UltraGuard® FILTRATION SYSTEMS

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

Point of Entry Ultrafiltration System

Model UG-1000, UG-2000, UG-2001

UG-1000

UG-2000

UltraGuard® Systems have been tested by WQA as a Microbiological Water Purifier based upon the recommendations set forth in the USEPA Guide Standard and Protocol for Microbiological Water Purifiers (OPP Task Force Report, 1987)

Please read carefully before proceeding with installation. Your failure to follow any attached instructions or operating parameters may lead to the product's failure.

Refer to enclosed warranty for operating parameters to ensure proper use with your water supply.

BioVir LABORATORIES®

TESTED AND CERTIFIED Water Quality UNDER INDUSTRY STANDARDS®

Part#

Rev 4

Manual Date: 8/24/15

Certification

NELAP* and California Department of Health accredited laboratory

*National Environmental Laboratory Accreditation Program (NELAP) Accredited #05234CA

The UltraGuard® UG Series Water Purifiers have been tested by BioVir Laboratories Inc. and found to meet all the requirements of the USEPA's Guide Standard and Protocol for Testing Microbiological Water Purifiers (OPP Task Force Report, 1987) as interpreted by the BioVir Laboratories specifically for the UltraGuard® UG Series Products.

The test results were:
Bacteria Reduction: >99.99999%
Virus Reduction: >99.999%

Applies to the following models: UG-1000, UG-2000, UG-2001

The UltraGuard® UG Series Water Purifiers have been Tested and Certified by the Water Quality Association (WQA) to the USEPA's Guide Standard and Protocol for Testing Microbiological Water Purifiers (OPP Task Force Report, 1987) as interpreted by the WQA.

Applies to the following models: UG-1000, UG-2000, UG-2001

Contact Information

TST Water®, LLC
42188 Rio Nedo
Temecula, California 92590
Phone: 951-541-9517
www.tstwater.com

Service Record

Date of Purchase:_____Date of Install:_____Installed By:_____

Date	Pre Filter	UF Membrane	Carbon Filter		Date	Pre Filter	UF Membrane	Carbon Filter

Introduction to the UltraGuard® Series

Thank you for your purchase of the UltraGuard® (UG) Point of Entry Water Filtration system. Using the patented ultra filtration hollow fiber membrane as the backbone for filtration, the point of entry UltraGuard® line is specifically engineered to provide crisp, clean water to every tap in the home.

Ultra filtration (UF) hollow fiber is a membrane filtration process using standard home water pressure to filter water through its membrane. Particulates in the water are unable to pass through the 0.02 micron membrane, allowing only fresh clean water and dissolved minerals to pass through. This is the same type of separation process that is frequently used in commercial municipal water treatment plants and hospitals. Through the advances in technology we can now bring this powerful water filtration plant into your home. Not only does the UF membrane allow dissolved minerals to remain in the water, the UF process does not alter the pH of your water. Because of this, the ultrafiltration process provides clean, fresh water to every tap in your home.

When properly maintained, this system will provide you with years of trouble-free service. UltraGuard® point of entry line consists of two lines; the 1000 and 2000 Series. The 1000 comes with the UF membrane, where the 2000 Series provides pre filter options based upon raw water quality and specific water treatment needs.

UG-1000 System Specifications

Stage	Description	*Service Life
1	UF hollow fiber membrane	36 mo.

UG-2000 and 2001 System Specifications

Stage	Description	*Service Life
	UG-2000	
1	Empty 4 x 20 Housing for customizable filtration options	N/A
2	UF hollow fiber membrane	36 mo.
	UG-2001	
1	Sediment pre-filter P/N P4.5-20	12 mo.
2	UF hollow fiber membrane	36 mo.

The UF Membrane Element in this system must be replaced on a regular basis to maintain efficiency and to ensure high water quality. We recommend pressure testing the UF membrane annually, and replacement every 36 months or sooner based on incoming water quality. Any significant change in performance (reduced water flow) of the system suggests that the UF membrane may require maintenance or replacement. Refer to Appendix A for directions on pressure testing the membrane.

The next sections contain important information on the installation, proper care and maintenance of your POE system; ***please take a few minutes to read through this information***.

