



**Reclaim Filters and Systems, Inc.**

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FilterJet Series Manual

# Water Recovery Systems Manual

INDUSTRIAL SYSTEMS DIVISION

# Systems Maintenance Manual

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©RECLAIM Filters and Systems, Inc.  
1129 Hidden Hills Dr.  
Raleigh, NC 27587  
(919) 528-1787 phone  
(919) 528-7217 fax  
[www.waterreclaim.com](http://www.waterreclaim.com) website  
[info@waterreclaim.com](mailto:info@waterreclaim.com) email



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# Introduction

## *General*

**T**his manual is intended to give you the information needed to install, start-up and maintain a RECLAIM FilterJet system. The sections detail your Reclaim's System Description, Installation, Operation and Maintenance.

## Warnings, Cautions, and Notes

As you read the manual, these symbols will let you know to pay special attention to the CAUTION, WARNING, and NOTE messages. These help to identify important safety issues or other important items.



**CAUTION** Information that could prevent system damage or minor personal injury.



**WARNING** Information that can prevent injury or death.



**NOTE** Just an FYI. Useful or interesting information.

## System Description

**T**his industrial filtration system is actually two systems in one. The primary system consists of a high efficiency pumping station with on board filtration. The second system is an ozone recirculation system. The Electronic Control Panel monitors and maintains both systems.

### *Primary Filtration System*

Consists of a high efficiency motor and pump used to pull the water from the storage tanks through the inlet filter and past the filter array. This pumping station provides pressure for your process water. A pressure control activates the pump whenever the output water pressure drops below 40 psi, it shuts off automatically when the demand ceases or the output pressure reaches 60 psi.

#### **Filtration**

Primary filtration is achieved via the holding tanks where if installed properly, act as a grease trap and sedimentation area, as well as providing a contact chamber for the ozone to oxidize contaminants in the water. On board the system, water is pulled through a coarse filter similar to a strainer basket on a swimming pool. This first filter is removable and should be checked periodically for debris such as bugs, cigarette butts and other floating debris that could have passed through the tanking. From there the water is pulled through the pump and pushed through the filter element or elements. Several types of filters are used in this application depending on your system options.



Local ordinances often call for a **clarifier tank** prior to discharge to sewer. Grit chamber or grease trap are also terms used to describe this multi-stage chamber designed to catch grease, oil and sediment.

#### **Self-Cleaning Filter**

This is a permanent stainless steel filter element that will not allow any particulate coarser than 25 microns or .001 inches across to pass through. This element is self cleaning utilizing a small burst of air to literally blow the dirt and debris from the element and out via the backwash/purge line.

#### **Bag filters**

These filters are fabric felts and woven socks that collect the dirt and debris on the inside of the bag and need to be changed periodically. Filter bags are rated in nominal sizes, meaning the smallest particle able to be filtered. A 5-micron bag means the smallest particle able to be filtered is 5 microns, however, not all the pores in the bag are that small and some larger debris will get through. An advantage of filter bags is their ability to absorb certain substances like silicone or oils.



Filter bags should be used once then replaced. If re-used the stitching or welded seams may become weak and burst. Cleaning also enlarges the pore size. This will result in sand or other abrasives passing through the filter damaging expensive high-pressure pumps and other devices.

### *Ozone Re-Circulation*

Consists of another high efficiency motor and centrifugal pump assembly that takes the pre-filtered water and passes it through a centrifugal sand separator, to remove abrasive elements from the process water, then through a venturi that pulls ozone into the water stream as tiny bubbles. The bubble size is critical for optimum ozone saturation and treatment of the water. This patented injector system provides a 99% transfer rate of ozone to the contact chamber when set properly (see system set-up) See Appendix D for Material Safety Data.



Ozone is a powerful oxidizing agent and is highly chemically reactive. Inhalation produces various degrees of respiratory effects from minor irritation to pulmonary edema (fluid in lungs) under high concentrations and long exposure. It can also cause eye irritation at levels above 2 ppm.

Shown at right is your RECLAIM System II. (Note the palletized design). The entire machine is enclosed with a 1 1/2" stainless steel frame to prevent damage during shipping and to protect from accidental impacts in tight equipment rooms.

On A model frames the input and output ports are on the right hand side of the unit. On B frame units, the output is available on the left or right with the suction line input located on the right.



## Chapter

# 2

## Specifications:

### 65 GPM System II with 3 Hp primary pump

DIMENSIONS: Max dimensions of stainless steel frame  
Width: 60"      Depth: 33"      Height: 70"

#### Primary Filtration and Control Panel

##### Electrical

Input Power: 208/230/480 Volt, 3 phase @ 8.5 / 8 / 4 amp max  
Control Power: 115 vac, 4 amp max  
On/Off control: Switch selectable On / Off / Auto  
Pump: 3 HP 65 GPM @ 40 – 60 psi  
Particle Separator: Self Purging Vortex Filter stainless steel body  
Inlet Filtration: Cleanable stainless steel filter basket  
Primary Filtration: Either 25 micron absolute, self cleaning stainless steel filter  
or  
Sized bag filters (replaceable)

Water Inlet: 2" FNPT  
Filtered Water Outlet: 2" FNPT  
Air Requirement: 95 PSI 3/8" min hose diameter  
Backwash Cycle Time 8.5 Seconds including filter air purge

### 100 - 125 GPM System II with 5 Hp primary pump

DIMENSIONS: Max dimensions of stainless steel frame  
Width: 60"      Depth: 33"      Height: 70"

