



**ADVANCED WATER ENGINEERING, INC.**

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# **INSTALLATION AND OWNER'S MANUAL**

## **Corona Discharge**

**CD10/AD**

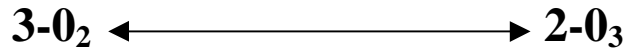
**Ozone generator**

# **IMPORTANT SAFETY INSTRUCTIONS**

- 1. PLEASE FOLLOW ALL INSTALLATION INSTRUCTIONS.**
- 2. A licensed, qualified electrician should make all electrical connections.**
- 3. Before attempting any electrical connections, be sure all power is off at the main circuit breaker.**
- 4. Install the ozone generator at least five feet from the water using nonmetallic plumbing.**
- 5. Install the provided ozone check valves to prevent water from contacting the electrical equipment.**
- 6. The electrical supply for this product must include a suitably rated switch or circuit breaker to open all ungrounded supply conductors to comply with Section 422-20 of the National Electrical Code, ANSI/N FPA 70-1987. The means of disconnecting the equipment must be readily accessible to the operator(s) but installed at least five feet from the water.**
- 7. Ambient temperature around the equipment should be between 40<sup>o</sup>F and 100<sup>o</sup>F (4.5 to 38<sup>o</sup>C). If the equipment is installed in an environment with temperatures over 100<sup>o</sup>F, additional air cooling must be provided. Installation without additional air cooling in an environment where temperatures exceed 100<sup>o</sup>F for any continuous 24 hour period will void the warranty.**
- 8. The system should be sized appropriately for its intended use by a qualified professional familiar with the application. The manufacturer for its intended use must validate this equipment.**
- 9. SAVE THESE INSTRUCTIONS.**

# CORONA DISCHARGE (CD) OZONE SYSTEMS

Ozone is manufactured in the CD ozone generator by drawing in air, which is composed of 20% oxygen (O<sub>2</sub>), and exposing it to multiple high voltage electrical discharges. This causes the oxygen molecules to dissociate and reassemble as ozone (O<sub>3</sub>). The ozone is drawn into the water by an injector/mixer, killing any bacteria, viruses or mold spores it contacts. Ozone is generated on-site, eliminating the need to store toxic and corrosive chemicals. The corona discharge method is the most efficient way to produce large amounts of ozone.



Chemical Formula for  
Corona Discharge Ozone

- Advanced Water Engineering, Inc. Tech manufactures high output corona discharge systems capable of producing enough ozone to substantially reduce the consumption of other chemical disinfectants. This reduction will make the water crystal clear and rainwater soft while allowing for cost savings on chemicals and maintenance. Also, important health advantages will be realized, including no hair discoloration, excessive skin dryness, faded swimming apparel, or irritation to the eyes, nasal passages and throat. Ozone reacts to waterborne contaminants significantly faster than other disinfectants and the primary by-product is pure oxygen.
- Advanced Water Engineering, Inc. ozone systems are built with the finest components available. All are air-cooled and use a venturi injection system to create the best possible contact and mixing of ozone while maintaining a high level of safety.
- In contrast to ultraviolet ozone generators, corona discharge systems produce a much higher concentration of ozone and in much larger quantities. In addition, the annual expense of replacing lamps and checking ballasts is unnecessary with corona discharge systems. Corona discharge ozone generation is the most economical and effective method to use on large, commercial water applications.

## UNCRATING AND INSPECTION

### Freight Inspection

All equipment should be thoroughly inspected immediately upon delivery. If any damage is noticed, promptly notify the freight line and request an on-site inspection. Thoroughly inspect all packing materials prior to discarding. Inspect all plumbing fittings and tubing for packing material inadvertently lodged in any openings.

# PRODUCT DESCRIPTION

The Advanced Water Engineering, Inc. corona discharge ozone system consists of two main components:

- Ozone Generator with built-in Air Preparation
- Venturi Injector Manifold

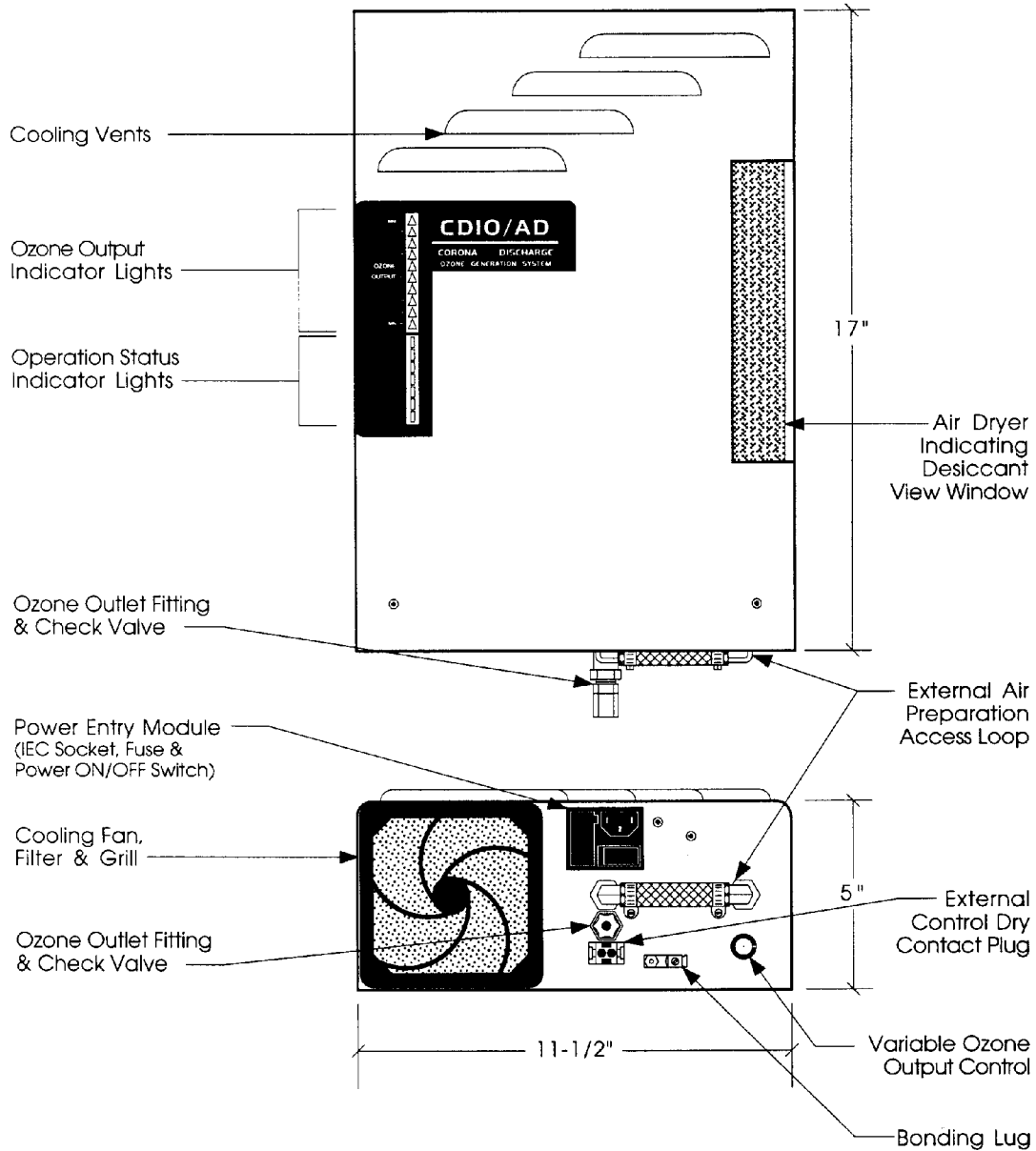
## Ozone Generator

The ozone generator houses the ozone reaction chamber, power supply and all electrical components directly related to the production of ozone. Ozone is produced when the feed gas is exposed to a high voltage electrical current inside the reaction chamber.

