

TROUBLE SHOOTING

OZONE GENERATOR

When trouble shooting, there are four major areas to look at to determine the location of any problem:

1. The Lamp Cartridge indicator light on the front of the unit, which should remain **ON** while the unit is operating.
2. The sound or vibration on the AQUAZONE purifier, which would indicate that the air pump is working.
3. The condition of the water.
4. Ozone bubbles in the water.

SITUATION: Indicator light OFF

1. Check GFCI to see if it has tripped.
2. Check lamp connection.
3. Check for blown lamp.
4. Check power supply.

SITUATION: Ozone not present in water

1. Check for clean filter (a dirty filter will cause a low flow of ozone).
2. Check for clogged jet (debris in line).
3. Check for kinked delivery line or blocked check valve.
4. Check diffuser stone to see that it has not been fowled.

SITUATION: Cloudy water with ozone present.

1. Check pH balance
2. Clean filter
3. Use shock treatment to rid water of excessive contaminants.
4. Drain and clean tanks.



RECIRCULATION
ozone system

INSTALLATION AND OWNER'S MANUAL

ultraviolet

CS-1400 & UV-2800

ozone generator

P.O. BOX 15330, SAN LUIS OBISPO, CA 93406



Copyright © 1993 - ClearWater Tech, Inc. • Reproduction of any kind is prohibited • Rev. 0596

IMPORTANT SAFETY INSTRUCTIONS

- 1. PLEASE FOLLOW ALL INSTALLATION INSTRUCTIONS.**
- 2. All electrical connections should be made by a licensed or qualified electrician.**
- 3. Before attempting any electrical connections, be sure all power is off at the main circuit breaker.**
- 4. Be sure to bond (ground) the system using the copper bonding lug on the back of the power pack. The system should be bonded with solid copper wire conforming with all local, state and national electrical codes.**
- 5. The ultraviolet light produced by the CS-1400 and UV-2800 is harmful to your eyes and skin if directly exposed. Do not look directly at the lamp. Always be sure power is off when servicing.**
- 6. Install the ozone generator at least five feet from the pool water using non-metallic plumbing.**
- 7. Install the ozone generator no less than one foot above the maximum water level to prevent water from contacting the electrical equipment.**
- 8. The electrical supply for this product must include a suitable rated switch or circuit breaker to open all ungrounded supply conductors to comply with Section 422-20 of the National Electrical Code, ANSI / NFPA 70-1987. The disconnecting means must be readily accessible to the occupant but installed at least five feet from the pool water.**
- 9. This equipment must be validated by the manufacturer for its intended use.**
- 10. SAVE THESE INSTRUCTIONS.**

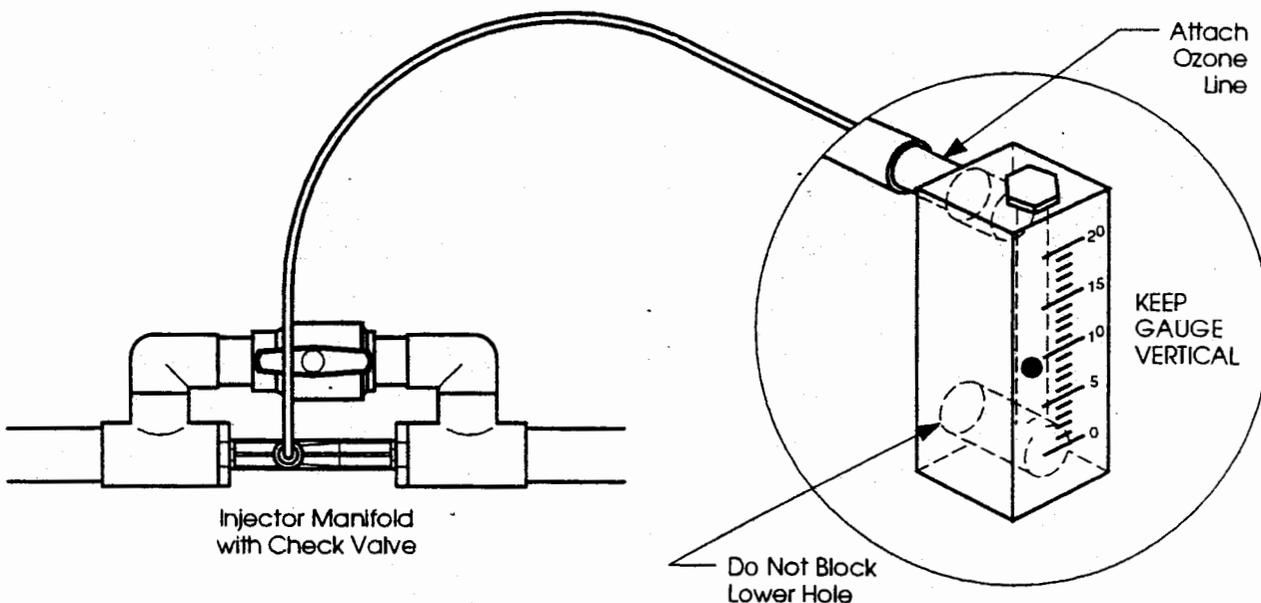
INSTALLING THE INJECTOR

1. Cut into the return line AFTER the pump, filter and heater.
2. Glue in the proper sized injector, noting the proper direction of flow (notice the arrow on the injector). Most pools use a single-speed pump, requiring a single-speed injector. If the pool has a two-speed pump, use a two-speed injector. If a single-speed injector is used, the air flow will have to be adjusted for proper suction using an SCFH gauge. (See below.)
3. Once the injector is installed, choose a location to mount the ozone generator as close to the injector as possible.

USING AN SCFH GAUGE (Must be ordered separately)

An SCFH (Standard Cubic Feet per Hour) gauge is used to accurately measure the amount of air flowing through the ozone delivery line. This affects the amount of ozone being injected into the water.

1. Install the tube fitting into the upper hole on the back side of the SCFH gauge.
2. With the pump running (low speed on a two-speed system), disconnect the tubing from the ozone outlet of the ozone generator and connect the tubing to the fitting on the gauge.
3. While holding the gauge vertically, read the amount indicated on the gauge. The optimum flow is 10 to 20 SCFH (10 is ideal). NOTE: Do not obstruct the bottom air hole on the gauge.
4. On a single speed pump system the injector will have a ball valve to adjust the amount of flow. To adjust the SCFH, simply install the gauge as described above and open the ball valve completely. With the pump running, begin closing the ball valve until optimum flow is achieved on the SCFH gauge. If possible, remove the ball valve handle to prevent tampering.

