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*Hellenbrand*

 **IRON CURTAIN™**  
SYSTEM 2.0



## Owner's Manual

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*Manufactured by:*

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**Congratulations** on your purchase of one of the finest water treatment systems available today – the Iron Curtain System. This patented, non-chemical filter system, when properly applied will remove iron, manganese and/or hydrogen sulfide from your water supply.

This owner’s manual is designed to assist owners and installers with the operation, maintenance, and installation of your new iron removal system. It is our sincere hope that this manual is clear, concise, and helpful to both owner and installer. We have included detailed instructions of general operating conditions, pre-installation, installation, start-up, and timer settings.

**Questions?** Should you have any questions regarding the installation, operation or servicing of this system, please **contact the dealer you purchased this system from**. Your dealer will be familiar with your particular situation, your water conditions, etc. and should be able to address your concerns promptly and efficiently.

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## **INSTALLATION DATA**

Date of Installation \_\_\_\_\_

Filter Model Number \_\_\_\_\_

Aeration Model Number \_\_\_\_\_

Address of Installation \_\_\_\_\_

Installed By \_\_\_\_\_

Raw Water Test:    Iron \_\_\_\_\_                      Manganese \_\_\_\_\_                      pH \_\_\_\_\_                      Hydrogen Sulfide \_\_\_\_\_  
    TDS \_\_\_\_\_                      Iron Bacteria \_\_\_\_\_ yes \_\_\_\_\_ no                      Tannins \_\_\_\_\_  
    Hardness \_\_\_\_\_                      Alkalinity \_\_\_\_\_

Automatic Filter Regeneration:    Every \_\_\_\_\_ Days

Frequency of Air Recharge: Every \_\_\_\_\_ Hours - Factory default is every 24 hours

Continuous Water Supply Flow Rate @ 30 PSI (While the pump is running) \_\_\_\_\_ Gallons Per Minute (gpm)

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# IRON CURTAIN 2.0

## Iron Filtration System

Aeration/precipitation/multi-media filtration for:

1. Iron Reduction/Removal
2. Manganese Reduction/Removal
3. Hydrogen Sulfide Reduction/Removal

## Principle of Operation

The Iron Curtain System uses a **three step process of oxidation, precipitation, and mechanical filtration** for the reduction/removal of iron, manganese, and hydrogen sulfide. The process of how the Iron Curtain System does each one of these separate procedures is the key to the successful results this product has obtained in the market place. **There are two main components that make up the Iron Curtain System.** They are:

1. Iron Curtain 2.0 Aeration Assembly
2. Iron Curtain Multi-Media Depth Filter

**1** The first step in any oxidizing process is to bring the raw water into intimate contact with a strong oxidant. This will begin to convert the dissolved element such as iron or manganese to a physical particle or nonsoluble precipitate. A strong, inexpensive, environmentally-safe oxidant is oxygen, which makes up about 21% of ambient air. To do this, the Iron Curtain System sprays water through a regulated head of air in the aeration tank.

**2** The second step in this three step process is to provide adequate reaction or contact time for the precipitation reaction to go to completion. This allows time for the iron and/or manganese particles to become large enough to filter out. The aeration tank with the Iron Curtain System allows for several minutes of contact time at the rated service flows, compared to only seconds on other systems.

It should be noted that this reaction time will also be affected by temperature; the warmer the water the faster the reaction. A low pH can slow the oxidation reaction of the iron. This reaction time may also be affected by the presence of organic material (such as tannins). **If tannins are present, field tests have shown that they will not be removed and will also hinder the ability of this system to effectively remove iron, manganese, and/or hydrogen sulfide. Installation of this system on water supplies with more than 0.5 ppm of tannins will void warranty.**

**3** The third and final step is filtration for the removal of the precipitates from the water. A WQA Water Filtration Study Guide states:

"The ideal filter bed would be one with large grains at the top to prevent the formation of a surface cake and to provide large pores for coarse particles and small grains at the bottom to entrap smaller particles. This allows the entire depth of the bed to be used as a filter. This also allows for longer filter runs and faster flow rates. Unfortunately, such an ideal bed, when consisting of a single media is not possible, the way to solve this problem is to use layers of media."

The advantages of a multi-media bed are:

1. Longer runs between backwash times.
2. Caking of the bed and breakthrough turbidity are virtually eliminated.
3. Much higher service flow rates per square foot.
4. Higher degree of clarity because of the heavier, finer filter media in the bottom.

The standard Iron Curtain System uses five layers of filter media. The top layer is made up of large, lighter weight particles. The second layer contains a slightly heavier media. The third layer contains a much heavier media, smaller in size than the one above. The fourth layer contains an even heavier media. The fifth layer is a special support bed to retain filter media so it does not pass through the distribution system, and allows an even distributed flow of backwash water.

## Operation of Aeration System

The Iron Curtain System introduces air into the aeration tank and bleeds off the old head of air automatically. A timer controls the air recharge cycle and how frequently it occurs. The timer turns on the air pump, opening the drain port and the top air recharge port of the aeration tank. The air pump runs for a pre-set amount of time, replenishing the head of air and discharging excess water and/or air to drain.

## Advantages Over Other Systems

1. The original systems was tested and validated by WQA under their S-200 Standard.
2. Uses no chemicals or salt.
3. Eliminates the need for air injectors, venturis, or micronizers.
4. No floats or air volume controls are used to regulate air volume in aeration tank which "foul" from iron.
5. Two-tank system consisting of a pressurized aeration tank and multi-media depth filter.
6. 110V aeration pump to recharge aeration tank.
7. "Piggy-back" plug allows control valve to be plugged into same outlet.
8. Can be used on shared wells, municipal water supplies, or with buried pressure tanks without additional equipment.
9. Higher service flow rates.
10. Better filtration results.
11. U.S. Patent #B1 5,096,596 and patent pending.
12. Variable settings on air recharge that is independent of backwash frequency.

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## Operating Conditions

The original Iron Curtain System has been validated by the WQA under their S-200 Filter Standard for the reduction/removal of iron, manganese, and/or hydrogen sulfide. The concentration limits listed below reflect the maximum individual limit that each contaminant was tested for separately without any interference of other contaminants in the influent water.

In reality, these contaminants may be present in combination which may limit the filter's ability to remove these contaminants in higher concentrations. In some cases, individual sellers of this equipment have had success removing higher concentrations of contaminants—iron, for example—above the limitations we have listed. If you are considering the installation of this system for the reduction/removal of iron, manganese and/or hydrogen sulfide levels that are above operating conditions listed below, we recommend that you consult your dealer for proper application. Installation of this system under these circumstances may void part(s) and/or all of the system warranty.

**pH**— The pH level of the influent water must be 7.0 or higher for iron oxidation reaction to proceed per the engineering specifications.\*

**Iron** — This system is rated for a maximum of 10 ppm of ferrous (clear water) and/or ferric (red water) iron.\*

**Iron Bacteria** — If iron bacteria are present; more frequent service may result, life of the Iron Curtain system may be limited and the system may be unable to properly remove iron. **By properly controlling the iron bacteria with chlorine or other approved methods for bacterial reduction, the Iron Curtain System will function properly. One option to control iron bacteria within the Iron Curtain is chlorine injection during the regeneration cycle. In some instances, continuous chlorination of the water supply may be needed.**

**Hydrogen Sulfide** — Sometimes referred to as "rotten egg" odor. This system is rated for a maximum of 10 ppm hydrogen sulfide. Hydrogen sulfide levels vary depending on barometric pressure.\*

**Manganese** — Limit 2.0 ppm; amounts present over 2.0 ppm may gradually prevent iron removal. Note: For optimum manganese reduction, pH should be greater than 8.5.\*

**Organic Matter (Tannins)** — The presence of organic matter such as tannins will prevent the oxidation process of converting the dissolved element, such as iron or manganese, to a nonsoluble precipitate or solid substance. In other words, organics can tie up the iron preventing filtration. **The presence of organics such as tannins above 0.5 ppm voids any claims for this system to perform as stated above. In some applications, tannin levels below 0.5 ppm or the presence of other organics may hinder the operation of this system.\***

**Chlorine** — The presence of chlorine in the raw water supply ahead of this system should be limited to a maximum of 1.0 ppm residual and preferably 0.5 ppm or less when fed continuously.

**Total Dissolved Solids (TDS)** — While TDS does not directly affect iron removal, it is a good indicator of potential interference. Most waters have TDS less than 500 and generally present no problems to iron reduction. If any ion becomes excessive, it may cause failure of iron removal. **A TDS more than 750 ppm voids any claims for this system to perform as stated above.\***

## Pre-Installation Check List

**Water Pressure:** A minimum of 30 psi at a predetermined continuous flow rate is required to backwash the filter properly, with a maximum of 70 psi to be used.\*

**Actual Influent Flow Rate:** (Water available from well pump, service inlet, etc.) The actual flow rate must exceed the backwash rate for the model of filter selected at a minimum of 30 psi for the entire length of the backwash cycle. See actual backwash rates in the Specifications section on page 6.

**Electrical Requirements for Filter Control:** A continuous 110 volts is required to cycle the controls and aeration pump. Make certain the electrical supply is always on and cannot be turned off with another switch.

**Existing Plumbing:** The condition of the existing plumbing should be free from lime and iron build-up. Piping that is heavily built-up with lime and/or iron should be replaced.

