RM900 GENERATOR

OWNER'S MANUAL

AZCO INDUSTRIES LIMITED

OWNERSHIP DATA

Unit Type:	RM900	Interface Board Version:	
Unit Serial No.:		Over Voltage Version:	
Delivery Date:		Circuit Breaker:	
Installation Date:		OPTO Relay:	
Voltage:		Oxygen Valve:	
Mother Board Version:		Drain Valve:	
PLC Board Version:		Vacuum Valve:	
Driver Board Version:		Internal Pump Type:	

SAFETY PRECAUTIONS

In addition to normal safety rules which should be observed with stationary Ozone Generators and equipment, the following safety directions and precautions are of special importance.

When operating this unit, the operator must employ safe working practices and observe all related local work safety requirements and ordinances.

The owner is responsible for maintaining the unit in a safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.

Installation, operation, maintenance and repair shall only be performed by authorized, trained, and competent personnel.

Normal ratings, pressures, temperatures, time settings, etc., Shall be diligently adhered to.

Any modification to the Ozone Generator, and/or related equipment, shall only be performed in agreement with Azco Industries Limited and under supervision of authorized, competent personnel.

If any statement in this book, especially with regard to safety, does not comply with local legislation, the stricter of the two shall apply.

These precautions are general and cover several machine types and equipment; hence some statements may not apply to the unit(s) described in this book.

INSTALLATION

1. The Ozone equipment should only be lifted with adequate equipment in conformity with local safety rules. Wear a safety helmet when working in the area of overhead or lifting equipment.
2. Place the unit where the ambient air is as cool and clean as possible. If necessary, install a suction duct. Never obstruct the air inlets. Care should be taken to minimize the entry of moisture into the air inlet.
3. The unit shall be installed in such a way that an adequate flow of cooling air is available.
4. Ensure that the rear exhaust vents are not in contact with or near to flammable materials.
5. All Azco products are designed to operate under vacuum. DO NOT operate under pressure.
6. Install the equipment on a solid floor suitable for the weight, this applies to all other equipment as well e.g. SPT's and Foam Fractionator's. If ground is not level or can be subject to variable inclination, consult Azco Industries Limited.

SAFETY PRECAUTIONS (Continued)

OPERATION

1. ATTENTION: Please read the section labeled “First Start-up” prior to operating the unit.
2. Air hoses shall be of correct size and suitable for the working vacuum/ pressure. Never use frayed, damaged or deteriorated hoses. Use only the correct type and size of hose end fittings and connections.
   (Caution: Use extreme care with the ozone gas lines when in operation, the unit must be turned off before any of the ozone lines are disconnected. Carbon face masks should be worn if an ozone leak arises.)
3. Never operate the unit when there is a possibility of taking in flammable or toxic fumes.
4. Never operate the unit at pressures below or in excess of its limit ratings as indicated on the product specifications sheet.
5. Keep all body panels closed during operation. Caution (High Voltage inside)
6. Periodically check that:
   - All hoses and/or pipes inside the unit are in good condition, secure, and not rubbing
   - There are no leaks
   - All electrical leads are secure and in good order
   - Air outlet lines are in good repair and free of wear or abuse.

MAINTENANCE

1. Maintenance and repair work shall only be done under supervision of someone qualified for the job.
2. Use only the correct tools for maintenance and repair work.
3. Use only genuine Azco spare parts
4. All maintenance work, other than routine attention, shall only be undertaken when the unit is stopped, the main power supply is switched off and the machine has cooled down. Take precaution to ensure that the unit cannot be started inadvertently.
   (In addition, a warning sign bearing a legend such as “work in progress; do not start” shall be attached to the starting equipment.)
5. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapors of cleaning liquids
6. Make sure that no tools, loose parts or rags are left in or on the unit.
7. Never use caustic solvents which can damage internal components and materials.

