



Quality through innovation

WATER SOFTENER 1" DUPLEX ALTERNATING INSTALLATION AND USER GUIDE

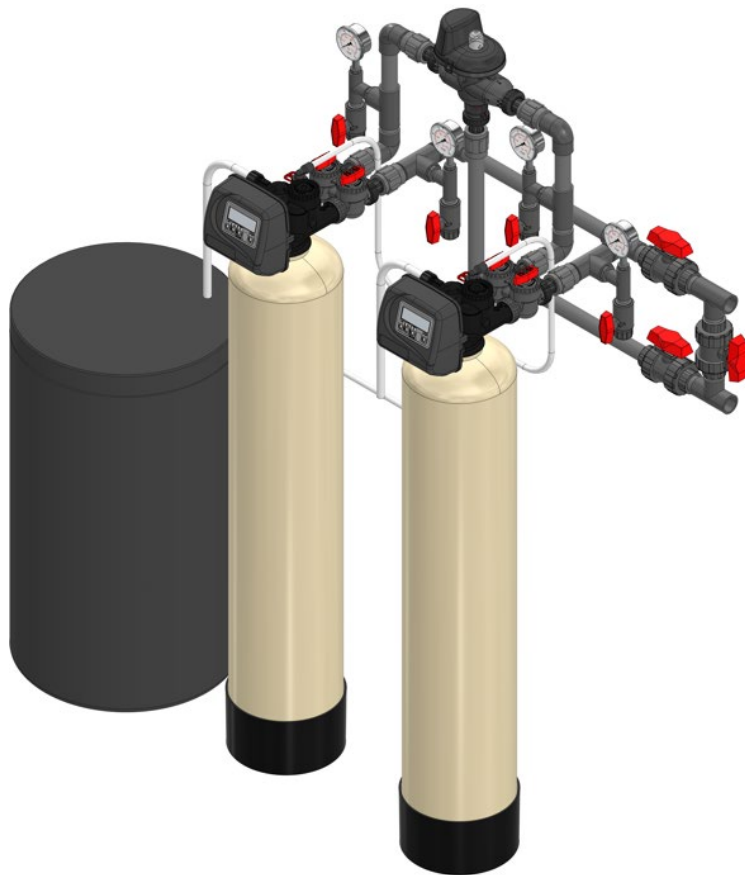


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1) INSTALLATION

1.1) Pre-installation instructions

The cycle times, sequence of cycles, salt dose refill time and exchange capacity are preset to default by Excalibur. Installer must program the valve to recommended hardness, Day override and time of regeneration. Set time of day, read normal operating displays, read power loss and error displays if any.

WATER TEST

Hardness	_____	gpg
Iron	_____	ppm
pH	_____	number
*Nitrates	_____	ppm
Manganese	_____	ppm
Sulphur	_____	yes/no
Total Dissolved Solids	_____	

1.2) General Installation and Service Warnings

- The softener is designed so that it can be installed easily with minor plumbing changes on previous plumbing.
- The piping must be clamped properly and the weight of the plumbing must not be on the softener.
- Do not use any kind of lubricant including silicone. A silicone based lubricant can be only used on O- Rings but not necessary.
- The nuts and caps can be fastened and unfastened by hand or the plastic service wrench. Do not use pipe wrench to tighten the caps and nuts.

1.3) Site Requirements

- Water Pressure: - 40-110 psi
- Water Temperature: - 40-110°F (4.4-43°C)
- Electrical- 115/120 V, 60Hz Uninterrupted Outlet
- Current required is 0.5 Amperes
- The plug-in transformers are for dry locations only
- The tank should be on a firm level surface

1.4) Loading Instructions

Step 1: Check the product upon removal and remove from box packaging checking for any shipping damage or shortages that must be reported to Excalibur Water Systems immediately for confirmation.

Step 2: Insert distributor(s) inside of media mineral tank(s) so it is positioned properly in the bottom centre groove. If not already sized properly cut the top of the distributor pipe $\frac{1}{2}$ - $\frac{3}{4}$ " above top of tank opening and clean off and excess PVC materials with grit cloth.

