

# **WELCOME!**

**To The Wonderful  
World of Filtered Water**



## **Owner's Manual**

**Congratulations!!**

**Your purchase has entitled you  
to enjoy the benefits of Krudico's  
fine family of water treatment products.**

# Introduction



## Iron Reduction

**Iron in water will create stains on fixtures and clothes at a level of 0.3 ppm. This is the level set by the EPA for *secondary contaminates for water*.**

Iron in water may be in one of two forms or partially “in-between”. When iron is totally dissolved it is in the *Ferrous* form. Because iron has a plus 2 *valance* it has an attraction for oxygen. Oxygen from any source will convert the Ferrous Iron to the precipitated or enlarged form called *Ferric* Iron.

In the Ferrous form, iron can be removed with a water conditioner by utilizing ion exchange. The resin beads will attract iron and exchange sodium ions into the water. However, any amount of oxygen in the water will start the conversion from the Ferrous form to the Ferric. At this point, if the conversion is not complete, iron ions will pass through a water conditioner or a filter.

Each bead of Cation Resin will exchange calcium and Magnesium ions with the majority of the exchange taking place on the interior of the bead. If iron oxide (ferric iron) builds up on the surface and prevents the ion exchange from occurring on the interior portion, the resin capacity is lowered. For long range results, Krudico does not make claims for the removal of high iron amounts, as the majority of water supplies may create problems.

Normally iron in water should be converted to the Ferric form and filtered from the water prior to a water softener. Low amounts of iron can be removed by a water conditioner (0.3 - 2 ppm). For water with higher amounts, a filter system such as the Air Charger should be used in front of the water softener.

**A water softener is made to remove hardness and not to be an iron or manganese filter.**

## Hydrogen Sulfide Control

This is one of the worst platable contaminates to be found in a water supply. While the water normally is safe to drink, the rotten egg or septic tank odor will gag people who are not used to it. A concentration of under 1 ppm is very obnoxious to most people when they try to drink the water, shower, bath or wash clothes.

The hydrogen sulfur is caused by sulfate reducing bacteria consuming the sulfates in the water and their waste creates a gas called hydrogen sulfur. Being a gas, the sulfur will coat the pore sites of Granular Activated Carbon (GAC) very rapidly. For water with 1 mg/l or more in the water, a one cu. ft. point of entry household unit may be rendered useless within a week.

Water supplies with concentrations of H<sub>2</sub>S in the range of 2 ppm to 5 ppm are better treated with aeration systems.

With a pressurized style of aeration, the water supply is still pressurized eliminating the need for a repressurization pump and in most cases, a UV light. Space needed to install this system is minimal and little piping is needed to connect to a filter.

A new catalytic carbon has been developed that does not coat over with the hydrogen sulfur gas. Rather, peroxide is released from the carbon, which oxidizes the gas into elemental sulfur and traps it further down in the bed.

With this new carbon, the carbon life is extended into months rather than weeks. If and when the sulfur odor starts to come through the carbon bed, pouring or siphoning two gallons of 3% hydrogen peroxide (available from the grocery store) through the carbon will “regenerate” and extend the life of the carbon.

It is very important that any treatment system installed to remove H<sub>2</sub>S be sized large enough to handle both the needed flow rates and also the amount of hydrogen sulfur in the water. It is better to over-size than to skimp and have problems just to save a couple of bucks.

### **Iron Filtration with Air Injection**

In 1995, Krudico designed and field tested a new aeration system called the "Air Charger". The Air Charger was introduced at the WQA product convention in Indianapolis during March of 1996. Since then, the Air Charger has become the product of choice by our dealers for the reduction of iron, manganese and hydrogen sulfide.

The principle of the Air Charger is simple. An Air Compressor is electrically wired into the pump pressure switch or into a flow switch plumbed into the water line. Whenever the well pump is activated, or water flows through the plumbing, oxygen (air) is forced into the Air Charger Tank from the air compressor. The air enters the tank at the top but is carried by a PVC line to the bottom of the tank where it is forced through a 10 micron porous pipe and enters the water.

The 10 micron pipe has broken the air into millions of tiny bubbles which mix with the water flow moving down through the tank. This interaction of oxygen with water changes the iron or manganese from the dissolved ferrous ions to the precipitated form in under two minutes. The precipitated iron or manganese can now be removed by passing the water through an adequate sized filter media bed.

Hydrogen sulfide is a gas created by sulfate reducing bacteria in the well. As the bacteria consume the sulfate ions, a rotten egg odor becomes present in the water. This gas can be removed by adding oxygen to the water which expels the gas and converts the sulfide to basic sulfur.

