AmeriWater
The Water Purification Specialists

OZONE DISINFECTION SYSTEM

OPERATION & MAINTENANCE MANUAL

MODEL: 0077-0010

Manufactured With Pride
In The USA

www.ameriwater.com • 800-535-5585

AmeriWater • 3345 Stop 8 Rd. • Dayton, OH 45414

PN 98-0121
Rev. B

TABLE OF CONTENTS

SECTION 1, GENERAL INFORMATION

IMPORTANT SAFETY INSTRUCTIONS:

1. **READ AND FOLLOW ALL INSTRUCTIONS.**

2. **DANGER – Risk of injury.**
   a. Replace damaged line cord immediately
   b. Do not bury cord
   c. Connect to a grounded, grounding type receptacle only

   DANGER - Risque de blessure.
   a. Remplacer cordon endommagé immédiatement
   b. Ne pas enterrer le cordon
   c. Connectez-vous à une mise à la terre, prise de terre ne

3. **WARNING – For indoor use only. This unit is not intended for outdoor use.**

   AVERTISSEMENT - Pour une utilisation en intérieur. Cet appareil n'est pas destiné à une utilisation en extérieur.

NOTE: **The operation manual should be stored near the system and used as a reference and troubleshooting guide.**

REMARQUE: **Le mode d'emploi doit être conservé à proximité du système et utilisé comme référence et guide de dépannage.**

1.1 WHAT IS OZONE?

Ozone is a form of naturally occurring oxygen possessing three atoms of oxygen per molecule instead of the normal two-atom oxygen molecule. Created by either lightning or ultraviolet radiation, ozone is commonly found in our atmosphere. The “ozone layer” protects us from the sun’s radiation. The “fresh air” smell after a thunderstorm is due to lightning generated ozone.

Ozone has a relatively short life span before it reverts back to oxygen. While active, ozone is 52% stronger and 3,125 times faster (in water) than chlorine as a disinfectant. Since it is much more effective than chlorine in destroying water-borne contaminants, ozone has become the preferred method of water treatment for over 4,000 large cities worldwide.

Ozone is recognized by the U.S. Environmental Protection Agency as a viable water treatment alternative to chlorine, and the FDA has added ozone to its list of disinfectants approved “Generally Recognized as Safe.” Ozone is the most powerful and rapid acting oxidizer disinfectant produced, and will oxidize all bacteria, endotoxin and biofilms it comes in contact within medical piping and water systems.

1.2 THE TECHNOLOGY

The AmeriWater Ozone Disinfection System uses a high technology corona discharge process for producing ozone. Ozone is manufactured by drawing oxygen (O_2) into the ozone generator and exposing it to multiple high voltage electrical discharges. This causes a percentage of the oxygen molecules to dissociate and reassemble as ozone (O_3). The ozone is drawn into the water by a venturi injector / mixer allowing the ozone to be injected into the water under a vacuum condition. A pressure differential of at least 15 PSI (**P**ound per **S**quare **I**nch) must be maintained across the venturi injector. This pressure causes a vacuum that is measured on the vacuum gauge. The gauge should read between –3" and –8" Hg when the system is in normal operation. The Ozone Disinfection System provides microbial reduction by a combination of disinfection by ozone and by physical removal by draining, flushing, and refilling the systems with fresh, purified water.

1.3 INDICATIONS FOR USE

The AmeriWater Ozone Disinfection System is an optional accessory for the AmeriWater Bicarb Solution Mix and Distribution System (SDS) cleared for market under K051031 and the AmeriWater Water Purification System (WPS) for Hemodialysis cleared for market under K991519. It is intended for use in hospitals and dialysis clinics for the disinfection of the AmeriWater SDS and WPS system. The disinfection process is completed during off-hours when the SDS or WPS are not being used for patient treatment. The AmeriWater Ozone Disinfection System provides dissolved aqueous ozone concentrations of at least 0.5 ppm with a contact time of at least 30 minutes for disinfection of the WPS and SDS systems (the entire disinfection process takes approximately 2 hours to complete and longer contact times may be necessary based on microbial loads). The Ozone Disinfection System is designed to produce water with a microbial count of 50 CFU/ml.

1.4 SPECIFICATIONS

Model	0077-0010
Dimensions	35" High X 15" Wide X 24" Deep
Weight	70 pounds
Electrical Requirements	115 VAC, 60Hz, 3 AMP
Power Consumption	275 Watts
Ozone Output	10 Grams/Hour (Oxygen)

Indicators: RPC E-Z Chek® Ozone in Water Test Strips (K100-0111)
Water Feed Flow Meter - GPM (Gallons Per Minute)
Oxygen Flow Meter (SCFH) with flow control valve (Standard Cubic Feet per Hour)
Injector Vacuum Gauge (inches of mercury)

Safety: Ozone Safety Vacuum Switch prevents the ozone generator from operating without the proper ozone draw (vacuum).
Ozone Overload Switch shuts the ozone generator off when the system begins to overheat.
Door switch kills power to the system when door is not in place.
Ozone gas-off destruct device eliminates excess ozone gas.

1.5 HEALTH AND SAFETY

Ozone is a toxic gas above certain high concentrations, and an irritant at lower concentrations. The Occupational Safety and Health Administration (OSHA) regulations state that an individual must not be exposed to a concentration of ozone gas higher than:

1) 0.10 PPM (**P**arts **P**er **M**illion) by volume over an 8-hour period.

2) 0.20 PPM by volume over a 10-minute period.

*See Ozone Badge information in Section 9.

The AMERIWATER OZONE DISINFECTION SYSTEM uses a gas off tank to contain any ozone gas not dissolved in the water and an ozone gas destruct device to limit the ozone exposure in the area of use. Ozone has a very short half-life and will decompose to oxygen in less than 5 hours. The human nose can detect the ozone odor at .02 PPM, which is 5 times lower than the OSHA safe level.

Call 1-800-535-5585 for the ozone SDS sheet.

WARNING:	**Oxygen is a fire hazard. It is a highly active oxidizer as it vigorously accelerates the burning of combustible materials. Do not use oil, grease, cotton fibers or any other combustible material on or near the Ozone or Oxygen Generator. Smoking, heat or any open flame should be kept at a distance of not less than 5 feet from any part of the system. It is STRONGLY recommended that only individuals experienced in the safe handling of Oxygen be allowed to operate this equipment.**
AVERTISSEMENT:	**L'oxygène est un risque d'incendie. C'est un oxydant très actif car il accélère vigoureusement la combustion des matières combustibles. Ne pas utiliser d'huile, de graisse, de coton ou tout autre matériau combustible sur ou près du générateur d'ozone ou de l'oxygène. Fumer, la chaleur ou d'une flamme nue doit être maintenue à une distance d'au moins 5 pieds de toute partie du système. Il est fortement recommandé que seuls les individus expérimentés dans la manipulation de l'oxygène être autorisés à utiliser cet équipement.**
WARNING:	**Connect power cord only to a properly grounded wall outlet.**
AVERTISSEMENT:	**Branchez le cordon d'alimentation à une prise murale correctement mise à la terre.**
WARNING:	**High voltage is present in Ozone Generators. Only qualified electricians should work on this equipment.**
AVERTISSEMENT:	**Présence de haute tension dans la Générateurs d'ozone. Seuls des électriciens qualifiés à travailler sur cet équipement.**

1.6 OZONE COMPATIBLE MATERIALS

Ozone is one of the strongest oxidizing agents currently available for water treatment, so great care should be taken to ensure that all piping, valves, gaskets, and other materials used in the water treatment system that will come in contact with ozone are resistant to the concentrations of ozone present during disinfection. Just about all the materials except filter cartridges and membranes used in the typical water system are acceptable.

Below is a list of materials that are compatible for ozone concentrations up to 6 PPM in water.

Piping:	**Gaskets & Seals:**
304L Stainless Steel	Kel-F 2800
316L Stainless Steel	Kal-Rez
PTFE (Teflon)	Chem-Rez
ETFE (Teflon)	Gortex
ECTFE (Halar)	Teflon tape
PVDF (Kynar)	Hypalon
CPVC Schedule 80	Viton
PVC Schedule 80	Silicon
HDPE (Polyethylene)	EPDM
PP (Polypropylene)	

NOTE: **Natural rubber and many plastic and synthetic rubbers cannot be used as gaskets, seals, or o-rings in combination with ozone. Exposure to ozone will cause these components to become brittle and crack.**

REMARQUE: **Le caoutchouc naturel et les caoutchoucs de nombreux plastiques et synthétiques ne peuvent pas être utilisés comme joints d'étanchéité, joints toriques ou en combinaison avec de l'ozone. L'exposition à l'ozone provoque ces composants deviennent fragiles et le crack.**

SECTION 2, COMPONENTS AND FLOW SCHEMATICS

2.1 OZONE DISINFECTION SYSTEM COMPONENT IDENTIFICATION

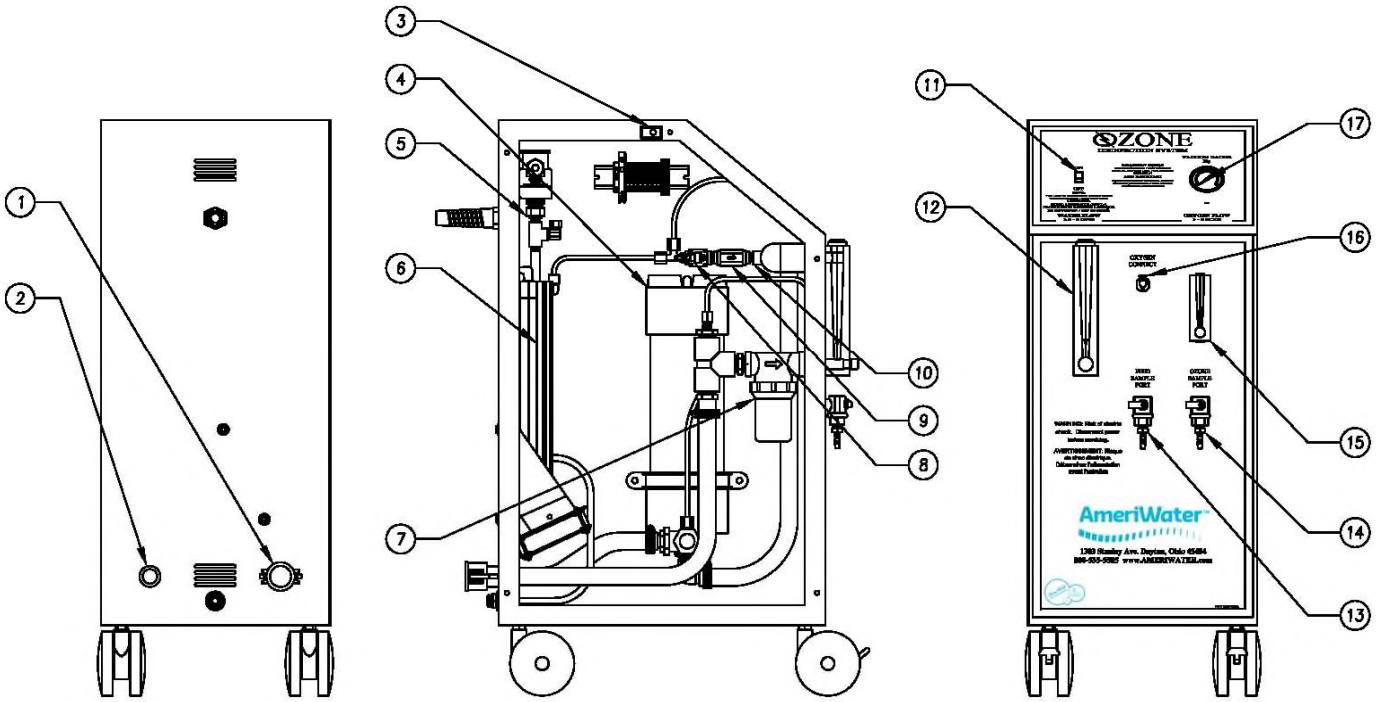


FIGURE 1

IDENTIFICATION OF COMPONENTS (FIGURE 1)

1. **Inlet Hose Connection** – (Female connector) Carries water to be disinfected to the ozone machine.

2. **Outlet Hose Connection** – (Male connector) Carries ozone rich water to the loop or tank to be disinfected.

3. **Door Switch** – Shuts off power to the unit when the cabinet door is removed.

4. **Gas Off Chamber** – Ozone rich water enters the gas off chamber to remove any excess, un-dissolved ozone before being directed into the water system.

5. **Ozone Gas Destruct Chamber** – Converts ozone gas back to oxygen.

6. **Ozone Generator –** Produces ozone by passing oxygen through a corona discharge.

7. **Strainer –** 40 mesh screen ensures small particles do not block injector.

8. **Injector Vacuum Switch –** Turns off the ozone generator when there is not enough flow of water to create an adequate vacuum.

9. **Check Valve –** Controls the direction of flow of ozone into the water stream.

10. **Injector** – Injects ozone gas into the water flow.