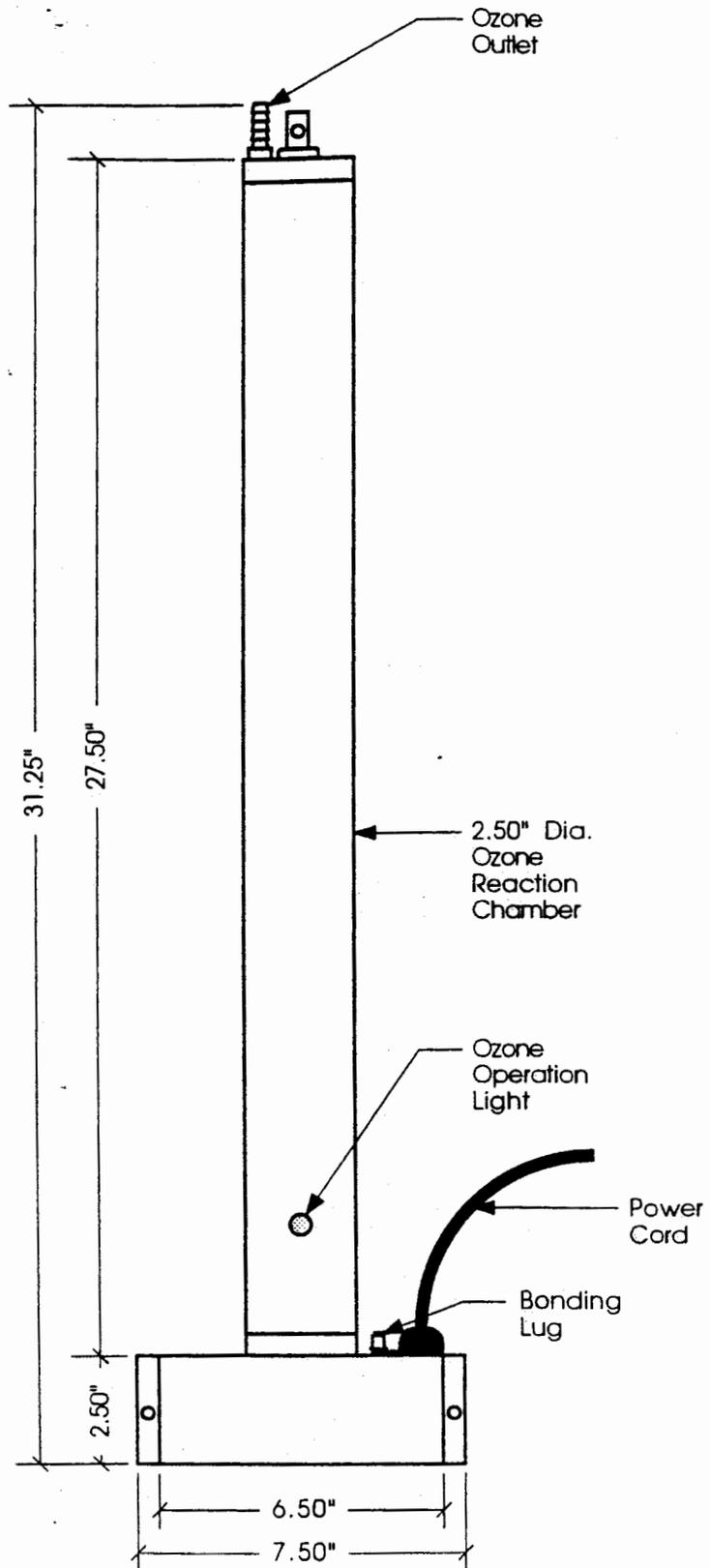


MOUNTING

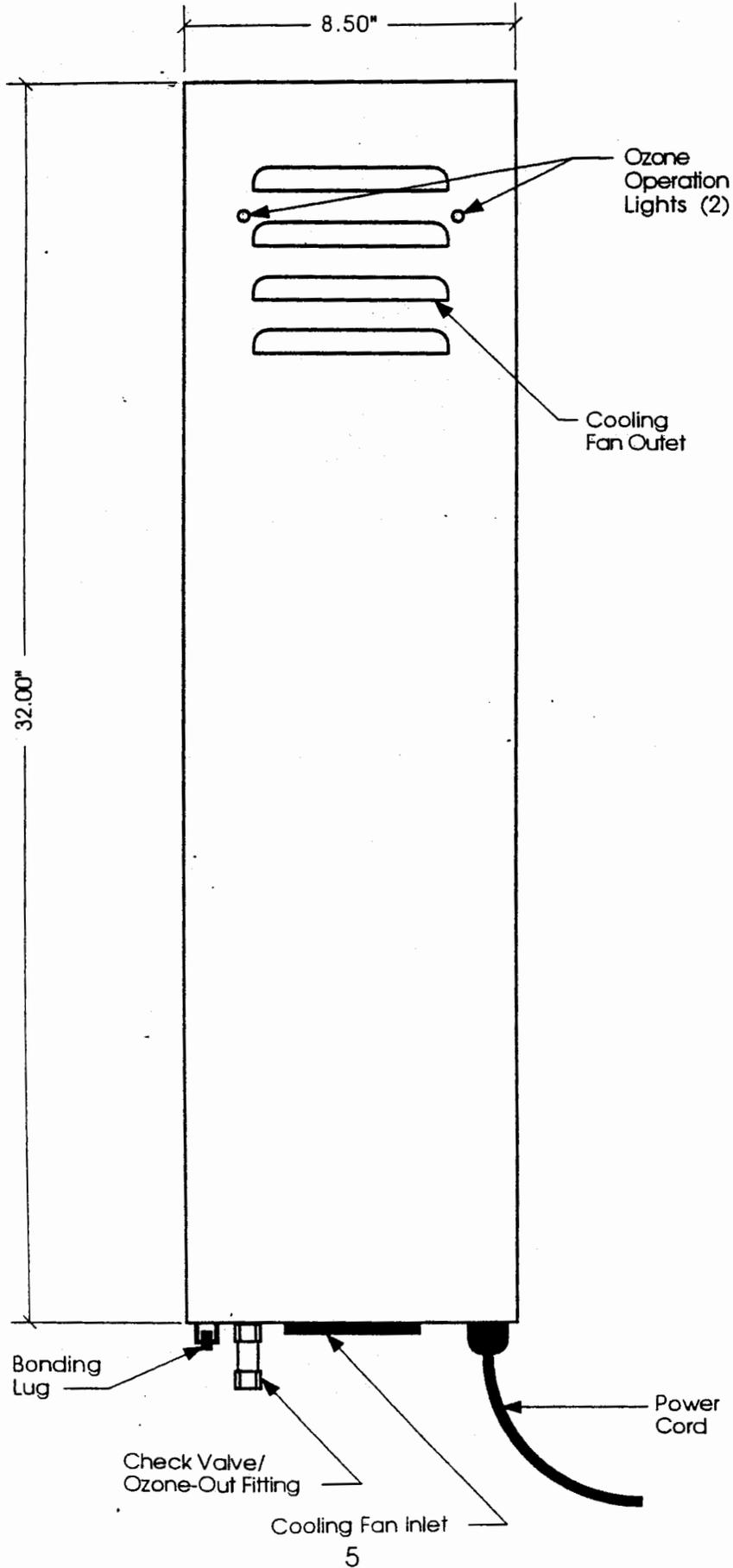
Pick a location as close to the injector as possible to mount the ozone generator. While the CS-1400 and UV-2800 enclosures are rain tight, it is best to pick a location out of the sun and rain.

On the back / top side of the enclosure are mounting holes; the unit can be attached to a wall using these mounting holes.

