp



Steps 4 & 5 – Remove Sockets



Step 6 – Remove Lamp



IN ORDER TO PERFORM THIS TASK, BE SURE TO WEAR THE FOLLOWING SAFETY EQUIPMENT: SAFETY GLASSES OR A FACE SHIELD, AS WELL AS GLOVES.

1. ⚠️ **WARNING** Disconnect power to water purifier.
2. Remove both **EASY-OFF™** End Caps by pulling each cap off static gland nut. Slide each end cap along the wire away from the socket.
3. Carefully withdraw lamp approximately 2 inches from chamber while feeding lamp socket and lead wire on opposite end of chamber.
4. While holding lamp end, carefully remove lamp socket on end now exposed.
5. Next, carefully slide lamp back into chamber, until approximately 2 inches of the lamp is exposed on the opposite end. Hold lamp and remove lamp socket.
6. Lamp should now be disconnected on both ends. Carefully remove lamp from chamber. Be sure to withdraw lamp straight out without angling until completely clear of quartz sleeve.

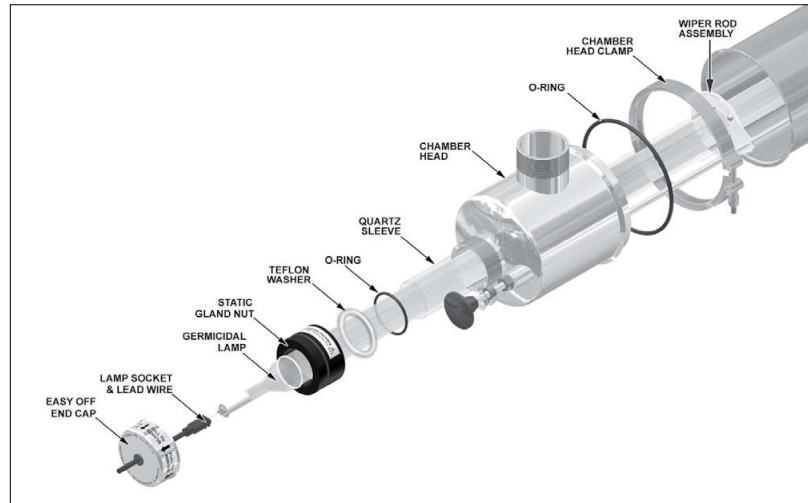
CAUTION Lamp and quartz sleeve are easily damaged. Exercise care when handling.

7. Reinstall lamp in reverse order.

WARNING Germicidal ultraviolet rays are harmful to eyes and skin. Do not restore power to water purifier until lamp and both **EASY-OFF™** End Caps have been properly reinstalled.

QUARTZ SLEEVE INSTALLATION OR REPLACEMENT

Figure 6 – Quartz Sleeve Installation or Replacement



Step 4 – Remove Gland Nuts



Step 5 – Remove Washer & O-Ring



Step 6 – Remove Quartz Sleeve

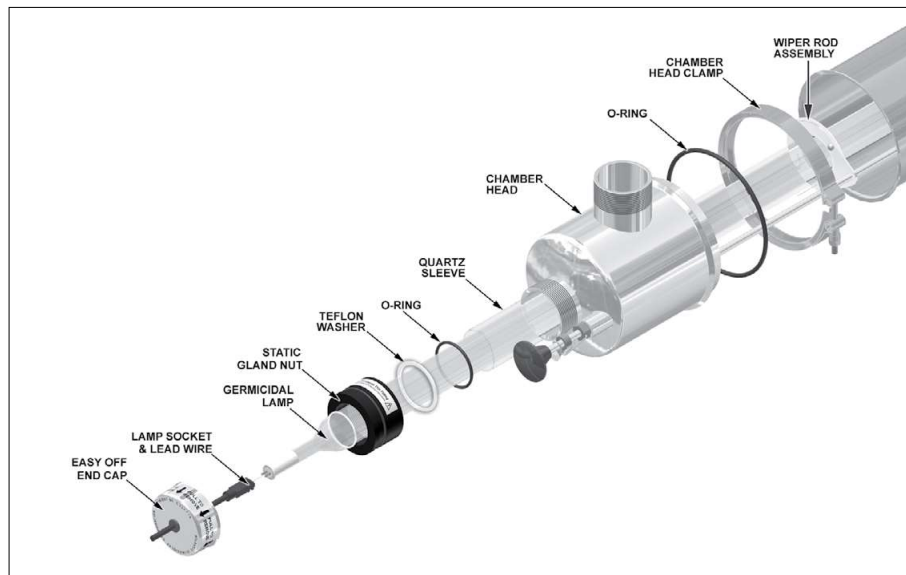


IN ORDER TO PERFORM THIS TASK, BE SURE TO WEAR THE FOLLOWING SAFETY EQUIPMENT: SAFETY GLASSES OR A FACE SHIELD, AS WELL AS GLOVES.

1. ⚠️ **WARNING** Disconnect power to water purifier.
2. Shut off water supply to water purifier via inlet and outlet shut off valves. Drain chamber. Once the chamber is completely drained, remove any old sealing tape from the threads of the drain plug, rewrap with 1/2" wide Teflon® thread sealing tape, reinstall and tighten the drain plug.
3. Follow the steps in “Lamp Installation or Replacement” to remove lamp.
CAUTION Lamp and quartz sleeve are easily damaged. Exercise care when handling.
4. Unscrew static gland nuts from each end of the chamber. Avoid striking quartz sleeve with static gland nut.
5. Remove Teflon® washer and O-Ring from both ends of quartz sleeve. Teflon® washer will sometimes remain within the static gland nut. If so, remove Teflon® washer from static gland nut before proceeding.
6. Carefully remove quartz sleeve from chamber. **NOTE: It is advisable to support the quartz sleeve on the opposite end with your finger so that it does not drop to the bottom of the chamber as it slides into the chamber.**
7. Once the quartz sleeve is removed, clean with alcohol or a mild, non-abrasive detergent. Stubborn stains usually can be removed with a dilute hydrochloric acid. **NOTE: Follow all manufacturer’s instructions and precautions when handling chemicals.**
8. Reassemble in reverse order. Make sure the quartz sleeve protrudes an equal distance past each threaded nipple. Be sure O-Rings are placed on quartz sleeve before Teflon® washer.
9. Tighten static gland nuts firmly by hand only, **DO NOT USE HAND TOOLS**. Tightening with hand tools is likely to cause quartz sleeve to break.
10. **Slowly** restore water supply to water purifier and check for leaks.
11. If no leaks occur, reinstall lamp, following the steps in “Lamp Installation or Replacement” section.
WARNING Germicidal ultraviolet rays are harmful to eyes and skin. Do not restore power to water purifier until lamp and both EASY-OFF™ End Caps have been properly reinstalled.

REPLACEMENT OF *BROKEN QUARTZ SLEEVE*

Figure 7 – Quartz Sleeve



IN ORDER TO PERFORM THIS TASK, BE SURE TO WEAR THE FOLLOWING SAFETY EQUIPMENT: SAFETY GLASSES OR A FACE SHIELD, AS WELL AS GLOVES.

CAUTION Broken Quartz is **SHARP**. It is recommended that protective glasses and gloves are worn when handling.

WARNING Disconnect power to water purifier. Shut off water supply to water purifier via inlet and outlet shut-off valves. Completely drain chamber.

Follow the steps in “**Quartz Sleeve Installation or Replacement**” to remove lamp and quartz sleeve.

1. To prevent damage to the electrical components, it is necessary to separate the ballast housing from the purifier chamber.
 - On **SANITRON**® Model S2400C the ballast housing is mounted to the purifier chamber using four (4) 1/4”-20 x 3/8” long hex head bolts. Using a 7/16” wrench or an adjustable wrench, carefully remove the four (4) bolts with the lock and flat washers, from along the top of the ballast housing, and set aside. Separate the housing from the chamber.
 - Keep ballast housing and mounting hardware in a clean, dry area.
2. **CAUTION** Carefully remove as much of the broken quartz sleeve as possible, from each end of the chamber.
3. Remove chamber head clamp, by using a 7/16” wrench to loosen and remove the 1/4” nut from the head clamp.
4. Withdraw chamber head and wiper assembly, from the chamber.
5. Any broken pieces of the quartz sleeve can now be removed through the open end of the purifier chamber. Flush water through chamber being careful to remove all quartz fragments from the interior of the chamber.
6. **Carefully** discard all pieces of the broken quartz sleeve.
7. Inspect the large O-Ring used to seal the chamber and the chamber head. Make sure the O-Ring is seated properly between the chamber head ring and the flare of the chamber head.
8. Insert replacement quartz sleeve through each Teflon® wiper segment, starting from the furthest segment working towards the chamber head. Twisting the quartz sleeve will help work the quartz sleeve through the Teflon® segments. Align the end of the quartz sleeve with the threaded gland nipple of the chamber head, and pass the quartz sleeve through the chamber head.
9. To re-install, carefully slide the chamber head and wiper rod assembly, into the chamber, with drain port pointing down; using your finger, support the far end of the quartz sleeve when passing it through the gland fitting of the chamber. Push chamber head flange into the chamber until flared end, of the chamber and the head, mate against the O-Ring.
10. Replace the head clamp around the flared end of the head and chamber. Install the 1/4” nut and tighten, using a 7/16” wrench, until approximately 3/4” to 7/8” of the bolt protrudes past the nut.
11. Center the quartz sleeve in the chamber, making sure the quartz sleeve protrudes an equal distance past each threaded gland fitting, of the chamber. **(Continued on Page 13)**

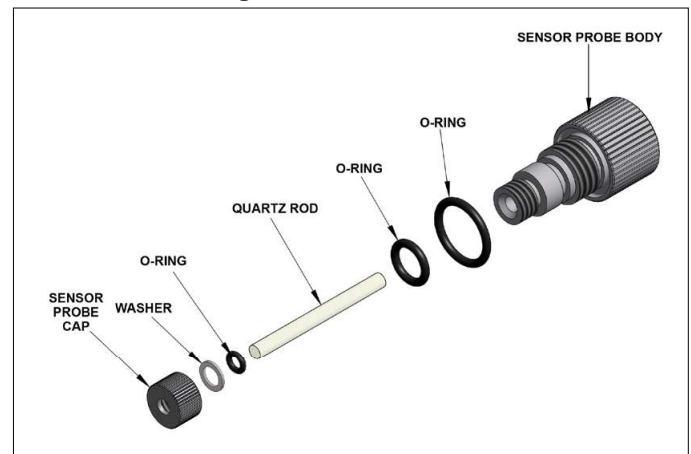
12. Re-install O-Rings, Teflon® washers, and static gland nuts. Be sure O-Rings are placed on quartz sleeve before Teflon® washer. Tighten static gland nuts firmly by hand only, **DO NOT USE HAND TOOLS**. Tightening with hand tools is likely to cause quartz sleeve to break.
13. Re-assemble ballast housing to purifier chamber, using hardware removed in Step 1. **NOTE:** When re-assembling ballast housing to purifier chamber, electrical power cord should exit ballast housing from the end mounted opposite the drain plug.
14. When all connections are complete, allow water to enter the water purifier at a low flow rate until the purifier is pressurized. With the purifier pressurized, it should be checked for leaks.
15. See “**Lamp Installation or Replacement**” section on **Page 10** to properly re-install the lamp into the water purifier.

