



# “AFC & CAF” Series

## AUTOMATIC WATER FILTERS

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### INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

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FILL IN FOR FUTURE REFERENCE

MODEL NO: _____
SERIAL NO: _____
DATE INSTALLED: _____
DEALER: _____

## SPECIFICATION TABLE

Filtration	Model	Service	Backwash	Tank	Cu. Ft.	Dimensions			Iron	H <sub>2</sub> S
		Flow Rate	Flow Rate	Dia. x Ht.		Length	Width	Height	PPM <sup>①</sup>	PPM <sup>②</sup>
Iron	CAF-1 *	5	4.2	9 x 48	1	10	10	56 1/2	-	-
	CAF-1-1/2 *	7	5.3	10 x 54	1-1/2	11	10	62 1/2	-	-
	CAF-2*	10	6	12 x 52	2	-	-	-	-	-
Turbidity	CAF-1 *	5	4.2	9 x 48	1	10	10	56 1/2	N/A	N/A
	CAF-1-1/2 *	7	5.3	10 x 54	1-1/2	11	11	62 1/2	N/A	N/A
	CAF-2	10	6	12 x 52	2	-	-	-	-	-
Neutralizing	CAF-1 *	5	6.5	9 x 48	1	10	10	56 1/2	N/A	N/A
	CAF-1-1/2 *	7	7.5	10 x 54	1-1/2	11	11	62 1/2	N/A	N/A
	CAF-2	10	10	12 x 52	2	-	-	-	-	-
Taste & Odor	CAF-1 *	5	4.2	9 x 48	1	10	10	56 1/2	N/A	N/A
	CAF-1-1/2 *	7	5.3	10 x 54	1-1/2	11	11	62 1/2	N/A	N/A
	CAF-2	10	6	12 x 52	2	-	-	-	-	-

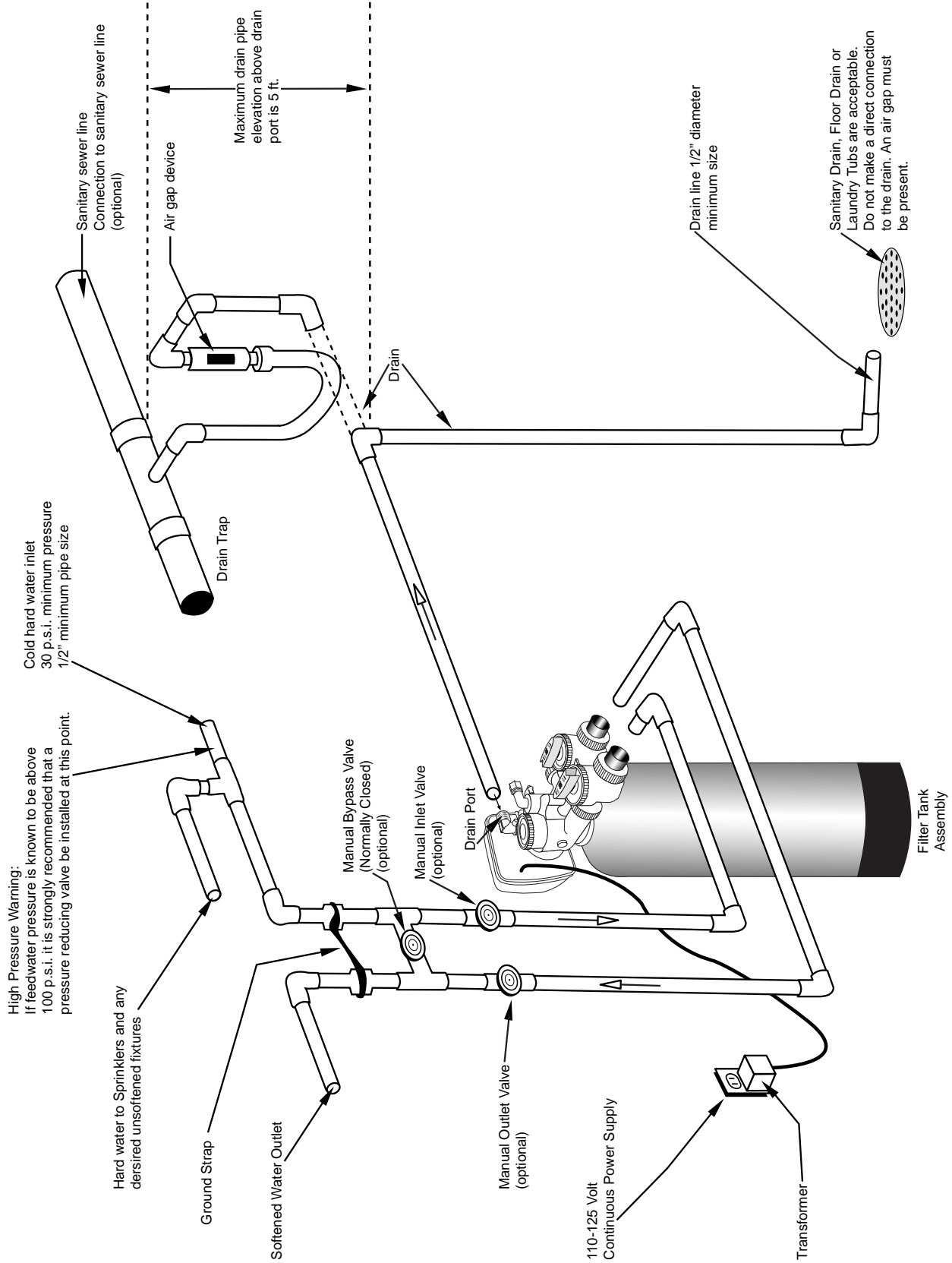
① Maximum iron content. Feed water pH must exceed 6.8

② Maximum hydrogen Sulfide content. Feed water Ph must exceed 6.8  
 These units have insufficient capacity to treat water for swimming pools.

\* Gravel included.

Select media required below

\* Consult the factory for other media preferences



**Typical Water Filter Installation**

## **Installation Fitting Assemblies**

Installation fittings connect to the control valve or the bypass valve **using nuts that only require hand tightening.** Hand tight nut connections between control valve and installation fittings, control valve and bypass valve, and bypass valve and installation fittings allow for ease serviceability. Do not use a pipe wrench to tighten nuts on installation fittings. **Hand tighten only.**

Split ring retainer design holds the nut on and allows load to be spread over the entire nut surface area reducing the chance for leakage. The split ring design, incorporated into the installation fittings allows approximately 2 degrees off axis alignment to the plumbing system. The installation fittings are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.

When assembling the installation fitting package, connect the fitting to the plumbing system first and then attach the nut, split ring and o-ring. Heat from soldering or solvent cements may damage the nut, split ring or o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring and o-ring. Avoid getting primer and solvent cements on any part of the o-rings or split rings, bypass valve or control valve. Solvent cements and primers should be used in accordance with the manufacturer’s instructions.

Slip the nut onto the fitting first, then the split ring second and the o-ring last. hand tighten the nut. If the fitting is leaking, tightening the nut will not stop the leak. Remove the nut, remove the fitting, and check for damage or misalignment of the o-ring.

**Do not** use the pipe dope or other sealant on threads. Teflon tape must be used on the threads of the 1” NPT elbow and the 1/4” NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.

**Do not** use Vaseline, oils or other unacceptable lubricants on o-rings. A silicon lubricant may be used on black o-rings.