CLEARWATER TECH MODEL CS-1400

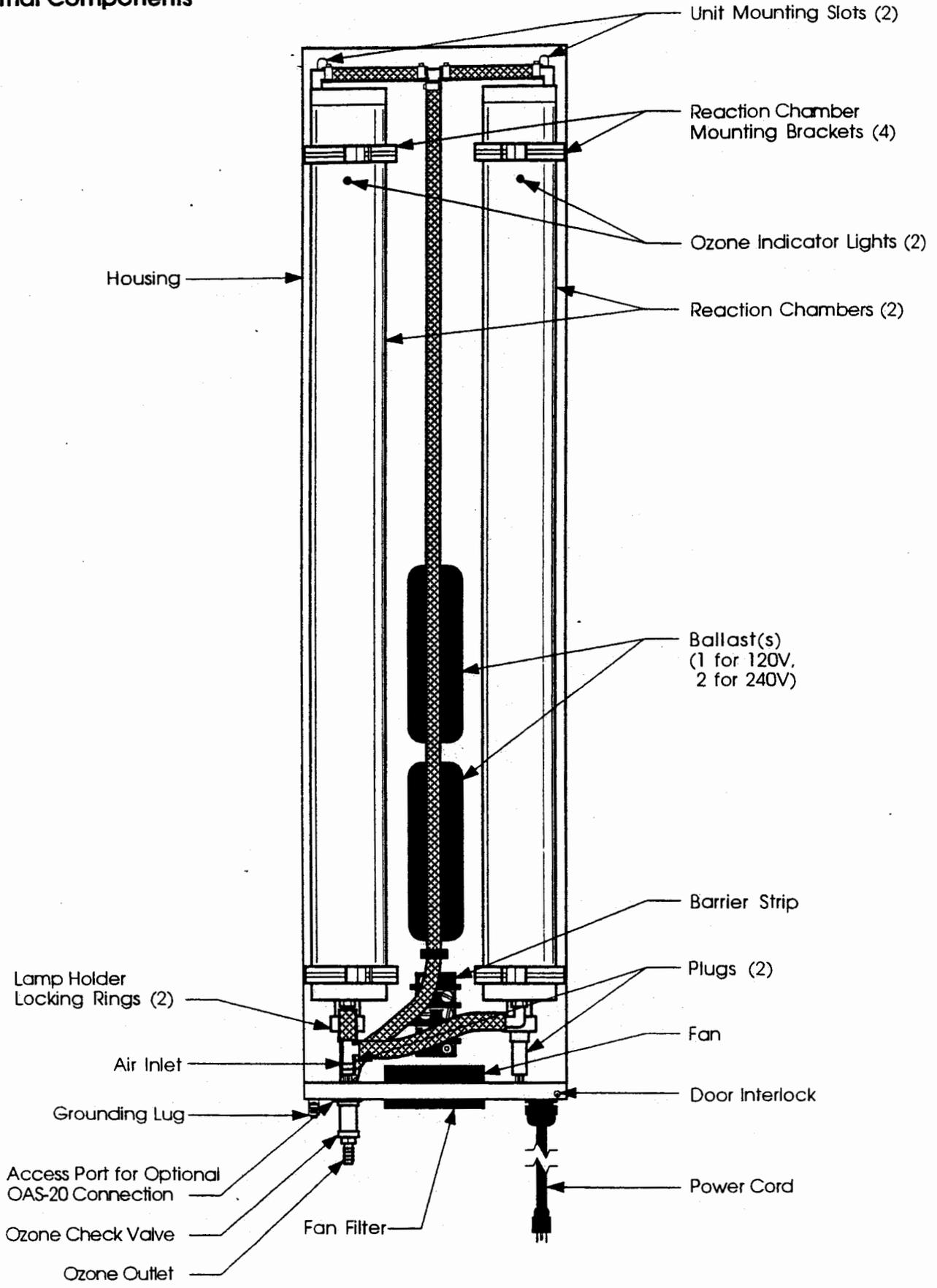


CLEARWATER TECH MODEL UV-2800



CLEARWATER TECH MODEL UV-2800

Internal Components



ELECTRICAL WIRING

The object is to have the ozone generator come on whenever the pool pump comes on for filtration. **The installation should be done by a licensed electrician.** All local codes must be observed.

There are several ways to wire the CS-1400 and UV-2800:

1. To a timer.
2. Directly to the electrical panel.
3. To the low speed connection in the control box (on two-speed systems).

The CS-1400 and UV-2800 are available in 120 volts and 240 volts. Be sure to install the proper system for your pool application. Before attempting any electrical hook-up, be sure the power is OFF at the main circuit box.

To hard wire a 110V system: Run the black wire to position #1, #2 or #3 listed above. Run the neutral wire to a neutral terminal (protected by a GFCI). Then run the ground to a ground terminal.

To hard wire a 220V system: Run one black wire to position L1 and run the second black wire to L2. Run the green wire to ground.

BONDING REQUIREMENTS: You must install a ground lead from the bonding lug (on the bottom left of the unit) to the pool's exterior ground line. This bonding wire should conform to all local, state and national electrical codes. (The standard recommendation is a #8 AWG copper wire.)

SUPPLY TUBING CONNECTION

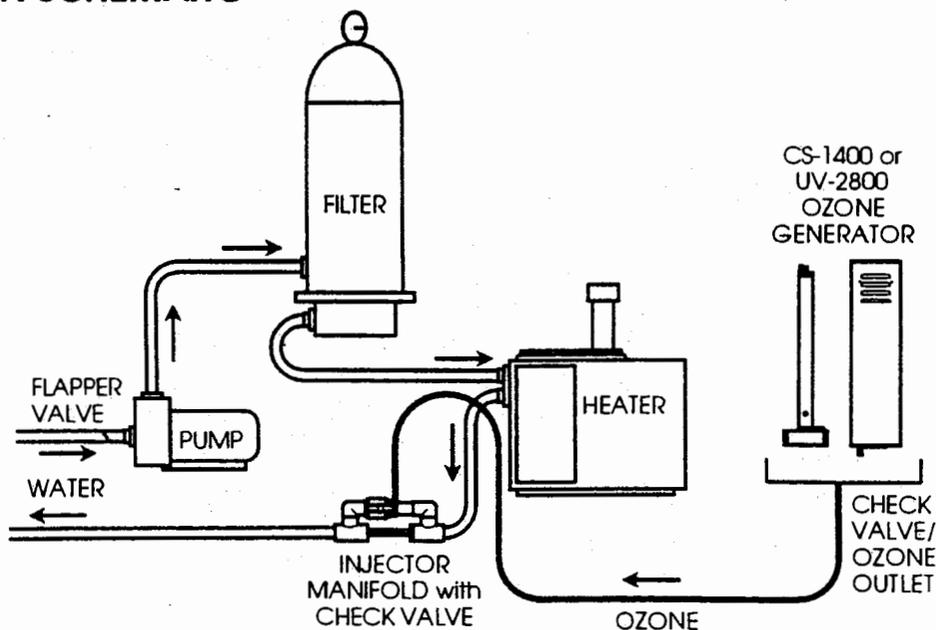
Connect the supply tubing provided to the injector. Secure with the hose clamp provided.

Inside the parts bag, you will find a black 1/4" mpt x 3/8" barb hose connector. Screw this into the ozone outlet (which has a built-in Kynar® check valve) located on the bottom of the ozone generator (to the left of the fan).

Connect the supply tubing from the injector to the black hose connector.

NOTE: This ozone generator is protected by two check valves. There is one check valve located at the injector and one check valve at the ozone generator outlet.

INSTALLATION SCHEMATIC



OPERATION

After the installation has been completed, the pool will operate as before. The ozone system will go on and off automatically if controlled by a time clock. The indicator lights (one on the CS-1400, two on the UV-2800) will be on if the unit is working and you should smell a slight odor of ozone from the water.

Running Time

It should not be necessary to increase your filtration time from the builder's recommendation. For pools, the typical running time will vary greatly. We recommend that you begin with two three-hour intervals daily. However, the bather load and frequency of use will vary from owner to owner. Therefore, you can adjust the time to fit your own needs by increasing or decreasing the hours on the time clock. Again, please refer to your builder's recommendations. **Note: On commercial systems, the filtration time will need to be increased.**

Understanding Your Water

If you are aware of a high concentration of any mineral (like calcium or iron) in your water, it is necessary to treat the water before starting the ozone system. We suggest that you take a sample of your water to a qualified ClearWater Tech dealer for analysis. They will make the proper recommendations of product(s) needed to remove these minerals from the water. You should only have to do this when you drain and fill new water into the pool.

If your water is clean and clear, you can start the ozone system right away. If the water is dirty and cloudy, we recommend that you first drain the water and thoroughly clean the filters (spas only).

Caution: It is not recommended that you drain a pool in the winter or after the first rain of the season. Instead, you should use a shock treatment because draining could possibly float the pool out of the ground resulting in severe damage.