OPTIONAL GUARDIAN™ ULTRAVIOLET MONITOR SENSOR PROBE CLEANING

Figure 8 – Ultraviolet Monitor and Sensor Probe



Figure 9 – Sensor Probe



If, after cleaning the quartz sleeve, there is no significant improvement in the ultraviolet intensity, as shown on the intensity meter, it may be necessary to clean the Ultraviolet Monitor’s sensor probe. The sensor probe body mounts in a fitting, located in the center of the disinfection chamber, and protrudes into the chamber.

1. ⚠️ **WARNING** Disconnect power to water purifier.
2. Shut off water supply to the water purifier via the inlet and outlet shut off valves. Remove drain plug and drain the chamber. Once the chamber is drained, remove any old sealing tape from the threads of the drain plug, rewrap with 1/2” wide Teflon® thread sealing tape, reinstall and tighten the drain plug.
3. Disconnect power to the Ultraviolet Monitor; remove from chamber by loosening the two set screws on the aluminum collar and lifting it free from probe body.
4. Unscrew the sensor probe and remove from the chamber.
5. Remove the quartz rod sensor probe cap, from the probe body. Take care not to damage the quartz rod, O-Ring or the threads of the probe body. **NOTE:** It is recommended, when servicing the sensor probe, to work in a clean, dry area.
6. Once the quartz rod is removed, clean with alcohol or a mild detergent, and rinse with clean water. Stubborn stains usually can be removed with a dilute hydrochloric acid. **NOTE:** Follow all manufacturer’s instructions and precautions when handling chemicals. Once the quartz rod has been cleaned, handle the rod by the sides, to avoid getting fingerprints on the quartz rod faces.
7. Clean the probe body, by removing any dirt or deposits on all surfaces. O-Rings should be inspected and can be replaced if worn or damaged.
8. Reassemble, replacing the O-Rings, quartz rod and securing in place with the quartz rod sensor probe cap. Tighten the quartz rod sensor probe cap by hand only, **DO NOT USE HAND TOOLS**. Tightening with hand tools may damage the quartz rod or O-Ring seal.
9. Reinstall sensor probe into the center fitting of the chamber and hand tighten.
10. **Slowly** restore water supply to the water purifier, pressurize, and check for leaks. Once it is determined that there are no leaks, inlet valve can be fully opened.
11. Reposition Ultraviolet Monitor on probe body and tighten set screws.
12. Restore power to the water purifier and ultraviolet monitor. If after the cleaning of the quartz rod, there is still no significant improvement in the ultraviolet intensity, as shown on the intensity meter, proceed to the “**Troubleshooting**” section.

TROUBLESHOOTING

⚠️ WARNING Always disconnect power to the water purifier before performing any service or maintenance.
IMPORTANT: This purifier is to be serviced **ONLY** by qualified, and appropriately licensed, personnel.

Table 2 – Troubleshooting

Problem	Possible Cause	Corrective Action
Purifier not operating	No electrical power	Verify that the purifier is connected to a live power source.
Water leaking from purifier	Cracked or broken quartz sleeve	Shut down purifier, drain, and replace quartz sleeve. See “ Quartz Sleeve Installation or Replacement ” in the “ Maintenance ” section.
	Quartz sleeve sealing O-Ring(s) worn, damaged	Shut down purifier, drain, and remove static gland nut, replace sealing O-Ring. See “ Quartz Sleeve Installation or Replacement ” in the “ Maintenance ” section.
	Poor, or loose, connections or fittings	Tighten suspect connection or fitting; or shut down purifier, drain, and remove fitting or connection. Clean threads; reapply thread sealing tape and reinstall.
Poor purifier disinfection performance AND/OR Low UV intensity (As indicated on optional GUARDIAN™ Ultraviolet Monitor)	Quartz sleeve fouled	Clean quartz sleeve, see “ Quartz Sleeve Cleaning ” in the “ Maintenance ” Section.
	Sensor Probe, if equipped, lens or quartz rod fouled	Clean lens or Quartz Rod, see “ Optional Ultraviolet Monitor Sensor Probe Cleaning ” in the “ Maintenance ” section.
	Germicidal lamp output depreciating	Replace lamp, as it nears its end of life (EOL). See “ Lamp Installation or Replacement ” in the “ Maintenance ” section.
	Germicidal lamp not functioning	Replace lamp. See “ Lamp Installation or Replacement ” in the “ Maintenance ” section.
	Low input voltage	Verify input voltage to purifier.
	Change in water quality	Have water tested to confirm that it does not exceed maximum recommended concentration levels for use with this purifier.

OPTIONAL ACCESSORIES

Table 3 – Optional Accessories

Optional Accessories	Available For:
GUARDIAN™ Ultraviolet Monitor - Analog/Digital	S2400C, S5,000C–S25,000C
GUARDIAN™ ASSIST Ultraviolet Monitor Extension	S2400C, S5,000C–S25,000C
SENTRY™ Safety Sensor	S2400C, S5,000C–S25,000C
STERALERT™ Lamp Status Alarm	S2400C, S5,000C–S25,000C
Promate™ Audio Alarm	S2400C, S5,000C–S25,000C
Promate™ Elapsed Time Indicator Universal Input	S2400C, S5,000C–S25,000C
Promate™ Time Delay Mechanism	S2400C, S5,000C–S25,000C
Promate™ Wall Mounting Kit	S2400C
Promate™ Solenoid Valve - (1-1/2”) ①	S2400C
Promate™ Solenoid Valve - (2”) ①	S5,000C–S25,000C
SureFLO™ Flow Control - PVC (2”) ②	S2400C
SureFLO™ Flow Control Valve - Stainless Steel (2”) ②	S2400C
SureFLO™ Flow Control Valve - PVC (2” Union) ②	S5,000C–S25,000C

Most options are available for operation at 120v 60Hz or 220v 50Hz. Please specify.

Not all options may be available for all models, consult factory for availability.

- ① Solenoid requires 2-150 PSI for satisfactory operation.
- ② Unless otherwise specified PVC flow control valves are supplied. All PVC and Stainless Steel flow control valves are male NPT. Consult Factory for other flow control valves.

TECHNICAL SPECIFICATIONS

Table 4 – Technical Specifications

Model:	S2400C 	*\$5,000C	*\$10,000C	*\$15,000C	*\$20,000C	*\$25,000C
Flow Rate (GPM):	40	83	166	250	333	416
Flow Rate (GPH):	2400	5000	10000	15000	20000	25000
Inlet/Outlet Size:	2”m NPT	2”m NPT	2”m NPT	2”m NPT	2”m NPT	2”m NPT
Number of Lamps:	1	2	4	6	8	10
Lamp Model No.:	05-1311-R	05-1311-R	05-1311-R	05-1311-R	05-1311-R	05-1311-R
Length:	52-1/8”	52-1/8”	52-1/8”	52-1/8”	52-1/8”	52-1/8”
Width:	6-9/16”	17”	17”	21-1/8”	21-1/8”	21-1/8”
Height:	11-1/8”	15”	34-3/4”	53-1/4”	71-3/4”	90-1/4”
Chamber Diameter:	5-1/2”	5-1/2”	5-1/2”	5-1/2”	5-1/2”	5-1/2”
Shipping Weight:	49 Lbs	116 Lbs	267 Lbs	400 Lbs	534 Lbs	670 Lbs
Voltage: ①	120V	120V	120V	120V	120V	120V
Amps:	1.17A	2.34A	4.68A	7.02A	9.36A	11.7A
Frequency:	60Hz	60Hz	60Hz	60Hz	60Hz	60Hz
Power Consumption: ③	140 Watts	280 Watts	560 Watts	840 Watts	1120 Watts	1400 Watts
Lamp Watts:	110 Watts	220 Watts	440 Watts	660 Watts	880 Watts	1100 Watts
Max Operating Pressure:	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI	100 PSI
Ambient Temperature:	35–100°F	35–100°F	35–100°F	35–100°F	35–100°F	35–100°F
Quartz Sleeve:	1	2	4	6	8	10
Drain Plug:	1/4” NPT	1/4” NPT	1/4” NPT	1/4” NPT	1/4” NPT	1/4” NPT
Lamp Out Indicator:	Translucent Sight Port	Translucent Sight Port	Translucent Sight Port	Translucent Sight Port	Translucent Sight Port	Translucent Sight Port
Ultraviolet Monitor: ②	Optional	Optional	Optional	Optional	Optional	Optional
Flow Control Valve: ②	Optional	Optional	Optional	Optional	Optional	Optional
Audio Alarm: ②	Optional	Optional	Optional	Optional	Optional	Optional
Solenoid Valve: ②	Optional	Optional	Optional	Optional	Optional	Optional
Time Delay Mechanism: ②	Optional	Optional	Optional	Optional	Optional	Optional
Elapsed Time Indicator:	Optional	Optional	Optional	Optional	Optional	Optional

① 220V 50Hz, 220V 60Hz purifiers are also available. Consult Factory for specific voltage requirements.

② Use of this option is recommended by U.S. Public Health Service “Criteria for Acceptability of an Ultraviolet Disinfection Unit.” Originally issued April, 1966.

③ Total power consumption, including ballast loss (based on 120V purifier).

All specifications, dimensional data, etc. are approximate and subject to change without notice.

*Our S2400C water purifier, used to build this model, is certified to /ANSI Standard 61 & 372.

All above models are available with alternate inlet/outlet fittings.