**Equipment Location:** See Figure 1, on page 7.

**Location of Aeration and Filter Tank:** See Figures 1 on page 7. These two tanks should be installed after the pressure tank and as close to each other as practical. If you want to filter outside hosebibs, be sure the filter system is properly sized to handle the flow rates required for extended periods of time, in addition to the normal household demand.

**Drain Lines:** All filter system drain lines must be a **minimum of 3/4"** or equal to the size of the drain line connection at the control valve **or larger**. Avoid overhead drain lines when possible. If used, overhead drain lines are not to exceed a height of five feet above the control valve and should be no more than fifty feet in length.

**Check Valve:** On applications where there is a non-filtered demand for water such as joint wells (where the filter system is only installed in one of two or more homes), outside hosebibs, farms with outbuildings, yard hydrants, etc. a spring loaded check valve is provided and must be installed ahead of the aeration tank. See Figures 1, on page 7. Install the check valve in a vertical upflow position with a minimum 6" water column above the check valve. This prevents air from escaping past the check valve. If the check valve is installed in a horizontal position, and there is a simultaneous demand for both non-filtered and filtered water, the air head in the aeration tank may escape backwards past the check valve into the non-filtered water line.

**By-Pass Valves:** Always provide for a bypass on the filter system. It is recommended that a bypass be placed on both the aeration tank and the filter tank.

**Filtered Water:** Normally, filtered water is furnished to all household lines; however, outside faucets are typically left on raw water. If filtered water is provided to outside faucets, the filter system must be sized accordingly.

**Caution:** The water pressure is not to exceed 70 p.s.i.; water temperature is not to exceed 110° F; filter system cannot be subject to freezing conditions; filter system cannot be subject to a negative pressure or vacuum. On installations where there is the possibility of a negative pressure or vacuum, a vacuum breaker or check valve must be installed at the inlet of the conditioner. For example, if the water service is interrupted due to a water pipe break, well pump being serviced, etc., a back siphon could occur causing a vacuum or negative pressure on the filtration equipment.

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\*For application parameters outside the specified operation conditions or additional information regarding the listed items, contact your dealer.

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## Installation Instructions

Your new Iron Curtain™ model IC-2.0 allows for simple installation and start up. Installation diagrams are provided to assist you. Use of these diagrams and the following procedures will ensure that the system is properly installed.

1. **Follow all state and local plumbing and electrical codes!**
2. The one-inch (1") check valve that is supplied must be installed in the upflow position on the raw water supply feeding the aeration tank. (See figure 1 page 7 for proper check valve installation procedures)
3. When installing an Iron Curtain Filter system it is common to provide filtered water to some fixtures such as the kitchen cold faucet. This is typically done as a matter of personal preference. In rare occasions it has been noted that the customer may experience some air in the filtered water line on the morning after regeneration. It has proven to be beneficial to plumb the line for the filtered only water fixture in a downward direction from the inlet of the softener (12 inches recommended), then make a reverse turn and go upward toward the fixture. Understanding that air always rises to the highest point in a water system, and it cannot naturally flow downward. (Figure 1, page 7)
4. The raw water supply from the outlet of the check valve must be connected to the down-flow inlet connection on the aeration tank. **Refer to the stickers marked inlet/outlet for proper connections.** A factory by-pass valve is available and should be installed on the aeration tank assembly. (See page 10 for details). Leave the aeration tank on by-pass at this time.
5. The outlet from the aeration tank is then connected to the inlet of the filter tank. A factory by-pass valve is available and should be installed on the filter tank assembly. (See page 10 for details).
6. Connect the outlet of the filter system to the water system lines you are filtering.
7. The IC-2.0 aeration head assembly has a 3/8" drain connection that must be run to a drain. This can tee into the drain line of the filter or to a drain independent of the filter drain. Drain line emits surges of excess air from aeration tank and must be secured. Tubing has been supplied along with a 3/4" male threaded adapter. (See page 10 for details).
8. There is a 1/4" tube size vent port off of the solenoid valve which is vented to the atmosphere. This will normally expel very little moisture unless an internal seal fails within the valve body. **This vent should be run to a drain to prevent any water damage to the surrounding area, should the solenoid fail. This must drain downward to an open atmospheric drain separate from the filter drain.**
9. Recommend 1" diameter pipe between aeration tank and filter tank.

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## Start-Up

1. Once all plumbing is finished and with the unit on bypass, flush the plumbing system until water is clear and no foreign material is detected.
2. Plug in aeration pump. Open the inlet valve on the by-pass to the aeration tank and allow the tank to fill with water and come up to full line pressure. You do not have to wait for the air recharge cycle (air pump running) to finish before proceeding to the next step.
3. Open the outlet valve on the by-pass(s) for the aeration tank and filter.
4. With the filter control valve in the service/filtering position, **slowly open** the inlet valve on the by-pass to the filter and run water at a filtered water fixture until the water is clear. Then continue to slowly open the filter inlet valve fully and continue to run water at a filtered water faucet until water is clear.
5. Start-up is complete.
6. **IMPORTANT: Do not backwash your Iron Curtain Filter for 24 hours.**

## Aeration Control Center

Your new IC-2.0 Aeration Control is factory pre-set to cycle the air compressor once every 24 hours. To adjust the frequency for the air pump refer to the wiring schematic. The timer has a fixed run time, which cannot be adjusted up or down. To manually initiate an air recharge cycle, unplug the power cord and plug it back into the electrical outlet. The air pump will begin to run and will automatically shut off.

## Iron Curtain Filter Control

Your Iron Curtain Filter is factory preset to backwash every third day. Adjust as necessary but never backwash less often than every three days. See filter control owners manual for details.

## Regeneration Frequency

Your Iron Curtain Filter System contains a special filter media mixture which allows it to filter iron longer than standard filters between backwash regenerations. However, it is our recommendation to leave factory settings as is, unless you wish to backwash more frequently. You will have to backwash more frequently if you have higher amounts of iron, iron bacteria, hydrogen sulfide, and/or manganese present in your water supply. You will also have to regenerate more frequently if you notice iron bleed through before the end of the normal service run.

## Backwash Frequency Iron Applications

- 0.3 - 3.0 ppm Iron - Every 3rd Day
- 3.0 - 6.0 ppm Iron - Every Other Day
- 6.0 - 10.0 ppm Iron - Every Day
- 10+ ppm Iron - Consult Factory

## Air Recharge Frequency

(Settings Based on Average Pressure (50psi) and <500 Gallons Daily Use)

- 0.3 - 3.0 ppm Iron - Once Daily (Every 24 hours)
- 3.0 - 6.0 ppm Iron - Once Daily
- 6.0 - 10.0 ppm Iron - Twice Daily (Every 12 hours)
- 10+ ppm Iron - Consult Factory

## Hydrogen Sulfide Applications

Hydrogen Sulfide (H<sub>2</sub>S) consumes 7 times the amount of oxygen to oxidize than iron does. Therefore, for Hydrogen Sulfide Applications, we use the following guideline;

- 0 - 4 ppm H<sub>2</sub>S - Twice Daily (Every 12 hours)
- 4 - 8 ppm H<sub>2</sub>S - Three Times Daily (Every 8 hours)
- 8 - 10 ppm H<sub>2</sub>S - Six Times Daily (Every 4 hours)

**See page 9 to change air recharge frequency on timer.**

## Specifications

Models	Filter & Aeration Tank Size	Media Cu. Ft	(1) Inlet/Outlet	Max. Service Flow GPM	(2) Backwash Rate GPM	Floor Space (WxHxD)
<b>IC-10</b> WM2-IC10-2.0, TF-IC10-2.0, AM4-IC10-2.0, PS4-IC10-2.0, PM1-IC10-2.0, HB-IC10-2.0	10"x54"	1.5	1"	5.0	5.0	26"x68"x16"
<b>IC-10A</b> WM2-IC10A-2.0, TF-IC10A-2.0, AM4-IC1-A-2.0, PS4-IC10-2.0, PM1-IC1-A-2.0, HB-IC10A-2.0	10"x54"	1.5	1"	5.0	5.0	26"x68"x16"
<b>IC-10+</b> WM2-IC10+2.0, TF-IC10+2.0, AM4-IC10+2.0, PS4-IC10+2.0, PM1-IC10+2.0	10"x54"	1.5	1"	5.0	5.0	26"x68"x16"
<b>IC-12</b> WM2-IC12-2.0, TF-IC12-2.0, AM4-IC12-2.0, PS4-IC12-2.0, PM1-IC12-2.0, HB-IC12-2.0	12"x52"	2.0	1"	7.0	8.0	30"x66"x18"
<b>IC-12A</b> WM2-IC12A-2.0, TF-IC12A-2.0, AM4-IC12A-2.0, PS4-IC12A-2.0, PM1-IC12A-2.0, HB-IC12A-2.0	12"x52"	2.0	1"	7.0	8.0	30"x66"x18"
<b>IC-12+</b> WM2-IC12+2.0, TF-IC12+2.0, AM4-IC12+2.0, PS4-IC12+2.0, PM1-IC12+2.0	12"x52"	2.0	1"	7.0	8.0	30"x66"x18"

(1) Aeration Head and Check Valve have 1" Inlet/Outlet.