Ozone and Bromine

Ozone has a short "half-life", or residual time, in your water. Therefore, there is a need to maintain a small residual of another product in the pool. We recommend the use of bromine. This bromine residual will act as a buffer when the ozone system is not operating. Bromine needs to be maintained between 1 to 1.5 ppm (parts per million) so that the trace amount of product in the water will not be noticed.

Ozone and Chlorine

For outdoor pools, we recommend the use of chlorine to supplement the ozone. This chlorine residual will act as a buffer when the ozone system is not operating. To decide which form of chlorine to use in your pool, refer to the chart on the following page.

Prepare Your Water

You should prepare your water by making the following adjustments and maintain these levels while using the ozone system:

Chlorine	0.5 to 2 ppm
or	
Bromine	1 to 3 ppm
pH	7.2 - 7.6
Total Alkalinity	80-150 ppm
Calcium Hardness	180-250 ppm

Note: If you experience any reaction with your water, such as coloring or unusual odor, please wait a few days to give the ozone and filter system time to work. If the situation continues, consult your pool dealer, possibly taking them a sample of the water.

Algae

Always maintain a chlorine residual of at least 0.5 ppm (or a bromine residual of at least 1 ppm) in your pool water. Brushing the sides of the pool once a week is also recommended.

Shock Treatment

If the water becomes cloudy with excessive oils or other contaminants or due to an unusually high bather load, we recommend that you use a shock treatment to assist the ozone in cleaning the water. These shock treatments are available at your local pool or spa supply dealer and are marketed under several different brand names. Ask for assistance in selecting the proper product.

Chlorine Types and Applications

Type of Bromine or Chlorine	% of Available Oxidizer	pH	Stabilizer Required?	Neutralizer Required?	Fast Dissolving?	Comments
BROMINE	61%	7.4	No	Yes (Muriatic Acid or CO ₂)	No	Works well in floaters or feeders - Can be used in vinyl pools
GAS CHLORINE	100%	Very Acidic	Yes	Yes	Yes	Dangerous
LIQUID CHLORINE (SODIUM HYPOCHLORITE)	12%	13	Yes	Yes	Does not have to - Makes HoCl instantly	Can be used to superchlorinate
CALCIUM HYPOCHLORITE	65%	11.8	Yes	Yes (Muriatic Acid)	No - Must be predissolved or broadcast can cloud	Extreme oxidizer - Do NOT use in a vinyl pool - Can be used in a feeder
SODIUM DICHLOR	56%	6.8 - 7.0	No (Built-in)	No	Yes - Will not cloud water	Can be used to superchlorinate
TRICHLOR	90%	2.8 - 3.0	No (Built-in)	Yes (Soda Ash)	No - Very slow	Works well in floaters - Cannot be used to superchlorinate
LITHIUM HYPOCHLORITE	35%	10.7	Yes	Yes (Muriatic Acid)	Yes - Will not cloud	Cannot be used in a feeder - Can be used in vinyl-lined pools

MAINTENANCE

Filter Care

Ozone will keep your pool or spa much cleaner than any other type of water purification system. This is because ozone neutralizes body oils and soaps. After ozone kills the bacteria, the by-products are oxygen, carbon dioxide and filterable solids. Filterable solids are usually at a higher level than with conventional sterilization processes, so your filter will have a bit more work to do. Keeping the filter clean will make a noticeable difference in the clarity of the water. Set up a regular filter cleaning program, or the end result will be poor flow through the filter. This will directly affect the amount of ozone that gets into the water. When starting your pool with the CS-1400 or UV-2800, you should clean your filter once a week for the first month.

The Ozone Lamp(s)

Caution: Never look at the unshielded ozone lamp while operating the unit. This lamp can cause severe eye and skin damage. There is an indicator light which will turn blue in color when the unit is operating. The CS-1400/UV-2800 lamps each have a 9,000 hour life expectancy, or about four years. On commercial installations, we recommend replacing the lamps every 12 to 18 months.

MAINTENANCE (continued)

Replacing the CS-1400 Lamp:

Lamps are available from your ClearWater Tech distributor should replacement be needed. Simply turn off the power, remove the two screws on the power pack cover and remove the cover. Disconnect the plug on the end of the ozone lamp. Now, loosen the lamp holder locking ring from around end of lamp by turning it counterclockwise and remove it. Remove lamp by grabbing the rubber bushing around the end of the lamp and pulling it straight out. Remove the rubber bushing from the lamp and install it on your new lamp making sure the outer edge of the bushing is flush with the outer edge of the silver end cap on the lamp. Now, slide the lamp back into the reaction chamber. **IMPORTANT! There is a centering device inside at the other end of the chamber. Care must be taken to make sure the lamp is inserted into the hole in the centering device before the lamp holder is tightened.** The lamp holder may now be reinstalled and tightened. Reinstall the plug onto the lamp and replace the power pack cover. **Caution:** Keep lamp free of fingerprints and dust particles by only handling the metal end caps on the lamp. You can clean the lamp with rubbing alcohol and a soft cloth. A dirty lamp will not allow maximum ozone output.

Replacing the UV-2800 Lamps

Lamps are available from your ClearWater Tech dealer should replacement be needed. Simply turn off the power, remove the six screws on the power pack cover and remove the cover. Disconnect the plug on the end of the ozone lamp(s) to be replaced. Loosen the lamp holder locking ring from around the end of lamp. Remove the lamp by grasping the rubber bushing around the end of the lamp and pulling it straight out. Remove the rubber bushing from the lamp and install it on your new lamp making sure the outer edge of the bushing is flush with the outer edge of the end cap on the lamp. Slide the lamp back into the reaction chamber. **IMPORTANT! There is a centering device inside at the other end of the chamber. Care must be taken to make sure the lamp is inserted into the hole in the centering device before the lamp holder is tightened. The lamp holder may now be reinstalled and tightened.** Reinstall the plug onto the lamp and replace the power pack cover. **Caution:** Keep lamp free of fingerprints and dust particles by handling only the metal end caps on the lamp. A dirty lamp will not allow maximum ozone output. You can clean the lamp with rubbing alcohol and a soft cloth.

TROUBLESHOOTING

PROBLEM/SYMP TOM	POSSIBLE CAUSE	SOLUTION
Unit does not turn on	No power to unit Switch not turned on Blown fuse Cover/door interlock not active (UV-2800 only)	Check breakers Check switch Replace fuse Check door interlock switch replace cover
Unit does not stay on (UV-2800 only)	Unit overheating	Clean fan filter, check fan
Only one ozone chamber lights (UV-2800 only)	Bad lamp or ballast	Switch ballast connections between chambers - if opposite chamber lights, replace ballast; if same one lights, replace lamp
Water in unit or ozone delivery tubing	Inadequate vacuum Defective check valve(s) Excessive back pressure on check valve	Adjust injector vacuum Replace check valve(s) Back pressure not to exceed 40 psi - if over 40 psi consult ClearWater Tech dealer
Ozone smell present	Insufficient vacuum Loose internal fittings Defective ozone chamber	Adjust injector vacuum Inspect and tighten fittings Replace chamber

CS-1400 & UV-2800 REPLACEMENT PARTS:

PART #	DESCRIPTION	QUANTITY REQUIRED	
		CS-1400	UV-2800
LA25	Ozone Lamp(s)	1	2
CKV20	Kynar® Check Valves	2	2
FA20	Cooling Fan Filter Element	N/A	1
BL30	Ballast, thermally protected, self-starting, 120VAC, 50/60 Hz	1	1
BL60	Ballast, thermally protected, self-starting, 240VAC, 60 Hz	1	1

CS-1400 SPECIFICATIONS:

ENERGY REQUIRED 120V: 105VAC MIN., 125VAC MAX., 60HZ., 0.8 AMP
 POWER CONSUMPTION: 96 WATTS
 RATED FOR: MEDIUM RESIDENTIAL POOLS AND COMMERCIAL SPAS
 AVERAGE LAMP LIFE: 9,000 HOURS
 LAMP WAVELENGTH: 185 nm
 DIMENSIONS: 31.25"L x 7.5"W x 4.25"D
 SHIPPING WEIGHT: 15 LBS.

