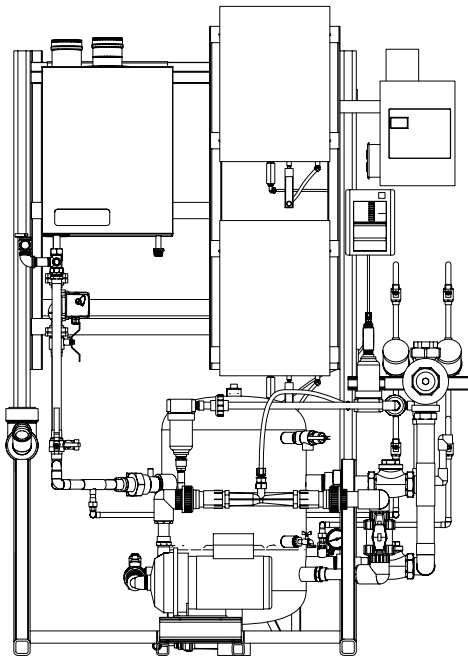
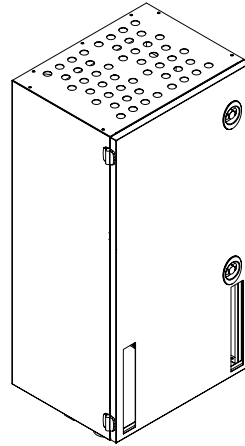


# Installing, Operating & Maintaining

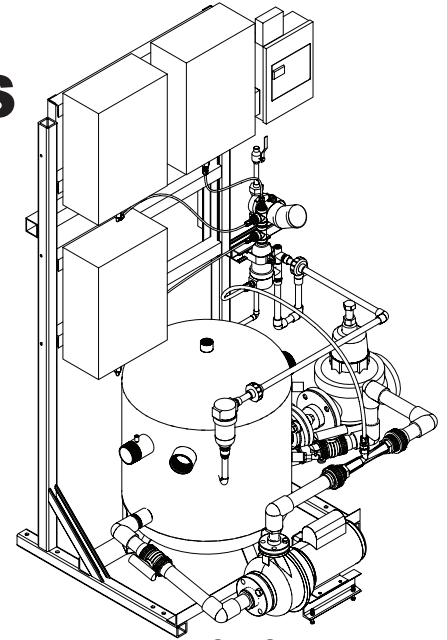
## SAN-O<sub>3</sub>-TYZER OZONE SYSTEMS



San-O<sub>3</sub>-tyzer Complete



San-O<sub>3</sub>-tyzer Lite



San-O<sub>3</sub>-tyzer

**Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.**

### WHAT TO DO IF YOU SMELL GAS:

- Do not try to light any appliance
- Do not touch any electrical switch
- Do not use any phone in your building

**Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier instructions. If you can not reach your gas supplier, call the fire department.**

The San-O<sub>3</sub>-tyzer System is designed and manufactured by Hamilton Engineering. The Ozone Generator and related mixing devices are a product of Aquawing Ozone Systems. San-O<sub>3</sub>-tyzer patent pending.



### WARNING

If the information in this manual is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.



### WARNING

These appliances MUST be installed by a properly licensed individual in the City and State which the unit is being installed. All start up adjustments and subsequent service work must be done by a similarly licensed contractor or a factory trained service individual. Failure to comply could result in loss of warranty and or severe personal injury, death and or substantial property damage. **These instructions are required to be kept with the appliance in the pocket provided.**

# USING THIS MANUAL

## SPECIAL ATTENTION BOXES

Throughout this manual you will see these special attention boxes similar to this one, which are intended to supplement the instructions and make special notice of potential hazards. These categories are in the judgement of Hamilton Engineering, Inc.



## DANGER

Indicates a condition or hazard which **MAY** cause severe personal injury, death, or major property damage.



## WARNING

Indicates a condition or hazard which **MAY** cause severe personal injury, death, or major property damage.



## CAUTION

Indicates a condition or hazard which **MAY** cause severe personal injury, death, or major property damage.



## WARNING

- THE VENT SYSTEM IS RATED AND DESIGNED TO BE 2 PIPE SEALED COMBUSTION **CATEGORY IV** ONLY, PVC SCH 40 OR CPVC SCH 40 OR 80 OR AL 29-4C STAINLESS VENTING FOR ALL MODELS. A FACTORY ENGINEERED VENTING SYSTEM MAY ALLOW FOR EXCEPTIONS; CONSULT FACTORY FOR DETAILS.
- THIS HEATER INSTALLATION MUST CONFORM TO THE LATEST EDITION OF THE "NATIONAL FUEL GAS CODE" ANSI Z223.1 NFPA 54 AND/OR CAN/CGAB149 INSTALLATION CODES. STATE AND LOCAL CODES MIGHT ALSO APPLY TO INSTALLATION.
- WHERE REQUIRED BY THE AUTHORITY HAVING JURISDICTION, THE INSTALLATION MUST CONFORM TO THE STANDARDS FOR CONTROLS AND SAFETY DEVICES FOR AUTOMATICALLY FIRED HEATERS, ANSI/ASME HEATER AND PRESSURE VESSEL CODE, SECTION IV, ALONG WITH CSD-1.
- THE HEATER, GAS PIPING, WATER PIPING, VENTING AND ELECTRICAL MUST BE INSTALLED BY TRAINED & QUALIFIED PERSONNEL FAMILIAR WITH INSTALLATION PRACTICES, LOCAL CODE, AND LICENSING REQUIREMENTS.
- IF THE INFORMATION IN THESE INSTRUCTIONS ARE NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT, CAUSING PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH.
- DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

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**NOTICE: Because you will be injecting the ozone directly into the water, if there is not a backflow preventer already existing on the water supply to the laundry, one may be required by local plumbing code. Please consult local authorities for details. This is an option that can be factory mounted.**

# PART 1. PRODUCT DESCRIPTION

## A. PRODUCT DESCRIPTION

The San-O<sub>3</sub>-tyzer (SOT) is available in three versions.

- The SOT Complete™ is an integrated water heating and water sanitizing system, and these two functions complement one another to provide the utmost cleaning experience possible in a vended laundry washer. However, despite their integration, these two components are independently controlled based on the water demand by the washers they supply. All cold water will be properly infused with ozone; heated water (for a hot wash) will not have any ozone added while feeding the washers. Whether heated or ozone infused water, the process is on demand and dynamically linked to the quantity of washers filling at any given moment, via the changing water pressure within the laundry.
- The SOT is an ozone injection system, intended to serve the cold water needs of the entire vended laundry.
- The SOT Lite™ is designed to be bulkhead mounted, and serves only that bulkhead's cold water needs on demand.

With proper controls and specially equipped washers, all of the above systems can be upgraded to the Select™ control system to provide ozone infused water only when selected by the washer user.

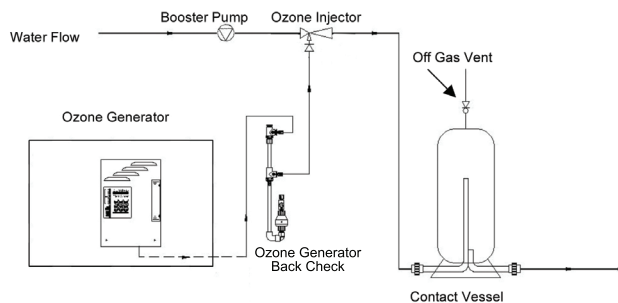
The EVO product line is an extremely high efficiency water heating product, requiring special venting and condensate removal precautions. Additionally, any high efficiency condensing appliances will require more maintenance (cleaning) than its non-condensing counterpart. Failure to perform regular maintenance may result in damage to the appliance that is not covered under warranty. Failure to follow all of the instructions contained in this manual may also cause premature product failure that may not be covered under warranty.

This appliance has built-in freeze protection, automatically activating the circulation pump when the internal water temperature drops below 41°F. If the internal water temperature drops to 37°F, a burn cycle will be initiated and will shut down as soon as the supply water temperature has reached 50°F. *Power and gas must be left on for this function to operate.*

Hamilton Engineering San-O<sub>3</sub>-tyzer ozone systems are designed for safe, effective use in a variety of water treatment applications. The CD12/AD ozone generators have been tested and certified by the Water Quality Association according to NSF/ANSI 50. Each complete, integrated system includes the components required for reliable, efficient ozone production and can be divided into four general segments - the air preparation system, the ozone generator, the ozone injection/contacting system, and the ozone off-gas vent.

The CD12/AD also *requires continuous power for proper operation.* The internal air preparation component must maintain properly dried air to be drawn into the ozone generator component on demand and this can only be accomplished by allowing the air dryers to operate as required, 24 hours a day.

**FIGURE 1-1:  
PRODUCT OVERVIEW**



## A. PRODUCT DESCRIPTION CONT.

**1. AIR PREPARATION SYSTEM:** The CD 12 AD Ozone Generator utilizes a heat regenerative dry air system. The heat regenerative system draws in ambient air and dries it to a -10 to -20°F dew point at 20% oxygen purity. The CD12/AD (“AD” represents Air Dryer) incorporates a heat regenerative air dryer system, rated with a duty cycle of no more than 10 hours of operation in a 24 hour period in conditions up to 75% relative humidity non-condensing.

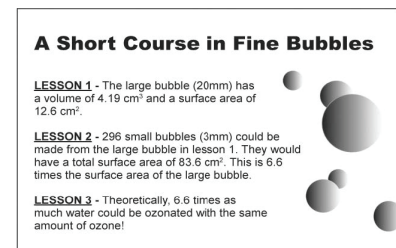
Due to the operation of the internal air dryer, continuous power must be applied to the CD12/AD for proper operation. As the ambient air travels through the dryer chambers the sieve material inside traps the moisture from the air and allows the oxygen to pass to the ozone reaction chamber. The heat, generated by the heating rods inside the dryer chamber, then evaporates the moisture that has been trapped in the sieve and expels off the top of the sieve bed. The two dryer chambers and attached 3-way solenoid valve operate on a timed cycle. Dryer chamber 1 heats first evaporating moisture for 1-1/2 hours, while the solenoid is energized allowing the vacuum from the venturi to draw air flow through dryer chamber 2. During this time the “AIR PREP” LED will flash and “DRYER 1” LED will be illuminated continuously.

After the 1-1/2 hours there is a 1/2 hour cool down period, power to dryer chamber 1 will be discontinued, correspondingly “DRYER 1” LED will not be illuminated. **Note: The “AIR PREP” LED will remain flashing throughout the cycle.** After the cool down period dryer chamber 2 will heat and the solenoid valve will de-energize, allowing vacuum from the venturi to draw air flow through dryer chamber 1. During this time, the “AIR PREP” LED will flash and “DRYER 2” LED will be illuminated continuously. After 1-1/2 hours there is a 1/2 hour cool down period when power to dryer chamber 2 will be discontinued; correspondingly, “DRYER 2” LED will not be illuminated. After this 1/2 hour cool down, the air dryer cycle will repeat.

**2. OZONE GENERATOR:** The air being used for conversion to ozone is drawn in by vacuum created at the ozone injector. As the feed gas enters the thermally-protected chambers inside the ozone generator, some of the oxygen molecules are split while passing through the high voltage electrical field (the ‘corona’), forming single oxygen atoms ( $O_1$ ). These oxygen atoms then recombine with other oxygen molecules in the air stream, forming ozone.

**3. OZONE INJECTION/CONTACTING:** The ozone injector serves two purposes. One, it creates the vacuum required to safely draw the ozone gas from the ozone generator and two, it provides a means by which the ozone gas can become dissolved in water. A very dynamic injection process is required to effectively dissolve ozone in water.

The Hamilton San-O<sub>3</sub>-tyzer systems use only Mazzei® injectors for maximum mass transfer efficiency. The injector produces a cavitation effect, enabling the ozone gas to join the water stream in the form of extremely tiny bubbles. These bubbles must be as small as possible in order to increase the ratio of bubble surface area to the amount of ozone entering the water.



**FIGURE 1-2: OZONE GAS**

All San-O<sub>3</sub>-tyzers incorporate the patented Aquawing Ozone Systems Static Mixing Chamber within the specially designed and fabricated 316T stainless steel mixing tank and the variable pressure dynamic flow system to insure proper levels of Ozone are delivered regardless of the number of washers filling at the same time. **Please note, the SOT Lite™ does not utilize a stainless tank for mixing.**

## A. PRODUCT DESCRIPTION CONT.

**4. NON-ABSORBED OZONE ELIMINATION:** The Hamilton San-O<sub>3</sub>-tyzer off-gas elimination system consist of two components: the ozone vent line off the mixing chamber and a water trap. Used in conjunction with an off gas vent, the ozone elimination system is an effective way to vent the non-absorbed ozone back into the atmosphere, where it originated and insure no Ozone is released into the building atmosphere. *Please see page 9 for a list of venting materials that are compatible with ozone.*

**5. OZONE GENERATOR SUPPLY AIR TREATMENT:** The ozone generator has been pre-plumbed at the factory with an internal heat regenerative air dryer to provide simplicity of a “plug and play” ozone system. They are also equipped with an internal moisture indicating cartridge, which can be seen by removing the cover. This indicating cartridge is used as a reference to indicate the quality of dry air. If the air dryer is not operating properly the silica will turn from blue and white in color to all white. See Troubleshooting Guide. The air flow of the system must not be drawn through the unit for more than 10 hours in a 24 hour period (to be used as sold in a Coin Laundry application only).

The San-O<sub>3</sub>-tyzer must be powered up for 24 hours prior to system start-up (no air flow should be drawn through the system by the ozone injection manifold). This sieve material in the heat regenerative air dryer must be evaporated of any moisture that has accumulated. **Note: If this step is not completed premature failure of the heat regenerative air dryer system will occur.** During this time the molex connector with two wires running into it (see Figure 5-4, pg.29, for location) should be removed so that the ozone reaction chamber will not have power to it.

## SAFETY INFORMATION

## PART 2. SAFETY INFORMATION

## A. SAFETY INFORMATION

**WARNING**

**High concentrations of ozone gas are dangerous to humans. Low concentrations can cause irritation to the eyes, throat, and respiratory system.**

Two aspects of Aquawing Ozone Systems ozone generators represent potential dangers: ozone gas and high voltage electricity.

- The Aquawing Ozone Systems CD12 AD Series corona discharge ozone generators are designed to operate under a vacuum condition. While safety precautions have been taken, entering the equipment area should be avoided if ozone gas is detected. Ozone has a very distinctive odor and is detectable at very low concentrations (0.02 ppm), which is far below OSHA's maximum permissible exposure level of 0.1 ppm.