REPLACEMENT PARTS

SANITRON® Model S2400C

Figure 10 – Exploded View S2400C

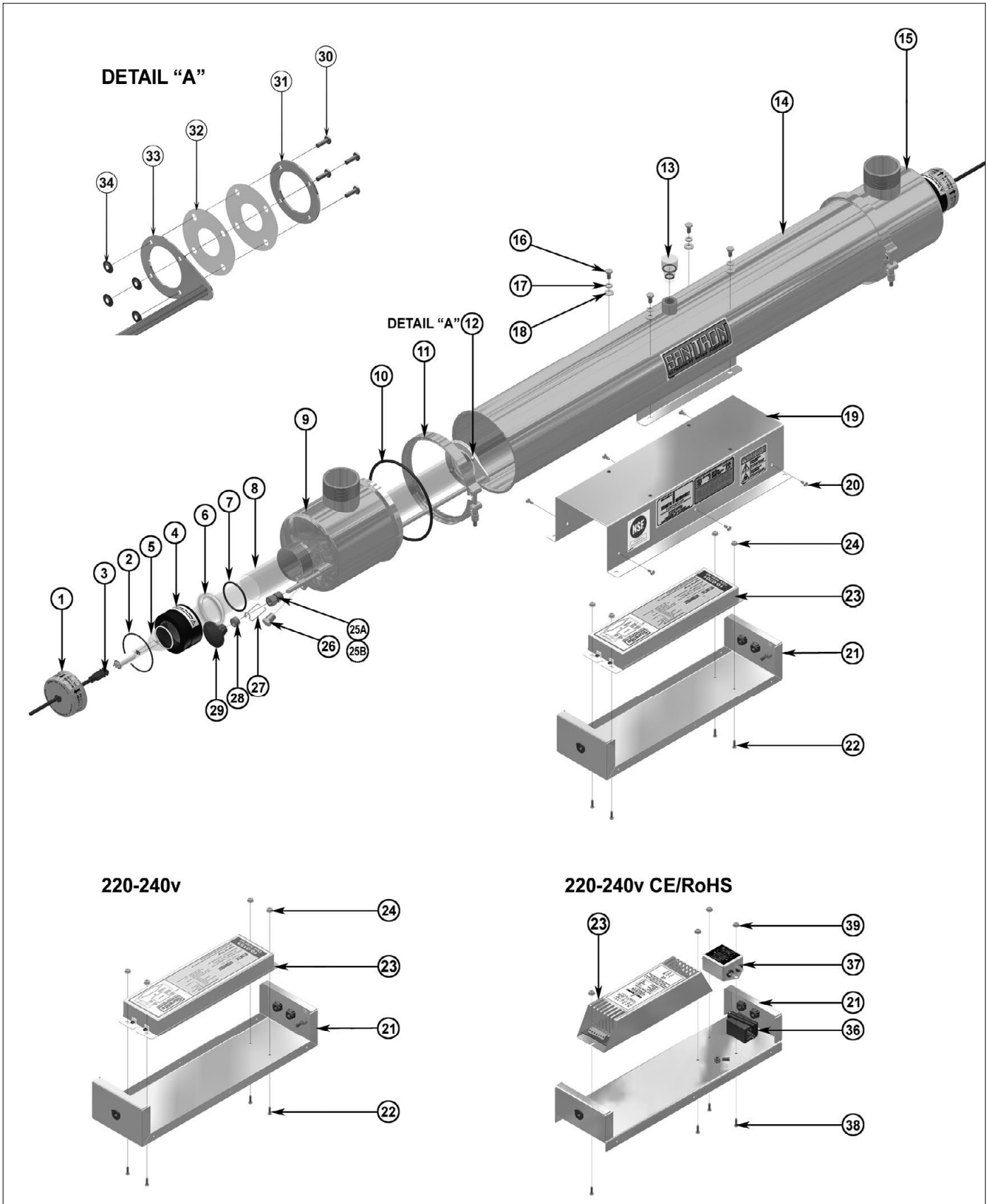


Table 5 – Replacement Parts S2400C

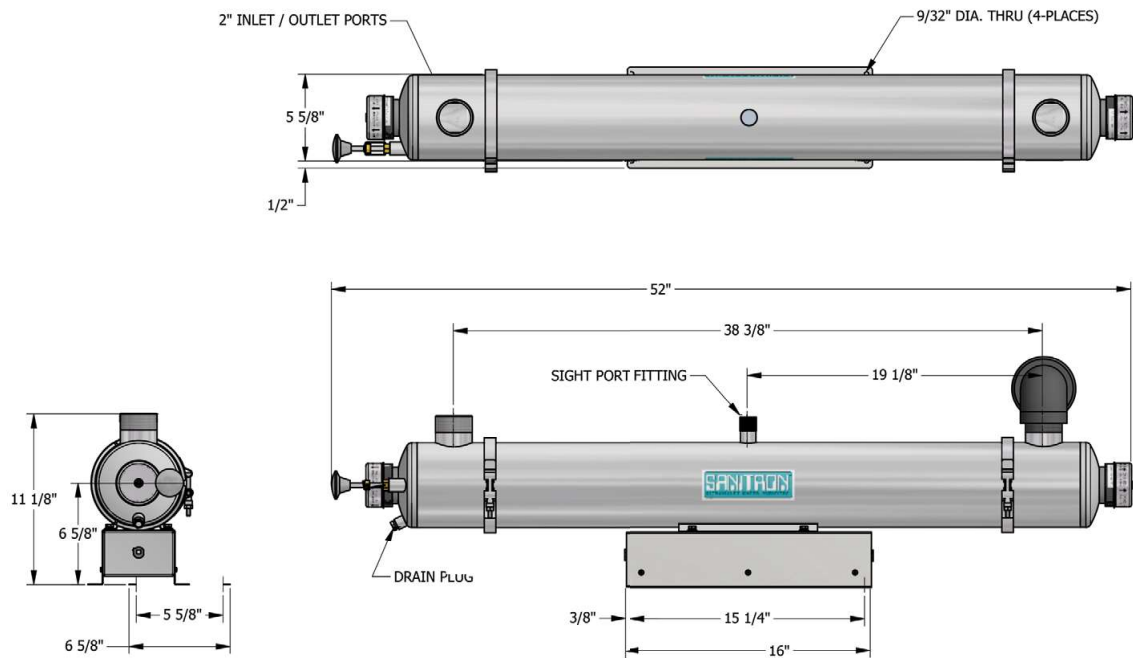
Item No.	Description	120v/60Hz		220-240v/50Hz		RoHS 220-240v	
		Qty	Part Number	Qty	Part Number	Qty	Part Number
1	EASY-OFF™ End Cap	2	25-0389A	2	25-0389A	2	25-0389A
2	Rubber O-Ring, Static Gland	2	00-0085A	2	00-0085A	2	00-0085A
3	Steadfast™ Lead Wire & Socket	2	05-2400A	2	05-2400A	2	05-2400A
4	Promate™ Static Gland Nut	2	25-1232C	2	25-1232C	2	25-1232C
5	STER-L-RAY® Lamp	1	05-1311-R	1	05-1311-R	1	05-1311-R
6	Teflon® Washer	2	25-1236A	2	25-1236A	2	25-1236A
7	Rubber O-Ring, Quartz Sleeve	2	00-1239A	2	00-1239A	2	00-1239A
8	CRYSTAL CLEAR™ Quartz Sleeve	1	15-1082A	1	15-1082A	1	15-1082A
9	Head, Flared	1	25-0763A1	1	25-0763A1	1	25-0763A1
10	Rubber O-Ring, Flared Head	2	00-0020A	2	00-0020A	2	00-0020A
11	Chamber Head Clamp	2	25-4002A	2	25-4002A	2	25-4002A
12	Wiper Rod Assembly	1	25-0427A	1	25-0427A	1	25-0427A
13	Sight Port Plug	1	30-1075	1	30-1075	1	30-1075
14	Chamber	1	25-7060	1	25-7060	1	25-7060
15	Head, Flared	1	25-0764A1	1	25-0764A1	1	25-0764A1
16	Screw, ¼”-20 x 3/8” long	4	50-1034	4	50-1034	4	50-1034
17	Lock Washer, ¼”	4	50-1321	4	50-1321	4	50-1321
18	Flat Washer ¼”	4	50-1317	4	50-1317	4	50-1317
19	Ballast Housing Cover	1	25-0417A	1	25-0417A	1	25-0417A
20	Screw, No. 8 x 3/8” long	6	50-0082	6	50-0082	6	50-0082
21	Ballast Housing	1	25-0418D	1	25-0125A	1	25-0125B
22	Screw, 6-32 x ½” long	4	50-0155	2	50-0155	2	50-0155
23	Surelite™ Ballast	1	10-0201	1	10-0155	1	10-0116
24	Speed Nut, 6-32	4	50-1314	2	50-1314	2	50-1314
25A	Dynamic Gland, Wiper Lock	1	25-1510C1	1	25-1510C1	1	25-1510C1
25B	Dynamic Gland, Wiper Lock	1	25-4041A	1	25-4041A	1	25-4041A
26	Drain Plug	1	27-1216	1	27-1216	1	27-1216
27	Wiper Clip	1	25-1507C1	1	25-1507C1	1	25-1507C1
28	Wiper Lock Spacer	1	25-1512A1	1	25-1512A1	1	25-1512A1
29	Wiper Knob	1	25-1222	1	25-1222	1	25-1222
30	Rivet	16	50-1300A	16	50-1300A	16	50-1300A
31	Wiper Backup Ring	4	25-1379A1	4	25-1379A1	4	25-1379A1
32	Teflon® Wiper Segment	8	25-1242A	8	25-1242A	8	25-1242A
33	Welded Wiper Rod	1	25-0425A	1	25-0425A	1	25-0425A
34	Push Nut	16	50-1223A	16	50-1223A	16	50-1223A
35	Lead Cord	1	35-1100	1	35-1452	1	35-1452
36	Ferrite: Broadband Clamp-on	-	-	-	-	1	35-1766
37	Filter: Power Multi-Stage	-	-	-	-	1	35-1765
38	Screw, 6-32 x 5/16” long	-	-	-	-	2	50-0087
39	Nut, 6-32 Tinnerman	-	-	-	-	2	50-0163

All specifications, dimensional data, etc. are approximate and subject to change without notice.