CAUTION: Improperly installed systems could result in water damage due to leaks or flooding. Proper installation of this system requires familiarity with plumbing. If you are not familiar with plumbing and proper use of common hand and power tools, or have any difficulty with the installation of this system, consult a licensed professional, such as a contractor or plumber. Follow all applicable codes and regulations. Do not install where water damage may occur. Protect System from freezing.

CAUTION: Please note the direction of flow on the UG Series of systems is right to left. Inlet and Outlet ports are labeled on the bracket of the filtration systems. Pay special attention when installing not to install backwards as this may damage the filtration system.

System Performance

The UF hollow fiber element has been tested by independent laboratory analysis according to EPA Guide Standard for the reduction of the below listed contaminents. The concentration of the indicated substances in water leaving the system was reduced to a concentration less than or equal to the permissible limit as specified in the standard.

System has been independently tested for the removal of microbiologically contaminated water that meets all other public health standards. The system is not intended for the treatment of water that has an obvious contamination source, such as raw sewage. This system is not intended to convert wastewater to microbiologically safe drinking water.

Substance	Average Influent Challenge	Maximum effluent concentration	% Reduction
Bacteria	1.1×10^8 CFU/100ml	<1	> 99.9999%
Virus	2.4×10^5 PFU/ML	<1	> 99.999%
Cyst	50,000 / L		99.95%

Operating Conditions

Operating Temperature	**Maximum 100°F (37.8°C)**	**Minimum 40°F (4.4°C)**
Operating Pressure	**Maximum 85 psi (6.0 kg/cm2)**	**Minimum 30 psi (2.11 kg/cm²)**
pH Parameters	**Maximum 10**	**Minimum 6**
Flow Rate	**8 GPM @ 60 psi***	

*Dependent on water pressure and water temperature

Recommended Feed Water Characteristics

TDS	up to 10,000 mg/L
TSS	up to 500 mg/L
Hardness	< 300 ppm as CaCO3
Turbidity	< 10 NTU
Iron	< 5 mg/L
Oils and Greases	< 0.1 mg/L
Solvents, phenols	< 0.1 mg/L

Location

1) System should be located where it will not be subject to physical impacts or rough contact by heavy objects.
2) Locate system where water damage will not occur. Close proximity to a floor drain is recommended.
3) Avoid direct sunlight.
4) Protect system from freezing temperatures.

Installation Recommendations

1) Installation of a water loop (by pass) plumbing to allow for periodic system maintenance (see illustration on page 7 for a suggested layout).
2) For systems without pre filtration, installation of pre-filter if needed based upon incoming water parameters.
3) Pressure regulator is recommended for pressures over 65 psi and required for pressures over 85 psi.
4) A bladder tank is required for proper operation. It is recommended to use a 10 to 30 gallon bladder tank. Filtered water that is stored in the tank is used during the back flush process to provide a back flush on the membrane. This back flush removes remove trapped dirt and other contaminants, flushing them to drain and restoring the flow rate of the system.