**WARNING - HIGH VOLTAGE**

**Aquawing Ozone Generators operate at high voltage. Do not tamper with or deliberately bypass the cover or safety switches built into the ozone generator unless instructed to do so by this manual. If contact is made with high voltage components, electric shock WILL occur.**

## A. SAFETY INFORMATION CONT.

- The Aquawing Ozone Systems corona discharge ozone generators take line voltage and convert it to DC current. A high voltage transformer then boosts the voltage. While each ozone generator has a cover safety switch and other safety interlocks, proper care must be used by a qualified electrician when making any internal adjustments or performing any maintenance procedures.

**IMPORTANT SAFETY INSTRUCTIONS**

When installing and using this electrical equipment, basic safety precautions should always be followed, including the following:

1. **READ AND FOLLOW ALL INSTRUCTIONS!**
2. **WARNING:** For indoor use only. This unit is not intended for outdoor use.
3. Install in accordance with the installation instructions.
4. **WARNING:** Short term inhalation of high concentration of ozone and long term inhalation of low concentrations of ozone can cause serious harmful physiological effects. Do not inhale gas produced by this device.
5. All electrical connections should be made by a licensed, qualified electrician.
6. Before attempting any electrical connections, be sure all power is off at the main circuit breaker.
7. 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/NFPA 70-1987. ***This portion of the San-O<sub>3</sub>-tyzer is factory supplied, wired, and assembled.***
8. The System should be sized appropriately for its intended use by a qualified professional familiar with the application. This equipment must be commissioned by personnel trained by the manufacturer for its intended use; failure to do so may void the warranty.
9. **SAVE THESE INSTRUCTIONS!**

# PART 3. INSTALLATION PROCEDURES

## A. GETTING STARTED

### UNPACKING

Compare the ozone system equipment received to the packing list provided. Before beginning any installation procedures, thoroughly inspect all components for damage. If damage is noticed, promptly notify the freight carrier and request an on-site inspection.

### EQUIPMENT PLACEMENT

- When placing the ozone system components in the equipment room, make sure to consider safety, maintenance requirements, local building and fire codes, etc. The components should be easily accessible by the operators, including equipment access doors and electrical hook-up boxes. All meters, gauges, indicator lights, and switches should be visible and accessible.
- Like any electronic component, performance and longevity is enhanced by favorable operating conditions. Also, since each air preparation system and ozone generator is air-cooled, a relatively dust-free, well-ventilated area is required. No caustic chemicals should be stored in the area surrounding the equipment. A minimum clearance of six inches from the vents on either side of the ozone generator is required.
- The equipment is heavy and requires proper support. Therefore, a clean, dry, level surface should be provided for the San-O<sub>3</sub>-tyzer System. These components should be securely fastened to the surface using the mounting holes and/or tabs provided.
- The air preparation system and ozone generator are not designed to withstand outdoor elements, including direct contact with water and/or temperature extremes. Therefore, the equipment must be installed in an environment consistent with the following operating parameters:

- A. Ambient temperature range: 20°F to 95°F continuous. If the temperature around the equipment consistently exceeds 95°F, additional air-cooling must be provided.
- B. Humidity: 0 - 75% relative humidity, non-condensing environment, must be observed in the installation.
- C. Line voltage: +/-10% of rated input of 208-240 volts, single phase

***Note: Equipment installed in extreme environmental conditions will void manufacturer's warranty.***



B. PLUMBING

**PLUMBING**

- Adequate use of unions and isolation valves is strongly recommended to facilitate maintenance and repairs.
- Plumbing size requirements are dictated by the water flow characteristics of the system. Consult your San-O<sub>3</sub>-tyzer Distributor or the factory if you are unsure of what your requirements may be.
- Make sure to use proper plumbing practices and secure all plumbing and system equipment according to local codes.
- Undissolved ozone is a powerful oxidizer and will degrade certain materials. Use ozone-compatible plumbing materials for section(s) of the system that will come in contact with ozone partially dissolved in water. The following is a list of the materials that are compatible with ozone:
  - PVC
  - CPVC
  - Kynar
  - Teflon
  - Stainless Steel (300 Series)
  - Viton
  - EPDM
  - Concrete
- The Hamilton San-O<sub>3</sub>-tyzer contains several patented designs to insure thorough mixing of the ozone into the incoming water and off-gassing of unabsorbed ozone, and therefore, does not require re-piping of the laundry utilizing copper plumbing to handle it's ozonated water; however, in new laundries, the use of PVC may reduce the overall project cost.
- Because the San-O<sub>3</sub>-tyzer is an on-demand system, it is important that recirculation lines be installed from the the furthest bulkhead on both the hot and cold lines, back to the integrated pumps on all models *except* the SOT Lite™. These lines should be 3/4" in diameter. This will ensure all water being delivered to washer has either been heated or ozonated.

## C. VENTING

**Note:** All lines for ozone off-gas, intake air, and exhaust **MUST** vent to the outside (preferably through roof). Please refer to page 9 for compatible venting materials. Refer to LIT91127, EVO Installation and Operation Manual for further clarification on venting.

## D. ELECTRICAL

**ELECTRICAL**

The Hamilton San-O<sub>3</sub>-tyzer is completely factory wired, only requiring 208 - 240v (110v SOT Lite™) 1 phase power be brought to the supplied intermediate disconnect box. All possible pre wiring has been completed at the factory. Logic schematics have been provided in the Appendix, Part 7, page 33.

- All electrical connections should be made by a licensed, qualified electrician. All local, state and national codes must be observed.
- Make sure all power is off at the main circuit breaker before making any electrical connections.
- The CD12/AD must be energized by a constant unswitched power source for proper operation of the on-board heat regenerative dry air system.
- The air flow of the CD12/AD must not be drawn through the unit for more than 10 hours in a 24 hour period for proper long term operation of the on-board air dryer (designed to be used in a vended laundry application only).

**CAUTION**

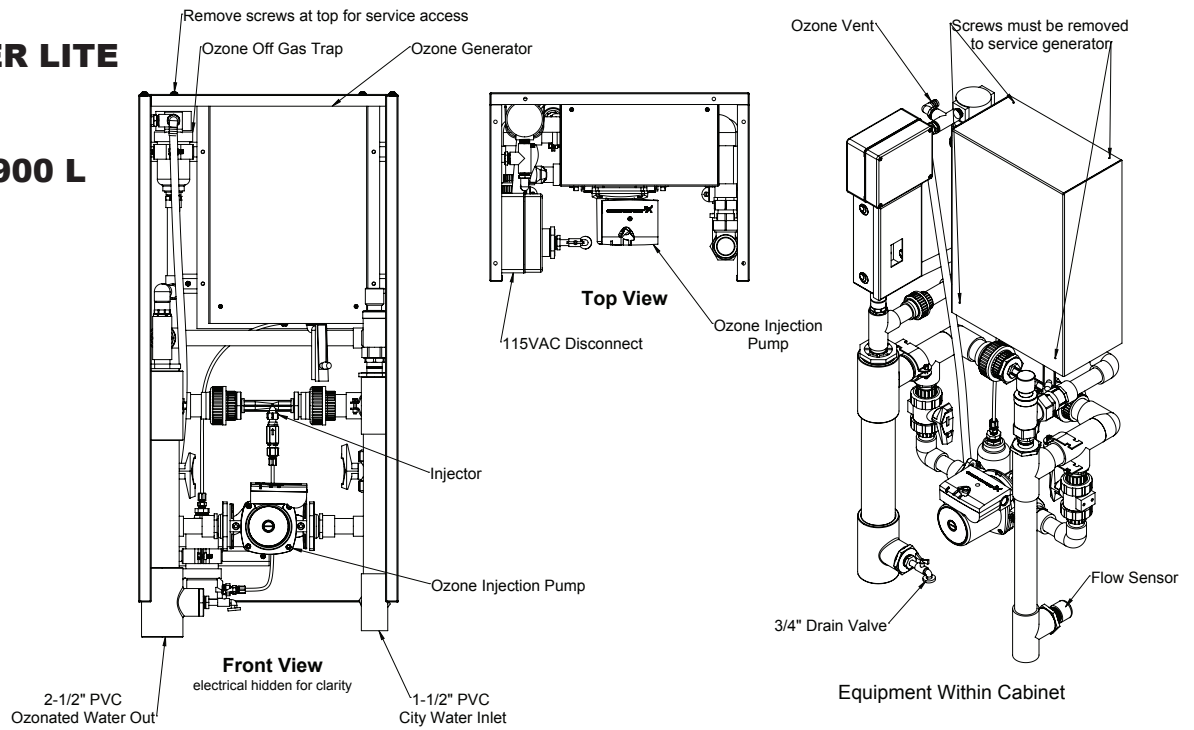
**The San-O<sub>3</sub>-tyzer MUST have power supplied and the two pin molex connector (on cabinet bottom) unplugged for a MINIMUM of 24 hours prior to its first use. Power must remain on the CD12/AD continuously, except for during service.**

E. SYSTEM DIAGRAMS

**FIGURE 3-1:**

**SAN-O<sub>3</sub>-TYZER LITE SYSTEM**

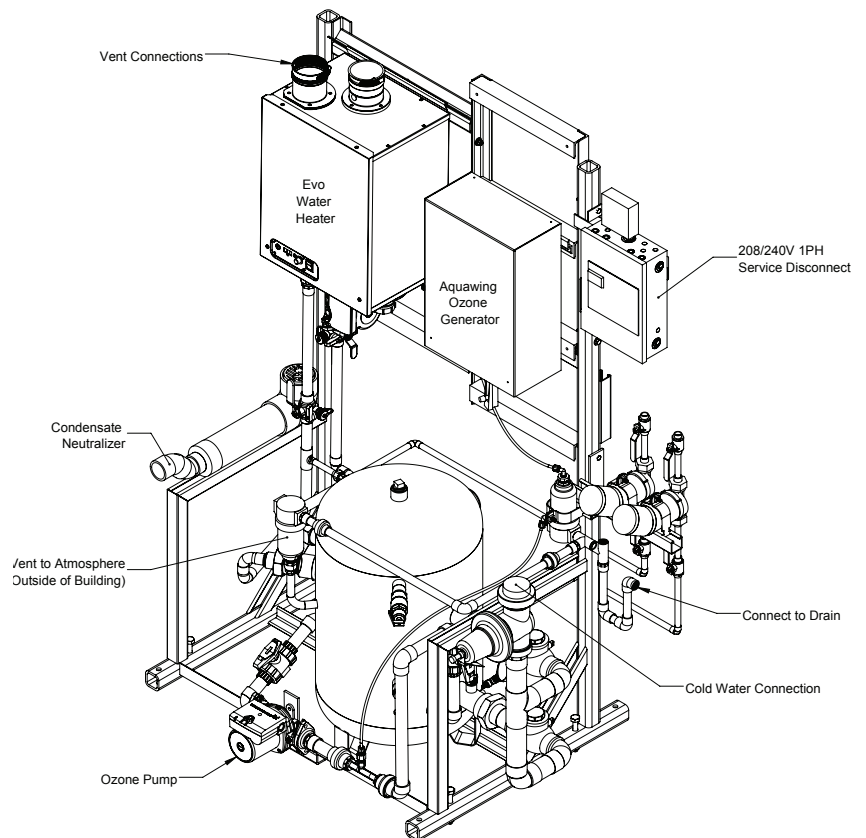
**MODEL SOT 900 L**



**FIGURE 3-2:**

**SAN-O<sub>3</sub>-TYZER COMPLETE SYSTEM**

**MODEL SOT 199-900**



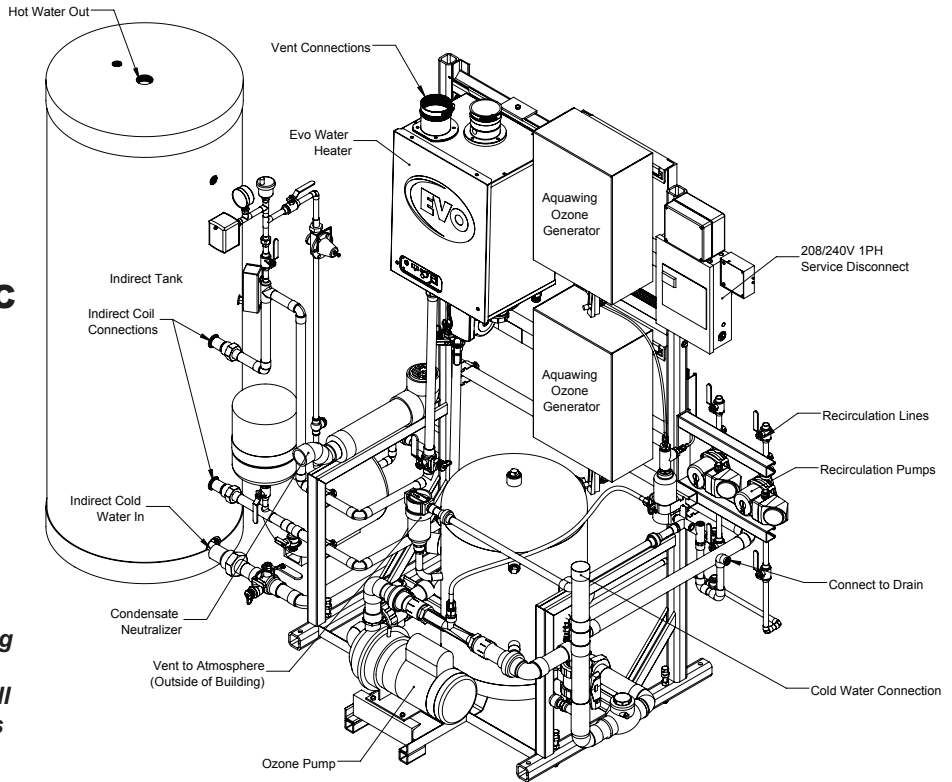
*Note: On all vertical systems, for best possible heated water and sanitized water performance, hot and cold building recirculation lines are required. A 3/4" line should be run from the far end of all bulkheads and connected to the pumps supplied on the San-O3-tyzer system.*

