

Water Tec of Tucson



WS1TA

Twin-Alternating Water softener



• Water Tec of Tucson • www.water-tec.com •
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MAIN COMPONENTS

Your water treatment system is a Twin-Alt point of entry (POE) system composed of four components:

- A. The control valve and computer assembly
- The fiberglass tank assembly's including the water treatment medium
- The brine tank assembly including safety float.

Each of these assemblies has a specific function as described below:

Control Valve Assembly...Automatically monitors water usage patterns, initiates regeneration and moves the valve through the steps of regeneration.

Media Tank Assembly... A fiberglass vessels, which contains the water softening media, in the proper diameter and depth of the media and evenly distributes the feed water throughout the media tank assembly.

Brine Tank Assembly...A polyethylene vessel, which is used to dissolve salt and to hold the proper amount of brine for the next regeneration. A brine valve keeps the control valve from drawing air into the system.

STEPS OF OPERATION

Service...Hard water flows downward through the water softening resin where the hardness minerals, calcium and magnesium, as well as dissolved iron, are removed from the water and are collected on the resin. The amount of resin and the salt dosage gives resin a certain capacity for hardness and iron removal.

Backwash 1 ...During the cycle the water flows upward through the resin bed and washes collected sediment or other foreign material to the drain.

Brine and Rinse...The brine solution is drawn from the brine tank and slowly flows downward through the resin collecting the hardness and iron as it goes. The brine carries the hardness and iron with it and rinses them to the drain.

Backwash 2 ...Same as backwash 1 above but of slightly shorter duration.

Fast Rinse...Water flows downward through the resin and to the drain carrying with it the remaining traces of brine.

Brine Tank Refill...A predetermined volume of water flows into the brine tank and dissolves a calculated amount of salt creating brine for the next generation. This occurs at the onset of the next **Service** cycle. Be sure that there is always un-dissolved salt remaining. Since the frequency of regeneration is reasonably consistent, a regular addition of salt should be scheduled. Approximately 6"-8" of salt must be in brine tank. In some cases the installation technician may decide a pre-brine refill may be appropriate. If so brine refill will occur 2 hours prior to regeneration and will result in minimal water in the brine tank assembly during service position.

Total Regeneration Time (Backwash 1 through Fast Rinse) can be anywhere between 57 and 107 minutes depending on setting made for certain water conditions.

GENERAL CARE AND MAINTENANCE INFORMATION

The following guidelines are recommended for you to obtain maximum efficiency from your water treatment system:

Control Valve... Try to keep free of dirt and debris both on valve body and under cover. No lubrication is required.

Brine Tank ... A major cleaning is recommended every two years. This interval may need to be adjusted depending on the amount of insoluble material in the salt being used.

Allow salt level to become very low so there is little to remove. Scoop out un-dissolved salt.

Disconnect and remove brine valve. There is no pressure or suction on this line except during a regeneration.

Remove internal parts of brine tank, if any.

Clean brine tank interior with a mild cleaning agent (dish soap) and rinse thoroughly.

Replace brine valve and internal parts.

Pour five gallons of water (softened if available) into the tank (Add only two gallons if pre-brine refill option is used).

Add salt.

Replace cover.

Allow two hours for concentrated brine to be made before next regeneration.

It is recommended that... a manually initiated regeneration should be started now. See **Manual Regeneration**.

Button Operation and Function



Scrolls to the next display.

Pressing once and releasing will schedule a regeneration at the preset delayed regeneration time.

Pressing again and releasing will cancel the regeneration.



Pressing and holding for 3 seconds will initiate an immediate regeneration

Pressing while in regeneration will advance to the next cycle.

Pressing in the program levels will go backwards to the previous screen



Changes variable being displayed.



Key sequence to lock and unlock program settings.



Holding for 3 seconds initiates a control reset. The software version is displayed and the piston returns to the home/service position, resynchronizing the valve.



Used with valve type 1.0F, holding for at least 3 seconds causes a switch in the tank in Service without cycling the regeneration valve. After tank switch, days remaining and capacity remaining status is retained for each tank until the next regeneration.

Regeneration Cycles and Times

Cycle	Range of times (min.)	
	Softening	Filtering
1. Backwash 1 st (upflow)	1 - 95	1 - 95
2. Regenerant Draw/Slow Rinse (downflow)	1 - 180	N/A
3. Backwash 2 nd (upflow)	1 - 95	N/A
4. Fast Rinse (downflow)	1 - 95	1 - 95
5. Regenerant Refill (with treated water)	0.1 - 99.9 or OFF	N/A
6. Service (downflow)		

The user can initiate manual regeneration. The user has the option to request the manual regeneration at the delayed regeneration time or to have the regeneration occur immediately:

1. Pressing and releasing the REGEN button. “ ◀ ” will flash towards Regen on the display and the regeneration will occur at the delayed regeneration time. The user can cancel the request by pressing and releasing the REGEN button.
2. Pressing and holding the REGEN button for approximately 3 seconds will immediately start the regeneration. The user cannot cancel this request, except by resetting the control by pressing NEXT and REGEN simultaneously for 3 seconds.

GENERAL INSTALLATION & SERVICE CAUTIONS

The control valve, fittings, and/or bypass are designed to accommodate minor plumbing misalignments they are not designed to support the weight of a system or the plumbing.

Do not use Vaseline, oils, other hydrocarbon lubricants, or silicone spray anywhere. **Do not use silicone on red or clear lip seals.**

Do not use pipe dope or other sealant on threads. Teflon tape must be used on the threads of the 1" NPT elbow, its ¼" NPT connections, and on the threads for the drain line connection. Teflon tape is not used on the nut connections or caps because o-ring seals are used. The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic Service Wrench, CLV-V3193(models with Clack control valves). If necessary, pliers can be used to unscrew the nut or cap. **Do not use a pipe wrench** to tighten nuts or caps. **Do not place screwdriver in slots, on caps, and/or tap with a hammer.**

SITE REQUIREMENTS

- Water Pressure, 20-125 psi
- Water Temperature, 40°-110° F
- The tank should be on a firm level surface
- Electrical: Use a 115/120V, 60Hz uninterrupted only.
- Current draw is 0.25 amperes
- A 15 ft. power cord is furnished
- The plug-in transformer is for dry locations
- Batteries are not used.

- The distance between the drain and the water conditioner should be as short as possible.
- Since salt must be periodically added to the brine tank, the tank should be located where it is easily accessible.
- Do not install any water conditioner with less than 10 feet of piping between its outlet and the inlet of a water heater.
- Do not locate unit where it or its connections (including the drain and overflow lines) will be subjected to freezing conditions.
- The use of resin cleaner in an unvented enclosure is not recommended.
- Do not install equipment in locations that would receive rain run-off from roof.

INLET/OUTLET PLUMBING: Connect to a supply line downstream of outdoor spigots. Install an inlet shutoff valve and plumb to the units bypass valve inlet located at the right rear as you face the unit. When assembling the installation-fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring and O-ring. Heat from soldering or solvent cements will 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 solder flux, primer, and solvent cement on any part of the o-rings, split rings, bypass valve, or control valve. If the building's electrical system is grounded to the plumbing install a copper-grounding strap from the inlet to the outlet pipe. **Plumbing must be done in accordance with all applicable local codes.**

DRAIN LINE: First, be sure that the drain can handle the backwash flow of the system. Solder joints near the drain must be located prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line flow control fitting and solder joints. Failure to do so could cause interior damage to the flow control. Install a 3/8"-1/2" I.D. flexible plastic tube to the Drain Line Assembly or discard the tubing nut and use the 3/4" NPT fitting for rigid pipe. If the backwash rate is greater than 7 gpm, use a 3/4" drain line. Run drain tube to its discharge point in accordance with plumbing codes. Pay special attention to codes for air gaps and ant siphon devices.

9. **BRINE TANK CONNECTION:** Install a 3/8" O.D. polyethylene tube from the Refill Elbow to the Brine Valve in the brine tank.

10. **OVERFLOW LINE CONNECTION:**

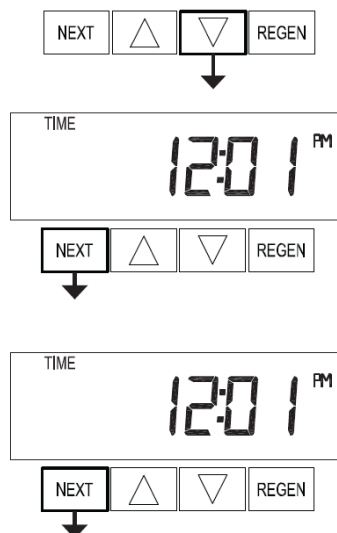
AN OVERFLOW DRAIN LINE IS RECOMMENDED ANYWHERE A BRINE OVERFLOW COULD DAMAGE FURNISHINGS OR THE BUILDING STRUCTURE.