All responsibility for any damage or injury resulting from neglecting these precautions, or by non-observance of ordinary caution and due care required in handling, operating, maintenance or repair, even if not expressly mentioned in this book, will be disclaimed by Azco Industries Limited.

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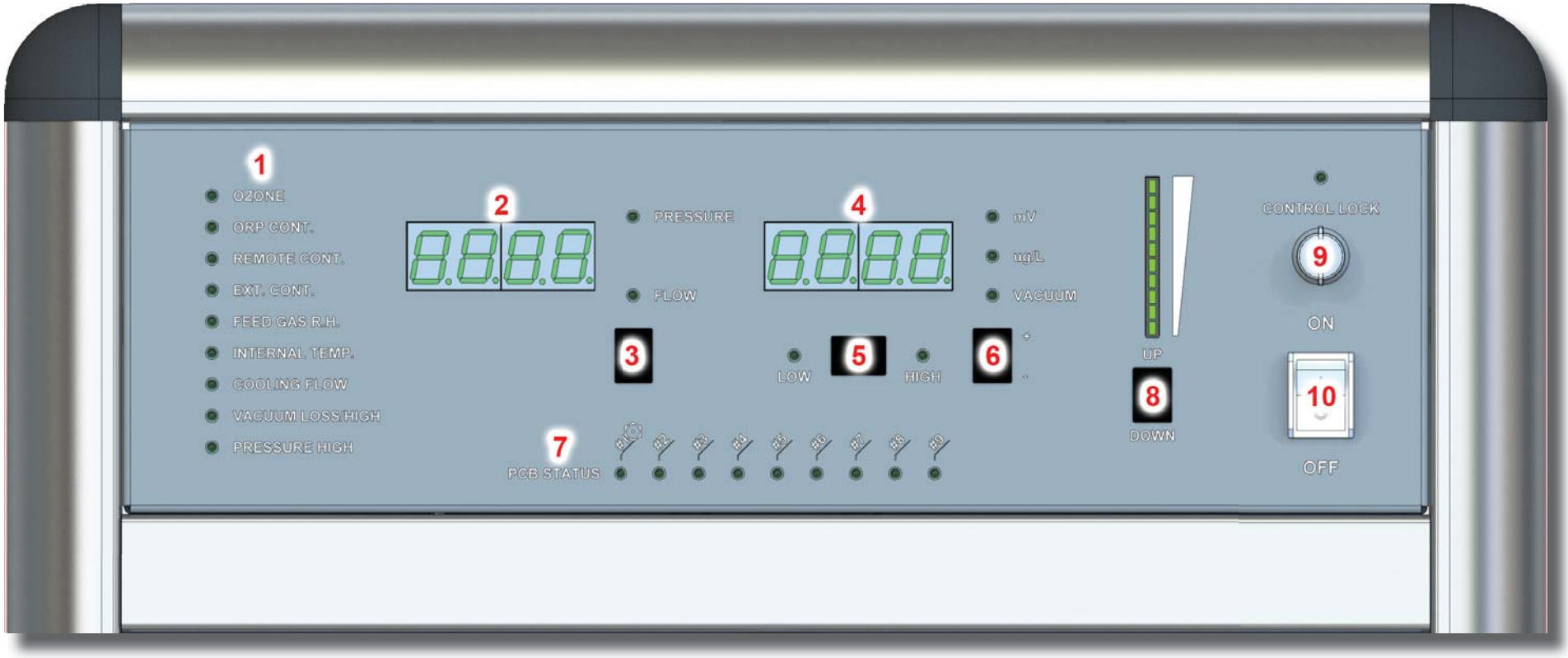
ORIENTATION

Front



1. System Status LED's
2. Pressure/Flow Display
3. Pressure/Flow Toggle Switch
4. ORP/Vacuum Display
5. ORP Low/High Toggle
6. ORP/Vacuum Switch
7. PCB Status LED
8. 10-position switch and indicator
9. Control keylock
10. On/Off switch. (Main shut off circuit breaker on rear panel)