(2) Water temps above 60° F will require a higher backwash rate. Consult factory.

# Installation Diagram

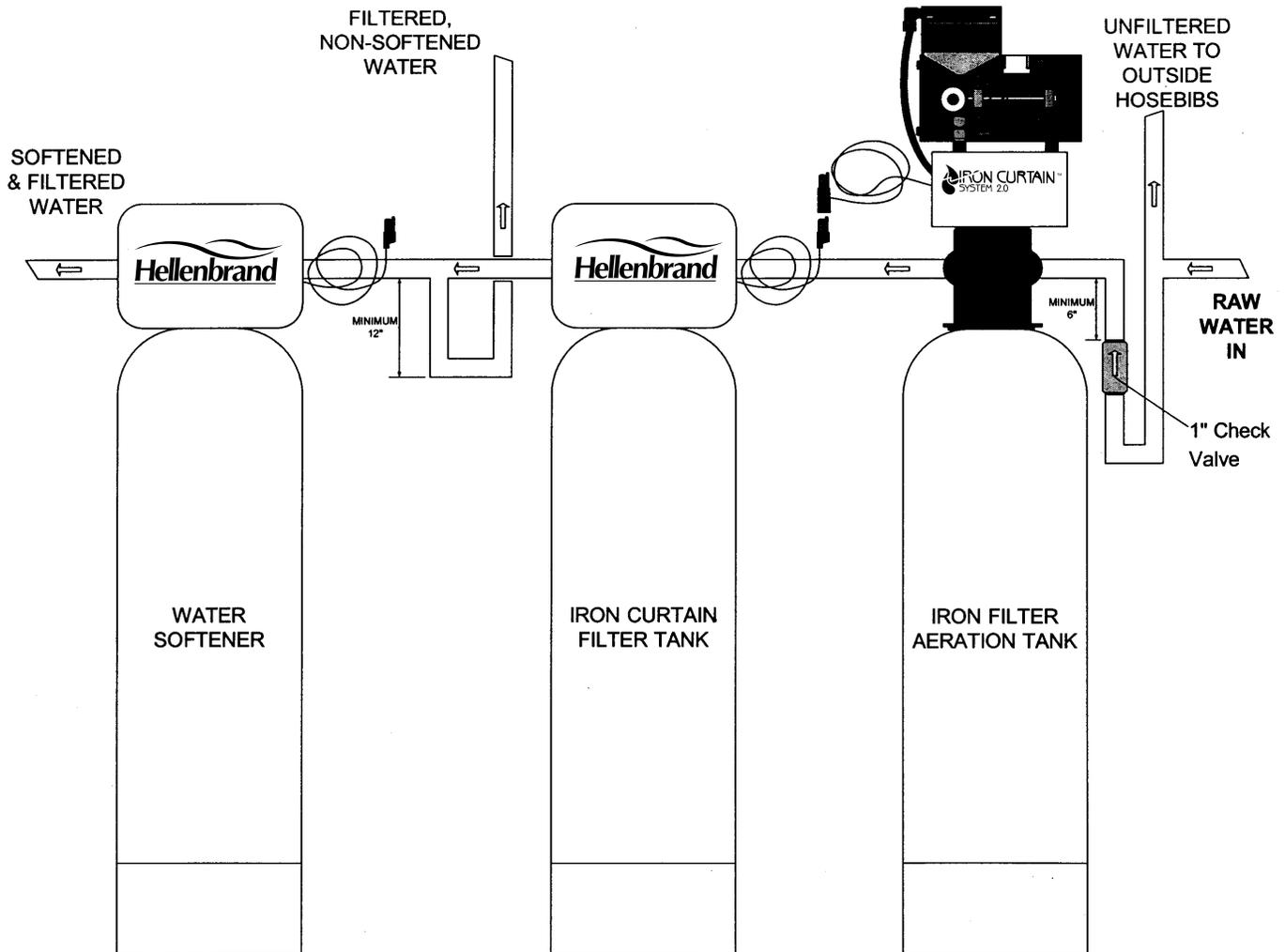
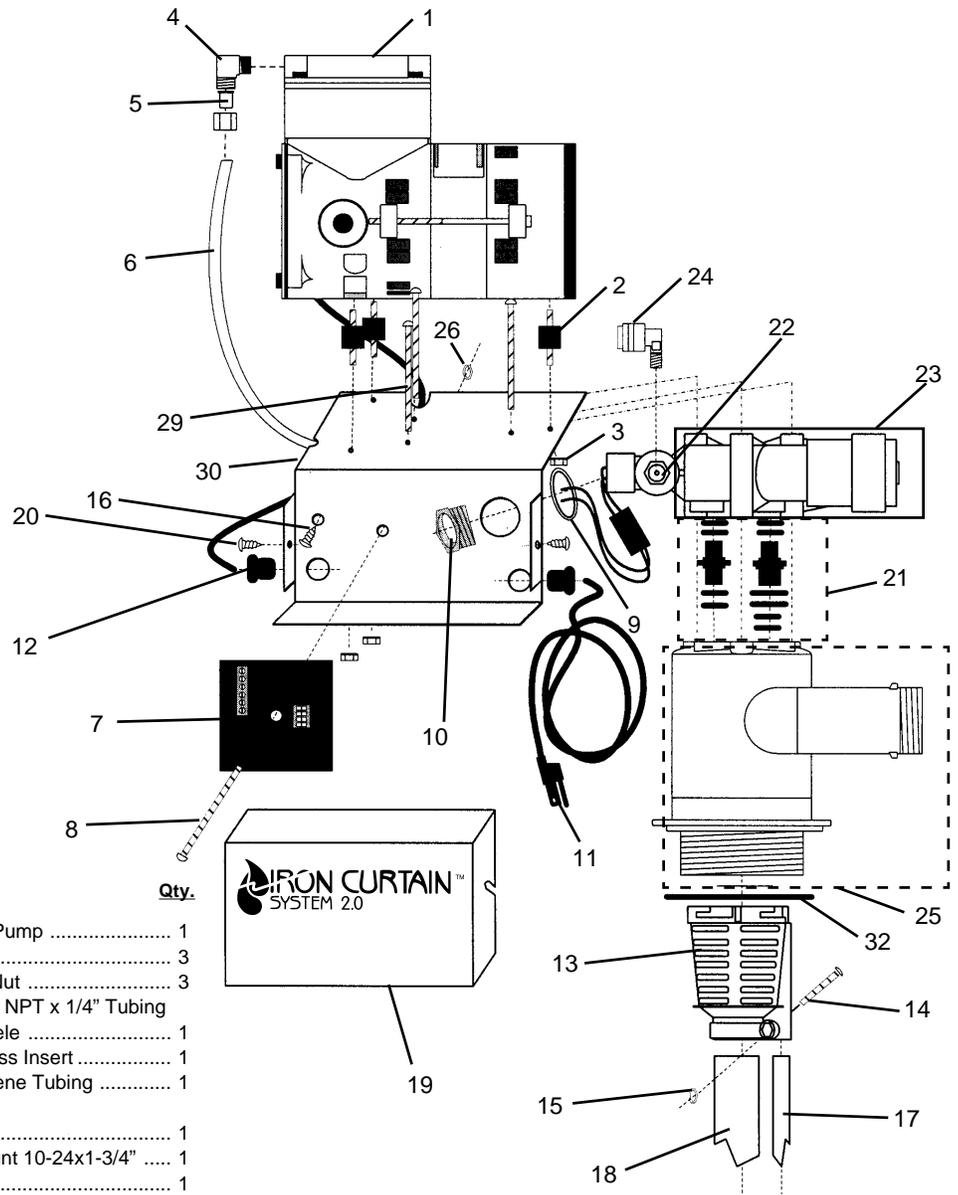


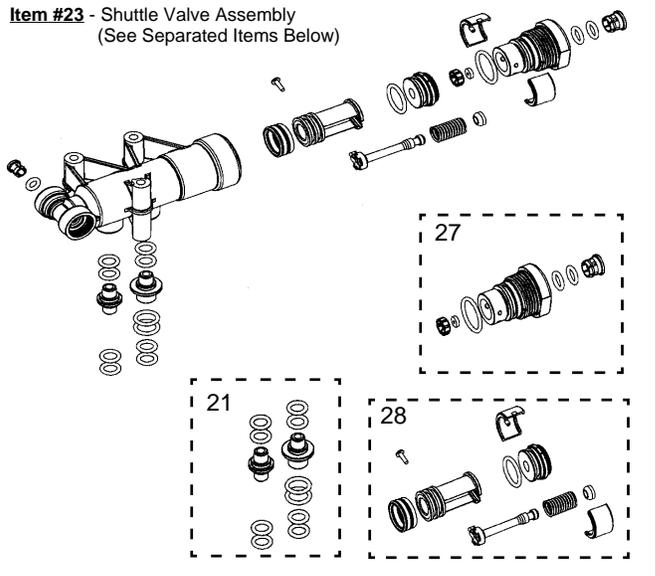
Figure 1

When installing an Iron Curtain Filter system it is common to provide filtered water to some fixtures such as the kitchen cold faucet. This is typically done as a matter of personal preference. In rare occasions it has been noted that the customer may experience some air in the filtered water line on the morning after regeneration. It has proven to be beneficial to plumb the line for the filtered only water fixture in a downward direction from the inlet of the softener (12 inches recommended), then make a reverse turn and go upward toward the fixture. Understanding that air always rises to the highest point in a water system, and it cannot naturally flow downward.