11. **Ozone Generator ON / OFF Switch –** Turns power to ozone generator ON and OFF and will illuminate when the ozone generator is producing ozone.

12. **Water Flow Meter and Valve** – Measures the flow rate in gallons per minute (GPM) of the water.

13. **Feed Sample Port** – Test port used to sample the water feeding the device.

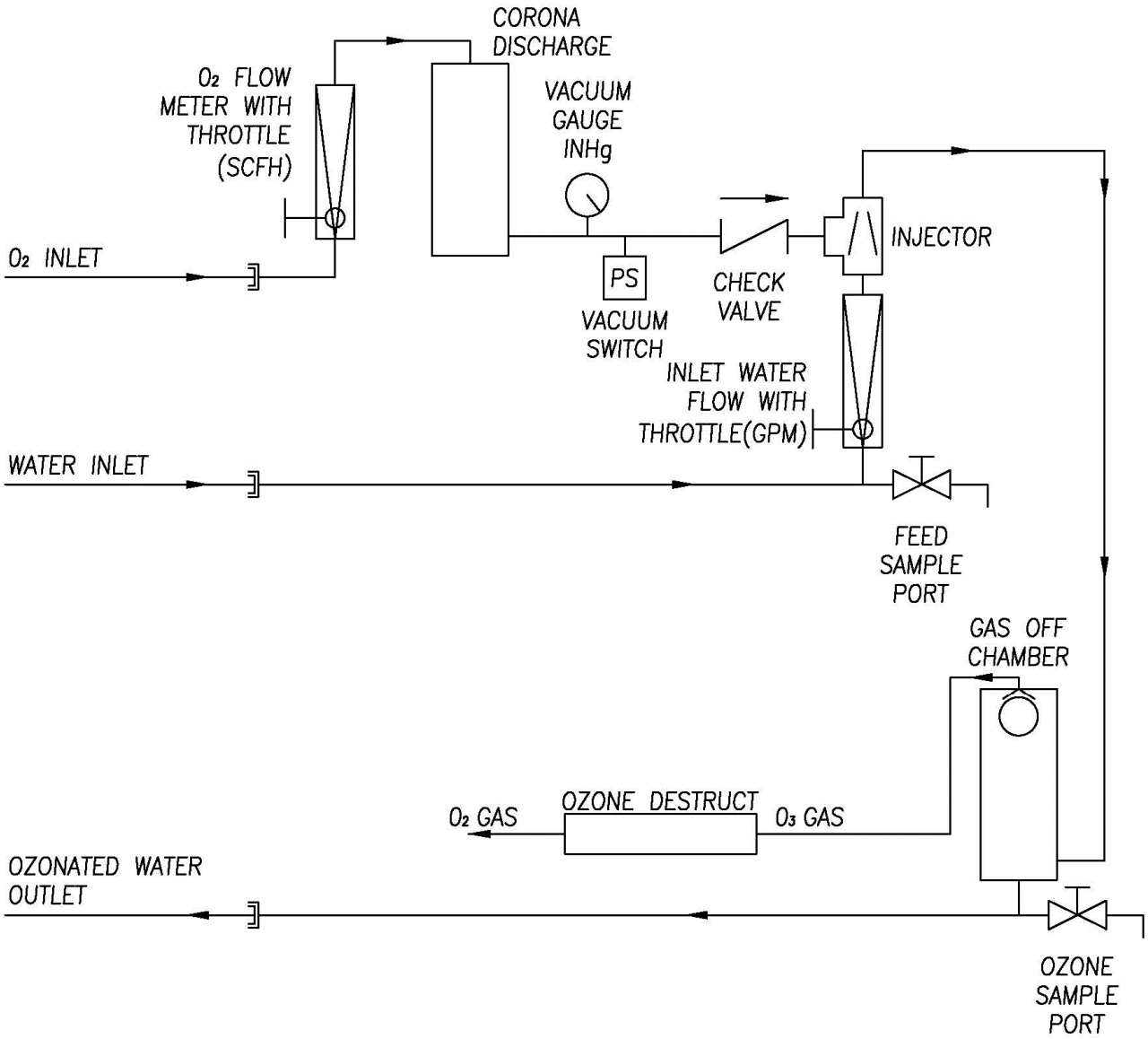
14. **Ozone Sample Port** – Test port used to sample product water rich in ozone.

15. **Oxygen Flow Meter and Valve** – Controls and measures the flow rate in standard cubic feet per hour (SCFH) of oxygen to the ozone generator.

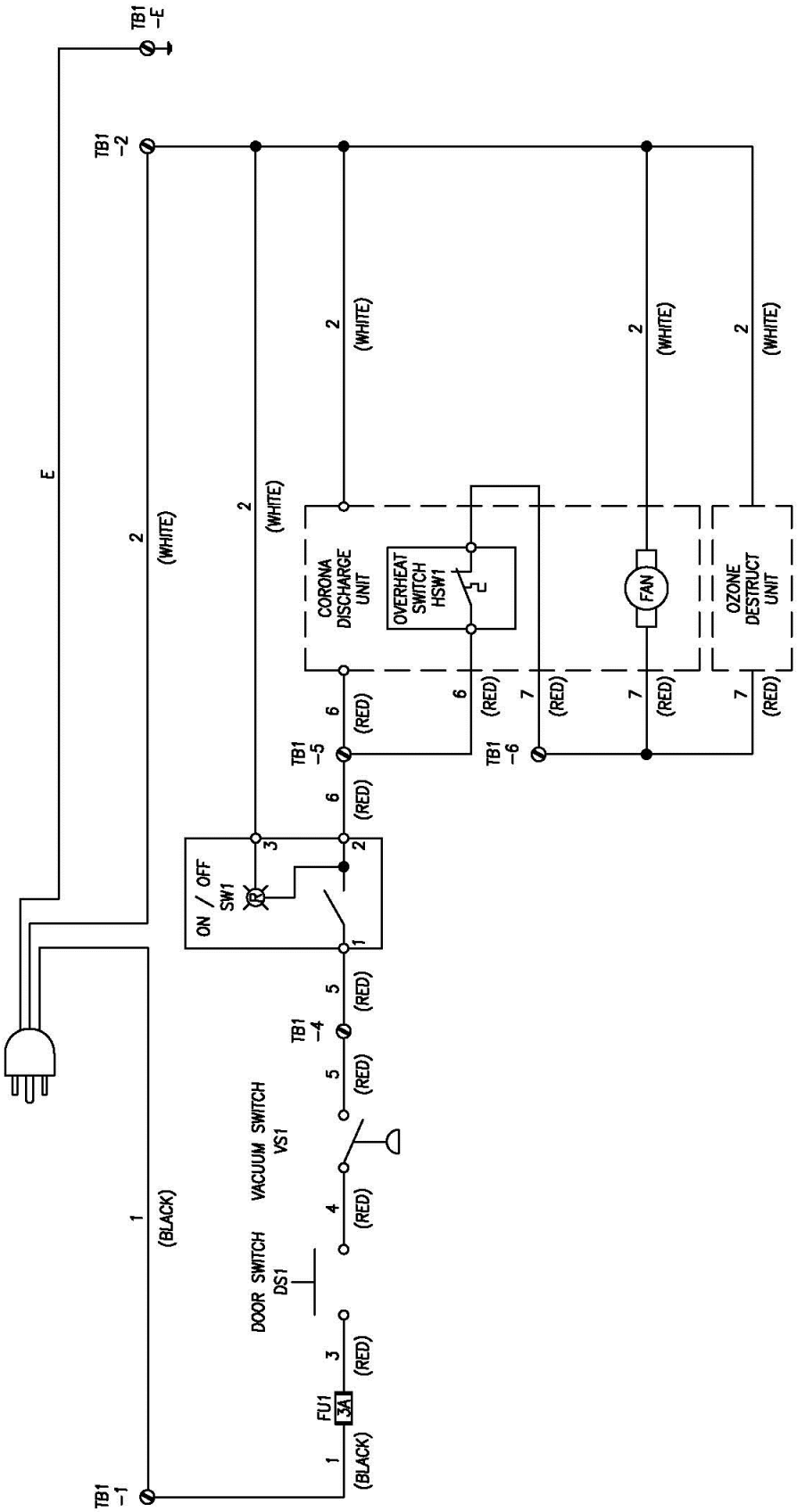
16. **Oxygen Connection** – Quick connect fitting for connecting oxygen supply to the system.

17. **Vacuum Gauge –** Displays the vacuum draw at the injector vacuum switch.