## **Bypass Valve**

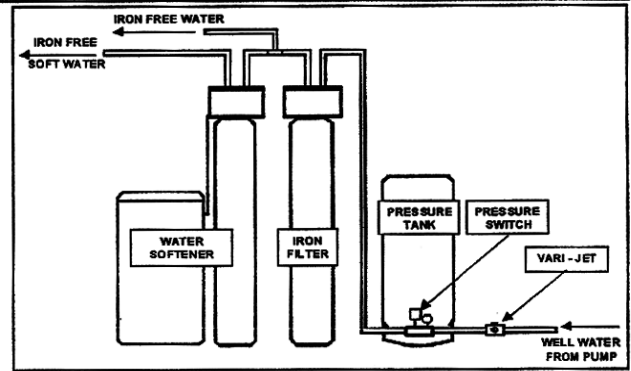
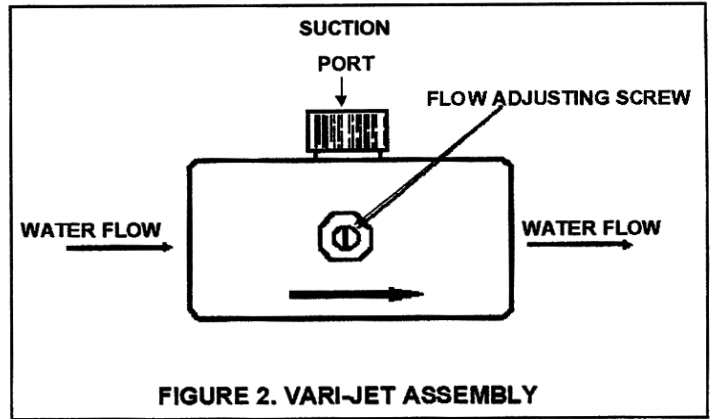
The bypass valve easily connects to the control valve body using nuts that only require hand tightening. Hand tighten nut connections between control valve and fittings, control valve and bypass valve, and bypass valve and installation fittings allow for easy serviceability. The split ring retainer design holds the nut on and allows load to be spread over the entire nut surface area reducing the chance for leakage. The split ring design, incorporated into the bypass, allows approximately 2 degrees off axis alignment to the plumbing system. The bypass is designed to accommodate minor plumbing misalignments but is not designed to support the weight of a system or the plumbing.

Avoid getting primer and solvent cements on any part of the o-rings or split rings, bypass valve or control valve. Do not use pipe dope or other sealant on threads. Teflon tape is not necessary on the caps because of o-ring seals.

Do not use Vaseline, oil or other unacceptable lubricants on o-rings. A silicon lubricant may be used on black o-rings.

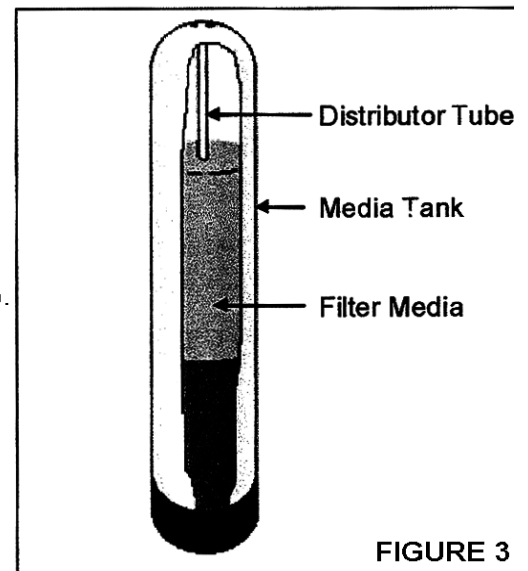
## INSTALLING THE VARI-JET ASSEMBLY:

- Step 1.** Shut off all water at the main supply. On a private well system, turn off power to the pump and drain pressure tank. Make sure pressure is relieved from complete system by opening nearest faucet to drain system. **SHUT OFF FUEL SUPPLY TO WATER HEATER.**
- Step 2.** If Vari-Jet is supplied with your filter: Cut main supply line as required to fit Vari-Jet assembly in plumbing between well pump and pressure tank. Vari-Jet may be installed in a vertical or horizontal position. Position Vari-Jet so that the flow adjusting screw is accessible for adjustment by screwdriver. Install unions to facilitate Vari-Jet removal and inspection. Be certain the Flow Arrow on Vari-Jet points toward the pressure tank and pressure control switch is located on pressure tank side of the Vari-Jet. (see FIGURE 2.)



## INSTALLING THE FILTER

- Step 3.** If media was shipped separately, Carefully unscrew control valve. Be sure to "plug" the top of the distributor tube using tape or some other means. Do not allow filter media to enter inside of distributor tube. (See Fig. 3)
- Step 4.** Pour the separately shipped media into media tank.
- Step 5.** Replace Control valve on media tank. Lubricate o-rings on control valve with silicone lubricant. **DO NOT USE PETROLEUM JELLY.**
- Step 6.** If bypass valve was provided, lubricate bypass valve o-rings with silicone lubricant and secure to the control valve using adapter couplings, clips and/or screws (provided).
- Step 7.** Cut main supply line as required to fit plumbing to the inlet and outlet of bypass valve. Make certain water flow enters through the **Inlet** and discharges through the **Outlet** of bypass valve.
- Step 8.** Attach drain line to drain line fitting. Position drain line over drain and secure firmly. To prevent back siphoning be sure to have adequate air gap of at least 2 inches.
- Step 9.** Make certain bypass valve is in the "bypass" position. Turn on power to well pump or open main supply valve completely.
- Step 10.** Plug control valve into a non-switched 115v power source.
- Step 11.** Open inlet valve and allow the unit to fill **SLOWLY**.
- Step 12.** Allow media to become saturated at least 2-4 hours before backwashing filter.
- Step 13.** Check for leaks and allow filter to backwash for at least 10 minutes or until water flowing from drain runs clear.
- Step 14.** Allow unit to fully regenerate (see service manual)



### INSPECTION AND HANDLING YOUR FILTER

Be sure to inspect the equipment for shipping damage and notify the transportation if damage exists. Handle the filter with care as damage can result if dropped or if the filter is set on a sharp object.

### CONDUCT A THOROUGH WATER TEST

Your water should have a thorough analysis prior to the selection of water conditioning equipment. Enter your analysis below.

#### WATER ANALYSIS

IRON (fe) \_\_\_\_\_ppm    Manganese (Mn) \_\_\_\_\_ppm

pH \_\_\_\_\_    Tannins \_\_\_\_\_ppm

Hydrogen Sulfide (H<sub>2</sub>S) \_\_\_\_\_ppm

*Note: Hydrogen Sulfide must be tested for at the well site. Failure to conduct an "onsite" analysis will result in inaccurate test results.*

### LOCATING EQUIPMENT CORRECTLY

The location of your filter should be selected carefully. A variety of conditions will contribute to proper location as follows:

- (A) Locate as close as possible to source of water supply.
- (B) Locate as close as possible to drain i.e. laundry tub or floor drain.
- (C) Locate in correct relationship to other water treatment equipment (see Figure 1. Standard Installation)
- (D) Allow sufficient area around the equipment for service.

### FACTS TO REMEMBER WHILE PLANNING YOUR INSTALLATION:

- A) All installation procedures MUST conform to local and state plumbing codes.
- B) All water MUST pass through the Vari-Jet Assembly, pressure tank and the Chemical-Free Iron Filter. See Figure 1.

**NOTE:** Vari-Jet is only supplied as a separate option.

- C) If lawn sprinkling, a swimming pool, geothermal heating/cooling are to be treated by the Chemical-Free filter, a larger model filter MUST be selected to accommodate the higher flow rate demands.
- D) **IMPORTANT:** Always use teflon tape on threaded plastic fittings. NEVER use pipe dope, as it will deteriorate the plastic fittings.

### CHECK WATER PRESSURE

Minimum water pressure required at the inlet of the filter is 20 psi. IF PRESSURE IS OVER 100 PSI, A PRESSURE REGULATING VALVE MUST BE INSTALLED TO REDUCE WATER PRESSURE.