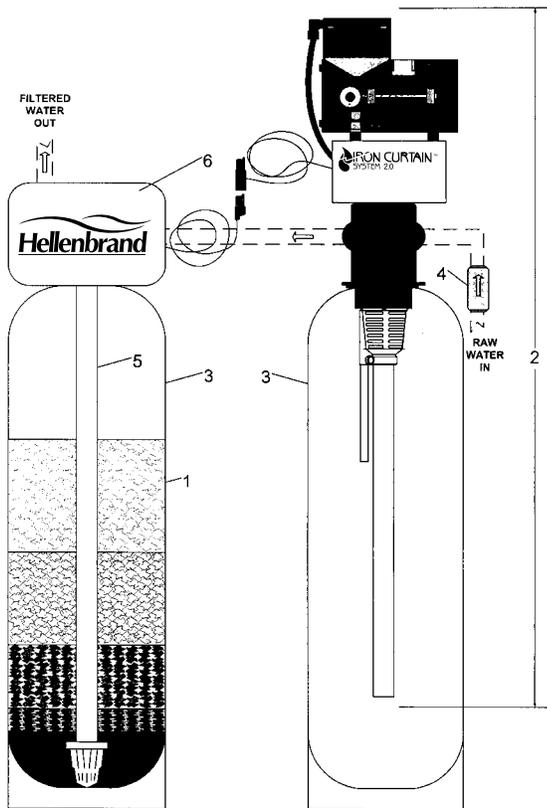
# IC-2.0 Assembly



Item No.	Part No.	Description	Qty.
1	22-01	405 Series Air Pump	1
2	22-05	IC Pump Feet	3
3	22-06	IC Pump Feet Nut	3
4	22-269CA-4-2	Brass Str L 1/8" NPT x 1/4" Tubing with Nut & Ferrele	1
5	22-63PT-4-40	1/4" Tubing Brass Insert	1
6	22-PPB-43-0500	1/4" Polypropylene Tubing (9" required)	1
7	22-MC1001181H	Timer Relay	1
8	67-28996	Bolt, Timer Mount 10-24x1-3/4"	1
9	25-759400	Conduit Seal	1
10	65-HA401	Electrical Bushing, 1/2"	1
11	65-183SJTW-8B	Power Cord, 8 ft.	1
12	65-1207	Strain Relief, Elec. Cords	2
13	22-D1268	Upper Distributor Basket	1
14	67-71346	Screw, Upper Distributor Basket 6-32 x 3/4" 8-18SS	1
15	67-70705	Nut, Upper Distributor Basket 6-32 316SS	1
16	67-10631-01439	Grounding Screw	1
17	22-D1269	Bleed off Tube	1
18	22-D1130-50.25	Pick Up Tube	1
19	22-D1267	Cover	1
20	67-10631-01439	Screw, Cover	2
21	22-D1273	Adapter Assembly Kit	1
22	22-A3321-51	Solenoid Operator Assembly	1
23	22-D1270-01	Shuttle Assembly	1
24	4-PI4808215	1/4" Vent Port Adapter	1
25	22-1220-02	Aeration Head	1
26	67-28996	Timer Bolt	1
27	22-D1271	End Cap Assembly	1
28	22-D1272	Piston Assembly	1
29	22-D1267	Back Plate Bolt	3
30	22-D1266	Back Plate	1
31	22-15	1" Inlet Check Valve (Not Shown)	1
32	22-800	Complete Aeration Assembly	1
	15-V3180	O'Ring	1
	15V	O'Ring Pick-Up Tube (Not Shown)	1



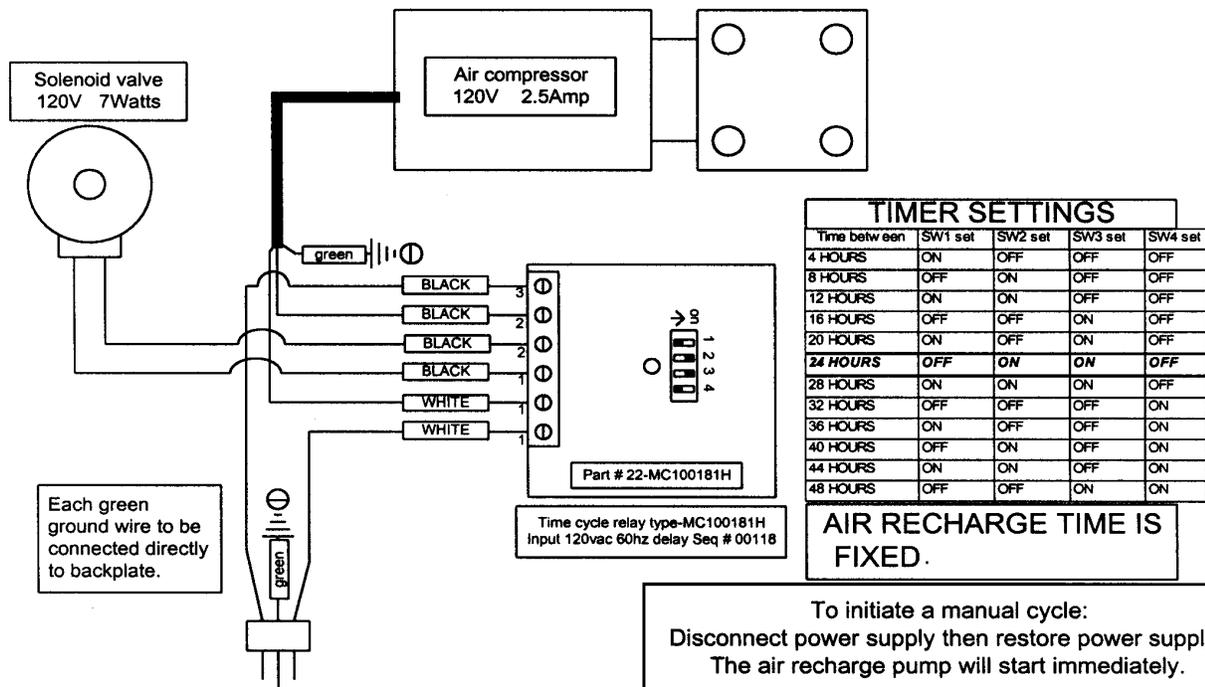
# Iron Curtain System



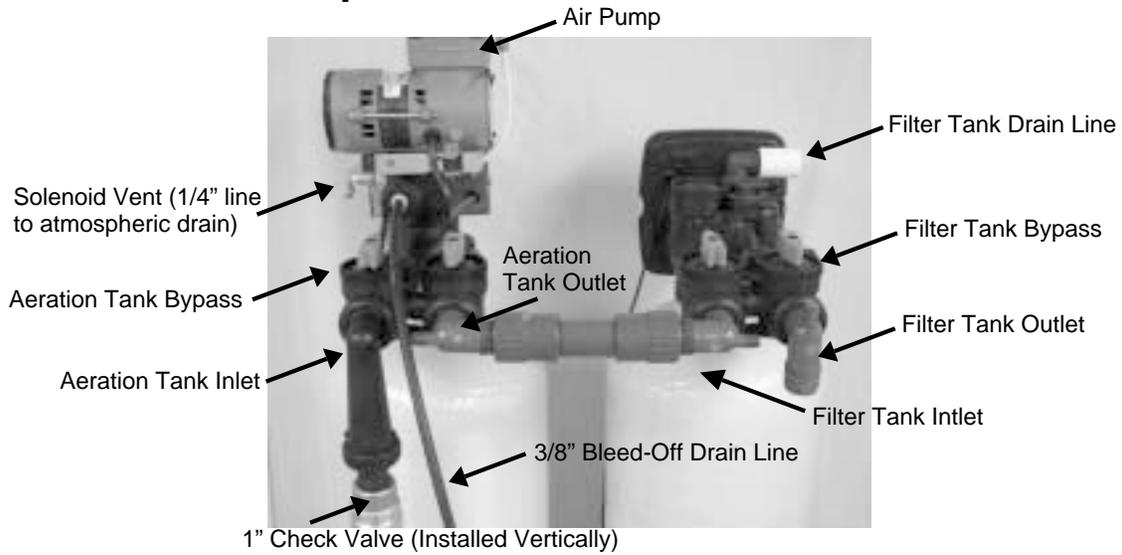
ITEM NO.	QTY. REQ'D.	PART NO.	DESCRIPTION
1	1	1-010	IC-10 Rebed Mix
		1-010A	IC-10A Rebed Mix
		1-010+	IC-10+ Rebed Mix
		1-012	IC-12 Rebed Mix
		1-012A	IC-12A Rebed Mix
		1-012+	IC-12+ Rebed Mix
2	1	22-800	Aeration Assembly
3	1	19-RT1054NAT	10x54 Polyglass IC-10 Tank
		19-RT1252NAT	12x52 polyglass IC-12 Tank
4	1	22-15	1" Check Valve
5	1	9-93253-RT	Distributor Tube for IC-10, PM, TF, HB, WM2 Series
		9-93254-RT	Distributor Tube for IC-10, PS, AM Series
		9-93252-RT	Distributor Tube for IC-12, PM, TF, HB, TS, WM2 Series
		9-93254-RT	Distributor Tube for IC-12 PS, AM Series
<b>Control Valve Options for Filter Valves IC-10</b>			
6	1	60-PM1-FLTRVLV-5.3	ProMate, HB Control
		60-WM2-FLAT-5.0DLFC	WM2, TF Control
		60-263/960F-05DLFC	AM, PS Control
<b>Control Valve Options for Filter Valves IC-12</b>			
		60-PM1FITRVLV-7.5	for PM, HB Series
		60-WM2-FLAT-8.0 DLFC	for TF, TS, WM2 Series
		60-263/960F-08DLFC	for AM and PS Series