READ ENTIRE MANUAL BEFORE INSTALLATION

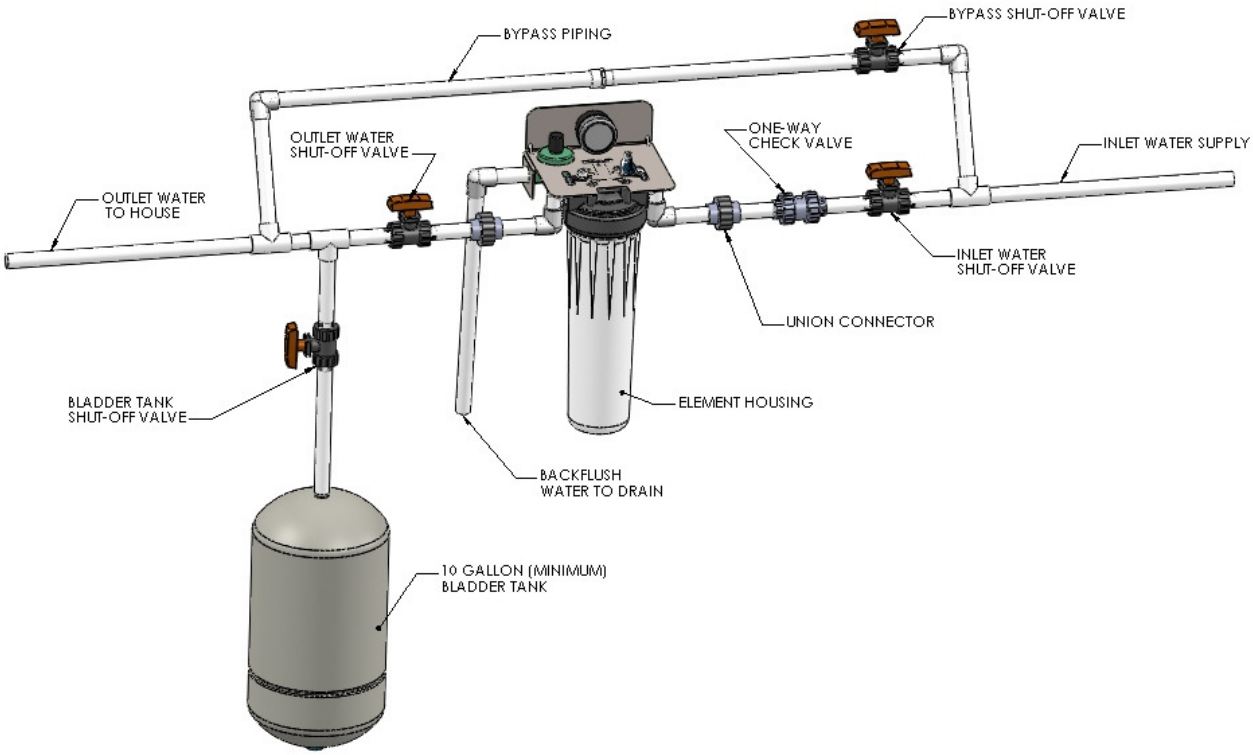
UF Membrane Element

1) The UF membrane is shipped in a sanitary package. Unpack and carefully remove the plastic wrapping from the UF membrane and inspect for any physical damage.
2) Inspect the o-rings and lubricate using an approved water based lubricant.
3) Unscrew the white sump from the lid pulling down on the sump once it is released from the lid. For the UG-2000 this will be the second sump.
4) Insert the double o-ring seal of the membrane into the black lid and then screw the white bowl on, making sure the bottom of the UF membrane properly seats on the bottom of the housing.
5) The 2001 system comes with the pre filter already installed.
6) Using the wrench provided tighten the housing. Do Not Over Tighten as this can damage the o-ring seal.
7) Run a dry element air test on the UF membrane in order to ensure efficacy of the UF membrane.
   a. Refer to Appendix A of the manual regarding directions on how to perform the dry element air test.
   b. In the unlikely event there is a problem with the UF membrane, contact your dealer or distributor for a replacement membrane.

Inlet, Drain and Outlet Connection

1) Close the water main to the house, or shut off water to line that the UG system is to be installed on. Relieve pressure in the line by opening a cold water tap, such as a faucet, downstream of where the UG system is to be installed.
2) UG systems come equipped with three ports that require connection:
   a. Inlet
   b. Outlet
   c. Drain
3) Each of the three double o-ring fittings are held in place by a retaining clip. These fittings can be removed by pulling up on and removing the retaining clip.
   a. CAUTION: MAKE SURE WHEN THE SYSTEM IS PRESSURISED THAT ALL RETAINING CLIPS ARE SECURLEY IN PLACE.
4) The inlet connection is equipped with a check valve. This prevents back flow of water when the system goes in to back-flush mode, ensuring rinse water goes to drain.
5) In order to maintain a sanitary system during shipping; the outlet connection is shipped with a plug in place. Using a screwdriver, carefully remove the stainless retaining clip from the head of the system. From the parts bag, remove the white straight connector. Inspect the o-ring and lubricate with an approved water based lubricant. Insert the double o-ring seal in to the head and secure in place with the stainless retaining clip.
6) The following illustration is a *suggested guideline* for proper installation, *please review before installing*.

7) Drain line must be installed with a proper air gap in order to prevent any back flow during normal operation. Ensure installation follows local plumbing and code regulations for air gap.
8) The bladder tank must be installed downstream of the outlet. Refer to diagram below for recommended location of the bladder tank.