The Air Charger, by adding large amounts of air to the water, is capable of expelling high concentrations of hydrogen sulfide from a water supply without the need of adding chemicals to the water or the need of an atmospheric tank and a repressurization pump.

By combining the Air Charger with one of Krudico's S-CFA line of catalytic carbon filters, the basic sulfur is also removed. Water as clean and fresh as a mountain stream is available for showers, bathing, drinking and other household needs.

Excess air is released from the tank by means of an air vent located at the top of the Air Charger tank. In the event of an iron bacteria or ferric iron buildup in the bottom of the tank, a drain cock is provided to flush the tank without the need of removing from the plumbing.

The Air Charger has proven to provide the highest quality of water of all the filters Krudico has sold over the past thirty plus years. It requires no chemicals, the basic operation is extremely simple and the results very satisfactory.

### **Water Facts**

- ◆ The U.S. population is estimated at 250 million people. If each person drinks 8 glasses of water, coffee, tea, etc. in just one day, the total consumption for that day would be over 200 million gallons.
- ◆ The human body is 66% water.
- ◆ The surface of the earth is 80% water. Of this amount about 97% is sea salt water. Of the balance, 2% is frozen, which leaves just 1% or less as liquid freshwater to sustain human needs.
- ◆ The average family uses 113,000 gallons of water per year in their home.
- ◆ **About half as much hot water is used in the average shower than the average bath**

# Installation of Krudico's



## Parts Enclosed

1	Air Compressor	1	Fiberglass Tank
1	Air Compressor Stand	1	Gray Tank Adapter Top W/piping
1	Air Vent	2	1/4" Check Valves (Pre-Installed on compressor)
1	1/8" Nylon Rod	1	Drain Valve
1	Junction Box with electrical plug in	1	Pressure Gauge (Pre-Installed)
10'	1/4" Poly Tubing	1	Air Regulator Valve on Pump (Pre-Installed)
1	1/4" Brass Compression Fitting (Air Vent to Poly Tube)	2	1/4" FPT x 1/4" Compression fittings (Pre-Installed)

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## Installation Tools & Materials

Krudico, Inc. recommends that you have the proper tools for water softener installations. These tools include:

- ◆ Safety Glasses
- ◆ Standard & Phillips Screwdrivers
- ◆ Channel Locks or Pipe Wrench
- ◆ Silicone Lubricant (**Never use Petroleum Based Products Such as Vaseline**)
- ◆ Drain Line – 1/2" Poly Tubing or Equivalent
- ◆ Pipe Cutters
- ◆ 12-2 or 10-2 Romex Wiring or Equivalent
- ◆ Wire Cutters
- ◆ Drill & Screws (For Mounting Compressor)
- ◆ Pipe & Fittings According to the Application
  - Threading Tools & Thread Tape
  - Torch, Solder, & Flex for Copper Sweat Connections
  - Saw, Cleaner, & Glue for Plastic Pipe

## Prior to installation

- ◆ With an operating Pressure Gauge, check the pressure setting of the customer's well pump. Record both the low and the high

settings of the Pressure Switch. These settings will normally be 20 psi apart. Settings may be from a low of 25 to 45 psi (minimum for the filter to backwash) up to 60 to 80 psi. Keep these Pressure Settings on file in the event the Pressure Switch settings are changed in the future.

## System Components

- ◆ Most Krudico Air Charger systems are shipped from the factory in four cartons. You should always remove the contents of each carton for inspection prior to installing the system.
- ◆ **The first carton** contains the Media Tank. Krudico uses fiberglass pressure vessels, high capacity filter media, underbedding, & a PVC distribution riser.
- ◆ **The second carton** contains the Backwashing Control Valve with a calendar time clock control. An Owner's Manual, warranty card, and bypass (if applicable) are also contained in this carton.

- ◆ **The third carton** is the Air Charger retention tank assembly. This includes the tank, PVC tank top, interior piping, drain cock, and air injection/check valve assembly.
- ◆ **The fourth carton** contains the air compressor, air vent, electrical junction box, outlet, 1/8" vent rod, and mounting bracket.