Your softener is equipped with a brine tank safety float, which greatly reduces the chance of an accidental brine overflow. In the event of a malfunction, an **OVERFLOW LINE CONNECTION** will direct the "overflow" to the drain instead of spilling on the floor. This barb type fitting should be on the side of the cabinet or the brine tank.

To connect the overflow fitting, locate the hole inside of brine tank. Insert overflow fitting into tank and tighten with plastic thumbnut from the inside. Attach a length of 1/2" I.D. tubing (not supplied) to the fitting and run to drain. Do not elevate overflow line higher than 3" below bottom of overflow fitting. Do not connect this tube into the drain line of the control valve. Overflow should be a direct, separate line from overflow fitting to drain, sewer, tub, or appropriate outdoor location. Allow an air gap as per the drain line instructions.

IMPORTANT:

Never insert a drain line directly into a drain, sewer line, or trap. Always allow an air gap between the drain line and the wastewater to prevent the possibility of sewage being back-siphoned into the water conditioner.



Setting Time of Day

Push NEXT until time of day screen is displayed. Press and hold ▼ until SET TIME is displayed and the hour flashes once. Press ▲ or ▼ until the correct hour is displayed.

Then press NEXT. The minutes will flash. Press ▲ or ▼ until the correct minute is displayed.

Press NEXT to return to the User Displays. Time of day should only need to be set after power outages lasting more than 8 hours, if the battery has been depleted and a power outage occurs, or when daylight saving time begins or ends. If a power outage lasting more than 8 hours occurs, the time of day will flash on and off which indicates the time of day should be reset. If a power outage lasts less than 8 hours and the time of day flashes on and off, the time of day should be reset and the battery replaced.

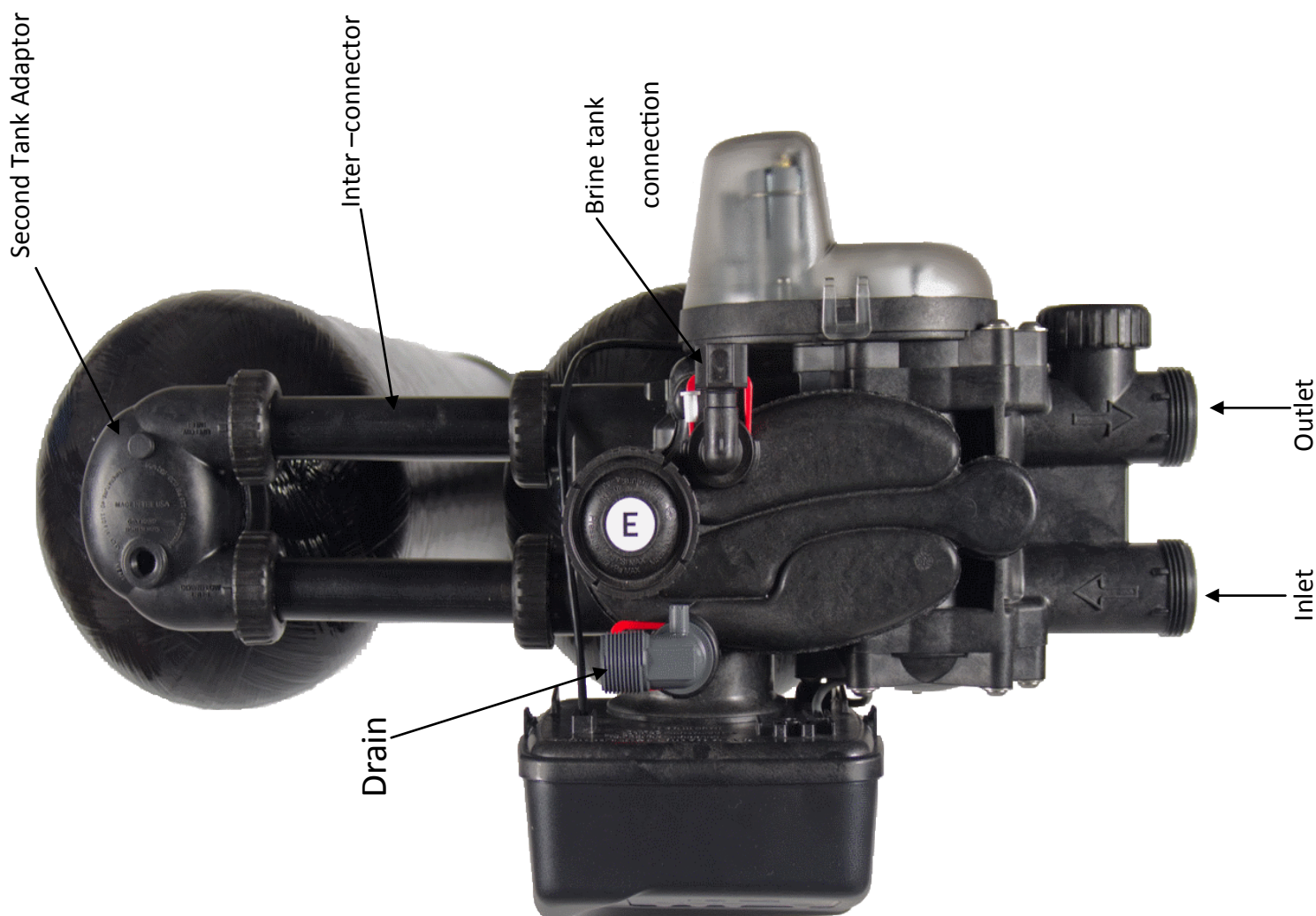
Installation and Startup

- 1) Connect second tank to main control valve.
- 2) Connect Brine Tank
- 3) Connect Drain
- 4) Connect inlet & Outlet
- 5) Program Regeneration Capacity in gallons (see next page)

****All control programming with the exception of the Regen Capacity is done at the factory.**

- 6) Perform a manual Backwash and rinse Cycle on each tank. Press and hold REGEN button for 5 seconds to start a regeneration let the first backwash complete and then skip the Brine & Rinse cycle by pressing the Regen button when timer starts counting down. Allow the next cycle to complete then skip the Fill Cycle for the first tank. Repeat these steps for the second tank (**DO NOT skip the fill cycle on the second tank**).

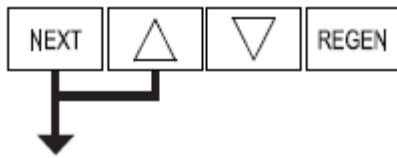
The system is now ready for use.



*****Do not remove red clips on Brine Tank connection or Drain connection, these clips are retainer clips and must be installed for proper operation.**

Installer Display Settings

Step 1I



Step 1I - To enter Installer Display press NEXT and ▲ simultaneously for about 5 seconds and release.

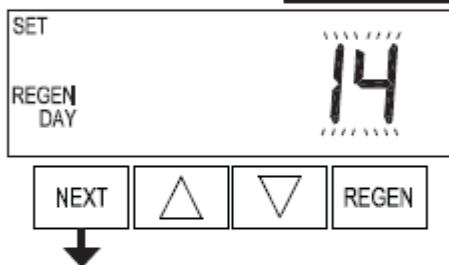
Step 2I



Step 2I – Hardness: Set the amount of influent hardness using ▲ or ▼. This display will not be viewed if FILTERING BACKWASH or FILTERING REGEN is selected in Step 2F.

Press NEXT to go to step 3I. Press REGEN to exit Installer Display Settings.

Step 3I



Step 3I – Day Override: When volume capacity is set to “oFF”, sets the number of days between

regenerations. When volume capacity is set to AUTO or to a volume, sets the maximum number of days

between regenerations. If value set to “oFF”, regeneration initiation is triggered solely by volume used.

Step 4I



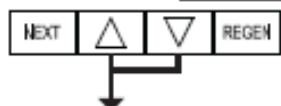
Step 4I – Next Regeneration Time : Set to “on 0”

Press NEXT to go to step 5I. Press REGEN to return to previous step.

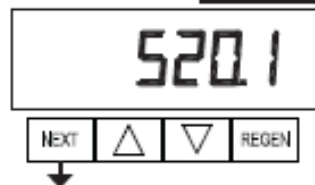
EXIT INSTALLER DISPLAY SETTINGS

Diagnostics

Step 1D



Step 2D



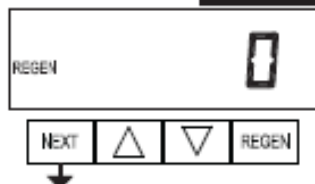
Step 3D



Step 4D



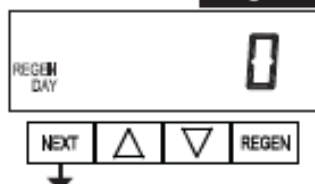
Step 5D



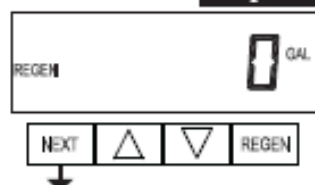
Step 6D



Step 7D



Step 8D



Step 1D - Press ▲ and ▼ simultaneously for 5 seconds and release. If screen in Step 2D does not appear the lock on the valve is activated. To unlock press ▼, NEXT, ▲, REGEN in sequence, then press ▲ and ▼ simultaneously for 5 seconds and release.

