

SAFE DRINKING PORTABLE WATER PURIFICATION UNIT



OWNERS MANUAL

NOTES:

Frequently Asked Questions

What is Ultraviolet?

Sunlight has long since been known to kill microorganisms. The rays from the Sun contain the UV Spectrum used in Ultraviolet Water Treatment Systems although at much lower intensities. It is also referred to as either the Germicidal Spectrum or Frequency. The frequency used in killing microorganisms is 254 nanometers (nm). The UV lamps that Safe Drinking Purifier uses are designed specifically to have the highest amount of UV energy at this frequency.

How is Ultraviolet strength measured?

The UV light, 254 nm, is measured in water treatment as Microwatts per Centimeter squared. The United States Department of Health has determined that a UV system should provide a minimum of 16,000 Microwatts per Centimeter Square.

Is the UV light exposed directly to the water?

Yes. The UV light is in the center of the filter; therefore, is exposed directly to the water. The best way to penetrate water with the UV light is to expose outward radiant into the water.

What is the Quartz Sleeve?

The Quartz Sleeve serves three purposes: 1. To isolate the lamp from the water so the electrical contacts are not shorted out by the water; 2. To create a thermal barrier allowing the lamp to maintain its ideal operating temperature of 104 Degrees Fahrenheit; and, 3. To allow maximum transmission of the UV energy into the water. The Quartz Sleeve is made of pure fused Quartz which has a transmission rate of approximately 98 percent.

How is a Quartz Sleeve cleaned?

The Quartz Sleeve should be wiped down with a damp cloth each time the filter is changed. There is no need to remove the Quartz Sleeve for this cleaning process. If there is any scale or hard water deposits on the Quartz Sleeve, they can be removed by using a vinegar solution or a weak acid solution.

How long does a UV lamp operate?

The UV light used by Safe Drinking Purifier is designed to operate for one (1) year under continuous operation. The lamp will slowly lose energy during this period; therefore, the lamp should be changed annually to guarantee the amount of UV energy available is sufficient enough to kill any micro-organisms.

Does UV purification alone make the water taste better?

No. The UV energy entering into the water has no effect on the taste and odor of the water with the exception that certain chemicals will oxidize under the UV light. The taste may change due to this oxidation. This oxidation only takes place when the water is standing for a long period of time in front of the UV lamp.

Should UV be used with other forms of filtration?

Yes. Because UV does not change the quality of the water other than killing the bacteria, it is always recommended to have an additional Carbon or Sediment Filter with a UV system. All Safe Drinking Purifier systems have these filter systems built in with the Ultraviolet light.

When used with other filters, where should the UV be placed?

It is always recommended that the Ultraviolet system be the last water treatment device before point of use. Any filter or other water treatment device may cause re-contamination.

What causes the black particles to appear in the water when using a Carbon filter?

The black particles that appear in the water are from the Carbon filter. During transit, Carbon filters generally give off small amounts of Carbon particles. These particles will be flushed out during the initial use of the system.

Is Ultraviolet as harmful as Radiation?

No. The UV light only penetrates the water and is very much like sunlight. There is no residue or residual of any kind in the water that has been treated with the Ultraviolet light. All Safe Drinking Purifier systems are designed so that no exposure to the UV light is possible. Always use caution when servicing a UV system so you are not exposed directly to the UV light.

May I run hot water through my system?

Safe Drinking Purifier does not recommend using hot water or water greater than 100 Degrees Fahrenheit through the UV system. At higher temperatures, the plastics may soften, distort, or weaken; therefore, defecting the system.

If the UV lamp is darkened, is it defective?

No. Darkening at the ends of the UV lamp is normal. The UV lamps rarely fail, and failure is usually caused by a too low or too high voltage. It is extremely important that the lamp be changed each year.

What is the difference between hard and soft glass UV lamps?

Safe Drinking Purifier systems exclusively use hard glass for lamp and Quartz Sleeve. Hard glass is pure fused Quartz and maintains its ability to transmit UV light over a longer period of time. Soft glass lamps use a glass more like normal window glass, and the UV light causes this glass to solarize and inhibits the transmission of UV light. Normally, soft glass lamps do not last more than three (3) months. Hard glass lamps are designed to operate for at least one (1) year.

Why is Teflon used with the EPCB Filter?

Teflon is used in the EPCB Filter to allow a double pass, or extended pass, of the water along the UV lamp. Very few materials are transparent to the UV light. Pure fused Quartz and Teflon allow transmission of UV light. This is a patented application of the Teflon Sleeve within the filter. The letters EPCB stand for Extended Pass Carbon Block.