Step 3: Plug the top inlet opening of the distributor (Hub & Lateral) or bottom stack with a clean cloth, rag, or tape to prevent any gravel or resin from entering into the distributor tube.

Step 4: Load the gravel under bedding onto the mineral tank using a funnel or some sort of loading device. If multiple layers of gravel with different sizes being utilized always load the largest gravel size in diameter to the smallest last.

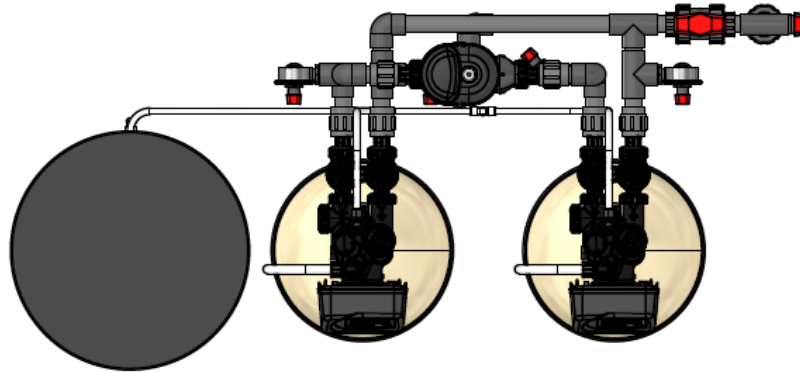
Step 5: Load the water softening cation exchange resin also by the use of a funnel or some sort of loading device until all resin is inside of mineral tank. If loading a duplex system that has two tanks divide the resin and gravel up equally when loading.

Step 6: Remove top opening cover of the distributor carefully not to move or disturb the distributor tube not allowing any debris or materials to get inside of the now loaded softener(s).

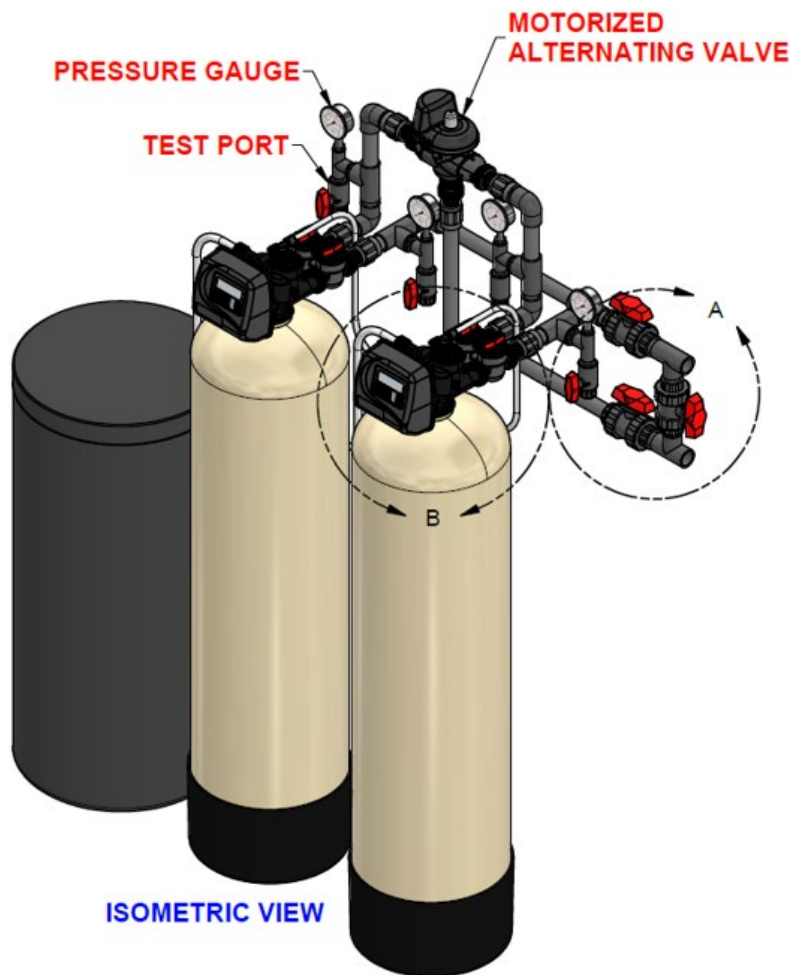
Step 7: Thread on control valves onto top opening tanks be sure to check and verify that the O-ring on the bottom base of the control valve is present and properly lubricated with silicone. Tighten control valve(s) clockwise until you have reached the end of the thread and have secured a water tight seal. (If control valves that utilize quick connect collars thread the collars the same into the tanks then attach control valves).

