



Owner's Manual

Installation, Operation, & Maintenance



IMPORTANT

Anyone responsible for installation, maintenance or operation of this equipment must have a thorough understanding of the instructions and safety requirements before attempting to install or service this unit.

Water Treatment & Accessories

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NEPTUNE-SERIES WATER DISINFECTION SYSTEM

Model Types

- **Neptune™** 1010, 1020 and 1030 6 GPM Maximum Flow Rate
- **Neptune™** 2010, 2020 and 2030 8 GPM Maximum Flow Rate
- **Neptune™** 3010, 3020 and 3030 12 GPM Maximum Flow Rate
- **Neptune™** 5020 and 5030 20 GPM Maximum Flow Rate

Thank you for selecting Water Treatment & Accessories' water disinfection system. Our **Neptune™** ultraviolet water treatment equipment effectively kills bacteria and is designed to meet primary requirements for bacteria reduction in potable water supplies. These ultraviolet systems feature a disinfection chamber manufactured from, type 304, stainless steel that is constructed using plasma arc fusion welding. The end cap has a stainless steel threaded nipple, through which the quartz sleeve is inserted.

The quartz sleeve is specially designed for maximum ultraviolet transmission, which maximizes disinfection efficiency. The quartz sleeve is held in place by using an o-ring seal, Teflon® backup washer and tightening the gland nut.

The ultraviolet lamp is inserted into the quartz sleeve, is operated by a plug-in style, ballast and secured by a translucent plug. The ballast features an LED lamp status indicator.

The inlet/outlet fittings for models 1000, 2000 and 3000 are 3/4-inch male NPT and the fittings for model 5000's are 1-inch male NPT.

A flow control is installed in the outlet fitting. The flow control limits the flow to the rated capacity of the system. All models can be mounted either horizontally or vertically. Vertical mounting allows for the inlet and outlet ports to face either left or right for optimum installation flexibility.

Applications

Ultraviolet Germicidal Disinfection

Water Treatment & Accessories' ultraviolet disinfection units are designed to destroy microorganisms in water supplies.

Approximately 95% of the ultraviolet energy emitted by the germicidal lamp is at the mercury resonance line of 254 nanometers (nm). This wavelength is in the region of maximum germicidal effectiveness and is highly effective against microorganisms (deactivates the DNA, destroying their ability to multiply and cause disease).

Water Treatment & Accessories' germicidal disinfection units meet or exceed minimum dosages of 16,000 microwatt seconds per square centimeter.

SAFETY WARNINGS

All personnel should be alerted to the potential hazards indicated by the product safety labeling on this unit.

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



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



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



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.

- Product safety labels should be periodically inspected and cleaned, as necessary, to maintain good legibility. Always replace illegible safety labels. Contact distributor to obtain replacement safety labels.

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. **▲ 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 maintenance.**
5. **▲ WARNING: Always depressurize unit before servicing.**
6. **▲ WARNING: Avoid exposure to direct or strongly 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 or plug is damaged.
9. Electrical power supplied, to the water purifier, must match power requirements listed on the water purifier.
10. **▲ CAUTION: Do not operate without proper electrical ground.**
11. Do not exceed water purifier's maximum rated flow capacity.
12. Do not exceed maximum operating pressure of 125 PSI.
13. Read and follow all notices and warnings on the water purifier.
14. Only authorized personnel possessing a strong understanding of the information in this manual should attempt to work on this equipment.
15. If you have any questions relating to proper maintenance or operating procedures, contact the distributor before servicing unit.
16. **SAVE THESE INSTRUCTIONS.**

SET UP

IMPORTANT: Please regard the following seriously. Failure to comply will affect your safety or system performance, and can invalidate your warranty.