#### Primary Filtration and Control Panel

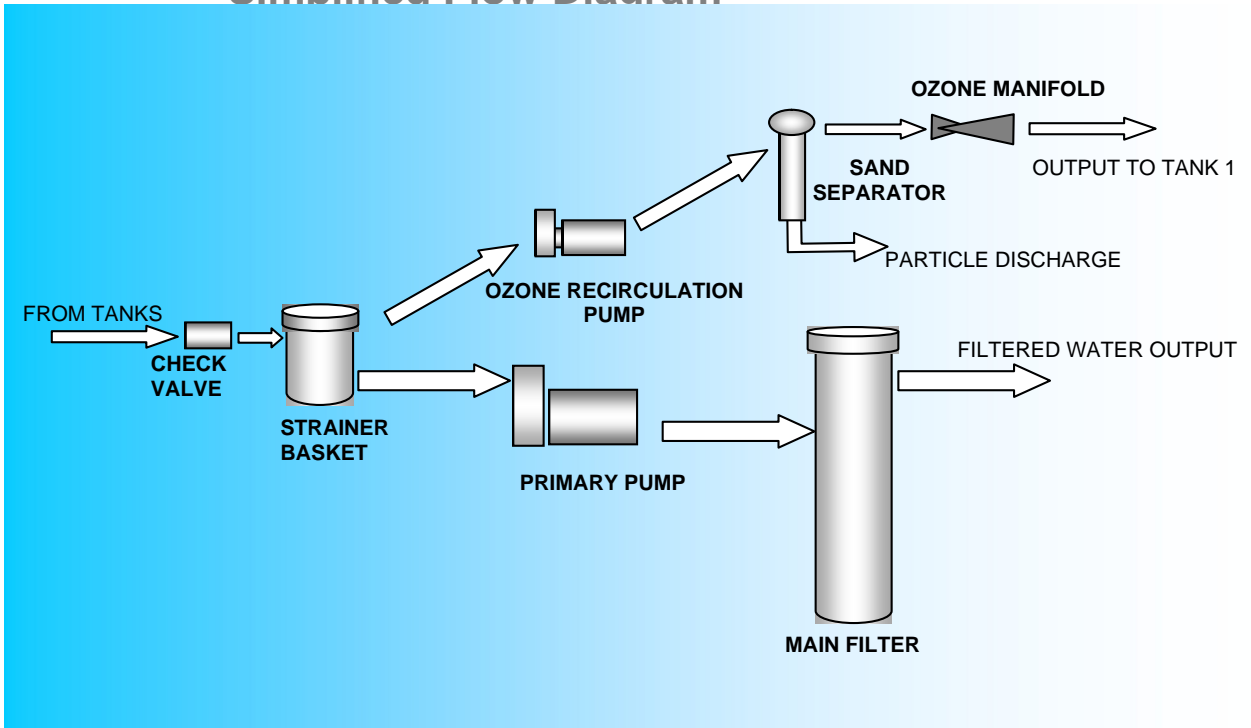
##### Electrical

Input Power: 208/230/480 Volt, 3 phase @ 13.1 / 11.5 / 5.7 amp max  
Control Power: 115 vac, 4 amp max  
On/Off control: Switch selectable On / Off / Auto  
Pump: 5 HP 125 GPM @ 40 – 60 psi  
Particle Separator: Self Purging Vortex Filter stainless steel body  
Inlet Filtration: Cleanable stainless steel filter basket  
Primary Filtration: Either 25 micron absolute, self cleaning stainless steel filter  
or  
Sized bag filters (replaceable)

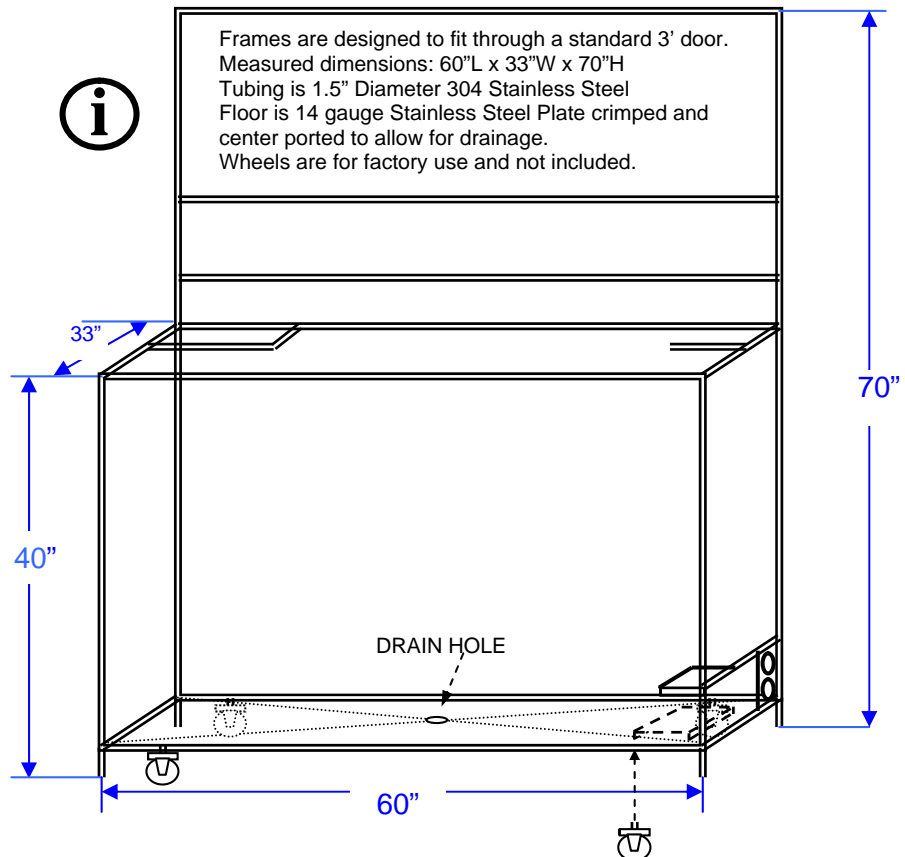
Water Inlet: 3" FNPT  
Filtered Water Outlet: 2" FNPT  
Air Requirement: 95 PSI 3/8" min hose diameter  
Backwash Cycle Time 8.5 Seconds including filter air purge