### Location

**\*\*See attached Plumbing Configuration**

- ◆ The softener should not be installed where temperature falls below 34<sup>o</sup>F (1<sup>o</sup>C) or 120<sup>o</sup>F (49<sup>o</sup>C). Likewise, the softener should not be installed closer than 10 feet of piping from a water heater. (If the softener has to be installed closer than 10 feet, a check valve should be installed to prevent backflow of hot water from the water heater into the water softener.)
- ◆ A minimum of 25 psi is required to properly backwash the system. Pressure should not exceed 120 psi.
- ◆ Allow 6-12 inches behind the unit for plumbing and drain lines.
- ◆ The unit should be installed on a level floor surface.
- ◆ An uninterrupted alternating current (A/C) supply is required. Please make sure your voltage supply is compatible with your unit before installation. A 6 foot (Fleck) or 10 foot (Autotrol) electrical cord is supplied with the **filter** control valve. The customer should provide a 3-prong grounded electrical outlet nearby.

### Bypass Valve

- ◆ A bypass valve should be installed on all filters since there are occasions when the water filter must be bypassed for servicing.
- The standard backplate on all Krudico water filters is a 3/4" Noryl FPT with Autotrol control valves (Autotrol 163).
- A 3/4" Brass backplate is the standard backplate on Fleck Model Filters (5000SE)
- ◆ If a bypass valve is desired, the bypass must be ordered separately with the filter system. Bypass valves are available in 3/4" and 1" connections.

### Installing Air Charger Tank

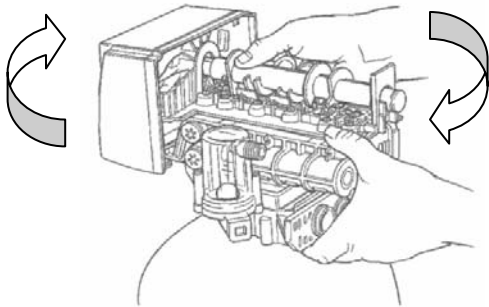
- ◆ Remove the PVC tank top from the fiberglass tank and **inspect the interior pipes to insure that they were not broken or jarred lose during shipment.**
- ◆ Apply silicon grease to the PVC top pipe threads and O-ring. Secure snugly to the Air Charger tank. The top does not have to be over tightened as the O-ring creates the water tight seal.
- ◆ Move the softener assembly to the location selected.

### Installing The Filter Tank

**Be sure to conform to all local plumbing codes when plumbing the service & drain connections.**

- ◆ Remove the control valve from the carton. Attach the bypass (if applicable) using the supplied bolt kit, making sure to lubricate the "O" rings with the supplied silicone. **(Do not use Petroleum Based Products!)**
- ◆ Lubricate the distributor "O" ring and the tank "O" ring with the supplied silicone.
- ◆ Thread the control valve onto the media tank by turning the valve clockwise. Do not


over-tighten the valve as the “O” ring will provide a water tight seal.



- ◆ Move the filter assembly to the location selected.


### Plumbing Connections

- ◆ Close the inlet water supply and open a faucet to relieve the water pressure in the supply line.

	<b>CAUTION</b>
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Failure to close the inlet supply and relieve line pressure may result in severe flooding.	


- ◆ **Plumb the Air Charger** into the water lines after the pressure tank. Use a minimum of  $\frac{3}{4}$ " water lines to insure maximum flow for backwashing the filter when installed for iron, manganese or sulfur removal. **NOTE: DO NOT OVER TIGHTEN THE FITTINGS THAT SCREW INTO TO AIR CHARGER TOP.**
- ◆ If there are water lines for livestock, outside hydrants, or sprinklers before the Air Charger, a check valve must be installed in a **vertical position** before the Air Charger inlet to prevent back flow of air.
- ◆ **Plumb the filter** into the service lines after the Air Charger using the supplied  $\frac{3}{4}$ " or 1" backplate or  $\frac{3}{4}$ " or 1" bypass. **NOTE: LET THE FILTER STAND FULL OF WATER FOR AT LEAST 4 HOURS.**

- ◆ Be sure to correctly identify the inlet and outlet connections. This is especially important if this unit is replacing a unit of another brand name. Plumbing the inlet & outlet connections backwards will result in media loss.
- ◆ Use plumbers tape only when utilizing threaded yoke or brass backplates. Do not use plumber's putty or thread paste.

	<b>CAUTION</b>
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When making sweat connections extreme heat may damage the rubber seals supplied with the sweat adapter kits. Be sure to remove these rubber seals prior to making any sweat connections. (Autotrol 163 Valves)	

### Drain Line Connection

- ◆ Select a nearby drain that can handle the rated backwash flow rate of the filter. A floor drain, stand pipe, or sink drain will work sufficiently. The drain should not be plumbed above the filter. If the drain line must be installed above the filter, a special check valve is needed for proper drainage.