Step 2D – Software Version. Press NEXT to go to Step 3D. Press REGEN to exit Diagnostics.

Step 3D – Volume, total used since start-up: This display shows the total gallons treated since startup. This display will equal zero if a water meter is not installed. Press the NEXT button to go to Step 4D. Press REGEN to return to previous step.

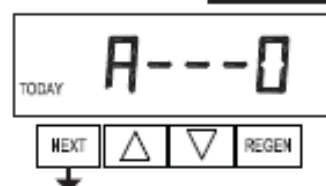
Step 4D – Days, total since start-up: This display shows the total days since startup. Press the NEXT button to go to Step 5D. Press REGEN to return to previous step.

Step 5D – Regenerations, total number since start-up: This display shows the total number of regenerations that have occurred since startup. Press the NEXT button to go to Step 6D. Press REGEN to return to previous step.

Step 6D – Error Log: This display shows a history of the last 10 errors generated by the control during operation. Press ▲ or ▼ to view each recorded error. Press NEXT to go to Step 7D. Press REGEN to return to previous step.

Step 7D – Days, since last regeneration: This display shows the days since the last regeneration occurred. Press NEXT to go to Step 8D. Press REGEN to return to previous step.

Step 8D – Volume, since last regeneration: This display shows the volume of water that has been treated since the last regeneration. This display will equal zero when a water meter is not installed. Press NEXT to go to Step 9D. Press REGEN to return to previous step.

Step 9D

400 GAL

to show the capacity for days 3, 4, 5 and 6. ▼ can be pressed to move backwards in the day series. This display does not appear if 1.0Γ is set in Step 2CS, if ALT A or ALT B are selected in Step 5CS, or anytime the reserve capacity is not determined by the control.

Press NEXT at any time to go to Step 10D. Press REGEN to return to previous step.

Step 9D – Volume, reserve capacity used for last 7 days: If the valve is set up as a softener, a meter is installed, and Set Volume Capacity is set to “Auto,” this display shows day 0 (for today) and flashes the reserve capacity. Pressing ▲ will show day 1 (which would be yesterday) and flashes the reserve capacity used. Pressing ▲ again will show day 2 (the day before yesterday) and the reserve capacity. Keep pressing ▲

Step 10D

0 GAL

show dashes if a water meter is not installed.

Press NEXT at any time to go to Step 11D. Press REGEN to return to previous step.

Step 10D – Volume, 63-day usage history: This display shows day 0 (for today) and flashes the volume of water treated today. Pressing ▲ will show day 1 (which would be yesterday) and flashes the volume of water treated on that day. Continue to press ▲ to show the maximum volume of water treated for the last 63 days. If a regeneration occurred on the day the word “REGEN” will also be displayed. This display will

Step 11D

170 hr

on it was in service. The next three digits represent the number of hours ago that the transfer occurred. The display alternates with the volume that was treated before the tank transferred. Press NEXT at any time to go to Step 12D. Press REGEN to return to previous step.

Step 11D – Twin Tank Valve transfer history: only displays when 1.0Γ was selected in Step 2CS. Use ▲ or ▼ to scroll through the last 10 tank transfers. The first position in the display ranges from 0 to 9 with the lowest number being the most recent transfer. The second position in the display will be either “A” or “b”. If “A” then the tank with the valve on it was in service, if “b” the tank with the in/out head

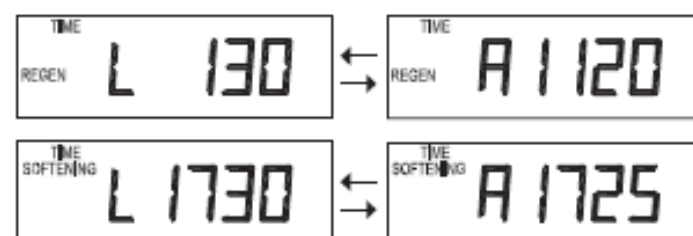
Step 12D

TIME REGEN TODAY A 0

Press REGEN to return to previous step.

Step 12D – MAV Drive History in the direction of retracted piston rod position. Display will only be shown if 1.0Γ is selected in Step 2CS, or OFF is not selected in Step 5CS. Up to a four digit number will appear after the “L” which stands for latest and “A” which stands for average. Drive time is measured in 1/100 of a second; i.e., a 17.10 second move is displayed as “1710”. Press NEXT at any time to go to Step 13D.

Press and hold ▲ and ▼ buttons for 3 seconds while in Step 12D to reset the MAV drive history in both the retracted and extended piston rod position. To view the old MAV drive history data for retracted and extended rod position press and hold REGEN and ▲ while in Step 12D. Press NEXT to advance display to the old MAV drive history.

**Step 13D**

TIME SOFTENING TODAY A 0

seconds while in Step 13D to reset the MAV drive history in both the extended and retracted piston rod position. To view the old MAV drive history data see Step 12D.

Press NEXT at any time exit Diagnostics. Press REGEN to return to previous step.

Step 13D – MAV Drive History in the direction of extended piston rod position. Display will only be shown if 1.0Γ is selected in Step 2CS, or OFF is not selected in Step 4CS. Up to a four digit number will appear after the “L” which stands for latest and “A” which stands for average. Drive time is measured in 1/100 of a second; i.e., a 17.15 second move is displayed as “1715”. Press and hold ▲ and ▼ for 3

EXIT DIAGNOSTICS

EE Front Cover and Drive Assembly

Drawing No.	Order No.	Description	Quantity
1	V3175EE-01	WS1EE FRONT COVER ASSEMBLY	1
2	V3107-01	WS1 MOTOR	1
3	V3106-01	WS1 DRIVE BRACKET & SPRING CLIP	1
4	V3408EE-03BOARD	WS1THRU2L/2 EEPCBRD MAV/ALT REPL	1
5	V3110	WS1 DRIVE GEAR 12X36	3
6	V3109	WS1 DRIVE GEAR COVER	1
Not Shown	V3186	WS1 AC ADAPTER 120V-12V	1
	V3186-01	WS1 AC ADAPTER CORD ONLY	
Not Shown	V3178	WS1 Drive Back Plate	1

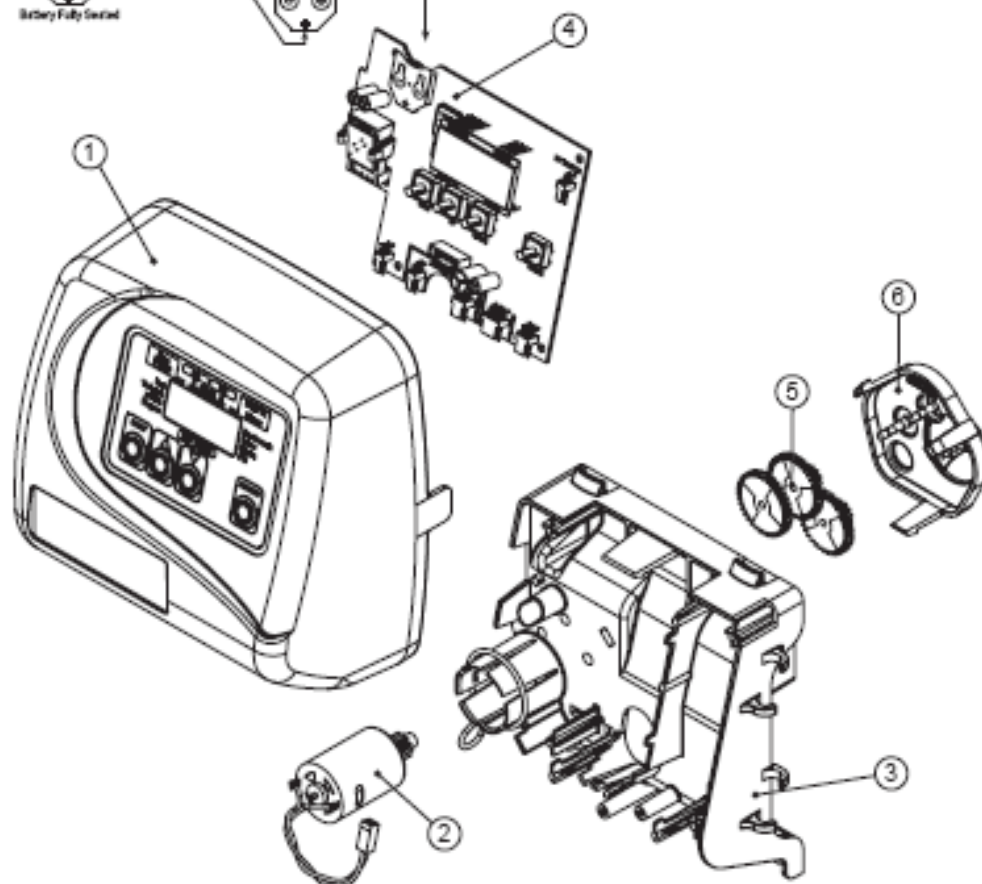
Refer to Control Valve Service Manual for other drawings and part numbers.