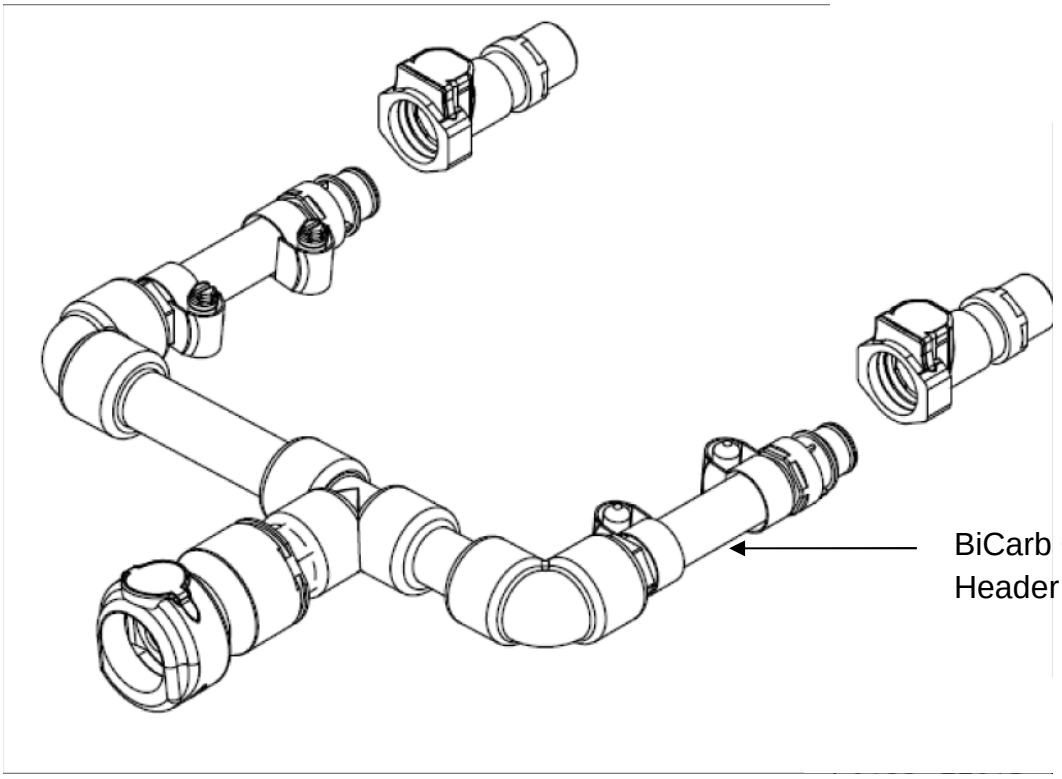
2.2 FLOW DIAGRAM

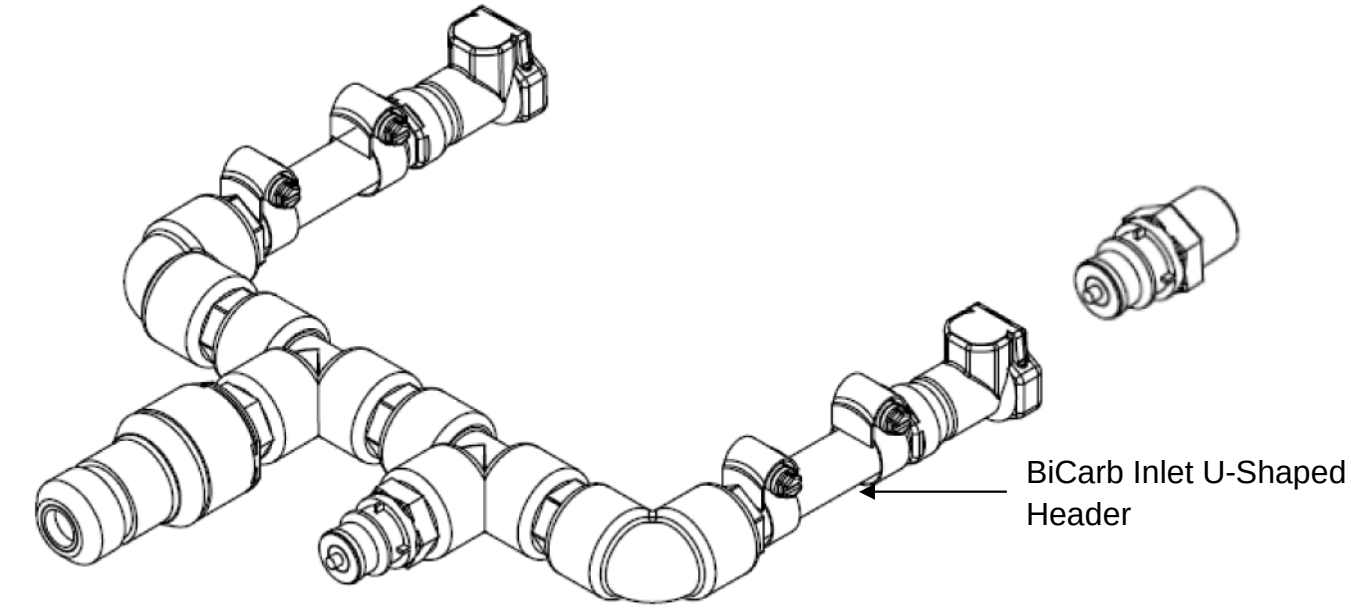


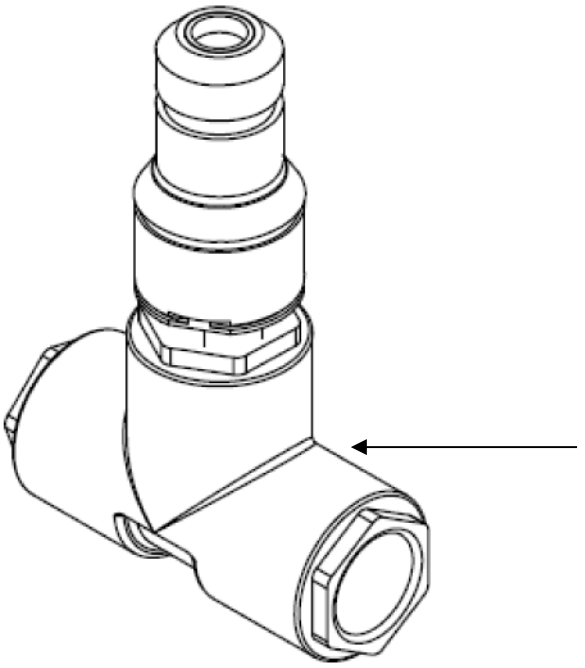
2.3 ELECTRIC SCHEMATIC



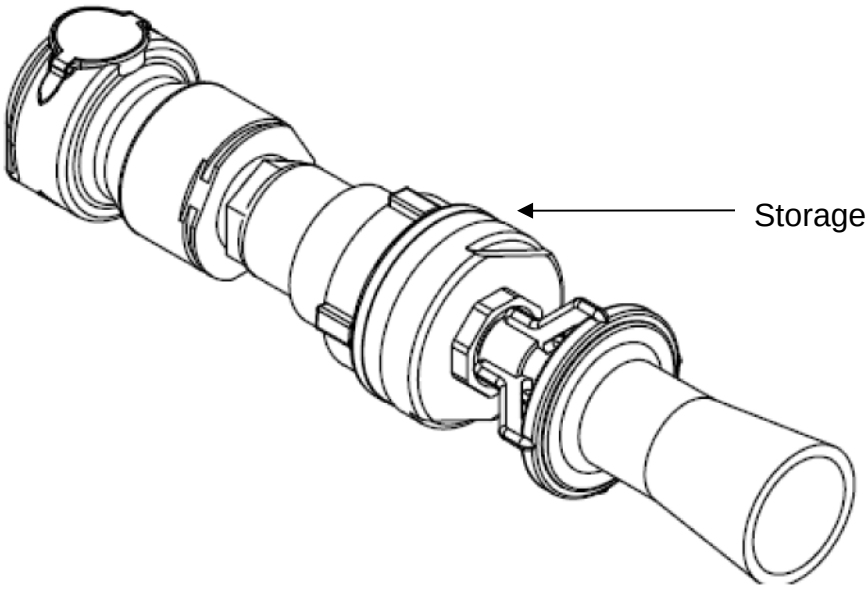
2.4 OZONE DISENFECTION ACCESSORY IDENTIFICATION







Storage Tank Inlet Loop Adapter



Storage Tank Outlet Adapter

SECTION 3, RPC E-Z Chek® Ozone Test Strips

3.1 TESTING

Procedure to detect (test for) ozone levels between 0 ppm and 0.4 ppm:

1) Dip one test strip into a 50mL (about 2 oz.) water sample with constant, gentle back-and-forth motion for 10 seconds (25-28 strokes).

2) Remove the strip, shake once, briskly, to remove excess water and wait 20 seconds.

3) Then, view through the aperture pad to match with the closest color on the bottle label.

4) Complete color matching within 30 seconds.

Note: For better color matching view the aperture against a white surface. A suggestion is to fold the white plastic handle of the test strip under the aperture so that it produces a white viewing background (blocks distractions from behind aperture).

Procedure to detect (test for) ozone levels between 0.5 ppm and 1.0 ppm:

1) Collect a 25 ml sample of the ozonated water to be tested.

2) Dilute and mix the 25 ml ozonated test sample with 25 ml of known ozone-free water (distilled, D.I., or RO).

3) Immediately test the resulting solution using the K100-0111 ozone test strip and the instructions for use in 1-4 above.

4) Compare the color development on the test strip to the color blocks on the ozone test strip bottle.

5) Note the test result and multiply it times two (compensates for 50% dilution) to determine the actual ozone level.

For example: If the ozone level in the initial 25 ml ozonated sample was actually 0.6 ppm, then the test value after 50% dilution should be 0.3 ppm. Record the actual ozone value as 0.6 ppm.

3.2 WARNINGS AND CAUTION

- Do not touch the indicator pads.
- Keep all unused test strips in the original bottle.
- Replace cap immediately/tightly after removing a strip.

- Do not use test strips from an opened or unopened bottle after expiration date printed on the bottle label.

- Do not allow the test strip to come in contact with liquids or with work surfaces that may contaminate the strip.

- Do not leave test strips in areas exposed to vapors of any type.

3.3 STORAGE AND HANDLING

KEEP THE CAP ON TIGHT BETWEEN USES.

REPLACE CAP IMMEDIATELY AFTER REMOVING STRIP.

- Store the test strips at temperatures between 15°-30°C (59°-86°F).

- The lot number and expiration date are printed on each bottle. Do not use a test strip after the expiration date.

- Do not touch the indicator pad.

- Do not allow the test strip to come in contact with liquids or with work surfaces that may be contaminated with potentially interfering substances.

- Do not leave test strips in areas exposed to chlorine vapors or other oxidizing vapors.

SECTION 4, INSTALLATION & OPERATION

4.1 GENERAL OVERVIEW

WARNING: **Do not turn the ozone generator on until the water flow has been established.**

AVERTISSEMENT: **Ne pas tourner le générateur d'ozone jusqu'à ce que le débit d'eau a été mis en place.**

The flow path in the AmeriWater Ozone Disinfection System is illustrated in Section 2.2. The water to be disinfected is pumped into the AmeriWater Ozone Disinfection System by the water distribution pump or the bicarb system pump(s). The water flows through the feed flow meter and into the venturi injector, which draws the oxygen from the oxygen valve through the flow meter into the generator creating ozone. The ozone is then mixed in the water flow. The ozone rich water enters the gas off tank to remove any excess, undissolved ozone gas and then is directed into the water system to be disinfected. The ozone gas collected in the gas off tank is vented automatically to the ozone gas destruct chamber and destroyed.

The driving force of the AmeriWater Ozone Disinfection System are the pump(s) on the bicarb system or the distribution pump(s) on the water loop. A valve arrangement has to be installed after the water treatment system distribution pump(s) and/or the bicarb system pump(s) to divert the flow into the AmeriWater Ozone Disinfection System and back to the bicarb system or the storage tank.

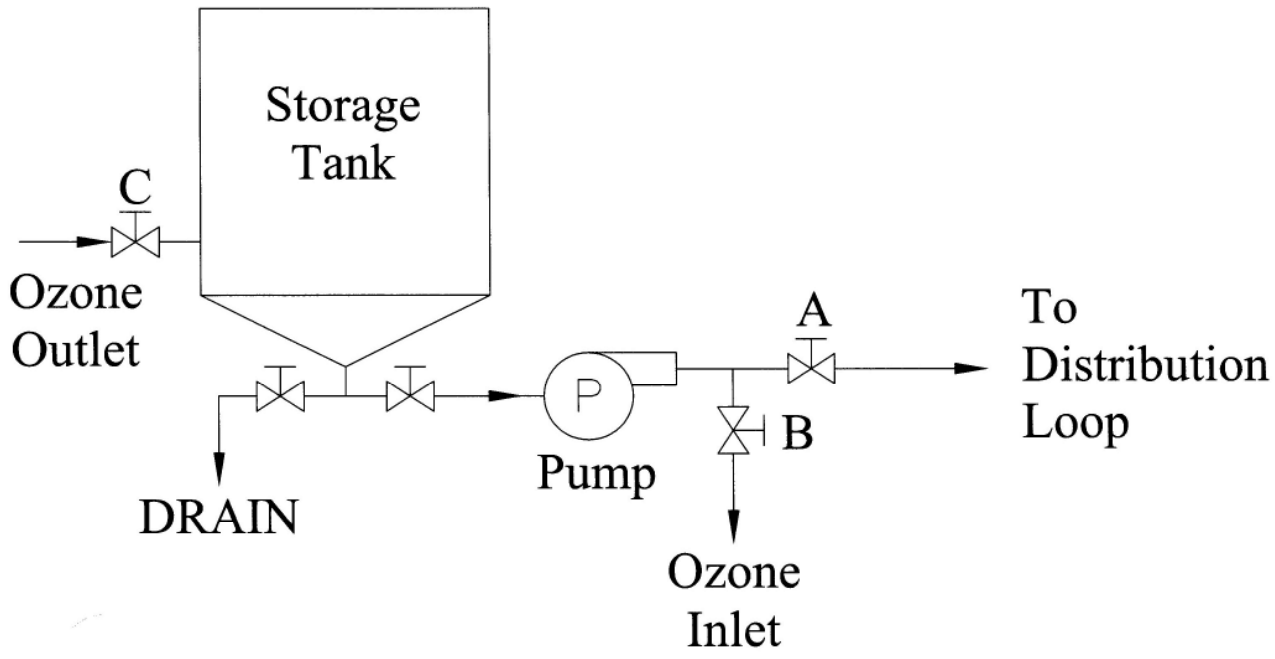


Figure 4A

In the illustration Figure 4A, Valve A is throttled and Valves B and C are open. (Note: Valve A is only closed enough to divert the loop water through the ozone system.) On newer storage tank systems, this 3 valve arrangement has been replaced with quick disconnect fittings.

Once the flow through the AmeriWater Ozone Disinfection System is established, the "Feed Flowmeter" on the unit should read from 3.5 to 5GPM. The amount of pressure supplied by the pump causes this variation in flow. If the "Feed Flow" is below 3 GPM the venturi injector may not draw the oxygen through the generator properly, throttle valve A until the flow is above 3 GPM. It is also necessary to have a differential pressure across the venturi injector to create a vacuum. The vacuum gauge should read between -3 and -8 in of Hg.

Once the water flow has been established, a vacuum will draw the oxygen into the ozone generator and ozone will be created. The ozone generator has a vacuum switch and will not operate without a minimum of -3" of vacuum from the venturi injector indicated on the vacuum gauge.

The gas off tank is in the flow path after the venturi injector. The water-ozone mix enters the bottom of the tank and exits at the bottom of the tank. The excess ozone will gas off and be vented to the destruct chamber to be converted to oxygen.

When ozone is injected into the water, Ameriwater recommends a reading of (0.5 ppm or mg/l) or greater for more than 30 minutes to thoroughly disinfect a system. Be aware that the water being disinfected may contain bacteria and endotoxin, and the piping may contain biofilm all of which consume the ozone. It is important to verify the ozone concentration at the end of the loop, not at the feed sample port, with a RPC Ozone in Water Test Strip (K100-0111) before starting the 30-minute dwell time.

Due to the killing of the bacteria, endotoxin ***will*** be present. You must dump the tank, refill, flush the loop and dump the tank again prior to use.

Helpful Hints

- Rapid intermittent stopping and starting of the ozone generator must be avoided to prevent damage to the generator.
- After stopping the ozone generator, do not restart for 1 minute.
- Input voltage to the ozone generator should never exceed 125 Volt AC 60 Hz. (The AmeriWater Ozone Disinfection System operates on 115 Volt AC 60Hz).
- Always use clean, dry, oxygen.
- Do not allow water to enter ozone generator. If a leak is detected inside the ozone disinfection system, turn off the system, unplug the power cord from the receptacle and repair the leak prior to restarting.
- When adjusting the oxygen flow to the Ozone Disinfection system higher flow creates lower vacuum and lower flow creates more vacuum.