Note: Pressure regulating valve must be installed in water line ahead of the Vari-Jet air induction assembly.

### CHECK PUMPING RATE OF WELL PUMP

The pumping rate of your well pump must be sufficient to properly backwash the filter. Check backwash flow rate required for specific filter model.

Water Pressure    Low \_\_\_\_\_psi    High \_\_\_\_\_psi

Pumping Rate    \_\_\_\_\_gpm

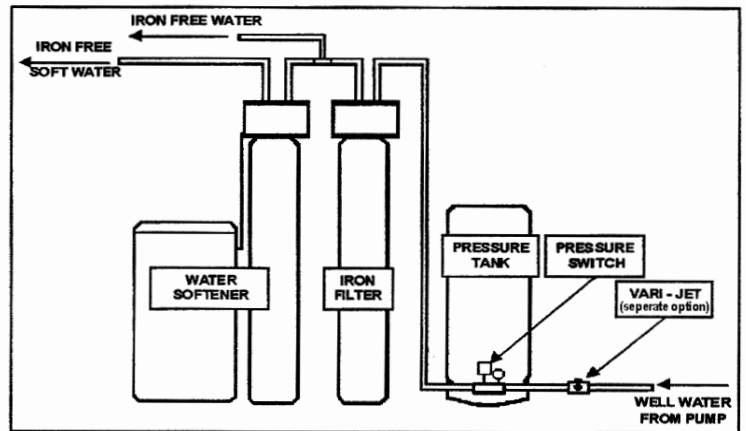


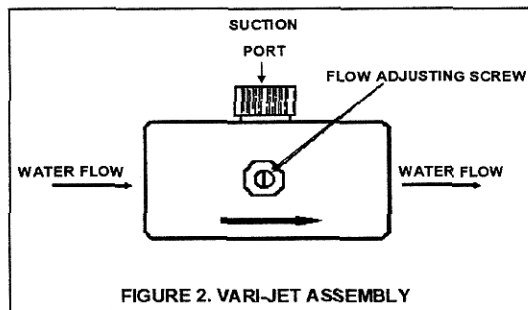
Figure 1 Standard Installation



## ADJUSTING THE VARI-JET ASSEMBLY

- a) Open nearest faucet until pump starts, then close faucet.
- b) Place finger lightly over SUCTION PORT (see FIGURE 2.) a slight suction should be detected for approximately ONE-THIRD of pumping cycle. (do not confuse with one-third of PRESSURE RANGE).
- c) If suction duration is too short, increase by turning FLOW ADJUSTING SCREW CLOCKWISE. To decrease duration, turn COUNTER CLOCKWISE.
- d) Repeat Steps a) through c) until proper setting is obtained.

**NOTE:** When the duration of the suction is too long, cold water may have a "milky" appearance caused by excess air in the system. Correct this condition by reducing the duration of suction. This condition is commonly associated with bladder type pressure tanks. In extreme cases where elimination of excess air prevents system from performing satisfactorily, it may be necessary to install a standard air-to-water type pressure tank with an air relief valve.









## D. PRESSURE TEST THE INSTALLATION

The plumbing system can now be checked for any possible leaks

1. Open the water supply inlet valve very slowly. Once the mineral tank is full of water, slowly open the outlet on the bypass. Open a faucet down stream from the filter & allow the air to escape. **DO NOT INITIATE A BACKWASH UNTIL MEDIA IS SATURATED.**
2. Allow water to run until clear. **CHECK FOR LEAKS!**
3. Plug the unit in.
4. Make sure the power cord is plugged into a properly grounded wall receptacle.

## E. MANUAL BACKWASH

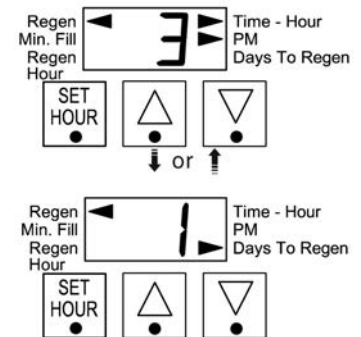
Sometimes there's a need to backwash your filter sooner. The user can initiate manual regeneration. The user has the option to request a manual backwash at the delayed backwash time or to have the backwash occur immediately:

1. Press the  &  buttons. An arrow will point on the display to REGEN. Backwash will occur at the delayed backwash time. The user can cancel the request by pressing and releasing the  &  buttons.
2. Pressing and holding the  &  buttons for approximately 4 seconds will immediately start the backwash. The user cannot cancel this request.

### Backwash Mode





Typically a system is set to backwash at a time of low water usage. An example of a time with low water usage is when a household is asleep. If there is a demand for water when the system is backwashing, untreated water will be used.

When the system begins to backwash, the display will change to include information about the step of the backwash process. The system runs through the steps automatically and will reset itself to provide treated water when the backwash has been completed.



### Manual Backwash

Sometimes there is a need to backwash the system, sooner than when the system calls for it, usually referred to as manual backwash.

To initiate a manual backwash at the preset delayed backwash time, press and release  and . An arrow point on the display indicates that the system will backwash at the preset delayed backwash time. If you pressed the  and  buttons in error, pressing the buttons again will cancel the request.

To initiate a manual backwash immediately, press and hold the “REGEN” button for three seconds. The system will begin to backwash immediately. The request cannot be cancelled.



## Control Valve Function and Cycles of Operation

This glass filled Noryl<sup>1</sup> fully automatic control valve is designed as the primary control center to direct and regulate all cycles of a water softener or filter. When the control valve is set up as a softener, the control valve can be set to perform down flow or up flow regeneration with the proper piston. When the control valve is set up as a filter, the control valve can be set to perform down flow regeneration or simply backwash. The control valve can be set to regenerate on demand (consumption of a predetermined amount of water) and/or as a time clock (passage of a particular number of days). The control valve can be set so that the softener can meet the Water Quality Association (WQA) or NSF International efficiency rating.

The control valve is compatible with a variety of regenerants and resin cleaners. The control valve is capable of routing the flow of water in the necessary paths to regenerate or backwash water treatment systems. The injector regulates the flow of brine or other regenerants. The control valve regulates the flow rates for backwashing, rinsing and the replenishing of treated water into a regenerant tank, when applicable.

The control valve is designed to deliver high service (27 gpm @ 15 psig) and backwash (27 gpm @ 25 psig) flow rates when the bypass has straight fittings and a 1.050” distributor. The control valve uses no traditional fasteners (e.g. screws), instead clips, threaded caps, nuts and snap type latches are used. Caps and nuts only need to be firmly hand tightened because radial seals are used. Tools required to service the valve include one small blade screwdriver, pliers and a pair of hands. Disassembly for servicing takes much less time than comparable products currently on the market. Control valve installation is made easy because the distributor tube can be cut 1/2” above to 1/2” below the top of the tank thread. The distributor tube is held in place by an o-ring seal and the control valve also has a bayonet lock feature for upper distributor baskets.

The transformer power pack comes with a 15-foot power cord and is designed for use with the control valve. The transformer power pack is for dry location use only. The control valve remembers all settings for two hours if the power goes out. After two hours, the only item that needs to be reset is the time of day; all other values are stored in the memory. The control valve does not need batteries.

Table 3 shows the order of the cycles when the valve is set up as a softener. When the control valve is used as a down flow softener, two backwashes always occur. When the control valve is used as an up flow softener, only one backwash occurs after brining. The installer has the option of having the regenerant refill after the rinse cycle or have the regenerant prefill before regeneration. If the installer chooses to have the regenerant prefill before regeneration, the prefill starts two hours before the regeneration time set. During the 2-hour period in which the brine is being made, treated (softened) water is still available. For example: regeneration time = 2:00 A.M., prefill option selected, downflow softener. Fill occurs at 12:00 A.M., start of backwash cycle occurs at 2:00 A.M.

