



# FACTORY ASSEMBLED ALL-IN-ONE FILTRATION, TWT® DEPOSIT CONTROL & ULTRA-VIOLET PURIFICATION SYSTEM

## System Design and Installation Guidelines

Please take the time and read the following suggestions before installation

### CONGRATULATIONS

You have now purchased a technologically advanced water treatment system that, with proper maintenance, will insure chemical-free and pollutant-free water for decades to come.

The TWT All-in-One system should be installed at point of entry, where water first enters the facility, utility room or office, or at point of use. If there is an existing pressure tank, pressure assist device or water softener, the system should be installed after that. Select a location near the water feed line in an area allowing enough room on all sides of system for filter replacement, UV lamp replacement, visual inspection, keeping it out of harm's way (i.e., appropriate service clearances), depending upon model purchased. This will allow most maintenance procedures to be accomplished without removing the UV unit and filters from its mounting bracket.

### INTRODUCTION

TWT Fluid Management Systems use filtration, technologically advanced electronic deposit control, and ultraviolet disinfection to treat water in homes, offices, medical, dental, laboratory, farm environments and anywhere the need for clean water is essential.



TRIANGULAR WAVE TECHNOLOGIES, INC.

## ALL-IN-ONE WATER TREATMENT SYSTEM

**Multi-Stage Filtration**

- Sediment Filter removes particles.
- Carbon Filter removes taste, odor and chemicals.
- Filter cartridges are interchangeable depending on water quality and treatment needs.

**UV Disinfection**

- Destroys bacterial, viral and spore contaminants
- Provides truly safe drinking water

**Electro-Magnetic Conditioning**

- Prevents scale build-up in plumbing systems.
- Removes scale from pipes and fixtures.



Chemical-Free Operation

**ENGINEERED FOR PERFORMANCE**

[www.Triangularwave.com](http://www.Triangularwave.com)

**TWT offers several systems designed to treat and meet your individual & industry-specific needs.**

TWT-MD-1001	1 GPM All-In-One Treatment System
TWT-MD-1002	4 GPM All-In-One Treatment System
TWT-MD-1003	8 GPM All-In-One Treatment System
TWT-MD-1004	12 GPM All-In-One Treatment System
TWT-MD-1005	15 GPM All-In-One Treatment System
TWT-MD-1006	30 GPM All-In-One Treatment System
TWT-SMD-1007*	50 GPM All-In-One Treatment System
TWT-SMD-1008*	100 GPM All-In-One Treatment System

\* SMD are skid-mounted systems

*Upgrades (GPM): Available upon request*



Skid Mounted System

## HOW THE TWT ALL-IN-ONE SYSTEMS WORK!

### 1. Filtration Systems:

Filters are designed to trap various kinds of debris, dirt and organic particles that will otherwise enter your equipment and/or plumbing system, restrict your water flow and create a breeding ground for bacteria. Filtration is the first line of defense for residential, commercial, industrial facilities, where the source of water may be ponds, wells or streams that have high exposure to contamination from airborne pollutants, surface run-off, agricultural or industrial waste or similar dangers. The first step in achieving clean water is to install a filtration device that effectively removes particulate matter and similar debris. Filtration is an important step in water treatment, especially for water intended for human consumption. Filtration systems provide a bacteriostatic environment and are designed to remove, volatile organic chemicals, hydrogen sulfide and sulfur, herbicides, pesticides, chemical fertilizer residues, trihalomethanes and many other pollutants. The filtration units utilized in TWT systems are comprised of several filter types and media that remove harmful chemicals, metals, and toxins from the water as it passes through these layers. Filters used in staged filter housings are configured as illustrated on system trade ads. Upon request if needed other filter mediums and filters used in system can be determined by a water quality analysis. If fluid conditions require additional micronic particle trapping for enhanced results, filters are available in various micronic sizes providing flexibility & adaptability to meet the needs of all fluid conditions & applications.