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, before ultraviolet application:

RECOMMENDED MAXIMUM CONCENTRATION LEVELS

Turbidity	5 NTU	Maximum
Suspended Solids	10 mg/l	Maximum
Color	None	Maximum
Iron	0.3 mg/l	Maximum
Manganese	0.05 mg/l	Maximum
Ph	6.5 - 9.5	Maximum
Hardness	6 Grains	Maximum

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

Preparation

1. Remove the **Neptune™** ultraviolet water treatment system from its shipping carton.
2. Carefully inspect all packing materials to prevent the loss of accessories, mounting hardware, spare parts or instructions.
3. Components included with your system are:
 - 1 - Disinfection Chamber
 - 1 - Germicidal Ultraviolet Lamp
 - 1 - Plug-in Style Ballast
 - 1 - Quartz Sleeve
 - 1 - O-Ring
 - 1 - Teflon® Washer
 - 1 - Static Gland Nut
 - 2 - Mounting Brackets (Upper & Lower)
 - 1 - Bracket Nut
 - 1 - Portable Electronic Surge Suppressor
 - 1 - 7/16" Diameter Rubber Ball
 - 1 - Owner's Manual
 - 1 - Warranty Card
4. Carefully inspect all components for damage, report all damage immediately. Do not assemble or operate if there is any damage, visible or suspected.
5. The lamp and quartz sleeve are packed separately. Keep these items aside until ready for installation. When installing, avoid touching glass with bare hands. Oils deposited, from fingers, on the glass could effect ultraviolet transmission.

Location

1. The **Neptune™** unit should be located in a dry, well lit area
2. The **Neptune™** unit is intended for indoor use only. The ultraviolet unit should be protected from the elements and to temperatures below freezing. Ambient temperatures in the area surrounding the ultraviolet unit should be between 40° - 90°F.
3. Choose a location for your **Neptune™** unit isolated from vibration. Vibration of ultraviolet unit will damage lamp and lead to premature system failure.
4. Install the unit after all other water treatments and as close as possible to the point of use.
5. The **Neptune™** unit is designed to mount in either a horizontal or vertical position; vertical mounting, with the gland end up, is preferred. The quartz sleeve and lamp are removed from the gland end. Allow a service area of at least one chamber length, from the gland end, for lamp and quartz sleeve removal.
6. The ballast supplied with your **Neptune™** unit has a lamp cable approximately 5-feet long. The unit should be located within 4-feet of a properly grounded, electrical outlet and mounted in such a way as to prevent any strain on the lamp cable or lamp. The ballast should not be mounted under any source of moisture or condensation and in such a way as to prevent water leaking onto the ballast.

Location Continued

- Flow direction (when mounted vertically) enters the unit through the lower fitting and exits through the upper fitting. The flow control is mounted in the upper (outlet) fitting.
- If your system is subject to water hammer conditions, it is recommended that you install a water hammer suppressor. Water hammer may cause damage to the o-ring seal.
- CAUTION:** As with any water handling device, the Neptune™ should be located in an area where any possible condensation or leakage from the unit, any accessory and/or plumbing will not result in damage to the area surrounding the unit. For added protection, it is recommended that a suitable drain pan be installed under the unit. The drain pan must be plumbed to an adequate, free flowing, drain to prevent water damage in the event of a leak. There are numerous leak detection/flood stop devices, available on the market today, designed to stop the 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 your supplier or Water Treatment & Accessories.