4.2 "OLD" WATER TREATMENT SYSTEM DISINFECTION PROCEDURE

WARNING: **Verify that all patient treatments have been terminated prior to disinfection with ozone.**

AVERTISSEMENT: **Assurez-vous que tous les traitements des patients ont été résiliés avant la désinfection à l'ozone.**

NOTE: **When the red on/off switch light is lit, the ozone generator is producing ozone.**

REMARQUE: **Lorsque le rouge lumineux marche / arrêt interrupteur est allumé, le générateur d'ozone est la production d'ozone.**

1. Remove the loop filter cartridges and store in plastic. (If a cross flow ultra-filter is used remove the membranes from the housings or bypass the ultra-filter).

2. Disconnect the DI exchange tanks and place a latex glove over the fittings on the tanks. Jumper the hoses together by connecting the male connectors to the female connectors or by using jumpers. Close the valves on the inlet and discharge side of the DI Header and open the bypass valve. Exposing DI tanks to ozone may cause damage to the tanks and destruction of the resin beads.

3. Connect the ozone inlet hose to VALVE B, on the ozone bypass (see Figure 4B). Connect the ozone outlet hose to VALVE C, on the storage tank. The quick connect fittings are gender-oriented to prevent incorrect connections.

4. Open VALVE B on the loop and VALVE C on the storage tank. Throttle VALVE A on the loop (see Figure 4B) to force water through the ozone system. Turn on the distribution pump. (If the water system has dual distribution pumps, use only one of the pumps at this time.) The feed flow should be between 3.5-5 GPM.

5. Plug the power cord for the AmeriWater Ozone Disinfection System into a 115 V, properly grounded power outlet.

6. Connect the oxygen supply to the oxygen connection on the front of the ozone disinfection system and adjust to 2-4L.

7. Turn on the oxygen flow meter valve (2-5 SCFH). Verify that the vacuum gauge on the front of the cabinet is above –3" Hg (the operating range is –3" to –6" Hg). The ozone generator will not operate if the vacuum is less than –3" Hg. The vacuum is adjusted by providing more or less oxygen flow. Less oxygen flow produces more vacuum. More oxygen flow decreases the vacuum.

8. Turn the ozone generator power switch ON (see Figure 1 section 2.2).

9. If the ON / OFF switch is illuminated, ozone is now being supplied to the system being disinfected. Monitor the FEED FLOWMETER (3.5-5 GPM) and the VACUUM GAUGE (-3" to –6" Hg) to verify they are in range.

10. Run the unit until the water from the sample port of the system has a reading of no less than 0.5 ppm or mg/l. Use the RPC Ozone Test Strip to obtain this reading.

11. Continue running the system for 30 minutes at a minimum of 0.5 ppm or mg/l to build the ozone level in the storage tank.

12. Throttle VALVE A to allow ozonated water from the storage tank to the loop. (Note: on some systems, VALVE A may not need to be throttled at all.) Verify flow and pressure on the loop.

13. If the water system has dual distribution pumps, use the opposite pump at this time.

14. Continue running the ozone system until ozone is detected at the end of the loop at a level no less than 0.5 ppm or mg/l. **DO NOT USE THE FEED SAMPLE PORT TO VERIFY THIS**. This level must be maintained for 30 minutes to completely disinfect the system. If the water system has bacteria, endotoxin, or biofilm the ozone will be consumed, so it may require several minutes to achieve the 0.5 ppm or mg/l level <u>at the end of the loop</u>.

15. All points of use must be opened and tested with the RPC Ozone Test Strips to verify that ozone is present at a level no less than 0.5 ppm or mg/l.

16. Turn off and disconnect the oxygen supply from the ozone disinfection system.

17. Turn the ozone generator power switch OFF (see Figure 1) and unplug the ozone disinfection system from the power outlet.

18. Turn off the distribution pump and close VALVE B and VALVE C, and FULLY open VALVE A. Let the system dwell for 15-30 minutes before turning the distribution pump back on.

19. Empty the tank to remove any endotoxin created by the destruction of the bacteria.

20. Refill the tank with RO water and flush the distribution loop. Empty the tank again.

21. Return the water distribution system to normal operation, reconnect the DI exchange tanks and replace the loop filter cartridges. The residual ozone will not affect these components.

WARNING: **The water distribution system contains ozone, which can be left in the system if dialysis treatments are not scheduled within 3 hours of completing disinfection. In the event that the water distribution system will be used for dialysis less than 3 hours after disinfection, dump the storage tank to drain and refill the tank with RO water. Test the end of loop, ppm or mg/l level, when the storage tank is full. If the ppm or mg/l level is above 0.0 ppm or mg/l, dump the storage tank to drain and refill the tank until the residual level is not above 0.0 ppm or mg/l.**

AVERTISSEMENT: **Le système de distribution d'eau contient de l'ozone, qui peut être laissé dans le système si les traitements de dialyse ne sont pas prévues dans les 3 heures suivant la fin de la désinfection. Dans le cas où le système de distribution de l'eau sera utilisée pour la dialyse à moins de 3 heures après la désinfection, vider le réservoir de stockage pour vider et remplir le réservoir avec de l'eau osmosée. Tester la fin de la boucle, ppm ou mg / l niveau, lorsque le réservoir est plein. Si l'ppm ou mg / l niveau est au-dessus 0,0 ppm ou mg / l, vider le réservoir de stockage pour vider et remplir le réservoir jusqu'à ce que le niveau résiduel ne dépasse pas 0,0 ppm ou mg / l.**

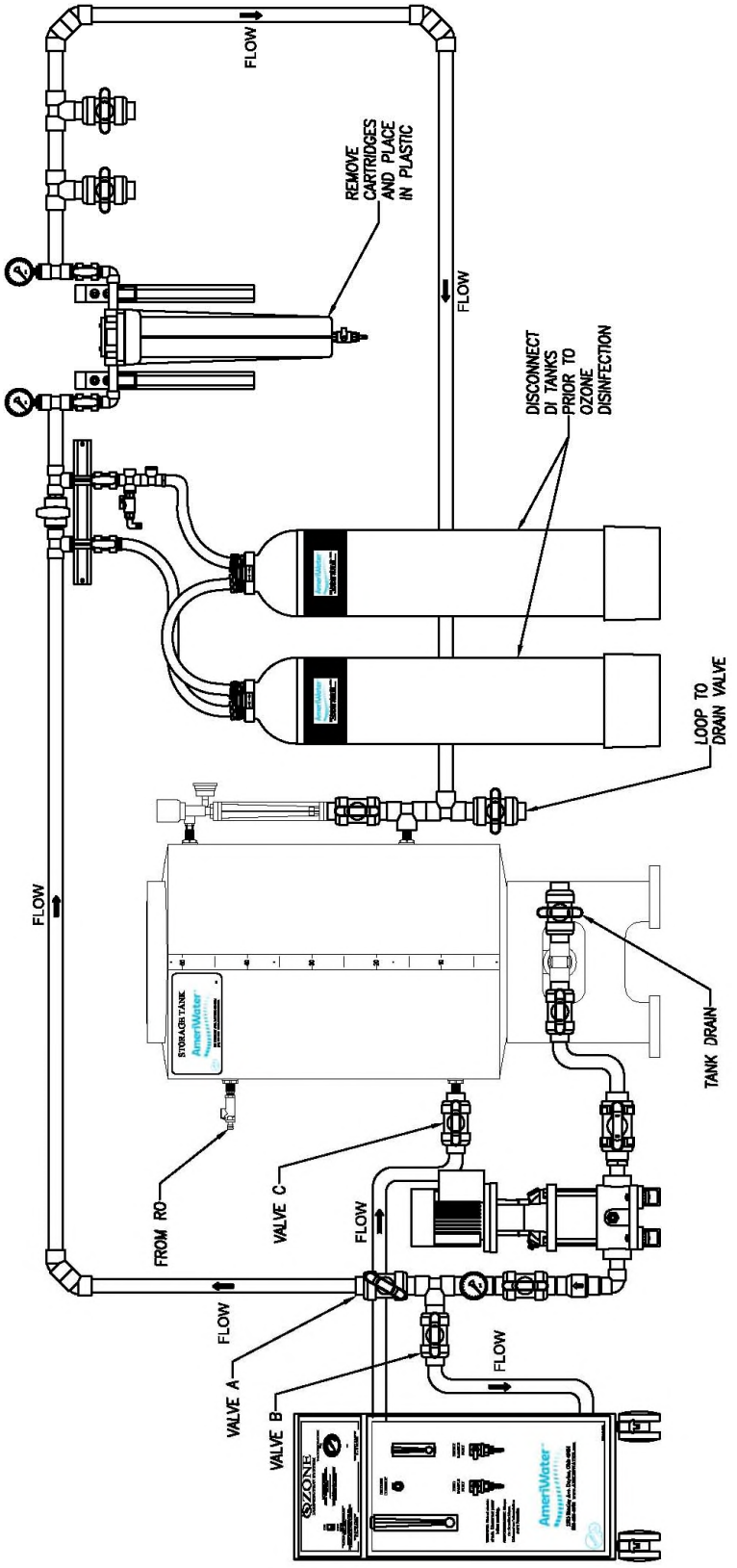


Figure 4B
Old Storage Tanks

4.3 "NEW" WATER TREATMENT SYSTEM DISINFECTION PROCEDURE

WARNING: **Verify that all patient treatments have been terminated prior to disinfection with ozone.**

AVERTISSEMENT: **Assurez-vous que tous les traitements des patients ont été résiliés avant la désinfection à l'ozone.**

NOTE: **When the red on/off switch light is lit, the ozone generator is producing ozone.**

REMARQUE: **Lorsque le rouge lumineux marche / arrêt interrupteur est allumé, le générateur d'ozone est la production d'ozone.**

1. Remove the loop filter cartridges and store in plastic. (If a cross flow ultra-filter is used remove the membranes from the housings or bypass the ultra-filter).

2. Disconnect the DI exchange tanks and place a latex glove over the fittings on the tanks. Jumper the hoses together by connecting the male connectors to the female connectors or by using jumpers. Close the valves on the inlet and discharge side of the DI Header and open the bypass valve. Exposing DI tanks to ozone may cause damage to the tanks and destruction of the resin beads.

3. Connect the Inlet and outlet quick disconnect fittings to their appropriate ozone hose. Hoses are gender oriented to prevent incorrect connections.

4. Connect the ozone inlet hose to the quick connect fitting on the pump discharge (See Figure 4C). Connect the ozone outlet hose to the quick connect fitting on the storage tank. The quick connect fittings are gender-oriented to prevent incorrect connections.

4. Turn on the distribution pump. (If the water system has dual distribution pumps, use only one of the pumps at this time.) The feed flow should be between 3.5-5 GPM.

5. Plug the power cord for the AmeriWater Ozone Disinfection System into a 115 V, properly grounded power outlet.

6. Connect the oxygen supply to the oxygen connection on the front of the ozone disinfection system and adjust to 2-4L.

7. Turn on the oxygen flow meter valve (2-5 SCFH). Verify that the vacuum gauge on the front of the cabinet is above –3" Hg (the operating range is –3" to –6" Hg). The ozone generator will not operate if the vacuum is less than –3" Hg. The vacuum is adjusted by providing more or less oxygen flow. Less oxygen flow produces more vacuum. More oxygen flow decreases the vacuum.

8. Turn the ozone generator power switch ON (see Figure 1 section 2.2).

9. If the ON / OFF switch is illuminated, ozone is now being supplied to the system being disinfected. Monitor the FEED FLOWMETER (3.5-5 GPM) and the VACUUM GAUGE (-3" to –6" Hg) to verify they are in range.

10. Run the unit until the water from the sample port of the system has a reading of no less than 0.5 ppm or mg/l. Use the RPC Ozone Test Strip to obtain this reading.

11. Continue running the system for 30 minutes at a minimum of 0.5 ppm or mg/l to build the ozone level in the storage tank.

12. If the water system has dual distribution pumps, use the opposite pump at this time.

13. Continue running the ozone system until ozone is detected at the end of the loop at a level no less than 0.5 ppm or mg/l. **DO NOT USE THE FEED SAMPLE PORT TO VERIFY THIS**. This level must be maintained for 30 minutes to completely disinfect the system. If the water system has bacteria, endotoxin, or biofilm the ozone will be consumed, so it may require several minutes to achieve the 0.5 ppm or mg/l level at the end of the loop.

14. All points of use must be opened and tested with the RPC Ozone Test Strips to verify that ozone is present at a level no less than 0.5 ppm or mg/l.

15. Turn off and disconnect the oxygen supply from the ozone disinfection system.

16. Turn the ozone generator power switch OFF (see Figure 1) and unplug the ozone disinfection system from the power outlet.

17. Turn off the distribution pump. Let the system dwell for 15-30 minutes before turning the distribution pump back on.

18. Empty the tank to remove any endotoxin created by the destruction of the bacteria.

19. Refill the tank with RO water and flush the distribution loop. Empty the tank again.

20. Return the water distribution system to normal operation, reconnect the DI exchange tanks and replace the loop filter cartridges. The residual ozone will not affect these components.