### 2. Deposit Control:

#### TWT® Patented Deposit Control Technology

The basic component in the TWT systems is the deposit controller. It is comprised of a microprocessor, solenoid coil wrap and/or a reaction chamber. The microprocessor is a patented controller that functions like a computer to

relay a continuous electrical power supply to the solenoid coil and/or reaction chamber. The reaction chamber is plumbed into the main water intake line and/or just before each piece of vital processing equipment, and provides a factory wrapped wire coil forming a solenoid. The solenoid conveys the triangular wave signal at the appropriate power level (as allowed by the model chosen) to the water passing through the chamber. This signal constantly changes the polarity, frequency, and amplitude of the current entering the water. This triangular wave treatment produces several benefits. It increases the capability of the water to hydrate scale ions and other colloidal particles. In effect, the surface charge of the hydrogen molecules is enhanced and the water is made "wetter".

This "hydrated" water can dissolve unwanted particles, suspend them in solution, and allow them to be easily filtered out or flushed from the system. Accordingly, the mineral and biological particles that cause scale, deposits, and corrosion are dissolved and washed away.

This means that the breeding environments for bacteria, such as bio-film and corrosion, are eliminated. The agitation created in the reaction chamber also disrupts the conditions essential for the normal reproduction of bacteria and they die, thus allowing them to be harmlessly flushed out of the system. If left untreated, scale build-up inside the reaction chamber and on the quartz sleeves containing the UV lamps may rapidly diminish the UV disinfection effectiveness by reducing the amount of UV light which is absorbed into the water stream. The TWT Deposit Control System will further condition the treated water stream so as to prevent this scale-build-up inside the UV reaction chamber, helping to maintain maximum UV life cycle and penetration into the water stream. TWT deposit control technology (treated fluid) maintains the ability to control deposits throughout the system with down-stream residual value.

### 3. Ultra-Violet Disinfection/Purification:

The UV disinfection technology used in the system to provide safe, potable drinking water, free of disease-causing pathogens. As water passes through the UV chamber, UV light will attack and render harmless any bacterial, viral or spore contamination present in the treated water. "High intensity UV light destroys these contaminants with a 99.9% kill rate". The output water is thus disinfected and offers exceptionally high quality for human consumption.

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## BASIC INSTALLATION GUIDELINES

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- Securely mount system using pre-drilled holes near water feed line in an area allowing enough room on all sides of system for filter replacement, UV lamp replacement, visual inspection, keeping it out of harm's way (i.e., appropriate service clearances).
- Install connectors and shut-off valves (included) at each end (if shipped separately)
- Shut off water to facility before you start installation
- Plumb system into to water feed line
- Test System
- Do not plug in control system
- Remove filter cartridges and reinstall housing before testing system
- Close drain ports
- Open shut-off valves, test for leaks
- Tighten all connectors and replace water filters (do not over tighten)
- System should now be ready for operation
- Plug controllers into VAC outlet, make sure manual shut off valves and drain ports are in proper position for water flow
- Turn on power
- Allow system to operate for several minutes before using water
- Outdoor installation: The Water Treatment System is pre-assembled on a mounting board or skid. Select the suitable location for application and installation. The system should be installed in an enclosure out of harms way and sheltered from direct sunlight and direct precipitation. Follow same steps as above.

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## COMPONENTS

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**One-** factory assembled and mounted system

**Two-** manual shut-off valves (packaged separately)

**One-** Filter wrench for filter replacement

**One-** Allen wrench for UV lamp replacement

**One-** owner's manual (read before installation): Additional information about components/subsystems of the All-in-one system will be shipped with system.