	<b>CAUTION</b>
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An air-gap or anti-siphon device is required by most plumbing codes for water filter drain lines. Never connect the drain line into a drain, sewer line, or trap. An air-gap or anti-siphon device will prevent the possibility of sewage being back-siphoned into the water filter.	

- ◆ Connect the drain line to the back of the filter using a  $\frac{1}{2}$ " connection.
- ◆ Run the drain line to the appropriate drain. Be sure to follow the steps listed above to prevent backflow.

- ◆ Secure the end of the drain line to the drain to prevent movement during regeneration.

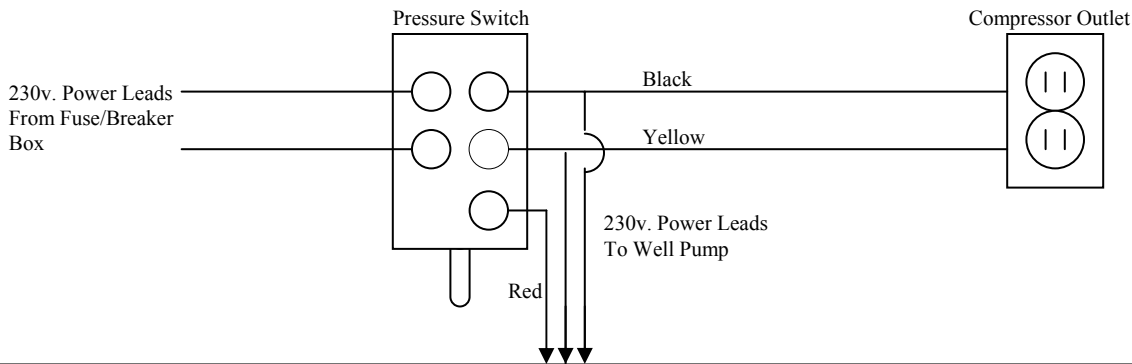
### **Preparing The Compressor**

- ◆ Typically, the Air Charger compressor should be wired to the pressure switch which operates the 230 volt well pump. If it is not feasible to wire the compressor directly to the pressure switch, see directions for wiring a 110 volt pump.

## Wiring a 230 volt Compressor

1. Turn the power off to the pressure switch & pump.
2. Secure the enclosed "L" shaped wall mounting shelf on the wall above the inlet of the Air Charger Tank. Mount the compressor to the bracket using the vibration mounts included to minimize pump noise. After the air compressor is mounted, also mount the supplied compressor outlet in close proximity to the compressor.

3. Using wire rated for 230v. such as 10-2 Romex, attach the two leads to the two terminals on the supplied plug-in.
4. Remove the pressure switch cover, and attach the two leads from the plug-in to the same terminals which the well pump is connected to. (This will allow the Air Charger compressor to operate during the same time frame that the well pump is operating.) Replace the cover, plug in the compressor, and turn the power back on.

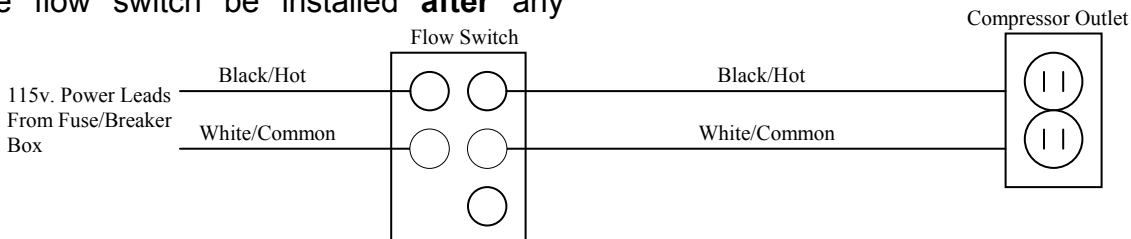


## ◆ Wiring a 115 volt Compressor (Additional Instructions For Wiring Flow Switch Are Included With Flow Switch)

1. If it is not feasible to wire the compressor directly to the pressure switch, we can use a flow switch to operate the compressor during times when there is flow. (This will allow the Air Charger compressor to operate during the same time frame that the well pump is operating.)
2. Determine the location where the air compressor will be mounted. After the air compressor is mounted, also mount the supplied compressor outlet in close proximity to the compressor.
3. Plumb in the flow switch **after** the filter, and/or any softening devices. It is imperative that the flow switch be installed **after** any

treatment equipment in order to keep the switch free from any contaminants or debris.