**Table 3**  
**Backwash Cycles and Times for Different Programs**

Program	All Times in Minutes				
	C1 1 <sup>st</sup> Backwash	C2 Regenerate	C3 2 <sup>nd</sup> Backwash	C4 Rinse	C5 Fill
P7	6	Skipped	Skipped	4	Skipped
P8	10	Skipped	Skipped	6	Skipped
P9	14	Skipped	Skipped	8	Skipped

Note: During regeneration the display will show C1, C2, etc. If the cycle is skipped, that cycle number will not be displayed.

## How To Change Time of Backwash and Days Between Backwashes

**STEP 1** - From normal mode, press  &  buttons simultaneously for 3 seconds and release.

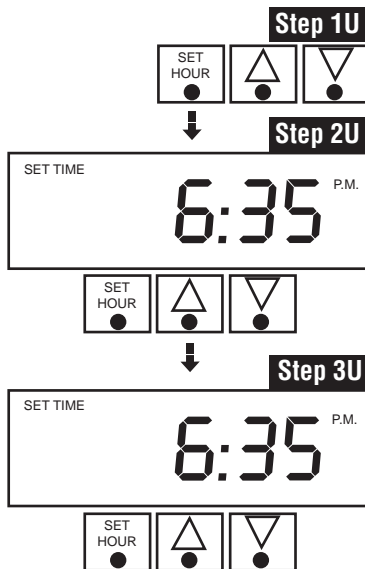
**STEP 1A** - Backwash Time:

Set the clock to the hour the backwash should occur by using the up or down arrow buttons. An arrow will point to p.m. after 12 (factory default is 2 a.m.). Press SET HOUR to go to step 1B.

**STEP 1B** - Setting Days Between Backwash:



Use the up and down arrow keys to set the days between backwashes (factory default is 3 days). Press SET CLOCK to return to Normal mode.

## How To Set Time Of Day



The user can also set the time of day. Time of day should only need to be set after extended power outages or when daylight saving time begins or ends and at the time of start-up. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset.

**STEP 1U** - press SET HOUR.

**STEP 2U** - Current Time (hour): Set the hour of the day using  or  buttons. AM/PM toggles after 12.

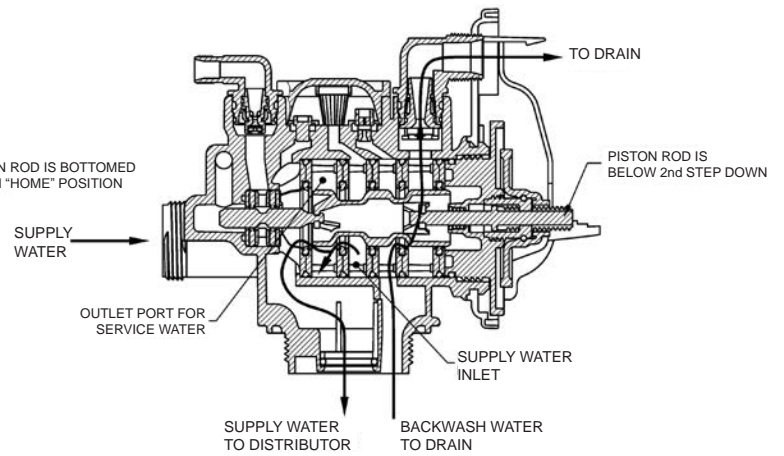
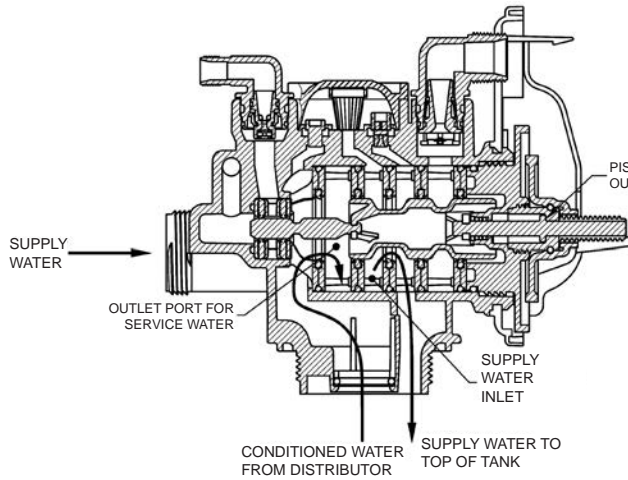
### Power Loss

If the power goes out for **less than two hours**, the system will automatically reset itself. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset. The system will retain the other information entered by your plumbing professional.

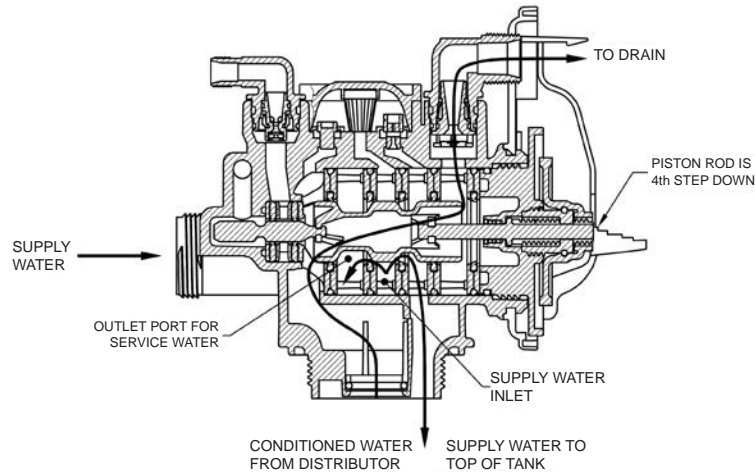
**FLOW DIAGRAMS**

**flow diagram...service**

**flow diagram...backwash**



**flow diagram...rinse**



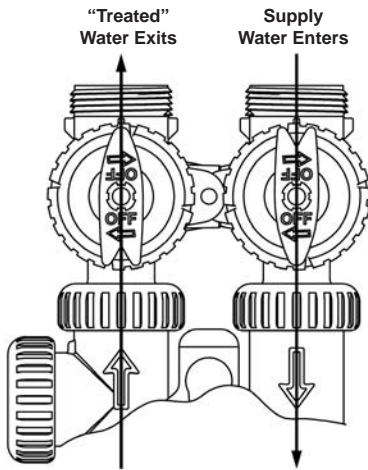
## Bypass Valve

The bypass valve is typically used to isolate the control valve from the plumbing system’s water pressure in order to perform control valve repairs or maintenance. The WS1 bypass valve is particularly unique in the water treatment industry due to its versatility and state of the art design features. The 1” full flow bypass valve incorporates four positions including a diagnostic position that allows service personal to work on a pressurized system while still providing untreated bypass water to the facility or residence. Its completely non-metallic, all plastic, design allows for easy access and serviceability without the need for tools.

The bypass body and rotors are glass filled Noryl and the nuts and caps are glass filled polypropylene. All seals are self-lubricating EPDM to help prevent valve seizing after long periods of non-use. Internal o-rings can easily be replaced if service is required.

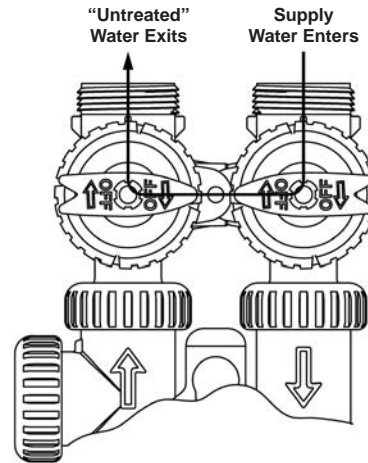
The bypass consists of two interchangeable plug valves that are operated independently by red arrow shaped handles. The handles identify the flow direction of the water. The plug valves enable the bypass valve to operate in four positions.