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## THINGS TO DO PERIODICALLY

Not less than weekly

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### **Shut off power switch and/or unplug AC power cord(s) before any repairs and/or replacements are performed**

- Visually inspect deposit controller to ensure continuous operation
- Deposit control system LED lights should be on
- Make sure the filters are free flowing, if they become clogged you must replace them
- Replace filters when needed, generally twice a year, depending on water use, quality, and conditions\*
- Water condition and GPM determines need (hard water areas of the country may require more frequent replacements)
- Use filter wrench (shipped with system) when replacing filters
- Replace UV lamp when needed
- Generally lamps should be replaced every 10 to 12 months, depending on water use, quality, and conditions
- Use Allen wrench (shipped with system) to check UV lamp operation

*\*TWT Inc. recommends that an initial supply of replacement products e.g., replacement filters, UV lamps etc. be stored at owners facility at all times, that will insure uninterrupted service and treatment.*

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## MAINTENANCE

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***Before any maintenance and/or replacement of filters or UV lamps is performed, follow these necessary and important steps:***

1. Shut off Power Switch
2. Unplug AC Power Cord(s)
3. Close inflow & outflow shut-off valves
4. Open drain port, allowing water to drain
5. Press down pressure release valve on filter assembly, allowing additional drainage
6. Allow enough time for system to drain fully

***It is now safe to perform maintenance, after performing maintenance, take these necessary and important steps:***

7. Close drain port
8. Open inflow and outflow valves
9. Plug in AC Power Cord
10. Turn on Power Switch

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## FILTER REPLACEMENT (on systems so equipped)

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01. Replace filters when needed, generally twice a year, depending on water use, quality, and conditions.
2. Shut down system before performing any maintenance (READ CAUTION LABEL).
3. Turn off water supply to system.
4. Depress pressure release button to relieve pressure in filter housing.
5. Unscrew housing using spanner wrench (shipped with system).  
**NOTE:** When opening filter housing to change cartridge, it is common for O-ring/Gasket to lift out of housing and stick to cap (remove carefully.)
6. Remove used cartridge and discard. Rinse out housing (wall mounted units) and fill about 1/3 full of water. Add about 2 to 3 tablespoons of bleach and scrub thoroughly with brush or sponge. Rinse thoroughly.
7. Remove O-ring/Gasket from housing and wipe groove and O-ring/Gasket clean. Lubricate O-ring/Gasket with a coating of clean food grade silicone grease. Place O-ring/Gasket back in place and press O-ring down into groove with two fingers or place gasket on rim of sump (housing).  
**NOTE:** This step is important to ensure proper seal. Make sure O-ring is seated level in the groove or gasket is on rim of sump (housing).  
**CAUTION:** If O-ring/Gasket appears damaged or crimped it should be replaced at this time, contact your distributor for replacement parts.
8. Insert the new cartridges into the sump (housing) making sure that it slips down into the housing.
9. Screw the sump (housing) onto the cap and hand tighten (**DO NOT OVER TIGHTEN**).
10. Turn on the water supply slowly to allow system to fill with water (check for leaks).
11. Depress the pressure release button to release trapped air from filter.
12. Restart system

**Note:** For skid mounted systems see accompanying instructions shipped with system

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## ULTRA-VIOLET LAMP REPLACEMENT

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The ultra-violet lamp located in the sterilization chamber will operate effectively, round the clock, for approximately one year under normal conditions. The lamp will light up longer than that, but the maximum U.V. light penetration may fall below the prescribed safety level. **NOTE:** It is required that the lamp be changed every 10 to 12 months after installation regardless of apparent condition of the lamp.

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## TO DISASSEMBLE THE UV LAMP

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### • Shut down system • Close shut off valves • Drain system

1. Shut off power switch and/or unplug the system from the electrical outlet and turn off all water supplies to the system.
2. With Allen wrench provided, loosen the two set screws that secure the top cap containing the electrical cord. Remove both cap and set aside carefully.
3. Remove the lamp connector located at the cord end of the lamp by gently wiggling and pulling away from the lamp.
4. Carefully slide UV lamp out of the quartz tube and discard.
5. Insert the replacement lamp into the quartz tube.  
**IMPORTANT: DO NOT TOUCH THE LAMP WITH BARE HANDS. FINGER PRINTS WILL PREVENT THE SYSTEM FROM WORKING EFFECTIVELY.** If the lamp should be touched, wipe down with an alcohol wipe.
6. Gently push the lamp connector against the pins at the end of the lamp.
7. Make sure that all electric components are dry before replacing the top cap. Secure both caps with the setscrews (**DO NOT OVER TIGHTEN**).
8. Plug in the power cord . The lamp should be operating at this time. To confirm that your new lamp is working correctly, check with your model's pilot light indicator:

**UV-4 & 250: The green LED indicator will light up on the side of the unit. UV-700 and above: A bluish light should be visible through the view port**

9. Close drain port, open shut off valves, test for leaks, and restart system to allow the flow of water through the unit.