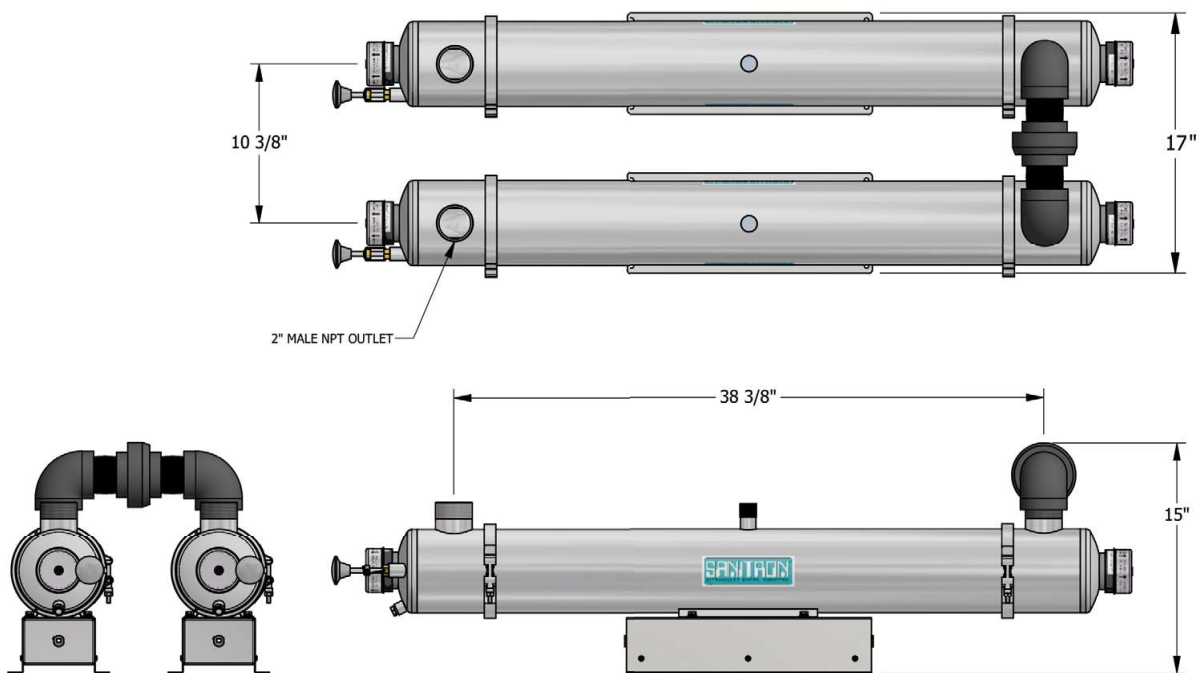
SANITRON® HIGH CAPACITY SYSTEMS

DIMENSIONAL DATA

Figure 11 – S2400C & S5,000C Dimensional Data



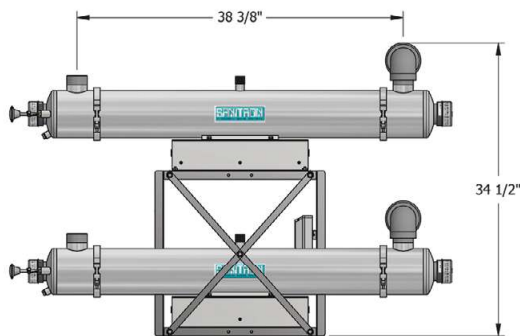
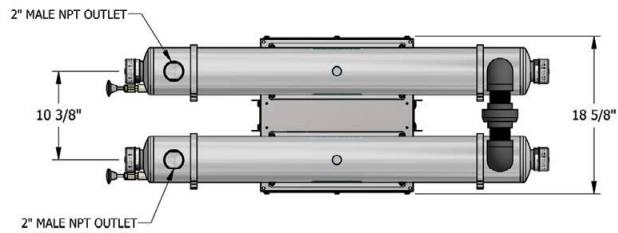
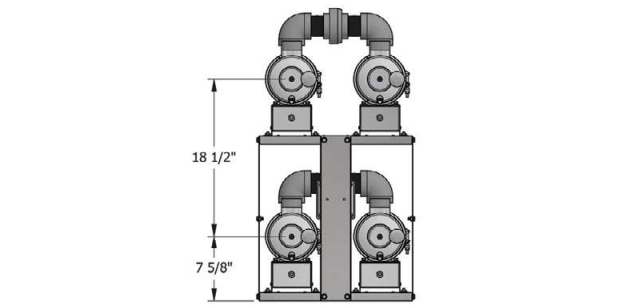
SANITRON® S2400C



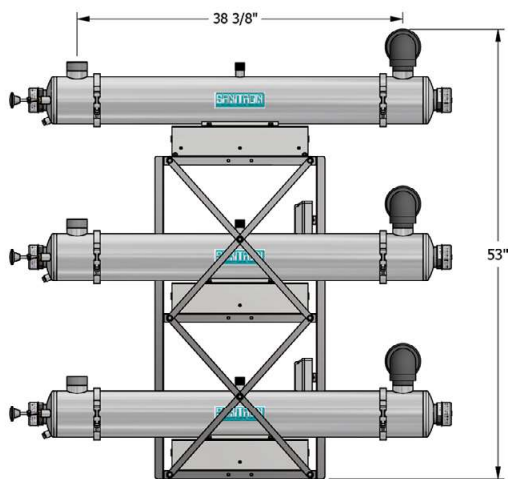
SANITRON® S5,000C (2 SANITRON® S2400C in Series. Interconnecting Piping Supplied.)

DIMENSIONAL DATA

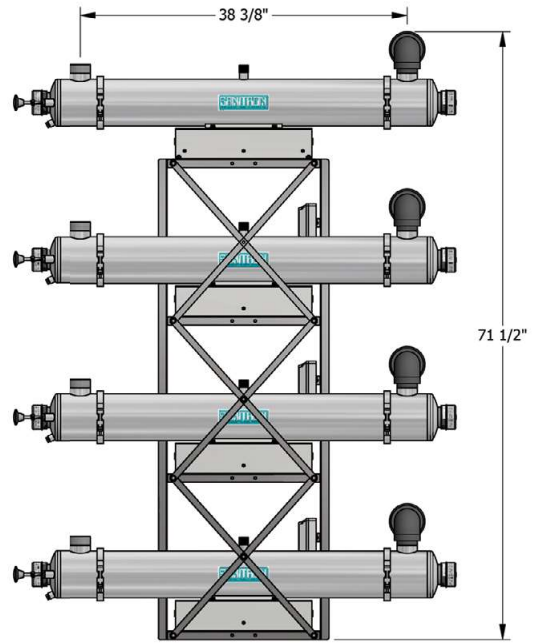
Figure 12 – S10,000C, S15,000C, S20,000C, S25,000C Dimensional Data



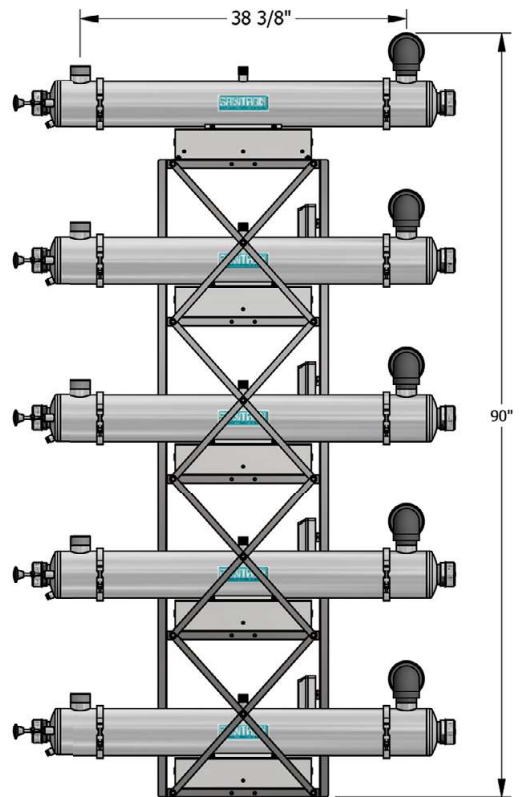
**SANITRON® S10,000C
4 SANITRON® S2400C in Series
Mounting Stand Supplied**



**SANITRON® S15,000C
6 SANITRON® S2400C in Series
Mounting Stand Supplied**



**SANITRON® S20,000C
8 SANITRON® S2400C in Series
Mounting Stand Supplied**



**SANITRON® S25,000C
10 SANITRON® S2400C in Series
Mounting Stand Supplied**

MAINTENANCE NOTES

MAINTENANCE NOTES

MAINTENANCE NOTES

MAINTENANCE NOTES

USER ASSISTANCE

Atlantic Ultraviolet Corporation® makes every effort to ensure that the **SANITRON®** Ultraviolet Water Purifiers are products of superior quality and workmanship. This manual describes the installation, operation and maintenance of the **SANITRON®** Ultraviolet Water Purifiers.

Please read and become familiar with the contents of this manual before installing or using this purifier. If after reading the manual you still have questions, or concerns, regarding the installation or use of this purifier, contact our offices, weekdays between 8:30 am and 5:00 pm Eastern Time, at:

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Website: Ultraviolet.com
BuyUltraviolet.com

PATENT NOTICE

No attempt has been made to determine the patent status of applications illustrated or described in this publication. Inclusion in this publication of any design or method of use, which may be patented, is not to be construed as promoting or sanctioning unauthorized use.

NSF/ANSI

NSF/ANSI 61 is a set of national standards that relates to water treatment and establishes stringent requirements for the control of equipment that comes in contact with either potable water or products that support the production of potable water. NSF/ANSI 372 was set in 2011 to establish procedures to meet the 0.25% lead content requirement of the RLDWA (Reduction of Lead in Drinking Water Act) using a wetted surface area average calculation or just simply using all no-lead materials for areas in contact with drinking water. NSF/ANSI 372 includes a broader scope of drinking water products covered by the law which may not be covered under NSF/ANSI 61 and enables large or complex products and assemblies to achieve certification.

WARRANTY & PRODUCT REGISTRATION

We warrant this product to the original owner to be free from defects in material and workmanship when installed in accordance with Atlantic Ultraviolet Corporation® specifications for a period of time as follows:

UV Water Purifier Chambers – Type 316 stainless steel chambers will have a Twelve (12) year Limited Warranty on the stainless steel chamber, from the date of original purchase while the Type 304 stainless steel chambers will have a Six (6) year Limited Warranty on the stainless steel chamber.

UV Air Disinfection Housing – Three (3) year Limited Warranty on the metal housing, from the date of original purchase.

Ballasts – Three (3) year Limited Warranty, from the date of original purchase.

UV Lamps, Monitoring Devices, Optional Accessories, and Other Parts – One (1) year Limited Warranty from the date of original purchase.

Within the warranty period we shall repair or replace such products, which are returned to us with shipping charges prepaid and which are determined by us to be defective. This warranty will not apply to any product, which has been subjected to misuse, negligence or accident; or misapplied; or modified; or repaired by unauthorized person; or improperly installed. Warranty will be null and void if any of the product's original labels are removed. This Limited warranty excludes the cost of labor.

The Buyer shall inspect the product promptly after receipt and shall notify us at our main office in writing of claims, including claims of breach of warranty, within thirty (30) days after the Buyer discovers or should have discovered the facts upon which the claim is based. Failure of the Buyer to give written notice of a claim within the time period shall be deemed to be a waiver of such claim.

The provisions of the above warranty are our sole obligation and exclude all other remedies or warranties, expressed or implied, including warranties of merchantability and fitness for a particular purpose, whether or not purposes or specifications are described herein. We further disclaim any responsibility whatsoever to the customer, or to any person for injury to person, damage to, or loss of property or value caused by any product which has been subjected to misuse, negligence, accident; or modified or repaired by unauthorized persons; or improperly installed.

Under no circumstances shall the Company be liable for any incidental, consequential or special damages; losses or expenses arising from the contract for this product, or in connection with the use of, or inability to use, our product for any purpose whatsoever.

Be sure to register your product and validate purchase within 30 days — registration is simple and will take less than 2 minutes to do.

NOTE – failure to register your purchase may jeopardize warranty.

Go to Ultraviolet.com and scroll down to the bottom of the page, under “Trust” click the “Warranty Registration Form”, complete and click “Submit”. Or click on “Warranty Registration PDF” to download the warranty registration card as a PDF, complete and mail to us at 375 Marcus Boulevard, Hauppauge, NY 11788, or simply fax to 631-273-0771. If you prefer to register by phone, please call 631-273-0500 and our customer service staff will be glad to assist you.

For your convenience, record the following information below. The model and serial number can be found on a label located on the **SANITRON®** Ultraviolet Water Purifier. Keep this manual, along with proof of purchase, handy when contacting our offices.