UV-2800 SPECIFICATIONS:

ENERGY REQUIRED UV-2800 120V: 105VAC MIN., 125VAC MAX., 60HZ., 1.6 AMP
 ENERGY REQUIRED UV-2800 240V: 210VAC MIN., 245V MAX., 60HZ., 0.8 AMP
 POWER CONSUMPTION: 192 WATTS
 RATED FOR: LARGE RESIDENTIAL POOLS AND COMMERCIAL SPAS
 AVERAGE LAMP LIFE: 9,000 HOURS
 LAMP WAVELENGTH: 185 nm
 DIMENSIONS: 32"L x 8.5"W x 3.5"D
 SHIPPING WEIGHT: 25 LBS.

MANUFACTURER'S FIVE YEAR LIMITED WARRANTY

ClearWater Tech, Inc. warrants that all electrical components of the ClearWater Tech ultraviolet ozone generator will be free from defects in materials and workmanship for a period of one (1) year from the date the unit is purchased by the end user. The check valves provided with the ozone generator shall carry the same one year warranty. ClearWater Tech further warrants that all other non-electrical components of the ozone generator will be free from defects in materials and workmanship for a period of five years from date of purchase by the end user. Should any component malfunction due to defects in materials or workmanship during the warranty period, ClearWater Tech will repair or replace it at no charge. The option to repair or replace the component(s) shall remain at the sole discretion of ClearWater Tech, Inc.

ClearWater Tech, Inc. shall not be responsible for loss of use of the ozone generator or other consequential or incidental damages, expenses or costs related to such loss. Any unit found to be defective during the stated warranty period may be returned to the authorized dealer from which it was originally purchased or directly to the ClearWater Tech factory. If it becomes necessary to return the ozone generator to the ClearWater Tech factory during the warranty period, the owner shall be responsible for shipping the unit freight prepaid. Upon completion of the required warranty work, ClearWater Tech, Inc. shall return the ozone generator to the owner freight prepaid. Prior to shipment, a Returned Goods Authorization (RGA) number must be obtained by calling the ClearWater Tech factory. The RGA number must be clearly written on the outside of the shipping box(es). When calling, have the model and serial numbers available.

This warranty is in lieu of all other warranties, either expressed or implied, including, but not limited to, implied warranties of merchantability or fitness for a particular purpose. In no event shall ClearWater Tech, Inc. be liable for an amount in excess of the original purchase price of the ozone generator.

No agent, dealer, distributor or service company is authorized to change, modify or extend the terms of this warranty in any manner whatsoever. This warranty gives you specific legal rights. You may also have other rights which may vary from state to state. This warranty is valid only in the fifty states of the United States of America.

This warranty does not cover any ClearWater Tech ozone generator which has been damaged due to misuse, abuse, neglect, mishandling, flood, fire or causes beyond the control of ClearWater Tech. Furthermore, this warranty does not cover damage caused by the use of parts found to be incompatible with the proper functioning of the ozone generator and does not extend to any unit that has been altered or modified. This warranty is not transferable to any subsequent owner and is valid only so long as the ozone generator is installed and operated in accordance with the owner's manual. Under the conditions outlined in this paragraph, ClearWater Tech, Inc. assumes no responsibility for labor costs or service charges involved in the removal or replacement of the defective part(s) of the ozone generator.

For prompt warranty service, make sure the warranty card is returned to ClearWater Tech, Inc. within ten (10) days of purchase. Failure to complete and return the warranty card will void this warranty.

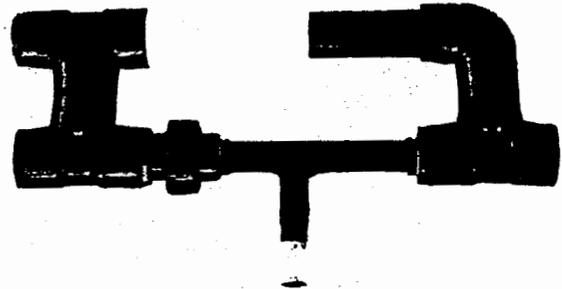
Please accept our sincere thanks for choosing a ClearWater Tech ozone generator.

ClearWater Tech, Inc.
P.O. Box 15330
San Luis Obispo, CA 93406
(805) 549-9724

Air Injection Assemblies

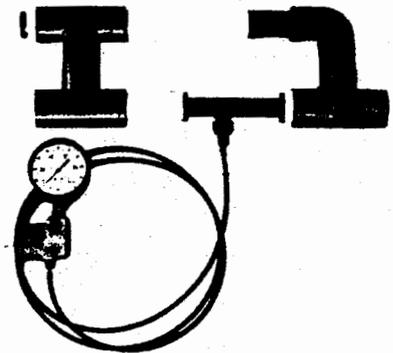
Automated Air & Ozone Injection System

The Mazzei Automated Air & Ozone injection system features a high efficiency Mazzei injector installed in a bypass assembly with an adjustable, spring loaded, flow control valve. The adjustable valve is capable of creating pressure differentials from 10 to as high as 20 psi with minimal flow restrictions. This permits the combination to optimize suction while minimizing restrictions from well pump to pressurized tank. The injectors are molded of ozone resistant PVDF (KYNAR), and the bypass assembly features schedule 80 PVC fittings for added durability and strength. Pressure differentials can easily be adjusted to match the application without unit removal. Union fittings permit injectors to be removed for servicing or replacement.



Automatic Air Volume Control For Pressurized Water Storage Tanks

The Mazzei Automatic Air Volume Control features a high efficiency Mazzei injector, installed in a bypass assembly with an adjustable, spring loaded, flow control valve, and a float air volume control installed in the tank. A tube connects the injector suction to the float air volume control valve. The float air volume control opens as the water level in the tank rises, and air is permitted to be sucked into the water stream through the injector. The aerated water recharges the depleted air and prevents water logging of the pressure tank. The assembly features an injector molded of PVDF (KYNAR) and schedule 80 PVC fittings for added strength. The pressure differential is achieved by an adjustable flow control valve, allowing it to be matched to the requirements of the pressure system. Union fittings are used to permit removing the injectors for servicing or replacement.