4. Using wire rated for 230v. such as 10-2 Romex, attach the two leads to the two terminals on the plug-in supplied with the Air Charger.
5. Remove the flow switch cover, and attach the two leads from the plug-in to the common and normally open terminals of the flow switch. (This will allow the pump to turn on during "flow" conditions.)
6. Run a power supply from the fuse/breaker box to the 115v. hot and common terminals on the flow switch.
7. Replace the flow switch cover, plug in the compressor, and turn the power back on. Your compressor is now wired for use.





## Additional Adjustments

- ◆ Insert one end of the ¼” poly tubing into the John Guest quick-connect fitting on the air compressor. Insert the other end of the poly tubing into the John Guest quick connect fitting on the tank top. (The tubing may need to be shortened to avoid excess tubing tangles.)
- ◆ Apply Teflon tape to the threads on the Braukmann Air Vent. There is a 1/8” x 12” long rod included with the air vent. Push this rod into the “V” bottom of the air vent. Now screw the air vent into the 1/8” top opening of the Air Charger.
- ◆ If the Air Charger is installed for the oxidation of Iron or Manganese, allow the air vent to expel the air directly out of the vent to a floor drain. If the Air Charger is installed for the removal of Hydrogen Sulfide, increase air tube size to 1/2” or larger and vent to outside.

## Putting the System into Service

- ◆ Make sure the control valve is in the Service Position.
- ◆ Make sure the air compressor is plugged in.
- ◆ Turn the filter bypass to the Service Position. (If applicable)
- ◆ Slowly open the supply valve and allow water to fill into the system.
- ◆ Check the service connections to make sure that there are no leaks in the plumbing connections.
- ◆ After the water stops flowing, open the supply valve fully.
- ◆ Open a faucet and allow all excess air to purge out of the system.

- ◆ Set the current time on the filter valve clock. **\*\*See control valve manual for correct directions on programming the control valve.**
- ◆ Set the control valve to backwash at least every other night. (If the filter begins to bleed through after a period of use, set the control to backwash every night.)
- ◆ Plug the control valve into a nearby outlet.
- ◆ Put the filter back into the bypass position.
- ◆ Allow the filter to sit for at least 6 hours to allow the media to soak (preferably overnight).



### CAUTION

Failure to allow the filter media to soak for at least 6 hours may result in loss of media and poor filter performance.

- ◆ Put the filter back into the service position after the media has soaked for at least 6 hours.
- ◆ Put the system into manual regeneration to charge the system and wash any media fines out to the drain.

## Setting the Air Compressor

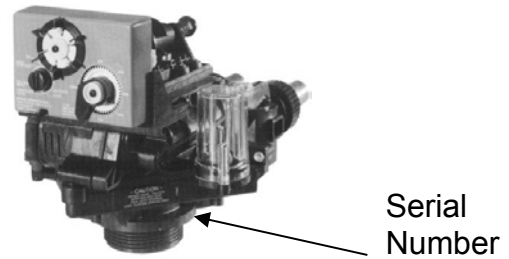
- ◆ Loosen the 6 sided lock nut on the brass Air Regulator Valve by **turning counter clockwise**.
- ◆ Turn the adjustment knob counter clockwise about half way. This will relieve the tension allowing air to be released out if the Air Regulator Valve.
- ◆ Plug the Air Compressor pump into the supplied plug-in. Make sure the voltage rating of the Air Compressor is the same as what the pressure switch is wired for.

- ◆ You are now ready to set the pressure of the Air Compressor to the point needed for operation in treating the water supply. For best results, allow air to be pumped into the Air Charger tank for the lower 10 psi setting of the pressure switch.
- ◆ Turn on a nearby water supply to activate the well pump or pressure switch.
- ◆ Kink the poly tubing to create back pressure on the air compressor.
- ◆ While the compressor is running, we want to set the air regulator valve 10 psi below the upper pump cycle . To achieve this, adjust the lock nut on the air regulator valve until the needle on the pressure gauge reads the proper psi.
- ◆ **EXAMPLE:** If the pressure switch has a setting of 40 psi startup and a 60 psi shut off, you will want to have the Air Compressor inject air into the Air Charger from 40 to 50 psi. With the poly tubing kinked, slowly close the Air Regulator Valve by turning clock wise until the needle reaches 50 psi. At this setting, the Air Regulator will allow the excess air (over 50 psi) to release out of the Air Regulator and not into the Air Charger.
- ◆ When the desired pressure is obtained, secure it by threading the 6-sided lock nut on the brass Air Regulator Valve clockwise until tight.
- ◆ Run the well pump through several cycles to insure the air compressor is set to deliver air to the Air Charger tank during the **lower 10 pounds of the pressure cycle.**