WARNING: **The water distribution system contains ozone, which can be left in the system if dialysis treatments are not scheduled within 3 hours of completing disinfection. In the event that the water distribution system will be used for dialysis less than 3 hours after disinfection, dump the storage tank to drain and refill the tank with RO water. Test the end of loop, ppm or mg/l level, when the storage tank is full. If the ppm or mg/l level is above 0.0 ppm or mg/l, dump the storage tank to drain and refill the tank until the residual level is not above 0.0 ppm or mg/l.**

AVERTISSEMENT: **Le système de distribution d'eau contient de l'ozone, qui peut être laissé dans le système si les traitements de dialyse ne sont pas prévues dans les 3 heures suivant la fin de la désinfection. Dans le cas où le système de distribution de l'eau sera utilisée pour la dialyse à moins de 3 heures après la désinfection, vider le réservoir de stockage pour vider et remplir le réservoir avec de l'eau osmosée. Tester la fin de la boucle, ppm ou mg / l niveau, lorsque le réservoir est plein. Si l'ppm ou mg / l niveau est au-dessus 0,0 ppm ou mg / l, vider le réservoir de stockage pour vider et remplir le réservoir jusqu'à ce que le niveau résiduel ne dépasse pas 0,0 ppm ou mg / l.**

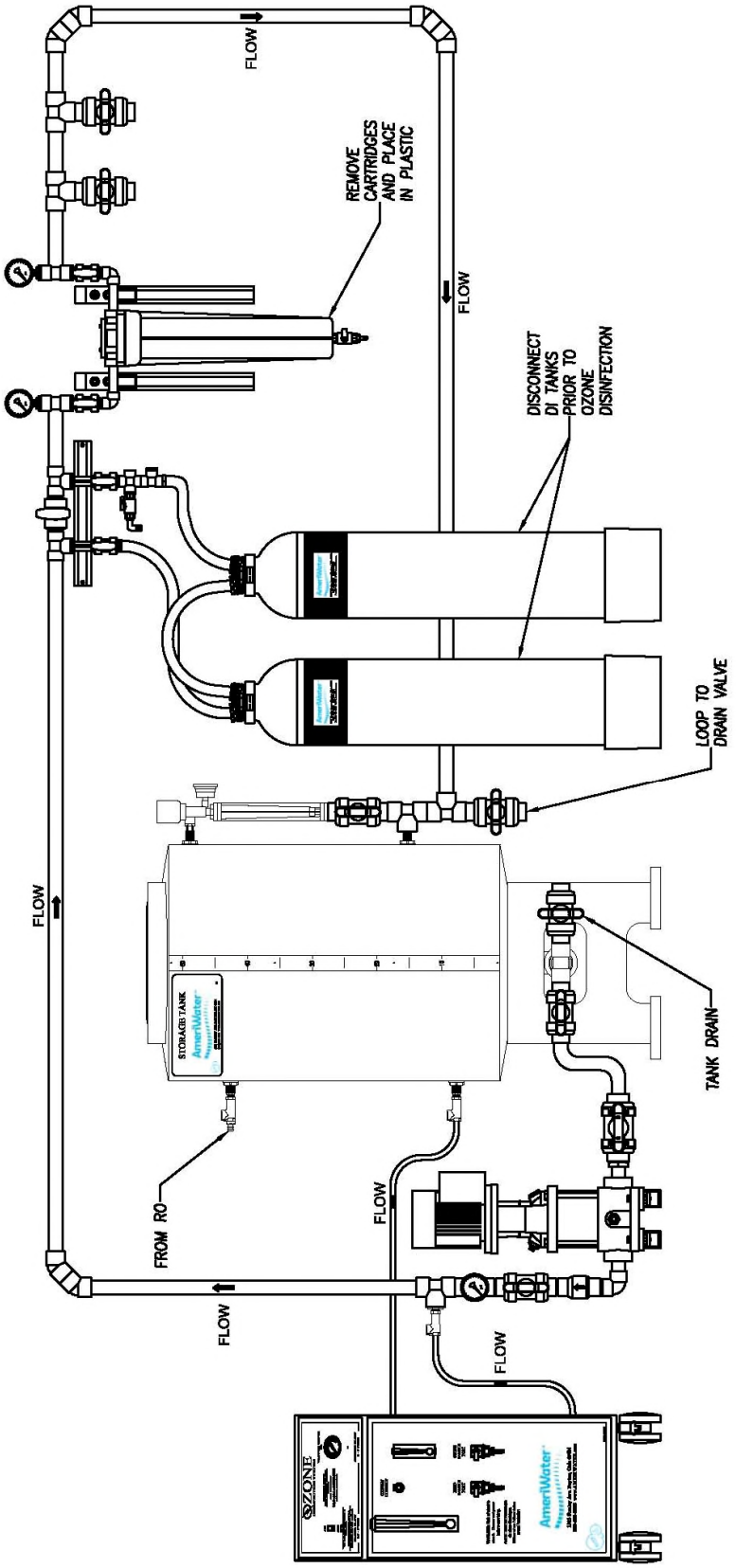


Figure 4C
New Storage Tanks

4.4 "OLD" BICARB DISINFECTION PROCEDURE

WARNING: **Rinse all bicarbonate out of the mix tank, distribution tank, and loop (see separate bicarb system instructions).**

ATTENTION: **Rincez bicarbonate de sortir de la cuve de mélange, réservoir de distribution, et la boucle (voir les instructions distinctes du système bicarbonate).**

WARNING: **No dialysis equipment may be connected for use during disinfection. Verify that all points of use are disconnected and all patient treatments have been completed.**

ATTENTION: **Aucun équipement de dialyse peut être raccordée pour être utilisée lors de la désinfection. Vérifiez que tous les points d'utilisation sont déconnectés et tous les traitements des patients ont été achevés.**

NOTE: **The drawing in Figure 4D is of the AmeriWater Bicarb Mix and Distribution System produced after October 2003. If your system pre-dates October 2003 or is not an Ameriwater bicarb system, please call AmeriWater at 1-800-535-5585 for guidance with the installation of the ozone disinfection valves on your bicarb system.**

REMARQUE: **Le dessin de la figure 4D est de l'Mix AmeriWater Bicarb et de distribution de produits après Octobre 2003. Si votre système est antérieure à Octobre 2003 ou n'est pas un système Ameriwater bicarbonate, s'il vous plaît appelez 1-800-535-5585 AmeriWater à titre indicatif par l'installation des vannes de désinfection à l'ozone sur votre système bicarbonate.**

NOTE: **When the red on/off switch light is lit, the ozone generator is producing ozone.**

REMARQUE: **Lorsque le rouge lumineux marche / arrêt interrupteur est allumé, le générateur d'ozone est la production d'ozone.**

1. Refer to Figure 4D for the layout valve placement and connections for the "Old" Bicarb unit.

2. Rinse the Mix tank with RO water. Confirm system has been completely rinsed by checking the pH. If pH is equal to or less than, 7.0 the system has been adequately rinsed. Completely drain the rinse water.

3. Rinse the distribution tank and bicarbonate loop with RO water. Open valve 5D, close valve 4D, and run the water to a drain for 30 to 60 seconds or until a pH reading of 7.0 or lower is obtained. Verify there is no bicarb present by testing for a pH of 7.0 or lower. Completely drain the rinse water.

4. Fill the Mix tank to 40 gallons with RO water by opening the Mix Fill (6M) Valve.

5. Connect the ozone inlet hose to valve 2M and the ozone outlet hose to valve 3M and open the valves.

6. Plug in the Ameriwater Ozone Disinfection System to a 115 V, properly grounded power outlet.

7. Open the Mix Nozzle (4M) Valve on the Bicarb System, close valve 1M, and turn on the Mix Transfer pump and press the Start button. (Water flowmeter on the ozone system should be between 3.5-5 GPM. Water flowmeter is read at the top of the float.)

8. Connect the oxygen supply to the oxygen connection on the front of the ozone disinfection system. Open the oxygen flowmeter valve (2-5 SCFH) located on the front of the system and adjust the valve until the vacuum gauge is between -3" to -8" Hg.

9. Turn the ozone generator power switch ON.

10. If the ON/OFF switch is illuminated, ozone is now being supplied to the system being disinfected. Monitor the WATER FLOWMETER (3.5-5GPM) and the VACUUM GAUGE (-3" to -8"Hg) to verify they are in range.

11. Run the ozone system for 15 minutes and test water from the sample port using the RPC Ozone Test Strips to verify that a minimum of 0.5 ppm or mg/l is maintained.

    a. Open the sample port valve on the Mix tank and let water flow for 5 seconds for sanitization. Close sample port. Open the drain valve and let water flow for 5 seconds. Close the drain valve.

    b. You can turn off the ozone generator in order to test the water from the ozone system sample port. This will allow you to observe the level of the ozone in the water. Turn the ozone generator back on when you are finished.

12. Open the Mix Spray-Down (5M) Valve and close the Mix Nozzle (4M) Valve. Spray down the mix tank for 1 minute. Then open the Mix Nozzle (4M) Valve and close the Mix Spray-Down (5M) Valve.

13. Continue running the Ozone Disinfection System for 5 more minutes and then turn off the Mix Transfer pump and place the ozone generator power switch in the off position.

14. Open valve 1M and close the valves 2M and 3M. Depressurize the Ozone Disinfection System by opening the ozone sample port. Disconnect the inlet and outlet hoses from the Bicarb System and connect together to avoid draining onto the floor.

15. Transfer the ozonated water to the Distribution tank by opening the Transfer (7M) Valve and closing the Mix Nozzle (4M) Valve, turning on the Mix Transfer pump, and pressing the Start button. Once the water is transferred, turn off the Mix Transfer pump and close the Transfer (7M) Valve.

16. Open the lid and the drain valve to allow the Mix tank to dry. Both of these will need to be closed prior to mixing bicarbonate powder.

WARNING: **No dialysis equipment may be connected for use during disinfection. Verify that all points of use are disconnected and all patient treatments have been terminated.**

ATTENTION: **Aucun équipement de dialyse peut être raccordée pour être utilisée lors de la désinfection. Vérifiez que tous les points d'utilisation sont déconnectés et tous les traitements des patients ont été résiliés.**

17. The Distribution tank is filled with water transferred from the Mix tank to 40 gallons. Connect the ozone inlet hose to valve 2D and the ozone outlet hose to valve 3D and open the valves, 2D and 3D.

18. Verify the AmeriWater Ozone Disinfection System is plugged into a 115 V, properly grounded power outlet.

19. Open the Distribution Mix Nozzle Valve, close valve 1D, and start the Distribution pump by placing the switch in Auto Mode. (The water flowmeter on the ozone system should be between 3.5-5 GPM).

20. Connect the oxygen supply to the oxygen connection on the front of the ozone disinfection system. Set the oxygen supply to 2-4L. Open the oxygen flowmeter valve (2-5 SCFH) located on the front of the system and adjust the valve until the vacuum gauge is between -3” to -8” Hg.

21. Turn the ozone generator power switch ON (see Figure 1 in section 2.1).

22. If the ON / OFF switch is illuminated, ozone is now being supplied to the system being disinfected. Monitor the WATER FLOWMETER (3.5-5 GPM) and the VACUUM GAUGE (-3” to –8” Hg) to verify they are in range.

23. Run the ozone system for 5 minutes and test water from the sample port to verify that a minimum of 0.5 ppm or mg/l is maintained.

24. Fully open the Loop Throttle Valve and slowly close the Distribution Mix Nozzle (4D) Valve. The Ozone Disinfection System will Power off indicated by the red light going out. The ozonated water is now being sent through the loop.

25. Test water from the feed sample port on the Ozone Disinfection System to verify that a minimum of 0.5 ppm or mg/l is maintained.

26. Sample the return loop by throttling valve 8D and opening valve 9D for 5 seconds. You may check for ozone 0.5 ppm or mg/l using the RPC Ozone Test Strips. After detecting ozone open valve 8D completely and close valve 9D, continue running the system for 15 minutes.

    a. While the ozonated water is circulating, open each station's Bicarb connection and verify the presence of ozone is at 0.5 ppm or mg/l using the RPC Ozone, Test Strips.

27. Slowly open the Distribution Mix Nozzle (4D) Valve. The Ozone disinfection System will power on indicated by the red light. The ozonated water is now being sent into the tank. Run the ozone system for 5 minutes.

28. Open the Distribution Spray-Down (5D) Valve and close the Mix Nozzle (4D) Valve. Spray down the Distribution tank for 1 minute.

29. Slowly close the Distribution Spray-Down (5D) Valve. The Ozone Disinfection System will power off indicated by the red light going out. The ozonated water is now being sent through the loop. Recirculate the ozonated water for 10 minutes.

    a. While the ozonated water is circulating, open each station's Bicarb connection and verify the presence of ozone is at 0.5 ppm or mg/l using the RPC Ozone, Test Strips.

30. Open the Distribution Mix Nozzle (4D) Valve and close the Loop Throttle (7D) Valve.

31. Open the sample port valve on the distribution tank and let water flow for 5 seconds for sanitization. Close the sample port. Open the drain valve and let water flow for 5 seconds. Close the drain valve.