## Air Preparation

The Advanced Water Engineering, Inc. CD10/AD ozone system is equipped with a heat regenerative desiccant air dryer built into the same enclosure. Corona discharge ozone generators are much more effective, produce more ozone and require far less maintenance if an air preparation unit is included. The air preparation system lowers the dew point of the feed gas. Moist feed gas (air) will cause nitric acid to form inside the generator, which decreases ozone production and if not removed, causes corrosion and eventual failure of the generator's internal components. The ability of the ozone generator to produce ozone is drastically reduced as the dew point rises above  $-55^{\circ}\text{C}$ . The air dryer desiccant material has an average life expectancy of five years under normal use.

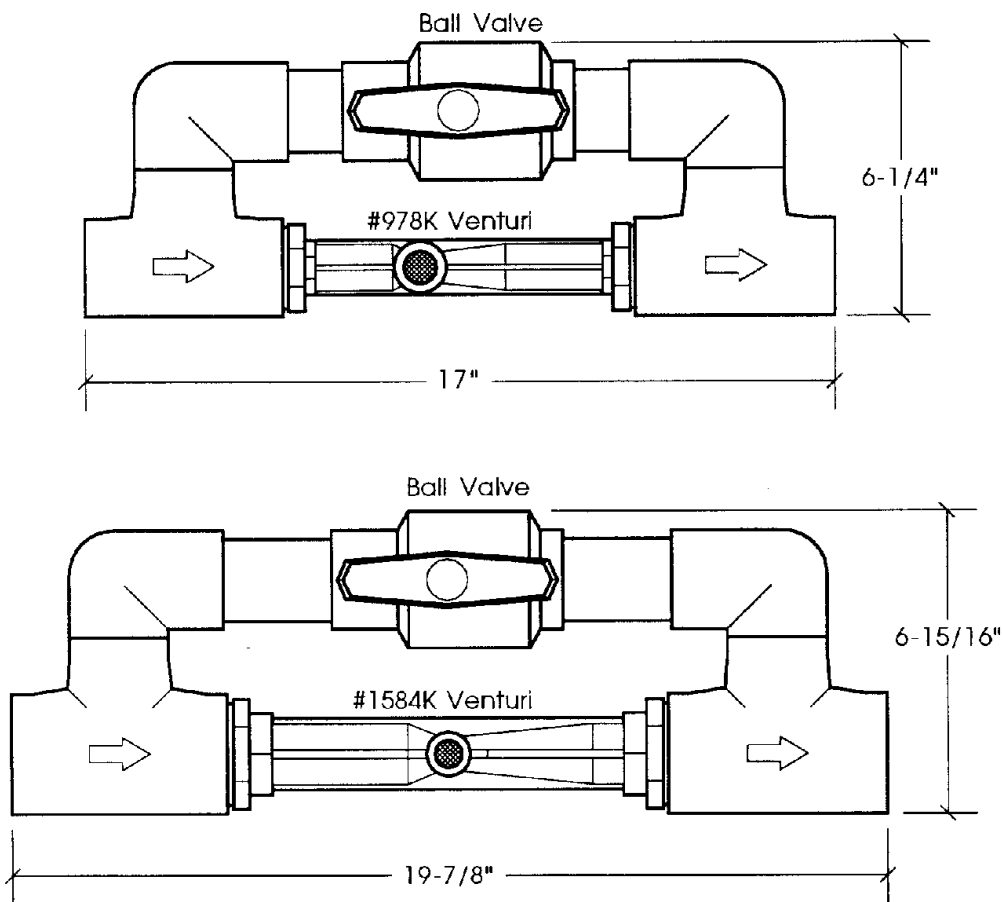
**PRODUCT DESCRIPTION (continued)**  
**CD10/AD Ozone Generator Dimensions and Layout**



## PRODUCT DESCRIPTION (continued) Injector Manifold

The ozone gas is injected into the filtered water return line by means of the injector manifold. This allows the ozone to be injected into the water under a vacuum condition, which is the safest technology available. The injector sizing will vary depending on the flow characteristics of the job. Atypical injector is shown below. The #978 injector manifold fits 1" plumbing, while the #1 584 injector manifold handles a higher flow rate and fits 2" plumbing.

### Layout and Dimensions of Typical Injector Manifolds



### Booster Pump (optional upgrade)

It is the booster pump that creates the side stream ozone injection loop. Without this pump, the main circulation pump could be overburdened, slowing the filtered water return and decreasing the turnover rate. The booster pump operates all the ozone mixing/injection equipment and enhances the turnover rate. We recommend the use of a booster pump with systems having a marginal flow rate.



# INSTALLATION

## Placement of Equipment

Select a location for the ozone equipment that is as close as possible to the ozone injection point. Situate the unit in a manner suitable for convenient electrical access. The CD1 0/AD enclosure is not rain proof, so it is important to choose a location that will keep the system away from direct weather and excessive heat.

Four mounting holes are located on the back of the ozone generator for convenient wall mounting. Mounting hardware is not provided.

There are two basic installation methods for the CD1 0/AD system: “Full Flow”, where the ozone is injected directly into the main water return flow, and “Side Stream”, which requires a booster pump on a new, separate side stream plumbed off of the main water return line. The side stream plumbing is dedicated to the ozone system only. Follow the instructions below for the alternative you will be using:

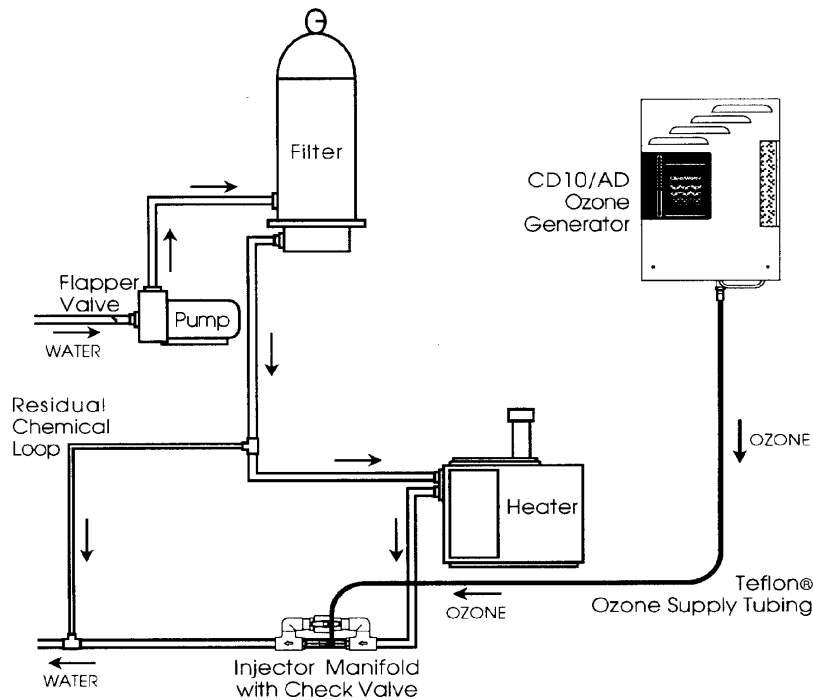
## FULL FLOW INJECTOR MANIFOLD PLUMBING CONNECTIONS

Refer to the ‘Full Flow Installation’ diagram and follow the instructions below if the ozone is being injected directly into the full flow of the pool’s return line:

1. Tap into the return line after the pump, filter and heater. The ozone injection point should be the last component in line and as far as possible from the injection point of the residual chemical.
2. Glue in the proper injector, noting the direction of flow (indicated by an arrow on the injector). Once the injector is installed, the vacuum may be adjusted as described in the ozone operation Section.