Step 8: Proceed now with the unit(s) in their proper installation locations to run piping and materials for all inlet, outlet, and drain connections properly with isolation valves and test ports for future water tests. Also, unions should be included in installation materials for easy future servicing of the control valves when necessary on all inlet, outlet, and drain lines.

1.5) Installation Drawing

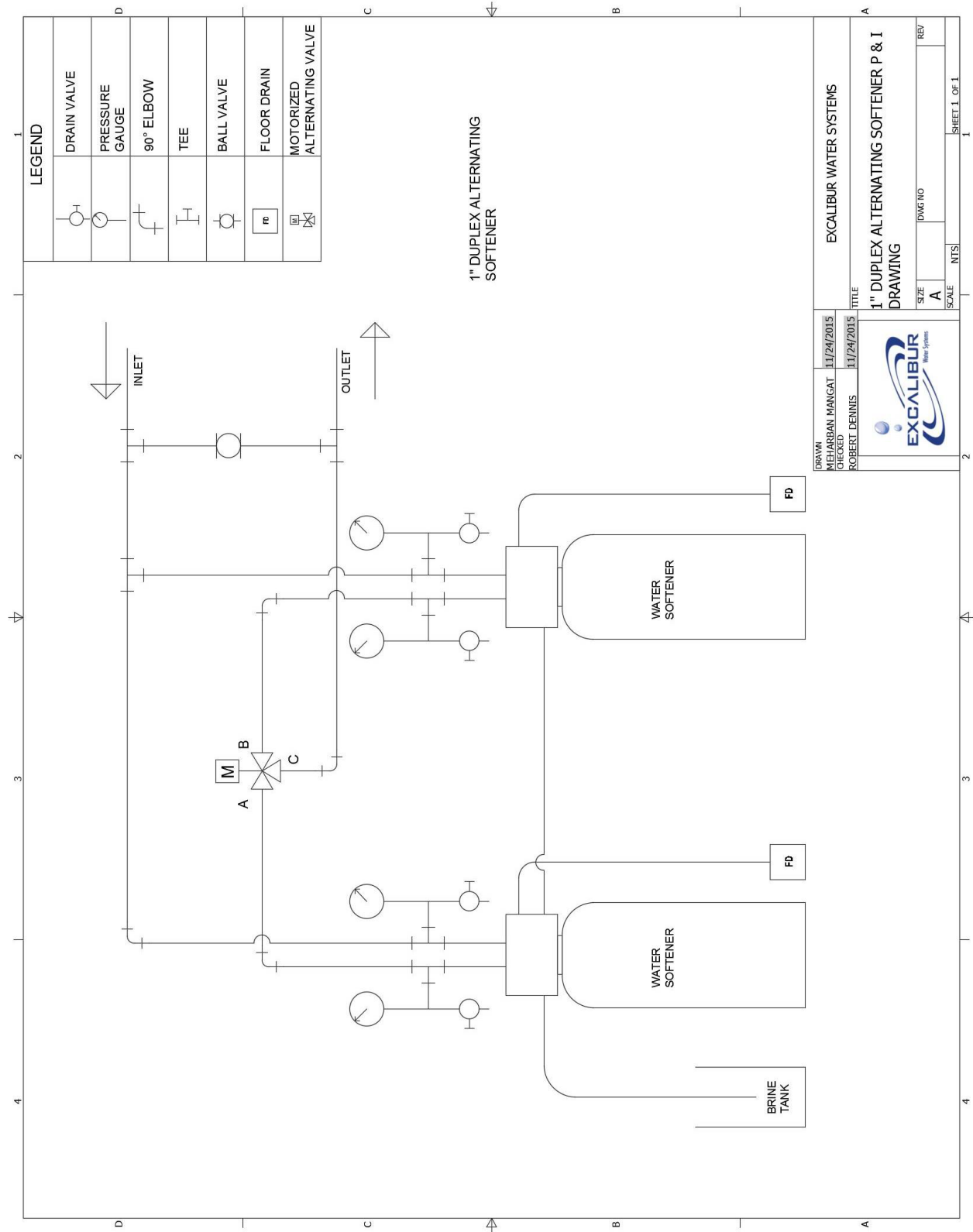


TOP VIEW



ISOMETRIC VIEW

1.6) Piping and Instrumentation Drawing



1.7) Installation Instructions

- 1) The softener must be close to drain as much as possible.
- 2) The salt must be refilled in brine tank with frequency stated by dealer.
- 3) The water heater's inlet and outlet must be at least 10ft away from softener.
- 4) The unit including the drain must be located in a room temperature above 33° F.
- 5) Never let the vacuum occur in tank this may cause implosion and leakage. If vacuum occurrence is expected than vacuum breaker must be installed in line.

1.8) Plumbing

- The bypass valve must be installed on the control valve.
- The outside tap water must be bypassed from the softener.
- The shutoff valve must be installed at the inlet of unit's bypass valve.
- The primer, solder or solder flux must not get on the O-rings.
- After soldering the lines must be cooled before installing the O-Rings, nuts and caps.
- If the electrical system is grounded to the plumbing than copper strap must be connected between inlet and outlet as shown in figure above.
- The plumbing must be done by following the local plumbing codes.

1.9) Brine Line Connection

See the brine line size either 1/2" or 3/8" O.D. Polyethylene tube from model specifications. Install the line from brine tank float to the tee which branches off to both control valves brine elbows.