AC Adapter	U.S.	International
Supply Voltage	120 V AC	230V AC
Supply Frequency	60 Hz	50 Hz
Output Voltage	12 V AC	12 V AC
Output Current	500 mA	500 mA

When replacing the battery, align
positives and push down to fully seat.



Battery replacement is
3 not alkaline coin cell
type 2032.



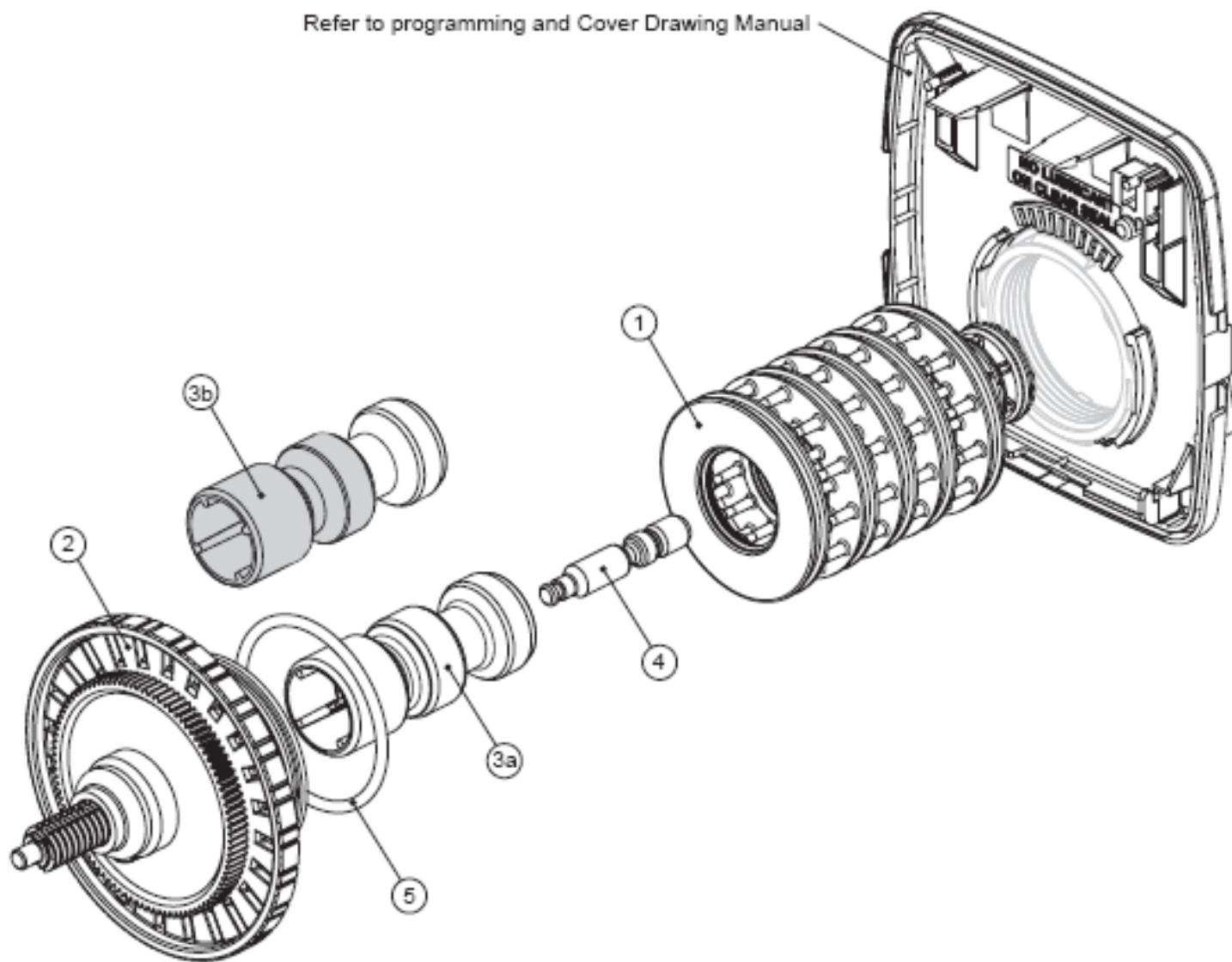
Drive Cap Assembly, Downflow Piston, Upflow Piston, Regenerant Piston and Spacer Stack Assembly

Drawing No.	Order No.	Description	Quantity
1	V3005	WS1 Spacer Stack Assembly	1
2	V3004	Drive Cap ASY	1
3a	V3011*	WS1 Piston Downflow ASY	1
3b	V3011-01*	WS1 Piston Upflow ASY	
4	V3174	WS1 Regenerant Piston	1
5	V3135	O-ring 228	1

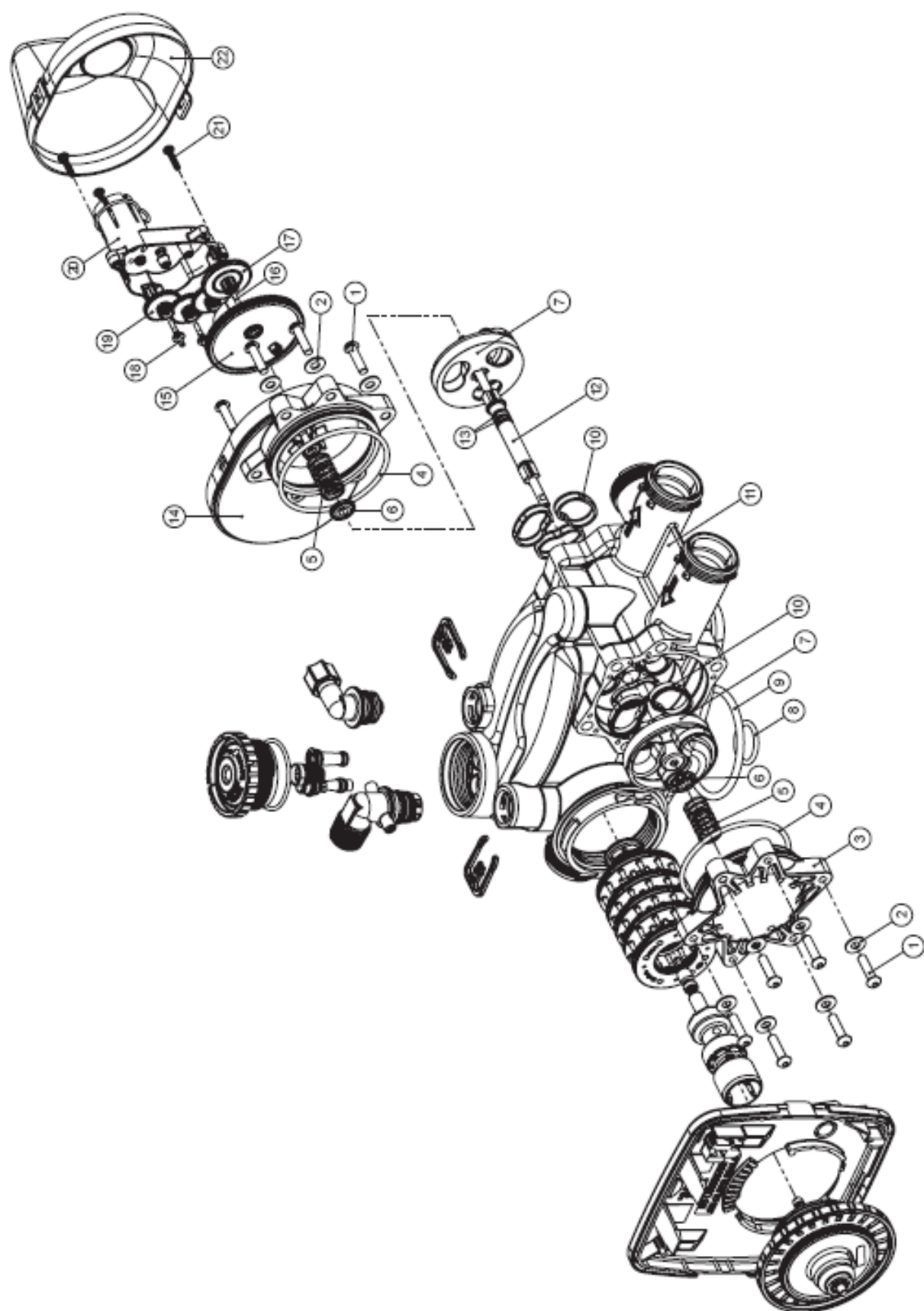
*V3011 is labeled with DN and V3011-01 is labeled with UP. Upflow option is not applicable to EA, EE or EI control valves.

Note: The regenerant piston is not used in backwash only applications.