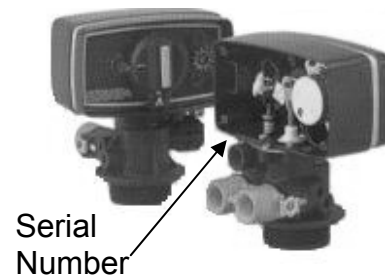
- ◆ **NOTE: Maximum setting on the air compressor is 70 psi. Above 70 psi, air will not be forced into the Air Charger Tank.**

### Identifying Your Serial Number

- ◆ Your Krudico water conditioner has a serial number stamp on the control valve. This serial number is important as it is referenced during warranty repair or replacement.



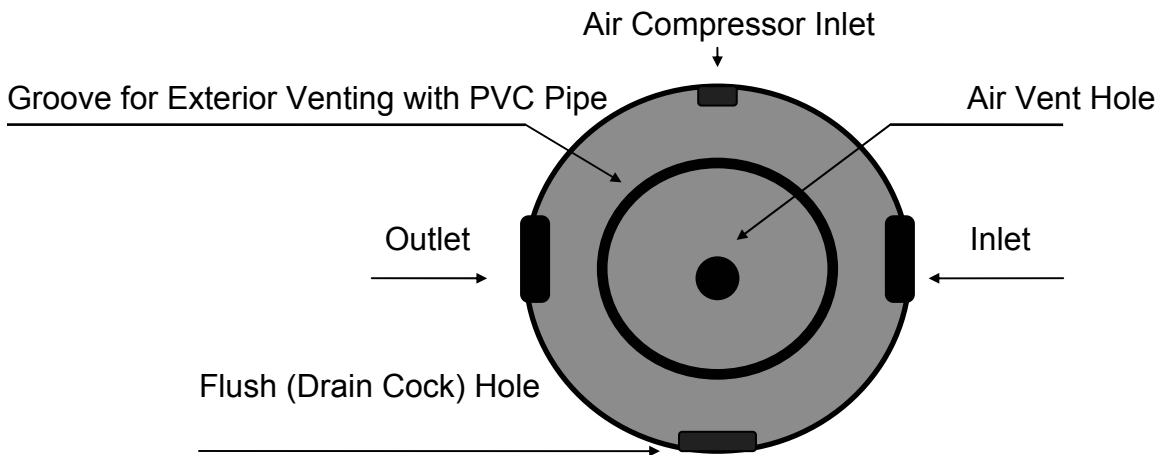
- ◆ The serial number stamp is located at the base of the control valve, where it attaches to the media tank on Autotrol Models.



- ◆ The serial number stamp is located at the back panel of the control valve on Fleck Models.

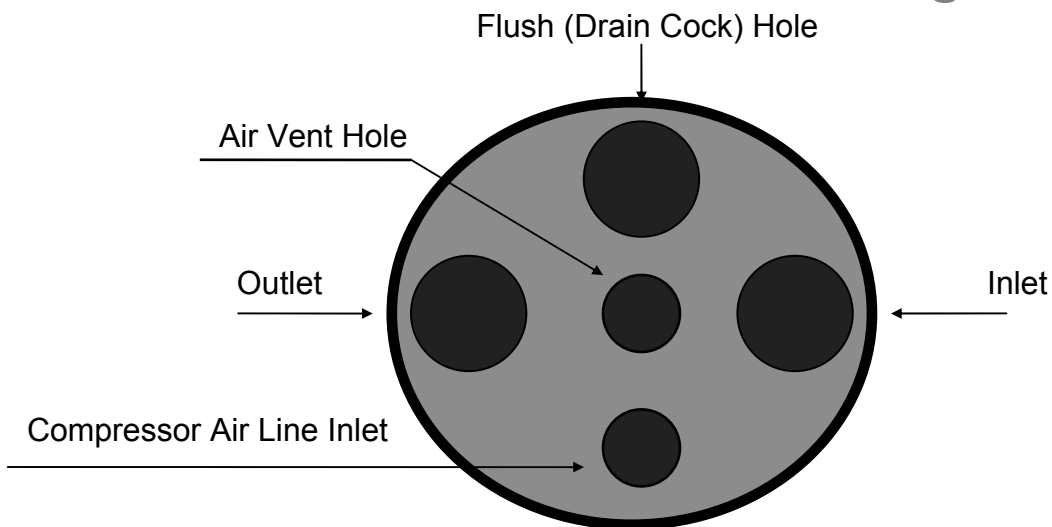
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# Top View of Air Charger Top