Figure 1  
**NORMAL OPERATION**



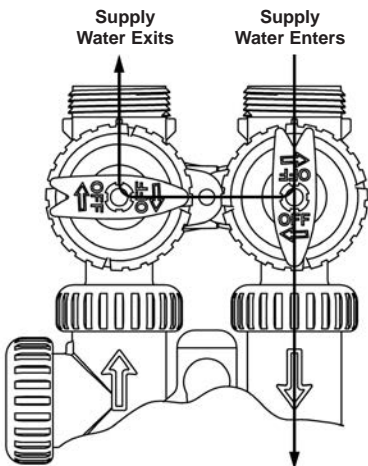
**Normal Operation:**  
The inlet and outlet handles point in the direction of flow indicated by the engraved arrows on the control valve. Water flows through the control valve during normal operation and this position also allows the control valve to isolate the media bed during the regeneration cycle.

Figure 2  
**BYPASS OPERATION**



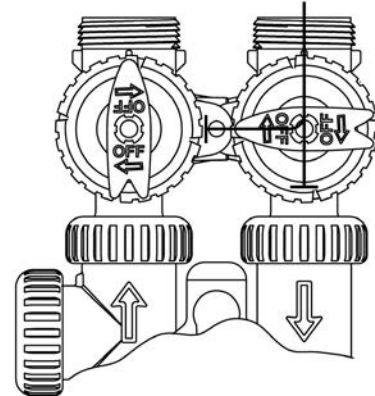
**Bypass:**  
The inlet and outlet handles point to the center of the bypass, the control valve is isolated from the water pressure contained in the plumbing system. Untreated water is supplied to the plumbing system.

Figure 3  
**DIAGNOSTIC MODE**



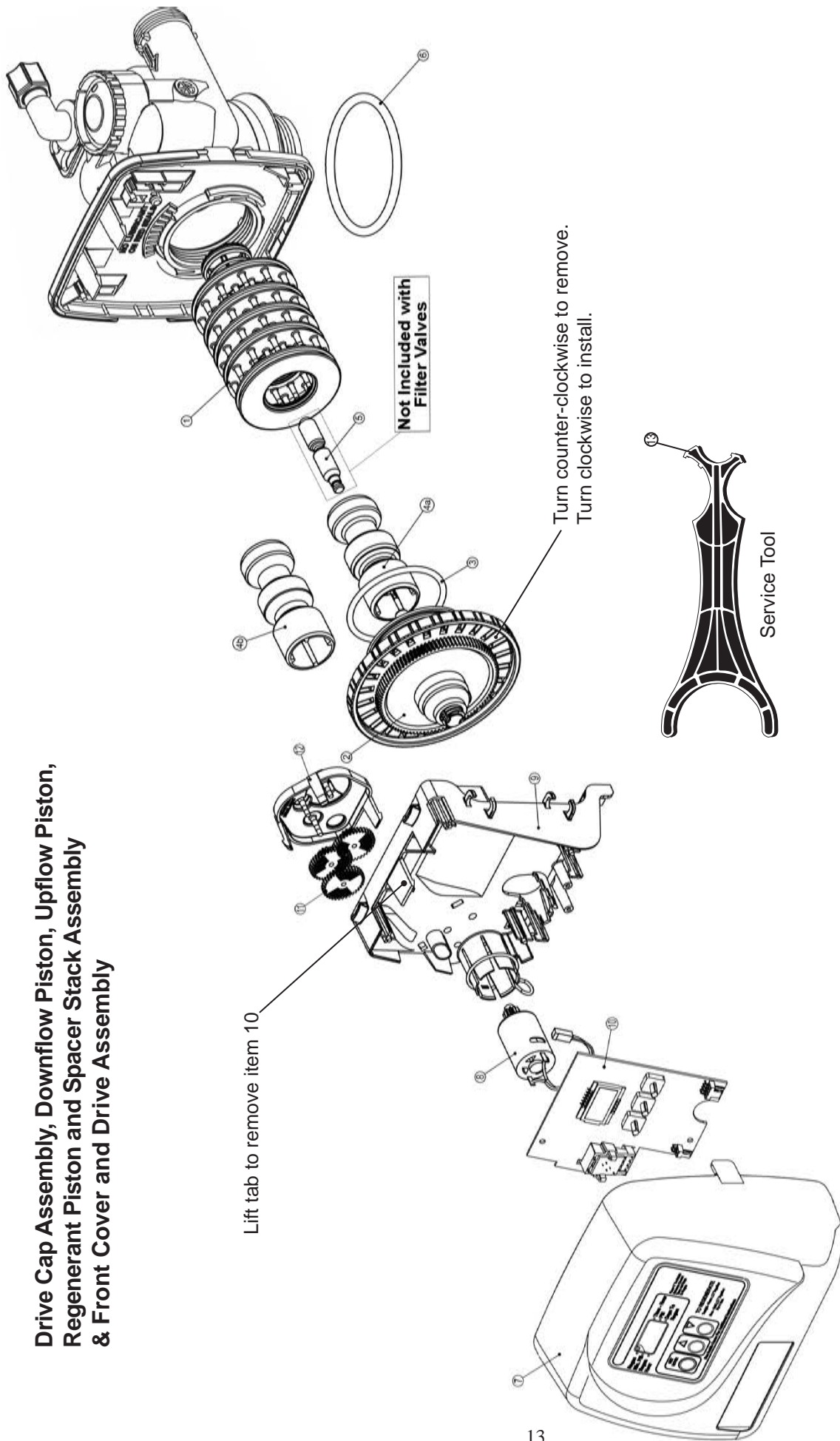
**Diagnostic:**  
The inlet handle points in the direction of flow and the outlet handle points to the center of bypass valve, system water pressure is allowed to the control valve and the plumbing system while not allowing water to exit from the control valve to the plumbing.

Figure 4  
**SHUT OFF MODE**



**Shut Off:**  
The inlet handle points to the center of the bypass valve and the outlet handle points in the direction of flow, the water is shut off to the plumbing system. If water is available on the outlet side of the softener it is an indication of water bypass around the system (i.e. a plumbing connection somewhere in the building bypasses the system).

**Drive Cap Assembly, Downflow Piston, Upflow Piston, Regenerant Piston and Spacer Stack Assembly & Front Cover and Drive Assembly**





## Drive Cap Assembly, Downflow Piston, Upflow Piston, Regenerant Piston and Spacer Stack Assembly

Item No.	Part No.	Description	Quantity
1	A2466034	*Spacer Stack Assembly w/o o-rings	1
2	A2080077	Drive Cap Assembly	1
◆3	A2077180	O-Ring 228 (use Valve O-ring Kit)	1
▲4	A2309040	Piston Downflow Assembly	1
⊗5	A2438033	Regenerant Piston	1
◆6	A2077181	O-Ring 337 (use Valve O-ring Kit)	1
◆15	A2077178	O-Ring 215 (use Valve O-ring Kit)	1

▲ Item #4 identified with “DN” code.

⊗ Item #5 not used with Backwash Only filter applications.

◆ See page 20 for Valve O-ring Kit.