System Activation, Flushing and Inspection

1) In order to allow trapped air to purge out of the water line, open any cold water outlet that is downstream of the UG system.
2) Slowly open the main water valve to the system.
3) Open the air inlet valve at the top of the unit to allow trapped air to escape as the housing fills with water. Close it when water comes out.
4) Observe all the connections ensuring there are no leaks.
5) Allow the faucet or outlet that you opened up in Step 1 above to run for up to 10 minutes, checking that air sputtering stops, and that water is running clear, then close the faucet.
6) Check again for leaks at all connections.

Installation Checklist

1) Feed water pressure to the unit is not less than 40 psi, and no greater than 80 PSI (If higher than 80 PSI, install a pressure regulator).
2) Main water valve is open.
3) Within one to two hours after initial installation, check system again in order to verify performance, flow rate and observe if there are any leaks**.**

Back Flush Controller Setup

The UG Series utilizes a low voltage battery operated back flush controller. The controller requires three AA batteries (not included) in order to operate.

The number of back flushes per day and duration is determined by the specific turbidity of the raw specific water that is being treated. Turbidity is measured with a NTU meter.

It is recommended that the turbidity of the water is tested and the flush cycles of the controller are set as follows based upon the turbidity of the water being treated:

Turbidity	Times Per Day	Duration
2 - 4 NTU	One	2 minutes
5 - 9 NTU	Two	3 minutes
> 10 NTU	Four	4 minutes

NOTE: When programming of the automatic back flush controller is completed, the controller must be put into the OFF position and back to service. This ensures the solenoid valve recognizes the controller. Failure to do this may cause the valve to remain open while in operation mode causing water to flush to drain.

Programming Automatic Back Flush Controller

1) Remove clear cover.
2) Remove timer body and install three AA batteries (not included)
3) Reinstall timer body.
4) Rotate bezel to – SET TIME – set hour and minutes with +/-. To switch from AM/PM, press ▶
5) Rotate to – SET DATE – set year with +/-, then press ▶, month with +/-, then press ▶, day with +/-
6) Rotate to – START TIME – set time with +/-, for multiple times a day (per chart above), set first time, press ▶, set next time, press ▶, up to four times a day.
7) Rotate to – HOW OFTEN – Set days of the week to operate, according to chart above, set with +, to select each day, - will unselect.

8) Rotate to – HOW LONG – set number of minutes, according to chart above, with +/-
9) Rotate back to AUTO.
10) "FLUSH DELAY" is used to manually back flush element, set for 2 minutes with +, wait, valve will open, press – X – to stop, or wait for timer to count down.
11) When finished, replace cover.

System Maintenance

UF Membrane Element Replacement

It is recommended that you test the UF membrane element annually and replace the UF membrane once every three years or when the flow rate has been reduced significantly.

1) Close the Inlet water shut-off valve to the UG System.
2) Close the Bladder tank shut-off valve on the UG System.
3) Open a dispensing faucet or outlet that is downstream of the system in order to relieve system pressure. Close dispensing faucet when flow has stopped.
4) Close the Outlet water shut-off valve on the UG System.
5) If you have installed a by-pass loop, you may want to open it now. (This will provide unfiltered water during maintenance of the UG System)
6) Unscrew element housing with the provided wrench; remove the cartridge from the housing. NOTE: Be careful as the housing will be full of water when it is initially removed.
7) The replacement UF membrane is shipped in a sanitary package. Carefully remove the plastic wrapping from the UF membrane Inspect the o-rings on the membrane filter and lubricate using an approved water based lubricant.
8) Insert the double o-ring seal of the membrane in to the black lid and then screw the white bowl on making sure the bottom of the UF membrane properly seats on the bottom of the housing.
9) Tighten with wrench
10) **Do not run water** through the element until you perform a "**Dry Element Test**" see Appendix A of the manual.
11) Open dispensing faucet, turn on feed water, bladder tank and outlet water valves slowly.
12) Close dispensing faucet after water starts running. Observe system for any leaks, especially at newly replaced cartridge. The system should be flushed at least once as described for new installation.

Pre Filter Replacement

The sediment pre filter is recommended to be replaced once annually or if the flow has been significantly reduced.