Operating Temperature 35° to 104°F (2° to 40°C)

## Simplified Flow Diagram



## Frame Dimensions



## Chapter

# 3

## System Description

### *Descriptions of main components*

#### **INPUT CHECK VALVE:**

This Brass swing type check valve is used to maintain prime in the primary pump by preventing the backflow of water to the storage tanks.



If this valve becomes stuck open or leaks, the resulting loss of prime may cause the primary pump to run dry resulting in pump damage.

#### **STRAINER BASKET:**

The basket strainer is the pre-filter and prime storage reservoir. It prevents large debris from entering the pump. The filter is provided with a removable lid and stainless steel strainer basket to allow periodic inspection and cleaning.

#### **PRIMARY PUMP:**

A centrifugal pump providing 60 to 125 GPM of flow depending on the horse-power and inlet pipe size.

#### **OZONE RECIRCULATION PUMP:**

A centrifugal pump that pulls water from the input strainer through a one way flapper style check valve then pushes it through a sand separator and into the ozone injection manifold. This pump is usually set to run continuously or on a pre-programmed on-off cycle.

#### **OZONE INJECTION MANIFOLD:**

Utilizes a venturi-style injector to pull the ozone into the water stream as billions of tiny bubbles. It is set at the optimum vacuum and pressure to result in the best ozone transfer.



Optimum settings for this manifold are preset during installation to approximately 29 psi as measured on the gauge at the sand separator, and to 5 LPM (liters per minute) ozone as measured on the ozone generator flow gauge. Improper settings may result in less efficient ozone transfer into the water stream.

#### **SAND SEPARATOR:**

This is also known as a centrifugal separator or a vortex particle separator. It creates a strong vortex of water forcing the heavy solids to the bottom where they are purged into the waste stream allowing the cleaner water through the top where it feeds the ozone injection manifold. The purge valve located at the bottom of the sand separator is cracked open slightly providing the necessary backpressure and allowing the solids to exit. This purge valve is opened approximately ¼ way.

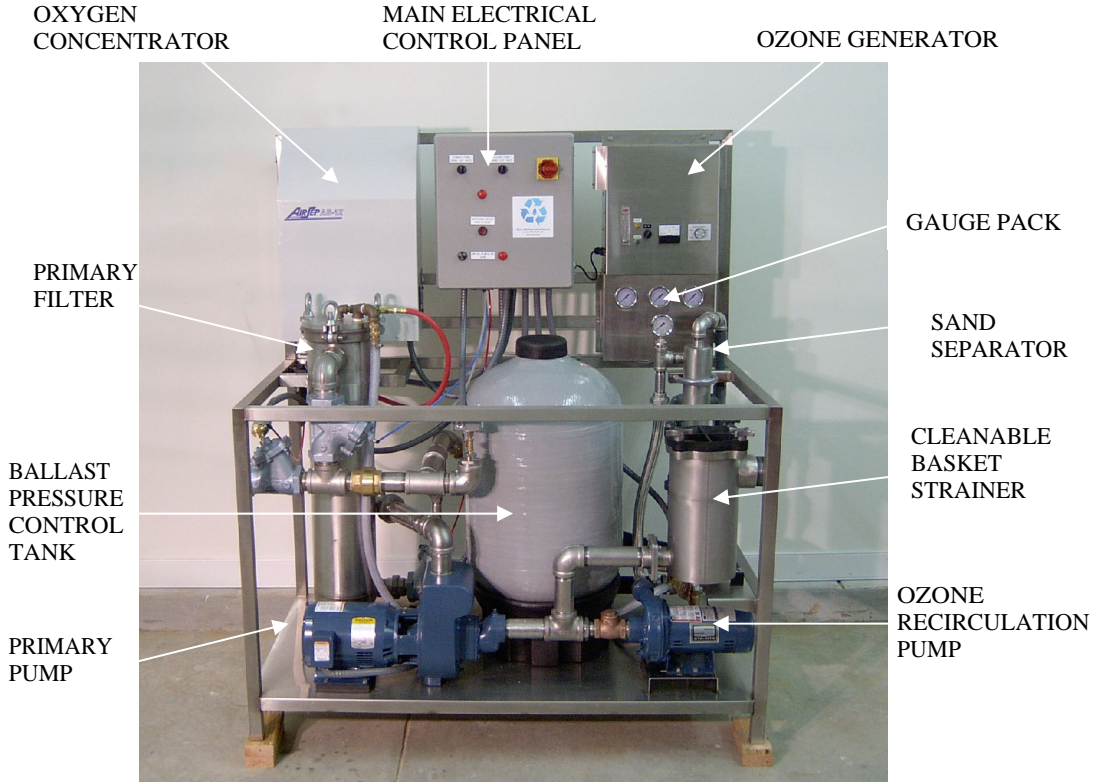
#### **MAIN FILTER:**

The primary filter is a stainless steel self-cleaning filter, a bag filter or a combination self-cleaning filter and bag filter or filters. The Stainless Steel self-cleaning filter uses compressed air to periodically flush the dirt and debris from the filter into the purge line. It is a 25-micron (absolute) mechanical filtration device. The bag filters housings hold various style filter bags. These bag filters need periodic replacement and will reduce the efficiency of the system if not changed.