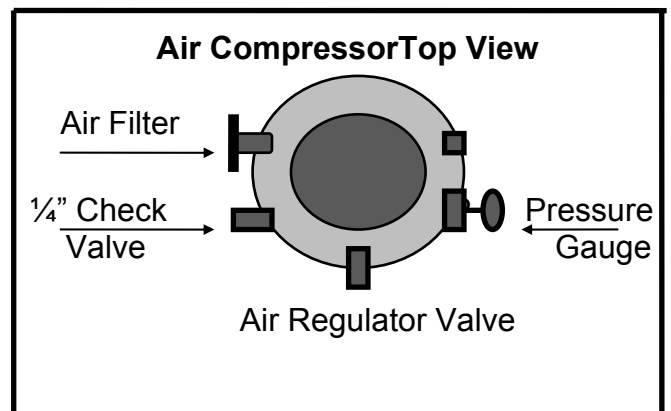


**NOTE: DO NOT OVER TIGHTEN CONNECTIONS**

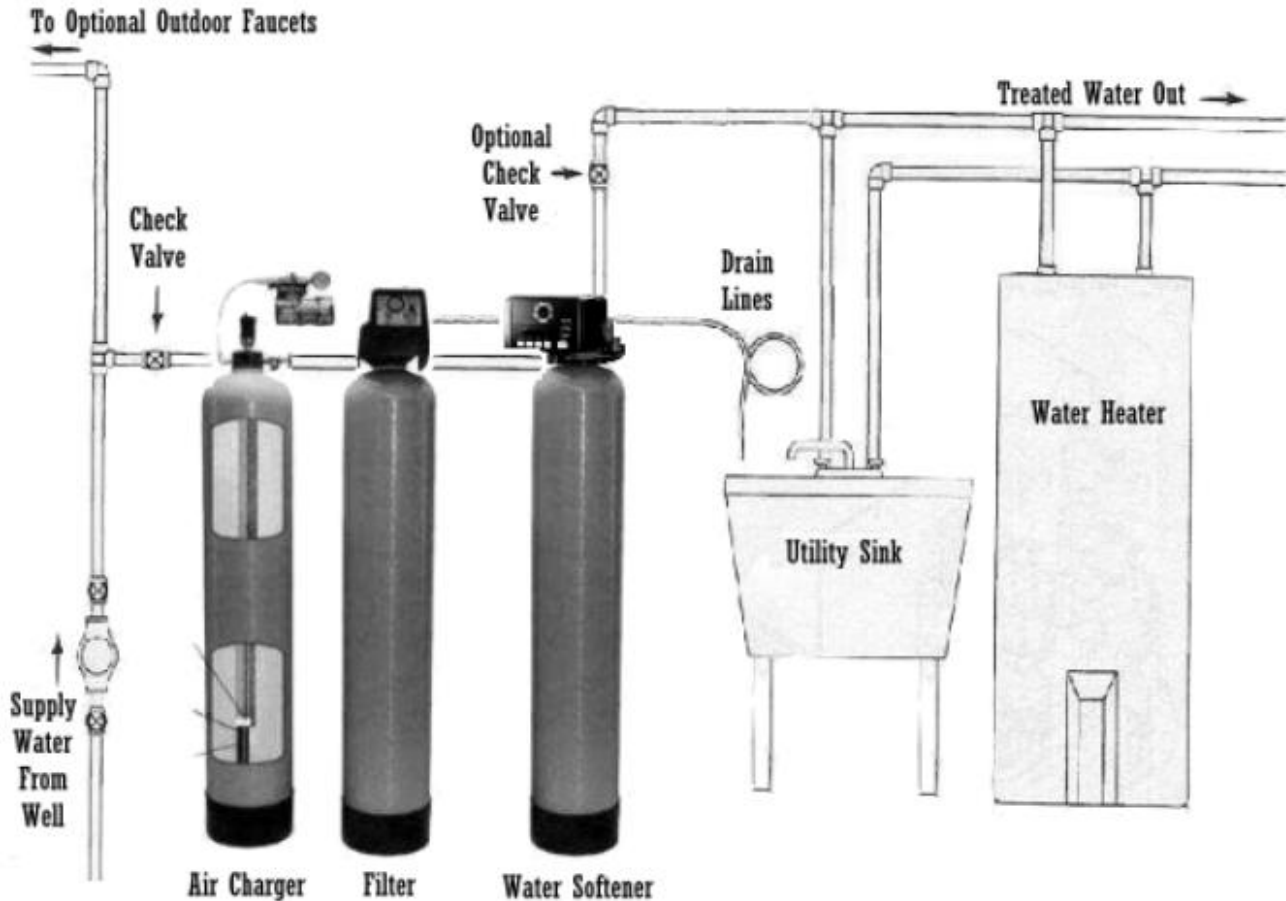
# Bottom View of Air Charger Top



NOTE: Check the arrows on the check valves for proper direction of air flow. Both arrows should flow to the Air Charger.



# Typical Plumbing Configuration For Krudico Air Chargers



- ◆ Place the media tank in a solid, level surface near an outlet and drain facilities.
- ◆ Make sure there is 10 ft. (3 m.) of pipe distance between the water filter and the hot water heater. If this is not possible, be sure to install a vertical check valve between the softener and the heater.
- ◆ When plumbing the filter into the service lines, make sure the inlet is on the left and the outlet is on the right when facing the unit. Inlet/Outlet connections differ on various brands of water conditioners – If this unit is replacing an existing system,

make sure the inlet/outlet connections are correct. Failure to properly plumb the softener will result in loss of media.

- ◆ An air-gap or anti-siphon device is required by most plumbing codes for water filter drain lines.



## CAUTION

**Electrical Shock Hazard!!** The control valve should be plugged in directly to an outlet, **do not use an extension cord**. Never remove the grounding prong from the supplied plug-in. If a two prong outlet must be used, obtain a 3 prong adapter and properly secure it to the receptacle.

## **Maintaining and Servicing the Air Charger**

Minimal servicing is normally needed when the Air Charger is installed properly according to directions. However, there are several items you can check if you feel the Air Charger is not performing as expected.

### **Air is being expelled from the faucets in the house.**

- ◆ Check the air level in the tank by shining a flashlight through the tank. The air pocket should be 8" - 14" from the tank top. If the air pocket is greater than this or near the bottom of the tank the air vent may be in the closed position or plugged. The air vent may be cleaned by turning it to the "closed" position and unscrewing the vent top. The float may be removed and cleaned without shutting the water off.