E. SYSTEM DIAGRAMS CONT.

**FIGURE 3-3:**

**SAN-O<sub>3</sub>-TYZER COMPLETE SYSTEM WITH INDIRECT TANK**

**MODEL SOT 199-1800-80SC**

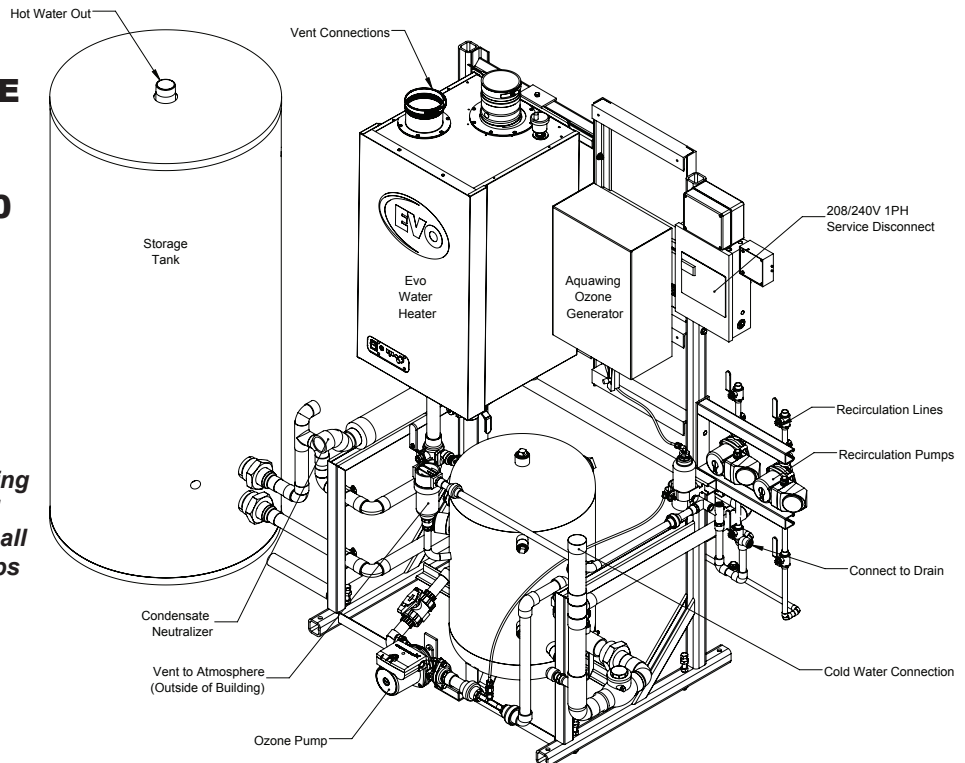


*Note: On all vertical systems, for best possible heated water and sanitized water performance, hot and cold building recirculation lines are required. A 3/4" line should be run from the far end of all bulkheads and connected to the pumps supplied on the San-O3-tyzer system.*

**FIGURE 3-4:**

**SAN-O<sub>3</sub>-TYZER COMPLETE SYSTEM WITH TANK**

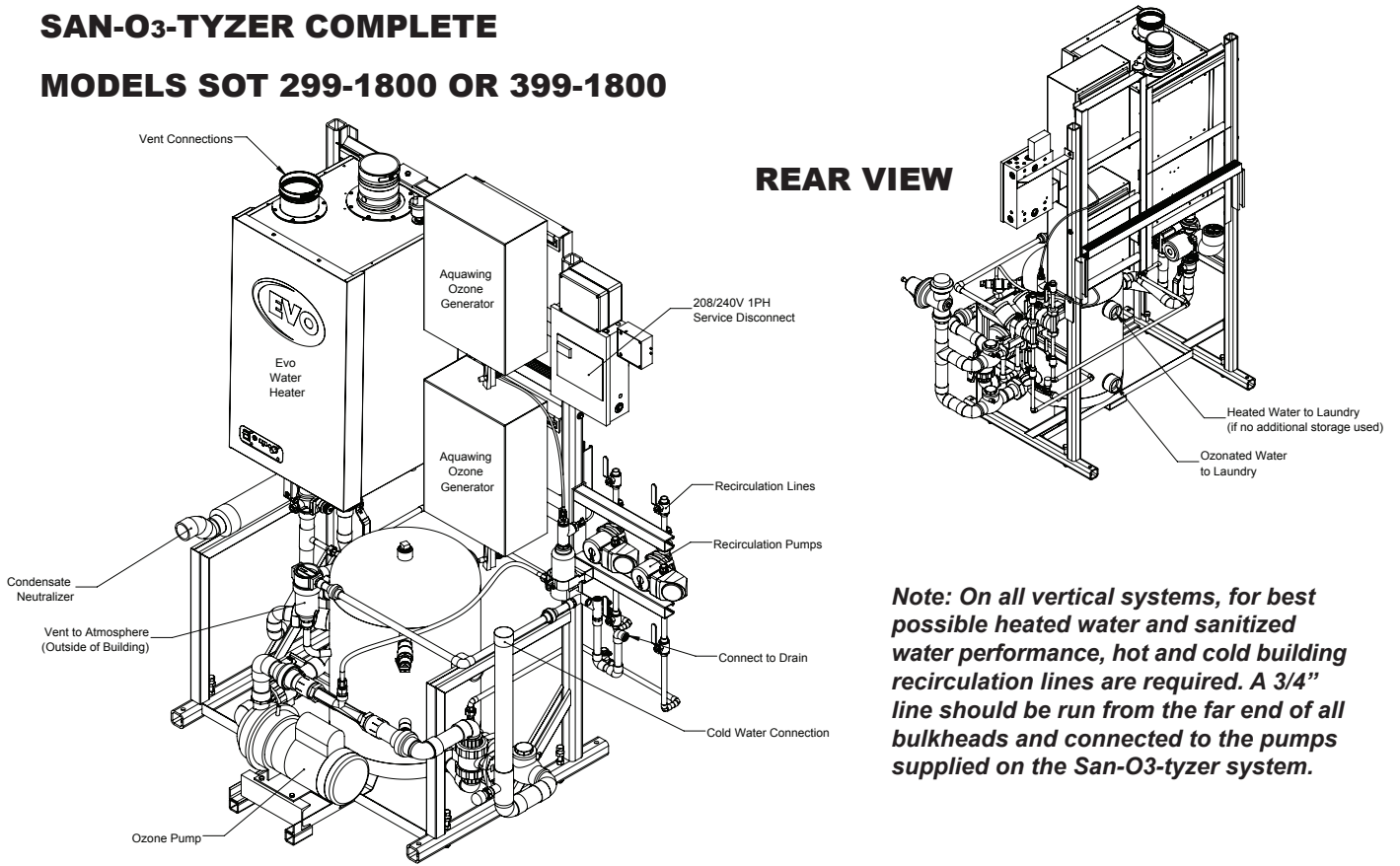
**MODELS SOT 299-900-120 OR 399-900-120**



*Note: On all vertical systems, for best possible heated water and sanitized water performance, hot and cold building recirculation lines are required. A 3/4" line should be run from the far end of all bulkheads and connected to the pumps supplied on the San-O3-tyzer system.*

E. SYSTEM DIAGRAMS CONT.

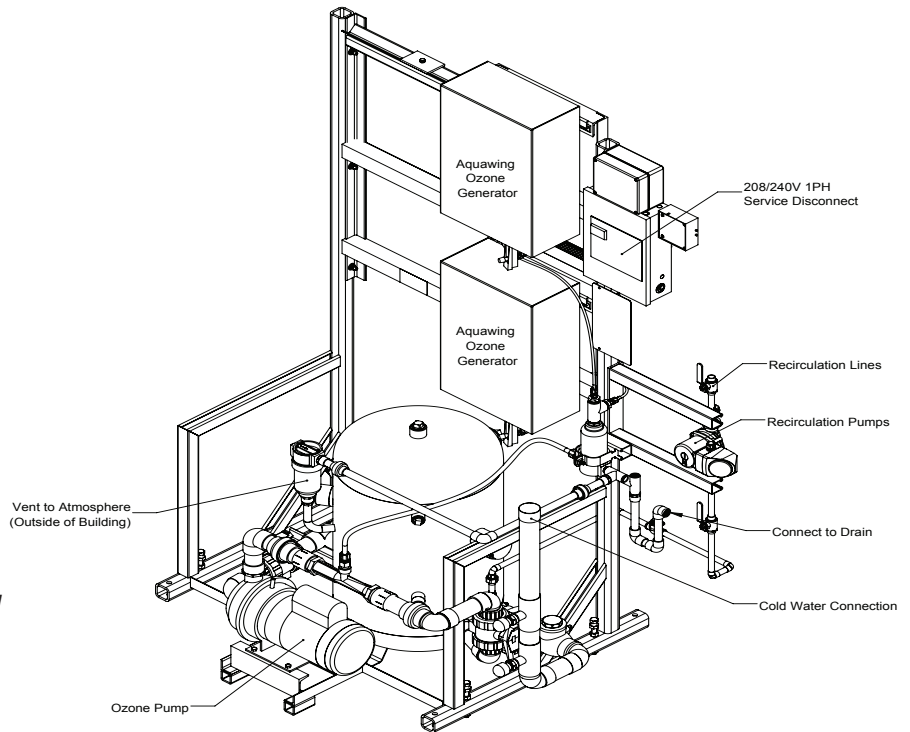
**FIGURE 3-5:  
SAN-O3-TYZER COMPLETE  
MODELS SOT 299-1800 OR 399-1800**



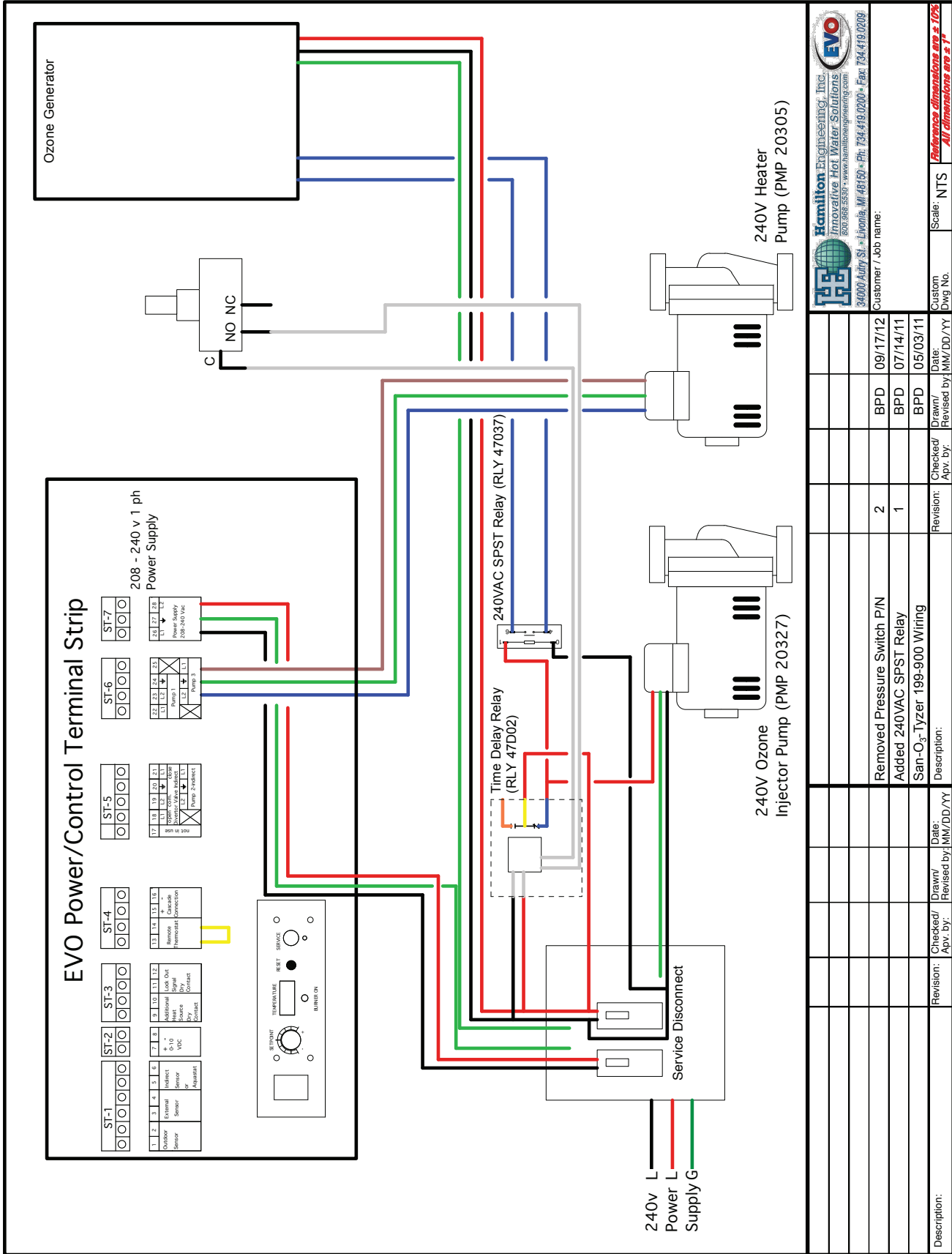
**Note:** On all vertical systems, for best possible heated water and sanitized water performance, hot and cold building recirculation lines are required. A 3/4" line should be run from the far end of all bulkheads and connected to the pumps supplied on the San-O3-tyzer system.

**FIGURE 3-6:  
SAN-O3-TYZER  
MODEL SOT 1800**

**Note:** On all vertical systems, for best possible sanitized water performance, building recirculation lines are required for cold, ozonated water only. A 3/4" line should be run from the far end of all bulkheads and connected to the pumps supplied on the San-O3-tyzer system.