Purchased From:	Date:
Model:	Serial No.:

Electronic Metering Pumps

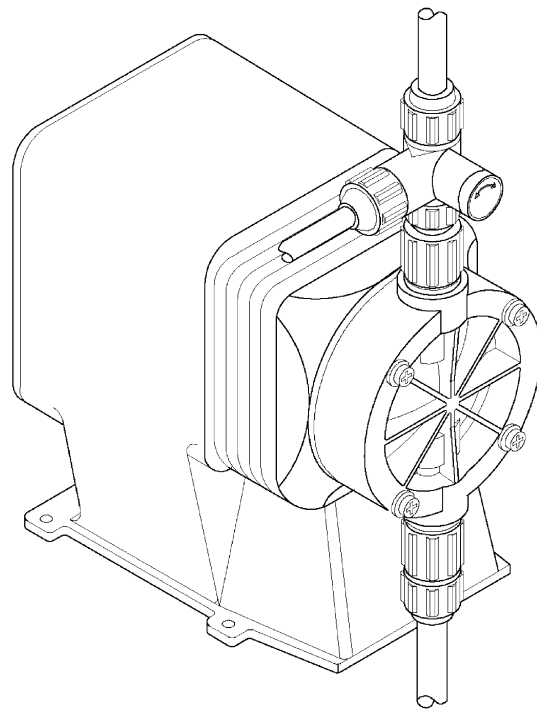
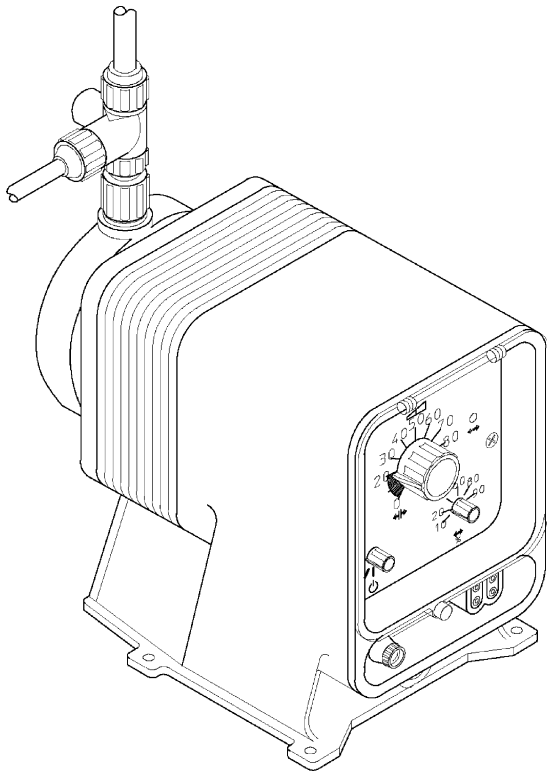
Series C, C+, A+, E, E-DC, E+ & HV

Installation

Operation

Maintenance

Instruction



**READ ALL WARNINGS CAREFULLY
BEFORE INSTALLING**

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1.0 SAFETY INSTRUCTIONS



When using chemical feed pumps, basic safety precautions should always be followed to reduce risk of fire, electric shock, and personal injury. Failure to follow these instructions could result in death or serious injury.



READ ALL INSTRUCTIONS

1.1 General Safety Considerations

Always wear protective clothing including gloves and safety goggles when working on or near chemical metering pumps.

Inspect tubing regularly when replenishing chemical solution for cracking or deterioration and replace as necessary. **(Always wear protective clothing and safety glasses when inspecting tubing.)**

When pump is exposed to direct sunlight use U.V. resistant tubing.

Follow directions and warnings provided with the chemicals from the chemical manufacturer. User is responsible for determining chemical compatibility with chemical feed pump.

Secure chemicals and metering pumps, making them inaccessible to children and pets.

Make sure the voltage on the chemical metering pump matches the voltage at the installation site.

Do not cut plug or the ground lug off of the electrical cord – consult a licensed electrician for proper installation.

Pump is **NOT** to be used to handle flammable liquids.

1.2 Safety Operating Procedures

Each Electronic Metering Pump has been tested to meet prescribed specifications and safety standards.

Proper care in handling, installation and operation will help in ensuring a trouble free installation.

Please read all these cautionary notes prior to installation and start-up of your metering pump.

Important: Pump must be installed and used with supplied back pressure/injection valve. Failure to do so could result in excessive pump output.

Handle the pump with care. Dropping or heavy impact causes not only external damage to the pump, but also to electrical parts inside.

Install the pump in a place where the ambient temperature does not exceed 104°F (40°C). The pump is water resistant and dust proof by construction and can be use outdoors, however **do not operate the pump submerged**. To avoid high internal pump temperatures, do not operate in direct sunlight.



Solenoid housing, head and pump housing may be hot to touch 160°F (70°C).

Install the pump in a place convenient for its future maintenance and inspection, and then secure it to prevent vibration.

Protective caps must be removed prior to installing tubing onto valve assemblies. Use tubing of specified size. Connect the tubing to the suction side securely to prevent the entrance of outside air. Make sure that there is no liquid leakage on the discharge side.

Be careful to check that the voltage of the installation matches voltage indicated on the pump data label. Most pump models are equipped with a three-prong plug. Always be sure the pump is grounded. To disconnect, do not pull wire but grip the plug with fingers and pull out. Do not use the receptacle in common with heavy electrical equipment, which generates surge voltage. It can cause failure of the electronic circuit inside the pump.

Tampering with electrical devices can be potentially hazardous. Always place chemicals and pump installation well out of the reach of children.

Never repair or move the metering pump while operating. Always disconnect electrical power. **For safety, always wear protective clothing (protective gloves and safety glasses) when working on or near chemical metering pumps.**

An air bleed valve is available for most models with tubing connections. Air purges should be performed when the pump-chamber contains no fluid at the time of start-up. As a safety measure, connect the return tubing to the air bleed valve and bypass fluid back to storage tank or a suitable drain.

For accurate volume output, the pump must be calibrated under typical operating conditions.

Chemicals used may be dangerous and should be used carefully and according to warnings on the label. Follow the directions given with each type of chemical. Do not assume chemicals are the same because they look alike. Always store chemicals in a safe location away from children and others. We cannot be responsible for the misuse of chemicals being fed by the pump. Always have the material safety data sheet (MSDS) available for any fluid being pumped.

All pumps are pretested with water before shipment. Remove head and dry thoroughly if you are pumping a material that will react with water, (i.e. sulfuric acid, polymers). Valve seats, ball checks, gaskets, and diaphragm should also be dried. Before placing pump into service, extreme care should be taken to follow this procedure.

Valve cartridges are stamped to indicate fluid flow direction. Always install so that markings read from top to bottom, with the arrow pointing in the direction of flow.

When metering hazardous material **DO NOT** use plastic tubing, strictly use proper rigid pipe. Consult supplier for special adapters or valve assemblies.

Pump is NOT to be used to handle or meter flammable liquids or materials.

Standard white discharge tubing is not recommended for installations exposed to direct sunlight. Consult supplier for special black tubing.

Factory will not be held responsible for improper installation of pump, or plumbing. All cautions are to be read thoroughly prior to hookup and plumbing. For all installations a professional plumber should be consulted. Always adhere to local plumbing codes and requirements.

When using pump with pressurized systems, make sure the pressure of the system does not exceed the maximum pressure rating on the pump data label. Be sure to depressurize system prior to hook up or disconnecting a metering pump.

Electronic power modules are equipped with automatic reset thermal overload devices and may reset unexpectedly.

2.0 UNPACKING THE PUMP

Check all equipment for completeness against the order and for any evidence of shipping damage. Shortages or damages should be reported immediately to the carrier and to the seller of the equipment.

The carton should Contain:

- ✓ Metering Pump
- ✓ Clear Flexible Suction Tubing*
- ✓ Stiff White Discharge Tubing*
- ✓ Foot valve/Strainer Assembly
- ✓ Backpressure Injection Valve Assembly
- ✓ Manual
- ✓ Bleed Valve Assembly*
- ✓ Strainer Weight*

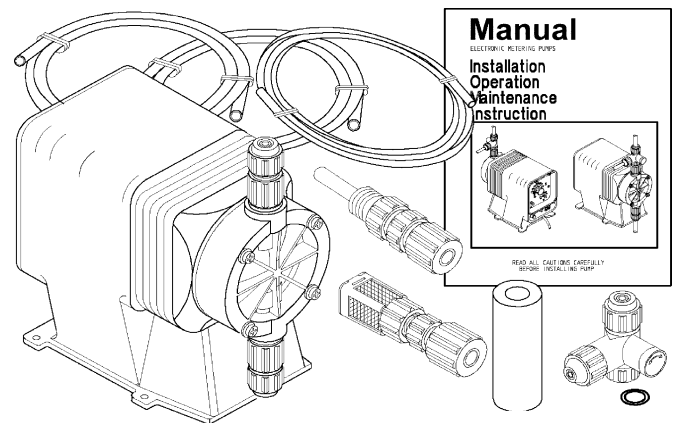


Figure 1

*Items may or may not be included depending on model.

Make sure that all items have been removed from the shipping carton before it is discarded.

3.0 INTRODUCTION

These installation, operation and maintenance instructions cover your electronic metering pump. Refer to the pump data label to determine the actual model.

3.1 Principle Of Operation

Diaphragm metering pumps are used to dispense chemicals or fluids. This is achieved by an electromagnetic drive mechanism (solenoid), which is connected to a diaphragm. When the solenoid is pulsed by the control circuit it displaces the diaphragm, which, through the use of check valves, moves the fluid out the discharge under pressure. When the solenoid is de-energized it returns the diaphragm and pulls more fluid into the pump head and the cycle repeats.

The pump stroke rate is controlled by an internal circuit and is changed by turning the rate knob. The mechanical stroke length is controlled by the stroke length knob. Some models do not allow stroke rate control and do not have the stroke rate knob.

3.2 Materials Of Construction

The wetted materials (those parts that contact the solution being pumped) available for construction are FPP (glass filled polypropylene), PVC, CSPE, Viton, PTFE or FTF, 316 Stainless Steel, PVDF, Ceramic and Alloy C. These materials are very resistant to most chemicals. However, there are some chemicals, such as strong acids or organic solvents, which cause deterioration of some elastomer and plastic parts, such as the diaphragm, valve seats, or head.

Consult a Chemical Resistance Guide or Supplier for information on chemical compatibility.

Various manufacturers of plastics, elastomers and pumping equipment publish guidelines that aid in the selection of wetted materials for pumping commercially available chemicals and chemical compounds. Two factors must always be considered when using an elastomer or plastic part to pump chemicals. They are:

The temperature of service: Higher temperatures increase the effect of chemicals on wetted materials. The increase varies with the material and the chemical being used. A material quite stable at room temperature might be affected at higher temperatures.

Material choice: Materials with similar properties may differ greatly from one another in performance when exposed to certain chemicals.

4.0 INSTALLATION

The metering pump should be located in an area that allows convenient connections to both the chemical storage tank and the point of injection. The pump is water resistant and dust proof by construction and can be used outdoors, however, **do not operate submerged**. Avoid continuous temperatures in excess of 104°F (40°C). To do otherwise could result in damage to the pump.

4.1 Mounting

Typical mounting arrangements are shown in Figures 3, 4, and 5.

Important: Injection point must be higher than the top of the solution supply tank to prohibit gravity feeding, unless suitable backpressure is always present at the injection point. Installation of an anti-siphon valve will prohibit gravity feeding.

For wall or shelf mounting refer to Figure 3. Connect suction tubing to suction valve of chemical pump. Suction valve is the lower valve. Tubing should be long enough so that the foot valve/strainer assembly hangs about 1-2 inches (2-5 cm) above the bottom of chemical tank. To keep chemical from being contaminated, the tank should have a cover.

Flooded suction mounting (installing the pump at the base of the chemical storage tank, Figure 4) is the most trouble free type of installation and is recommended for very low output requirements. Since the suction tubing is filled with chemical, priming is accomplished quickly and the chance of losing prime is reduced.

To mount pump, drill four holes of .25" (6 mm) diameter in the shelf as shown in the dimension drawing (figure 2). Attach pump securely using four #10 (M5) bolts and nuts.