## Front Cover and Drive Assembly

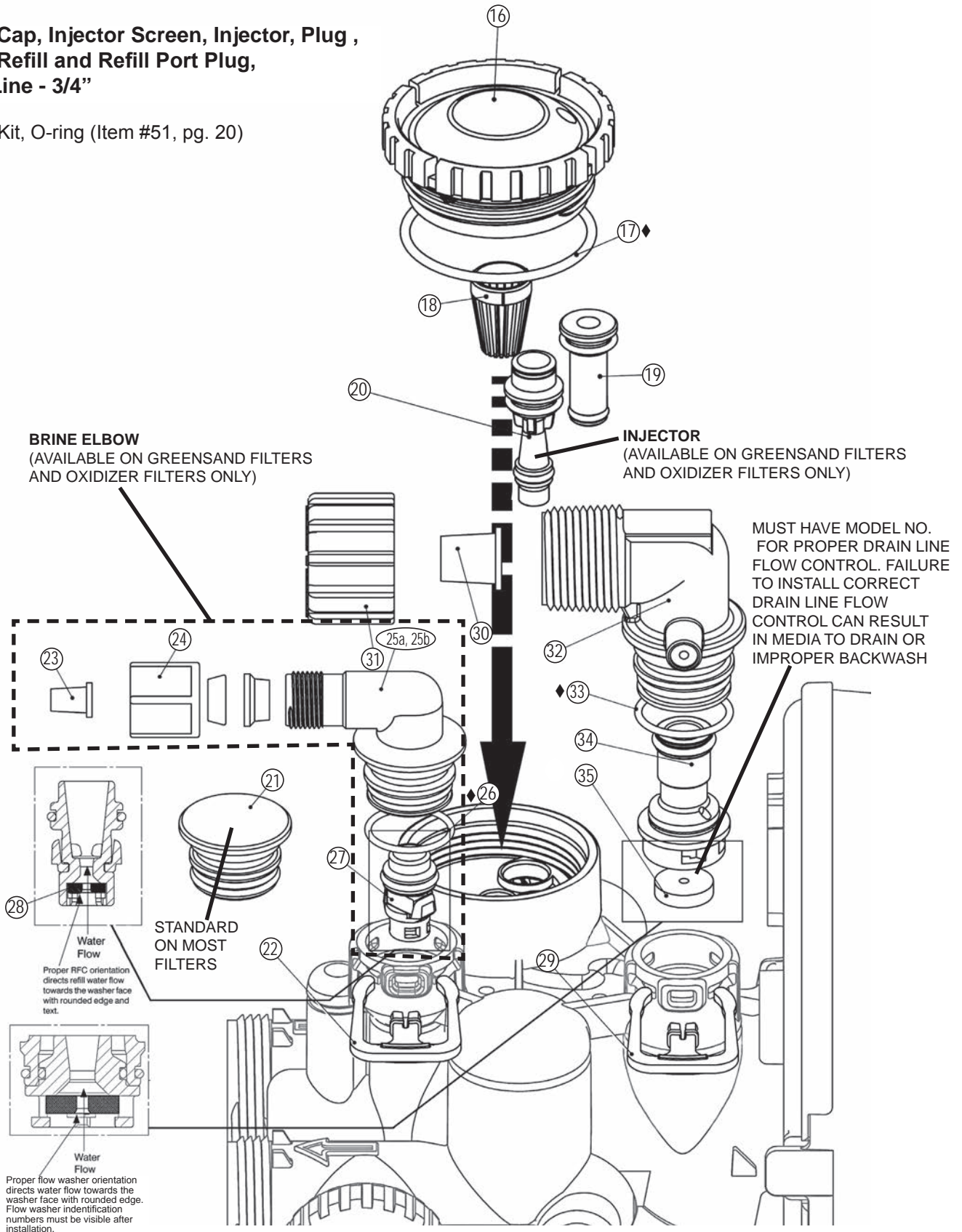
Item No.	Part No.	Description	Quantity
7	A2103131	Front Cover ASSY	1
8	A2085050	Motor	1
9	A2328046	Drive Bracket & Spring Clip	1
10	A2341017	PC Board *	1
11	A2393046	Drive Gear 12 x 36	3
12	A2103132	Drive Gear Cover	1
13	A2491086	Service Tool	1
14	A2242054	Transformer 110V - 12V	1

\* Please provide model number when ordering so that circuit board can be programmed.



**Injector Cap, Injector Screen, Injector, Plug ,  
O-Ring, Refill and Refill Port Plug,  
& Drain Line - 3/4”**

◆ Part of Kit, O-ring (Item #51, pg. 20)



## Injector Cap, Injector Screen, Injector, Plug and O-Ring

Item No.	Part No.	Description		Quantity
16	A2080079	Injector Cap		1
◆17	A2077182	O-Ring 135 (Use Valve O-ring Kit)		1
18	A2142016	Injector Screen		1
19	A2079059	Injector Assembly Z Plug	See note	1
20	A2079060	Injector Assembly A Black		
	A2079048	Injector Assembly B Brown		
	A2079046	Injector Assembly C Violet		
	A2079045	Injector Assembly D Red		
	A2079049	Injector Assembly E White		1
	A2079047	Injector Assembly F Blue		
	A2079050	Injector Assembly G Yellow		
	A2079055	Injector Assembly H Green		
	A2079062	Injector Assembly I Orange		
	A2079063	Injector Assembly J Light Blue		
A2079064	Injector Assembly K Light Green			

\*The injector plug and the injector each contain one 011 (lower) and 013 (upper) o-ring.

Note: For downflow brine, injector is located in the down hole and injector plug in the up hole.  
For a filter that only backwashes injector plugs are located in both holes.

## Refill and Refill Port Plug

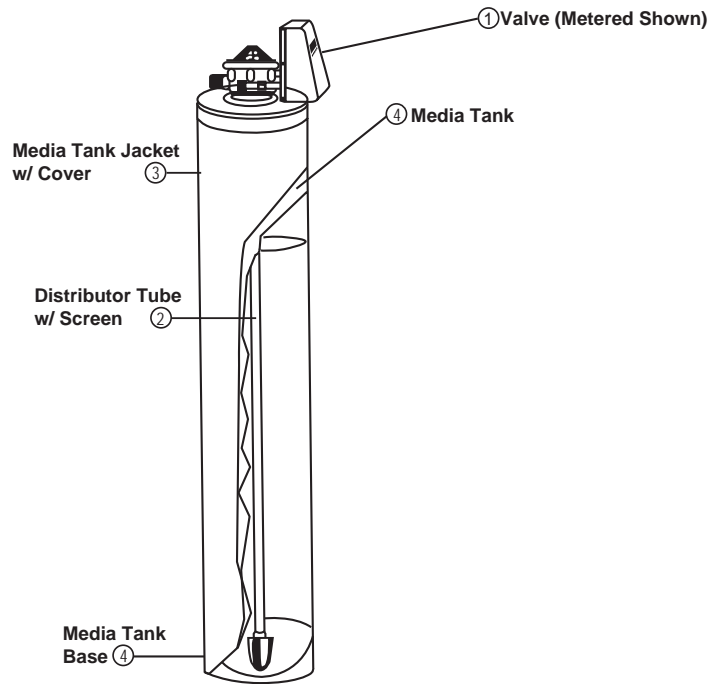
Drawing No.	Order No.	Description	Quantity
21	A2287059	Refill Port Plug Assembly	This part is required for backwash only systems
22	A2411015	Elbow Locking Clip	1
23	A2409016	Polytube insert 3/8	1
24	A2095071	Nut 3/8	1
25a	A2080078	Elbow Cap 3/8	(use w/ 3/8" tubing) 1
25b	A2129100	Elbow 1/2" with nut and insert	(use w/ 1/2" tubing) Option
◆26	Use Item 51	O-Ring 019 (Use Valve O-ring Kit)	1
27	A2104033	RFC Retainer Assembly*	1
28	A2253108	RFC Brine Refill Flow Washer	1

\*Assembly includes RFC.