**There are a total of 8 separate blocks internally. Line 1 and line 3 Carry 3 blocks each while Line to carries the remaining 2, thus the discrepancy*

Rear

1. Main Circuit Breaker
2. Power plug receptacle (power plug included)
3. 1/2” NPT Female brass connector (For Oxygen in)
4. 5/8” O.D. S.S. Compression fitting (For Ozone out)
5. ORP BNC connector (Jumper included)
6. 2-Pin Switchcraft quick connect for External Control
7. 2-Pin Switchcraft quick connect for Remote Control
8. Female AMP-37 pin PLC connector (Male adapter included)

INSTALLATION

1. Physical Space
- The System requires at least 30cm (12 Inches) of clearance on each side.
- 590mm x 750mm x 1645mm

2. Environmental
- Amb. Temp. <35 degree Celsius
- Amb. R.H. < 85%
- Minimize dust and corrosive vapors
- Good Ventilation

3. Connections
- Plumbing
  a. #6 on rear panel to #2 on water trap
  b. #3 on water trap to Ball Valve
  c. Ball Valve to Injector

- Electrical
  a. Wire the plug and plug it in

4. **Ready to move onto Start-Up**

LOCATION

Physical Space

The RM900 is 590mm Wide by 750mm Deep by 1645mm Tall. This equipment is both air and water cooled and thus requires space to allow the air to enter and escape. At least 30 cm (~12”) should be free from obstructions in the front and rear of the machine. All controls and fan inlets are located in the front and rear and under **NO** circumstances is this to be obstructed. This equipment should be placed near a drain so that the water trap can be allowed to expel access water before it reaches the sensitive electrical equipment (via the water trap).

AZCO Industries LTD. is not liable for water release due to a failure of any part or failure to control the external water supply, The customer shall provide proper drainage of the space below the unit. Going beyond the pressure limits may cause damage internally to the RM900 causing potential water leaks.

Environmental Conditions

A clean, well ventilated environment is vital to the equipment’s longevity. Major factors that should be considered when installing are as follows:

- Ambient Temperature must be maintained below 35 degrees Celsius.
- Ambient Relative Humidity must be maintained below 85% non condensing.
- Corrosive and oily vapors as well as dust must be kept to a minimum.
- Proper ventilation is also a must and can greatly help in keeping the above mentioned problems in check.
- The equipment must also be indoors sheltered from rain and other hazardous environments.
- An adequate supply of fresh air is necessary to prevent temperatures from building

CONNECTIONS

Gas Line Plumbing

Plumbing of this equipment only requires the connection from the water trap (diagram 3) to the S.S. Ball valve and then to the injection point. The Rear Orientation diagram shows all of the connections on the rear of the RM900.

All connections to the water trap MUST use Teflon® lined, Solid Teflon® tubing, or 316 SS. The connections are as follows,

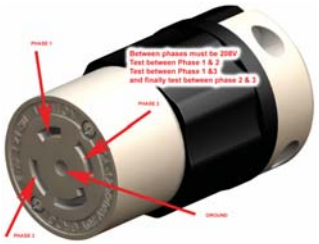
1. Vacuum sensor port not present for use with RM900
2. Ozone-In ports. These ports are to be connected to the ozone generators’ ozone-out ports (#6 rear orientation).
3. Ozone-Out port(s). Connected to S.S. ball valve shown on the flow diagram on page 12 and then to the injector.

Cooling Water Plumbing

Both inlet and outlet ports are located on the Back side of the machine *Diagram 4*. The inlet port (#2) is a 1/2 NPT female connection. The outlet port (#1) is a 3/4” NPT female connection. It is critical to maintain the flow in the correct direction for the safety of the equipment as well as the potential output of the machine.