ozone system

INSTALLATION AND OWNER'S MANUAL

ultraviolet

PR-1300

ozone generator

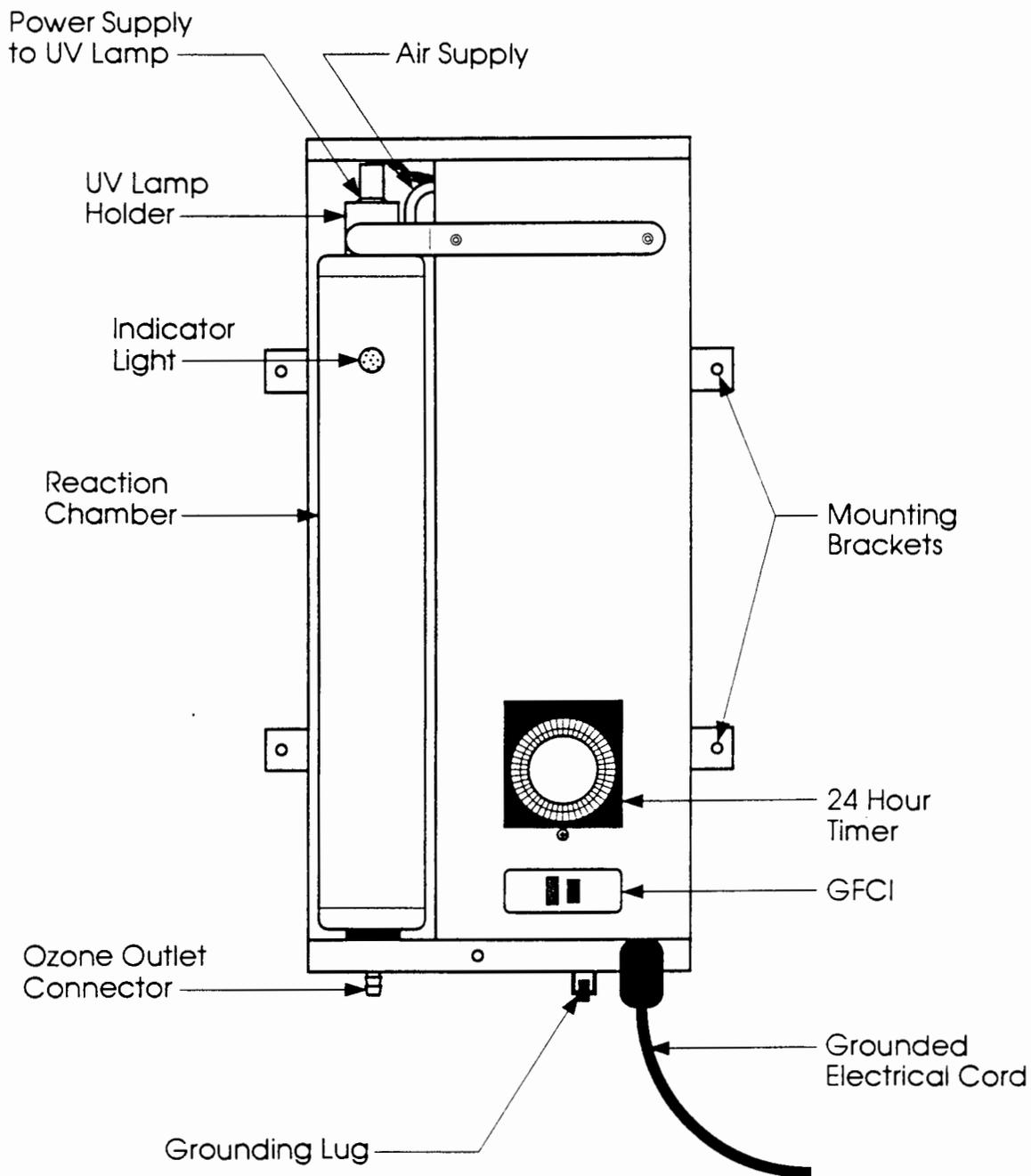
P.O. BOX 15330, SAN LUIS OBISPO, CA 93406

IMPORTANT SAFETY INSTRUCTIONS

- 1. PLEASE FOLLOW ALL-INSTALLATION INSTRUCTIONS.**
- 2. Before attempting any electrical connections, be sure all power is off at the main circuit breaker.**
- 3. The ultraviolet light produced by the PR-1300 is harmful to your eyes and skin if directly exposed. Do not look directly at the lamp. Always be sure power is off when servicing.**
- 4. Install the ozone generator at least five feet from the tub water using non-metallic plumbing.**
- 5. Install the ozone generator no less than one foot above the maximum water level to prevent water from contacting the electrical equipment.**
- 6. The electrical supply for this product must include a suitable rated switch or circuit breaker to open all ungrounded supply conductors to comply with Section 422-20 of the National Electrical Code, ANSI / NFPA 70-1987. The disconnecting means must be readily accessible to the occupant, but installed at least five feet from the tub water.**
- 7. This equipment must be validated by the manufacturer for its intended use.**
- 8. SAVE THESE INSTRUCTIONS.**

PRODUCT DESCRIPTION

We recommend that you become familiar with the PR-1300 unit by studying this illustration. All components will be referred to by the names below.



PLUMBING

There are three ways to plumb the PR-1300:

- #1. Using a tee in the air venturi line.
- #2. Using a diffuser stone.
- #3. Using a saddle clamp in the air venturi line.

NOTE: All fittings, with the exception of a tee, will be provided by ClearWater Tech.

AIR LINE: TEE INSTALLATION

NOTE: Use the following instructions if the venturi or air line of the spa is accessible. The air line is the upper PVC pipe, flex or rigid, of the jet fittings. If the venturi line is not accessible, the instructions for the diffuser stone should be followed.

For air line tee installation locations, see the installation schematic #T1 & #T2.

1. Mount the PR-1300 using the four mounting brackets. The system is intended to be mounted five feet from the spa or at the remote power pack site.
2. Determine the size of the venturi line, either 1/2", 3/4" or 1 1/2". Purchase a PVC tee the same size as your line, with a 1/2" female threaded top.
3. Turn the spa on high speed (blower not necessary). By having the spa on, water will evacuate this line. If your selected plumbing location is in an area over the power pack, we recommend draining the spa.
4. Cut the PVC pipe between the two lowest jets (if possible), this will give you the longest contact time. If the low jets are not accessible, any location on this line will work.
5. Cement the tee in place with the 1/2" threads opening up.
6. Using teflon tape, screw the provided tube fitting into 1/2" threads in the tee. Install one end of the ozone delivery line on the tube fitting.
7. Run the delivery line up from the tee to the highest point possible and cut the line here to install the check valve. (See illustrations on installation schematic) **NOTE: THE CHECK VALVE SHOULD BE MOUNTED ABOVE THE WATER LINE. BE SURE THE FREE FLOW IS TOWARDS THE ELBOW OR AWAY FROM THE OZONE UNIT.**
8. Continue running the delivery line back down and out to the ozone generator.