The pump can be mounted on top of a solution tank as shown in Figure 5. Install chemical pump on the cover. Insert suction tubing through the center hole and cut tubing so foot valve/strainer hangs about 1 or 2 inches (2-5 cm) above the bottom of the tank. Mount the chemical pump rigidly by drilling four .25" (6 mm) holes and using four (4) #10 (M5) screws and nuts.

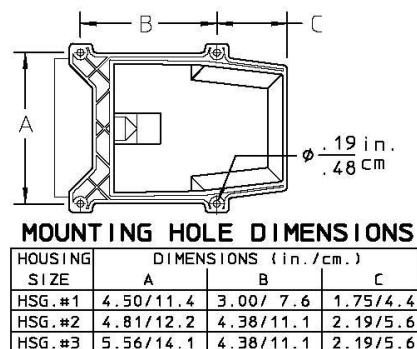


FIGURE 2

USE AN ANTI-SIPHON VALVE IN THE DISCHARGE LINE whenever the fluid pressure in the discharge line is below atmospheric pressure. This can occur if the injection point is on the suction side of a water pump or against a "negative" head such as when feeding down into a well.

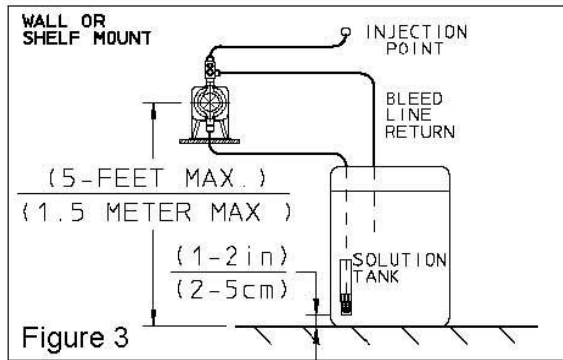


Figure 3

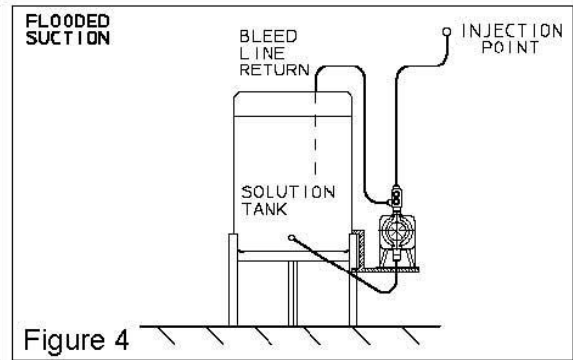


Figure 4

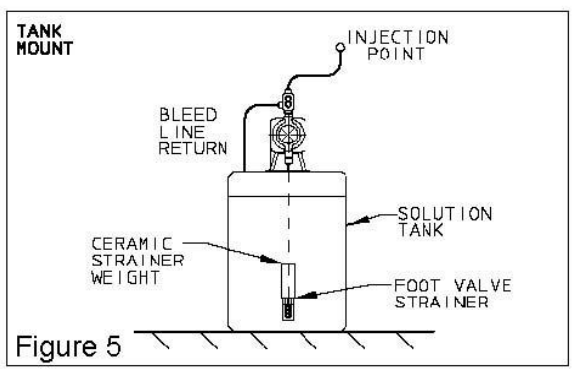


Figure 5

4.2 Piping

Use provided tubing of specified size for connection. Connect tubing securely to prevent leakage of chemical and the entrance of air. Since plastic nuts are used for fittings, they should not be tightened excessively (i.e. hand tighten only). NPT suction and discharge valves must **NOT** be over tightened. Hold fitting in place while adding piping and fittings. NPT suction and discharge valves should only be tightened 25 to 35 in. lbs. (4.5-6.3 kg/cm).

If the air bleed valve assembly is being used, a return line (tubing) should be securely connected and routed back to the storage tank. **To avoid possible injury from chemicals do not attempt to prime using a bleed valve without installing a return line.**

When pump is shelf mounted or top mounted on tank, suction tubing should be kept as short as possible.

To maintain metering performance, a backpressure/injection valve is provided. The spring in the standard injection valve typically adds 17 - 20 PSI (1.17 - 1.38 BAR) to the line pressure, with the exception of the H8 pump, which adds 8 - 10 PSI (.55 - .69 BAR). The injection valve must be installed in the discharge line. Best practice is to install the injection valve at the point of chemical injection.

If the discharge tubing is going to be exposed to direct sunlight, black tubing should be used instead of the standard white translucent tubing supplied with each pump. To obtain, contact supplier.

To prevent clogging or check valve malfunction always install a strainer assembly to the end of the suction tubing (Figure 5). This foot valve/strainer assembly should always be installed 1 to 2 inches (2-5 cm) above the bottom of the chemical tank. This will help prevent clogging the strainer with any solids that may settle on the tank bottom. The chemical tank and foot valve/strainer should be cleaned regularly, to ensure continuous trouble free operation. If the chemical being pumped regularly precipitates out of solution or does not dissolve easily or completely (e.g. calcium hydroxide), a mixer should be used in the chemical tank. These are readily available in many motor configurations and mounting. To obtain, contact supplier.

A flooded suction (tank liquid level always at a higher elevation than the pump) is recommended when pumping solutions such as sodium hypochlorite (NaOCl), hydrogen peroxide (H₂O₂), etc., which are likely to produce air bubbles. Maintaining a low liquid temperature will also help eliminate this problem.

Pipe corrosion can result if dilution at the injection point does not occur rapidly. This problem is easily prevented by observing this simple rule: install injection fitting so that the end is in the center of the flow stream of the line being treated. Trim injector tip as required. See Figure 6. Note: Extended injection assemblies are available for large water lines. Consult your supplier for more information.

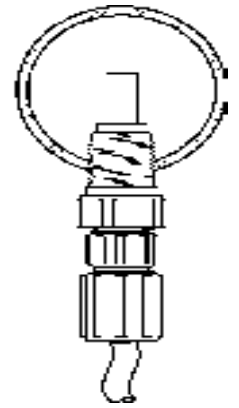


Figure 6

4.3 Wiring

⚠ WARNING Risk of electrical shock. This pump is supplied with a three-prong grounding type power plug. To reduce risk of electric shock, connect only to a properly grounded, grounding type receptacle.

The metering pump should be wired to an electrical source, which conforms to those on the pump data label. Applying higher voltage than the pump is rated for will damage the internal circuit.

In the electronic circuit of the control unit, measures for surge voltage are made by means of surge absorbing elements and high voltage semiconductors. Nevertheless, excessive surge voltage may cause failure in some areas. Therefore, the receptacle should not be used in common with heavy electrical equipment, which generates high voltage. If this is unavoidable however, measures should be taken by (a) the installation of a surge-absorbing element (varistor of min. surge resistance 2000A) to the power supply connection of the pump, or (b) the installation of a noise suppression transformer.



Signal input to the external pulse signal input terminals ([EXTERNAL], [STOP]) must be a no-voltage signal from relay-contacts etc. and the input of other signals is prohibited. In the case of relay contacts, 100 ohms or below when ON and 1-meg ohms or above when OFF. The pulse duration of the input signal must be 10 milliseconds or over and the frequency of the input signal must not exceed 125 times per minute. Signal cord is provided with the pump.

4.4 Well Pump System Installation

Ensure that the metering pump voltage matches the voltage of the well pump. Typical well pump electrical circuits are shown in Figure 8. All electric wiring should be installed in accordance to local codes by a licensed electrician.

Install the backpressure/injection (Figure 7) on the discharge side of the metering pump into a tee which is installed into the water line going to the pressure tank.

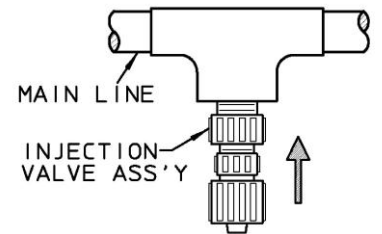


Figure 7

Pumps carrying the or "ETL Sanitation" (tested to NSF Standard-50) marks are listed for swimming pools, spas and hot tubs, and when proper materials are selected, are capable of handling but not limited to the following chemical solutions:

- | | |
|----------------------------|-----------------------|
| 12% ALUMINUM SULPHATE, | 5% SODIUM CARBONATE, |
| 2% CALCIUM HYPOCHLORITE, | 10% SODIUM HYDROXIDE, |
| 12.5% SODIUM HYPOCHLORITE, | 10% HYDROCHLORIC ACID |

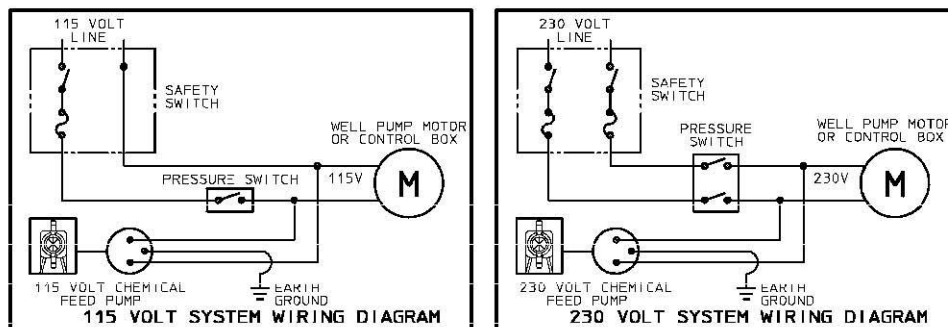


Figure 8

5.0 START UP AND OPERATION

5.1 Power

All metering pumps are available in 115 and 230 volts at 50/60 Hertz, single phase. In addition, certain models are available in 12 volt DC. Prior to start-up always check to insure that the pump voltage/frequency/phase matches that of the power supply.

CAUTION If pump is fitted with a PVC pump head (7th position of model number is "V" or "W". Note: PVC is gray, not black), uniformly hand tighten the four head screws before use, 18-22 in. lbs. (3.2 -3.9 kg/cm). Periodically tighten after installation.

5.2 Priming

CAUTION When working on or around a chemical metering pump installation, protective clothing and gloves and safety glasses should be worn at all times.

All pumps are tested with water. If the chemical to be pumped reacts when mixed with water (e.g. sulfuric acid, polymer) the pump head should be removed and dried thoroughly along with the diaphragm and valve seats.

Turn on the power to the pump. The green LED (not available on all models) will light up and flash off each time the pump strokes.

Adjust the stroke rate knob to the 100% setting mark (for more information see Section 5.3, Capacity Control).

Adjust the stroke length knob to the 100% setting mark if applicable (for more information see Section 5.3, Capacity Controls).

If the discharge line is connected directly to a pressurized system it should be temporarily bypassed during priming of the pump. A bleed valve will simplify this operation by allowing easy bypass of the discharge fluid. Air must be purged from the pump-head before the pump will operate against pressure. (See Figure 9)

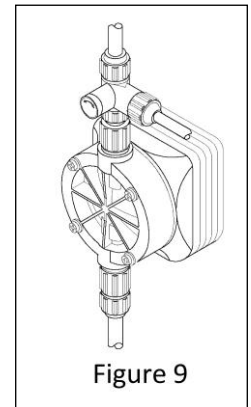


Figure 9

Air Bleed Operation:

While pump is running, turn adjustment knob counterclockwise.