Installation

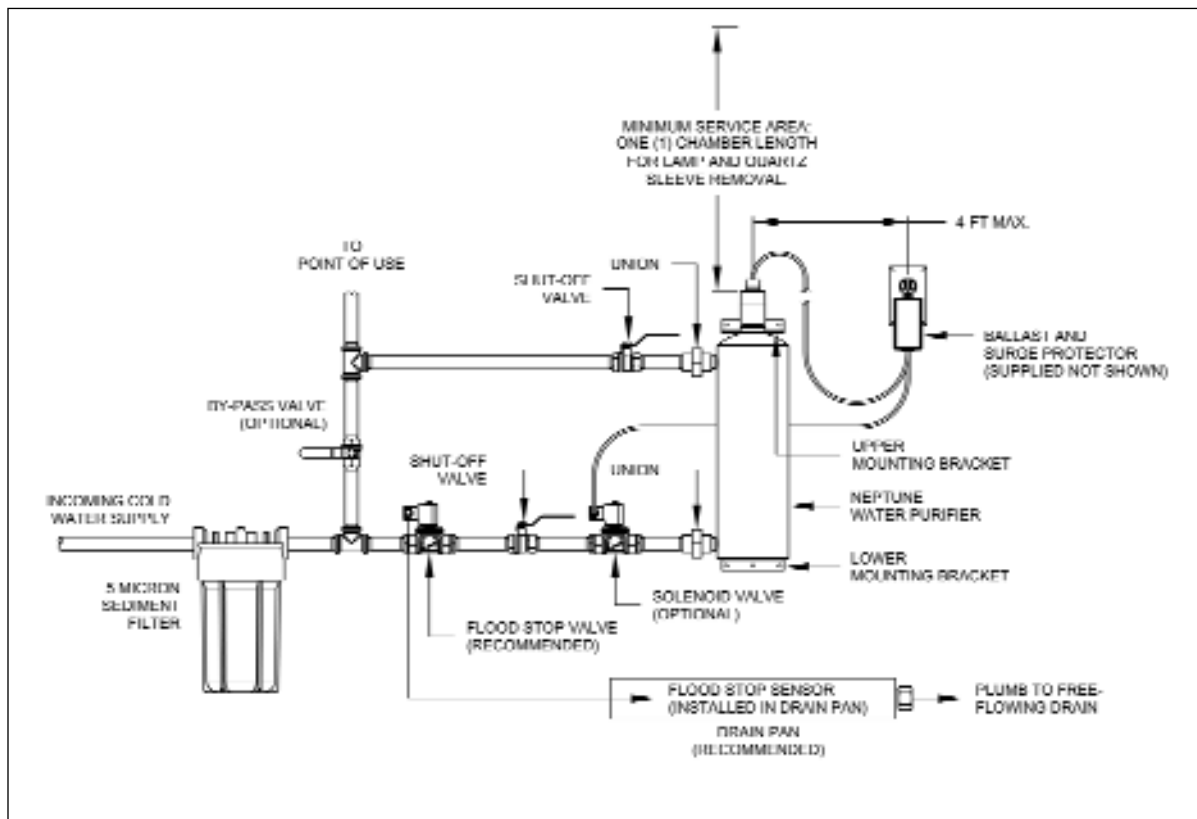


Figure 1 - Recommended Installation

Note: The use of components shown above or in combinations as stated below, but not originally supplied with the Neptune™ System, are recommended for a safe, effective and easily maintained installation.

- Mount the unit using the brackets provided. The unit should be mounted properly to support the disinfection chamber while eliminating possible strain on the mating fittings.
- The unit must be connected to the cold water line only. Inlet water temperature should not exceed 100°F.
- It is recommended that a 5-micron sediment filter be installed, in line, prior to the disinfection system. The sediment filter will stop or trap any particulates from entering the disinfection system.
- It is recommended that shut-off valves be installed on both the inlet and outlet sides of the unit for servicing. Shut-off valves allow the unit to be isolated from the water supply, which is required when removing the quartz sleeve.
- Unions should be installed on both the inlet and outlet of the unit; this will allow easy removal from the plumbing. Apply Teflon® tape to threads of inlet and outlet ports to ensure a tight seal.
- When all plumbing connections are complete proceed to “Installation of Quartz Sleeve”.