Tee

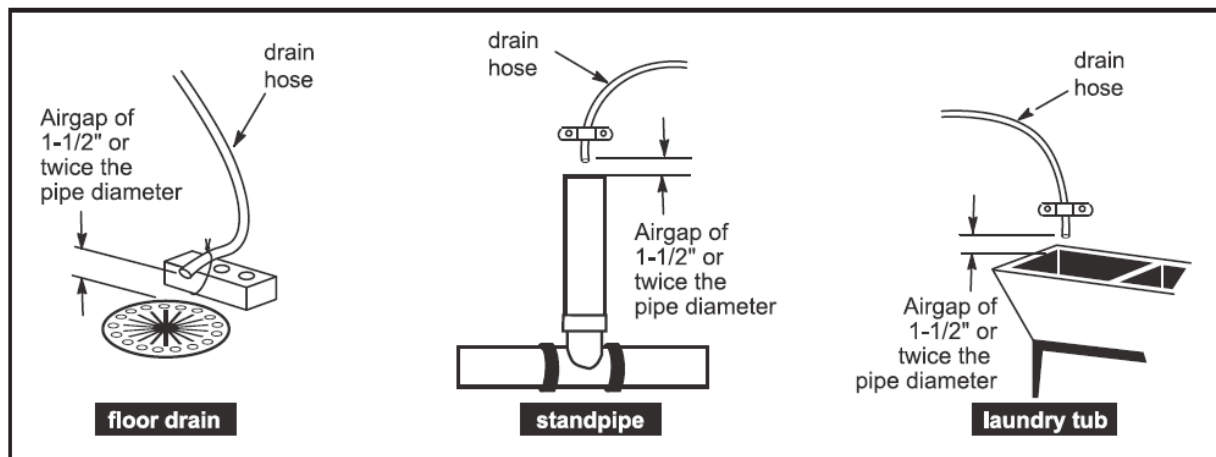
Brine Elbow

1.10) Overflow Line Connection

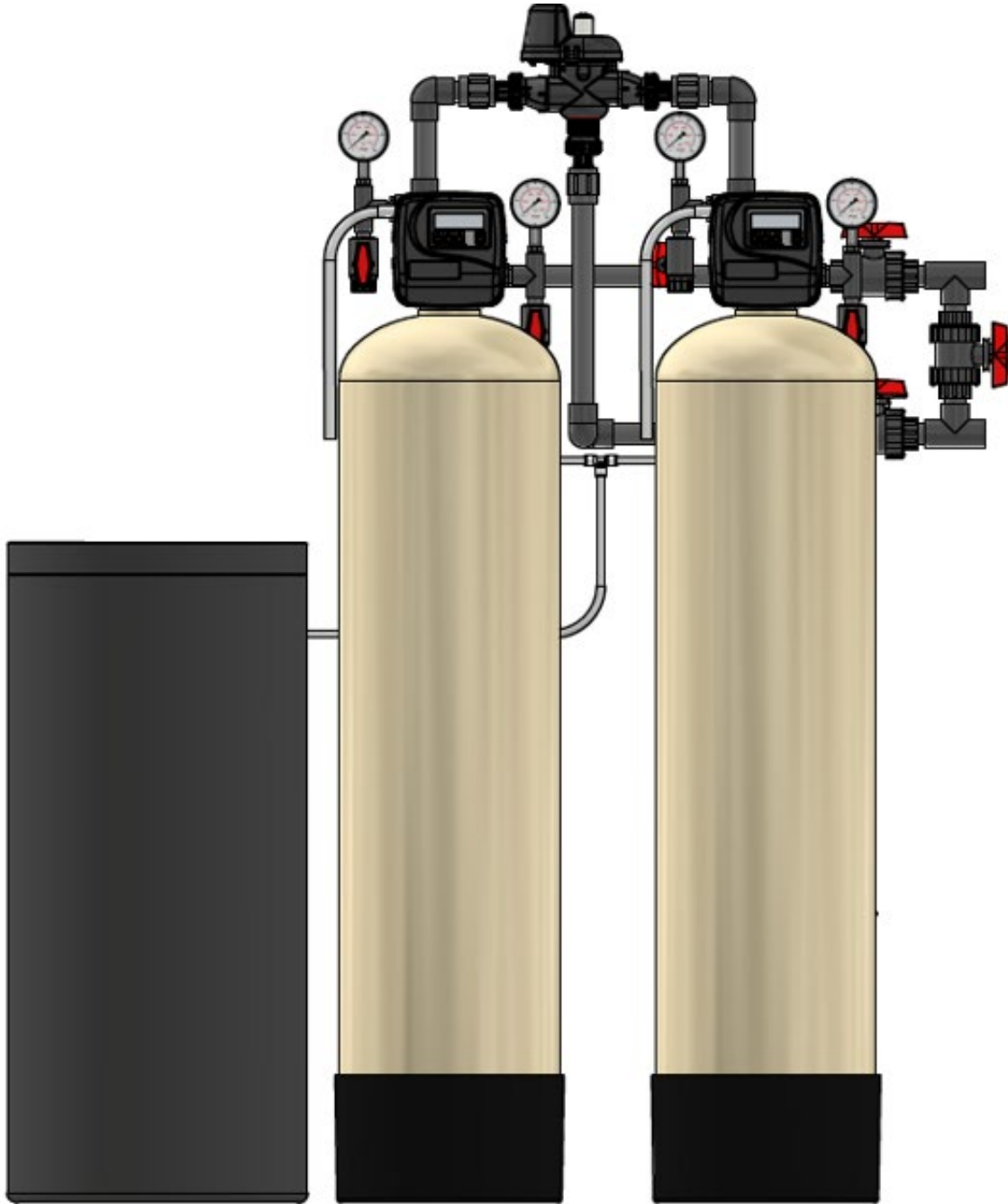
The overflow drain line is used where overflow of the brine tank can damage the floor finishing or structure. The brine tank line is equipped with safety float valve which prevents the overflow so, the overflow line is only used in case is overflow float valve fails. The overflow line will transfer fluid from brine tank to the drain hence prevents the spillage.

1.11) Drain Line

- The size of the drain must be according to the specifications.
- Leave minimum of 6" gap between flow control fitting and solder joints. The gap less than this can damage the flow control.
- Use $\frac{3}{4}$ " or 1" tubing for drain line according to the specifications.
- If the drain line is elevated and then emptied into the drain below the level the of control valve the 7" loop should make at the end of drain line.
- The air gap between the drain and the end of the drain line must be twice the diameter of the tube.
- The strap must be tied at the end to secure the line.