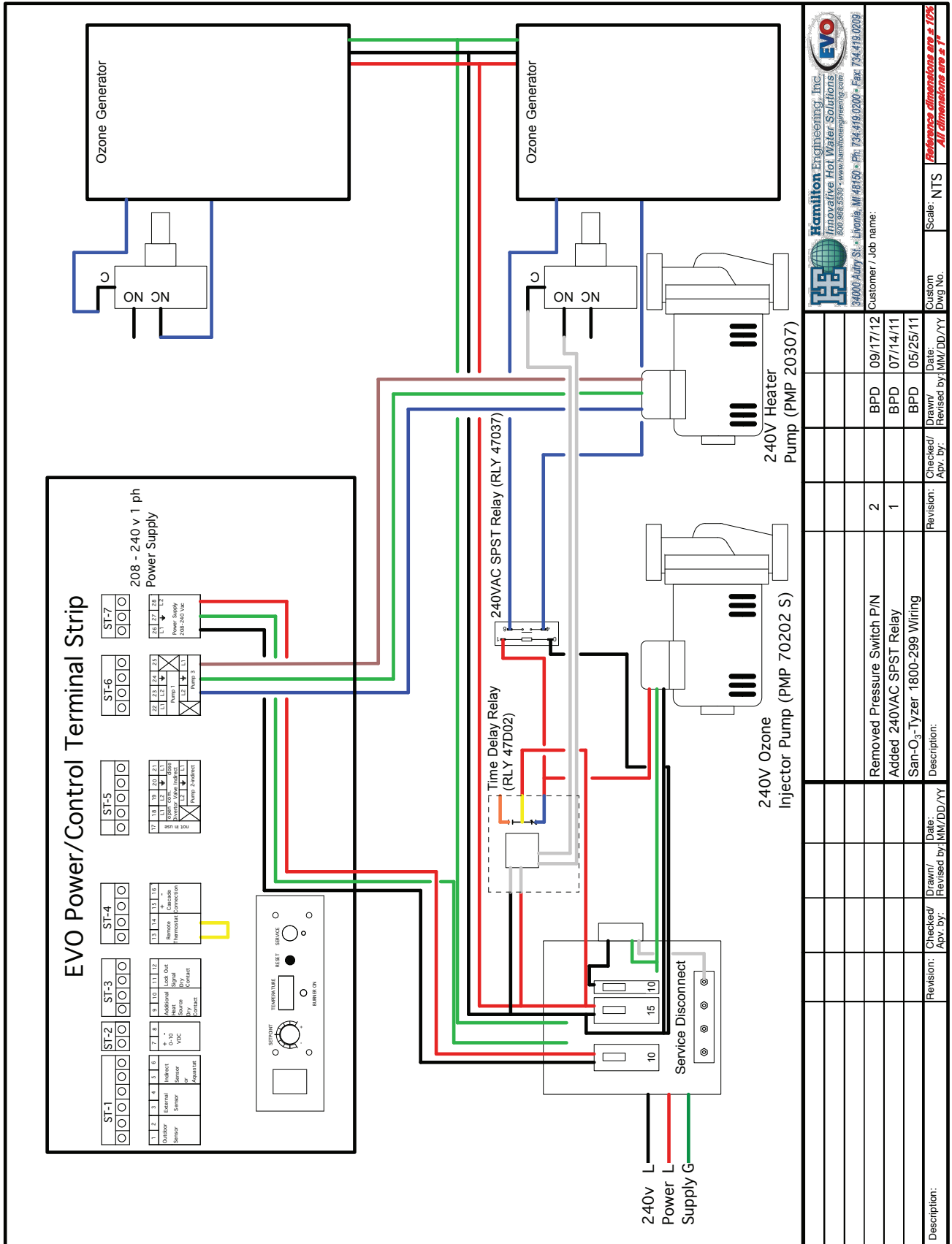


F. WIRING DIAGRAMS



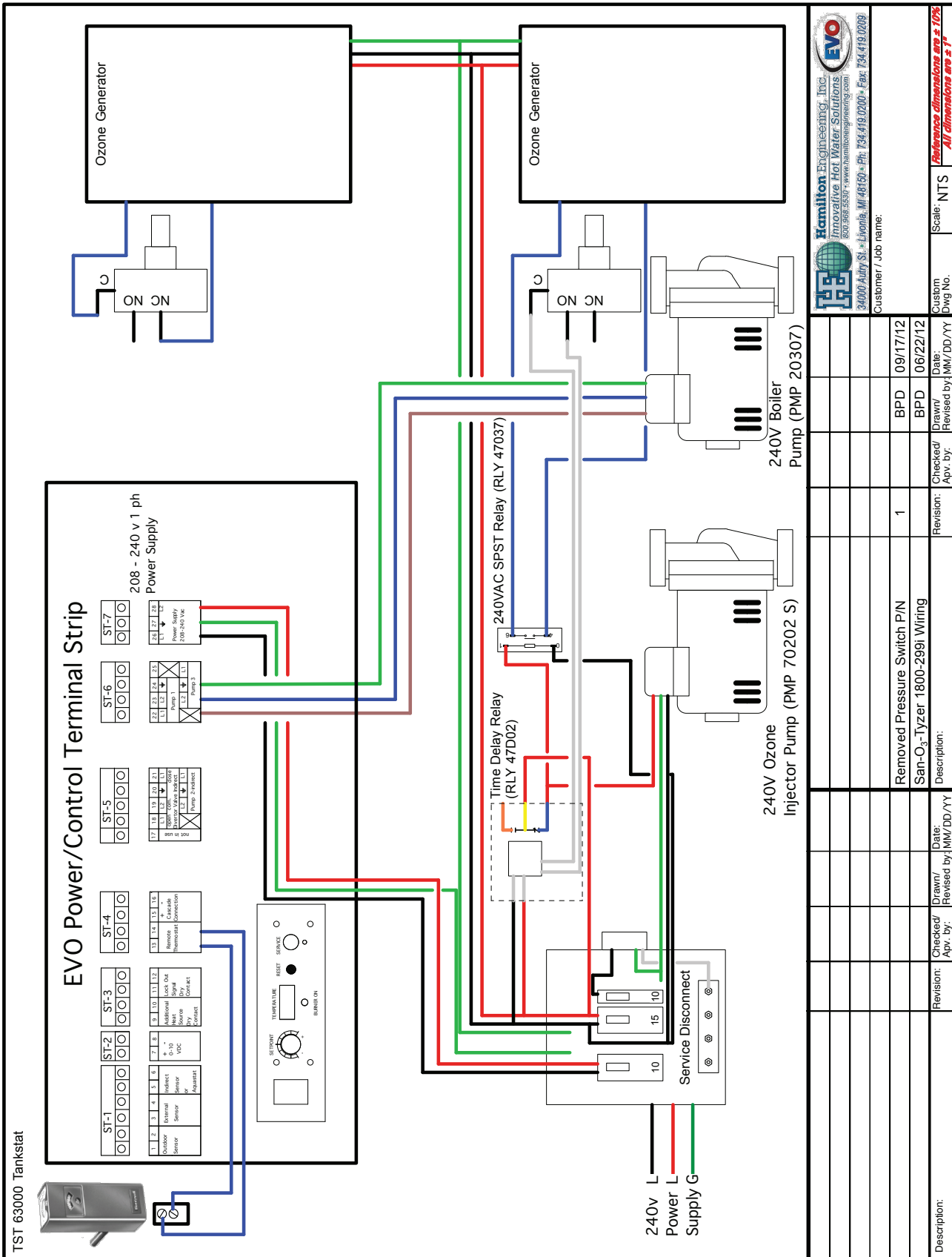
 <b>Hamilton Engineering, Inc.</b> Innovative Hot Water Solutions 34000 Autry St., Livonia, MI 48150 • Ph: 734.419.0200 • Fax: 734.419.0209	
Customer / Job name:	
Scale:	NTS
Custom Dwg No.	
Drawn/ Revised by:	MM/DD/YY
Checked/ Appv. by:	
Revision:	Description:
2	Removed Pressure Switch PIN
1	Added 240VAC SPST Relay
	San-O <sub>3</sub> -Tyzer 199-900 Wiring
Date:	
09/17/12	BPD
07/14/11	BPD
05/03/11	BPD

F. WIRING DIAGRAMS CONT.



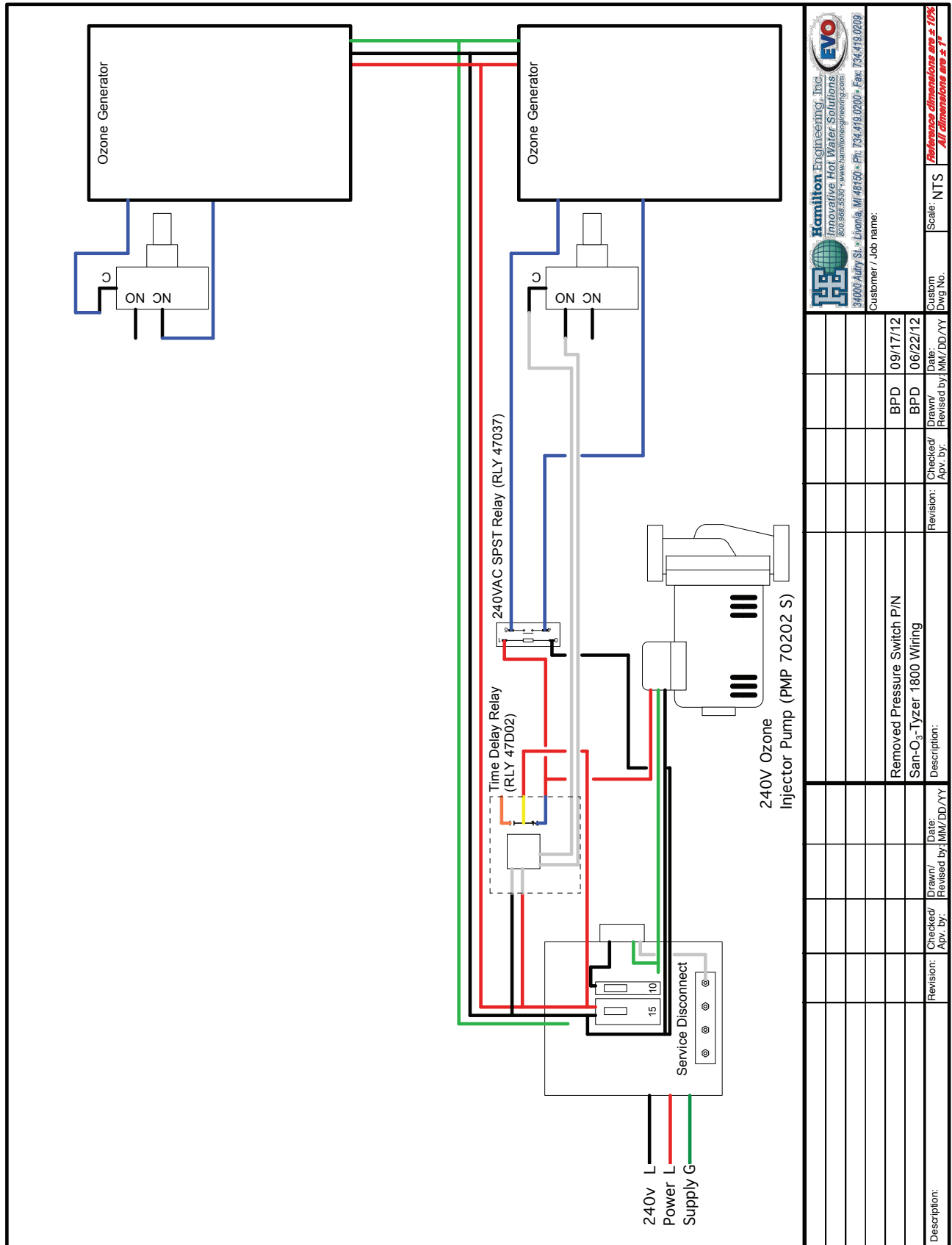
 Hamilton Engineering, Inc. Innovative Hot Water Solutions 34000 Autry St., Livonia, MI 48150 • Ph: 734.419.0209 • Fax: 734.419.0208 www.hamiltonengineering.com	
Customer / Job name:	
Drawn/	BPD
Revised by/	
Date:	09/17/12
Checked/	BPD
Adv. by:	
Revision:	2
Description:	Removed Pressure Switch P/N
	Added 240VAC SPST Relay
	San-O <sub>3</sub> Tzyer 1800-299 Wiring
Drawn/	BPD
Revised by/	
Date:	07/14/11
Checked/	BPD
Adv. by:	
Revision:	1
Description:	San-O <sub>3</sub> Tzyer 1800-299 Wiring
Drawn/	BPD
Revised by/	
Date:	05/25/11
Checked/	BPD
Adv. by:	
Revision:	1
Description:	San-O <sub>3</sub> Tzyer 1800-299 Wiring
Scale:	NTS
Custom Dwg No.:	
Reference dimensions are ± 10% All dimensions are ± 1/8"	

F. WIRING DIAGRAMS CONT.



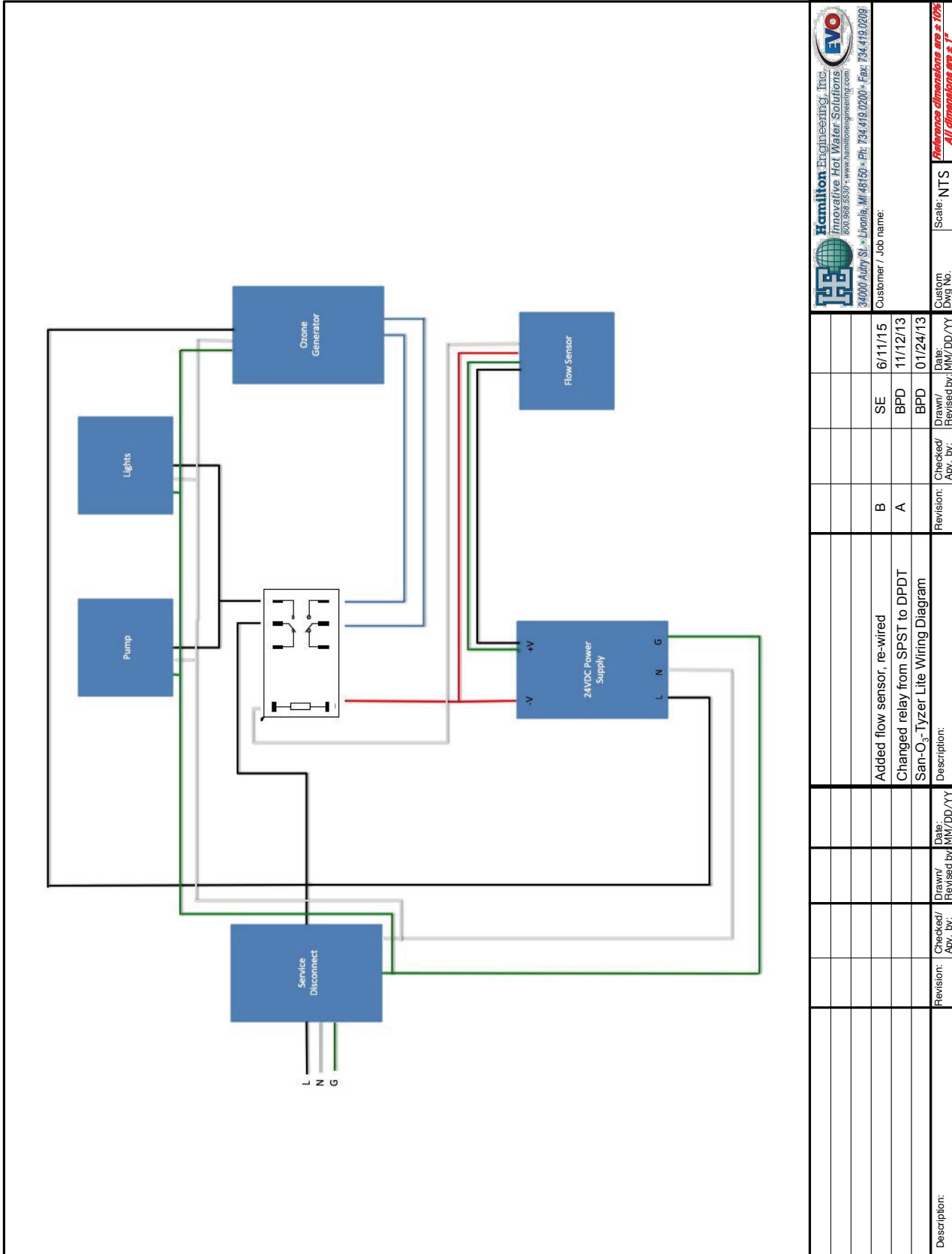



F. WIRING DIAGRAMS CONT.



 Hamilton Engineering, Inc. Innovative Hot Water Solutions 800.968.5530 • www.hamiltonengineering.com 34000 Autry St. • Livonia, MI 48150 • Ph: 734.419.0209 • Fax: 734.419.0209	
Customer / Job name:	
Scale:	NTS
Dwg No.	
Customer / Job name:	
Date:	09/17/12
Drawn/ Revised by:	BPD
Checked/ Appr. by:	BPD
Revision:	
Description:	Removed Pressure Switch P/N San-C <sub>3</sub> -Tyzer 1800 Wiring
Date:	
Drawn/ Revised by:	
Checked/ Appr. by:	
Revision:	
Description:	