1) Close the Inlet water shut-off valve to the UG System.
2) Close the Bladder tank shut-off valve on the UG System.
3) Open a dispensing faucet or outlet that is downstream of the system in order to relieve system pressure. Close dispensing faucet when flow has stopped.
4) Close the Outlet water shut-off valve on the UG System.
5) If you have installed a by-pass loop, you may want to open it now. (This will provide unfiltered water during maintenance of the UG System)
6) Unscrew element housing with the provided wrench; remove the filters from the housing. NOTE: Be careful as the housing will be full of water when it is initially removed.
7) Remove filter from packaging.
8) Install new filter into housing, set housing under cap and screw into place, tighten with wrench.
9) Open dispensing faucet, turn on feed water, bladder and outlet water valves slowly.
10) Close dispensing faucet after water starts running. Observe system for any leaks, especially at newly replaced cartridge. The system should be flushed at least once as described for new installation.

Appendix A

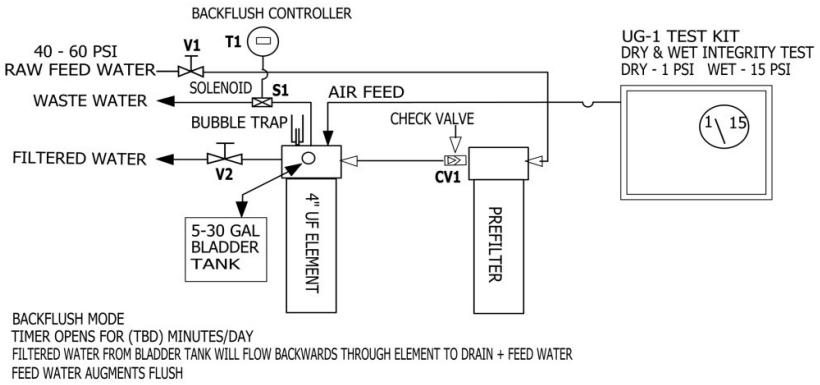
DRY ELEMENT TEST PROTOCOL

1) If replacing membrane, turn off water supply, or if new system do not introduce water to the system until after this test.
2) Turn off filtered water outlet. This should be a ball valve, which is described in the installation instructions.
3) Set timer to manual back flush to drain bladder tank (open, then close drain valve via back-flush controller).
4) Install clean, dry, oil free, air supply 1/4" tubing to UF housing, after removing plug from fitting (see drawing below).
5) Install bubble trap to fitting on UF housing after removing black plug; fill clear tube of trap with water.
6) Turn on air pressure, set air pressure to 1 PSI on regulator if required **(Note: Test air pressure before filling membrane with air to ensure you are not over-pressurizing the membrane).**
7) Observe bubble trap, there may be an initial surge of bubbles, after 2-3 minutes the bubbles will become very intermittent or may stop completely. If steady stream of bubbles (bubbles form a steady stream, or are emitting faster than 1 per every 2 seconds), remove element and inspect all o-ring seals, reinstall element, tighten housing firmly, and retest. If continued leakage occours, replace element.

WET ELEMENT TEST PROTOCOL

1) Follow steps 1-5 above.
2) Turn on air pressure, set air pressure to 15 PSI on regulator if required **(Note: Test air pressure before filling system with air to ensure you are not over-pressurizing the membrane).**
3) It will take several minutes to displace water from the UF element, this water will flow out from the bubble trap. **If unit is not near a drain, be prepared to contain or clean up spilled water.**
4) When water stops flowing out of bubble trap, there may be some bubbles, but should not be a steady stream (bubbles form a steady stream or are emitting faster than 1 per every 2 seconds). If steady stream continues after 5 minutes, remove element and inspect all "O" ring seals, reinstall element, tighten housing firmly and retest. If continued leakage occurs, replace element, and test with the Dry Element Test above.

UG-2000 UF ELEMENT TEST SETUP FLOW DIAG.



Limited Warranty

This Limited Warranty extends to the original purchaser of the system only. This warranty covers all Manufacturer-supplied items only that prove to be defective in material, workmanship or factory preparation. This warranty covers parts only; all labor is excluded from this warranty, including, but not limited to, services related to the removal, replacement, installation, adjustment, maintenance and/or repair of the unit or its components items. Excludes all non-Manufacturer labor required for any servicing of the unit, including, but not limited to, servicing related to installation, adjustment, maintenance and repair of the unit. This warranty applies only for the First full calendar year from date of purchase. The following items are excluded from this warranty: membranes, Filters, O-rings, and all other parts or components that require regular replacement as a result of ordinary usage.