Run with valve open until a solid stream of fluid comes out of the bypass tubing with no air bubbles.

Close air bleed valve by turning adjustment screw clockwise.

Chemical should reach the pump head after a few minutes of operation. If not, remove the discharge fitting and moisten the discharge valve area (ball check and valve seats) with a few drops of **chemical being fed to the metering pump**. For safety, always use protective clothing and gloves, wear safety glasses and use a proper container to hold the chemical.

If the pump continues not to prime, refer to Section 7.0, Troubleshooting, of these instructions.

Once the pump has been primed and is pumping the chemical through the head, turn off the power, reconnect the discharge tubing (if it had been removed) and immediately clean any spilled chemical that is on the pump housing or head.

Turn the power on once more and adjust the pump flow to the desired rate (see Section 5.3.3, Controlling Procedure).

Always check the calibration of the pump after start-up. It's best to calibrate the pump under your typical use conditions.

5.3 Capacity Control

Capacity can be controlled by means of the stroke length adjusting knob and/or stroke rate adjusting knob (except model C pumps). Control knobs provide coarse adjustment; use a calibration column for accurate calibration. Contact your pump supplier for proper calibration equipment.

5.3.1 Stroke Frequency Adjustment (E, E-DC, E+, A+, C+ and HV only)

Stroke frequency can be controlled from 10 to 100% (12 to 125 strokes per minute on 125SPM models or 25 to 250 strokes per minute on 250SPM models) by means of the electronic circuit.

Stroke frequency can be set by means of the stroke rate adjusting knob even while the pump is in operation (See Figure 10).

5.3.2 Stroke Length Adjustment

Stroke length can be controlled within 0 to 100% of the diaphragm displacement. It should be controlled within 20 to 100% for practical use.

Stroke length can be set by means of the stroke length adjusting knob while the pump is in operation. Do not turn the knob while the pump is stopped.

5.3.3 Controlling Procedure

Proper set points for stroke length and stroke frequency should be determined after consideration of the pump and characteristics of the fluid. The following procedure is recommended from the viewpoint of pump performance. **Note: The closer the stroke length is to 100%, the better the pump performance will be.**

Set the stroke length to 100% then adjust the stroke frequency for coarse capacity control.

Measure the capacity.

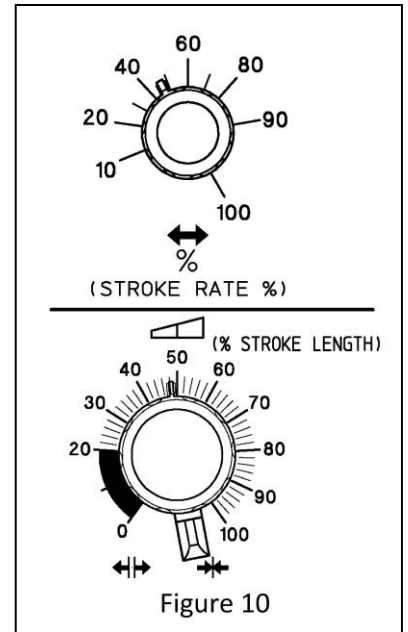
When the measured capacity is less than the required value, increase the stroke frequency and measure the capacity again.

Then, adjust the stroke length for fine capacity control.

Finally, measure the capacity and make sure that the required value is obtained.

<u>Example</u>	Selected Model	=	LPD4
	Set Stroke Length	=	100%
	Set Stroke Rate	=	100%
	Output Capacity	=	21 gallons per day (GPD)*
	(Rated Pressure)		
	Desired Flow	=	15 GPD
	Adjust Stroke Rate to 80%		
	Output Capacity	=	$0.80 \times 21 = 16.8 \text{ GPD}^*$
	Stroke Length Setting	=	$\frac{15}{16.8} \times 100 = 90\% \text{ approximate}$
			16.8

Thus to obtain the desired flow, stroke length is set at 90% and stroke rate is set at 80% i.e. output capacity = $0.90 \times 0.80 \times 21 = 15.12 \text{ GPD}^*$



*IMPORTANT!

Check these values by measurement. Output capacity is higher when feeding against less than rated pressure

5.4 Control Panel Symbols

The pumps come with universally accepted symbols, the following is provided for your convenience.

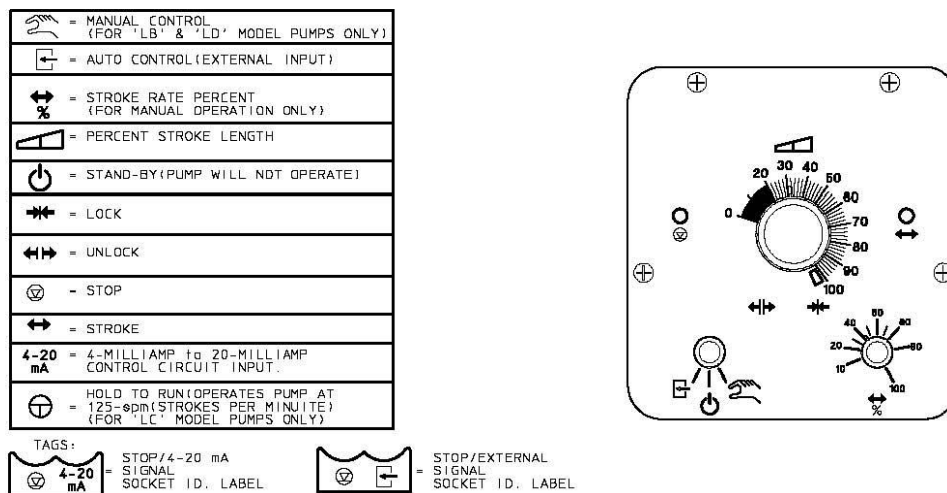


Figure 11

5.5 Operation By External Input Signals (Options):

The pump can be controlled by three types of input signals. All are fully isolated from AC input and from earth ground. The input socket connections are located at the bottom of the control panel face and the signal cords are provided with the pump. Remove rubber plugs to access plug sockets.

5.5.1 Stop Function (E+, A+, C+, C and HV only)

Operation of the pump can be stopped by an external signal input. When the external signal is input to the terminal marked \ominus which is provided at the bottom of the control panel, the \ominus lamp (red) lights up and operation of the pump is stopped. The stop function overrides both manual settings and external input.

⚠ CAUTION Operation of more than one pump from the same contact closure will damage the pump circuits. When such operation is required, the pump circuits must be electrically isolated from one another by means of a multi-contact control relay or similar means.

The input signal must be in the form of closure of a mechanical relay or other mechanical switching device, or solid-state relay or other solid-state switching device. Voltage signals are prohibited. The switching resistance of either mechanical or solid-state devices must be 100 ohms or below when ON and 1 megohm or above when OFF. If any type of solid-state device is employed, it must be installed with the proper polarity, if required for the device; and leakage current must not exceed 200 microamperes to prevent false triggering in the OFF state.

The stop function is commonly used in conjunction with a tank float switch. The float switch contacts are normally open but when the tank level falls past a certain point the contacts close and the pump stops.

5.5.2 External Pacing Function (E+, A+, C+, C and HV only)

The pump's stroke rate can be controlled by an external signal input. When the input signal line is connected and the EXTERNAL /OFF /MANUAL switch is in the external position and a contact signal is input to the terminal marked \square , the pump makes one discharge stroke.

⚠ CAUTION Operation of more than one pump from the same contact closure will damage the pump circuits. When such operation is required, the pump circuits must be electrically isolated from one another by means of a multi-contact control relay or similar means.

When the "ON" signal pulse is input, the pump operates one stroke and the fluid is discharged. In addition, the pump can be operated continuously to its maximum strokes/min. by repeated input of "ON" and "OFF" signals.

After receiving an input signal, the pump generates the necessary power pulse to actuate the solenoid. The external signal input is debounced by the pump circuit. The pump will not stroke in response to a spurious or erratic input signal that follows at a rate greater than its maximum strokes/minute. If the external signal rate exceeds its maximum strokes/minute, the pump will stroke at half the external signal rate to prevent overdosing and to protect the pump from overheating.

The input signal must be in the form of closure of a mechanical relay, other mechanical switching device, or of a solid-state switching device. Voltage signals are prohibited. The switching resistance of either mechanical or solid-state devices must be 100 ohms or below when ON and 1 megohm or above when OFF. If any type of solid-state device is employed, it must be installed with proper polarity, if required for the device; and leakage current must not exceed 200 microamperes to prevent false triggering in the OFF state.

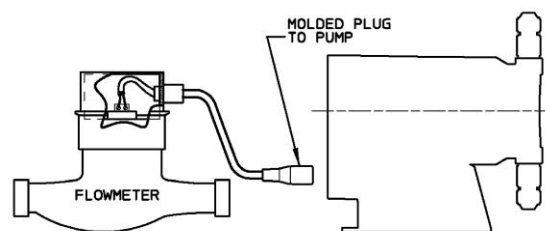


Figure 12

Cycle rate of the input signal should not exceed the maximum stroke/minute speed of the pump.

Typical wiring is shown at right for use with switch closure flow-meters. (Figure 12)

10 millisecond contact time required for each "ON" input signal.

5.5.3 4-20mA DC Input Function (E+ and HV only)

The pump's stroke rate can also be controlled by a 4-20 mA DC signal to the terminal marked [4-20 mA].

For the 4-20 mA input to have any effect on the pump output rate, the AUTO/OFF/MANUAL switch must be in the AUTO position.

The 4-20 mA input signal affects the pump's outputs as per the graph below:

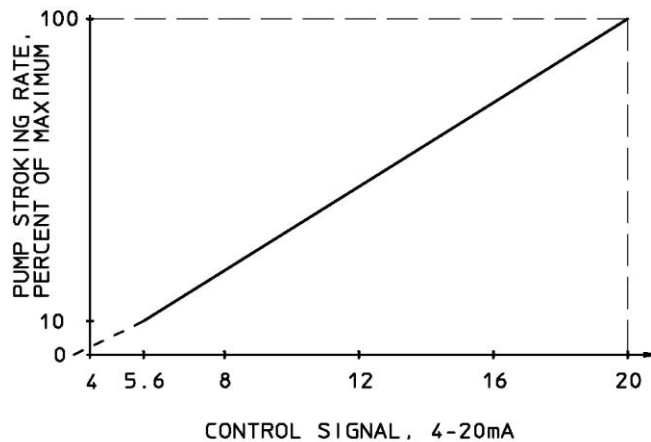


Figure 13

The signal cord polarity is:

Black = Common

White = Positive

Wrong polarity can result in excess flow.

Signal input impedance is 124 ohms.

Remove cap from pump socket labeled 4-20 mA, use polarized cord supplied with pump to connect control circuit to pump. Plug cord into pump socket labeled 4-20 mA.

6.0 MAINTENANCE

CAUTION Before performing any maintenance or repairs on chemical metering pumps, be sure to disconnect all electrical connections, insure that all pressure valves are shut off and pressure in the pump and lines has been bled off.

Always wear protective clothing, gloves and safety glasses when performing any maintenance or repairs on chemical metering pumps.