FIGURE 8

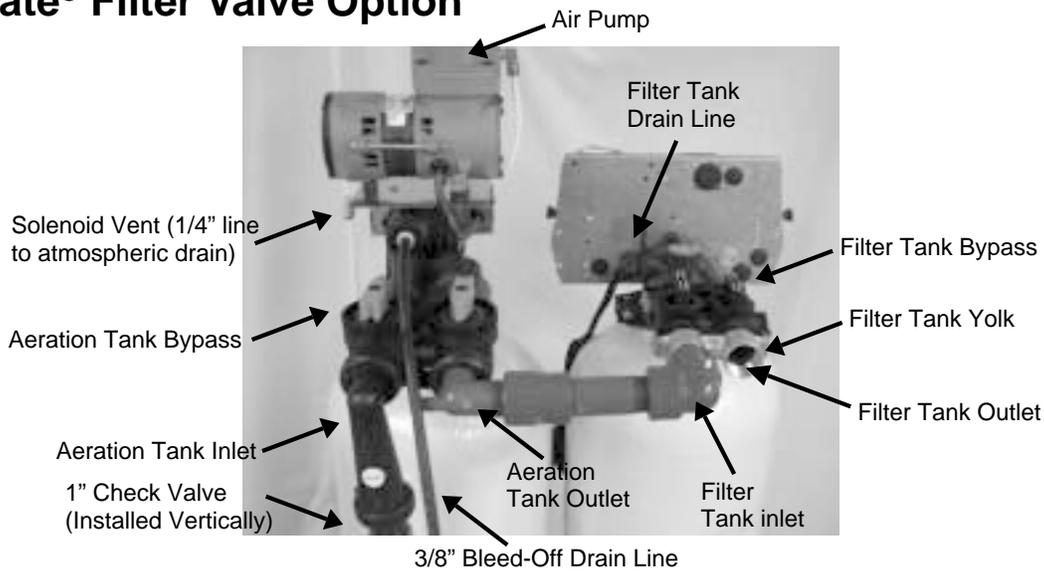
## Iron Curtain 2.0 Aeration Wiring



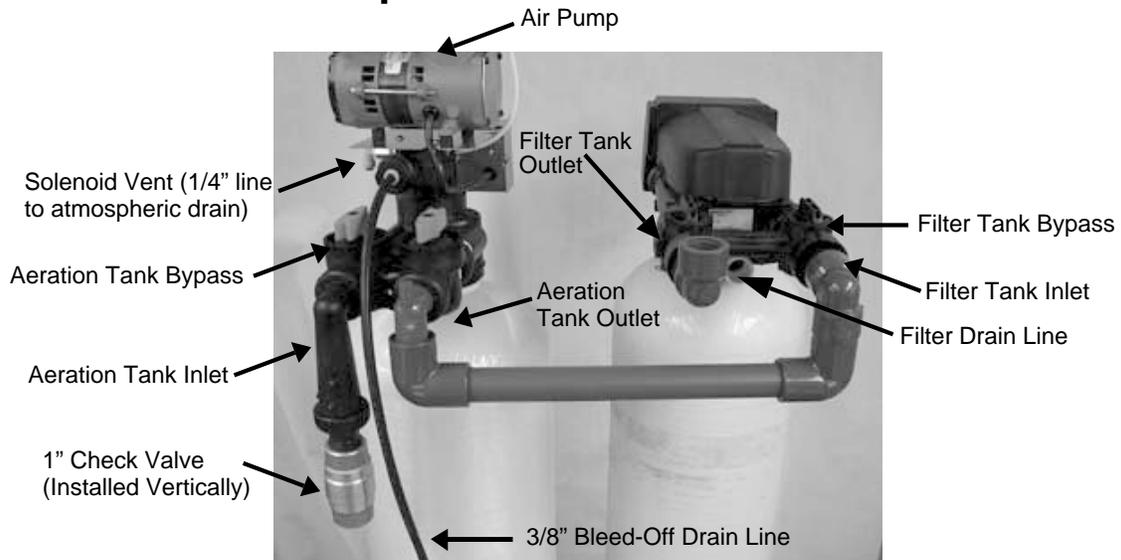
## ProMate® Filter Valve Option



## WaterMate® Filter Valve Option

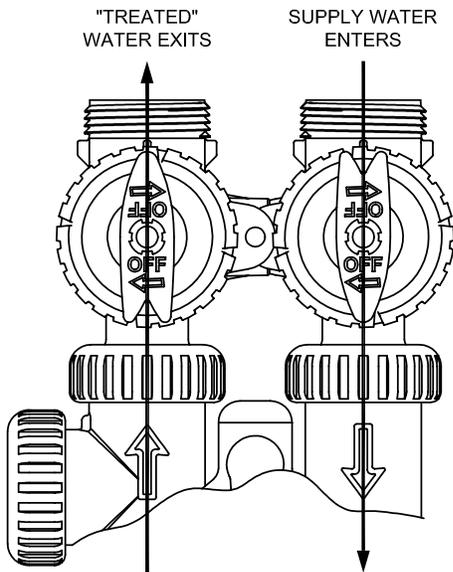


## AutoMate® Filter Valve Option

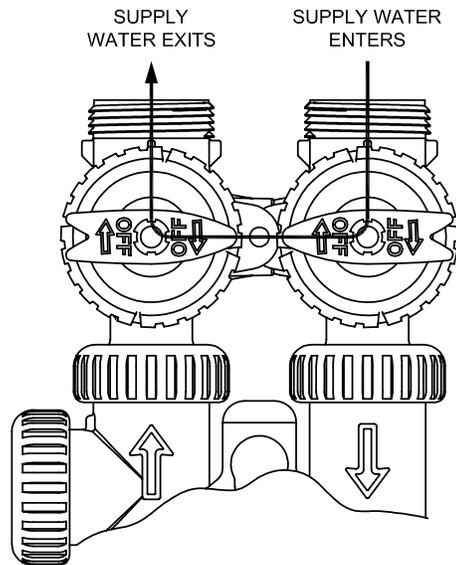


# BYPASS VALVE OPERATION

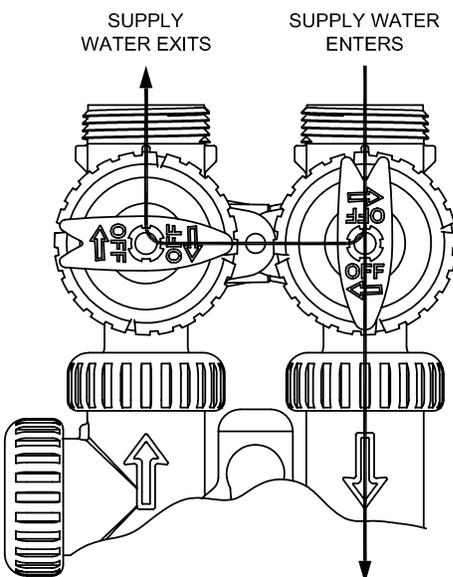
## NORMAL OPERATION



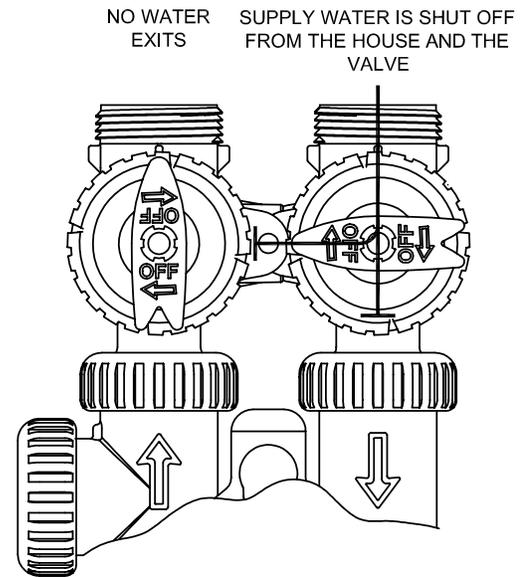
## BYPASS OPERATION



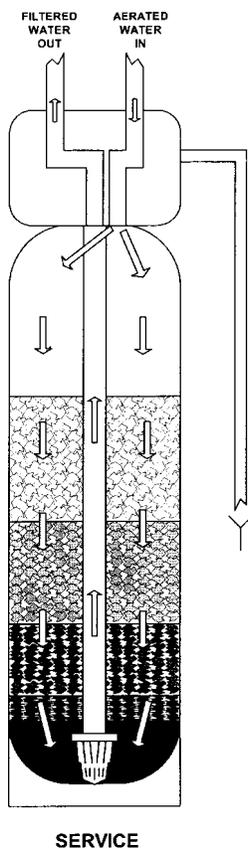
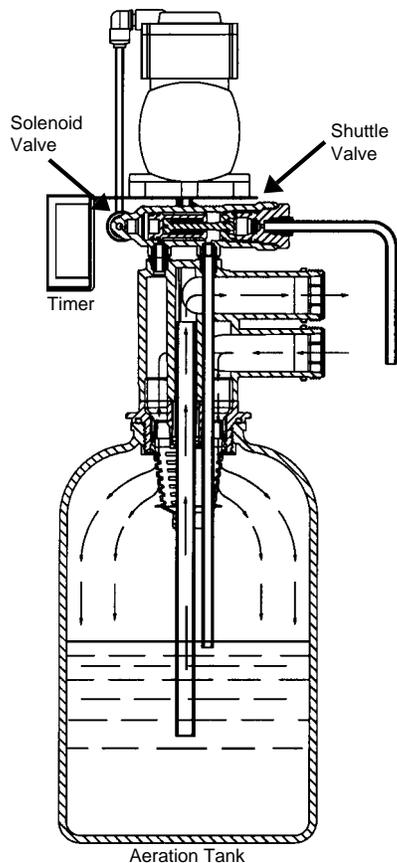
## DIAGNOSTIC MODE