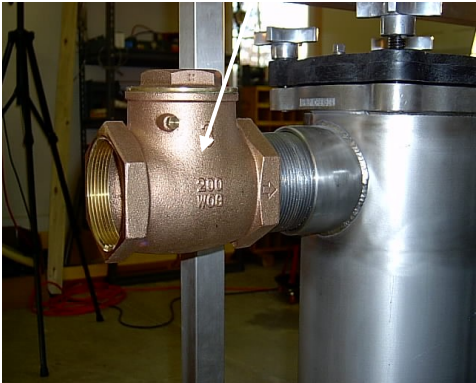


Continual cleaning and re-use of bag filters will result in a weakened bag with a larger pore size than indicated. Damage to equipment may result.

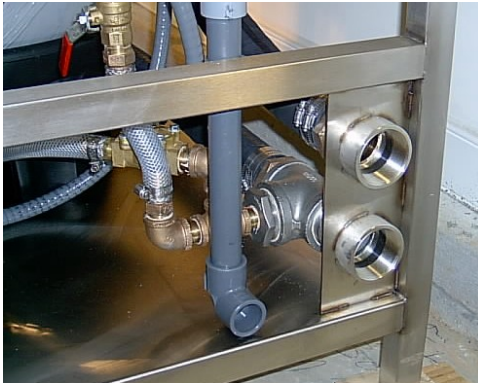
# Component Locations



INPUT CHECK VALVE



- OUTPUTS
1. OZONE RECIRCULATION
  2. FILTERED WATER
  3. PURGE LINE



## Chapter

# 4

## Installation

The RECLAIM system is enclosed in a stainless steel frame and should be mounted on a hard relatively level surface away from debris or standing water. The frame is made so that a standard hand truck can move the unit into position from the front, back or sides.

The system should be mounted in an equipment room where it will not be exposed to freezing conditions, spraying or standing water.



Insure water cannot enter pump motor housing. If water is allowed to enter the electrical housing, a short circuit will result and the water could become electrified resulting in a hazardous condition!

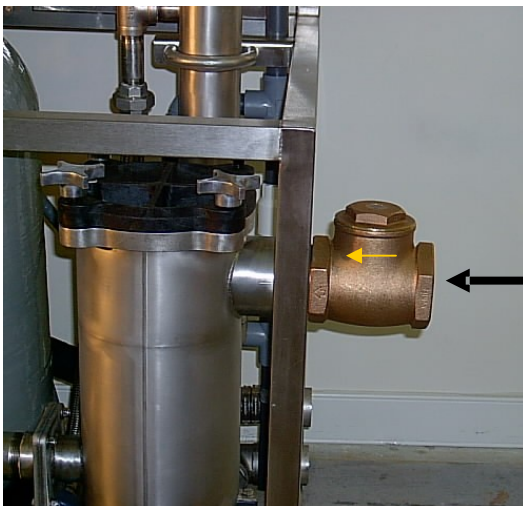


Freezing conditions will cause water in the system to expand and may damage pipes, pumps and valves voiding the warranty.

### *Plumbing Connections*

#### **INLET:**

The inlet to the system is made via a two or three inch suction line located on the left of the system. During shipping, the flapper check valve is stored inside the basket strainer. Remove the check valve and attach to the inlet of the basket strainer. Note: the arrow on the check valve indicating flow direction should be pointing towards the basket strainer.



Mount check valve hinge up.  
Arrow points to strainer basket.  
Be sure to use Teflon tape and pipe dope on the close nipple and piping to prevent leaks.

**Suction Piping:**

The suction pipe must be kept free of leaks. Avoid any fittings that could cause an air trap or leak. Avoid the use of unions or ball valves on the inlet to the system. The suction line must be at least 4 times the diameter of the pipe below the surface of the water in the tanks to prevent vortexing (sucking air from the surface of the water via a whirlpool). Example: if the pipe is 3” diameter it must be at least 12” under the surface of the water. Refer to your tanking drawings for placement. Schedule 80 PVC is recommended for all suction lines. The use of a quality PVC cleaner and cement is required. The check valve should be the highest point of the plumbing. High spots in the suction line prior to the check valve could result in unwanted air pockets.



All centrifugal pump will suck air before it sucks water. If there is any air leak in the suction line the unit will not prime or pull water up from underground tanks. The suction line is the most common cause of problems during installation.



Long suction runs and high lifts are not recommended.



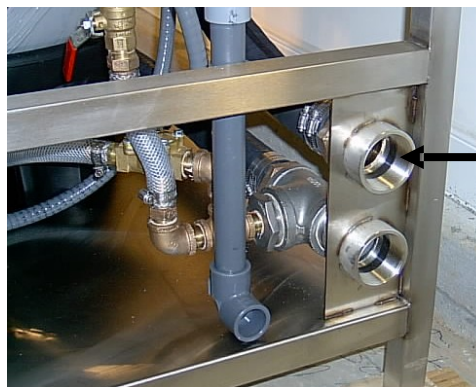
The use of in tank foot valve and/or strainer is not required nor recommended. These tend to clog frequently and are difficult to clean and often overlooked causing problems. Your RECLAIM system has a dual check valve and easily accessible strainer system incorporated into the design.



Refer to Appendix A Sta-Rite “D” series Owner’s Manual Figures 1 and 2.