## FULL FLOW OZONE INSTALLATION





## INSTALLATION (continued)

### SIDE STREAM BOOSTER PUMP AND INJECTOR MANIFOLD PLUMBING CONNECTIONS

This alternative set up utilizes a two-inch side stream ozone treatment method. Typically, the feed water for the side stream is pulled from the main filtered water return after the filter, before the heater and returned at a point after all other equipment and before the residual chemical injection point. The pH adjustment point will always be the last item in this sequence.

Use Schedule 80 PVC for all plumbing connections whenever possible. Also, it is recommended that unions and valves are used wherever practical. Ozone rapidly deteriorates a variety of compounds; the following is a list of materials that may be used with ozone:

Viton	Teflon®	Stainless Steel	EPDM
Silicon	Kynar®	Concrete	Hepalon

**NOTE:** Be sure to use good plumbing practices and install unions and isolation valves wherever the situation dictates, i.e. pump removal, etc. Secure all plumbing with unistrut or similar hardware.

In the main water return line, after the filter but before the heater, install a wet tap (or a tee) and isolation valve.

Install the booster pump. Secure the pump on a housekeeping pad with the appropriate mounting hardware.

If an optional auxiliary control relay (i.e. flow switch) is being used, install it into the line after the ozone booster pump.

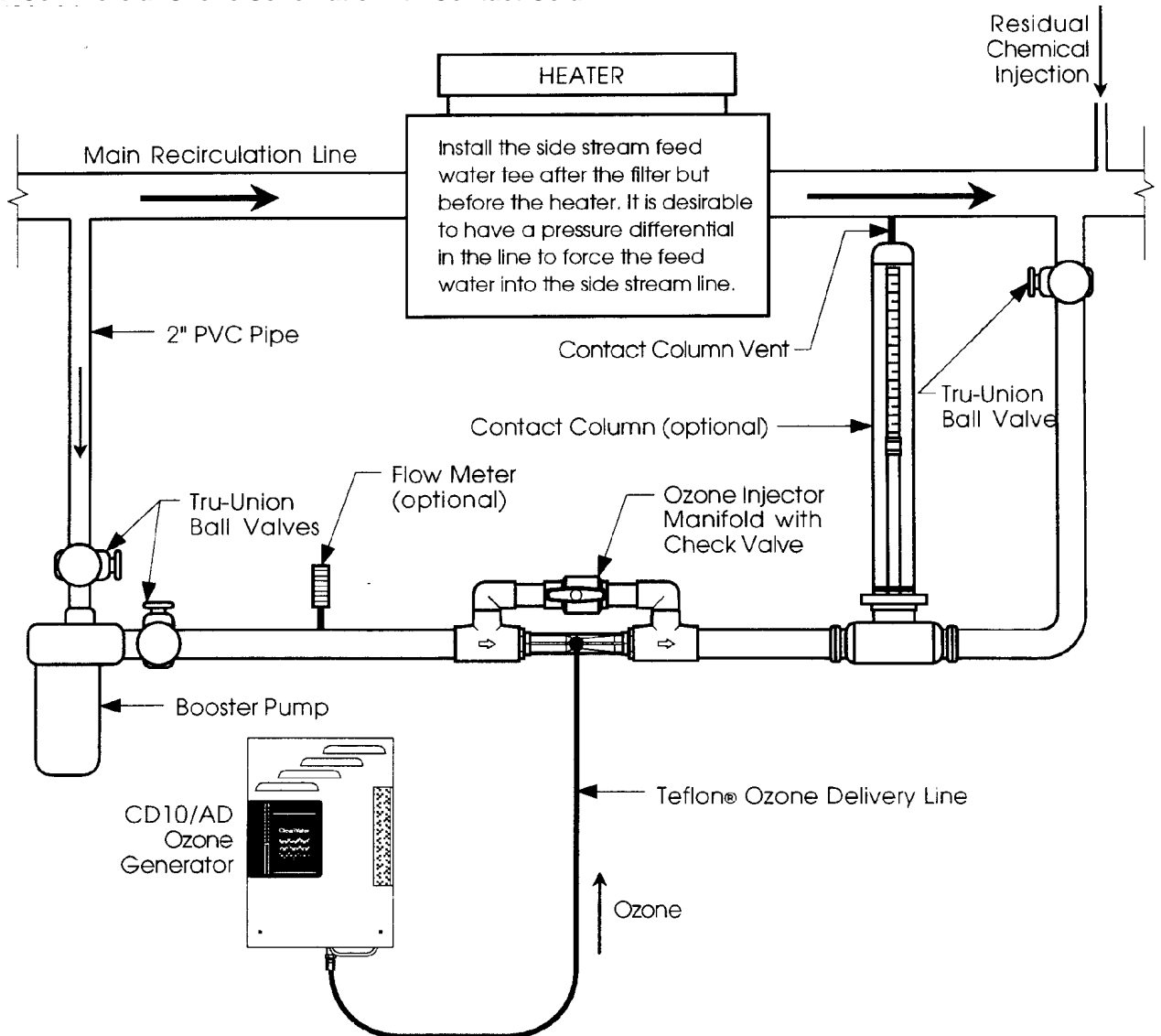
Install the injector manifold after the ozone booster pump, making sure to note the correct flow direction of the injector manifold. The location of the injector manifold and booster pump is dictated by the mechanical blueprints. The check valve assembly is strapped to the injector manifold. Unstrap and install the check valve assembly to the injector.

## **Tubing Installation**

Install the check valve assembly into the injector. Connect the 1/4" Teflon tubing from the OZONE OUT fining on the bottom of the ozone generator to the check valve assembly on the injector. Secure by tightening the fitting around the 1/4" Teflon tubing after insertion.

# SIDE STREAM OZONE INJECTION SYSTEM

## Typical Commercial Ozone Schematic with Contact Column



# INSTALLATION (continued)

## ELECTRICAL CONNECTIONS

**IMPORTANT:** The CD1 0/AD is capable of accepting input from 90 to 260 volts AC, 43 to 63 hertz (10 only). Installations of 120 or 240 VAC, 50-60 Hz fall within this range.

The objective is to have the ozone generator come on whenever the pool pump comes on for filtration. All local codes must be observed.