## Drain Line - 3/4"

Drawing No.	Order No.	Description	Quantity
29	A2411015	Elbow Locking Clip	1
30	A2409013	Polytube insert 5/8	Option
31	A2095065	Nut 3/4 Drain Elbow	Option
32	A2099056	Drain Elbow 3/4 Male Assembly	1
◆33	Use Item 51	O-Ring 019 (Use Valve O-ring Kit)	1
34	A2104034	Drain Flow Washer Retainer Assembly	1
35	A2253114	Drain Flow Washer 0.7 gpm for 3/4	One DLFC must be used if 3/4 fitting is used
	A2253099	Drain Flow Washer 1.0 gpm for 3/4	
	A2253084	Drain Flow Washer 1.3 gpm for 3/4	
	A2253083	Drain Flow Washer 1.7 gpm for 3/4	
	A2253081	Drain Flow Washer 2.2 gpm for 3/4	
	A2253082	Drain Flow Washer 2.7 gpm for 3/4	
	A2253085	Drain Flow Washer 3.2 gpm for 3/4	
	A2253086	Drain Flow Washer 4.2 gpm for 3/4	
A2253087	Drain Flow Washer 5.3 gpm for 3/4		

## “CCF” Series



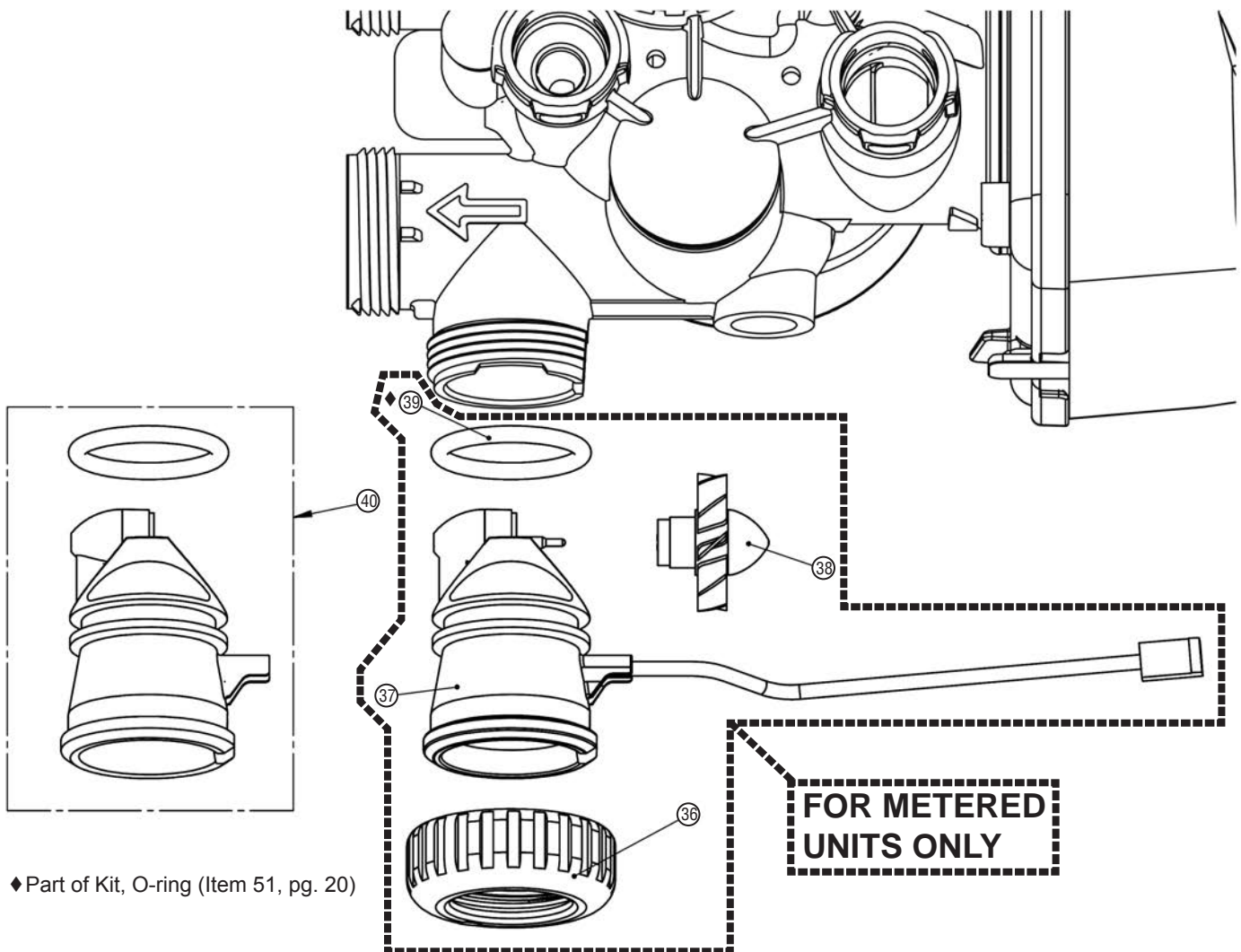
### Parts Listing

Part Number	No.	Description
	1	Valve Metered (Complete - Specify Model)
	2	Distributor Tube Assembly - Specify Model
	3	Media Tank Jacket w/ cover - Optional
	4	Media Tank & Media Tank Base
	--	Media (Specify Model)

## Water Meter and Meter Plug

Item No.	Part No.	Description	Quantity
36	A2095069	Nut 1” Quick Connect	1
*37	A2360039	Meter Assembly	1
38	A2100027	Turbine Assembly	1
39	A2077178	O-Ring 215 (Use Valve O-ring Kit)	1
40	A2287077	Meter Plug Assembly (Time clock option)	1

\*Item #37 includes Items #38 & #39.



Item No.	Part No.	Description	Quantity
41	A2095069	Nut 1” Quick Connect	2
42	A2453012	Split Ring	2
●43	A2077178	O-Ring 215 (Kit available - see Item #10)	2
44	A2607004	Bypass 1” Rotor	2
45	A2080090	Bypass Cap	2
46	A2395009	Bypass Handle	2
47	A2104036	Bypass Rotor Seal Retainer	2
●48	A2077182	O-Ring 135 (use Bypass Valve Kit)	2
●49	A2077223	O-Ring 112 (use Bypass Valve Kit)	2
●50	A2077224	O-Ring 214 (use Bypass Valve Kit)	2

●Part of Kit, O-ring By-Pass(Item 52)

◆ Valve O-ring Kit

51	B1213022	KIT O-ring (contains 1 each of 3, 6, 15, 17, 26, & 33)	1 per valve
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● Bypass Valve O-ring Kit

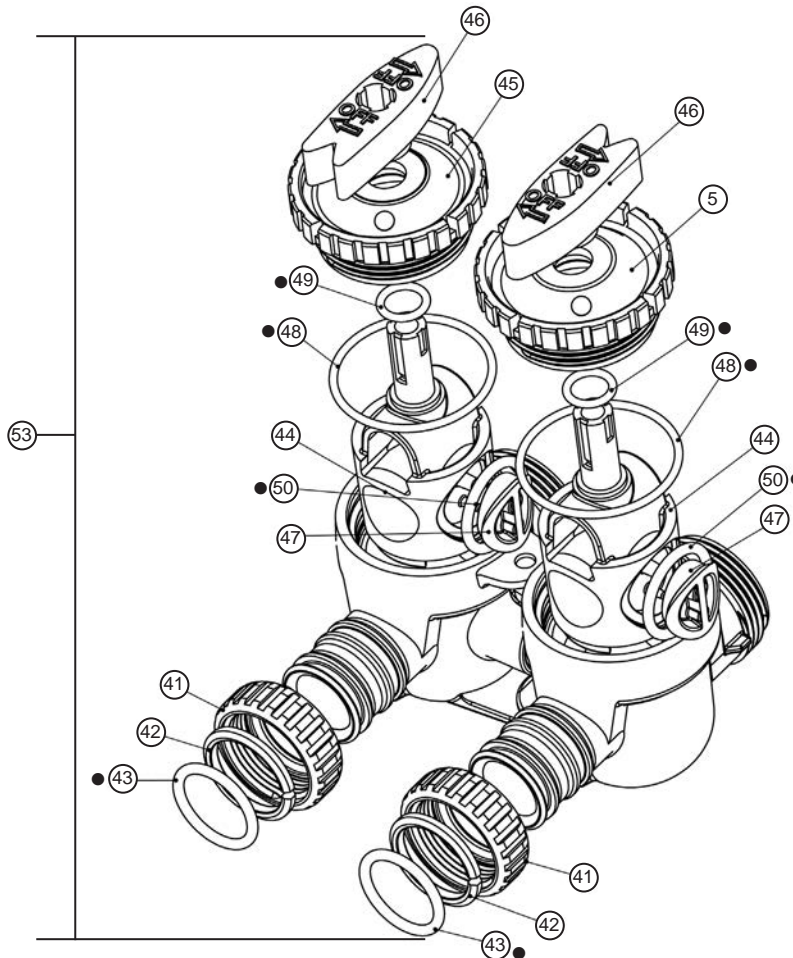
52	B1213021	KIT O-ring Bypass (Incl. 2 ea. of items 43,48,49,& 50)	1 per valve
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(Not Shown) Order No. A2412076, Description Bypass Vertical Adapter Assembly