32. Continue running the Ozone Disinfection System for 5 more minutes and then turn off the Distribution Mix pump and place the ozone generator power switch in the OFF position. Turn off the oxygen feed.

33. Open valve 1D, close valves 2D and 3D. Depressurize the Ozone Disinfection System by opening the Product sample port. Disconnect the inlet and outlet hoses from valves 2D and 3D. Drain hoses into nearest drain and then cap and plug hoses.

34. Disconnect oxygen supply from the ozone system and unplug power cord from outlet.

35. Put the Distribution pump on the auto setting and allow the ozonated water to continue circulating through the loop. Leave the ozonated water in the system until bicarbonate is ready to be transferred. Rinse Distribution tank to ensure ozone is not present before transferring bicarbonate.

36. When transferring bicarbonate to the distribution tank after disinfection close valve 8D and open valve 9D and send water from loop to the drain until bicarbonate is detected.

WARNING: **Bicarbonate powder should not be mixed with ozone rich water. Drain the Mix Tank and fill it with fresh RO water before mixing.**

ATTENTION: **Poudre de bicarbonate doit pas être mélangé avec de l'eau riche en ozone. Égoutter le mélange en cuve et remplissez-le avec de l'eau fraîche avant de les mélanger RO. Si bicarbonate ne va pas être mélangé pendant plusieurs heures après la désinfection, l'ozone peut être laissé dans le système et le réservoir peut être vidé et rempli au moment du mélange.**

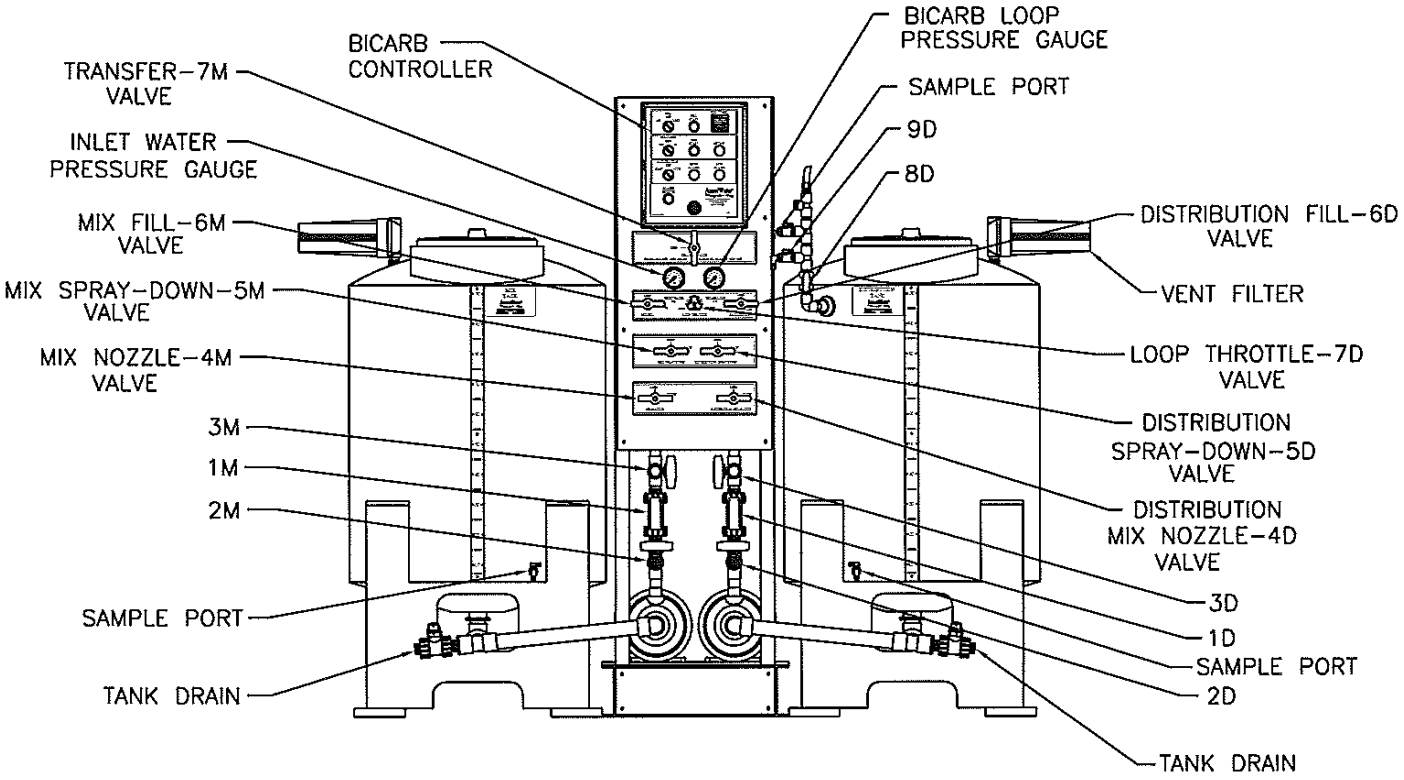


FIGURE 4D
FRONT VIEW
"OLD" BICARB CONTROL PANEL AND VALVE DESIGNATIONS

4.5 "NEW" BICARB DISINFECTION PROCEDURE

1. Refer to figure 4F for a layout of all valves and connections on the "New" Bicarb system.

2. Rinse the Mix and Distribution tanks prior to carrying out disinfection.

3. Close all valves, close tank lids, and turn OFF all switches on the Bicarb System.

4. Open MIX TANK DRAIN valve (9M) and valve 8M to drain completely, then close 9M.

5. Open DISTRIBUTION TANK DRAIN valve (11D) and valve 10D to drain the Distribution Tank completely and then close valve 11D.

6. To rinse the fill solenoid and flow control, set the FILL TIMER to 5 minutes.

    a. Turn the supply water isolation valve ON.

    b. Turn the FILL ON/OFF/RESET switch to ON and push the FILL START button.

    c. **After the 5 minute rinse** reset the FILL TIMER to the original time and the FILL ON/OFF/RESET switch to RESET.

    d. Carefully open the INLET SAMPLE port (at least 10 seconds) then close the port.

    e. Open the DISTRIBUTION TANK SAMPLE PORT for at least 5 seconds (at full flow) then close the DISTRIBUTION TANK SAMPLE PORT.

7. Open the MIX TANK DRAIN valve (9M) to drain the Mix Tank.

    a. Open MIX FILL VALVE (6M) to rinse the Mix Tank to the drain until the pH at the Mix Tank drain is less than or equal to (≤) 8, rinsing for a minimum of 5 minutes.

    b. Use pH test strips (AmeriWater part number 97PH20901) to verify pH at the drain.

8. When the pH at the Mix Tank drain is ≤ 8, close the MIX TANK DRAIN valve (9M) and allow the MIX FILL VALVE (6M) to partially fill the Mix Tank with purified water.

    a. 55-gallon Mix Tank: Fill to 25 gallons, and then close MIX FILL VALVE (6M).

    b. 100-gallon Mix Tank: Fill to 50 gallons, and then close MIX FILL VALVE (6M).

9. Open the DISTRIBUTION FILL (6D) valve for 1 minute then close valve 6D.

10. Open valves 1M, 4M, and 5M. Turn the TRANSFER/MIX switch to ON and press the MIX START button.

11. Run in this configuration for 1 to 2 minutes.

12. Close valves 4M and 5M, then open the TRANSFER VALVE (7M).

    a. **Be ready to turn the TRANSFER/MIX switch OFF when the Mix Tank is empty! Running the pump dry will result in pump damage!**

13. When the water from the Mix Tank is transferred, close 7M first and then turn the TRANSFER/MIX switch to OFF.

14. Open 4M, 5M, and the MIX TANK DRAIN (9M) valve to drain leftover Mix Tank water.

15. Open valve 1D, 4D, 10D, and the DISTRIBUTION SPRAY DOWN (5D) valve. **Verify that the Distribution Tank lid is closed!**

16. Turn the DISTRIBUTION OFF/AUTO switch to AUTO and allow the system to run with the valves in this configuration for 1 to 2 minutes.

17. Open valve 9D and fully open the LOOP THROTTLE valve (7D). Allow water to flow to the drain for a minimum of 5 minutes.

18. Open 8D and close 9D to allow water to recirculate through the loop for at least 5 minutes.

    a. Fully open the LOOP RETURN SAMPLE PORT for at least 5 seconds, then close the LOOP RETURN SAMPLE PORT.

19. Run fresh purified water through each point of use and check with test strips until the pH at each point of use is less than or equal to 8.

20. Turn the DISTRIBUTION OFF/AUTO switch to OFF.

21. Open the DISTRIBUTION TANK SAMPLE PORT for at least 5 seconds (at full flow) then close the DISTRIBUTION TANK SAMPLE PORT.

22. Open the CROSSOVER valve (10M) for 10 seconds then close valve 10M.

23. Open the DISTRIBUTION TANK DRAIN valve (11D), empty tank and close valve 11D.

24. Fill the DISTRIBUTION TANK half full with purified water by opening valve 6D. Close valve 6D when the tank is half full, repeat steps 13-21 until the pH is less than or equal to 8 at valve 9D and the DISTRIBUTION TANK SAMPLE PORT.

25. Open 4D, 5D, 8D, 9D, 10M, 11D, and the LOOP RETURN SAMPLE PORT to drain leftover water from the Distribution Tank.

26. Verify that both tank lids are closed and all switches are turned OFF.

27. Verify that all valves and points of use on the Bicarb System are closed and all points of use are labeled to prevent inadvertent use during disinfection.

28. Open the supply water isolation valve and 6M to fill the Mix Tank to the appropriate level.

    a. 55-gallon Mix Tank: Fill to 25 gallons, and then close MIX FILL VALVE (6M).

    b. 100-gallon Mix Tank: Fill to 50 gallons, and then close MIX FILL VALVE (6M).

29. Open the supply water isolation valve and 6D to fill the Distribution Tank to the appropriate level.

    a. 55-gallon Distribution Tank: Fill to 25 gallons, and then close 6D.

    b. 100-185 gallon Distribution Tank: Fill to 50 gallons, and then close 6D.

30. Close the supply water isolation valve. Open 6M to relieve pressure and remain open.

31. Connect the OZONE CPC QUICK CONNECT U-SHAPED INLET HEADER to the mating ports below the Bicarb System valves 1M and 1D.

32. Connect the OZONE CPC QUICK CONNECT U-SHAPED OUTLET HEADER to the mating ports above the Bicarb System valves 1M and 1D.

33. Connect the Ozone System inlet hose CPC quick connect fitting to the mating fitting on the OZONE CPC QUICK CONNECT U-SHAPED INLET HEADER.

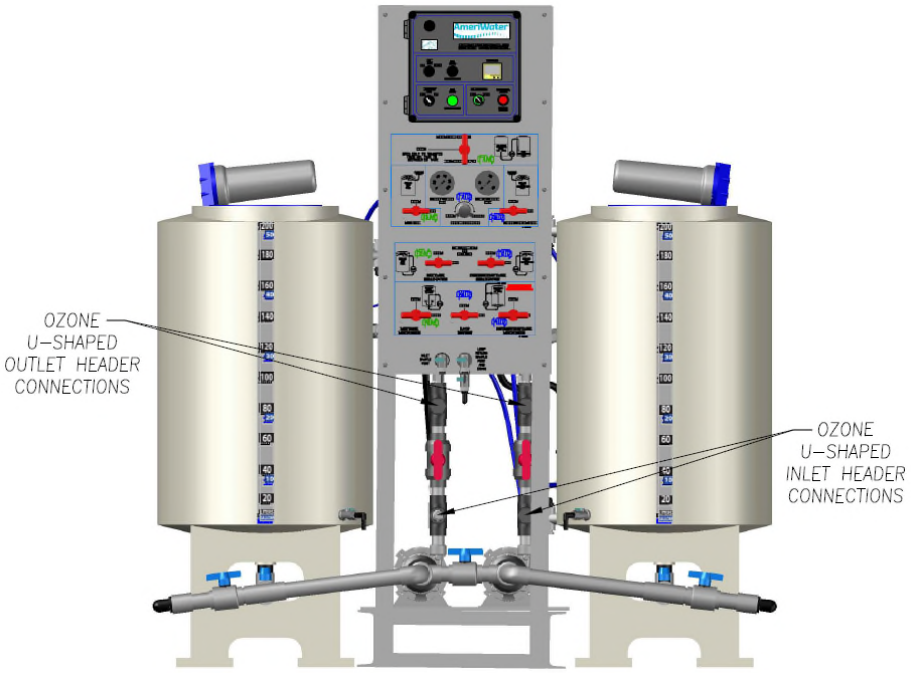


FIGURE 4E
OZONE HEADER CONNECTIONS

34. Connect the Ozone System outlet hose CPC quick connect fitting to the mating fitting on the OZONE CPC QUICK CONNECT U-SHAPED OUTLET HEADER.