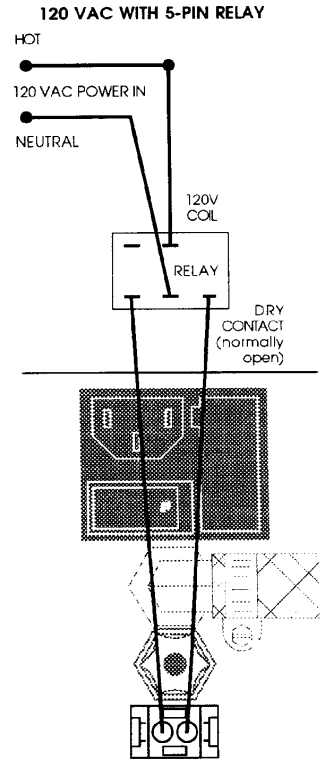
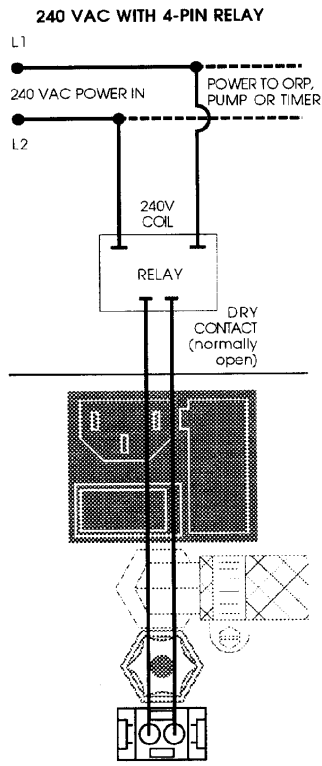
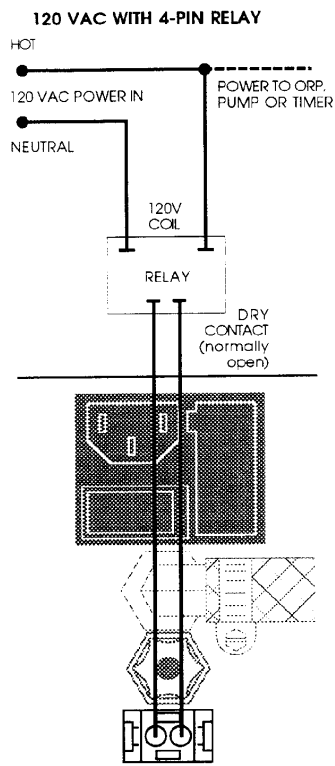
The CD1 0/AD will accept any power cord with an IEC plug on one end. It is available with different electrical cords to suit the differing electrical currents in different nations. The cords available from Advanced Water Engineering, Inc. (and their corresponding part numbers and sample nations) are:

CRD900	IEC BY NEMA 5-15 Plug (USA)
CRD905	IEC by CEE 7/7 Plug (EUROPE)
CRD910	IEC BY BS 1363A PLUG (BG, HONG KONG, SINGAPORE)
CRD915	IEC BY AS3112-1990 PLUG (AUSTRALIA, NZ)
CRD 920	IEC BY ASEV 1011 TYPE 12 PLUG (SWITZ)

Plug the IEC end of the cord into the CD10/AD unit and the other plug end into a standard wall socket to supply power to the unit. **IMPORTANT:** The power source selected must be continuously energized. The air dryer portion of the CD10/AD unit must have continuous power in order to supply dry air.

## EXTERNAL CONTROL LOOP ELECTRICAL CONNECTIONS

The CD10/AD is to be used with an external controller (such as an ORP controller, pump, or timer) wire the controller signal to the external control dry contact plug on the bottom of the CD10/AD unit as shown in the illustration below. A single pole single throw (SPST) normally open relay should be used. A single pole double throw (SPDT) can be used if desired. Be sure to use the correct relay coil voltage based on the signal voltage (i.e. 24V, 1 20V, 240V).



# OZONE GENERATOR OPERATION

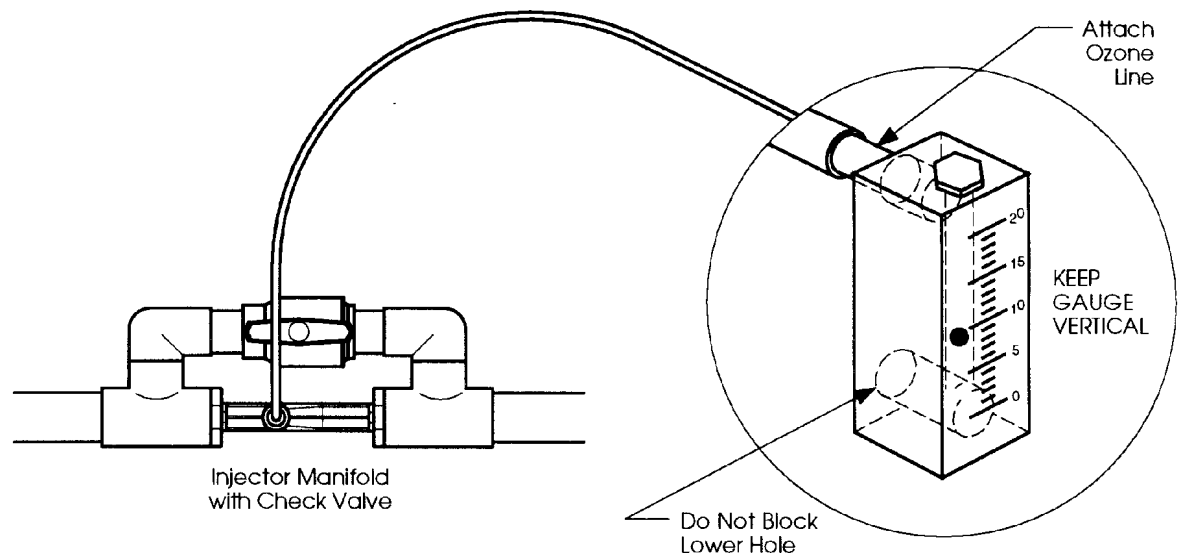
## INITIAL START-UP AND CALIBRATION

After the installation has been completed, the water system operating parameters should remain the same as before installation of the ozone generator. The cooling fan will start and the air dryer portion of the unit will begin to produce heat if the unit is functioning properly. The air preparation system on the Advanced Water Engineering, Inc. CD10/AD is a vacuum type and will require adjustment of the airflow through the system. There are two different methods for achieving proper airflow, both involving an SCFH (Standard Cubic Feet per Hour) gauge. (Note: An SCFH gauge is NOT supplied with the CD1 0/AD unit.)

## Adjusting Air Flow through the Injector

Use an SCFH gauge to accurately measure the amount of air flowing through the ozone delivery line on single speed injectors (in other words, the amount of ozone being injected into the water). Follow the directions and illustration below to optimize flow through the injector:

1. Install the tube fitting into the upper hole on the back of the SCFH gauge.
2. With the pump running, 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 3 to 8 SCFH. Note: Do not obstruct the bottom air hole on the gauge.
4. The injector has a ball valve to adjust the amount of flow. To adjust the SCFH, simply install the gauge as above and open the ball valve completely. With the pump running, begin closing the gate valve until the optimum flow is achieved on the SCFH gauge. Once the proper flow is achieved, remove the SCFH gauge and reconnect the ozone supply tubing between the injector and the CD1 0/AD.