## SHUT OFF MODE



# IRON CURTAIN FLOW DIAGRAMS



## Step 1.

### Aeration Operation Service Cycle

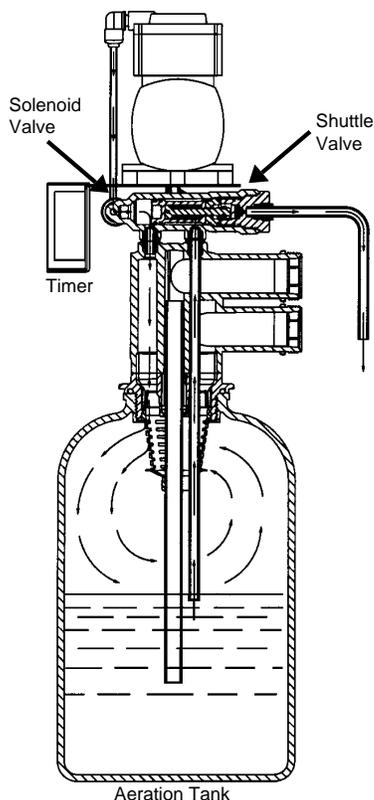
In the service cycle, raw water enters the inlet port of the aeration tank and is directed through the inlet diffuser. The oxidation process begins when the water passes through the inlet diffuser and cascades through a head of air. This air/water contact oxidizes the iron, manganese, hydrogen sulfide in the water. The water is directed toward the bottom of the tank and travels through the pick-up tube. It then passes through the outlet of the aeration tank to the inlet of the filter tank.

### Filter Tank Operation Service Cycle

Raw water enters the filter tank through the inlet port of the filter control valve. Upon system demand for filtered water, water is directed to the top of the tank and flows downward through the multimedia filter bed toward the lower distributor. Oxidized iron particles are trapped by the filter bed as the water passes through. Filtered water enters the lower distributor and travels up the distributor tube to the outlet port on the filter valve.

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## Step 2.

### Aeration Operation Air Recharge Cycle

When energized, the air pump sends air through the solenoid valve into one end of the shuttle valve. Once air pressure in the shuttle valve is greater than the water supply pressure at the other end of the shuttle valve, the piston shifts to the open position. In the open position, the bleed-off port discharges excess water and old air to the drain port through a flow restrictor. Simultaneously, the air inlet port opens to provide a direct connection between the air pump and the top of the aeration tank. The air pump runs for a preset period of time recharging the head of air in the aeration tank.

### Air Recharge Shut Off

The timer turns power off to the air pump and the solenoid valve at the end of the recharge cycle. The solenoid valve then closes the port between the air pump and the shuttle valve. The port between the shuttle valve and the atmosphere opens and releases air pressure. This allows water pressure to shift the piston to the closed position. With the piston in the closed position, the air recharge inlet port is closed and direct communication between the bleed off tube and the drain port is also closed.

### Timer Operation

A timer controls the air recharge cycle and how frequently it occurs. The timer simultaneously energizes the air pump and the solenoid valve. After a preset amount of time, the timer shuts off the air pump and de-energizes the solenoid valve.

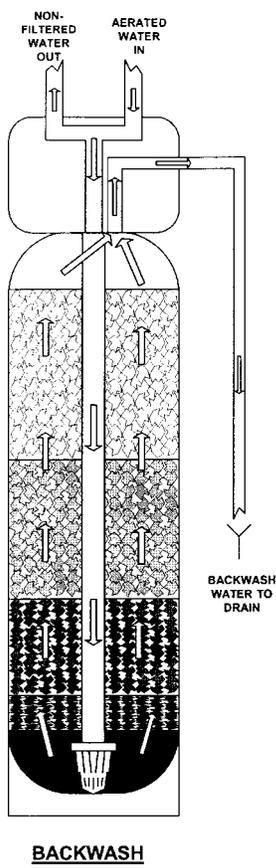
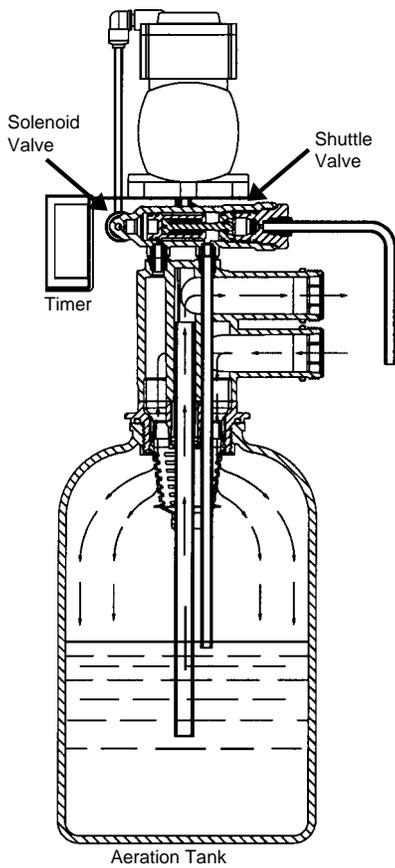
### Solenoid Valve Operation

The solenoid valve is a three-way valve having ports that connect to the air pump, shuttle valve and the atmosphere. In the service cycle, the solenoid valve is de-energized and closes the port to the air pump, providing a positive shut-off to the pump. This prevents water from backing up into the air pump and damaging the pump. In the air recharge cycle, the solenoid valve closes the port to the atmosphere and opens the port from the air pump.

### Shuttle Valve Operation

In the service position, water pressure holds the shuttle valve piston in the closed position, trapping the airhead in the aeration tank and closes the air recharge inlet port and drain port. During air recharge cycle, air pressure is greater than the water pressure and forces the shuttle valve piston in the open piston. The shuttle valve has an internal pressure relief valve that will relieve pressure (greater than 100 psi) that may build up in the aeration tank. This precautionary function protects components from failure due to excessive pressure.

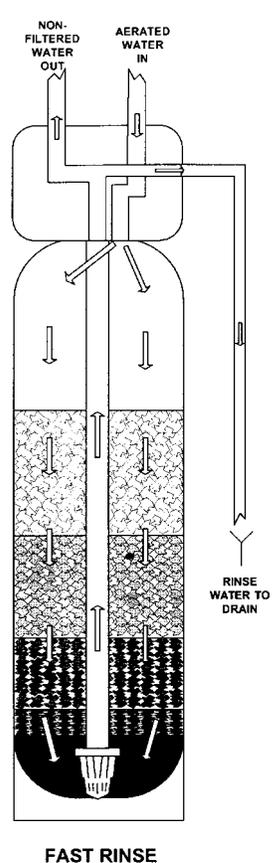
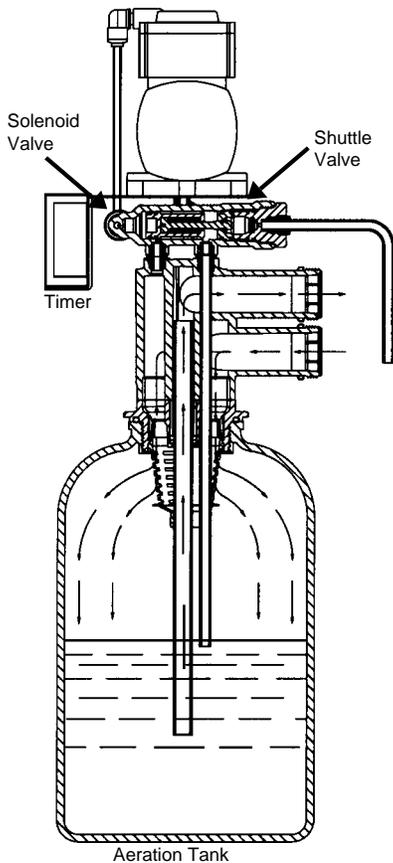
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**Step 3.**  
**Filter Tank Operation**  
**Backwash Cycle**

Reversing the flow of water through the filter bed and backwashing dirty water to the drain cleans the filter bed. Raw water enters the filter control valve through the inlet port and is directed down the distributor tube and out the lower distributor at the bottom of the tank, flowing upward through the multi-media filter bed toward the top of the tank into the control valve. Water is then directed through a specific flow restrictor and out the drain port to be discharged to drain.