INSTALLATION OF QUARTZ SLEEVE

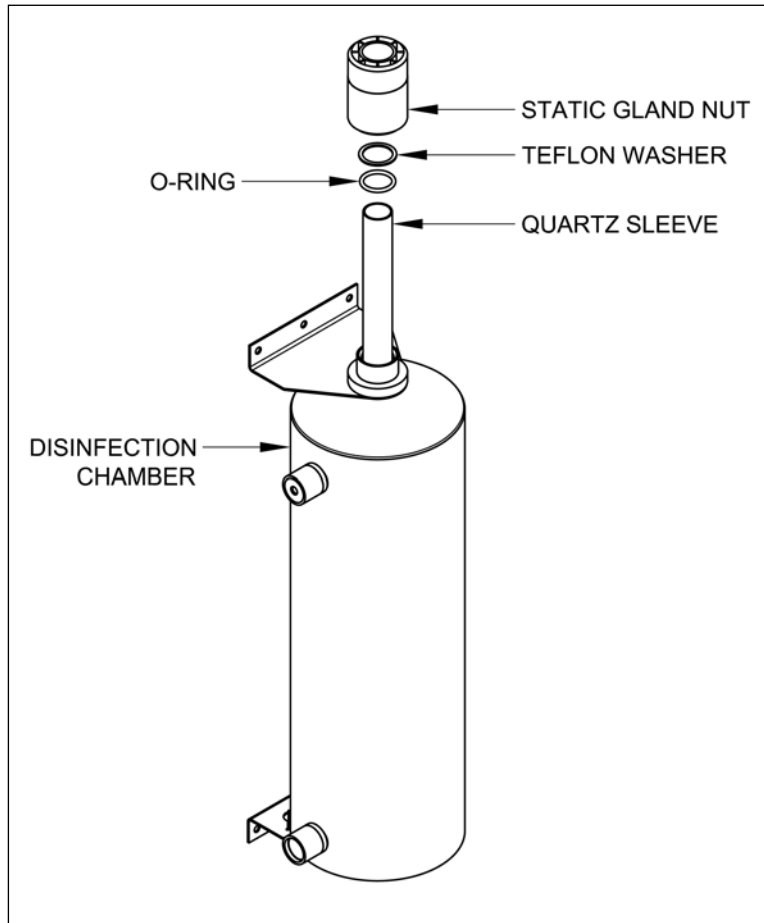


Figure 2 - Quartz Sleeve Installation

- The quartz sleeve surrounds the lamp and prevents water from contacting the lamp and electrical connection.
- ⚠ CAUTION: Quartz sleeve is fragile. Take care when removing it from the shipping carton.**
- Care should be taken that fingerprints are not left on the quartz sleeve. Handle quartz sleeve with clean cotton gloves.
 - Install the quartz sleeve as follows:
1. Slowly and carefully slide the quartz sleeve through the static gland nipple, until it rests on the bottom of the chamber.
 2. Place the o-ring over the end of the quartz sleeve and push the o-ring down the quartz sleeve until it is seated against the static gland nipple.
 3. Place the Teflon® washer, over quartz sleeve, until it rests on o-ring.
 4. Install the static gland nut over quartz sleeve and onto the static gland nipple. Be careful when installing static gland nut.
 5. Firmly tighten the static gland nut by hand. Hand tightening will provide the required seal. **NEVER USE PLIERS, CHANNEL LOCKS® OR OTHER HAND TOOLS.**
 6. After tightening the static gland nut, and all other plumbing connections, open the outlet shut-off valve. Open a faucet at the downstream from the system. Slowly open the inlet shut-off valve, flushing out remaining air. Close the outlet valve and slowly open inlet valve fully. Check for leaks.
 7. If the unit leaks, make sure that the static gland nut is firmly tightened. **DO NOT** use sealing compounds to stop the leak! If the leak continues, close the inlet shut-off valve; release the pressure on the unit and drain. Inspect the quartz sleeve and o-ring for damage. Carefully reassemble the o-ring, Teflon® washer and tighten static gland nut. Be sure the o-ring is placed on quartz sleeve **BEFORE** the Teflon® washer. Re-pressurize unit and check for leaks.
 8. If no leaks occur, proceed to “**Installation of the Ultraviolet Lamp**”.

INSTALLATION OF THE ULTRAVIOLET LAMP

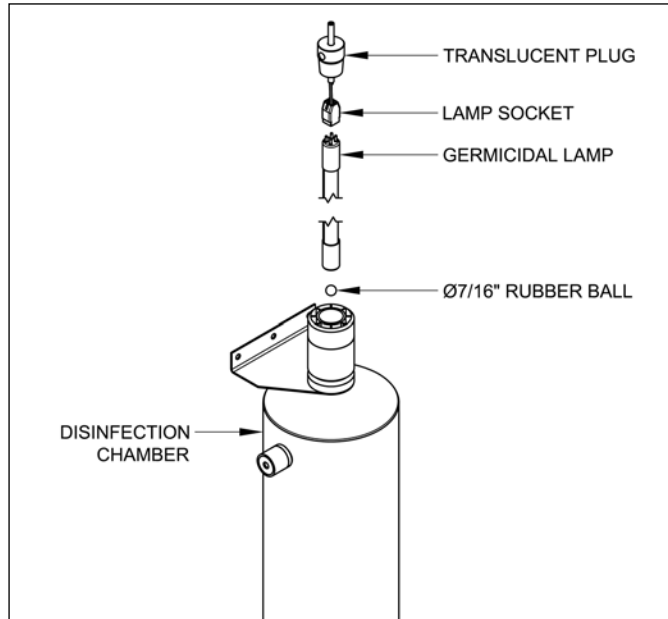


Figure 3 - Lamp Installation

⚠ CAUTION: Improper lamp installation will cause damage to the rim and/or closed end of the quartz sleeve. **DO NOT** drop the lamp into the quartz sleeve.