**OUTLET TO EQUIPMENT:**

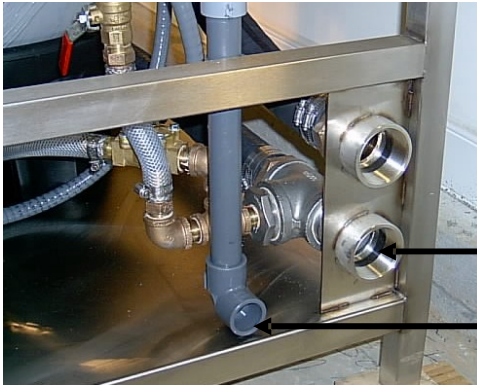
The output line to the equipment is a full 2” diameter bung welded onto the frame at the (frame A) lower right. Use a 2” line for up to 100 GPM output. The usage of a smaller line will result in reduced flow.



Connect output to equipment here.

**PURGE LINE:**

The purge line allows the dirty water from the sand separator and self-cleaning filter to exit the machine. It is a 2” bung located on the right hand side of the machine below the output line, (2” is the minimum line size to be used when plumbing this line, anything smaller will restrict the self-cleaning purge and result in poor performance). The use sweeps and 45° fittings, when attaching this line, will enable the best cleaning operation. The purge line should empty into the main sump, pit, or trough for easy cleaning and disposal of solids.



Connect PURGE/BACKWASH line here

Connect OZONE recirculation line here



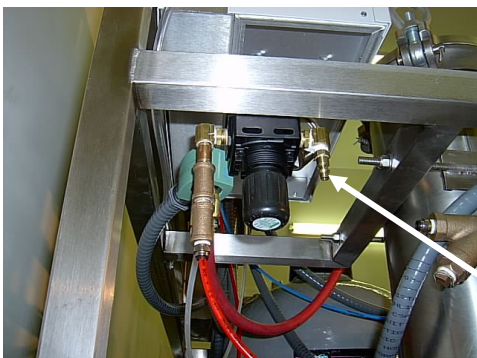
The purge line should not be elevated above fitting height. It should slope downward towards the drain. Any upward slope increases backpressure and decreases performance.

**OZONE RECIRCULATION LINE:**

This 1” SCH 80 PVC line is used to send ozonated water from the unit to tank 1 or as specified in your drawings. This line is under approximately 30 PSI and can be plumbed with SCH 40 PVC. It is recommended you keep the 1” diameter and do not size down throughout the pipe run.

**AIR INPUT:**

Connect air from an air compressor to the input located on left hand side of the machine via a 1/4” industrial air coupling. Air pressure should be no less than 90 PSI. The on-board air regulator should be set between 90 and 95 PSI.



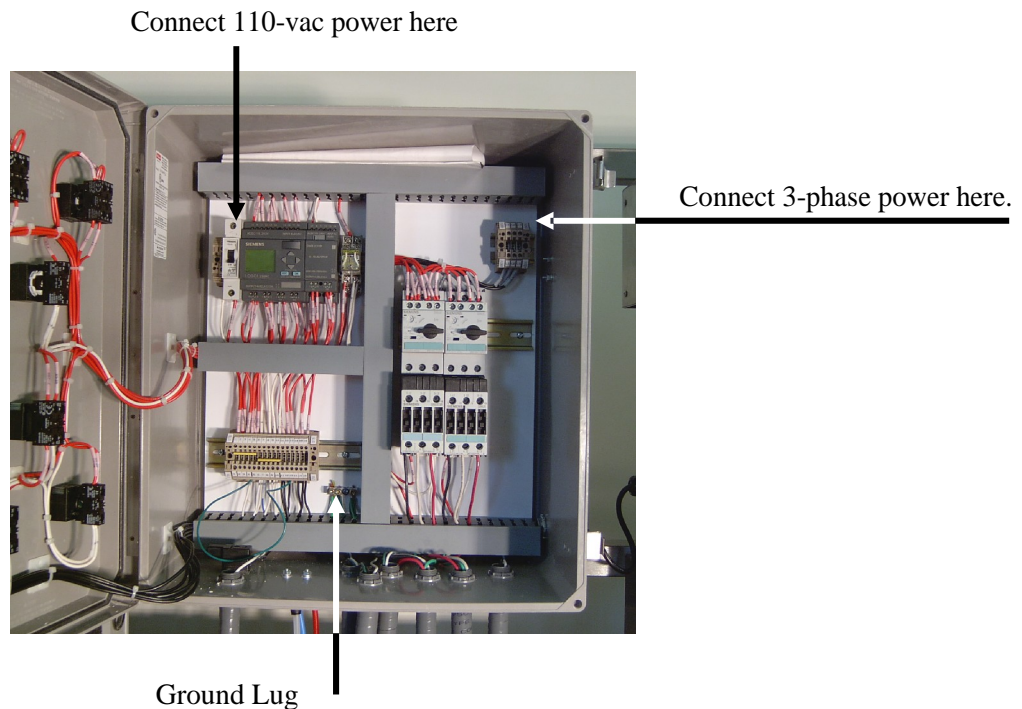
The air input is located on the left hand side of the machine, below the oxygen concentrator. Pull to turn the regulator knob. Set indicated air pressure to 95 PSI.

Connect airline here. 3/8” min diameter.

## Electrical Connections

### 3 phase:

The Hoffman electrical enclosure contains the inputs for 208/ 240/ 480 **3-phase**, AC power, 20 amps minimum.



### 110 VAC CONTROL POWER:

The control system should be connected to 110 – 120 VAC ground fault protected line capable of at least 20 amps. Connection is located via a 110-vac breaker located on the upper left of the enclosure left of the PLC controller. See Diagram.

### COMPONENT POWER:

Power to the oxygen concentrator and ozone generator is provided via an internal relay and has its own ON/OFF/AUTO switch on the front panel. This circuit is protected via an internal circuit breaker.