Refer to programming and Cover Drawing Manual



Twin Transfer



Twin Transfer

Drawing No.	Order No.	Description	Quantity
1	V3470	SCREW BHC 1/4-20 X 1 SS	12
2	V3724	WASHER FLAT SS 1/4	12
3	V4005-01	T1 TRANSFER CAP ASY	1
4	V4029	O-RING 236	2
5	V4015	T1 TRANSFER SPRING	2
6	V4014	T1 TRANSFER SPRING SUPPORT	2
7	V4036	T1 ROTOR DISK ASY	2
8	V3105	O-RING 215 (DISTRIBUTOR TUBE)	1
9	V3180	O-RING 337	1
10	V4016	T1 TRANSFER SEAL	6
11	V3031	T1 BODY SFT WTR REGEN	1
12	V4023	T1 TRANSFER DRIVE SHAFT ASY	1
13	V3287	O-RING 110	2
14	V4006-01	T1 TRANSFER DRIVE CAP ASY	1
15	V4011-01	T1 TRANSFER DRIVE GEAR ASY	1
16	V4012	T1 TRANSFER DRIVE GEAR AXLE	1
17	V4013	T1 TRANSFER REDUCTION GEAR	1
18	V3264	WS2H BYPASS REDUCTION GEAR AXLE	3
19	V3110	WS1 DRIVE REDUCING GEAR 12X36	3
20	V3262-01	WS1.5&2ALT/2BY REDUCGEARCV RASY	1
21	V3592	SCREW #8-1 PHPNT-25 SS	3
22	V4049	T1 COVER ASSEMBLY	1
NOT SHOWN	V4043	T1 TRANSFER MOTOR ASY	1
NOT SHOWN	V3151	WS1 NUT 1 QC	1
NOT SHOWN	V4055*	TWIN TANK METER ASY	1
NOT SHOWN	V4017-01	T1 INTERCONNECT FITTING ASY	1
NOT SHOWN	D1400	1191 IN/OUT HEAD	1

***THIS WATER METER SHOULD NOT BE USED AS THE PRIMARY MONITORING DEVICE FOR CRITICAL OR HEALTH EFFECT APPLICATIONS.**

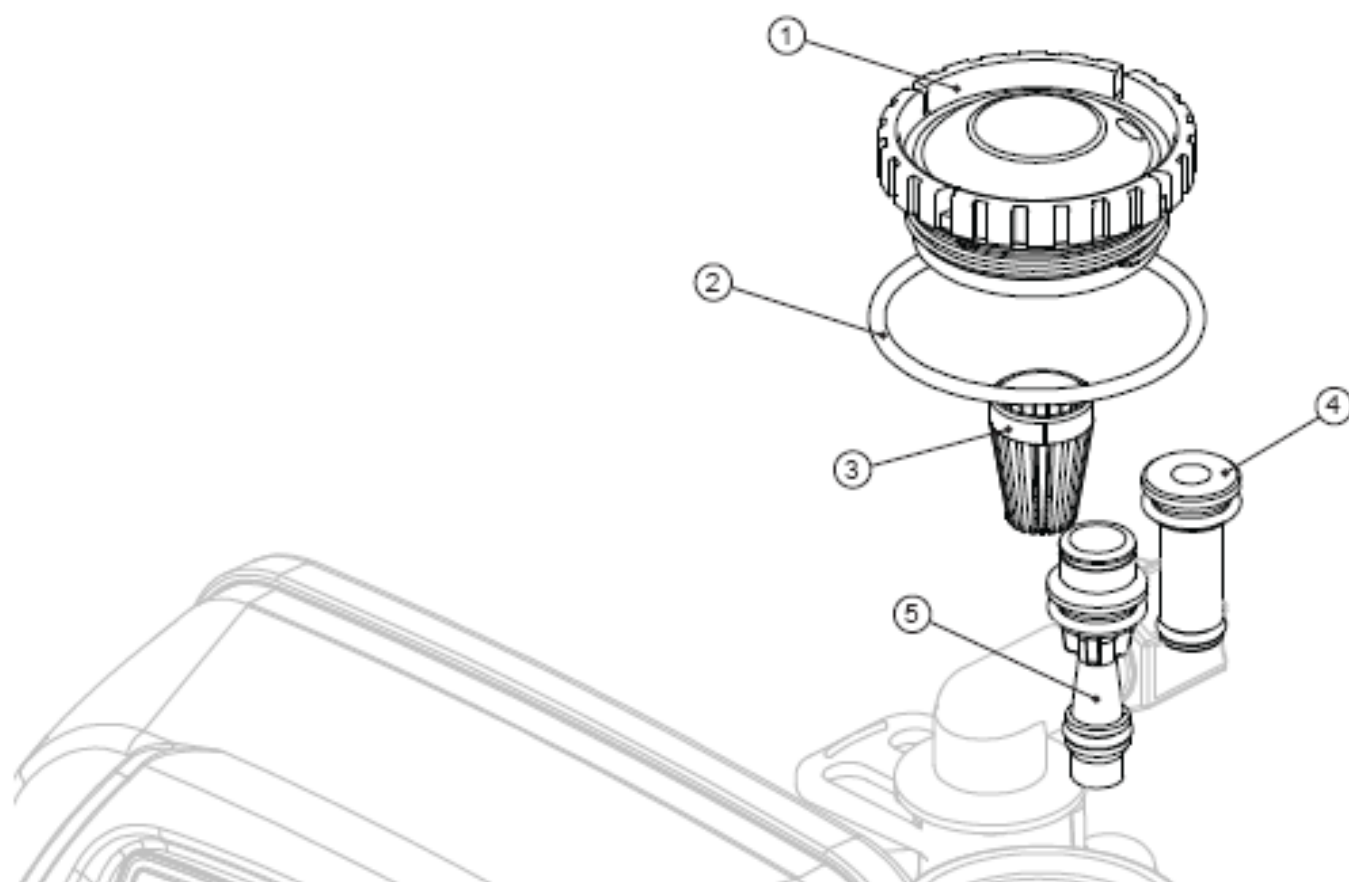
Injector Cap, Injector Screen, Injector, Plug and O-Ring

Drawing No.	Order No.	Description	Quantity
1	V3176	INJECTOR CAP	1
2	V3152	O-RING 135	1
3	V3177-01	INJECTOR SCREEN CAGE	1
4	V3010-1Z	WS1 INJECTOR ASY Z PLUG	1
5	V3010-1A	WS1 INJECTOR ASY A BLACK	1
	V3010-1B	WS1 INJECTOR ASY B BROWN	
	V3010-1C	WS1 INJECTOR ASY C VIOLET	
	V3010-1D	WS1 INJECTOR ASY D RED	
	V3010-1E	WS1 INJECTOR ASY E WHITE	
	V3010-1F	WS1 INJECTOR ASY F BLUE	
	V3010-1G	WS1 INJECTOR ASY G YELLOW	
	V3010-1H	WS1 INJECTOR ASY H GREEN	
	V3010-1I	WS1 INJECTOR ASY I ORANGE	
	V3010-1J	WS1 INJECTOR ASY J LIGHT BLUE	
	V3010-1K	WS1 INJECTOR ASY K LIGHT GREEN	
Not Shown	V3170	O-RING 011	*
Not Shown	V3171	O-RING 013	*

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

Note: For upflow position, injector is located in the up hole and injector plug is in the other hole. Upflow option is not applicable to EA, EE or EI control valves.

For a filter that only backwashes, injector plugs are located in both holes.



Injector Order Information

Injector Order Number	Injector Color	Typical Tank Diameter	
		Down WS1 & WS1.25	Up*
V3010-1A	Black	6"	8"
V3010-1B	Brown	7"	9"
V3010-1C	Violet	8"	10"
V3010-1D	Red	9"	12"
V3010-1E	White	10"	13"
V3010-1F	Blue	12"	14"
V3010-1G	Yellow	13"	16"
V3010-1H	Green	14"	18"
V3010-1I	Orange	16"	21"
V3010-1J	Light Blue	18"	
V3010-1K	Light Green	21"	

Actual tank size used may vary depending on the design and application of the system. Tank diameter is an approximation for the following:

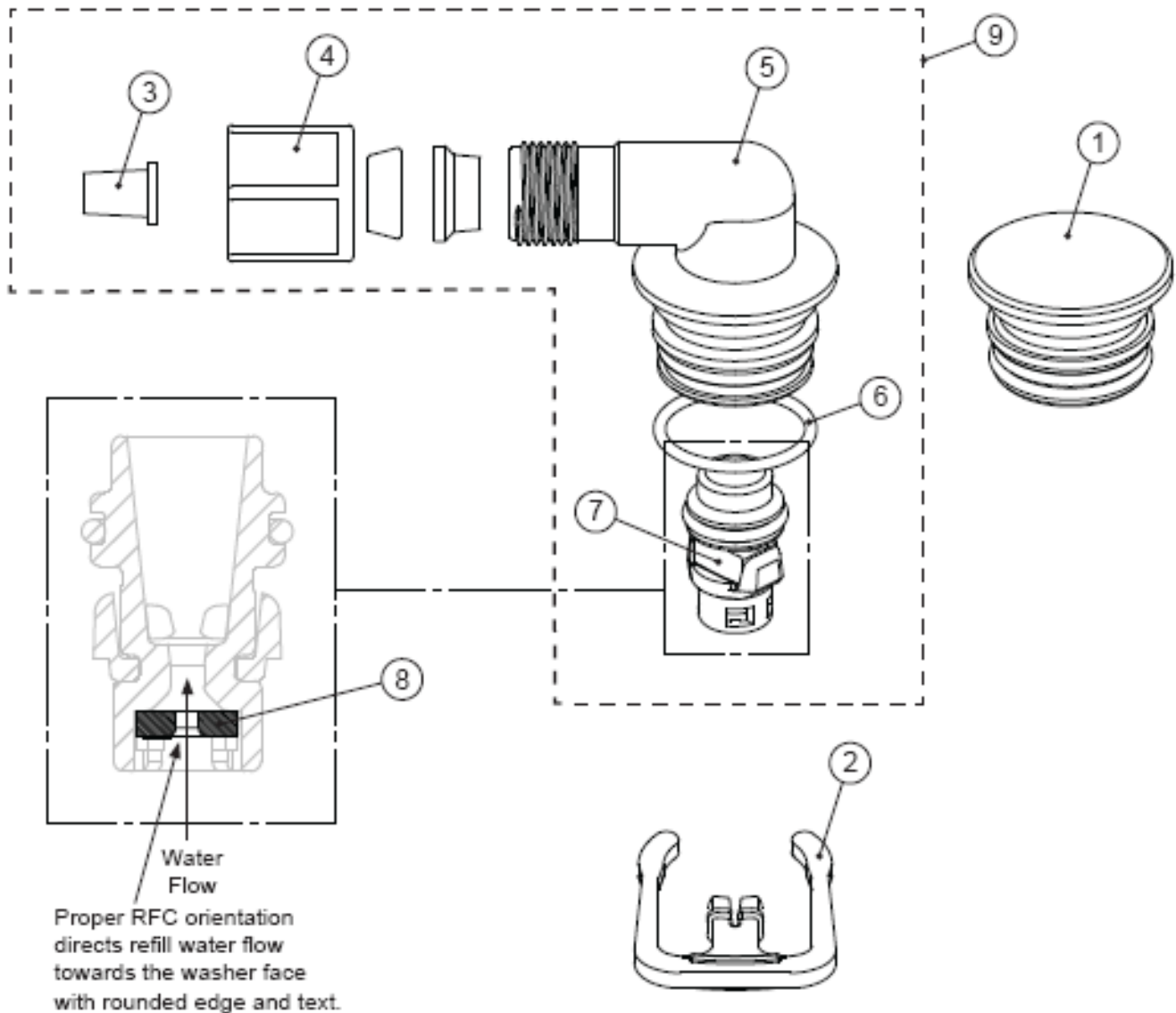
1. downflow softener using standard mesh synthetic cation exchange media regenerating with sodium chloride.
2. upflow softener using standard mesh synthetic cation exchange media regenerating with sodium chloride, an inlet water pressure of 30 to 50 psi (2.1 to 3.4 bar) and water temperature of 60°F (15.6°C) water or warmer. Higher pressures or lower temperatures would need smaller injectors to avoid lifting the bed.

*Not applicable for EA, EE or EI control valves.

Refill Flow Control Assembly and Refill Port Plug

Drawing No.	Order No.	Description	Quantity
1	V3195-01	WSI Refill Port Plug Asy	This part is required for backwash only systems
2	H4615	Elbow Locking Clip	1
3	JCP-P-6	Polytube insert 3/8"	1
4	JCPG-6PBLK	Nut 3/8"	1
5	H4613	Elbow Cap 3/8"	1
6	V3163	O-ring 019	1
7	V3165-01*	WSI RFC Retainer Asy (0.5 gpm)	1
8	V3182	WSI RFC	1
9	V3330-01	WSI Brine Elbow Asy w/RFC 3/8"	1
Not Shown	V3552	WSI Brine Elbow Asy w/RFC 1/2"	Option
Not Shown	H4650	Elbow 1/2" with nut and insert	Option

*Assembly includes V3182 WSI (0.5 gpm) RFC.

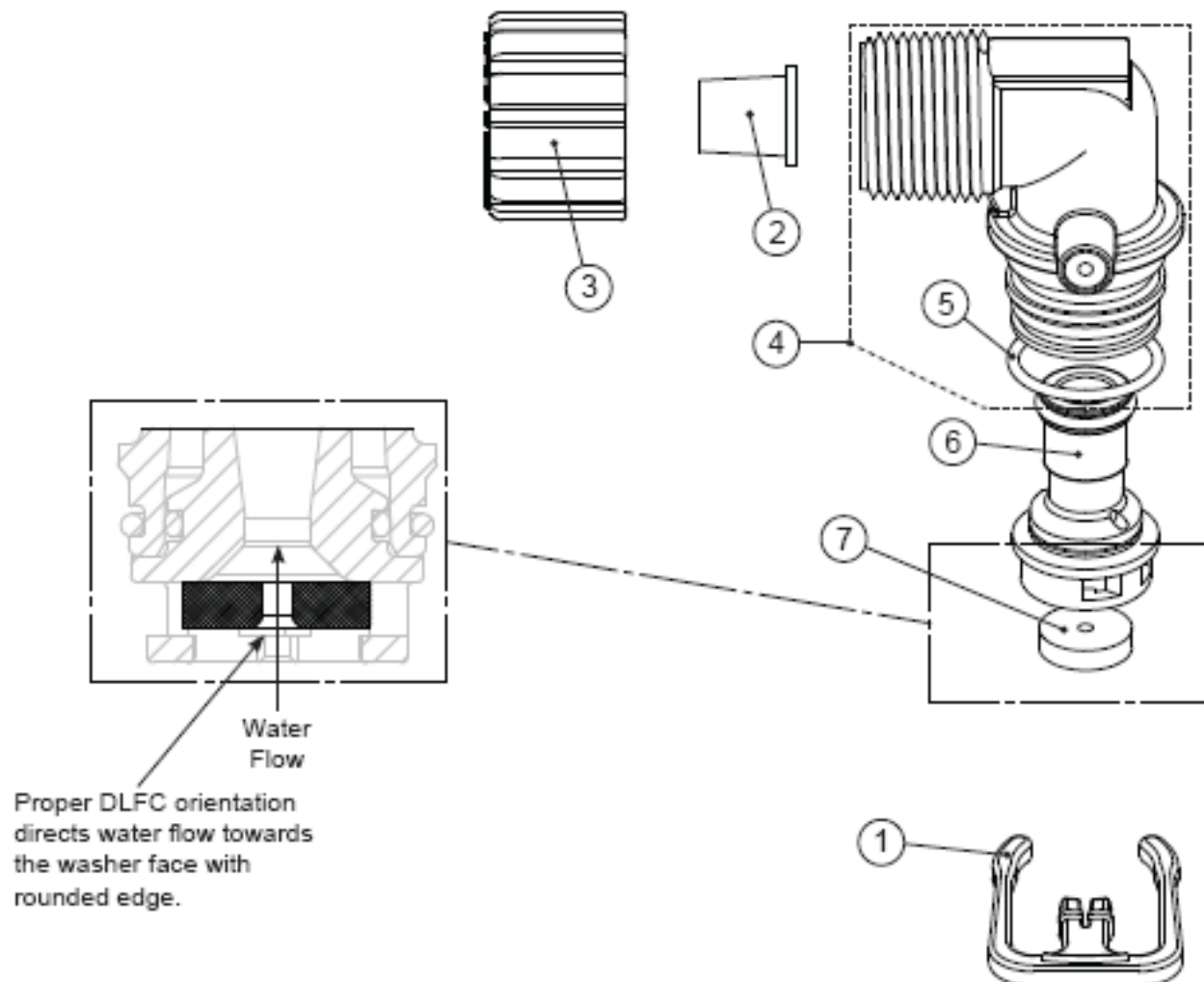


Drain Line – 3/4"

Drawing No.	Order No.	Description	Quantity
1	H4615	Elbow Locking Clip	1
2	PKP10TS8-BULK	Polytube insert 5/8	Option
3	V3192	WS1 Nut 3/4 Drain Elbow	Option
4*	V3158-01	WS1 Drain Elbow 3/4 Male	1
5	V3163	O-ring 019	1
6*	V3159-01	WS1 DLFC Retainer ASY	1
7	V3162-007	WS1 DLFC 0.7 gpm for 3/4	One DLFC must be used if 3/4 fitting is used
	V3162-010	WS1 DLFC 1.0 gpm for 3/4	
	V3162-013	WS1 DLFC 1.3 gpm for 3/4	
	V3162-017	WS1 DLFC 1.7 gpm for 3/4	
	V3162-022	WS1 DLFC 2.2 gpm for 3/4	
	V3162-027	WS1 DLFC 2.7 gpm for 3/4	
	V3162-032	WS1 DLFC 3.2 gpm for 3/4	
	V3162-042	WS1 DLFC 4.2 gpm for 3/4	
	V3162-053	WS1 DLFC 5.3 gpm for 3/4	
	V3162-065	WS1 DLFC 6.5 gpm for 3/4	
	V3162-075	WS1 DLFC 7.5 gpm for 3/4	
	V3162-090	WS1 DLFC 9.0 gpm for 3/4	
	V3162-100	WS1 DLFC 10.0 gpm for 3/4	