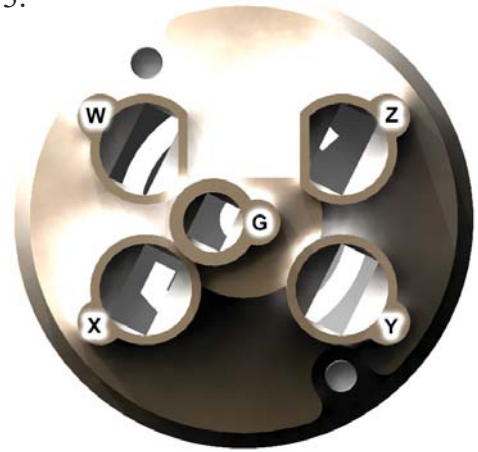
Electrical

1.



2.

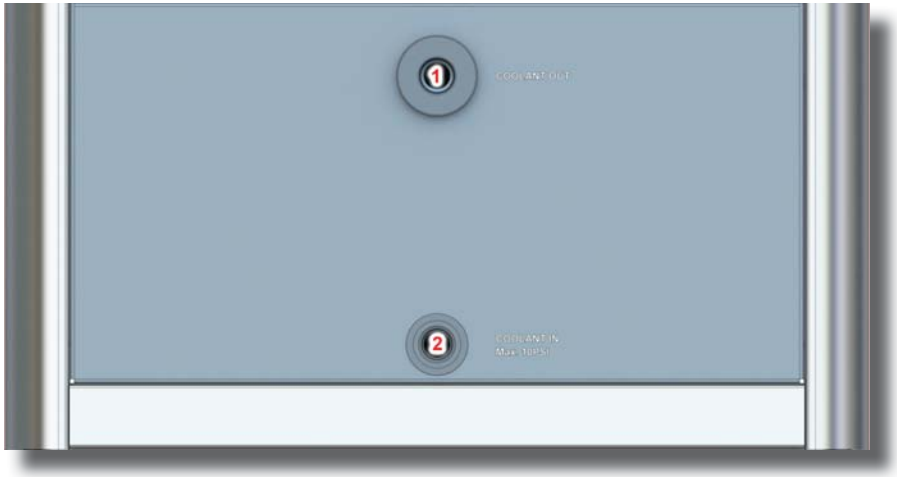
3.



G= Ground
W= Neutral
X= Phase 1
Z= Phase 2
Y= Phase 3

*Diagram 3: Top of the water trap showing all connection ports.**

Diagram 4: RM900’s Back Lower side shows the Coolant Outlet #1 and inlet #2 for the cooling water connections



**Ports will be labeled and may vary in orientation and quantity.*

Step 1:
Turn on the main power

Step 2:
Turn on the RM900

Step 3:
Adjust ORP Levels
- Hold “high” and press + or -
- Hold “Low” and Press + or -

Step 4:
- Plug in ORP Probe
- Override with jumper

Initial start-up and settings

After verifying that all gas, water plumbing and electrical connections are correct, you will be ready to turn on the system for the first time. The following steps and diagrams are designed to make this initial start-up as quick and easy as possible. Diagrams are numbered to correspond with the steps below. Remember to use the ORIENTATION diagrams for reference.

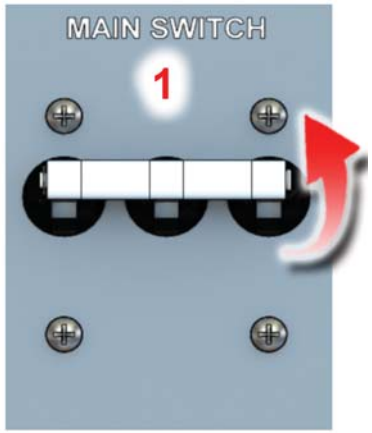
Step 1:

Turn on the main power to the RM900 by lifting the Circuit breaker (#1) on the back panel of the RM900.

Step 2:

Now that the main power has been turned on, you can proceed to use the ON/OFF switch on the front panel (#10) At this point the RM900 should have the status lights lit and the main display turned on. The next series of steps will involve preparing and/or clearing the status LED’s one by one until we have all the conditions green and producing ozone. Step 3 deals with the ORP settings.