All electrical connections should only be performed by a local licensed electrician.



Even with the main breaker in the off position, there is still 110 VAC applied to the control circuit. The circuit breaker must be off to remove all power.

## Chapter

# 5

## System Operation

### *System Controls*

Your RECLAIM system is a self contained and controlled unit that requires very little attention. However, you should be aware of the controls and their function.

#### **PRIMARY 3-PHASE DISCONNECT:**

ON/OFF switch that disconnects the three-phase power to the overloads and contactors and motor starters.

#### **PRIMARY PUMP SWITCH:**

This is the HAND/OFF/AUTO switch. HAND turns on the primary pump as long as the primary 3-phase disconnect is turned on. Used when priming the primary pump, or checking pump rotation. The self-cleaning operation is disabled when in HAND. OFF disables the primary pump overload/contactor/starter. AUTO enables the primary pump to operate on demand and enables the self-cleaning functionality of the primary filter.

#### **OZONE RECIRCULATION PUMP:**

This is a HAND/OFF/AUTO switch. HAND turns the ozone pump, oxygen concentrator and ozone concentrator on full time. OFF disables the power to the component relay removing power to the oxygen concentrator, ozone generator and ozone recirculation pump starter. AUTO enables the timed mode where the ozone recirculation system will be on for a preset number of minutes then off for a preset time. The default values are off for twenty minutes, on for ten.

### *Alarms*

#### **LOW LEVEL ALARM:**

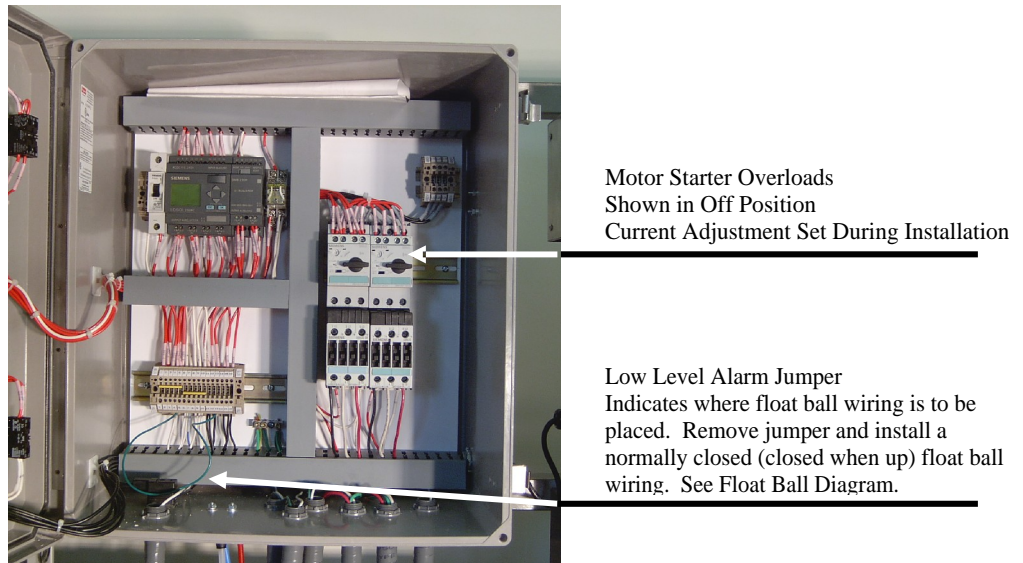
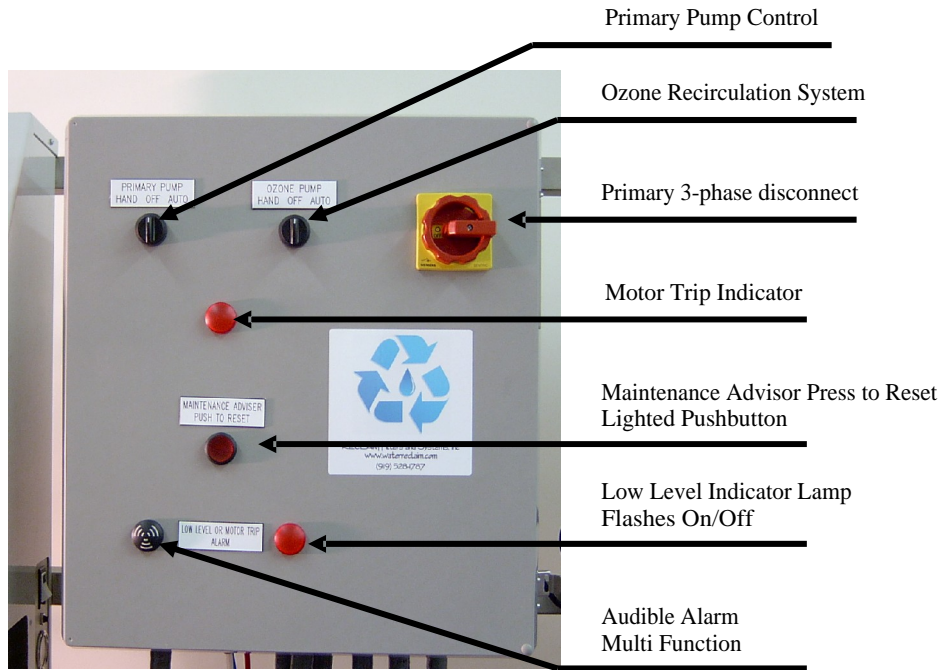
If your system was purchased with this option, and a float ball or other sensor installed in the last tank and wired to the terminal block across # 13 and 120 VAC common, then an alarm will sound, the light will flash, and the system will turn off automatically if the sensor/float ball indicates a low water condition in the last tank.