Disclaimers: This Limited Warranty applies only if the system is installed, used and maintained in compliance with all instructions and requirements enclosed with the system. This warranty will be void for failure to observe the following conditions:

1) The system is to be used with potable water from a municipal water system.
2) Feed water pressure to the unit is no less than 30 PSI and no greater than 85PSI.
3) The system is to be used on water supplies with chlorine concentrations of 1.0 mg/L (ppm) or more.
4) Feed water temperature to the unit must be no less than 40℉ and no more than 100℉.
5) Total suspended solids in feed water must be less than 10 ppm.
6) Feed water must have a pH between 6 and 10.
7) Turbidity must be less than 10 NTU.

System has been independently tested for the removal of microbiologically contaminated water that meets all other public health standards. The system is not intended for the treatment of water that has an obvious contamination source, such as raw sewage. This system is not intended to convert wastewater to microbiologically safe drinking water.

The Manufacturer does not know the characteristics of your water supply. The quality of water supplies may vary seasonably or over a period of time. Your water usage may vary as well. Water characteristics can also change if the drinking water appliance is moved to a new location. The Manufacturer assumes no liability for the determination of the proper equipment necessary to meet your requirements, and we do not authorize others to assume such obligation on our behalf.

This Limited Warranty does not cover any Manufacturer-supplied items that are defective as a result of the use of improper parts, equipment or materials. This warranty does not cover alterations or modifications of the unit, or failure of a unit caused by such alterations and modifications.

This Limited Warranty does not cover malfunctions of the unit due to tampering, misuse, alteration, lack of regular maintenance, misapplication, fouling due to hydrogen sulfide, manganese or iron, scaling from excessive hardness, turbidity greater than 10 NTU, Silt Density Index (SDI) greater than 5.0 SDI, or excessive membrane hydrolysis due to chlorine levels in excess of 2.0 mg/L (ppm) or damage due to freezing. In addition, damage to the unit due to Fire, accident, negligence, act of God, or events beyond the control of the Manufacturer are not covered by this warranty.

Limited Warranty Cont'd

Incidental and Consequential Damages Limitation: The Manufacturer will not be responsible for any incidental or consequential damages as a result of the failure of this unit to comply with express or implied warranties or any defect in the unit, including but not limited to, lost time, inconvenience, damage to personal property, loss of revenue, commercial losses, postage, travel, telephone expenditures, or other losses of this nature. Some states do not allow the exclusion or limitation of incidental or consequential damages, so this exclusion may not apply to you.

Owner's Warranty Responsibilities: As a condition of this Limited Warranty, the owner must ensure periodic maintenance of the system is performed as described in the literature enclosed with the system. Neglect, improper maintenance, abuse, modification or alteration of the unit will invalidate this Warranty. Should your unit develop a defect or otherwise fail to perform in accordance with this warranty, you should contact the retailer from whom the product was originally purchased.

Implied Warranties: The implied at-law warranties of merchantability and fitness for a particular purpose shall terminate on the date one year after the date of purchase. Note: some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

Other Rights: This Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Assembly Outline – see visual aid below

Remove unit from shipping box. Lower tray will remain with the unit.

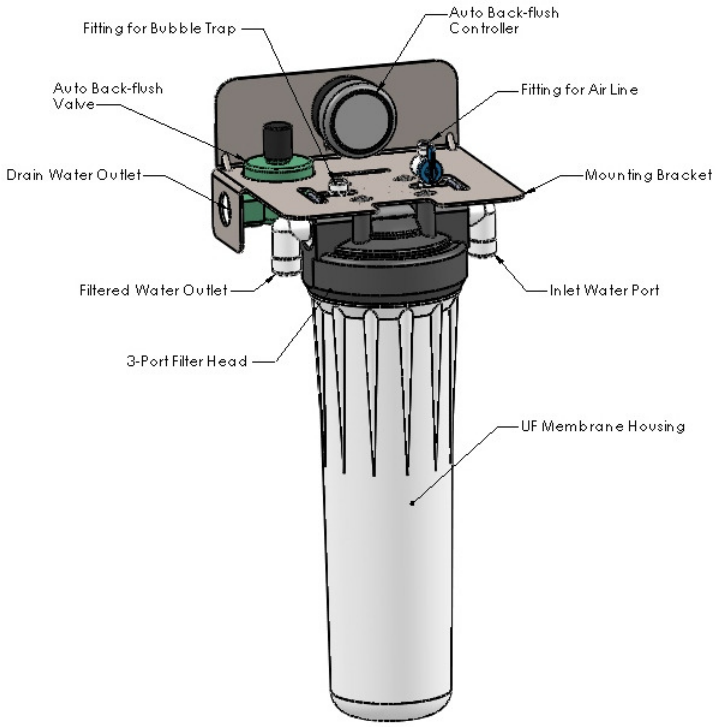
Remove top inserts and miscellaneous packaging from around filtration unit.