F. WIRING DIAGRAMS CONT.



 <b>Hamilton Engineering, Inc.</b> Innovative Hot Water Solutions 800.968.5530 • www.hamiltonengineering.com 34000 Autry St. • Livonia, MI 48150 • Ph: 734.419.0200 • Fax: 734.419.0209		Customer / Job name:	Scale: NTS
Added flow sensor, re-wired Changed relay from SPST to DPDT San-O <sub>2</sub> Tyzer Lite Wiring Diagram		Revision: B A Date: 6/11/15 11/12/13 01/24/13	Custom Dwg No. Date: MM/DD/YY Revised by: MM/DD/YY
Description:		Checked/ App. by:	Checked/ App. by:
Description:		Drawn/ Revised by:	Drawn/ Revised by:

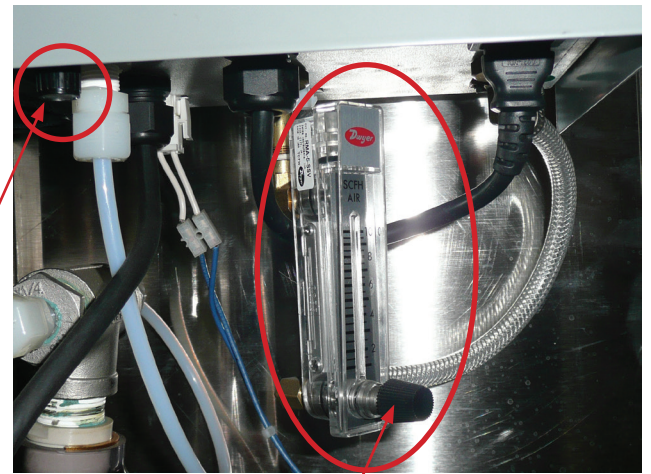
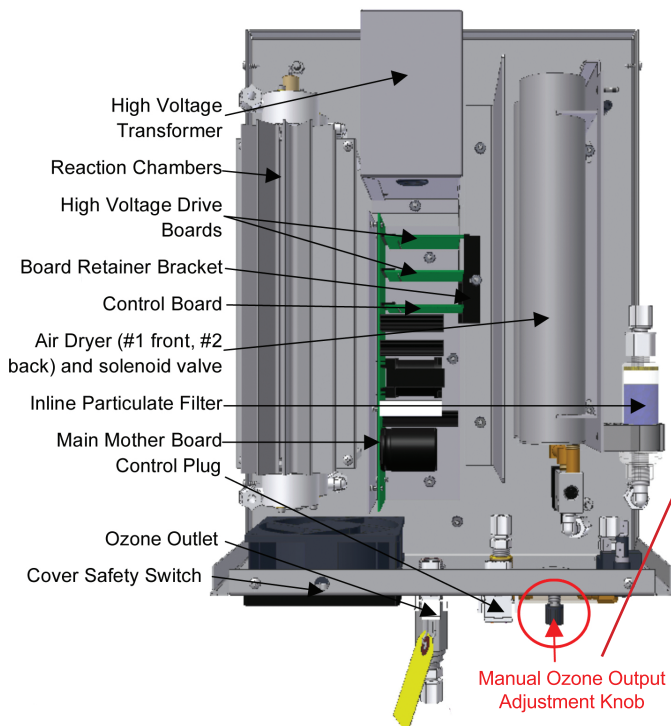
G. CONTROLS

**OZONE OUTPUT CONTROL**

The ozone generators are equipped with two options for controlling the ozone output. The first is a manual 0-100% ozone output control as a black adjustment knob on the bottom of the cabinet - this must always be left in the factory start up position. The second option (which is the primary method of control) is the adjustment knob on the Dwyer flow gauge below the generator. (See below or Appendix, Part 7).

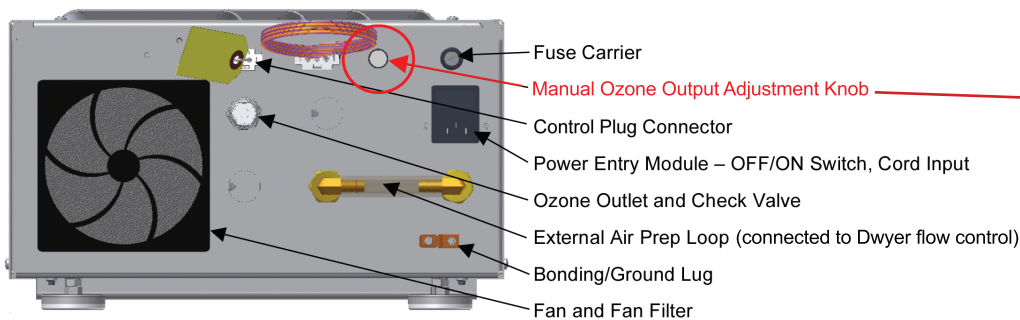
- 1. Manual Ozone Output Control:** Turning the control knob counterclockwise will decrease the ozone output down to 0%, while turning the knob clockwise will increase the ozone output up to 100%. The percent of ozone output is indicated by the “Ozone Output” LEDs on the front of the ozone generator, with each LED representing 10% output. This % output will be set by your start up technician and should not be changed.

Cabinet with cover removed



Dwyer Flow Gauge  
 (connected to External Air Prep Loop)

Bottom of cabinet



## PART 4. START-UP PROCEDURES

### A. AIR PREPARATION SYSTEM, OZONE GENERATOR

The previous sections of this manual have involved comparatively static procedures: making electrical connections, fitting pipe, etc. This section involves the dynamic process of starting up and balancing the components of the ozone system, including initiating water flow, making air and water flow adjustments, etc.

Because this system is designed to deliver ozonated water over a wide variety of flow rates, set up and testing must be done with no flow to washers, one washer filling and 6 or more washers filling with cold water. To confirm proper ozone saturation in the water, an ORP (Oxidation Reduction Potential) meter must be used and the water tested as it leaves the bulkhead washer connection fitting. This test should be performed with a hose removed from a washer, dumping into an overflow bucket. ***The target ORP is 850, but should never be below 750.***



### NOTICE

**Unit must be powered up for 24 hours prior to system start-up (no air flow should be drawn through the system by the ozone injection manifold until this step has been completed). The sieve material in the heat regenerative air dryer must be evaporated of any moisture that has accumulated. If the molex connector (on cabinet bottom) has been removed during this step, replace the molex connector. If this step is not completed premature failure of the heat regenerative air dryer system may occur.**

- **Step 1:** Make sure all isolation valves in the ozone water system are open
- **Step 2:** Start up hydraulics. Allow the water system to reach hydraulic equilibrium (contact vessel(s) full, off-gas vent(s) operating, etc.) and observe for plumbing leaks. Note: Water flow must be established through the water heater pump and the ozone system booster pump.
- **Step 3:** Make sure electrical power to all ozone system electrical components is on. The main power switch of the air preparation system must be in the “ON” position (if so equipped).
- **Step 4:** Observe all indicating LEDs on the front cover of the ozone generator (see Table 4-1 on next page) for proper operation and adjust the manual ozone output knob to desired level setting.

### B. AIR VENT

There are two air vents utilized in the San-O<sub>3</sub>-tyzer system: one in the upright position (the ‘off-gas’ vent), off the tank vent line, and one mounted to the rack, upside down, with a hose connected to the bottom of the generator. The upright vent should have water halfway up the clear sidewall and should have excess ozone bubbling through during production only, and the inverted vent should have no water showing in it. If water is observed in the flexible tubing on the leaving side, the system must not be operated until the cause is corrected.

C. SAN-O<sub>3</sub>-TYZER (ALL MODELS EXCEPT SOT LITE™) START-UP PROCEDURES

**DO NOT BEGIN START UP PROCESS UNLESS THE OZONE GENERATOR HAS BEEN POWERED UP FOR AT LEAST 24 HOURS! Failure to do so may result in component failure due to excess moisture.**

The following indicates what LEDs will be on during this pre-start up condition:

**TABLE 4-1: SOT™ OZONE GENERATOR LED DISPLAY**

LED	FUNCTION	CD12/AD
Ozone Output	The ten LEDs represent 0-100%, minimum to maximum ozone output. Each LED is equal to 10% output. These LEDs can be adjusted with the minimal output control knob located at the bottom of the ozone generator	
Power	Main power is 'ON' to the ozone generator when LED is illuminated	
HV Drive	Power is being sent to the high voltage drive board when LED is illuminated	
Ext Loop	The External Loop has continuity through it when the LED is <b>not</b> illuminated, which indicates that ozone is being produced. The External Loop <b>does not</b> have continuity when the LED and red LED on the relay box are illuminated, indicating that there is no ozone production	
High Temp	The High Temp LED will not be illuminated during normal operation. If the ozone generator's internal temperature is in excess of 150° F, the High Temp LED will illuminate and discontinue ozone production	
Air Prep	The Dryer Timer LED will flash continuously during normal operation and indicates that the dryer timer cycle is operating correctly	
Dryer 1	Dryer 1 LED will be illuminated when dryer chamber 1 is heating	
Dryer 2	Dryer 2 LED will be illuminated when dryer chamber 2 is heating	

**Start-Up and Testing - all systems except San-O<sub>3</sub>-tyzer Lite™**

**Step 1:** Check for leaks at all tubing connections

**Step 2:** Check both air vents for leaks and air/water flow;

- a. Upright unit off tank should have water half way up the clear sidewall and should have excess ozone bubbling through during production only
- b. Inverted air vent off Ozone Generator should not have any water showing in it

**Step 3:** Adjust the water flow sensors (used to turn on the individual ozone generators based on store demand). These sensors are factory-set *at typical washer fill rate levels*; however, at start-up, you must perform the tests laid out in step number four (4), below, as further adjustment (different water flow rate settings on second, third, and fourth switches) may be required to ensure adequate ozone at all washer fill settings.

**Step 4:** Stop all water flow to washers, which will **turn off** Ozone Generator (see **Setting The Thermal Flow Switch**, below, for adjustment).

- a. The first generator should come on with any one washer beginning to fill
- b. If there are two generators, set the second generator flow sensor to come on when just less than half the washers are filling
- c. If there are three generators, set the second at just under 33%, and the third at just under 66% of the washers filling
- d. If there are four generators, set the second at just under 25%, the third at just under

**C. SAN-O3-TYZER (ALL MODELS EXCEPT SOT LITE™) START-UP PROCEDURE CONT.**

50%, and the fourth at just under 75% of the washers filling.

*The first generator should always turn on with anyone washer filling, and turn back off when there are no washers filling.*

**Step 5:** Set ozone flow meter(s) to a minimum of 6 scfh flow during high water flow operation - up to 8 scfh may be required to provide adequate ozone

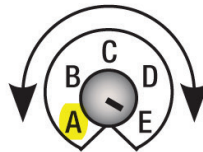
**Step 6:** Test leaving water with ORP meter for a level of 850 or above - *ensure that the meter being used is properly calibrated.* This test should be performed with a hose removed from a washer, dumping into an overflow bucket. **The target ORP is 850, but should never be below 750.**

**Step 7:** Confirm that the time delay is set at six (6) **minutes**. For efficiency in testing, the time delay has been factory-set to six **seconds**; however, for purposes of regular operation, you will want the delay set to six minutes so that the generator will continue to produce ozone, assuring that all the water in the system and/or cold water piping has been ozonated, even after the demand for ozone has ended. (See Figure 4-2, below.)

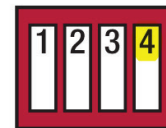
**FIGURE 4-2: TIMING ADJUSTMENT**



Timing Adjustment



Range Selection



Close Only 1 Switch

TIMING CHART						
SWITCH RANGES	CLOSE DIP SWITCH	POTENTIOMETER SETTING				
		A	B	C	D	E
6s-20s	1	6s	9s	13s	16s	20s
22s-1min15s	2	22s	36s	50s	1min4s	1min15s
1min30s-5min	3	1min30s	2min10s	3min20s	4min16s	5min
6min-20min	4	6min	9min	13min20s	17min20s	20min

**SOT LITE™ START-UP AND TESTING**

- **Step 1:** Check for leaks at all tubing connections
- **Step 2:** Check both air vents for leaks and air/water flow:
  - a. Upright unit off tank should have water half way up the clear sidewall, and should have excess ozone bubbling, through production ONLY
  - b. Inverted air vent off Ozone Generator should not have any visible water in it
- **Step 3:** Remove the cold water fill hose from one washer and let it run into a five (5) gallon bucket, and test for ozone level.
- **Step 4:** Start at least four (4) other washers; during their fill cycles, test for ozone levels in your overflowing five (5) gallon bucket

***If the ozone level in the overflowing bucket is below 750 ORP, consult Section 6, Troubleshooting.***

• **NOTE:** The water flow switch will come set from the factory at the lowest water flow setting. This will allow the unit to function at all usage loads. You must confirm that it turns the ozone generator on when only a single, small washer is filling.