⚠ DANGER: Shock hazard. Damage to the closed end of the quartz sleeve, will allow water, under pressure, to fill the quartz sleeve.

- Included with this ultraviolet system is a 7/16" diameter rubber ball; this rubber ball is placed in the bottom of the quartz sleeve **BEFORE** the lamp is installed. The ball acts as a "shock absorber" and will help prevent damage to the closed end of the quartz sleeve if the lamp were to be dropped into the quartz sleeve.
- Care should be taken that fingerprints are not left on the ultraviolet lamp. Handle the lamp with clean cotton gloves.

⚠ CAUTION: Ultraviolet lamps are easily damaged and may cause injury if broken. Exercise care when handling lamps.

1. Locate and remove the ultraviolet lamp from its packing carton.
2. Remove any paper and/or warning tags.
3. Locate the 7/16-inch rubber ball and place it into the quartz sleeve.
4. Attach the lamp connector; make sure the connector is fully seated on the ultraviolet lamp.
5. Carefully slide lamp into the quartz sleeve.
6. Lower, **DO NOT DROP**, the ultraviolet lamp into the quartz sleeve so that the lamp is resting on the rubber ball at the bottom of the quartz sleeve.
7. Due to the possibility of quartz sleeve damage, when installing the lamp, it is advisable to re-check the unit for leaks after installing the lamp.
8. If no leaks occur, install the translucent retaining plug into the gland nut and hand tighten.
9. Plug electronic surge suppressor (supplied) into a properly grounded outlet.
10. Plug ballast in the surge protector. The system should now be operational.

⚠ WARNING: Avoid exposure to direct or strongly reflected germicidal ultraviolet rays. Germicidal ultraviolet rays are harmful to the eyes and skin.

System Disinfection

- Local public health authorities recommend system disinfection after the addition of appliances to a water system. Follow the recommendations of your state and local public health authorities, in regard to system disinfection.

Keys to Successful Operation

- Establish and implement a routine inspection and maintenance schedule.
- Monitor the LED lamp status indicator (on ballast). Immediately replace failed lamp.
- To ensure proper system performance, periodic biological testing should be performed on a schedule recommended by local public health authorities.

Plug-In Style Ballasts

All plug-in style ballasts supplied with **Neptune™** units include an LED lamp status indicator. Located on the top of the ballast, the LED indicator provides positive, visual indication of the ultraviolet lamp operation.

Optional Features

1. Plug-in, electronic ballast with LED lamp status indicator and audible alarm. The audible alarm alerts the user to lamp failure.
2. Plug-in, electronic ballast with LED lamp status indicator, audible alarm and solenoid outlet. The audible alarm alerts the user to lamp failure. The solenoid outlet provides power for an optional solenoid valve, which will prevent the flow of water through the unit during fault conditions.

NOTE: These features can be tested, but doing so will activate the ballast's lamp-out protection which **MUST BE** reset before the ballast will operate.

To Test:

1. Unplug the ballast and remove the lamp.
2. Plug ballast back in.
The lamp status LED should be OFF, the audible alarm should sound and the solenoid valve (if installed) should close. If the ballast does not operate properly, go to “**Troubleshooting**”.
3. Follow the Lamp-out Protection Reset instructions below.

Lamp-out Protection

If the ballast (electronic versions provided with all **Neptune™** models EXCEPT 1010, 2010 and 3010) is plugged in without a lamp connected or if the lamp fails, the ballast's lamp-out protection will switch off the ballast output circuit.

To Reset:

1. Unplug the ballast, remove and reconnect the lamp. The ballast must remain unplugged for two (2) minutes to reset.
2. After 2 minutes plug the ballast back into the outlet, the system should resume normal operation.

MAINTENANCE

- Keep a record of ultraviolet lamp replacement and service dates.
- It is recommend that the system be disinfected after a shutdown or servicing. See "System Disinfection".

Lamp Replacement

▲ DANGER: To prevent the risk of severe or fatal electrical shock, always disconnect power before performing any maintenance.