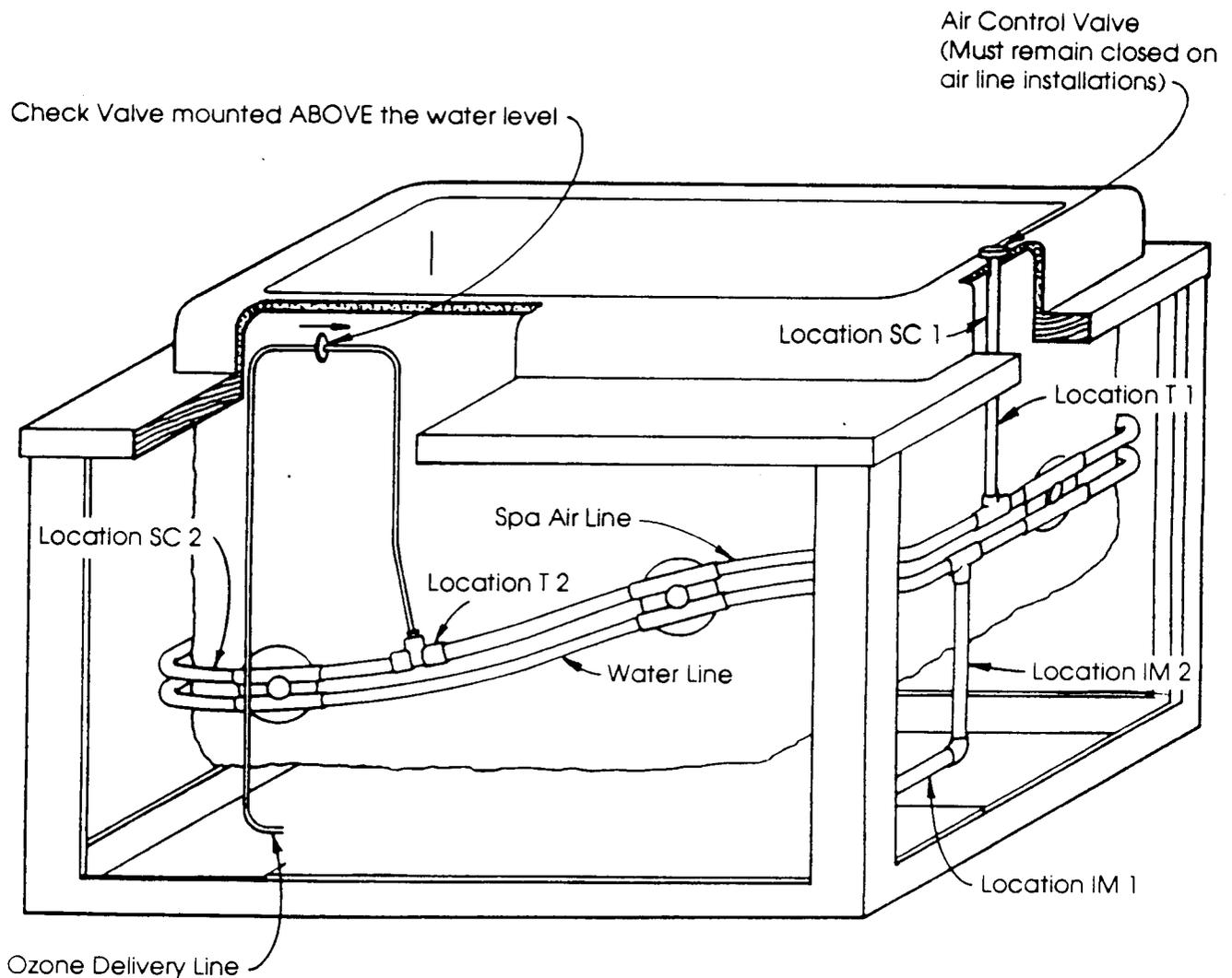
DIFFUSER STONE APPLICATION

1. The diffuser stone is already connected to the end of the ozone tubing supplied by ClearWater Tech.
2. Simply attach the open end of the tubing to the fitting at the bottom of the PR-1300, and drop the diffuser stone into the spa. When the ozonator is operating you should see tiny bubbles being dispersed from the diffuser stone.

NOTE: FOR OPTIMAL RESULTS, USE THE DIFFUSER STONE SIMULTANEOUSLY WITH THE FILTRATION CYCLE.

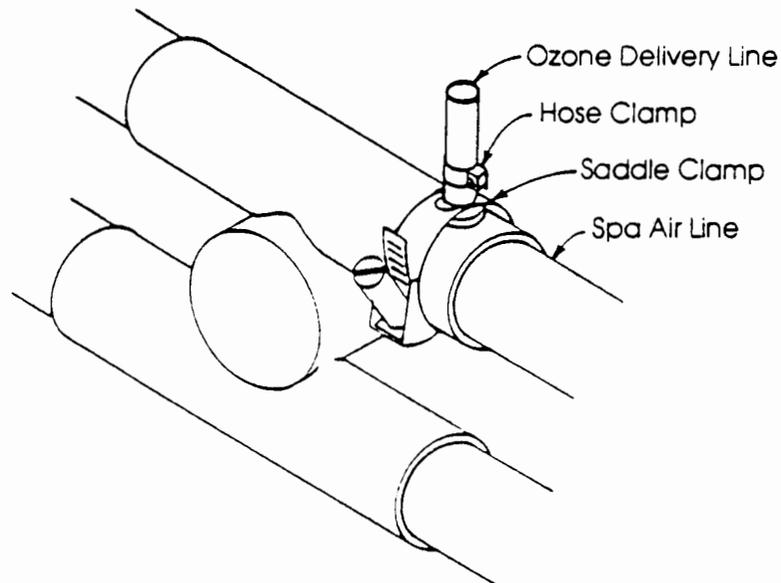
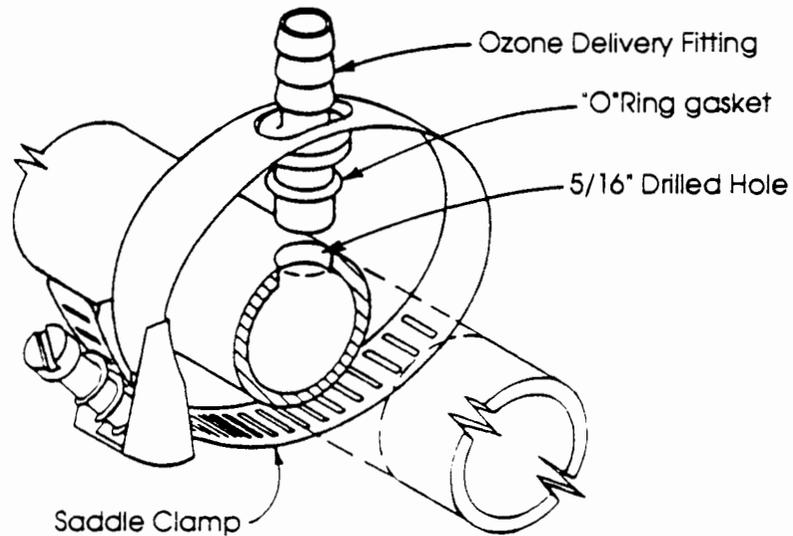
NOTE: DIFFUSER STONES MAY BECOME CLOGGED AND RESULT IN AIR COMPRESSOR DAMAGE. TO PREVENT THIS FROM HAPPENING, IT IS RECOMMENDED TO CLEAN YOUR DIFFUSER STONE ONCE A MONTH. THIS CAN BE DONE BY SUBMERSING THE DIFFUSER STONE FOR A FEW HOURS IN A SOLUTION MADE OF 50% WATER AND 50% MURIATIC ACID.

INSTALLATION SCHEMATIC



SADDLE CLAMP INSTALLATION

1. Find a suitable location for the saddle clamp. See the installation schematic, locations SC1 & SC2 for examples.
2. Turn on the spa to low speed, (filter mode).
3. Drill a 5/16" hole. Note: A spade bit is best, but a twist bit will also work.
4. Install the saddle clamp as shown in illustration below.
5. Run the delivery line to the highest accessible location. Splice the line here and insert the check valve (noting flow direction). Continue running delivery line to the ozone generator.



ELECTRICAL WIRING

Models with cords simply need to be plugged into a grounded 110V wall outlet. An overcurrent protector must be provided by connecting to a branch circuit rated at 20 AMPS or less. **NOTE: ALL LOCAL ELECTRICAL CODES MUST BE OBSERVED.**

GFI (GROUND FAULT INTERRUPTER)

1. To test the GFI push the black TEST button. Red RESET button should pop out from inner surface. This should result in power being OFF at all outlets protected by the GFI. **NOTE: If RESET button does not pop out DO NOT USE THIS ELECTRICAL APPLIANCE. CALL A QUALIFIED ELECTRICIAN.**
2. If the GFI tests okay, restore power by pushing the RESET button in. The RESET button must be pushed firmly and fully into place until it locks and remains depressed after pressure has been removed. **IF THE GFI FAILS TO RESET PROPERLY, DO NOT USE - CALL A QUALIFIED ELECTRICIAN.**
3. If GFI trips by itself at any time during or after installation, RESET it and perform test procedures 1 and 2 above. **IF RESET BUTTON DOES NOT POP OUT WHEN TEST BUTTON IS DEPRESSED, DO NOT USE GFI. CALL A QUALIFIED ELECTRICIAN. NOTE: THE GFI SHOULD BE TESTED AT LEAST ONCE A MONTH.**

OPERATION

After the installation has been completed, the spa will operate as before. Again, for best results run the timer of your PR-1300 simultaneously with the filtration cycle.