Can I use non-Safe Drinking Purifier filters?

No. The filters used in the Safe Drinking Purifier systems have been tested extensively for use with Ultraviolet light. Filters that are not supplied by Safe Drinking Purifier cannot be guaranteed to resist the effects of Ultraviolet light, and Safe Drinking Purifier cannot guarantee the kill rate or the effectiveness of the system. The use of non-Safe Drinking Purifier filters will void any warranties on the system.

How long do filters last?

Filters normally last up to six (6) months depending on the quality of the water. All Safe Drinking Purifier systems incorporate pre-filtration, sediment filtration and carbon filtration for extended filter life.

Do ordinary filters kill bacteria?

No. Ordinary filters cannot kill bacteria. The bacteria will enter the filter and either pass through the filter or grow within the filter. Safe Drinking Purifier's UV system is always the very last pass after the Carbon filter to ensure that bacteria does not pass through to the drinking water.

How much amperage does your Safe Drinking Purifier model need for operation?

The Safe Drinking Purifier unit has an amperage draw of 3.32 amps at 12volts during operation.

WARRANTY INFORMATION

All merchandise designed, manufactured and assembled by Safe Drinking Purifier, is warranted at the time of shipment and for a period of three years to be free from defects in material and workmanship, provided such merchandise is properly installed and used only for the intended purpose and under normal service conditions as detailed in the Owners Manual. Liability with respect to any such merchandise proved defective is limited to buyer's net purchase price or, at Safe Drinking Purifier's option, to the repair or replacement thereof upon its return to Safe Drinking Purifier freight prepaid. In no event shall Safe Drinking Purifier be liable for any loss or damage, either direct, incidental or consequential.

All merchandise supplied by Safe Drinking Purifier but designed, manufactured and assembled by others (i.e. pumps, generators, electrical components etc) shall be accepted by Buyer with only those warranties made by such vendors or manufacturers and in lieu of any additional warranties on the part of Safe Drinking Purifier. Filters are not warranted due to varying water conditions.

This warranty agreement excludes all products or components that, in the opinion of Safe Drinking Purifier Water Systems, have been subject to negligent use, misuse, alteration, or that have been repaired/replaced with component parts other than those manufactured or supplied by Safe Drinking Purifier Water Systems. Purchaser has the full responsibility for obtaining any licenses, permits, and inspections required to install and/or use the goods herein described.



WHAT IS ULTRAVIOLET?

The ultraviolet rays from the sun have long since been known for their ability to destroy micro-organisms. However, it has only been in recent years that ultraviolet equipment has been manufactured for the home consumer.

Ultraviolet, commonly referred to as UV, is an extremely efficient form of disinfection. For residential use, it is an excellent system because of its reliability and ease of maintenance.

The UV lamp is similar to a fluorescent lamp in appearance only. It operates by arcing electricity through a low pressure mercury vapor producing light waves at 254 nm (2537 Å) UV energy necessary to sterilize the water born micro-organisms. In order to achieve its full intensity, the UV lamp needs two (2) minute start up periods. Therefore, it is recommended to leave the system in operation at all times. After each start up period, a six (6) hour lamp loss is The lamp that is now in your system needs to be replaced every twelve (12) months to ensure proper disinfection of the water.

In order to allow the lamp to maintain its ideal operating temperature, 104o Fahrenheit, an additional hard quartz sleeve is used to isolate the lamp from the cooler water. It is very important the sleeve is kept clean so the maximum dosage of UV energy is allowed to pass into the water. It is recommended to clean the sleeve every three (3) months with soap and water.

Five (5) major groups of micro-organisms are destroyed with the Ultraviolet process. Organisms sterilized are viruses, bacteria, fungi spores algae, and Protozoa. Exposure to the UV energy causes the microbe's DNA (deoxyribonucleic acid) to "scramble," prohibiting reproduction. Sterile cells cannot reproduce; therefore it is considered "dead" and no longer a threat.

The United States Department of Health has established that proper exposure should be a minimum of 16,000 micro watts per centimeter square to achieve potable water standards.

The filter system that Safe Drinking Purifier has incorporated into the unit serves a dual purpose. Its first task is to remove the suspended solids from the water because they provide an excellent shield for the microbes to hide behind; therefore, making it difficult to receive sufficient UV exposure. Second, because Safe Drinking Purifier uses carbon filtration, we are also removing unpleasant tastes and odors; assuring the consumer of safe, good tasting water.