### SETTING THE THERMAL FLOW SWITCH

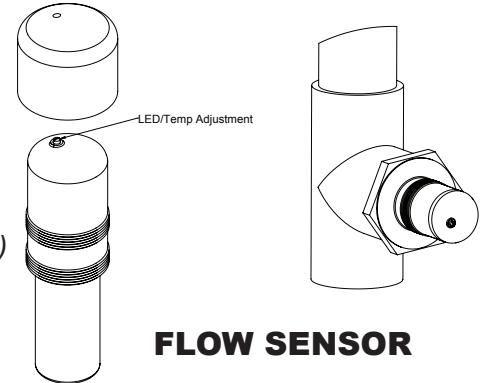
If the preset factory calibration is not adequate for your application, then follow these calibration steps:

1. Remove the white protective cap that the wires run through. Locate the adjustment screw at the top of the flow switch. The red LED should be visible through this adjustment screw. *As you make the adjustments indicated below, bear in mind that the flow switch will take up to ten (10) seconds to respond to each adjustment. Be sure to allow adequate response time before you make subsequent adjustments. LED on indicates a no flow condition; LED off indicates there is sufficient water flow to switch the ozone generator on.*

a. **LED is on, and the desired amount of washers are filling:** use a small slot screwdriver to make small (1/16th turn or less) counterclockwise adjustments, until the LED turns off.

b. **LED is off, and you have no water flow, or less than the required number of washers filling:** use a small slot screwdriver to make small (1/16th turn or less) clockwise adjustments, until the LED turns on.

2. Replace the white protective cap when you have finished adjusting the water flow switch.



**FLOW SENSOR**

## PART 5. MAINTENANCE



### NOTICE

**Maintenance of the ozone system is critical to its longevity and operating efficiency. While all system components are built to provide years of reliable service with minimum maintenance, following the procedures outlined below is strongly recommended.**

All maintenance procedures have been segmented by interval: daily, monthly, semi-annual and annual. Daily procedures involve quick visual checks for changes in normal operating conditions. Monthly, semi-annual and annual procedures include cleaning and/or replacement of certain critical parts. ***Please refer to LIT91127U for complete EVO Maintenance Procedures. If required periodic maintenance is not performed, warranty coverage may be voided.***

***The ozone generator warranty states that it 'does not extend to any product or part which has been damaged or rendered defective as a result of use of parts not sold by Hamilton Engineering, Inc., or service or unit modification not authorized by Hamilton Engineering.' Please contact your San-O<sub>3</sub>-tyzer dealer if you have any questions about any maintenance procedure before you begin that procedure.***



### CAUTION

**Observe all common safety practices and review the "Safety Information" (Part 2, page 6-7) before attempting any maintenance procedure that requires the use of tools and/or shutting down the ozone system.**

## A. DAILY PROCEDURES

### Ozone Generator

- **Indicator Lights:** Check the indicator lights on the ozone generator. See Table 4-1, page 21, for Ozone Generator LED Display function.
- **Ozone Flow:** Check the SCFH flow gauge assembly attached to the ozone generator during demand. Make sure air flow is operating at factory start-up volume under high demand (see label on side of cabinet for setting). If it is not, contact your Laundry Equipment Distributor for service.

### Air Vents - (Tank vent connection and ozone generator back check)

- Check the leaving flexible tubing on both air vents for signs of water. If any is observed, the cause must be found and eliminated immediately prior to further system operation.

### Injection Manifold

- **Check valve:** Inspect the Teflon® ozone delivery line that runs between the back check and the check valve assembly on the suction port of the ozone injector manifold. If water is observed in the delivery line near the check valve assembly, the check valve has failed. See Troubleshooting Guide.

### EVO Water Heater (if applicable)

- Check the display on the front of the EVO Water Heater - it should read your preferred water temperature, during normal operation.

## B. MONTHLY PROCEDURES (weekly during heavy use or in humid environments)

### Ozone Generator

- **Cooling Fan Operation:** Check to make sure the cooling fan mounted on the bottom panel of the ozone generator is operating. If not, refer to the Troubleshooting Guide.
- **Cooling Fan Filters:** Check the cooling fan filter element mounted on the fan assembly located at the bottom panel of the ozone generator and clean as required. Operating conditions in the equipment area will dictate the frequency required for this procedure. Remove the filter element and clean with soap and water, drying them completely before re-installing (see Figure 5-1 on the following page).

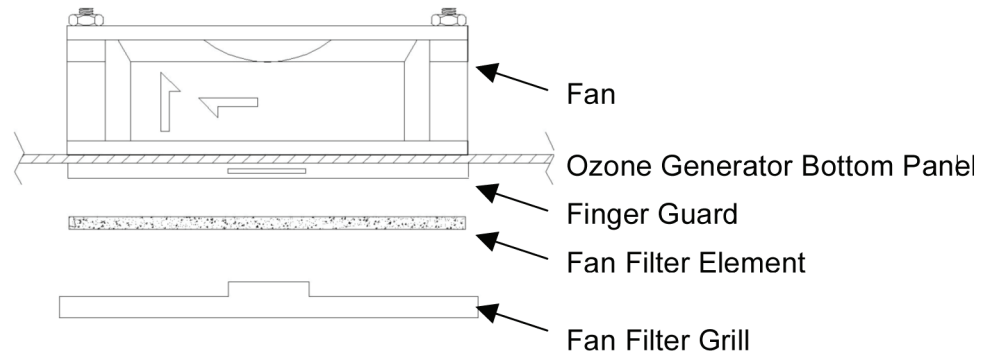
### Booster Pump(s) (if applicable)

- Look for any signs of leaks or abnormal noise.



**C. OZONE GENERATOR COOLING FAN ASSEMBLY**

**FIGURE 5-1: OZONE GENERATOR FAN ASSEMBLY**



**D. SYSTEM SHUTDOWN PROCEDURES**

**⚠ CAUTION**

**The ozone generator operates at high voltages. Follow these steps carefully before performing any semi-annual or annual maintenance procedures.**

- **Step 1:** Turn off power to any peripheral system hydraulic components and air prep system.
- **Step 2:** Turn the Main Power switch on the ozone generator to the “OFF” position. The LED display on the front cover should not be illuminated.
- **Step 3:** Disconnect the power to the ozone system either at the service disconnect box (if so equipped) or main circuit breaker.

**E. SEMI-ANNUAL PROCEDURES (quarterly during heavy use or in humid environments)**

**⚠ CAUTION**

**Follow system shutdown procedures (outlined above) before performing any of the following steps.**

The San-O<sub>3</sub>-tyzer system requires maintenance semi-annually by factory trained personnel to insure proper operation and to keep the warranty in effect.

The water heating system will be checked for proper drainage from the condensate removal system and will have the combustion side inspected and cleaned as required, at least once a year. This procedure will provide a full inspection of over 20 items and components related to the water heater, pump and tank (see LIT91127U for complete EVO Maintenance Procedures).

During that annual combustion chamber cleaning, a factory supplied maintenance kit will be required to be purchased to replace consumable components (see page 28 for Heat Exchanger Maintenance Kit).

**Failure to have factory trained personnel perform these semi-annual maintenance procedures may void warranty.**

**CAUTION**

**Follow system shutdown procedures (outlined on previous page) before performing any of the following steps. Allow the air dryer chambers to cool completely before continuing with the following steps.**

**Ozone Generators**

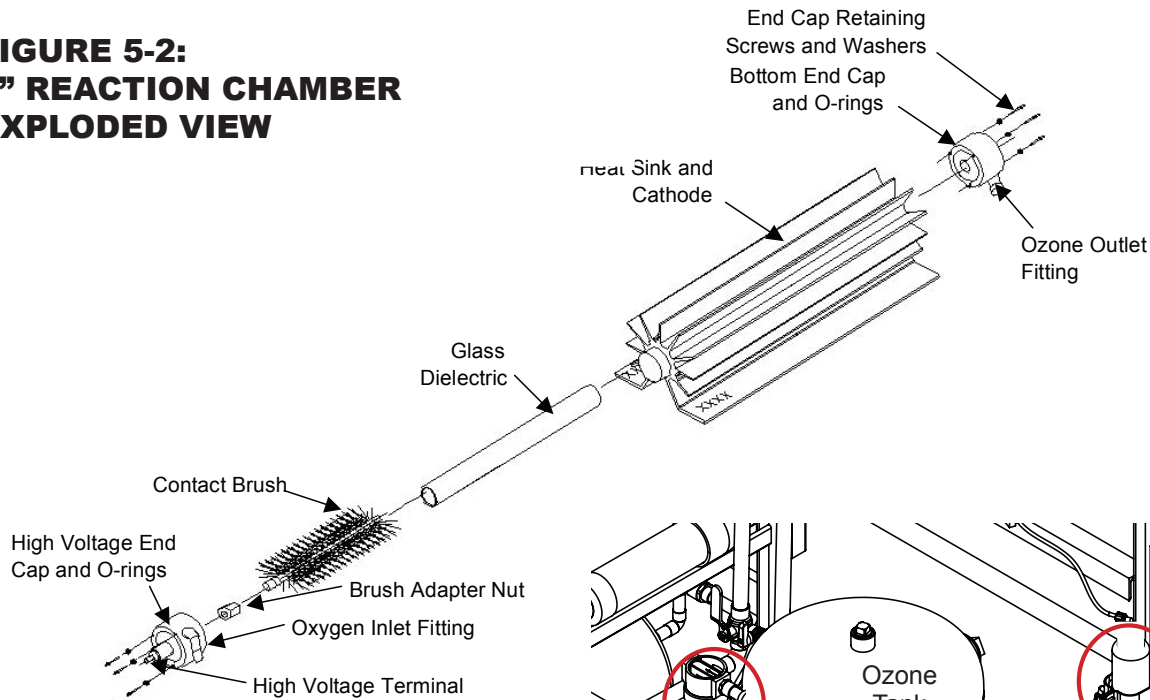
- **Cooling Filters:** Clean or replace the cooling fan filter elements as required.
- **Inline Particulate Filter:** Replace the inline particulate filter.
- **Reaction Chambers:** Remove and disassemble the reaction chamber according to the steps outlined below (see Figure 5-2, page 27). Check the chamber interior and dielectric tube for oil, dirt or moisture.

**Reaction Chamber Removal and Disassembly**

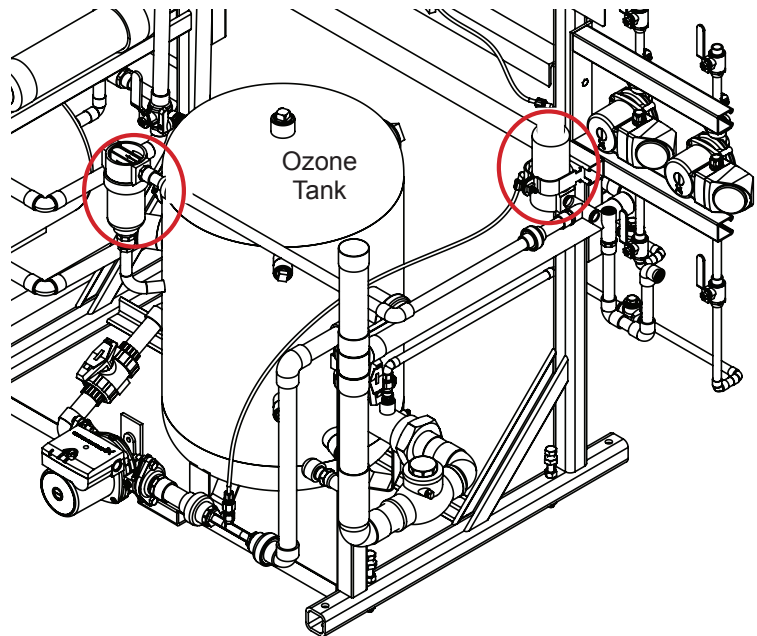
**Note:** *Disassembly and service of the reaction chamber(s) is a technical, delicate and critical procedure. Please consult your Hamilton Engineering dealer before attempting this procedure.*

- Step 1:** Make sure all power to the ozone generator has been disconnected according to the “System Shutdown Procedures” outlined on the previous page).
- Step 2:** Disconnect the high voltage lead from the reaction chamber(s).
- Step 3:** Remove reaction chamber from ozone generator.
- Step 4:** Remove retaining screws and washers from the two end caps (3 each).
- Step 5:** Using a gentle back-and-forth twisting motion, remove the non-high voltage end cap (the one without the high voltage attachment screw) from the heat sink/cathode assembly. Note orientation of the end cap on the heat sink/cathode assembly.
- Step 6:** Remove the high voltage end cap and dielectric from the heat sink/cathode assembly. Note orientation of the end cap on the heat sink/cathode assembly. Remove end cap and contact brush from dielectric glass anode.
- Step 7:** With contact brush attached, remove the brush adapter nut from the high voltage end cap.
- Step 8:** Inspect the dielectric, end caps and cathode for breakage, corrosion or debris, and then follow the assembly and re-installation steps below.
- Step 9:** Re-install complete reaction chamber assembly into the ozone generator by following the “Removal and Disassembly” instructions in reverse order, from Step 5 to Step 2. Follow steps outlined in Part 4, “Start-Up Procedures” to re-start the ozone system.

**FIGURE 5-2:  
1" REACTION CHAMBER  
EXPLODED VIEW**



**FIGURE 5-3:  
OZONE VENTS**

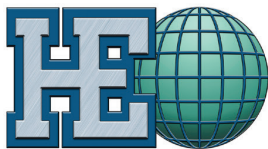


**Ozone Vents**

- *Ozone Generator Back-Check:* Disconnect ozone delivery lines. Remove the air vent from mounting clamps. Disassemble vent and clean inside thoroughly. The float assembly shall be disassembled and cleaned, making sure all ports and orifices are clean and free of debris. Clean O-rings or replace as required. Re-assemble and mount vent.
- *Off-Gas Vent:* Disconnect tubing from top of air vent and remove vent from contact vessel. Disassemble vent and clean inside thoroughly. The float assembly shall be disassembled and cleaned, making sure all ports and orifices are clean and free of debris. Clean O-rings or replace as required. Re-assemble and mount vent onto the contact vessel.