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**Step 4.**  
**Filter Tank Operation**  
**Rinse Cycle**

The rinse cycle packs the clean filter bed. Raw water enters the control valve through the inlet port and is directed downward through the filter bed into the bottom distributor, up the distributor tube into the control valve. Water is then directed through a specific flow restrictor and out the drain port to be discharged to drain.

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# Iron Curtain Aeration Pump

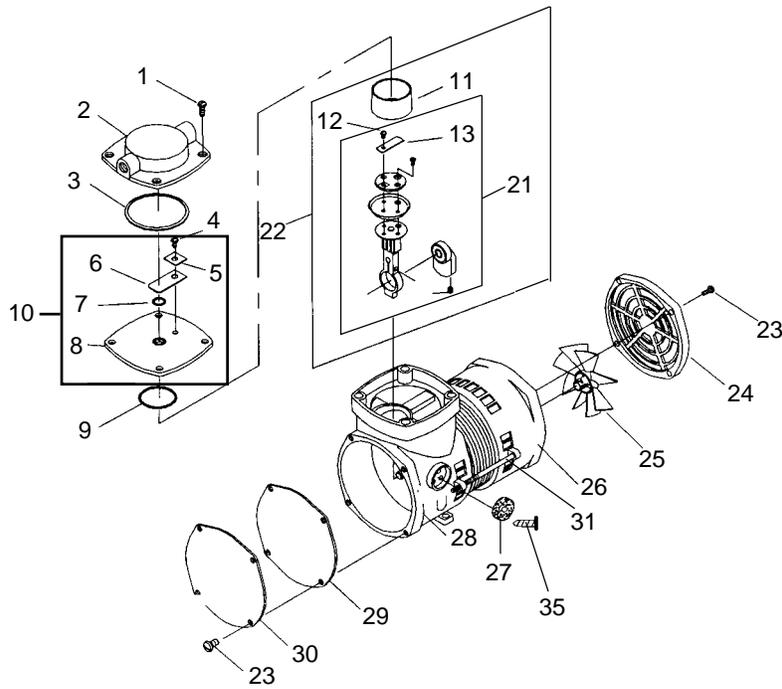


FIGURE 10

Item No.	Part No.	Description	Qty.	Item No.	Part No.	Description	Qty.
1	74-625646	Screw/Head	4	21	74-607604	Connecting Rod Assy	1
2	74-660631-504	Head	1	22	74-607605	Connecting Rod, Valve Plate Eccentric & Set Screw Assy	1
3	74-623121	O-Ring/Head	1	23	74-625449	Screw/Cover	4
4	74-625307	Screw/Exhaust Valve Flapper	1	24	74-614609	Cover/Fan	1
5	74-617045	Valve Keep Strip	1	25	74-633504	Fan	1
6	74-621102	Exhaust Valve Flapper	1	26	74-614425-504	Motor End Cap	1
7	74-623615	O-Ring/Valve Flapper	1	27	74-641169	Air Filter	1
8	74-662150	Valve Plate	1	28	74-669213-504	Housing	1
9	74-623537	O-Ring/Piston Sleeve	1	29	74-633562	Gasket/Front Cover	1
10	74-662784	Valve Plate Assembly	1	30	74-614430	Front Cover	1
11	74-618145	Piston Sleeve	1	31	74-625107	Screw/Slator	2
12	74-625160	Screw/Ramped Intake Valve Flapper	1	32	22-01	IC Complete Air Compressor	1
13	74-621488	Intake Valve Flapper	1	33	74-650465	405 Air Pump Service Kit (Not Shown) (Includes # 3,4,5,6,7,9,11,12,29)	1
				34	74-650571	405 Air Pump Rebuild Kit (Not Shown) (Includes 22, 33)	1

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## Iron Curtain Aeration Pump Repair Instructions

Air pump must be removed from Aeration Tank and have power supply disconnected before proceeding.

1. Remove four front cover screws and remove front cover and cover gasket.
2. Remove four pump head screws and remove pump head.
3. Remove valve plate assembly.
4. Remove felt air filter on side of pump with a flat screw driver prying under the flat center retainer.
5. Remove piston sleeve from connecting rod assembly.
6. Using an 1/8" allen wrench through the air intake hole loosen eccentric/bearing and piston connecting rod assembly set screw and remove eccentric/bearing and connecting rod assembly.
- 7A. If eccentric & bearing assembly need replacing: Using a 1/8 allen wrench through air intake hole, loosen eccentric & bearing assembly screw and remove eccentric & bearing assembly. Remove piston sleeve from connecting rod assembly. Remove valve flapper screw and valve flapper. Remove intake valve plate screws and remove ramped valve plate and piston cup. Install new piston cup on connecting rod. Place a dab of silicone caulk in the center dimple on bottom side of ramped valve plate and install ramped valve plate and intake valve plate screws (12" lbs.) making sure the intake hole is aligned in the connecting rod, piston cup and ramped valve plate. Install new valve flapper and valve screw (12" lbs.). Slide new piston sleeve upwards over connecting rod assembly starting from the bottom, forcing new piston cup to curve upwards inside piston sleeve. Note: If piston sleeve slides over the top of connecting rod assembly, reinstall, starting from the bottom.
8. If installing new connecting rod assembly, slide new piston sleeve upwards over connecting rod assembly starting from the bottom, forcing new piston cup to curve upwards inside piston sleeve. Note: If piston sleeve slides over top of connecting rod assembly, reinstall, starting from the bottom.
9. From the top of the pump insert connecting rod/eccentric bearing assembly with set screw facing air filter holes. Install on motor shaft all the way and tighten set screw (8 inch pounds) **Note: Set screw should tighten onto flat spot on motor shaft.**
10. Remove exhaust valve flapper screw, valve keeper strip, valve flapper, valve flapper o-ring and piston sleeve o-ring from valve plate. Lubricate new o-rings with silicone lubricant to hold o-rings in place and install in valve plate. Install new valve flapper, valve keeper strip and exhaust valve flapper screw (12" lbs.) in valve plate.
11. Install valve plate on pump, aligning piston sleeve o-ring with top of piston sleeve.
12. Remove o-ring from pump head. Place 3-4 small dabs of silicone lubricant in pump head o-ring groove to hold o-ring in place and install o-ring in pump head.
13. Install pump head on pump, aligning exhaust port with front of pump. Install four pump head screws and tighten (48" lbs.).
14. Remove any remaining gasket material from front cover and pump front and make sure both surfaces are clean.
15. Install new front cover gasket with burr side in. Install front cover and four cover screws and tighten screws (20" lbs.).
16. Air pumps manufactured after 11/94 use an air filter with a hole in the center and a plastic press in retainer to hold it in place. To replace air filter, order p/n 74-641169 Air Filter and Retainer. Place air filter in place and install new retainer.

# Troubleshooting

Complaint	Problem	Cause	Solution
Iron or manganese* bleed-through or staining	A. Inadequate backwash of filter	1. Plugged drain line flow control	1a. Clean or replace drain line flow control
		2. Insufficient water supply from well	2a. Check for minimum specified flow and pressure requirements of filter system
Sulphur odor bleed-through		3. Plugged aeration tank inlet diffuser or pick-up tube	3a. (Generally will only plug with the presence of iron bacteria) Clean aeration assembly and shock treat the water supply with chlorine as needed to control iron bacteria
		4. Media bed fouled	4a. Rebed filter and correct the cause of fouling
	B. Fails to regenerate <b>See specific control manual</b>	1. Interrupted electrical service	1a. Assure continuous electrical supply (check plug, breaker, fuses, etc.)
		2. Faulty timer motor	2a. Replace timer motor
		3. Faulty skipper wheel (on Fleck Control)	3a. Replace skipper wheel
		4. Faulty 24 hour gear	4a. Replace 24 hour gear or timer assembly
	C. Water contaminant levels are greater than limits established by the manufacturer	1. It is not uncommon for local water conditions to change	1a. Consult dealer
	D. Inadequate aeration	1. Loss of air through inlet check valve	1a. Check installation position of check valve – Consult Installation and Operation Manual for proper position 1b. Check for foreign material in seat of check valve, clean or replace as required
		2. Loss of air through air leak	2a. Check aeration tank assembly and air recharge line and fittings for any air leaks and repair (Note: soapy water solution works well for locating air leaks)
		3. Faulty aeration pump due to: a. Electrical failure	3a. Assure permanent electrical service (check plug, breaker, fuses, terminal block on control valve, etc.) 3b. Check for adequate pressure and volume production from air pump. Repair or replace air pump
		b. Pneumatic failure	3c. Clean, repair or replace aeration pump, ventilate environment or provide external air source
		c. Damp environment	3c. Clean, repair or replace aeration pump, ventilate environment or provide external air source
		4. Air loss through high demand	4a. Increase air recharge frequency of filter. See page 9
	E. Exceeding recommended filter system flow rate	1. Service flow rate demand is higher than filter system design flow rate	1a. Install a flow control at filter system outlet equal to or less than the design flow rate of filter system 1b. Install additional filter(s) or a larger single filter system which meets both the service flow demand and backwash flow requirements available
	F. Regeneration during service flow demand	1. Time of day set incorrectly	1a. Reset timer
	G. Raw water bleeding through filter <b>See specific control manual</b>	1. Internal control valve leak	1a. Assure all adapter base o-ring seals are in place 1b. Replace seals, spacer and piston assemblies