CAUTIONS

- Always allow the unit to run for 4 minutes before drinking.
- DO NOT exceed 65 PSI water pressure.
- DO NOT use any combustible or corrosive liquids.
- DO NOT run salt water through this unit.
- DO NOT use unit when the UV lamp indicator light is OFF.
- DO NOT pour purified water into a contaminated container.
- DO NOT reverse water flow through the system.
- Never look directly at the lighted UV lamp, Ultraviolet rays can be harmful to your eyes.
- DO NOT lengthen the inlet or output hoses by connecting any additional lengths of hose. The pump cannot handle the additional load.
- DO NOT restrict (or block) water flow while pump is running.
- Your unit contains delicate glass components – please use proper care when handling and transporting.

NORMAL MAINTENANCE: The following diagrams and instructions will provide you with all the information needed to properly maintain your Safe Drinking Purifier unit so that you may enjoy the benefits of the safe, healthy water for years to come. It is important that any water treatment system be properly maintained to ensure water quality.

BETWEEN USES: In bucket, mix 3–5 gal sanitizing solution using 1 Tablespoon bleach per gallon of water. Remove carbon filter and immerse in bucket. With both inlet and outlet hoses in the bucket, turn unit on and cycle the solution for 8–10 minutes. Drain water from hoses and both canisters; allow unit and filters to air dry for 48 hours before re-assembly and storage. Always protect against freezing.

QUARTZ SLEEVE: The quartz sleeve and filter canisters should be cleaned each time filters are changed. The presence of iron or poor water quality will require frequent cleanings of the quartz sleeve. Clean all parts except the filters and electronic parts with soap and water. **DO NOT ATTEMPT TO REMOVE QUARTZ SLEEVE** as part of your normal maintenance. Damage to the system and personal injury may occur. Contact Safe Drinking Purifier Water Systems if quartz sleeve is broken or needs replacement.

Filter replacement: Filters will normally last approximately three to six months, but will vary according to water conditions and frequency of use. A reduced flow rate indicates that filters must be changed. Use only Safe Drinking Purifier Filters. Safe Drinking Purifier filters are specifically designed to work in the ultraviolet disinfection process. Use of non-Safe Drinking Purifier filters will void your warranty.

TO CHANGE FILTERS

1. Disconnect power and remove entire assembly from carrying case.
2. Unscrew sump; remove old filter and discard. (For Carbon Filter – slowly remove from quartz sleeve).
3. Remove Teflon sleeve (carbon Filter) and gasket (rubber washer) from cartridge and save for reinstallation. (See Photos).
4. Rinse out sump and fill 1/3 full of water. Add 2–3 tablespoons of bleach, scrub thoroughly with brush or sponge. Rinse well.
5. Wipe down quartz and Teflon sleeve to remove any film and fingerprints.
6. Lubricate the sump O ring and gasket with petroleum jelly. Wipe groove and O ring / Gasket clean. Place O ring / Gasket back in place and press down O ring into the groove with two fingers (or place gasket on the rim of the sump). This will ensure a proper seal.
7. Re-insert Teflon sleeve into new cartridge (carbon filter only) and place gasket (rubber washer) on top of sleeve. (See Photos).
8. Twist the sump clockwise and hand tighten into the machine head.
DO NOT OVERTIGHTEN.
9. Re-connect power supply, turn on the unit and check for leaks.
(Depressing the RED button will release trapped air from the filter).
10. Re-secure entire assembly back into carrying case.

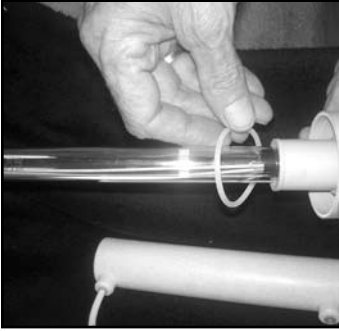
NOTE: When opening filter housing to change cartridge, it is common for the O ring Gasket to lift out of sump and stick to the head.

CAUTION: If O RING Gasket appear damaged or crimped, it should be replaced. Contact Safe Drinking Purifier Water Systems for Replacements.

CAUTION: Use caution when changing the carbon filter to avoid breaking the quartz sleeve in the UV chamber.