6.1 Routine Maintenance

Routinely check the physical operating condition of the pump. Look for the presence of any abnormal noise, excessive vibration, low flow and pressure output or high temperatures [when running constantly at maximum stroke rate, the pump housing temperature can be up to 160°F (70°C)].

For optimum performance, cartridge valves should be changed every 6-12 months. Depending on the application, more frequent changes may be required. Actual operating experience is the best guide in this situation.

Repeated short-term deterioration of valve seats and balls usually indicates a need to review the suitability of wetted materials selected for the application. Contact the supplier for guidance.

Check for leaks around fitting or as a result of deteriorating tubing e.g. when standard white translucent discharge tubing is exposed to direct sunlight. Take appropriate action to correct leak by tightening fittings or replacing components.

Keep the pump free of dirt and debris as this provides insulation and can lead to excessive pump temperatures.

If the pump has been out of service for a month or longer, clear the pump head valve assemblies by pumping fresh water for approximately 30 minutes. If the pump does not operate normally after this "purging run", replace cartridge valve assemblies.

6.2 Disassembly And Assembly

Diaphragm Removal

Flush pump head and valve assemblies out by running pump with water or other suitable neutralizing solution. Wash outside of pump if chemical has dripped on pump. Set stroke length knob of pump to 0% and unplug pump.

Depressurize the system and disconnect tubing or piping from the pump. Remove the four pump head screws and then remove the pump head assembly.

Remove the diaphragm by grasping it at the outer edge and turning it counter clockwise until it unscrews from the electronic power module (EPM). Don't lose the deflector plate or diaphragm shims which are behind the diaphragm, they are needed for re-assembly. Note shim quantity may be from 0 to 2.

Inspect diaphragm, if it is intended to be used again look for indications of the PTFE face being overstretched, (localized white areas) or the elastomer on the back of the diaphragm being worn. Excessive amounts of either condition require diaphragm replacement.

6.3 Diaphragm Replacement

When replacing the diaphragm, it is always a good idea to replace the valve cartridges and other worn parts. A kit is available from your supplier with all parts necessary to completely rebuild your pump's wet end. All your supplier needs to know is the "KOPkit No." on your pump's data label to supply this kit.

Set pump stroke length at 50% and unplug the pump.

If you kept the shims from the original diaphragm or know the original quantity you can avoid the next step for shimming the diaphragm.

Apply grease to areas of the diaphragm that contact the deflection plate.

Slide the diaphragm deflection plate onto the back of the diaphragm stud, radius side towards the diaphragm. Next slide two shims onto the diaphragm threaded stud and screw the diaphragm into the EPM unit. Refer to Figure 14. Turn diaphragm clockwise until deflection plate and shims are tight against solenoid shaft and the diaphragm stops turning. If there is a gap between the adaptor and diaphragm, repeat the procedure removing one shim each time until the diaphragm just touches the adaptor or is slightly recessed.

If not already done, adjust stroke length to 50%. Place the pump head onto the adaptor with valve flow arrows pointing up and install and tighten pump head screws. Tighten screws until pump head pulls up against adaptor.

NOTE: Adjust stroke length only when pump is running!

Adjust stroke length back to 100% for easier priming and place pump back into service.

6.4 Valve Replacement

Flush pump to clean any chemical from pump head.

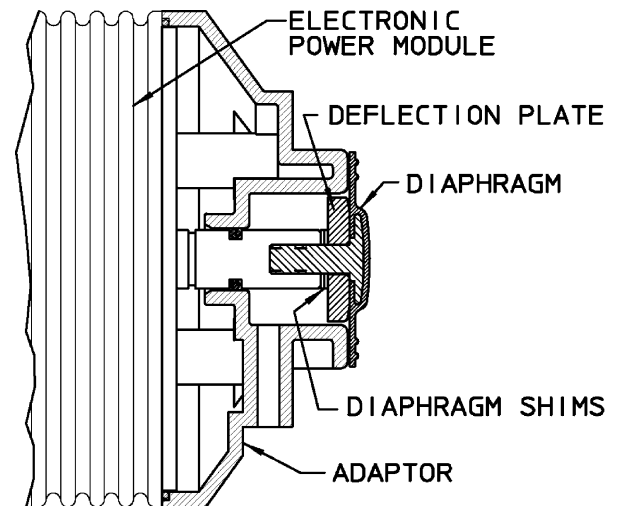
Unplug pump, release system pressure, and disconnect tubing or piping.

Unscrew valve cartridges and discard. Also remove o-rings down inside the pump head.

Install new valve cartridges with stamped letters reading from top to bottom, and the arrow pointing in the direction of flow. Hand-tighten only, do not use wrenches or pliers.

Reconnect tubing or piping and reinstall the pump.

Check for leaks around newly installed fittings.



7.0 TROUBLESHOOTING

Problem	Probable Cause	Remedy
<p>Failure to Pump</p>	<ol style="list-style-type: none"> 1. Leak in suction side of pump 2. Valve seats not sealing 3. Low setting on pump 4. Low suction level 5. Diaphragm ruptured 6. Pump head cracked or broken 7. Pump head contains air or chlorine gas 8. Breakdown or disconnection of wiring 9. Voltage drop 10. Malfunction of electronic control board 	<ol style="list-style-type: none"> 1. Examine suction tubing. If worn at the end, cut approximately one inch (2.5cm) off and reconnect 2. Clean valve seats if dirty or replace with alternate material if deterioration is noted 3. When pumping against pressure, the dial should be set above 20% capacity for a reliable feed rate 4. Solution must be above foot valve strainer 5. Replace diaphragm as shown in 6.0 Maintenance Section. Check for pressure above rated maximum at the injection point. NOTE” Chemical incompatibility with diaphragm material can cause diaphragm rupture and leakage around the pump head 6. Replace pump head as shown in 6.0 Maintenance Section. Make sure fitting are hand tight only. Using pliers and wrench can crack pump head. Also, chemical incompatibility can cause cracking and subsequent leakage. 7. Bleed pump head, see 5.0 Start-up and Operation section 8. Connect wiring properly. Check fuse or circuit breaker 9. Take measures after investigation of cause 10. Contact supplier
<p>Loss of Chemical Residual</p>	<ol style="list-style-type: none"> 1. Pump setting to low 2. Scale at injection point 3. Solution container allowed to run dry 	<ol style="list-style-type: none"> 1. Adjust to higher setting (pump must be operating to adjust stroke length knob) 2. Clean injection parts with 8% muriatic acid or undiluted vinegar (also, see Maintenance Section) 3. Refill the tank with solution and prime (see Start-up and Operation Section)
<p>Too Much Chemical</p>	<ol style="list-style-type: none"> 1. Pump setting too high 2. Chemical in solution tank too rich 3. Siphoning of chemical into well or main line 	<ol style="list-style-type: none"> 1. Lower pump setting (pump must be operating to adjust stroke length knob) 2. Dilute chemical solution. NOTE: For chemical that reacts with water, it may be necessary to purchase a more dilute grade of chemical direct from chemical supplier 3. Test for suction or vacuum at the injection point. If suction exists, install an anti-siphon valve

Leakage at Tubing Connections	<ol style="list-style-type: none"> 1. Worn tube ends 2. Chemical attack 	<ol style="list-style-type: none"> 1. Cut off end of tubing approximately one inch (2.5cm) and reconnect 2. Consult your seller for alternate material
Leakage at Fitting	<ol style="list-style-type: none"> 1. Loose fittings 2. Broken or twisted gasket 3. Chemical attack 	<ol style="list-style-type: none"> 1. Tighten hand tight. Replace gasket if hand tightening does not stop leakage 2. Check gaskets and replace if broken or damaged 3. Consult your pump supplier for alternate material
Pump Loses Prime	<ol style="list-style-type: none"> 1. Dirty check valve 2. Ball checks not seating or not sealing properly 3. Solution container allowed to run dry 4. Chemical outgassing 	<ol style="list-style-type: none"> 1. Remove and replace or clean off any scale or sediment 2. Check seat and ball checks for chips, clean gently. If deformity or deterioration is noted, replace part with proper material. Resulting crystals can hold check valves open, therefore, the valves must be disassembled and cleaned 3. Refill the tank with solution and prime. See 5.0 Start-up and Operation Section 4. Bleed gas, use flooded suction and maintain chemical at room temperature (approximately 20°F) to minimize outgassing
Pump will not Prime	<ol style="list-style-type: none"> 1. Too much pressure at discharge 2. Check valves not sealing 3. Output dials not set at maximum 4. Suction lift height too much. Maximum 5ft (1.5m) 5. Pump equipped with spring loaded high viscosity valves 	<ol style="list-style-type: none"> 1. Turn off all pressure valves, relieve system pressure then loosen outlet tubing connection at discharge point. Remove discharge valve cartridge. Dampen ball check and valve seats with a few drops of solution. Set pump dial to maximum rate. When pump is primed, reconnect all tubing connections 2. Disassemble, clean and check for deterioration, damage or swelling. Reassemble and wet the valve assembly, then prime. See 5.0 Start-Up and Operation Section. 3. Always prime pump with output dial set at maximum rated capacity. 4. Decrease suction lift or pull vacuum on pump discharge until pump is primed 5. Loosen discharge valve to aid in priming, take necessary safety precautions for spills or apply vacuum to pump discharge

8.0 POLICIES AND PROCEDURES

8.1 Manufacturers Product Warranty

The manufacturer warrants its equipment of its manufacture to be free of defects in material or workmanship. Liability under this policy extends for twenty-four (24) months from the date of purchase or one (1) year from date of installation or whichever comes first. The manufacturer's liability is limited to repair or replacement of any device or part, which is returned, prepaid, to the factory and which is proven defective upon examination. This warranty does not include installation or repair cost and in no event shall the manufacturer's liability exceed its selling price of such part.

The manufacturer disclaims all liability for damage to its products through improper installation, maintenance, use, or attempts to operate such products beyond their functional capacity, intentionally or otherwise, or any unauthorized repair. Replaceable elastomeric parts are expendable and are not covered by any warranty either expressed or implied. The manufacturer is not responsible for consequential or other damages, injuries, or expense incurred through use of its products.

The above warranty is in lieu of any other warranty, either expressed or implied. The manufacturer makes no warranty of fitness or merchantability. No agent of ours is authorized to make any warranty other than the above.

For warranty and service matters within the European Union, contact the seller first or:

PULSAFEEDER-Europe
Via Kennedy, 12-20090
Segrate—Milano— Italy

8.2 Returns

The Customer Service Department will issue a Return Authorization (RA) number for all returns. The following information will be required:

1. Billing and a ship-to address.
2. Model and serial number.
3. Contact name and phone number.
4. Reason for return.
5. Purchase order (where applicable).
6. RA number on outside of the carton.

All material must be returned freight prepaid. All merchandise must be properly packaged and free of any corrosive, toxic or otherwise hazardous chemical. All items returned must reference Return Authorization.

8.3 Credits

No equipment will be accepted beyond six months after date of shipment from the factory. Only unused and undamaged equipment will be accepted for return to stock. All credits are based on acceptance of materials as new and unused by our inspection personnel. A restocking fee will apply. All equipment returned for credit must have a RA number and be returned freight prepaid.



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