NOTE: If your PR-1300 is installed to your air line, it is important to remember to keep the air dial(s) closed when not using the spa.

The indicator light on the PR-1300 will be on if the unit is working, and you should smell a slight odor of ozone from the spa.

RUNNING TIME:

We suggest you start out with 4 hours of total running time. It is best to split this time up into at least two two-hour intervals; or four one-hour intervals. We recommend you start with the longer periods and work your way down until you find the optimum running time for your application.

Examples:	10-12 AM	or	12-1 AM and 12-1 PM
	10-12 PM	or	6-7 AM and 6-7 PM

The bather load and frequency of use will differ from owner to owner, therefore, you can adjust the time to fit your own needs by increasing or decreasing the hours on your time clock. **NOTE: On commercial systems the filtration time will need to be increased. Please consult your dealer.**

UNDERSTANDING YOUR WATER

If you are aware of a high concentration of any mineral in your water (like calcium or iron), it is necessary to treat your water before starting the PR-1300 system. We suggest you take a sample of your water to a qualified pool and spa dealer for analysis. They will make the proper recommendations of product(s) needed to remove these minerals from your water. You should only have to do this when you drain and fill new water into the spa.

If your water is clean and clear, you can start the PR-1300 system right away. If the water is dirty or cloudy, we recommend that you drain the water and thoroughly clean the filter(s) first.

CAUTION: It is not recommended that you drain an in-ground spa in the winter or after the first rain of the season. Instead, you should use a shock treatment because by draining you could possibly float the spa out of the ground resulting in severe damage.

OZONE AND BROMINE:

Ozone has a short half-life, or residual time, in your water. So there is a need to maintain a small residual of another product in the spa or pool. We recommend that you use Bromine. This Bromine residual will act as a buffer when the ozone system is not operating. The bromine needs to be maintained at ONLY .8 ppm (parts per million), so that the trace amount of product in the water will not be noticed. Chlorine will work as a residual oxidizer, and may be used effectively in conjunction with the ozone system.

Prepare your Water:

You should prepare your water by making the following adjustments and maintain these levels while using the PR-1300 system.

Bromine	1 to .8 ppm
or	
Chlorine	1 to .5 ppm
pH	7.2-7.6
Total Alkalinity	80-150 ppm
Calcium Hardness	180-250

Note: If you experience any reaction with your water, such as coloring or unusual odor, please wait a few days to give the ozone and filter system time to work. If the situation continues, consult your pool and spa dealer, possibly taking them a sample of the water.

SHOCK TREATMENT:

If the water becomes cloudy with excessive oils or other contaminants, or after an unusually high bather load, we recommend that you use a **Non-chlorine** shock treatment to assist the ozone in cleaning the water. These **Non-chlorine** shock treatments are available at your local pool or spa supply dealer, and are marketed under several different brand names, ask for assistance in selecting the proper product.

FILTER CLEANING:

Ozone will keep your spa much cleaner than any other type of spa or pool purification system. The reason is that ozone neutralizes body oils and soaps. After ozone kills the bacteria, the end product is oxygen, carbon dioxide and filterable solids. The filterable solids are usually at a higher level than with conventional sterilization processes, so your filter has a bit more work to do. Keeping the filter clean will make a definite difference in the clarity of the water. Please set up a regular cleaning program, or the end result will be poor flow when the low speed of the pump comes on with the ozone system. This will have a direct effect on the amount of ozone that will get into the water. An easy check you can do without removing the filter is to look for air bubbles through the jets (on air line installations) when the spa system is on low speed (usually controlled by the timer). When the filter is clean you will see many bubbles, when it is dirty you will hardly see any bubbles.

TROUBLE SHOOTING

SITUATION: No indicator light

1. Check GFI to see if it has tripped.
2. Check lamp connection.
3. Check for blown lamp.
4. Check power supply.

SITUATION: Ozone not present in water

1. Check for clean filter (a dirty filter will cause a low flow of ozone to spa).
2. Make sure air dial is closed on air line installations.
3. Make sure adjustable jets are all open and not loose.
4. Check for clogged jet (debris in line).
5. Check for kinked delivery line, blocked or reversed check valve.
6. Check diffuser stone to see that it has not been fouled.

SITUATION: Cloudy water with ozone present

1. Check pH balance.
2. Clean filter.
3. Check for other minerals in water.
4. Use a spa shock treatment to rid water of excess body oils.
5. Drain and clean spa and filter thoroughly.

PR-1300 SPECIFICATIONS

Energy required: 115 VAC 0.6 AMPS, 65 watts

Rated up to: 1000 gallon spa or 2000 gallon pool

Average lamp life: 8500 hours

Compressor rating: 6 PSI

Size: 20" x 8 3/4" x 3 1/2"

Shipping Weight: 20 lbs.

MANUFACTURER'S FIVE YEAR LIMITED WARRANTY

ClearWater Tech, Inc. warrants that all electrical components of the ClearWater Tech ozone generator will be free from defects in materials and workmanship for a period of one (1) year from the date the unit is purchased by the end user. The check valves provided with the ozone generator shall carry the same one year warranty. ClearWater Tech further warrants that all other non-electrical components will be free from defects and workmanship for a period of five years from date of purchase by the end user. Should any component malfunction due to defects in materials or workmanship during the warranty period, ClearWater Tech will repair or replace it at no charge. The option to repair or replace the component(s) shall remain at the sole discretion of ClearWater Tech, Inc.

ClearWater Tech, Inc. shall not be responsible for loss of use of the ozone generator or other consequential or incidental damages, expenses or costs related to such loss. Any unit found to be defective during the stated warranty period may be returned to the authorized dealer from which it was originally purchased or directly to the ClearWater Tech factory. If it becomes necessary to return the ozone generator to the ClearWater Tech factory, the owner shall be responsible for shipping the unit freight prepaid. Upon completion of the required warranty work, ClearWater Tech, Inc. shall return the ozone generator to the owner freight prepaid. Prior to shipment, a Returned Goods Authorization (RGA) number must be obtained by calling the ClearWater Tech factory. The number must be clearly written on the shipping box(es). When calling, have the model and serial numbers available.

This warranty is in lieu of all other warranties, either expressed or implied, including, but not limited to, implied warranties of merchantability or fitness for a particular purpose. In no event shall ClearWater Tech, Inc. be liable for an amount in excess of the original purchase price of the ozone generator.

No agent, dealer, distributor or service company is authorized to change, modify or extend the terms of this warranty in any manner whatsoever. This warranty gives you specific legal rights. You may also have other rights which may vary from state to state. This warranty is valid only in the fifty states of the United States of America.

This warranty does not cover any ClearWater Tech ozone generator which has been damaged due to misuse, abuse, neglect, mishandling, flood, fire or causes beyond the control of ClearWater Tech. Furthermore, this warranty does not cover damage caused by the use of parts found to be incompatible with the proper functioning of the ozone generator and does not extend to any unit that has been altered or modified. This warranty is not transferable to any subsequent owner and is valid only so long as the ozone generator is installed and operated in accordance with the owner's manual. Under the conditions outlined in this paragraph, ClearWater Tech, Inc. assumes no responsibility for labor costs or service charges involved in the removal or replacement of the defective part(s) of the ozone generator.

For prompt warranty service, make sure the attached warranty card is returned to ClearWater Tech, Inc. within ten (10) days of purchase. Failure to complete and return the warranty card will void this warranty.

Please accept our sincere thanks for choosing a ClearWater Tech ozone generator.

ClearWater Tech, Inc.
P.O. Box 15330
San Luis Obispo, CA 93406
(805) 549-9724