35. Disconnect the CPC style quick disconnect fitting on the 6’ inlet hose from the SUPPLY WATER ISOLATION valve and reconnect it to the mating fitting on the OZONE CPC QUICK CONNECT U-SHAPED INLET HEADER.

36. Close valve 6M and open the CROSSOVER/BALANCING VALVE (10M).

37. Verify that valves 5M, 5D, 6M, 6D, and 7M are closed.

38. Open valves 1M, 1D, 4M, 4D, and fully open the LOOP THROTTLE valve (7D).

39. Open valves 8M, 10D, and 8D.

40. Verify that the Ozone Disinfection System test port is closed, and the power switch is OFF.

41. Plug the Ozone Disinfection System into a properly grounded, 120V outlet.

42. Connect the oxygen supply to the OXYGEN CONNECT fitting on the front of the Ozone Disinfection System.

43. Turn ON the TRANSFER/MIX switch (on the Bicarb System) and press the MIX START button.

NOTE: The MIX TIMER may time out during this procedure. When this occurs, press the MIX START button again to reset the timer and turn the pump back on.

44. Turn the DISTRIBUTION OFF/AUTO switch to the AUTO position.

45. Check the connections for leaks prior to starting the Ozone Disinfection System.

46. Verify that the water level in the Mix Tank remains equal to the water level in the Distribution Tank (± 10 gallons).

    a. If it does not, check the valve positions to ensure that they are correct and verify that both pumps are running.

47. Close valves 1M and 1D.

48. Verify that both the Mix and Distribution pumps begin pumping water into the WATER FLOWMETER GAUGE on the Ozone Disinfection System.

    a. Adjust the WATER FLOWMETER valve so that the flow registers between 3.5 and 5.0 gallon per minute (gpm) on the WATER FLOWMETER.

49. Set the oxygen supply between 2 and 4 liters per minute as indicated on the regulating device of the oxygen concentrator or the oxygen bottle.

50. Open the OXYGEN FLOWMETER valve on the front of the Ozone Disinfection System.

    a. Adjust the oxygen flow until it is between 2 and 5 SCFH (Standard Cubic Feet per Hour) and until the vacuum gauge reads between -3” to -8” Hg (negative inches of mercury).

51. Turn ON the Ozone Disinfection System ON/OFF SWITCH (red toggle switch).

52. When ON/OFF switch (red toggle switch) is illuminated, ozonated water is being supplied to the system being disinfected.

53. Run the Ozone Disinfection System until the ozonated water from the sample port on the Ozone Disinfection System has a reading greater than 0.5 mg/L (or 0.5 ppm).

    a. Verify this using the RPC Ozone, Test Strips.

54. Open the MIX TANK SAMPLE PORT valve and let the ozonated water flow for about 10 seconds before testing.

55. Verify ozone concentration at the MIX TANK SAMPLE PORT is ≥ 0.5 mg/L using the RPC Ozone, Test Strips, then close the MIX TANK SAMPLE PORT valve.

56. Open the DISTRIBUTION TANK SAMPLE PORT valve and let the ozonated water flow for about 10 seconds before testing.

57. Verify ozone concentration at the DISTRIBUTION TANK SAMPLE PORT is ≥ 0.5 mg/L using RPC Ozone, Test Strips, then close the DISTRIBUTION TANK SAMPLE PORT valve.

58. Verify that the ozone concentration at the LOOP RETURN SAMPLE PORT is ≥ 0.5 mg/L using RPC Ozone, Test Strips, then close the LOOP RETURN SAMPLE PORT valve.

59. Proceed to the next step only after the correct ozone concentrations have been confirmed at each of the above locations. Continue running the Ozone Disinfection System in this configuration until the correct ozone concentrations have been confirmed at each of the above locations.

60. Open valves 6M and 6D. Operate in this configuration for 5 minutes to disinfect the MANUAL FILL plumbing and spray disinfectant throughout the Mix and Distribution tanks.

61. Close valves 6M and 6D.

a. Open the inlet sample port for 60 seconds, then close the inlet sample port.

62. Open valve 7M and operate in this configuration for 1 minute to disinfect the TRANSFER valve (7M) internal components. DO NOT run longer than 1 minute in this configuration (the transfer plumbing is exposed to ozonated water the entire time the ozone machine and the Mix and Distribution pumps are running).

NOTE: The water level in the Mix Tank will lower slightly and the water level will rise slightly in the Distribution Tank.

63. Close the TRANSFER valve (7M).

64. To disinfect the fill solenoid and flow control, turn ON the FILL ON/OFF/RESET switch and push the FILL START button.

    a. Allow to operate in this configuration for 1 minute, and then turn the FILL ON/OFF/RESET switch to the OFF/RESET position.

65. Open valves 5M and 5D and operate in this configuration for 1 minute to disinfect the spray **plumbing**.

66. Close valves 5M and 5D.

67. Open the LOOP RETURN TO DRAIN valve (9D) for 1 minute (flowing to drain) and then close 9D.

68. Open the bicarb ports, one at a time, in all of the wall boxes on the loop for a minimum of 10 seconds before testing.

    a. Verify that the ozone concentration at each bicarb port is ≥ 0.5 mg/L using RPC Ozone, Test Strips, then close each port.

69. Verify again that the ozone concentration at the MIX TANK SAMPLE PORT, the DISTRIBUTION TANK SAMPLE PORT, and the LOOP RETURN SAMPLE PORT is ≥ 0.5 mg/L using RPC Ozone, Test Strips.

70. Open valves 6M and 6D, this is a second power flush of the manual fill lines following the ozone “soak”.

71. Open valves 1M and 1D. The Ozone Disinfection System will turn off.

72. Turn OFF the TRANSFER/MIX switch.

73. Turn OFF the DISTRIBUTION OFF/AUTO switch.

74. Turn OFF the Ozone Disinfection System ON/OFF SWITCH (place the red toggle switch in the OFF position).

75. Relieve the pressure in the Ozone Disinfection System hoses by opening the SAMPLE PORT on the front of the Ozone Disinfection System.

76. Disconnect the Ozone Disinfection System inlet hose CPC quick connect fitting from the mating fitting on the OZONE CPC QUICK CONNECT U-SHAPED INLET HEADER.

77. Disconnect the Ozone Disinfection System outlet hose CPC quick connect fitting from the mating fitting on the OZONE CPC QUICK CONNECT U-SHAPED OUTLET HEADER.

78. Finish disconnecting the Ozone Disinfection System, empty the hoses, and close the SAMPLE PORT on the front of the Ozone Disinfection System. The Ozone Disinfection System may now be stored until next use.

79. Disconnect the CPC style quick disconnect fitting on the 6' inlet hose from the CPC QUICK CONNECT U-SHAPED INLET HEADER, and reconnect it to the mating fitting on the SUPPLY WATER ISOLATION valve.

80. Disconnect the OZONE CPC QUICK CONNECT U-SHAPED INLET HEADER from the mating ports below the Bicarb System valves 1M and 1D.

81. Disconnect the OZONE CPC QUICK CONNECT U-SHAPED OUTLET HEADER from the mating ports above the Bicarb System valves 1M and 1D.

82. ***** Close CROSSOVER/BALANCING VALVE 10M*****

83. Open the SUPPLY WATER ISOLATION valve.

84. If bicarb solution will not be mixed until the following day:

    a. Open the MIX TANK DRAIN (9M) and valves 8M, 1M, 4M, and 5M.

    b. Remove the Mix Tank lid to allow the tank to air dry.

    c. Allow the Bicarb System Distribution side to recirculate overnight with valves 1D, 4D, 10D, 7D, and 8D fully open and the DISTRIBUTION OFF/AUTO switch set to AUTO.

NOTE: Follow the procedures below prior to mixing bicarb solution.

85. To prepare the Bicarb Mix and Distribution System for use:

    a. Drain and rinse entire Bicarb System, including the loop, and wallbox ports as found in section **4.1.1 RINSE RESIDUALS OUT OF THE BICARB SYSTEM** in the Bicarb Mix and Distribution System operation manual.

86. Log the disinfection completion in your facility's system daily checklist or journal.

WARNING: **Bicarbonate powder should not be mixed with ozone rich water. Drain the Mix Tank and fill it with fresh RO water before mixing.**

ATTENTION: **Poudre de bicarbonate doit pas être mélangé avec de l'eau riche en ozone. Égoutter le mélange en cuve et remplissez-le avec de l'eau fraîche avant de les mélanger RO. Si bicarbonate ne va pas être mélangé pendant plusieurs heures après la désinfection, l'ozone peut être laissé dans le système et le réservoir peut être vidé et rempli au moment du mélange.**

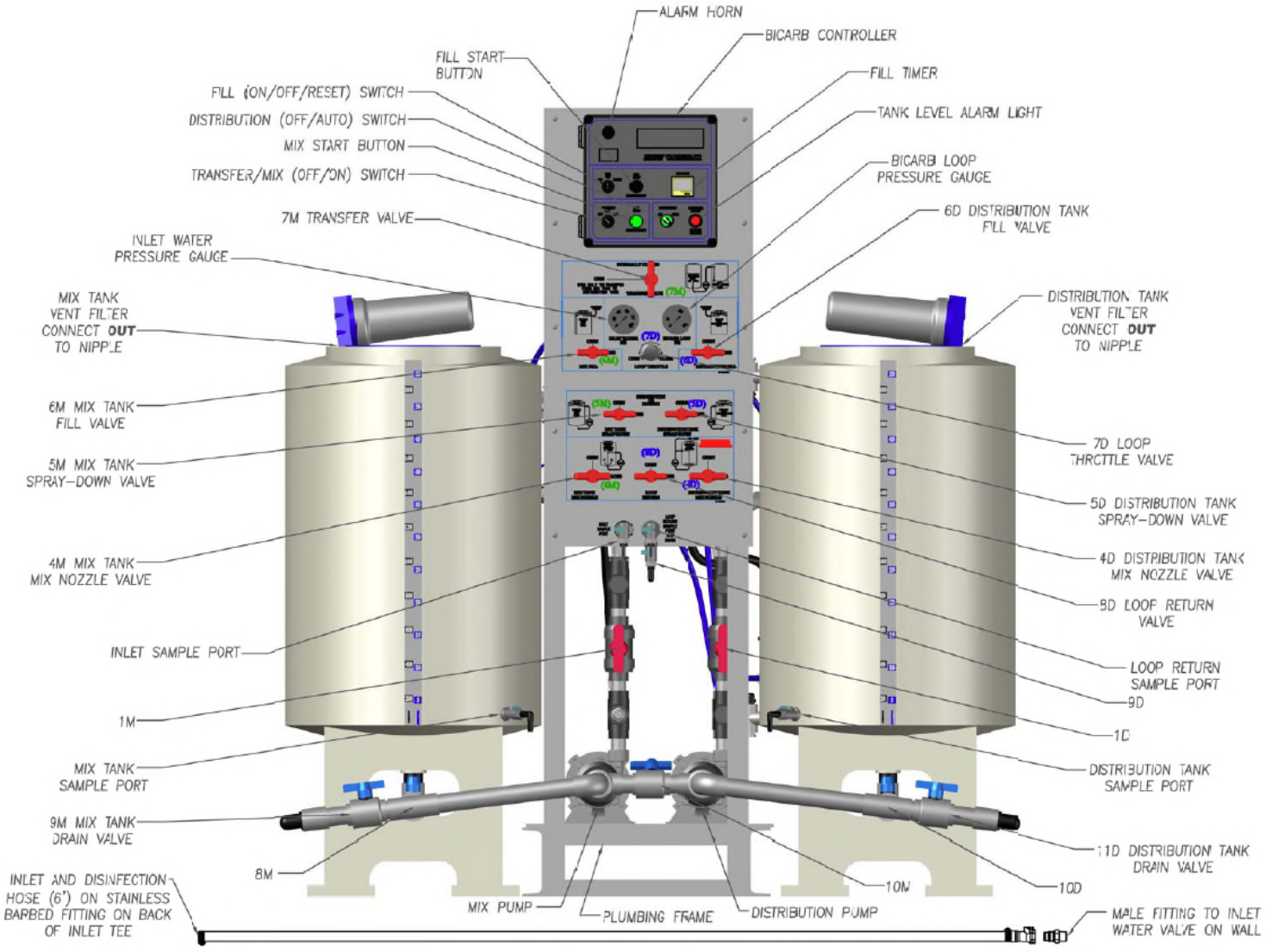


FIGURE 4F
FRONT VIEW
"NEW" BICARB CONTROL PANEL AND VALVE DESIGNATIONS

SECTION 5, MAINTENANCE / TROUBLESHOOTING GUIDE

5.1 MAINTENANCE

Keep the ozone generator clean. The ozone generator does not need regular service if clean feed oxygen is used.