**Injector Manifold**

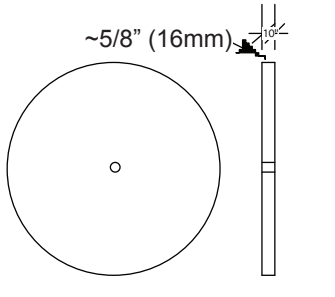
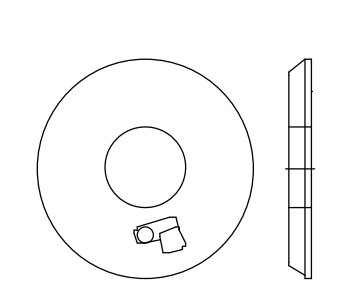
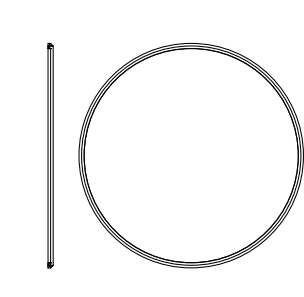
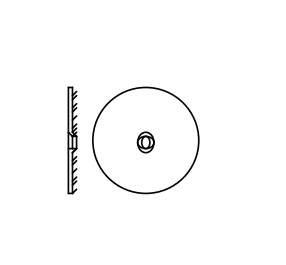
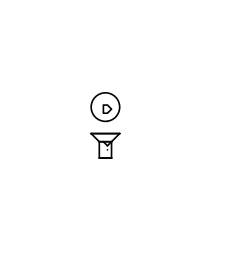
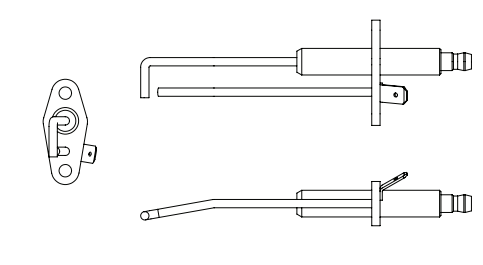
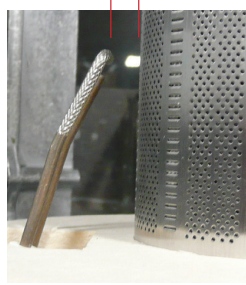
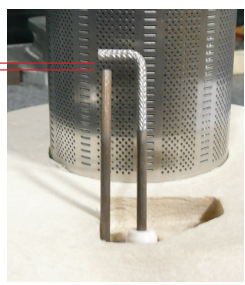
- *Check Valve:* Replace the check valve located at the ozone injection manifold. Note: Because the system is in the shutdown mode, no vacuum is present at the injector. Therefore, it is normal for some water to be flowing from the injector during this procedure.



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**EVO 79 - 599** (in SOT Complete™ systems only)  
**Heat Exchanger Maintenance Kit**  
**MNT 94309 B**

<p><b>FIB 74902</b> Insulation Rear Wall</p> 	<p><b>FIB 74007</b> Insulation Burner Door</p> 	<p><b>GKT 74035</b> Gasket Burner Door</p> 
<p><b>MSC 74029</b> Insulation Washer (Rear Wall Insulation)</p> 	<p><b>MSC 74028</b> Screw for (Rear Wall Insulation)</p> 	<p><b>PLT 94318 A</b> Ignitor Replacement Kit</p> 
<p><b>Ignitor Adjustment/Mounting Instructions</b></p>		
<p>~5/16" (8-10mm)</p> 		<p>~1/8" (3.50mm)</p> 

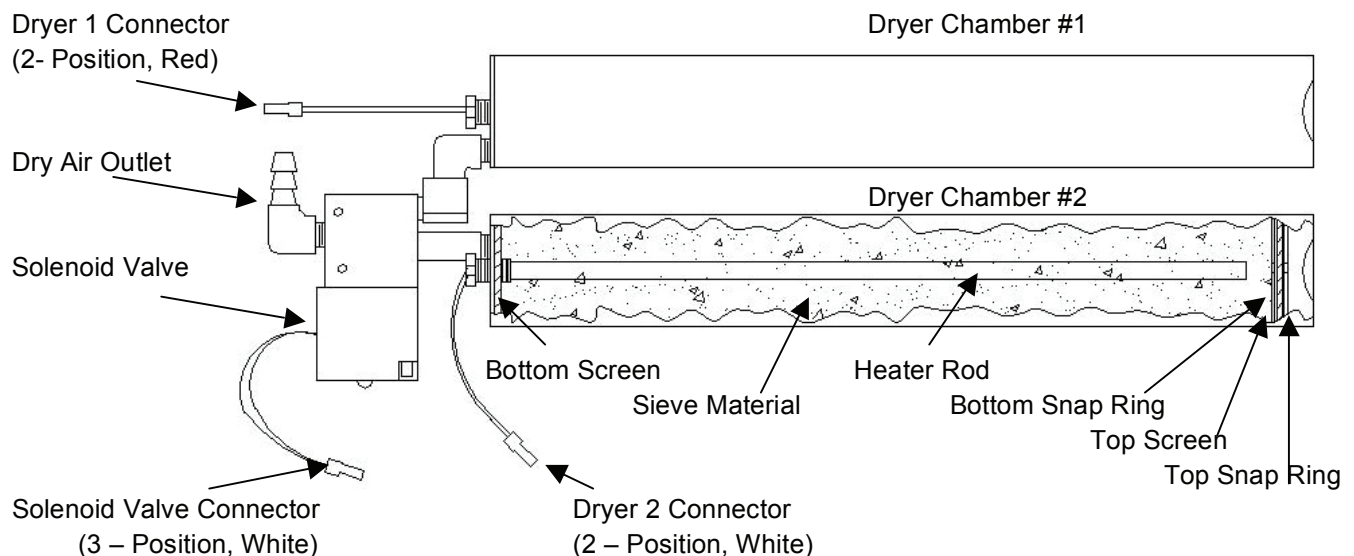
H. ADDITIONAL MAINTENANCE PROCEDURES

In addition to the semi-annual and annual maintenance procedures, you will need to perform additional maintenance every three years. Please follow the steps listed below.

**Air Preparation System**

- **Step 1:** Straighten out the ends of the dryer chambers.
- **Step 2:** Using a snap ring tool, remove the top snap rings.
- **Step 3:** Remove the top screens.
- **Step 4:** Using a snap ring tool, remove the bottom snap rings.
- **Step 5:** Remove the old sieve material from the dryer chambers and dispose.  
**Note: When removing the sieve material , be sure not to discard the bottom screens.**
- **Step 6:** Re-install the bottom screens. Note: The heater rod must be put through the bottom screens.
- **Step 7:** Fill chamber with new sieve material to 3/4" to 1" below the top of the dryer chamber.
- **Step 8:** Using a snap ring tool, place the bottom snap rings just above the top level of the new sieve material.
- **Step 9:** Re-install the top screens.
- **Step 10:** Using a snap ring tool, place the top snap rings snug against the top screen.
- **Step 11:** Bend the ends of the dryer chambers in-ward for added retention of the sieve material.
- **Step 12:** CD12/AD must be turned on for 24 hours prior to system start-up to eliminate any moisture trapped in the new sieve material. See Part 4, Start-Up Procedures, Step 4.

**FIGURE 5-4: HEAT REGENERATIVE AIR DRYER**



# PART 6. TROUBLESHOOTING

## A. AIR PREPARATION - HEAT REGENERATIVE DRY AIR

PROBLEM / SYMPTOM	POSSIBLE CAUSE	SOLUTION
Air prep LED not flashing	- Air dryer not functioning	Replace air dryer board
Dryer 1 or 2 LED is not illuminated	- Air dryer board not functioning - Dryer 1 LED will not illuminate when Dryer 2 LED is illuminated - Dryer 1 is in cool down mode - Dryer 2 LED will not illuminate when Dryer 1 LED is illuminated - Dryer 2 LED is in cool down mode	- Replace air dryer board - See 'Part 1, Product Description, Air Preparation System' - See 'Ozone Generator LED Display', Table 4-1, page 20
Dryer chamber(s) not heating	- Heating element not functioning	Replace heating element
Indicating desiccant cartridge has changed from blue & white to all pink or white. Moisture has entered air prep system	- Unit does not have constant power - Excessive air flow - Excessive duty cycle - Excessive relative humidity - Solenoid valve not operating - Air dryer board not functioning	- Unit must have constant power - Adjust flow meter - Duty cycle must not exceed 10 hours in a 24 hour period - Relative humidity must not exceed 75% - Replace solenoid valve - Replace dryer board

## B. OZONE GENERATOR

PROBLEM / SYMPTOM	POSSIBLE CAUSE	SOLUTION
LED display is not illuminated	- No power to unit - Main power switch is in the 'OFF' position - Blown fuse - Incorrect wiring - LED display board ribbon cable is disconnected from output control board	- Check circuit breakers - Turn switch to the 'ON' position  - Replace fuse(s) - See 'Installation Procedures, Electrical' - Connect ribbon cable (be sure all of the pins are properly inserted into the output control board)
Main Power LED is not illuminated, but all other LEDs are illuminated	- LED display board is inoperable	- Replace LED display board
Circuit breaker trips	- Incorrect wiring - Circuit breaker amperage does not match draw - Unit flooded with water	- See 'Installation Procedures, Electrical' - Replace with correct circuit breaker  - Assess damage, correct cause and reboot as required

**B. OZONE GENERATOR CONT.**

<b>PROBLEM/SYMPTOM</b>	<b>POSSIBLE CAUSE</b>	<b>SOLUTION</b>
HV Drive LED is not illuminated	- No power to the high voltage drive board	- Check board to be sure it is attached securely to mother board - Bad high voltage drive board, replace as required
External Loop LED is illuminated	- The external loop does not have continuity	- See 'Installation Procedures, Electrical, pg. 10' for function
Ozone Output LEDs are not illuminated	- The manual 0-100% output potentiometer is set to 0% output - Remote 4-20mA controller is sending a 4mA signal, which indicated 0% output	- Adjust potentiometer clockwise to desired setpoint - No solution required, controller will adjust LEDs automatically
Hi Temp LED illuminated	- Unit is overheating	- Check fan for proper operation and clean fan filter - Check operating temperature - See 'Installation Procedures, Getting Started, Equipment Placement'
Internal Mother Board Power LED is not illuminated	- No power to mother board - Inoperable mother board - Blown mother board fuse	- See 'Installation Procedures, Electrical' pg. 10 - Replace mother board - Replace fuse
Receive an electrical shock upon touching the unit	- Incorrect wiring - Unit not grounded - Unit flooded with water	- See 'Installation Procedures, Electrical' pg. 10 - Ground unit according to local codes - Assess damage, correct cause and reboot as required
Fan not operating	- Debris caught in fan - Fan inoperable	- Remove debris - Replace fan
Low air flow or no air flow	- Air prep system not operating properly - Fouled inline filter - Air leak	- See 'Start Up Procedures', Step 4, pg. 19 - Change inline filter - Check all fittings, tighten as required
Low vacuum	- Hydraulics/pneumatics out of adjustment  - Defective check valve(s) - Blocked injector orifice  - Defective o-ring seals in reaction chamber - Loose internal fittings - Defective dielectrics	- See 'Start-Up Procedures', pg. 19-21 - Back wash filter (if so equipped), look for obstruction through the ozone loop - Replace check valves - Check injector orifice  - Check & replace as required  - Check all fittings, tighten as required - Check & replace as required

**B. OZONE GENERATOR CONT.**

<b>PROBLEM / SYMPTOM</b>	<b>POSSIBLE CAUSE</b>	<b>SOLUTION</b>
High vacuum	<ul style="list-style-type: none"> <li>- Hydraulics/pneumatics out of adjustment</li> <li>- Change in hydraulics - excessive water flow through ozone injector</li> </ul>	<ul style="list-style-type: none"> <li>- See 'Start-Up Procedures', pg. 21-23</li> </ul>
Unit flooded with water	<ul style="list-style-type: none"> <li>- Defective check valve(s)</li> <li>- Hydraulics out of adjustment</li> </ul>	<ul style="list-style-type: none"> <li>- Assess damage, repair as required, replace check valve(s)</li> <li>- See 'Start-Up Procedures', pg. 21-23</li> </ul>
Ozone smell detected from or near ozone generator	<ul style="list-style-type: none"> <li>- Insufficient vacuum at venturi</li> <li>- Loose internal fittings</li> <li>- Defective o-ring seals in reaction chamber(s)</li> <li>- Defective dielectrics</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust injector, see 'Start-Up Procedures', pg. 21-23</li> <li>- Check all fittings, tighten as required</li> <li>- Check &amp; replace as required</li> <li>- Check &amp; replace as required</li> </ul>