**IMPORTANT:** Where water turbidity is a problem, it is advisable to clean the quartz tube when replacing the lamp.

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## TO CLEAN AND CHANGE THE QUARTZ TUBE

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1. Turn water off and unplug unit.
2. Remove plastic cap on the top end containing the electrical cord of the UV purifier by loosening the setscrews with Allen key provided.
3. Remove lamp— as per lamp replacement instructions.
4. Loosen and remove the retaining nut. Caution: Quartz sleeve will be stuck to the O-ring inside the retaining unit.
5. CAREFULLY remove the quartz sleeve from the UV chamber.
6. Wipe the quartz sleeve with an alcohol wipe being careful not to touch the sleeve with your fingers.

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## TO REASSEMBLE

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1. Slide a rubber seal onto one end of the quartz tube.
2. Slide the tube into the sterilization chamber and secure the rubber seal.
3. Slide the second rubber seal onto the other end of the quartz tube and secure it in its seat as well.

**NOTE:** A little soapy water may help to work the rubber seals onto each end of the new lamp.

4. Replace the two retaining washers and secure them with the steel nuts. Just snug nuts up for now. (Too much pressure may break the tube).  
**WARNING: DO NOT OVER TIGHTEN SCREWS!**
5. Insert replacement lamp into the quartz tube. Gently push the lamp connector against the pins at the end of the lamp.

6. Turn the water supply on slowly and check the unit carefully for leaks. If water is leaking from around the rubber seals, tighten the retaining washernuts until the leak stops. A 1/8 turn past this point should be tight enough.

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### **COMPLETE REASSEMBLY OF THE UV STERILIZER BY FOLLOWING LAMP REPLACEMENT INSTRUCTIONS 7 THROUGH 9.**

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## OPTIONAL UPGRADES

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**Installation, operation and maintenance guidelines for optional product upgrades are only included upon request and purchase from owner/operator.**

Optional automatic monitoring upgrades are designed to stop water flow through the system when treatment functionality is interrupted, e.g. when UV lamp is burned out, or when filters need to be cleaned or replaced. It is the responsibility of the owner/operator to perform proper maintenance procedures at all times, including periodic visual inspection of equipment status indicators. TWT Inc. or its agents shall not be held liable or responsible in any way for any events and/or complications that may arise from shut off of water flow and/or, from any conditions that may arise from lack of adherence by owner/operator to proper maintenance procedures for the system.

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## CAUTION

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- Unplug/shut off and drain system and discard filters if unit is out of service or not in use for extended period of time, or in freezing temperature
- Do not operate TWT system without water in plumbing system
- Disconnect power before servicing
- Change filters and/or UV lamp regularly
- Valves should be in open position when in operation
- Manual Drain Port should be closed when in operation
- Filter housing should be cleaned regularly depending on water use and quality
- Cleaning procedure: filter housings should be cleaned each and every time filters are replaced
- Use clean food grade silicone grease when checking and/or reassembling O-Rings
- Outdoor installation: system must be enclosed in water-resistant casing and out of harms way
- Install your system where the temperature does not fall below 4 degrees celsius (40 degrees Fahrenheit) and the humidity level is low ( to prevent condensation on the sterilization chamber). The unit functions ideally in a temperature range from 9 degrees C to 29 degrees C.
- A grounded electrical outlet is required.

### **Note:**

If operating under high pressure conditions, a pressure reduction system is recommended to be installed. Contact plumber before TWT system installation.

To find out even more about us, and how we can help you, contact us at:  
Email: [info@triangularwave.com](mailto:info@triangularwave.com) or visit our website: [www.triangularwave.com](http://www.triangularwave.com)