- ◆ The compressor setting is too high. Readjust the brass air regulator on the pump to lower the amount of air injected into the Air Charger.
- ◆ Check to make sure the 1/8" rod has not fallen out of the bottom of the air vent.

### **The filter downstream from the Air Charger is washing media out during the backwash cycle.**

- ◆ This again is caused by too much air in the Air Charger passing into the filter. Correct as per the instructions above.

### **There isn't an air pocket inside of the Air Charger.**

- ◆ Either the outlet tube or the air vent tube inside of the Air Charger tank has broken out of the tank cap.
- ◆ Remove the tank cap from the tank and inspect whether the Air Charger is plumbed in backwards.

### **Iron periodically comes through the filter.**

- ◆ Ferric oxide has built up inside the Air charger. Flush the Air Charger to eliminate the problem.
- ◆ Water usage has increased, backwash the filter more frequently.
- ◆ If there is a water softener after the filter, make sure the regeneration times are different. If both the filter and softener regenerate at the same time, there will not be enough water to properly backwash the filter.

### **My sulfur odor was gone for several weeks or months but it is now returning.**

- ◆ Sulfate reducing bacteria has formed a slime growth inside of the Air Charger. Disinfect by pouring one pint of 5% Bleach or one gallon of 3% Hydrogen Peroxide into the Air Charger and allow it to stand for one hour. Flush the Air Charger out by opening the drain valve and running the water down the drain until the smell of chlorine is gone.
- ◆ For extreme amounts of sulfur we recommend installing a chemical feed pump in front of the Air Charger and continually inject hydrogen peroxide into the water. This will disinfect the system and the hydrogen peroxide will regenerate the S-CFA catalytic filters.

### **The pressure gauge on the air compressor shows I'm building up pressure but I'm not getting air into the Air Charger.**

- ◆ One of the two check valves is installed backwards. Check arrows on the check valves for the proper direction of flow.
- ◆ The gray air muffler (bubbler) has plugged with iron or hydrogen sulfide. Remove the Air Charger top and replace the white muffler.