**C. OZONE INJECTING/CONTACTING**

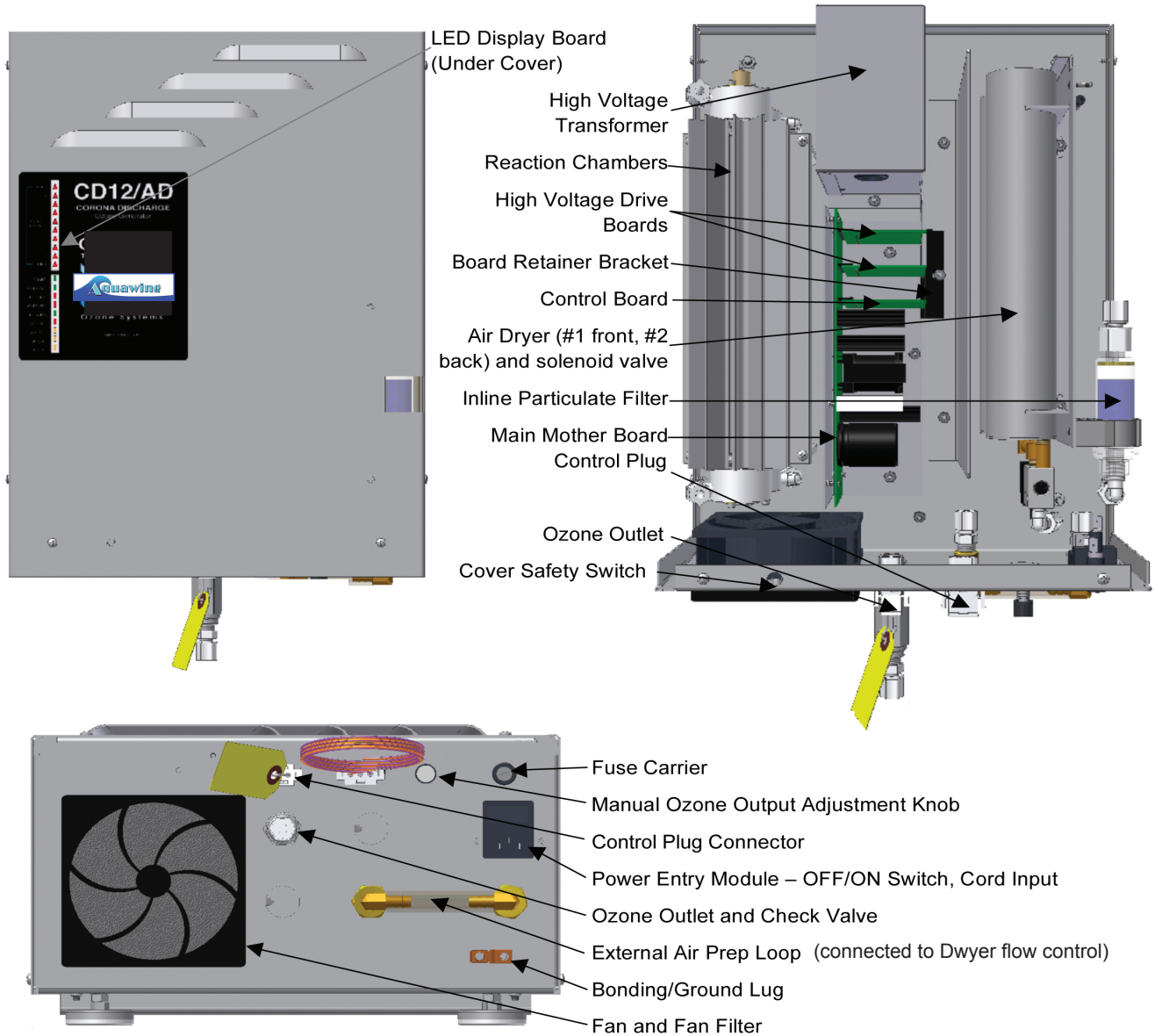
<b>PROBLEM / SYMPTOM</b>	<b>POSSIBLE CAUSE</b>	<b>SOLUTION</b>
Water backflow past injector check valve(s)	<ul style="list-style-type: none"> <li>- Defective check valve(s)</li> </ul>	<ul style="list-style-type: none"> <li>- Replace check valve(s)</li> </ul>
No vacuum at venturi inlet port	<ul style="list-style-type: none"> <li>- Low water flow thru ozone injector</li> <li>- Back pressure in hydraulic line</li> <li>- Injector orifice is clogged</li> <li>- Booster pump not functioning properly</li> </ul>	<ul style="list-style-type: none"> <li>- Check for obstructions upstream of ozone injector</li> <li>- Check for obstructions downstream of ozone injector</li> <li>- Check for obstructions</li> <li>- Check booster pump (contact dealer)</li> </ul>
Ozone smell detected around back check or ozone injector	<ul style="list-style-type: none"> <li>- Insufficient vacuum at venturi</li> <li>- Loose fittings</li> </ul>	<ul style="list-style-type: none"> <li>- See 'Start-Up Procedures', pg. 21-23</li> <li>- Check all, tighten as required</li> </ul>



# PART 7. APPENDIX

## A. SPECIFICATIONS

**FIGURE 7-1: OZONE GENERATOR SPECIFICATIONS**



Shown: Aquawing Ozone Systems CD12/AD Ozone Generator (wire harness omitted for clarity)

OZONE GENERATOR	SPECIFICATIONS	OZONE OUTPUT/SCFH
CD12/AD	22”h x 13.5”w x 8.25”d, 20 lbs	2.6 g/h, 1% @ 8 scfh
Mounting Bracket Measurement	Z-Bar Mount	

## B. PARTS LISTS

**TABLE 7-1: AIR PREPARATION PARTS**

Description	Part #
Complete Air Dryer Assembly	ADP100
Air Dryer Heating Rod	ADP20
Solenoid Valve, 3-way, 24DC	SV220
Indicating Desiccant Refill	DES16
Dryer Sieve Desiccant Refill	DES12
Dryer Media Screen, Small	SCN20
Dryer Media Screen, Large	SCN30
Dryer Media Retaining Ring	HDW137
Dryer Chamber Retaining Spring	SPG110

**TABLE 7-2: OZONE GENERATOR PARTS**

Description	Part #
Reaction Chamber - Complete	RCC17
Dielectric Anode 1"	RCC76
Non-High Voltage End Cap	RCC57
High Voltage End Cap	RCC53
O-Ring Set	ORS50
Mother Board	CCA1325
Control Board	CCA1232
LED Display Board	CCA1350
High Voltage Drive Board	ELPC5040 / ELPC5042
High Voltage Transformer	ELTR105
Check Valve - 1/4 FPT x 1/4 MPT	CKV22
Cooling Fan	FA47
Cooling Fan Filter	FA40
Inline Particulate Filter	FLT34
Fuse, Bussmann MDL (5-5 amp, 250 VAC Slow Blow, Main Power)	FUS20
Fuse, Littelfuse 239003 (3 amp, 250 VAC Slow Blow, Mother Board)	FUS15

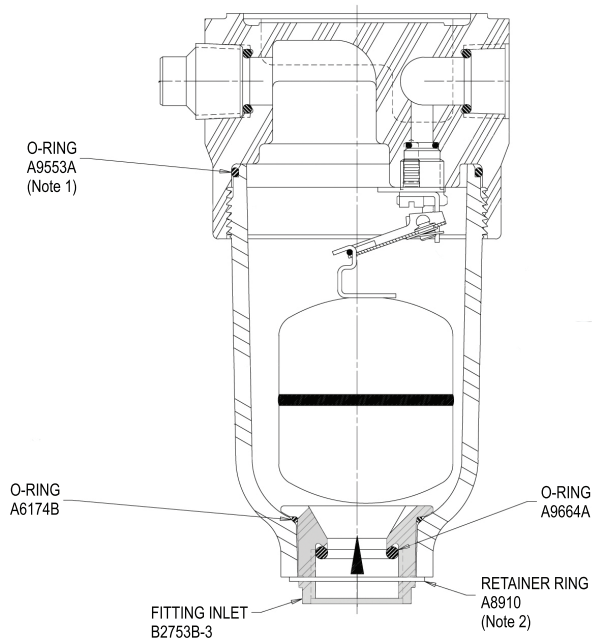
**TABLE 7-3: ASP115A - MAINTENANCE KIT (PER OZONE GENERATOR)**

Description	Part #	Qty
Filter - Cooling Fan Filter	FA40	1
Filter - Inline Particulate Filter	FLT34	1
O-Ring Set	ORS50	2
Check Valve - 1/4 FPT x 1/4 MPT	CKV22	1
Indicating Desiccant Refill	DES16	1
Dryer Sieve Desiccant Refill	DES12	1
Fuse, Bussmann MDL (5-5 amp, 250 VAC Slow Blow, Main Power)	FUS20	5
Fuse, 3A, 250 VAC Slow Blow, 5 x 20mm	FUS15	1

## B. PARTS LISTS CONT.

**TABLE 7-4: ADDITIONAL PARTS**

Description	Part #
Vent/Drain Automatic Valve	VAL44001
Relief Valve - 125psi (0.75")	RLV02008
Injector 0.75"	MSC71076
Injector 1.0"	MSC71079
Injector 1.5"	MSC71080
Lead Pressure Switch	PRS44130
Lag Pressure Switch	PRS44120
Coupler - Kynar HxF Compression 1/4"	COMP91101
Coupler - Kynar HxF Compression 1/2"	COMP91103
Coupler - Kynar HxF Compression 1/4" x 1/8"	COMP91300
Elbow - Kynar HxM Compression 1/4" x 1/8"	COMP91301
Coupler - Kynar HxM Compression 1/4"	COMP91401
Coupler - Kynar HxM Compression 1/2"	COMP91403
Tee - Kynar Compression 1/4"	COMP91501
Tubing - Teflon PTFE 1/2" OD	COMP97503
Tubing - Teflon PTFE 1/4" OD	COMP97502
240VAC SPST Relay	RLY47037
Relay Time Delay 208//277V	RLY47D02
Dwyer Flow Meter, 0 - 10 SCFH	GTP60005
Ozone Vent/Drain Automatic Valve (see drawing below)	VAL44001
Inner O-Ring for De-Gas Valve	VRP A6174B
Retaining Ring for De-Gas Valve	VRP A8910
O-Ring for De-Gas Valve	VRP A9664A
Large Upper O-Ring for De-Gas Valve	VRP A9668A
Inlet Fitting for De-Gas Valve	VRP B2753B-3

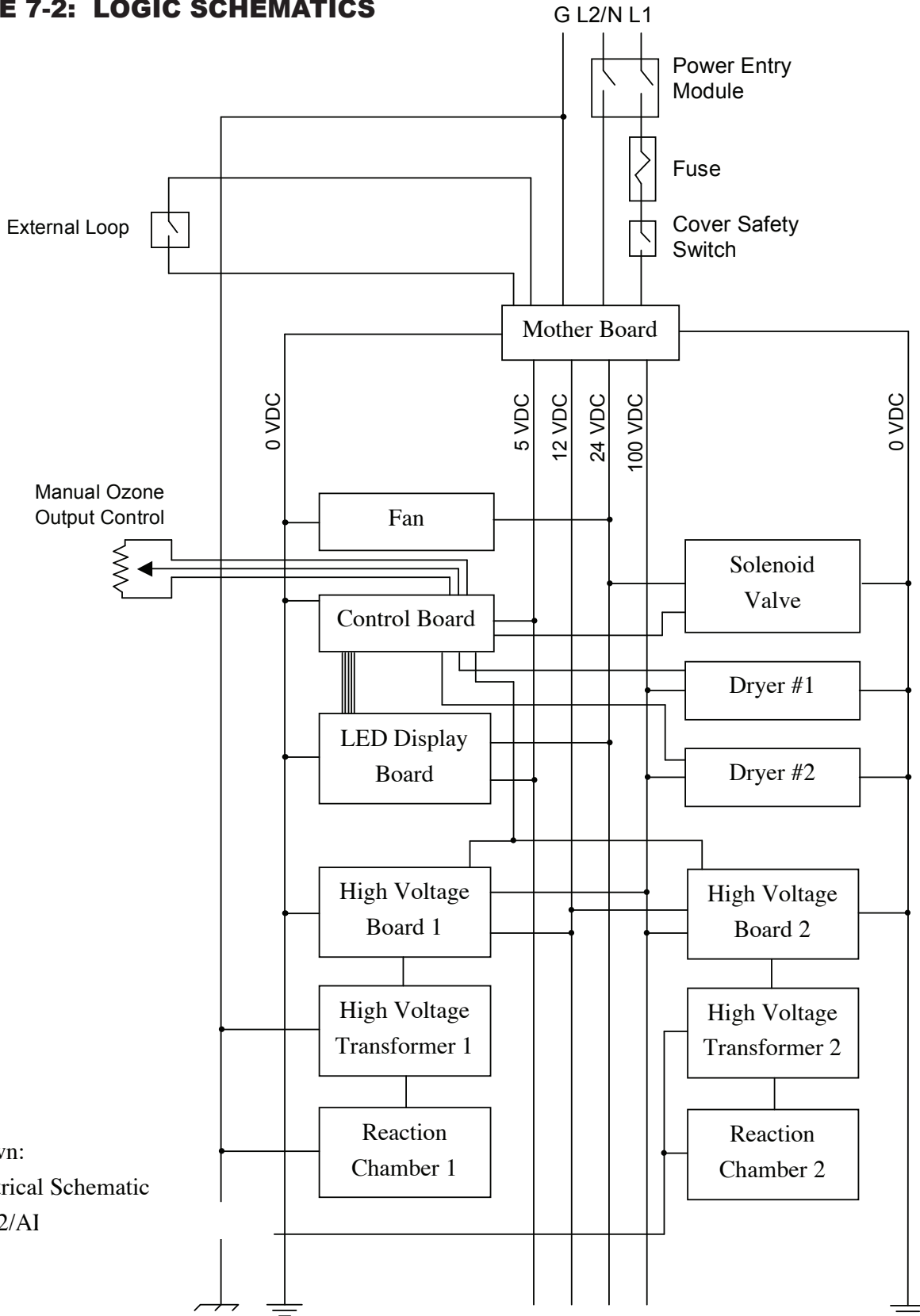


## Notes:

1. Before installing o-ring, lubricate with petrolatum (Vaseline)
2. After inserting o-ring over inlet fitting, slide assembly thru hole, inside of body, compressing o-ring and snap retainer in place
3. Color of o-rings: Brown

C. LOGIC SCHEMATICS

FIGURE 7-2: LOGIC SCHEMATICS



Shown:  
Electrical Schematic  
CD12/AI

# PART 8. WARRANTY

## A. WARRANTY CONTACT INFORMATION

### HAMILTON ENGINEERING LIMITED ONE-YEAR WARRANTY

#### Summary of the Warranty

Hamilton Engineering, 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, 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.

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 Hamilton Engineering 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 Hamilton Engineering
- Service or unit modification not authorized by Hamilton Engineering
- Check valve/solenoid valve failure
- Damage which may occur during shipping
- Failure to meet service requirements as outlined in the I & O manual

#### Obtaining Service Under the Warranty

Any product and/or part not performing satisfactorily may be returned to Hamilton Engineering for evaluation. A Return Goods Authorization (RGA) number must first be obtained by either calling or writing your local authorized dealer, distributor or Hamilton Engineering direct, prior to shipping the product. The problem experienced with the product and/or part must be clearly described. The RGA 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 Hamilton Engineering 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.

A. WARRANTY CONTACT INFORMATION CONT.

If, after the product and/or part is returned prepaid and evaluated by Hamilton Engineering, it proves to be defective while under warranty, Hamilton Engineering 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 Hamilton Engineering manufactured products without prior permission shall void any and all warranties. For service, contact your authorized dealer or distributor or Hamilton Engineering direct at (800) 968-5530.

**Exclusive Warranty**

There is no other expressed warranty on Hamilton Engineering products and/or parts. Neither this warranty, nor 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 limitation 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.***



Hamilton Engineering, Inc. warrants each San-O<sub>3</sub>-tyzer System to be free from defects in material and workmanship according to terms, conditions and time periods. *Unless otherwise noted, these warranties commence on the date of installation. If required periodic maintenance is not performed, warranty coverage may be voided.*

Warranty information specific to each model can be found on our website **[www.hamiltonengineering.com](http://www.hamiltonengineering.com)**, requested via email at **[info@hamiltonengineering.com](mailto:info@hamiltonengineering.com)**, or in our printed Product Catalogs.

If you have any questions or comments, please contact us at 800.968.5530. If you need emergency technical support after hours, we are available 24 hours a day, 7 days a week by calling this number.

Please keep the following information on hand when calling about warranty information:

Model: \_\_\_\_\_ Serial #: \_\_\_\_\_

Installer Name: \_\_\_\_\_ Phone #: \_\_\_\_\_ Install Date: \_\_\_\_\_