Step 1



Step 2

Step 3:

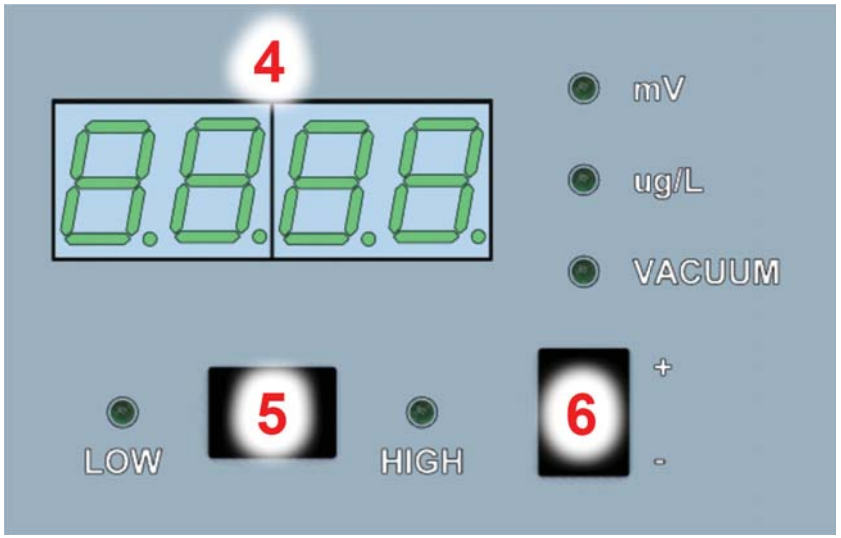
Before any adjustments are made make sure that the control lock (#1 on front panel) is disabled. If the ORP is not going to be used then you must install the ORP jumper*(note:)*. Using the Jumper will zero display #4 and override the ORP settings. Setting the ORP cutoff levels (default levels are; low: 700mV, high: 800mV,). Make sure the display (#4) is displaying the “mV” level (Ambler light at the top of #6) not PPM(ug/l).

1. To adjust the high level Press and Hold “HIGH” on #6, the display will show the high cutoff point. To adjust this continue to hold the “HIGH” and press “UP” or “DOWN” on #6 (below the 3 LED’s).
2. To adjust the low level repeat the above except press and hold “LOW” on #6 instead of “high”.

Step 4:

Plug in the ORP probe into port #5 on the rear panel. The reading on display #4 will not function properly without the probe or the jumper being installed. When done correctly the mV or ug/L will be displayed depending on what you chose to have displayed. Now that the ORP high low levels have been set, the ozone generator will automatically turn on and off based on the high and low respectfully.

Step 3:



Note: ORP Jumper

START-UP CONT.

Step 5: Water Chiller
- Max 10 PSI inlet
- No back pressure
- 12 degrees Celsius optimal