*4 and 6 can be ordered as a complete assembly - V3331 WS1 Drain Elbow and Retainer Asy

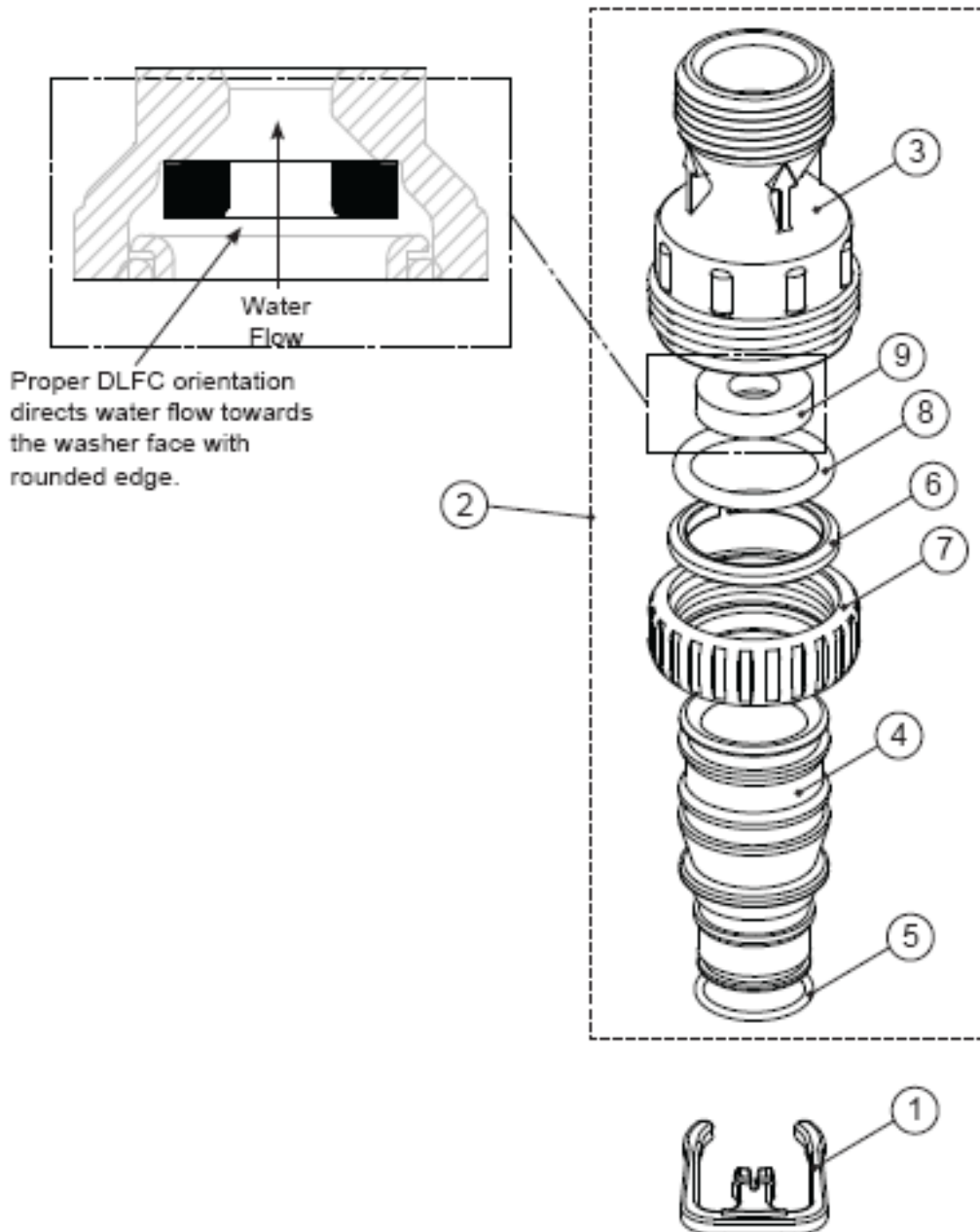
Valves are shipped without drain line flow control (DLFC) - install DLFC before using. Valves are shipped without 3/4 nut for drain elbow (polytube installation only) and 5/8" polytube insert (polytube installation only).



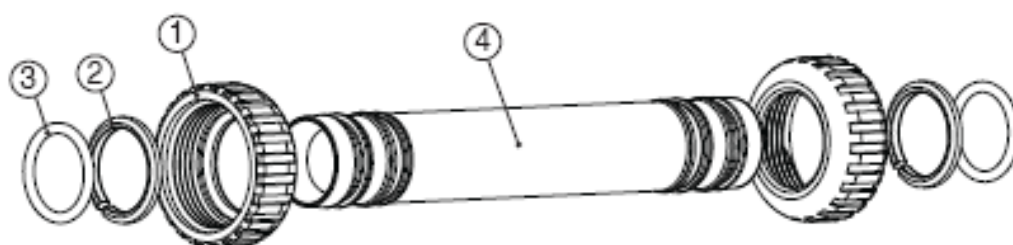
Drain Line - 1"

Drawing No.	Order No.	Description	Quantity
1	H4615	Elbow Locking Clip	1
2	V3008-02	WS1 Drain FTG 1 Straight	1
3*	V3166	WS1 Drain FTG Body 1	1
4*	V3167	WS1 Drain FTG Adapter 1	1
5*	V3163	O-ring 019	1
6*	V3150	WS1 Split Ring	1
7*	V3151	WS1 Nut 1" QC	1
8*	V3105	O-ring 215	1
9	V3190-090	WS1 DLFC 9.0 gpm for 1	One DLFC must be used if 1" fitting is used
	V3190-100	WS1 DLFC 10.0 gpm for 1	
	V3190-110	WS1 DLFC 11.0 gpm for 1	
	V3190-130	WS1 DLFC 13.0 gpm for 1	
	V3190-150	WS1 DLFC 15.0 gpm for 1	
	V3190-170	WS1 DLFC 17.0 gpm for 1	
	V3190-200	WS1 DLFC 20.0 gpm for 1	
	V3190-250	WS1 DLFC 25.0 gpm for 1	

* Can be ordered as a set. Order number V3008-02, description: WS1 Drain FTG 1 Straight.

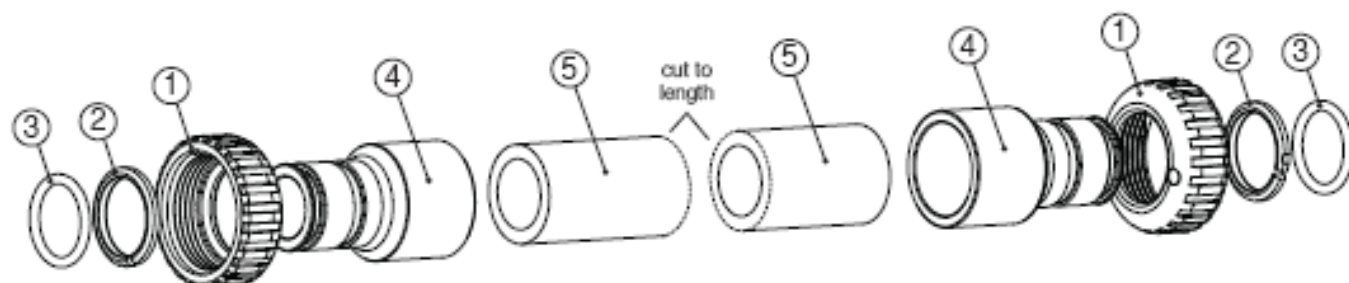


V4017-01 TT Interconnect Fitting Assembly up to 10" tanks



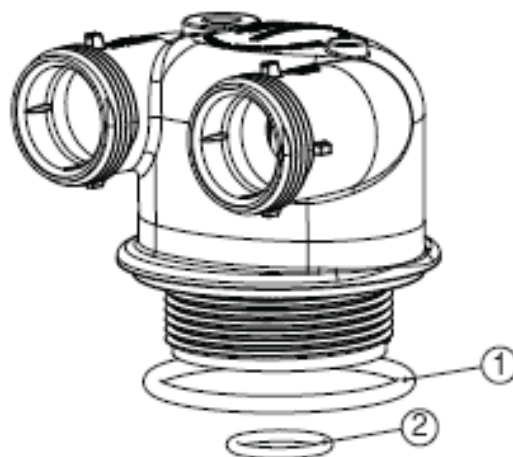
Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 NUT 1" QUICK CONNECT	4
2	V3150	WS1 SPLIT RING	4
3	V3105	O-RING 215	4
4	V4017	T1 INTERCONNECT FITTING	2

V4052-01 TT Interconnect Fitting Assembly for 12" to 21" Tanks



Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 NUT 1" QUICK CONNECT	4
2	V3150	WS1 SPLIT RING	4
3	V3105	O-RING 215	4
4	V3352	WS1 FITTING 1¼" & 1½" PVC SOLVENT	4
5	V4052	PIPE PVC SCH 80 1¼" X 2"	2

D1400 1191 In/Out Head



Drawing No.	Order No.	Description	Quantity
1	V3180	O-RING 337	1
2	V3105	O-RING 215 (DISTRIBUTOR TUBE)	1

Fitting Installation Instructions:

- Installation fittings are designed to accommodate minor plumbing misalignments, but are not designed to support the weight of a system or the plumbing.
- Slide nut on first, then the split ring and o-ring.
- Hand tighten the nut only.