#### **MOTOR TRIP ALARM:**

Your system has a sophisticated motor protection circuit that senses phase loss and overloads. If any of these damaging conditions are present, the motor starters will trip and this lamp will illuminate. The system will not run until the motor starter overload circuit breakers are reset.

**MAINTENANCE ADVISOR:**

If your system was purchased with this option a combination maintenance lamp and water resistant pushbutton will be located on the front panel of your electrical control box. This lighted pushbutton works in conjunction with an upgraded PLC (programmable logic circuit) computer that will signal maintenance personnel to weekly clean the strainer basket of debris. It signals maintenance is due by flashing the lighted pushbutton and sounding the audible alarm.



## Chapter

# 6

## Start-Up

### TANKING:

Insure water tanks are free of debris and filled with clean water. This is especially important in new construction.



Garbage in the tanks can easily be sucked into the plumbing causing expensive repairs.



Recently a new construction, eager to start, failed to check the tanks. A plastic cup was pulled into the suction line blocking the flow of water to the RECLAIM system. The system ran dry and the owner had to pay for a new pump motor, and spent over \$400.00 having his plumbing snaked out to remove the cup. Luckily he was able to remove the blockage without having to dig up the new cement.

### VISUAL INSPECTION:

- Water in tanks
- Plumbing Connected (refer to installation diagram)
  - Inlet
  - Outlet
  - Ozone Line
  - Purge Line
  - Air Line
- External Ball valves (if any) in proper position
- Sand separator purge valve cracked open ¼ way. (Pre-set at factory)
- All switches to OFF
- Output for reclaim water turned on
  - This prevents air-lock during prime

### VERIFY MOTOR ROTATION:

1. Make sure all switches are OFF
2. Turn ON main power (3-phase disconnect ON)
3. Find Arrow on primary pump face
4. Turn Primary Pump to ON for one second and check rotation
5. The motor should turn as indicated by arrow
6. Correct wiring if needed and check again
7. Repeat this process with the ozone recirculation pump



Proper rotation is Counter Clockwise  
Rotation arrow is indicated on Pump Casting

**PRIME THE PUMP:**

1. Make sure all switches are OFF
2. Turn ON main power (3-phase disconnect ON)
3. Remove 4 hand bolts from basket strainer and fill with water
4. Replace the 4 bolts (wing-nuts) hand tight
5. Turn Primary Pump to Hand (ON)
6. Check Pressure Input Pressure Gauge
  - a. It should read 45 psi with a 3 hp Primary Pump
  - b. It should read 60 – 65 psi with a 5 hp Primary Pump
7. After several seconds turn off the primary pump and repeat until the pressure gauges read the correct pressure
  - a. This will take several tries until the pump pulls water from the tanks
  - b. For more information on the Primary Pump see Appendix “A”
8. Once the system is primed (pressure gauges reading correct pressure) turn primary pump switch to AUTO
9. Turn Ozone pump to HAND (always on)
10. Go to ozone recirculation adjustment

**OZONE RECIRCULATION ADJUSTMENT:**

1. Verify pressure on the ozone pressure gauge (25 –35 psi)
2. Again, visually check to insure the sand separator purge valve is not fully open or closed; set at ¼ open
3. Insure Oxygen Concentrator and Ozone Generator are switched ON
  - a. Oxygen conc. switch is on lower right side, up is ON
  - b. Ozone switch is on front of Ozone unit
4. Set Oxygen Concentrator flow meter to 20 psig (See Airsep Manual page 4-2)
5. Set Ozone Generator to MAX if equipped with variable supply.
6. Close or open injector manifold bypass valve until 5 LPM (liters per minute) is indicated on the ozone flow meter located on the ozone generator front panel
7. Re-check Oxygen concentrator flow meter is set to 15 – 20 scfh



Ozone manifold injector bypass valve  
Adjust to obtain 5 LPM on ozone flow meter

Proper setting for sand separator purge valve

# Chapter

# 7

## MAINTENANCE

### PERIODIC MAINTENANCE SCHEDULE

MAINTENANCE ITEM	WEEKLY	MONTHLY	YEARLY	2-YEAR	5-YEAR
Clean Strainer Basket*	●				
Clean O2 Air Filter*		●			
Primary Filter Clean		●			
Check Air Pressure		●			
Replace Venturi				●	
Rebuild Valves					●
Replace Pump Seals*					●

\* Or as needed

**INSURE SYSTEM IS OFF AND DEPRESSURIZED PRIOR TO ANY MAINTENANCE!**

#### **CLEAN STRAINER BASKET:**

Turn off primary and ozone pumps. Insure input and output pressure gauges read ZERO PSI. Remove the strainer basket lid by unscrewing the four wing nut bolts. Remove and clean the stainless steel strainer basket. Replace, and refill the strainer housing with water. Clean the o-ring and replace the lid and four wing nut bolts, hand tighten only. Do Not Over Tighten... Restart system by starting primary pump first (HAND position) until the gauge reads normal operating pressure then return the primary switch to AUTO. Turn on ozone recirculation system.




Whenever opening a filter housing, whether it be the strainer basket, primary filter, or filter bag housing, make sure the pressure gauges read **ZERO PSI**. A failure to release pressure may result in explosive decompression!