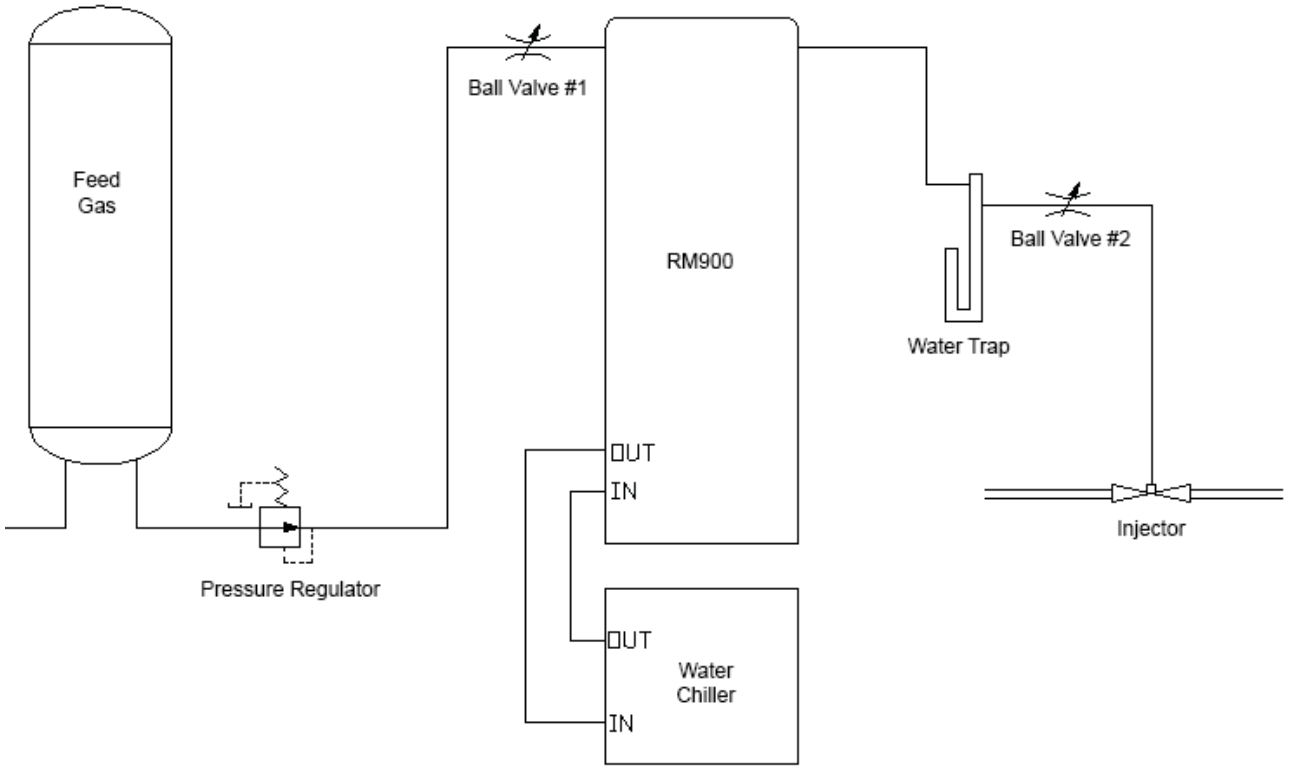
Step 6: Gas Flow
- Use Pressure regulator, use a setting of 5 PSI
- Maximum 7 PSI
- Balancing

Step 7: Status LED's
Check that all the status LED's are green excluding the vacuum LED's. Adjusting the vacuum will be explained in step 6

Step 5: Water Chiller
The connections have already been made and it is time to establish the flow. The "cooling flow" status LED shows the status of the internal water flow detection sensor. Start the flow on the water chiller until the status LED turns green (~10 l/min) The inlet pressure to the ozone generator must not exceed 10PSI. The lower the pressure the better. If pressure builds up, check to make sure there are no restriction between the outlet of the RM900 and the inlet of the Water chiller. The system should be as free flowing as possible. If no restrictions are found try to lower the flow rate.

Step 6: Begin Feedgas Flow
1. Install a pressure regulator and set it to MAXIMUM 7 PSI, 5 PSI is optimal. The use of a pressure regulator is required!
2. Ensure that valves #1 and #2 are both closed before proceeding.
3. Start the oxygen. In case of oxygen concentrator, follow manufacturer's start up procedure. (Note: The pressure gauge will not function at this time)
4. Proceed to Step 7 before turning on the pumps to create suction.