Complete Assembly

53	A23540231	Bypass Valve Complete / Less Connectors	1 per valve
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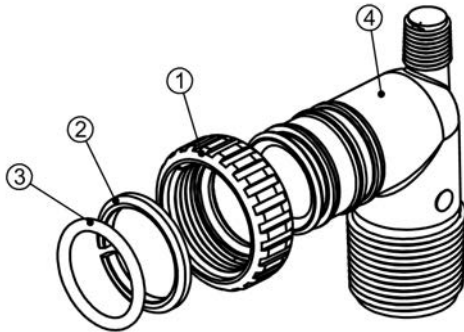
**Bypass is optional on 1” units.**





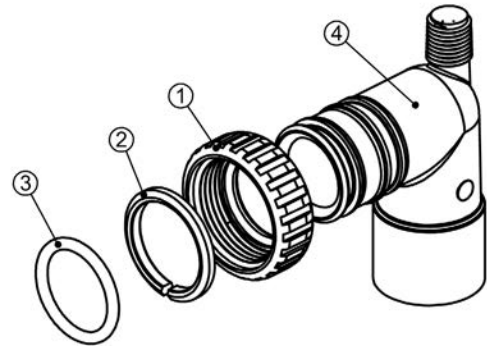
Order No: **A2129080** (Optional)  
 Description: **Fitting 1” PVC Male NPT Elbow Assembly**

Drawing No.	Order No.	Description	Quantity
1	A2095069	Nut 1” Quick Connect	2
2	A2453012	Split Ring	2
3	A2077178	O-Ring 215	2
4	A2129101	Fitting 1”PVC Male NPT Elbow	2



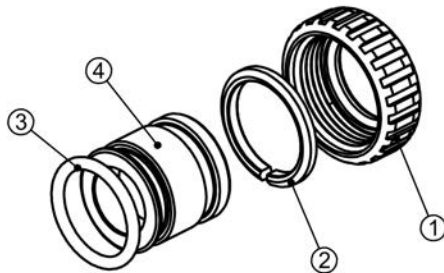
Order No: **A2099054** (Optional)  
 Description: **Fitting 3/4” & 1” PVC Solvent 90° Asy**

Drawing No.	Order No.	Description	Quantity
1	A2095069	Nut 1” Quick Connect	2
2	A2453012	Split Ring	2
3	A2077178	O-Ring 215	2
4	A2569008	Fitting 3/4&1 PVC Solvent 90	2



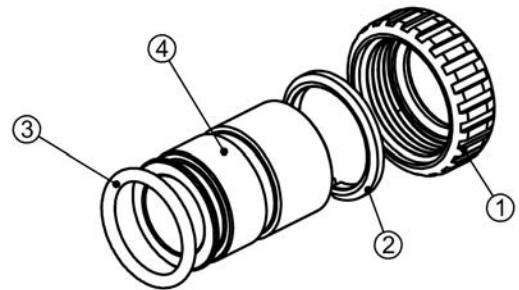
Order No: **A2435068** (Optional)  
 Description: **Fitting 1” Brass Sweat Assembly**

Drawing No.	Order No.	Description	Quantity
1	A2095069	Nut 1” Quick Connect	2
2	A2453012	Split Ring	2
3	A2077178	O-Ring 215	2
4	A2569006	Fitting 1” Brass Sweat	2



Order No: **A2435072** (Optional)  
 Description: **Fitting 3/4” Brass Sweat Assembly**

Drawing No.	Order No.	Description	Quantity
1	A2095069	Nut 1” Quick Connect	2
2	A2453012	Split Ring	2
3	A2077178	O-Ring 215	2
4	A2569007	Fitting 3/4” Brass Sweat	2



Part No.	Description	Quantity
A2095069	Nut 1” Quick Connect	2
A2453012	Split Ring	2
A2077178	O-Ring 215	2
A2412076	Bypass Vertical Adapter Assembly	2



**Table 6  
Troubleshooting Procedures**

Problem	Possible Cause	Solution
1. Timer does not display time of day	a. AC adapter unplugged	a. Connect power
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Defective transformer	c. Replace transformer
	d. Defective PC board	d. Replace PC board
2. Timer does not display correct time of day	a. Switched outlet	a. Use uninterrupted outlet
	b. Power outage	b. Reset time of day
	c. Defective PC board	c. Replace PC board
3. Control valve regenerates at wrong time of day	a. Power outages	a. Reset control valve to correct time of day
	b. Time of day not set correctly	b. Reset to correct time of day
	c. Defective PC board	c. Reset regeneration time
4. E1, E2, or E3  E1 - Unable to recognize start of regeneration  E2 - Unexpected stall  E3 - Motor ran too long, timed out trying to reach the next cycle position or trying to reach home position	a. Control valve has just been serviced	a. Press SET HOUR and DOWN for 3 seconds or unplug power source jack (black wire) from the circuit board and plug back in to reset control valve.
	b. Foreign matter is lodged in control valve	b. Check piston and spacer stack assembly for foreign matter.
	c. High drive forces on piston	c. Replace piston(s) and spacer stack assembly
	d. Control valve piston not in home position	d. Press SET HOUR and DOWN for 3 seconds or unplug power source jack (black wire) from the circuit board and plug back in to reset control valve
	e. Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure	e. Check motor and wiring. Replace motor if necessary
	f. Drive gear label dirty or damaged, missing or broken gear	f. Replace or clean drive gear
	g. Drive bracket incorrectly aligned to back plate	g. Reseat drive bracket properly
	h. PC board is damaged or defective	h. Replace PC board
	i. PC board incorrectly aligned to drive bracket	i. Ensure PC board is correctly snapped on to drive bracket
	5. Control valve stalled in regeneration	a. Motor not operating
b. No electric power at outlet		b. Repair outlet or use working outlet
c. Defective AC adapter		c. Replace AC adapter
d. Defective PC board		d. Replace PC board
e. Broken drive gear or drive cap assembly		e. Replace drive gear or drive cap assembly
f. Broken piston retainer		f. Replace drive cap assembly
g. Broken main or regenerant piston		g. Replace main or regenerant piston

## Troubleshooting Procedures (continued)

Problem	Possible Cause	Solution
7. Control valve does not regenerate automatically when UP and DOWN button is depressed and held	a. AC adapter unplugged	a. Connect AC adapter
	b. No electric power at outlet	b. Repair outlet or use working outlet
	c. Broken drive gear or drive cap assembly	c. Replace drive gear or drive cap assembly.
	d. Defective PC board	d. Replace PC board
8. Control valve does not regenerate automatically but does when UP and DOWN button is depressed and held	a. Defective PC board	a. Replace PC board
	b. Set-up error	b. Check control valve set-up procedure

## NOTES



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