Remove PVC threaded plug from inlet and outlet side.

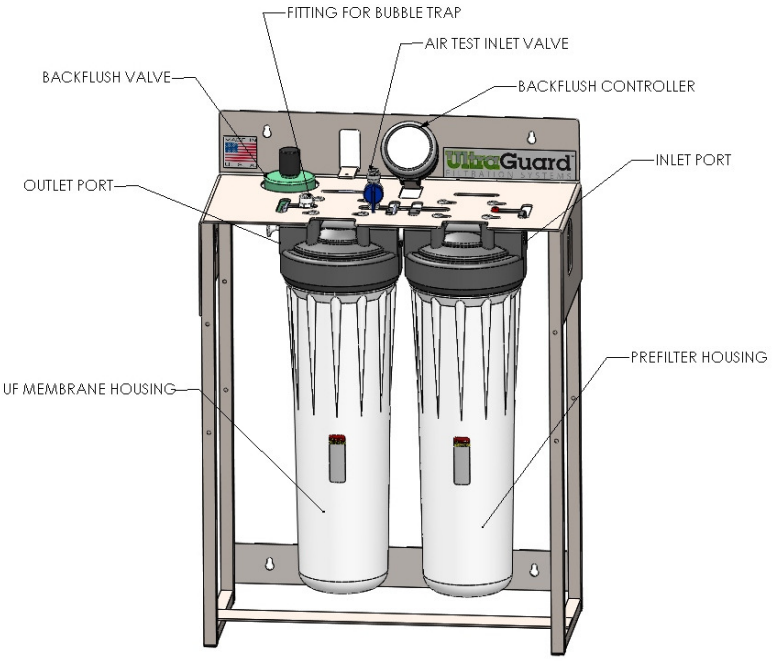
Remove plastic wrapping from UF Membrane.

Review installation instructions included in this manual to determine other steps required for installing the unit.