The V4017-01 twin tank control valve interconnect kit can be used on tanks up to 10" in diameter and is packed in with control valve. If using 12" diameter tanks or larger order optional kit number V4052-01 twin tank control valve interconnect kit for 12" thru 21" diameter tanks.

Troubleshooting

Problem	Possible Cause	Solution
1. No Display on PC Board	a. No power at electric outlet	a. Repair outlet or use working outlet
	b. Control valve Power Adapter not plugged into outlet or power cord end not connected to PC board connection	b. Plug Power Adapter into outlet or connect power cord end to PC Board connection
	c. Improper power supply	c. Verify proper voltage is being delivered to PC Board
	d. Defective Power Adapter	d. Replace Power Adapter
	e. Defective PC Board	e. Replace PC Board
2. PC Board does not display correct time of day	a. Power Adapter plugged into electric outlet controlled by light switch	a. Use uninterrupted outlet
	b. Tripped breaker switch and/or tripped GFI	b. Reset breaker switch and/ or GFI switch
	c. Power outage	c. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	d. Defective PC Board	d. Replace PC Board
	a. Meter is not connected to meter connection on PC Board	a. Connect meter to three pin connection labeled METER on PC Board
	b. Restricted/ stalled meter turbine	c. Remove meter and check for rotation or foreign material
	c. Meter wire not installed securely into three pin connector	c. Verify meter cable wires are installed securely into three pin connector labeled METER.
	d. Defective meter	d. Replace meter
	e. Defective PC Board	e. Replace PC Board
4. Control valve regenerates at wrong time of day	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	b. Time of day not set correctly	b. Reset to correct time of day
	c. Time of regeneration set incorrectly	c. Reset regeneration time
	d. Control valve set at "on 0" (immediate regeneration)	d. Check programming setting and reset to NORMAL (for a delayed regen time)
	e. Control valve set at "NORMAL + on 0" (delayed and/ or immediate)	e. Check programming setting and reset to NORMAL (for a delayed regen time)
5. Time of day flashes on and off	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
6. Control valve does not regenerate automatically when the REGEN button is depressed and held.	a. Broken drive gear or drive cap assembly	a. Replace drive gear or drive cap assembly
	b. Broken Piston Rod	b. Replace piston rod
	c. Defective PC Board	c. Defective PC Board
7. Control valve does not regenerate automatically but does when the REGEN button is depressed and held.	a. Meter is not connected to meter connection on PC Board	a. Connect meter to three pin connection labeled METER on PC Board
	b. Restricted/ stalled meter turbine	b. Remove meter and check for rotation or foreign material
	c. Incorrect programming	c. Check for programming error
	d. Meter wire not installed securely into three pin connector	d. Verify meter cable wires are installed securely into three pin connector labeled METER.
	e. Defective meter	e. Replace meter
	f. Defective PC Board	f. Replace PC Board

Problem	Possible Cause	Solution
8. Hard or untreated water is being delivered	a. Media is exhausted due to high water usage	a. Check program settings or diagnostics for abnormal water usage
	b. Meter not registering	b. Remove meter and check for rotation or foreign material
	c. Water quality fluctuation	c. Test water and adjust program values accordingly
	d. No regenerant or low level of regenerant in regenerant tank	d. Add proper regenerant to tank
	e. Control fails to draw in regenerant	e. Refer to Trouble Shooting Guide number 12
	f. Insufficient regenerant level in regenerant tank	f. Check refill setting in programming. Check refill flow control for restrictions or debris and clean or replace
	g. Damaged seal/stack assembly	g. Replace seal/stack assembly
	h. Control valve body type and piston type mix matched	h. Verify proper control valve body type and piston type match
	i. Fouled media bed	i. Replace media bed
9. Control valve uses too much regenerant	a. Improper refill setting	a. Check refill setting
	b. Improper program settings	b. Check program setting to make sure they are specific to the water quality and application needs
	c. Control valve regenerates frequently	c. Check for leaking fixtures that may be exhausting capacity or system is undersized
10. Residual regenerant being delivered to service	a. Low water pressure	a. Check incoming water pressure – water pressure must remain at minimum of 25 psi
	b. Incorrect injector size	b. Replace injector with correct size for the application
	c. Restricted drain line	c. Check drain line for restrictions or debris and clean
11. Excessive water in regenerant tank	a. Improper program settings	a. Check refill setting
	b. Plugged injector	b. Remove injector and clean or replace
	c. Drive cap assembly not tightened in properly	c. Re-tighten the drive cap assembly
	d. Damaged seal/ stack assembly	d. Replace seal/ stack
	e. Restricted or kinked drain line	e. Check drain line for restrictions or debris and or straighten drain line
	f. Plugged backwash flow controller	f. Remove backwash flow controller and clean or replace
	g. Missing refill flow controller	g. Replace refill flow controller
12. Control valve fails to draw in regenerant	a. Injector is plugged	a. Remove injector and clean or replace
	b. Faulty regenerant piston	b. Replace regenerant piston
	c. Regenerant line connection leak	c. Inspect regenerant line for air leak
	d. Drain line restriction or debris cause excess back pressure	d. Inspect drain line and clean to correct restriction
	e. Drain line too long or too high	e. Shorten length and or height
	f. Low water pressure	f. Check incoming water pressure – water pressure must remain at minimum of 25 psi
13. Water running to drain	a. Power outage during regeneration	a. Upon power being restored control will finish the remaining regeneration time. Reset time of day.
	b. Damaged seal/ stack assembly	b. Replace seal/ stack assembly
	c. Piston assembly failure	c. Replace piston assembly
	d. Drive cap assembly not tightened in properly	d. Re-tighten the drive cap assembly

Problem	Possible Cause	Solution
14. E1, Err – 1001, Err – 101 = Control unable to sense motor movement	a. Motor not inserted full to engage pinion, motor wires broken or disconnected	a. Disconnect power, make sure motor is fully engaged, check for broken wires, make sure two pin connector on motor is connected to the two pin connection on the PC Board labeled MOTOR. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. PC Board not properly snapped into drive bracket	b. Properly snap PC Board into drive bracket and then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Missing reduction gears	c. Replace missing gears
15. E2, Err – 1002, Err – 102 = Control valve motor ran too short and was unable to find the next cycle position and stalled	a. Foreign material is lodged in control valve	a. Open up control valve and pull out piston assembly and seal/ stack assembly for inspection. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Mechanical binding	b. Check piston and seal/ stack assembly, check reduction gears, check drive bracket and main drive gear interface. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Main drive gear too tight	c. Loosen main drive gear. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	d. Improper voltage being delivered to PC Board	d. Verify that proper voltage is being supplied. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
16. E3, Err – 1003, Err – 103 = Control valve motor ran too long and was unable to find the next cycle position	a. Motor failure during a regeneration	a. Check motor connections then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	b. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	c. Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

Problem	Possible Cause	Solution
17. Err – 1004, Err – 104 = Control valve motor ran too long and timed out trying to reach home position	a. Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	a. Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
18. Err -1006, Err – 106, Err - 116 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too long and unable to find the proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	a. Control valve programmed for ALT A or b, nHbP, SEPS, or AUX MAV with out having a MAV or NHBP valve attached to operate that function	a. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect. Then re-program valve to proper setting
	b. MAV/ NHBP motor wire not connected to PC Board	b. Connect MAV/ NHBP motor to PC Board two pin connection labeled DRIVE. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. MAV/ NHBP motor not fully engaged with reduction gears	c. Properly insert motor into casing, do not force into casing Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	d. Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	d. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
19. Err – 1007, Err – 107, Err - 117 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too short (stalled) while looking for proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	a. Foreign material is lodged in MAV/ NHBP valve	a. Open up MAV/ NHBP valve and check piston and seal/ stack assembly for foreign material. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Mechanical binding	b. Check piston and seal/ stack assembly, check reduction gears, drive gear interface, and check MAV/ NHBP black drive pinion on motor for being jammed into motor body. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

Please do not hesitate to call with any questions regarding
Installation or service.

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