**CLEAN O2 AIR FILTER:**

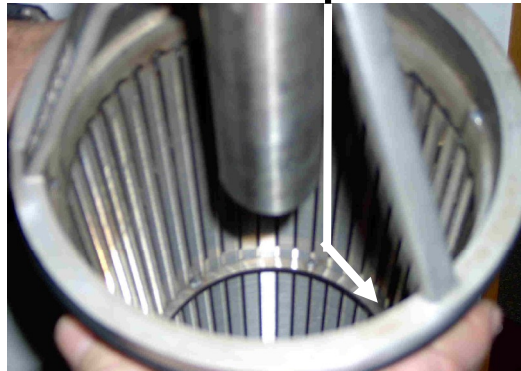
The oxygen concentrator has a cleanable air filter. For optimum performance and long life we recommend you clean it once a month. It is located on the right hand side of the oxygen concentrator. Pull it out, clean it with light compressed air and return it dry back into the filter slots.

**PRIMARY FILTER CLEAN:**

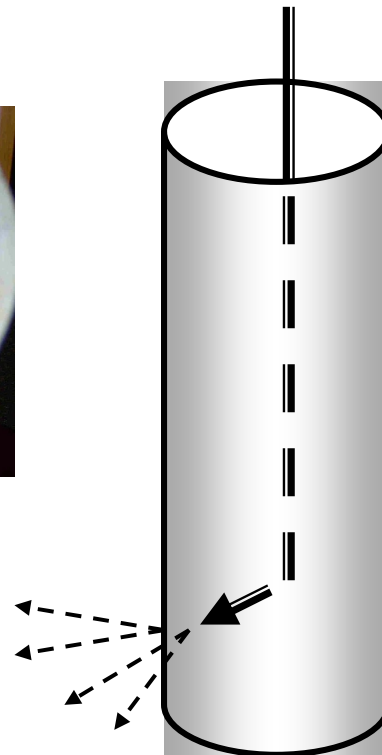
The primary filter cleans itself during normal operation. However, sludge or silt can accumulate over time. To insure best water flow we recommend you clean this filter monthly or as needed. Turn off primary and ozone pumps, insure inlet and outlet pressure read ZERO! Remove the quick disconnects for air and purge exiting the lid, loosen the eyebolts and lift off cover by pulling straight up. Carefully remove the stainless steel filter element and pressure wash FROM THE INSIDE OUT. Check and clean o-ring and re-insert fully into the filter housing. The top tube should be flush with the rim. Clean the top o-ring and replace the cover and fittings. Hand-tighten the eyebolts after the lid has been replaced. Restart per normal.

 Pressure wash the permanent stainless steel element from the inside out. If you accidentally wash it from the outside dirt will be forced into the element potentially ruining it. A 1/4" 90° fitting screwed into the end of a pressure wash wand with the spray tip inserted works great.

Pressure Wash from inside out!



**BLOW DIRT OUT  
NOT IN !**

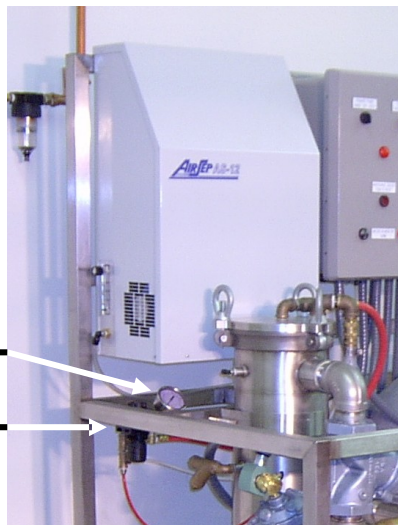


### CHECK AIR PRESSURE:

The Self-Cleaning filter uses 90 to 95 psi to blow out the dirt and debris. Anything less will not clean as well, anything more may blow out the internal o-rings and let dirt pass. To adjust the air pressure, pull the regulator knob out and turn to set. When done press it back in to lock. The air regulator and gauge are located on the left side of unit beneath the oxygen concentrator.



A larger air line is better than a small one. Use a 3/8" line minimum. The air purge works on volume more than pressure.



Air pressure gauge

Air pressure regulator

### REPLACE VENTURI:

The venturi used on the ozone manifold is installed using union fittings. These allow periodic replacement by simply unscrewing the old venturi and installing a new one. These KYNAR® injectors are subject to wear from the inside and over time will enlarge internally reducing the effectiveness of the ozone transfer.

### REBUILD VALVES:

The Aquamatic diaphragm valves have Teflon coated rubber parts that will eventually wear out. The valves are easy to rebuild by removing the 6 plated hex screws, removing the cap, replacing the diaphragm and reinstalling the cap and hex screws. An inexpensive rebuild kit is available. When ordering please indicate whether the valve is a 425 or 426 model. See Appendix C for part numbers and mechanical drawings.

### REPLACE PUMP SEALS:

The pump seals will provide many years of service as long as the pumps don't run dry. We recommend changing them every 5 years or as needed. If a pump seal wears out or is damaged water will escape from around the seal. See Appendix A for pump seal replacement instructions, part numbers, and mechanical drawings.

# APPENDIX A

## *PUMP AND MOTOR INFORMATION*

### **INCLUDING**

- SAFETY
- WARRANTY
- INSTALLATION
- ELECTRICAL
- SERVICE
- MECHANICAL DRAWINGS
- REPAIR PARTS

# APPENDIX B

## *BALLAST PRESSURE CONTROL INFORMATION*

### **INCLUDING**

- SAFETY
- WARRANTY
- OPERATION
- REPAIR PARTS
- SERVICE
- MECHANICAL DRAWINGS

# APPENDIX C

## *DIAPHRAGM VALVE INFORMATION*

### **INCLUDING**

- TECHNICAL NOTES
- REPAIR PART KITS
- SERVICE
- OPERATION
- MECHANICAL DRAWINGS

# APPENDIX D

*Material Safety Data Sheet*

OZONE