\*Manganese can be slow to oxidize when the pH is less than 8.5

Complaint	Problem	Cause	Solution
Water leaking from vent port adapter	A. Seals failed internally	1. Pressure has exceeded rating on system	1a. Check pressure on system. Adjust if necessary. Replace shuttle assy.
Water is effervescent	A. This can be expected when water is aerated under pressure	1. Water supply has been naturally aerated under well system pressure. As water is released to the atmosphere, air molecules separate from the water.	1a. This natural phenomenon will typically dissipate to the atmosphere in a matter of seconds. If preferred, water can be drawn and stored in an open container prior to use (i.e. fill a pitcher and store in the refrigerator for cool fresh drinking water)
Loss of pressure	A. See complaint #1, Page 16	1. Plugged Inlet 2. Fouled Media Bed can also cause loss of pressure.	1a. See 3a under #1 Solutions, pg 16 2a. See 4a under #1 Solutions, pg 16
Air spurting at outside or non-filtered water fixtures	A. Inlet check valve not sealing	1. Improper installation location 2. Foreign material preventing check valve from sealing 3. Worn or faulty check valve	1a. See installation and operation manual for proper location of inlet check valve 2a. Clean or replace check valve
Air spurting from filtered water fixtures	A. Reduced pressure in distribution system	1. Service flow demand is greater than water supply available from well pump system 2. Water flow is restricted by supply piping and/or water treatment equipment	3a. Replace check valve 1a. Repair or replace well pump system 2a. Eliminate restrictions in supply pipings to water treatment equipment such as iron bacteria plugging the upper diffuser assembly, etc. 2b. Install larger water treatment system to provide less pressure drop
Loss of media through drain line	A. New filter backwashed during first 24 hours after installation	1. New filter media is shipped in a dry condition and must soak for 24 hours to become fully saturated before a backwash cycle	1a. Clean drain line flow control, control valve body, seals, spacers and piston assemblies
	B. Air passing through filter during backwash	1. Excess air accumulated in aeration tank from aeration pump 2. Excess air accumulated in filter system from water supply or well pump	1a. Bleed-off valve flow control is plugged with foreign material – clean or replace 2a. Repair well pump system 2b. If the cause was due to temporary loss of water main pressure; the problem will most likely correct itself with the return of continuous pressure
Excessive noise during regeneration	A. Howling or whistling noise during regeneration cycle	1. Inadequate drain line size 2. Drain line is vibrating against other pipes, conduits, pipe hangers, heat ducts, floor joists, etc.	1a. Increase drain line size 2a. Insulate drain line, specifically at points of contact with other materials
Water running to drain continuously	A. Control valve is stuck in regeneration cycle. <b>See specific control manual</b>	1. Electrical service to control(s) has been interrupted 2. Faulty timer motor 3. Foreign material lodged in piston 4. Timer is lodged in regeneration cycle	1a. Assure continuous electrical service is available (check plug, breaker, fuse, etc.) 2a. Replace timer motor 3a. Disassemble and clean control valve, replace seals, spacers, and piston assemblies 4a. Check program wheel pins, to assure back pins are not catching on timer gears 4b. Check to assure timer gears are clean and free from foreign materials such as solder or pipe burrs

Complaint	Problem	Cause	Solution
Water running to drain continuously from 3/8" bleed-off drain line.	B. Did not plug in aeration pump prior to filling	1 Drain port open	1a. Plug in aeration pump.
	C. Air pump failed during air recharge cycle.	1 Drain port open	1b. Replace/Repair pump
Blue green staining	A. Corrosive water condition in copper distribution piping system	1. Low pH condition of the raw water supply. On type "A" filters, the pH correction media may be depleted	1a. On type "A" filters add pH correction media to filter tank, see Installation and Operation manual
		2. In rare occasions, highly aerated water in combination with a specific water supply can create a slightly corrosive condition	2a. Install a polyphosphate cartridge filter after the Iron Curtain Filter System to protect the distribution piping
		3. Shorten bleed off tube, reduce recharge frequency	3. See page 9 for recharge frequency changes. Shorten bleed-off tube to 9" (Page 8)

## Winterizing Iron Curtain Systems (Optional)

In certain climates where houses and/or cottages are not heated during the winter months, Iron Curtain Systems must have the water removed from them to protect from damage due to freezing. Following are instructions for "winterizing" Iron Curtain Systems.

Draining of the Iron Curtain System should be done in conjunction with or after the complete water distribution system is drained to prevent water from entering the Iron Curtain System after it has been winterized. After Iron Curtain System and water distribution system are drained, make sure all water shut-off valves are open.

### Instructions for winterizing Iron Curtain Systems:

1. Before shutting off the water, manually shift the filter control valve to the backwash cycle.
2. Unplug the electrical cords for the Aeration Control Center and the Filter Control Valve.
3. Let unit backwash for 15 minutes.
4. Place the Aeration Tank Bypass in shut off mode - See page 11. (Make sure you leave the filter tank bypass in the service position.)
5. Plug the electrical cord for the Filter Control Valve back in and manually shift the control valve to the fast rinse cycle.
6. Unplug the filter electrical cord.
7. You will need to plug the fitting for the 3/8" drain connection on aeration head. 3/8" plug available from manufacturer - p/n 11-P108125.
  - A. Consult your dealer if assistance is needed with this step.
8. Plug in the electrical cord for the Aeration Control Center.
  - A. This will start the Air Recharge Cycle.
  - B. Water/air will drain out the filter drain pipe.
  - C. You need to leave in this cycle until only air is discharging out of the drain pipe.
  - D. You will need to repeat this step if the air pump shuts off while water is still discharging to the drain.
9. To start pump unplug the electrical cord for the Aeration Control Center, re-plug in.
10. Turn off water when only air is discharging to drain.
11. Remove the plug installed in the pressure relief valve previously installed.
12. Loosen the union nuts on the Aeration Tank Bypass Valve on the Aeration Head. (Make sure you loosen the nuts between the bypass and the aeration head.)
13. Move the Aeration Tank to the side.
14. You then can proceed with winterizing the rest of the building.
15. You will need to make sure there is no water left below the 1" Check Valve. (Consult your dealer if you have questions.)
16. Make sure the Aeration Tank Bypass Valve is in the service position.
17. System is now winterized.
18. When turning the system back on, refer to the start up instructions on page 5.

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## Iron Curtain 2.0 Filter Systems Limited Warranty

Hellenbrand, Inc., warrants to the original consumer/purchaser against defects in material and/or workmanship from the date of the original installation as follows:

- For a Period of **THREE YEARS:** The 3/4" or 1" control valve(s) including electrical parts, internal parts, and valve body.
- For a Period of **TEN YEARS:** The fiberglass and/or polyglass mineral tanks, 6" Diameter - 13" Diameter.
- For a Period of **FIVE YEARS:** The fiberglass and/or polyglass mineral tanks, 14" Diameter - Up.
- For a Period of **ONE YEAR:** The Iron Curtain aeration pumps and any other defective component.

Any parts used for replacement are warranted for the remainder of the original warranty period.

If a part described above becomes defective within the specified period, you should notify your Hellenbrand Iron Curtain reseller and arrange a time during normal business hours for the Iron Curtain reseller to inspect the water conditioner on your premises. Any part found defective within the terms of this warranty will be replaced by him. You pay only freight from our factory and local Iron Curtain reseller charges.

THIS WARRANTY DOES NOT COVER defects caused by accident, fire, flood, Act of God, misuse, misapplication, neglect, alteration, installation or operation contrary to our printed instructions, or repair or service by anyone other than the factory or authorized Hellenbrand Iron Curtain reseller.

**EXCEPT AS EXPRESSLY PROVIDED ABOVE, HELLENBRAND MAKES NO OTHER WARRANTY WITH RESPECT TO THE IRON CURTAIN FILTER SYSTEM WHETHER EXPRESS OR IMPLIED, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH BUT FOR THIS PROVISION MIGHT ARISE BY IMPLICATION OR OPERATION OF LAW; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED.**

Our performance specifications are furnished with each water conditioning unit. As a manufacturer, we do not know the characteristics of your water supply or the purpose for which you are purchasing this water conditioner. Please understand the quality of water supplies may vary seasonally or over a period of time, and that your water usage may vary as well. Water characteristics can also change considerably if your water conditioner is moved to a new location. For these reasons, we assume no liability for the determination of the proper equipment necessary to meet your requirements and we do not authorize others to assume such obligations for us.

**UNDER NO CIRCUMSTANCES SHALL HELLENBRAND, INC., BE LIABLE TO PURCHASER OR TO ANY OTHER PERSON FOR ANY INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES OR FOR ANY OTHER LOSS, DAMAGE OR EXPENSE OF ANY KIND, INCLUDING LOSS OF PROFITS, WHETHER ARISING OUT OF BREACH OF WARRANTY, BREACH OF CONTRACT, OR OTHERWISE.**

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

**Hellenbrand, Inc. • 404 Moravian Valley Road • P.O. Box 187 • Waunakee, WI 53597**