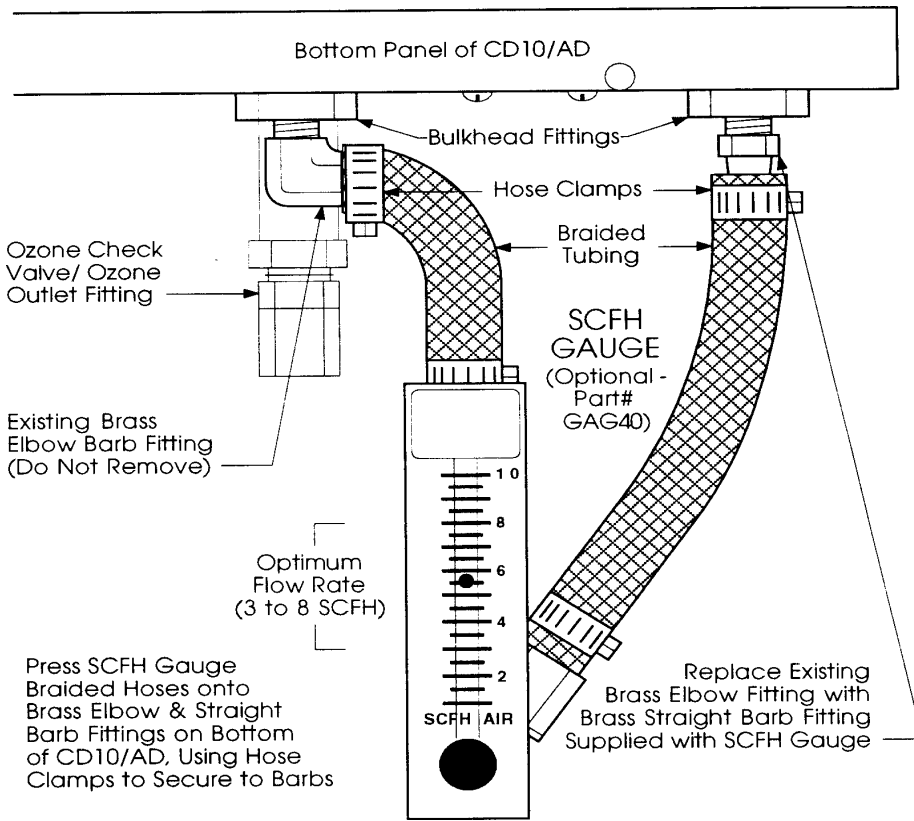
# **OZONE GENERATOR OPERATION (continued)**

## **INITIAL START-UP AND CALIBRATION (continued)**

### **Adjusting Air Flow with the CD1 0/AD Flowmeter Kit (Optional - order Part # GAG40)**

The other method of adjusting the flow is to add the optional CD1 0/AD Flowmeter Kit. This consists of an SCFH gauge and tubing which is installed permanently on the CD1 0/AD, fitting into the external air preparation access loop fittings. To install this flowmeter option, follow the directions and illustration below:

1. Loosen the hose clamps and remove the braided tubing between the two brass external loop elbow fittings. The tubing may be cut with a knife to remove, if necessary. Keep the hose clamps and discard the tubing.
2. The brass elbow fitting next to the ozone check valve will remain, but remove the other brass external loop elbow fitting nearer the end of the unit. Using Teflon~ tape on the threads, install the brass straight barb fitting into the bulkhead fitting from which the elbow fitting was removed. (See illustration below.)
3. Slide one hose clamp onto each piece of braided tubing on the SCFH gauge. Push the SCFH gauge assembly up into the brass external air preparation access loop barb fittings and tighten the hose clamps.
4. The injector has a ball valve to adjust the amount of flow. Open the ball valve completely. With the pump running, begin closing the gate valve until the optimum flow (3 to 8 SCFH) is achieved on the SCFH gauge. Once the proper setting has been achieved, it can be maintained by checking this gauge and adjusting the ball valve as needed.





## OZONE GENERATOR OPERATION (continued)

### Unit Operation Indicator Lights

MAX	-	△	On the front of the CD10/AD are a series of LED's. The ten triangular red LED's indicate the setting of the variable ozone output control, from minimum (0% ozone output) to maximum (100% ozone output). These are controlled by the variable ozone output control on the bottom of the CD10/AD, which is described below. Below the ten ozone output LED's are seven colored rectangular LED's, which indicate the unit's operational status as follows:
	-	△	
	-	△	
	-	△	
	-	△	
OZONE	-	△	POWER: Green LED indicates that the unit is receiving electrical power
OUTPUT	-	△	HV DRIVE: Green LED indicates power to the unit's drive board, which means that the reaction chamber is receiving power
	-	△	EXT LOOP: Orange LED indicates when the ozone drive is disabled by an owner specified external control, such as a vacuum switch, flow switch, ORP controller, ambient ozone detector, pump switch, or timer. There is a two-pin connector located on the bottom of the unit for the purpose of interfacing with any external device you might include in the system. The CD10/AD provides a 5 volt DC fully isolated current to an external device. Therefore, use <b>dry contacts only</b> for this purpose. At no time should a fully energized circuit be used for this function.
	-	△	
	-	△	
MIN	-	△	
POWER		□	HIGH TEMP: Red LED indicates an operating temperature which has exceeded normal operating range. There is a thermal switch integrated into the system which will turn off the ozone drive board when an excessive temperature condition occurs. When the unit cools down, it will reset the thermal switch and restart the ozone portion of the unit.
HV DRIVE		□	
EXT LOOP		□	DRYER TIMER: Yellow LED indicates power to the dryer control board. This LED will blink during normal operation.
HIGH TEMP		□	
DRYER TIMER		□	DRYER 1 & DRYER 2: The air dryer built into the CD10/AD has two drying chambers. The control circuit is designed to energize a chamber for approximately 2½ hours, followed by a 20 minute cooling down period, during which time the other chamber is energized. The Yellow LED for either chamber will turn off while that chamber is in its cooling cycle.
DRYER 1		□	
DRYER 2		□	

### Variable Ozone Output Control

On the bottom of the unit, in between the ozone outlet / check valve and the external control loop (see unit illustration earlier in this manual), is the dial which controls the variable ozone output of the CD10/AD. By turning this dial clockwise, the amount of ozone produced by the CD10/AD increases and the rectangular "OZONE OUTPUT" indicator LED's (see above) light up vertically, indicating the percentage of maximum ozone output being generated. If all of the LED's are lit, the unit is producing the maximum amount of ozone (100%). By turning the dial clockwise, the amount of ozone being produced decreases and the LED's go down. If no LED's are lit, no ozone is being produced.

The variable output control is included because some applications may not need the full output of the CD10/AD. Rather than off-gas the excess ozone, the output can be adjusted to fit the needs of the particular application. There may also be occasions when the need is temporarily reduced, such as when the water level is lower than usual. In some water applications, the ozone output may need to be reduced to minimize off-gassing of excess ozone. If an ozone test kit determines that there is too much residual ozone in the water, the ozone output should be reduced. Conversely, if the ozone does not appear to be doing its job completely, the output can be increased. The variable output control can also be used to adjust ozone output based on seasonal, temperature, or water usage variables.