▲ WARNING: Avoid exposure to direct or strongly reflected germicidal ultraviolet rays. Germicidal ultraviolet rays are harmful to the eyes and skin.

The germicidal ultraviolet lamp used in the Neptune™ has a manufacturer's rated average effective life of 9,000 hours. Lamps may operate longer than their rated effective life, but the reduction in ultraviolet output will make it impractical to use past the manufacturer's rated life. For maximum efficiency lamp replacement is recommended every 9,000 hours (approximately 12 months) of continuous operation.

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 <http://www.lamprecycle.org>.

Quartz Sleeve Cleaning or Replacement

- To maintain optimum ultraviolet output, the quartz sleeve must be kept clean and free of organic build-up. The quartz sleeve will require periodic cleaning; the frequency of cleaning will be determined by the quality of the water passing through the unit.
- Periodically inspect the quartz sleeve to determine the frequency of cleaning. The first inspection should be 30 days after initial start-up. If the quartz sleeve requires cleaning, shorten the inspection interval. If the quartz sleeve does not require cleaning, extend the inspection interval.

▲ DANGER: To prevent the risk of severe or fatal electrical shock, always disconnect power before performing any maintenance.

1. Unplug the ballast from the power outlet.
2. Shut off the water supply to water purifier using the inlet and outlet shut-off valves.
3. Unscrew translucent plug and remove the lamp.
4. Remove static gland nut from the chamber.
5. Remove the Teflon® washer and o-ring from end of quartz sleeve. Teflon® washer will sometimes remain within the static gland nut. If so, remove Teflon® washer from static gland nut.

▲ CAUTION: Lamp and quartz sleeve are easily damaged. Exercise care when handling lamp and/or quartz sleeve.

6. Carefully remove quartz sleeve from chamber. **NOTE:** Place a bucket under the unit to catch any water that may spill out when removing the quartz sleeve.
7. Remove the 7/16-inch rubber ball from the quartz sleeve.
8. Once the quartz sleeve is removed, clean with alcohol or a detergent. Stubborn stains usually can be removed. **NOTE:** Follow all manufacturer's instructions and precautions when handling chemicals.
9. Inspect Teflon® washer, o-ring and 7/16-inch rubber ball. Do not re-use if there is any damage. Replace all damaged components.
10. Re-install quartz sleeve, following the instructions provided in "Installation of Quartz Sleeve".

TROUBLESHOOTING

▲ CAUTION: Always disconnect power to the water purifier, before performing any service.



Use **personal protection equipment**, such as gloves; long sleeves with no gaps between cuffs and gloves, and ultraviolet resistant face shield, when there is a possibility of ultraviolet exposure or when troubleshooting the lamp outside of the disinfection chamber.

SITUATION	RECOMMENDED ACTION
Leakage	<ul style="list-style-type: none"> • Verify that the gland nut is tightened properly. • Verify influent water pressure 125 PSI maximum. • Carefully check quartz sleeve for possible cracks. If broken, call distributor for replacement.
Ultraviolet Lamp LED Light is Out, Alarm Sounding	<ul style="list-style-type: none"> • Check for proper socket connection. • If lamp is on, replace ballast.
Ultraviolet Lamp is Out	<ul style="list-style-type: none"> • Check input voltage • Exchange questionable lamp with a known good lamp. If good lamp lights, replace bad lamp. • If the lamp does not light, verify ballast output. If ballast is bad, replace ballast. • Ballast lamp-out protection activated. Reset ballast.
Poor Bacterial Performance	<ul style="list-style-type: none"> • Verify that ultraviolet lamp is operating properly. • Replace lamp if more than 9,000 hours old. • Confirm water quality does not exceed maximum recommended concentration levels. (i.e. more turbid, higher iron content, more color, etc.) • Verify flow rate. • Check the quartz sleeve condition - should be clear and clean.

If questions still remain after completing a troubleshooting procedure, please contact your distributor or Water Treatment & Accessories.

REPLACEMENT PARTS

Contact your supplier or Water Treatment & Accessories for available replacement parts. Replacement parts are determined by model number, please have your model number ready when ordering replacement parts.