Visual Aid- Main System Features



UG-1000

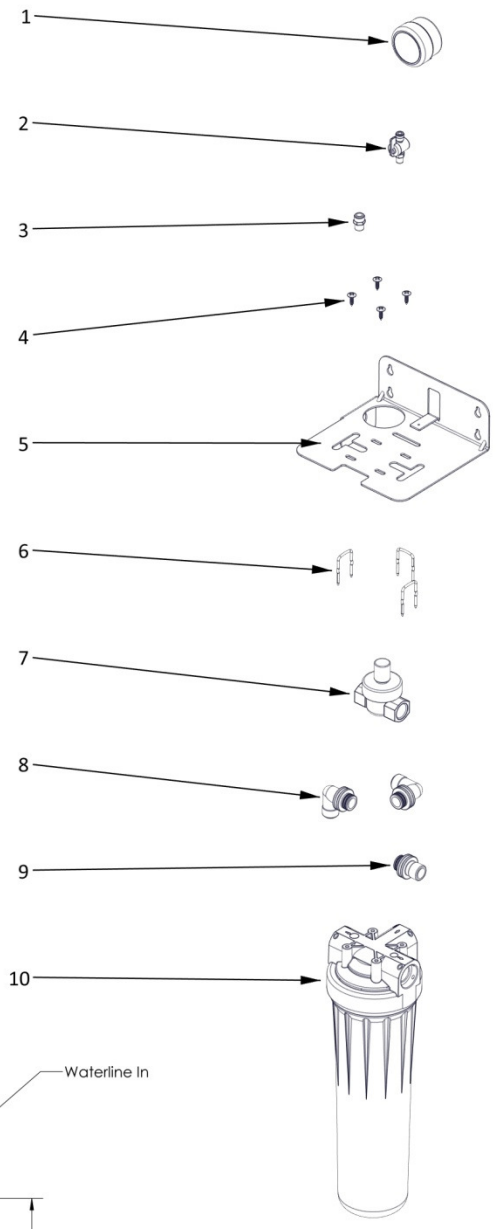


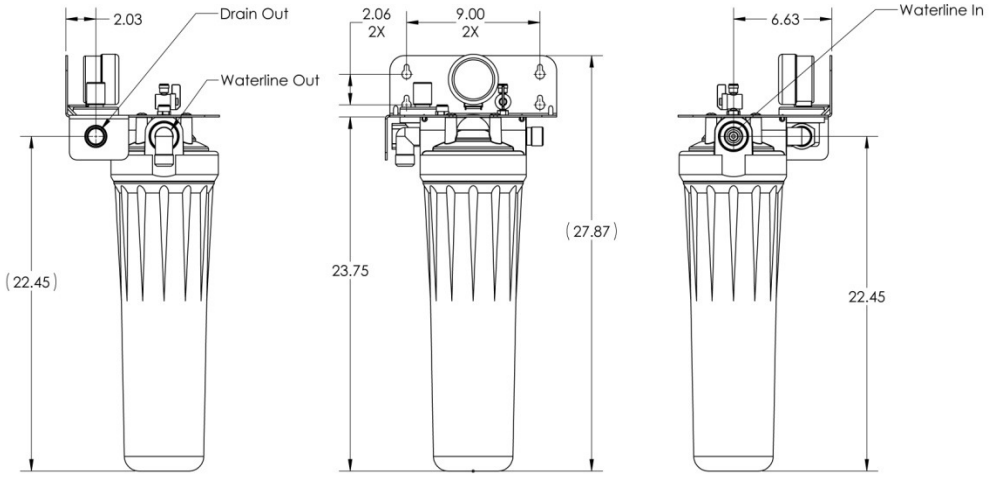
UG-2000 and 2001

Replacement Parts

UG-1000 POE Filter System

Item	Part No.	Description	Qty.
1	309095, controller	Orbit Valve and Meter Kit	1
2	304548	Inline Ball Valve 1/4" JG X 1/4" MIP	1
3	306008	Fitting 3/8 QC X 3/8 MPT with Flap Valve	1
4	Screw Temp	5/16-18 x 1" Pan Head Self-tapping Screw	4
5	509016	Mild Steel Sheet, .125 Thickness	1
6	PJC3	STAINLESS CLIP FOR 3-PORT HOUSING	3
7	309095, Valve	Orbit Valve and Meter Kit	1
8	PJE1	1" NPT MALE ELBOW FOR 3-PORT FILTER HOUSING	2
9	306007	1" NPT MALE X 1" O-RING CONNECTOR w/CHECKVALVE	1
10	PJ3100-WH-BK	4.5" X 20" BIG DIAMETER HOUSING W/3 PORT MODIFIED HEAD	1





Replacement Parts

UG-2000 POE Filter System

Item	Part No.	Description	Qty.
1	309095, controller	Orbit Valve and Meter Kit	1
2	304548	Inline Ball Valve 1/4" JG X 1/4" MIP	1
3	306008	Fitting 3/8 QC X 3/8 MPT with Flap Valve	1
4	Screw Temp	5/16-18 x 1" Pan Head Self-tapping Screw	8
5	UG2000R	Stainless Steel Standing Bracket	1
6	PJC3	STAINLESS CLIP FOR 3-PORT HOUSING	3
7	309095, Valve	Orbit Valve and Meter Kit	1
8	PJE1	1" NPT MALE ELBOW FOR 3-PORT FILTER HOUSING	1
9	306007	1" NPT MALE X 1" O-RING CONNECTOR w/CHECKVALVE	1
10	PJ3100-WH-BK	4.5" X 20" BIG DIAMETER HOUSING W/3 PORT MODIFIED HEAD	1
11	PJP1	Plug for 3 Port Housing	1
12	PJ1200-WH-BK-PR	4.5" X 20" BIG DIAMETER HOUSING 1"WHT/BLK W/PR	1