LAMP REPLACEMENT: Lamps must be changed every year or every 9200 hours of use (remember that each time the lamp is turned on, 4 hours of life are expended). Lamps rarely burn out, but they do lose their disinfection power with use. The UV lamp is removed through the top of the unit, and not by removal of the sump and carbon filter. To change lamp, remove the latch from the mounting bracket on top of the UV assembly. Lift and replace with new lamp. Touch only the ends of the lamp, as fingerprints on the glass will reduce the lamp's effectiveness. Slide the lamp back into the sleeves and tighten screws on the mounting latch.

FILTER CANISTER CARBON FILTER AND UV LIGHT



This photo shows your UV light and quartz tube exposed with the white canister removed. Please note the black “gasket”, or rubber washer.



This photo illustrate the CORRECT configuration of the carbon filter, Teflon sleeve, and rubber washer. Note the Teflon sleeve is first inserted into the hollow core of the carbon filter. The rubber gasket is then seated on top of the lip of the Teflon sleeve.



This shows the INCORRECT way to re-install your carbon filter assembly. This will prevent the necessary watertight seal, allowing the untreated water to bypass the carbon filter and the UV process, rendering the water undrinkable.

What is Activated Carbon?

Activated carbons are created from wood, coal or coconut shells that have been ground up and activated by heating at a controlled temperature and pressure to promote the active sizes where pollutants can be absorbed.

Absorption is the physical process where certain water pollutants are attracted to the surface of the carbon rather than to the water. The pollutants are locked into the carbon and are removed from the water. Activated carbons are also able to filter out sediment through mechanical filtration by trapping particles in the spaces between the carbon granules. Activated carbon has been used for hundreds of years to treat taste, odor, and color problems. Major water utilities and water treatment manufactures have found activated carbon to be an excellent media to produce better tasting water and remove harmful water contaminants at a reasonable cost.

Use of the Safe Drinking Purifier water purification system

Safe Drinking Purifier Portable Water purification Systems provide 99.9999% disinfection of bacteria and viruses. Safe Drinking Purifier systems are designed to provide complete treatment in a compact, easy to use package. Safe Drinking Purifier products are designed to provide years of trouble free service with proper maintenance. It is important that you read the entire instructions before use.

Operating your unit

1. Situate the unit near your salt-free water source. Open the carrying case, uncoiling and uncapping the hoses.
2. Connect power cables to 12 volt power source (RED connection to positive terminal and BLACK connects to negative).
3. Turn toggle switch to ON-UV indicator light will be illuminated.
4. Run the unit for 2 minutes before inserting inlet hose into the water supply. This allows the Ultraviolet lamp to reach maximum operating intensity.
5. Place the inlet hose assembly (yellow band) into the water source.
6. Remove protector cap from the outlet hose (blue band) and place outlet at collection point of your choice.
7. To turn off, switch toggle to OFF and remove power cables.
8. Drain hoses thoroughly and cap.
9. Coil hoses and power cord and stow in the carrying case.

What is TDS?

Total Dissolved Solids (TDS) are the total amount of inorganic elements, including minerals, salts or metals, dissolved in a given volume of water, other than the pure water molecules (H₂O) and suspended solids. TDS is expressed in parts per millions (ppm). TDS affects everything that consumes, lives in or uses water. For people, a lower TDS level in drinking water is preferred.

Useful links for more information:

More information on TDS:

<http://www.tdsmeter.com/abouttds.html>

RO Percent Rejection Calculator:

http://www.tdsmeter.com/abouttd_filter.html

DM-1 Page:

<http://www.tdsmeter.com/products.dualtdsmeter.html>

Assembled in the USA

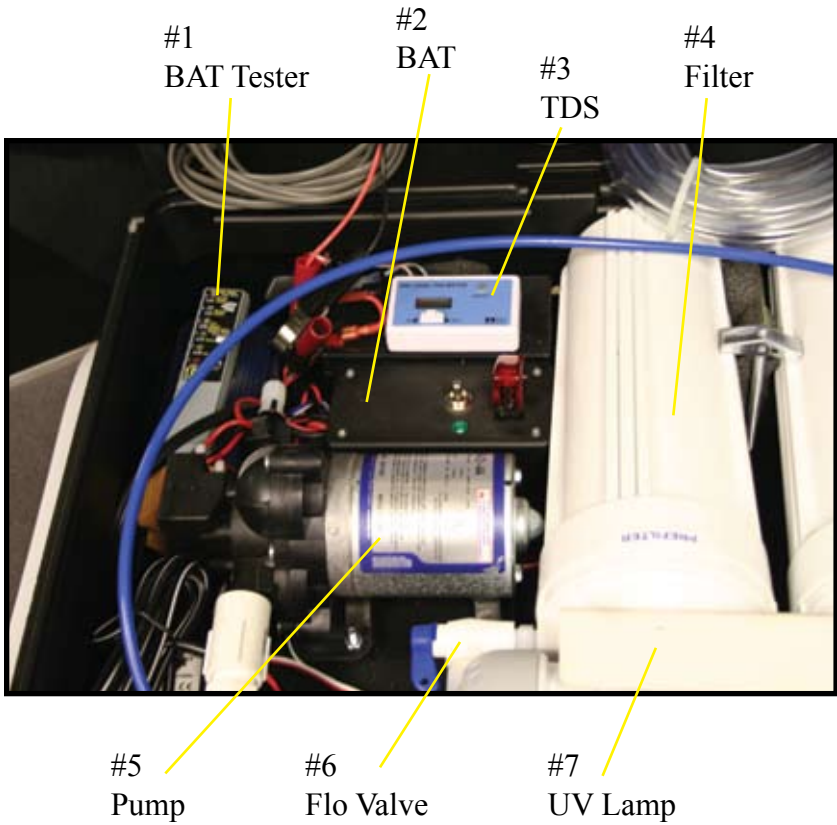
Power Inverters

The V-1 thru V-4 units use a 150W/450W power inverter. Modified Sinewave; 12 VDC Input; 115 VAC/60 Hz Output; Low Voltage Warning (10.6 V), Low Voltage Shutoff (10 V), and Overvoltage Shutoff (15 V).

- A. The purity of the water depends on the clarity of the water. Sometimes you need to adjust the flow as in fig 6 until the TDS meter is 500 or less on the filtered side of the meter.
- B. The UV light kills viruses and bacteria. But as the light gets older you may have to slow down or replace the bulb if necessary. Make sure that the light comes on every time you turn on the unit.
- C. The V3 has two batteries. When you use battery one you switch the solar panel to two. When you are using battery two switch the solar panel to one, therefore it is charging the battery that is not being used. Make sure that you do not let the batteries run all the way down or it will kill the batteries.
- D. Total Dissolved Solids (TDS) are the total amount of inorganic elements, including minerals, salts or metals, dissolved in a given volume of water, other than the pure water molecules (H₂O) and suspended solids. TDS is expressed in parts per millions (ppm). TDS affects everything that consumes, lives in or uses water. For people, a lower TDS level in drinking water is preferred. If the TDS meter is slow check the filters, UV light, battery power or adjust the flow of water. Remember human consumption is 500 or less on the meter. This is only a guideline to the purity of the water. It does not filter out poisons, unless you order the appropriate filters. For more information: www.tdsmeter.com/abouttds.html
- E. Adsorption is the physical process where certain water pollutants are attracted to the surface of the carbon rather than to the water. The pollutants are locked into the carbon and are removed from the water. Activated carbons are also able to filter out sediment through mechanical filtration by trapping particles in the spaces between the carbon granules. Activated carbon has been used for hundreds of years to treat taste, odor, and color problems. Major water utilities and water treatment manufacturers have found activated carbon to be an excellent media to produce better tasting water and remove harmful water contaminants at a reasonable cost. The replacement of the filter will vary depending on the pollutants in the water that is being filtered. The dirtier the water is being filtered the quicker the filter will need to be replaced. Use clean water to rinse the filter housing out.
- F. The sediment filter is to stop the sediment from contaminating the carbon filter and the UV light, which therefore needs to be replaced quite often. If the water flow slows down the sediment filter is getting clogged up.

Parts List

Part #	Description	Unit
SLAA 12-7	Battery	V1
SLAA 12-12	Battery	V1 & V2
UV-B01	UV Bulb	V1, V2 1-gal
UV-12	UV Bulb	V3 2-gal
2088-422-444	Water Pump	V1, V2 & V3
5W	Solar Panel 5W	
10W	Solar Panel 10W	
FS105X1	Sediment Filter	
FCCT010L	Carbon Block Filter	
FCGAC10T33	GAC Filter	
P450	Power Inverter	
TDS	TDS Meter	
TH200-160-0900	BM Case	
TH275-160-1000	BM Case	
275-0602	On/Off Switch	
275-1533	DPDT 10A Switch	
278-0567	18 gauge wire	



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