# OZONE GENERATOR OPERATION (continued)

## System Running Time

On residential pools, the ozone generator should operate for six to eight hours per day. Normally, the ozone system will run whenever the pool filtration system is operating. Since commercial pool and spa filtration systems normally operate 24 hours a day, the ozone system will run continuously on a commercial pool.

## Understanding Your Water

If a high concentration of any mineral (such as calcium or iron) exists in the water, it is necessary to treat it before starting the ozone system. Advanced Water Engineering, Inc. suggests a water sample be taken to your Advanced Water Engineering, Inc. distributor for analysis. Specific recommendations will be made relative to the product(s) needed to remove these minerals from the water. **Note: This should be required only when the pool is drained and refilled.**

If the water is clean and clear, the ozone system may be started immediately. If the water is dirty *and* cloudy, it is recommended that it is drained and the filters thoroughly cleaned before refilling and starting the system. **Note: It is not recommended that an in-ground pool be drained in the winter or after the first rain of a season. Use a shock treatment instead of draining to avoid the possibility of severe damage resulting from “floating” the pool out of the ground.**

## Ozone and Bromine

Ozone has a short “half-life”, which means it dissipates very quickly. Therefore, a *small* residual of another disinfectant must be maintained. We recommend the use of bromine in indoor pools. A bromine residual will act as a buffer when the ozone system is not operating. Bromine needs to be maintained at only 1.0 PPM (parts per million) so that the trace amount of the product in the water will not be noticed. Chlorine will also work as a residual oxidizer and may be used effectively in conjunction with the ozone system (see below and chart on following page).

## Ozone and Chlorine

For outdoor pools, we recommend the use of chlorine to supplement the ozone. A chlorine residual will act as a buffer when the ozone system is not operating. Chlorine needs to be maintained at 1.0 to 2.0 PPM (parts per million - see below). To decide which form of chlorine to use in your pool, refer to the chart on the following page.

## Water Preparation

To properly prepare the water for the ozone system, make the following adjustments and maintain the levels outlined below:

Bromine	1.0 PPM
or	
Chlorine	1.0 to 2.0 PPM
pH	7.2-7.6
Total Alkalinity	100-150 PPM
Calcium Hardness	200-350 PPM

**Note:** *If any unusual reactions are experienced when ozone is introduced to the water (such as abnormal color or odor), please wait a few days to give the ozone and filter system time to work. If the situation continues, your Advanced Water Engineering, Inc. distributor should be consulted.*

## Algae

Always maintain the recommended residual levels of bromine or chlorine (at least 1.0 PPM) to help control algae. Brushing poolside once a week is also effective, as is any algaecide. Note: *Please consult your AWE, Inc. distributor before using any algaecide*

## Shock Treatment

If an unusually high bather load causes cloudiness in the water, it is recommended that a chlorine shock treatment be used to assist the ozone in cleaning the water. Routine, periodic shocking is recommended to prevent buildup of organic contaminants, especially with indoor pools. These treatments are available from your Advanced Water Engineering, Inc. distributor. Ask for assistance in selecting the proper product.

### Properties of Bromine and Various Forms of Chlorine

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 <sub>2</sub> )	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 the water much cleaner than any other type of water purification system. This is due to the fact that ozone neutralizes body oils and soaps. After ozone kills the bacteria, the by-products of the process are oxygen, carbon dioxide and filterable solids. Since filterable solids are usually at higher levels than with conventional disinfection processes, the filter will have more work to do. Keeping the filter clean will make a noticeable difference in the clarity of the water. It is recommended that a regular filter cleaning schedule is established, or poor water flow through the filter will result. This will have a direct effect on the amount of ozone that enters the water.

A word of caution: There is extremely high voltage inside the ozone generator. If you suspect a problem, disconnect the power to the unit at the service disconnect box or main electrical panel and immediately contact your Advanced Water Engineering, Inc. distributor. Inspect the ozone delivery line check valves daily for water seepage and replace the injector check valve yearly.

### Clean the ozone generator cabinets air filter:

This filter must be cleaned regularly. Depending on the location of the unit, it may be necessary to clean the air filter monthly. The filter element is located on the bottom of the cabinet (see illustration below). This is the air intake element for the cooling fan and may therefore require the most frequent cleaning. The element may be cleaned with soap and water and should be dried completely before reinstalling. **Note: In a clean environment, this procedure may only need to be performed every three months. IMPORTANT: CLEAN THIS FILTER REGULARLY! FAILURE TO DO SO WILL PROMOTE OVERHEATING AND WILL VOID THE WARRANTY!**

### Check valves:

Two Kynar® check valves are built into the ozone delivery system: one where the ozone tubing attaches to the ozone generator and one where it attaches to the injector. The purpose of these check valves is to prevent water from backing up into the ozone generator. The Teflon® ozone delivery line(s) should be inspected daily to insure water is not flowing back into the ozone generator. Check valves should **be replaced** yearly. Note: The only time it is possible for water to flow back toward the ozone generator is during a system shutdown. Always inspect for water seepage during this time.

### Regenerating the Desiccant in the Indicating (visible) Chamber

Check to see that the air dryer is warm. This indicates that it is working. If the air dryer is not working, call your dealer. The visible indicator cartridge is 25% desiccant beads which should be blue in color. If they are clear to white in appearance, check to be sure that the unit is working. When the desiccant granules become clear to pink in appearance, they have absorbed too much moisture and must be dried to regain their efficiency. To dry the desiccant beads, follow these steps:

1. Disconnect the power to the CD1 0/AD.
2. Remove the four cover retaining screws from the top rear and bottom front of the unit. Tilt the cover up from the bottom over the top of the unit and carefully pull the plug from the LED circuit board built into the cover. Remove the cover.
3. With a slot head screwdriver, loosen the fitting at the bottom of the indicating chamber where the flexible tubing attaches to the chamber's elbow fitting.
4. Loosen the fitting at the bottom inside of the unit where the brass tubing goes out the bottom of the unit into the external control loop. Lift the cartridge up and out of the unit.
5. Unscrew the top threaded cap from the chamber. Spread the desiccant evenly on a cookie sheet and bake at 3500 in an oven. Check often. Once the desiccant granules regain their blue color, remove from

the oven.