5.2 GENERATOR TROUBLESHOOTING GUIDE

Problem / Symptom	Possible Cause	Solution
Unit does not turn on	**No power to unit**	**Check breakers**
	Switch not turned on	**Check switch**
	Blown fuse	**Replace fuse**
	Cover / door interlock not active	**Check door interlock switch replace cover**
	Incorrect wiring connections	**Check wiring**
	Vacuum switch not closed	**Check vacuum and vacuum switch**
Unit does not stay on	**Unit overheating**	**Check fan**
	Insufficient vacuum (should be –3 to –8 on vacuum gauge)	**Adjust injector vacuum, be sure check valves are properly installed**
	Defective check valve	**Inspect and replace if necessary**
Unit cycles on and off	**Overheating**	**Check fan**
	Defective power	**Check for constant power if not timer controlled**
	Insufficient oxygen supply	**Check oxygen supply**
	Insufficient water flow	**Check water flow meter**
Unit trips circuit breaker	**Incorrect wiring**	**Check wiring**
	Incorrect circuit breaker	**Check and, if necessary, replace with correct circuit breaker**
You receive an electric shock upon touching the unit	**Incorrect wiring**	**Check wiring**
	Unit not grounded	**Ground unit in accordance with local codes**
	Unit has been flooded	**Return unit for major service or completely disassemble and clean**

GENERATOR TROUBLESHOOTING GUIDE (CONTINUED)		
Water in unit or ozone delivery tubing	**Insufficient vacuum** **Defective check valve(s)** **Excessive backpressure on check valve(s)**	**Adjust injector vacuum** **Replace check valve(s)** **Backpressure not to exceed 40 PSI, if over 40 PSI consult AmeriWater**
Unit seems noisy	**Generator not securely bolted to cabinet** **Shipping damage** **Fan blocked** **Insufficient oxygen**	**Bolt it firmly into place** **Locate and repair** **Check and clear obstructions** **Check oxygen supply**
Flow meter will not adjust oxygen flow	**Oxygen not operating** **Defective check valve**	**Make sure oxygen supply system is set properly** **Check and replace**
Vacuum gauge reads on pressure side	**Insufficient vacuum** **Defective vacuum gauge** **Loose Kynar compression fittings** **Mesh strainer blocked**	**Adjust injector vacuum** **Replace vacuum gauge** **Tighten all Kynar fittings** **Remove bowl from strainer and remove obstructions**

5.3 BACKPRESSURE

Excessive backpressure on the system will cause the injector not to function properly. The inlet pressure must be at least 15 PSI greater than the outlet pressure in order for the injector to work properly. If the vacuum is not at least -3 Hg, verify that there are no restrictions on the outlet side of the system or in the loop or tank being disinfected.

SECTION 6, PRODUCT WARRANTY

AmeriWater warrants the Ozone Disinfection System to be free from defects in parts and workmanship for one year; provided that the system is not subject to abuse, misuse, alteration, neglect, freezing, accident or negligence; and provided further that the system is not damaged as the result of any unusual force of nature such as, but not limited to, flood, hurricane, tornado, or earthquake. This warranty covers all system components under normal use and operation. AmeriWater's obligation under this warranty is limited to the replacement of equipment and/or parts shown to be defective only. The warranty does not cover labor charges or travel expenses resulting from the service of equipment. The manufacturer is excused if failure to perform its warranty obligations is the result of strikes, government regulation, materials shortages, or other circumstances beyond its control.

To obtain warranty service, notice must be given to the manufacturer within 30 days of the discovery of the defect. Each system for which a warranty claim is asserted shall, at the request of AmeriWater, be returned freight prepaid with proof of purchase date to AmeriWater at the expense of the purchaser. Any replacement parts shall be warranted as stated above for the original one-year warranty.

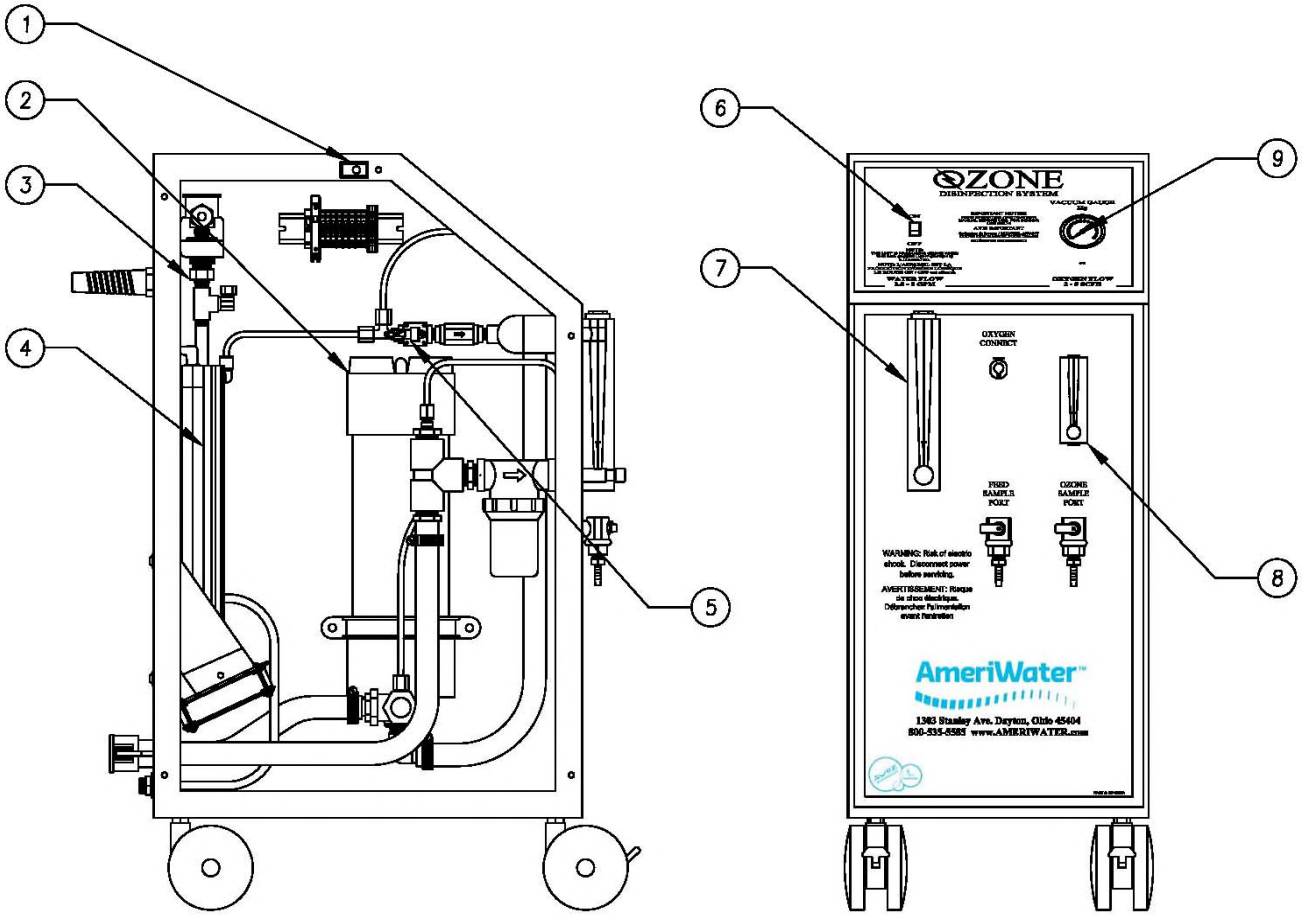
This warranty does not extend to any generator or part if a defect or malfunction occurs from misuse. Allowing water to enter the generator will cause damage not covered under AmeriWater's product Warranty. Feed gas must be clean, dry Air or Oxygen at –60º F dew point for maximum Ozone production. Provide proper voltage to the generator (100-125 VAC 60 Hz). Improper voltage causes damage not covered under the AmeriWater Product Warranty. Locate the generator in a well-ventilated area that is protected from the weather elements and remains between 40º F and 100º F to prevent damage not covered under the AmeriWater Product Warranty.

There are no warranties on the AmeriWater Ozone Disinfection System beyond those specifically described above. All implied warranties, including any implied warranty of merchantability or of fitness for a particular purpose are disclaimed to the extent they might extend beyond the above periods. The sole obligation of the manufacturer under these warranties is to replace or repair the component or part which proves to be defective within the specified time period, and the manufacturer is not liable for consequential or incidental damages. No dealer, agent, representative, or other person is authorized to extend or expand the warranties expressly described above.

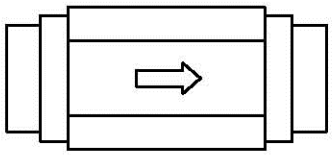
Some states do not allow limitations on how long an implied warranty lasts or exclusions or limitations of incidental or consequential damage, so the limitations and exclusions in the warranty may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state.

SECTION 7, SPARE PARTS LIST

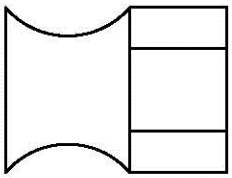
7.1 OZONE DISINFECTION SYSTEM COMPONENTS



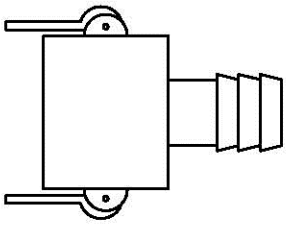
NUMBER	PART NUMBER	DESCRIPTION
1	65-0008	Door Switch
2	77-0007	Gas Off Assembly w/Float Valve
3	77-0006	Ozone Gas Destruct Chamber
4	77-0005	Corona Discharge Chamber w/Fan
5	65-0007	Vacuum Switch
6	65-0003	Switch, Toggle, ON / OFF, Illum.
7	41530611	Flow Meter 0-5 GPM W/Valve
8	41821990	Flow Meter w/Valve, 0-5 SCFH
9	43-0011	Gauge Vacuum, 0/30 INHG
NOT PICTURED		
-	77-0008	Fan for Corona Discharge Chamber
	77-0009	Power Supply Board for CD Unit
-	40531620	Injector, 0-6 GPM, ¾" MPT



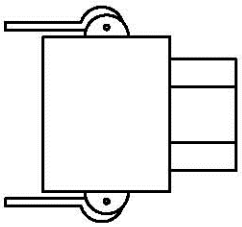
041-0032 – CHECK VALVE



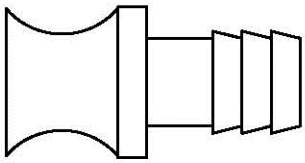
16-0009 – Q-CON 0.75 FPT X INS



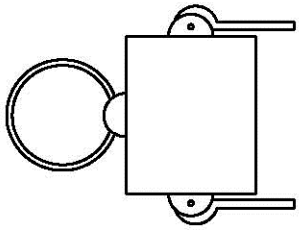
16-0011 – Q-CON 0.75 HB X COUPLING



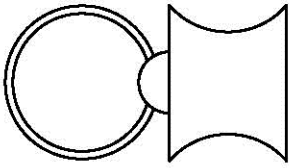
16-0012 – Q-CON 0.75 FPT X COUPLING



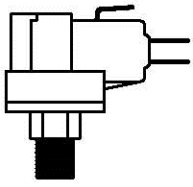
16-0013 – Q-CON 0.75 HB X INS



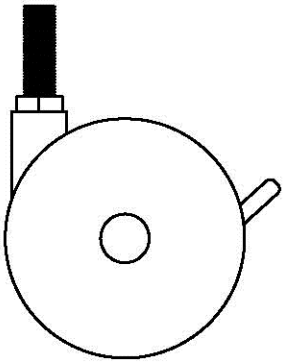
16-0015 – Q-CON CAP



16-0016 – Q-CON PLUG



65-0007 – VACUUM SWITCH



94-0013 – LOCKING CASTER
94-0014 – FREE ROLLING CASTER

SECTION 8, OZONE BADGE INFORMATION

SafeAir Ozone monitor
(Part Number: 382004)

Applications:
The SafeAir ozone badge may be used for personnel or area monitoring for exposure times ranging from 15 minutes to 2 days.

Cross Interferences:
Chlorine does not affect the performance of the monitor. Hydrogen peroxide is a known interference. Up to 0.3 ppm nitrogen dioxide shows no interference. Exposure to 0.5 ppm nitrogen dioxide for 5 hours causes false positive readings equivalent to 0.04 ppm ozone; exposure to 1 ppm nitrogen dioxide for 3 hours causes false positive readings equivalent to 0.04 ppm of ozone. No further interferences are known.

Technical Summary

Physical Specifications:

Dimensions	(74 ± 1 mm) x (41 ± 1 mm) x (1 mm)
Weight	1.5 g
Refrigerated shelf life	1 year
Color change	blue to white

Sampling Parameters:

Exposure level	0.05 ppm·hr
Minimum detectable limit (8 hours)	0.006 ppm
Maximum recommended sampling time	2 days
Minimum recommended sampling time	15 minutes
Relative humidity range	30% - 80%
Face velocity range	10 - 150 cm/sec
Temperature range	16ºC - 33ºC (60ºF - 91ºF)
Light effect - UV (direct sunlight)	not recommended

Ozone badges are available from AFC International, Inc. at 800-952-3293.
Ozone SafeAir Badge Pack of 50 Part Number: 382004-50