Flow Diagram



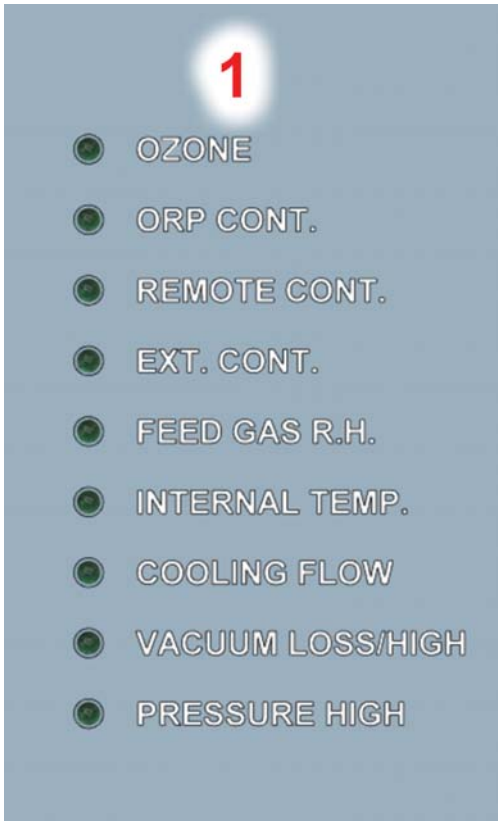
Step 7: Clearing Status LED's

Check the status lights on the Left of the control panel. At this point one of the vacuum LED's is the only one that should be red, as the vacuum still has to be adjusted. If any LED other than vacuum is red something is wrong. The problems **MUST** be corrected from top to bottom. Some of the LED's can affect LED's below them so going from top to bottom, excluding OZONE READY, is Vital. Correcting possible problems with each red LED are listed below.

- ORP CONT: This LED shows the status of ORP level. If the ORP has turned off the ozone generator the LED will be red.
- REMOTE CONT: This requires a voltage signal of 80-240VAC/VDC in order to enable the feature. In most cases, this feature is disabled unless otherwise ordered by the customer.
- EXT. Cont: Identical to remote control, this acts as a secondary port
- FEED GAS R.H.: Feed gas relative humidity measures the dew point of the incoming Feed Gas. It will turn red if there is a problem with the oxygen. While the LED is red the oxygen will continue to run trying to clear any incidental moisture that may have entered the system.
- INTERNAL TEMP: This status LED is used for both Ambient room temperature. If the ambient room temperature reaches above 35 degrees Celsius the LED will turn red.
- VACUUM LOSS/HIGH Indicates that the Vacuum is either too high or too low. To Correct the issue cycle display #4 with #5 until VACUUM is selected. the reading will indicate if you are too high or too low. Adjust accordingly
- COOLING FLOW: Indicates a lack of water flow in the system. It displays the status of an internal water flow indicator sensor.

Note: Any LED that is red will turn off the ozone generators and place the system into standby mode until the situation is resolved.

Step 5:



Note: Ozone in air Jumper

START-UP CONT.

Step 8:
1. Switch Main display to vacuum
2. Turn on pump(s) to create suction
3. Balance the flow with Valves 1&2
4. Reach proper flow and vacuum
5. Fine Tuning
6. Wait for Feed gas to turn green

Step 8:

Balancing the vacuum and pressure to achieve the flow required can be quite tricky, but with patience and the following steps the process should be easy.

1. Switch display #4 to vacuum.
2. Turn on the pump(s) to create water flow, thus suction, at the injector.
3. Slowly begin opening valve #2. Continue opening this valve until the vacuum low LED turns green. When the condition is green begin to open Valve #1 to allow oxygen to flow. This of course throws the vacuum low again.
4. Continue opening valves #1 and #2 until you have reached the desired Flow rate on display #2. When you have reached the correct flow rate, make final adjustments to the vacuum to achieve a reading of 60-100 on display #4. At this point switching display #2 to pressure on the front panel will aid you by showing you if the pressure is stabilizing.
5. Adjusting the flow is a matter of **fine tuning*** between valves #1 and #2 as one is opened more the other must also be opened more to compensate and vice versa.
6. Now your system is ready to operate and within a few minutes the Feed gas status light should switch to green and the unit will start producing ozone.

**Note: Fine tuning may be required after first start-up due to changes in flows and pressures*

Output Chart

Troubleshooting