6. Return the desiccant granules to the cartridge, recap and reverse the above steps to replace the chamber.



**ADVANCED WATER ENGINEERING, INC.**

**PO BOX 37314 INDIAN HARBOUR BEACH FL**

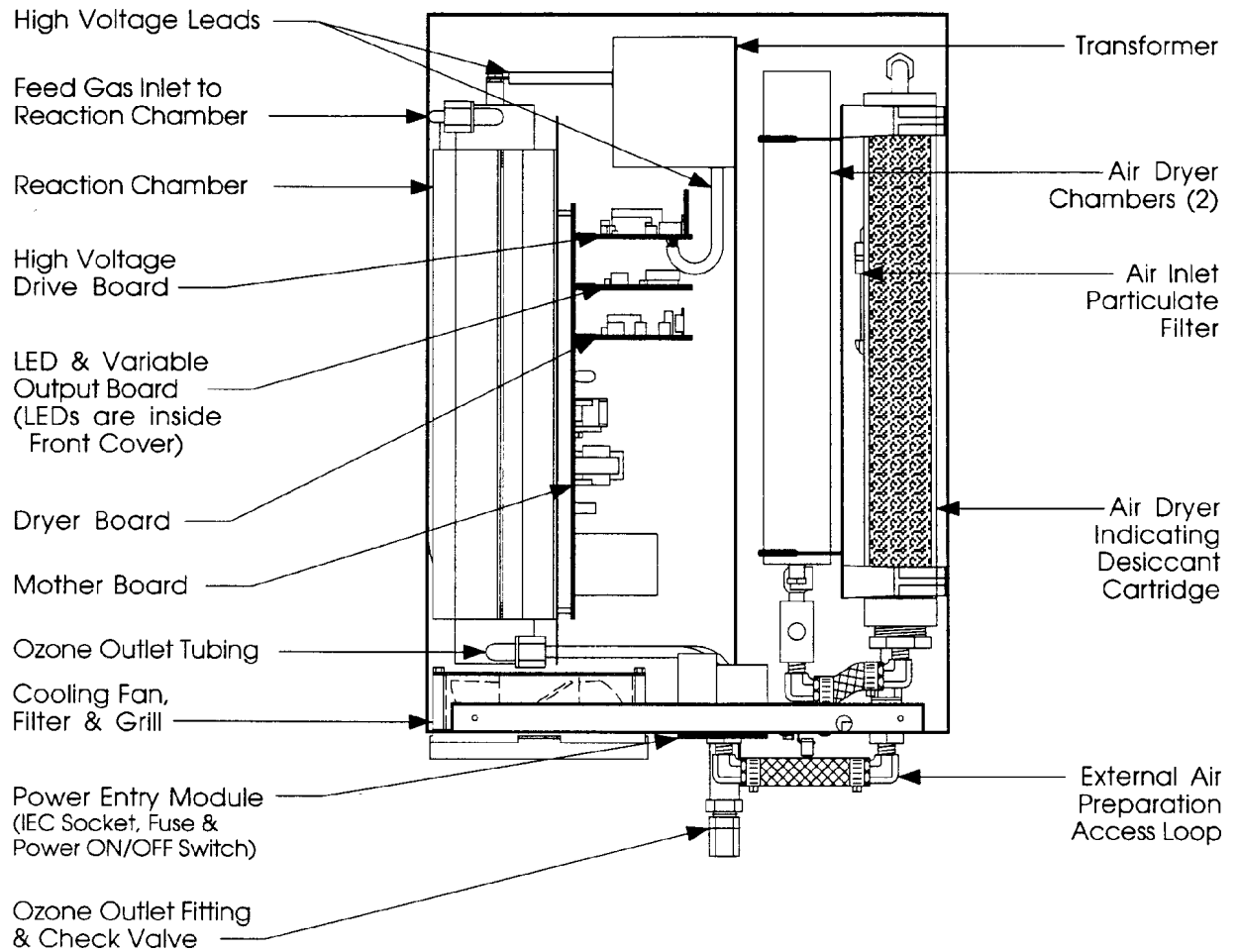
**(407) 777-4909 FAX: (407) 773-8338**

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# **CD10/AD**

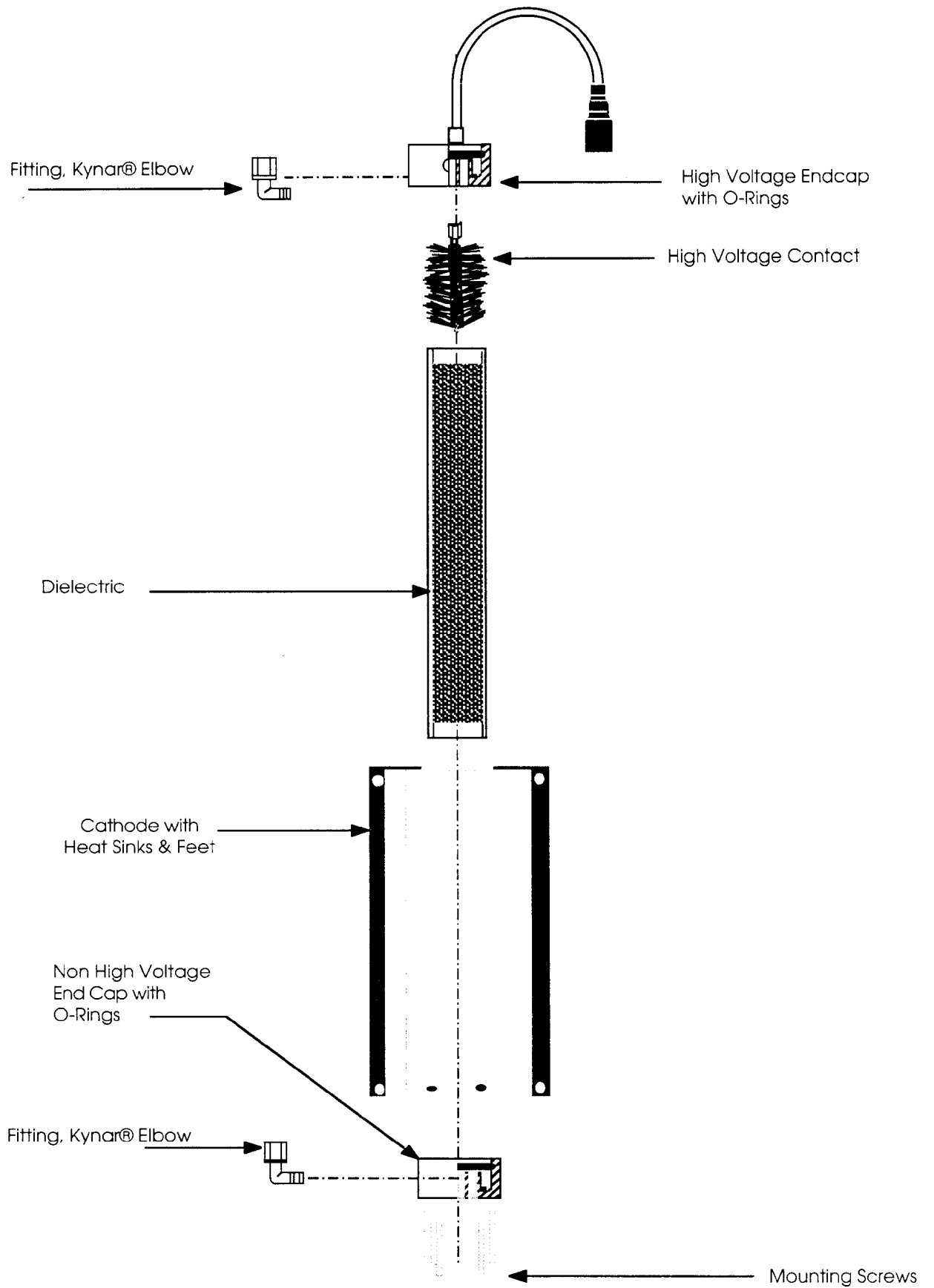
**MAINTENANCE & TROUBLE SHOOTING  
MANUAL  
PARTS & WARRANTY**

## CD10/AD OZONE GENERATOR COMPONENTS





# EXPLODED VIEW OF CORONA DISCHARGE REACTION CHAMBER





## OZONE GENERATOR TROUBLESHOOTING

PROBLEM/SYMPTOM	POSSIBLE CAUSE	SOLUTION
Unit does not turn on, green power LED does not light	Unit has a turn-on time delay	Wait - the unit may take up to 8 seconds to turn on
	No power to unit	Check breakers, make sure power cord is plugged in at both ends
	Switch not turned on	Check switch
	Blown fuse	Replace fuse in bottom panel
	Incorrect wiring connections	Check wiring (see manual)
Unit does not stay on	Bad power supply	Contact distributor
	Defective check valve	Inspect and replace if necessary
Ozone cycles on and off	Major unit failure	Contact distributor
	Overheating	Clean fan filter, check fan
Unit trips circuit breaker	Defective power	Check for constant power if not timer controlled
	Incorrect wiring	Check wiring (see manual)
'OZONE' indicator LED is not lit	Incorrect circuit breaker	Check and, if necessary, replace with correct circuit breaker
	Ozone card has become unseated from its connector on the main circuit board	Plug the ozone card back into the main circuit board
'DRYER TIMER' LED is not flashing	Defective ozone card	Contact distributor
	Dryer timer card has become unseated from its connector on the main circuit board	Plug the dryer timer card back into the main circuit board
'HIGH TEMP' indicator LED is lit (unit is overheating)	Defective dryer timer card	Contact distributor
	Clogged fan filter	Clean or replace fan filter
	Fan is not plugged in	Plug fan in
	Fan is not operating	Contact distributor
	Bad temperature sensor	Contact distributor
External control loop is not functioning	Bad ozone card	Contact distributor
	Bad external wiring	Check wiring
	External plug has become unseated from its connector on the main circuit board	Plug the external loop card back into the main circuit board
	Bad variable output control card	Contact distributor
You receive an electrical shock upon touching the unit	Bad main circuit board	Contact distributor
	Incorrect wiring	Check wiring (see manual)
	Unit not grounded	Ground unit in accordance with local codes
	Unit has been flooded	Return unit for major service or completely disassemble and clean
	Internal electrical failure	Contact distributor

## OZONE GENERATOR TROUBLESHOOTING (continued)

PROBLEM/SYMPTOM	POSSIBLE CAUSE	SOLUTION
Water in unit or ozone delivery tubing	Defective check valve(s)	Replace check valve(s)
	Excessive back pressure on check valve	Back pressure not to exceed 40 psi - if over 40 psi consult ClearWater Tech distributor
Ozone smell present	Loose internal fittings	Inspect and tighten fittings
	Defective O-ring seals in reaction chamber	Check and replace if necessary
	Loose fittings in the external control loop	Inspect and tighten fittings
	Defective reaction chamber	Check and replace if necessary
You suspect that no ozone is being produced	HV transformer is not plugged in	Check all HV transformer connections, plug the HV transformer back into the drive card on the main circuit board
	HV transformer failure	Contact distributor
	Dielectric failure	Inspect and replace if necessary
Variable output control not working	Variable output control card has become unseated from its connector on the main circuit board	Plug the variable output control card back into the main circuit board
	Defective output control card	Replace output control card
	Defective adjustment control	Contact distributor
Unit seems noisy	Not properly secured to wall	Bolt unit firmly into place
	Shipping damage	Locate and repair
	Fan blocked	Check and clear obstructions
Air dryer cold when operating, dryer LED's not lighting	Heater cartridge not plugged into the main circuit board	Check all heater connections, plug the heater cartridge back into the drive card on the main circuit board
	Defective heater cartridge	Replace heater cartridge
Desiccant indicator cartridge not blue in color	Air leak	Tighten fittings
	Desiccant saturated in storage	Reactivate desiccant (as described in manual)
Air dryer not cycling	Bad dryer card	Replace dryer card



## ADVANCED WATER ENGINEERING, INC.

PO BOX 37314 INDIAN HARBOUR BEACH FL

(407) 777-4909 FAX: (407) 773-8338