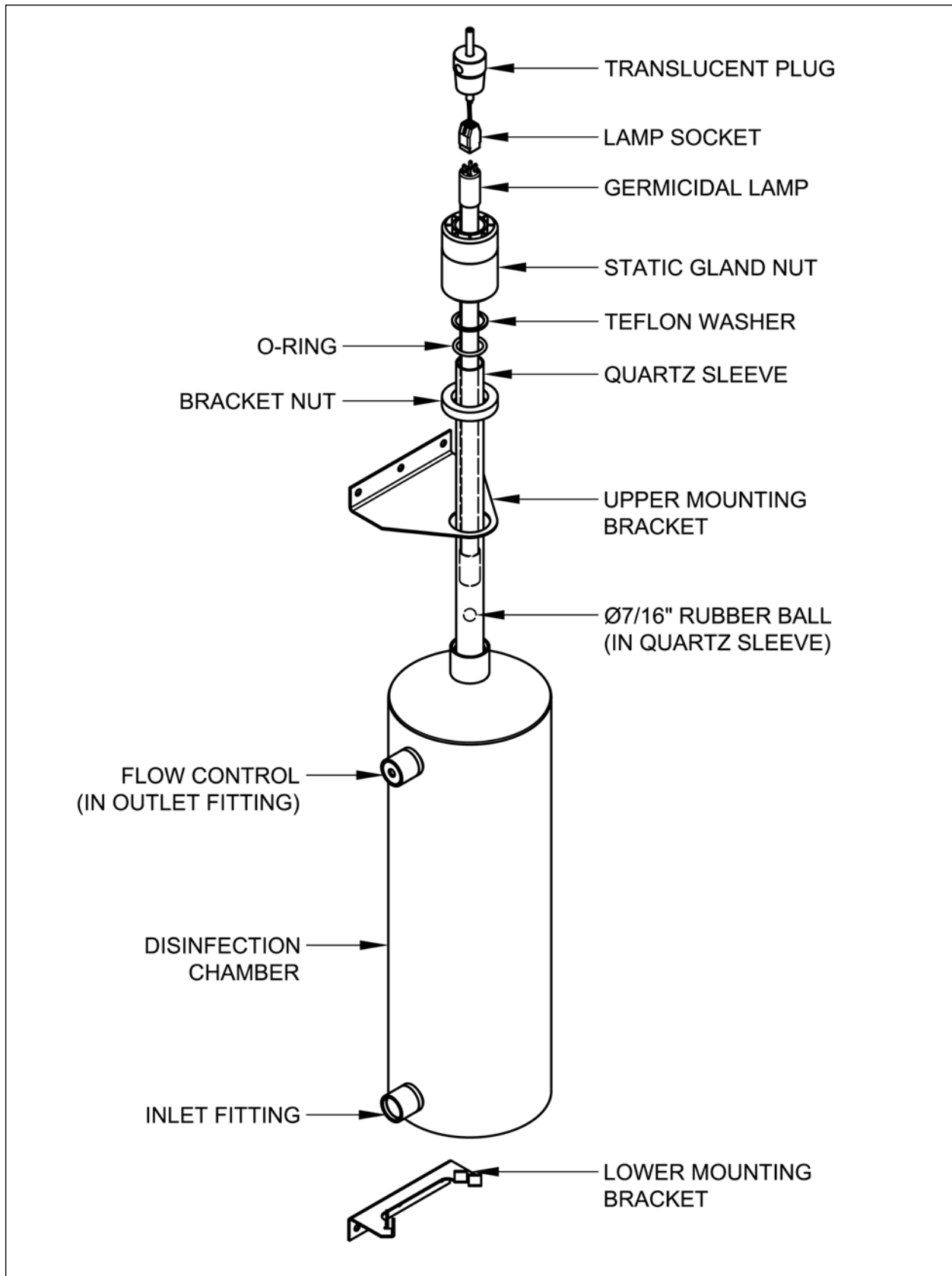


Figure 4 - Exploded View

LIMITED WARRANTY

We warrant that this product will be free from defects in material and workmanship for a period of one year with the exception of the pressure vessel (10 years) and the ballast (2 years) from the date of shipment thereof or the product's total rated life, whichever first occurs. 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 persons; or improperly installed.

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 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, express 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 or damage to or loss of property or value caused by any product which has been subject to misuse, negligence, or accident; or modified or repaired by unauthorized person; or improperly installed.

Under no circumstance 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.

____/____/____
DATE OF PURCHASE

MODEL NO.

SERIAL NO.