e-mail: [info@advancedwater.com](mailto:info@advancedwater.com)

### Limited One-Year Warranty

#### Summary of the Warranty

Advanced Water Engineering, Inc. (AWE,INC) makes every effort to assure that its products meet high quality and durability standards and warrants the products it manufactures against defects in materials and workmanship for a period of one (1) year, commencing on the date of original shipment from AWE,INC, with the following exceptions: 1) The warranty period shall begin on the installation date if the installation is performed within 90 days of the original shipment from AWE,INC; 2) The warranty period shall begin on the date of the bill of sale to the end user if the installation date is more 90 days after the original shipment date. To validate the warranty, a warranty card, accompanied by a copy of the bill of sale, must be returned to AWE, Inc and must include the following information:

- End user name
- Complete address, including telephone number
- Date installed
- Complete model and serial number information
- Name of company from which the unit was purchased

Repairs and replacement parts provided under this warranty shall carry only the unexpired portion of this warranty or 90 days, whichever is longer.

#### Items Excluded from the Warranty

This warranty does not extend to any product and/or part from which the factory assigned serial number has been removed or which has been damaged or rendered defective as a result of:

- an accident, misuse, alteration or abuse
- an act of God such as flood, earthquake, hurricane, lightning or other disaster resulting only from the forces of nature
- normal wear and tear
- operation outside the usage parameters stated in the product user's manual
- use of parts not sold by CWT
- service or unit modification not authorized by CWT

#### Obtaining Service Under the Warranty

Any product and/or part not performing satisfactorily may be returned to CWT for evaluation. A Return Goods Authorization (RCA) number must first be obtained by either calling or writing your local authorized dealer, distributor or CWT direct, prior to shipping the product. The problem experienced with the product and/or part must be clearly described. The RCA number must appear prominently on the exterior of the shipped box(es). The product and/or part must be packaged either in its original packing material or in comparable and suitable packing material, if the original is not available. You are responsible for paying shipping charges to CWT and for any damages to the product and/or part that may occur during shipment. It is recommended that you insure the shipment for the amount you originally paid for the product and/or part.

If, after the product and/or part is returned prepaid and evaluated by CWT, it proves to be defective while under warranty, CWT will, at its election, either repair or replace the defective product and/or part and will return ship at lowest cost transportation prepaid to you **except for shipments going outside the 50 states of**

**the United States of America.** If upon inspection, it is determined that there is no defect or that the damage to the product and/or part resulted from causes not within the scope of this limited warranty, then you must bear the cost of repair or replacement of damaged product and/or part and all return freight charges. Any unauthorized attempt by the end user to repair CWT manufactured products without prior permission shall void any and all warranties. For service, contact your authorized dealer or distributor or AWE, INC direct at (321) 777-4909.

#### **Exclusive Warranty**

There is no other expressed warranty on AWE, INC products and/or parts. Neither this warranty, or any other warranty, expressed or implied, including any implied warranties or merchantability of fitness, shall extend beyond the warranty period. Some states do not allow limitations on how long an implied warranty lasts, so that the above limitation or exclusion may not apply to you.

#### **Disclaimer of Incidental and Consequential Damages**

No responsibility is assumed for any incidental or consequential damages; this includes any damage to another product or products resulting from such a defect. Some states do not allow the exclusion or limitation of incidental or consequential damages, so that above limitation or exclusion may not apply to you.

#### **Legal Remedies of Purchaser**

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

**THIS STATEMENT OF WARRANTY SUPERSEDES ALL OTHERS PROVIDED TO YOU AT ANY PRIOR TIME.**

**Advanced Water Engineering, Inc  
101 central rd  
Indian Harbour Beach, FL 32937**