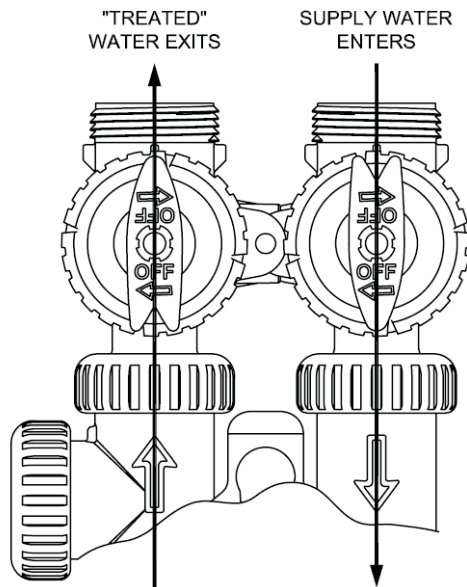
1.12) System Drawing



FRONT VIEW

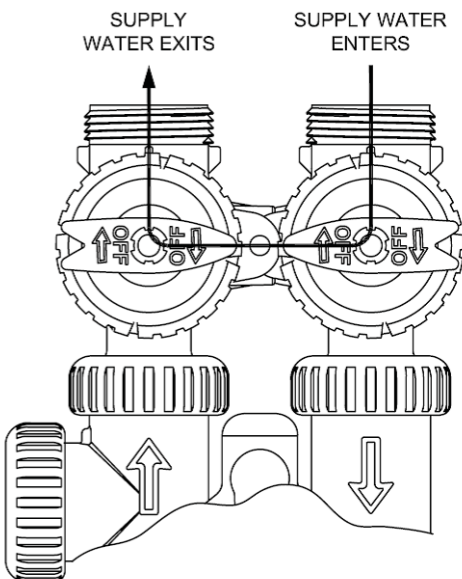
1.13) Bypass Valve

NORMAL OPERATION



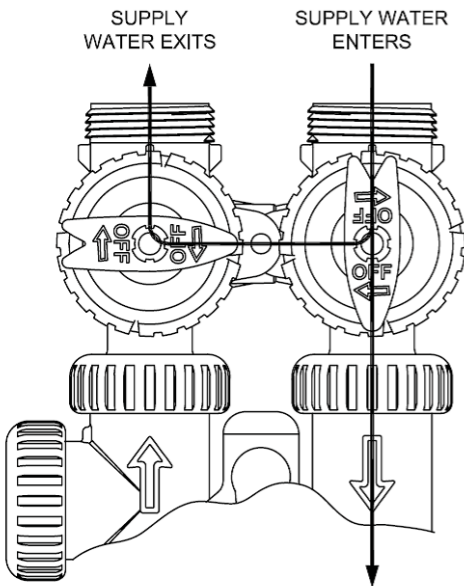
The inlet and outlet handles point in the direction of flow indicated by the engraved arrows on the control valve. Water flows through the control valve for normal operation of a water softener. During the regeneration cycle this position provides regeneration water to the unit, while also providing untreated water to the distribution system

BYPASS OPERATION



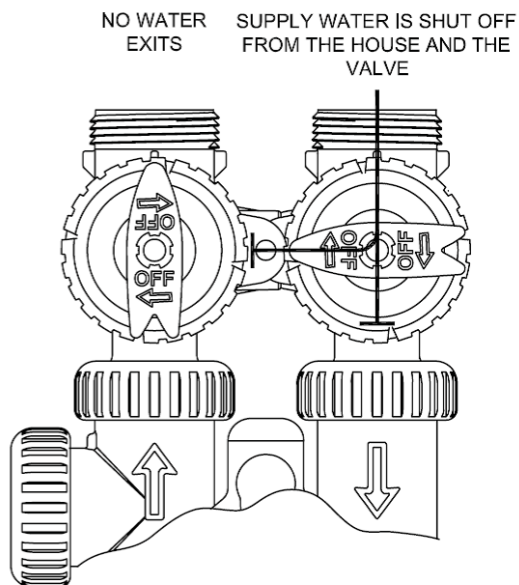
The inlet and outlet handles point to the center of the bypass. The system is isolated from the water pressure in the plumbing system. Untreated water is supplied to the building

DIAGNOSTIC MODE



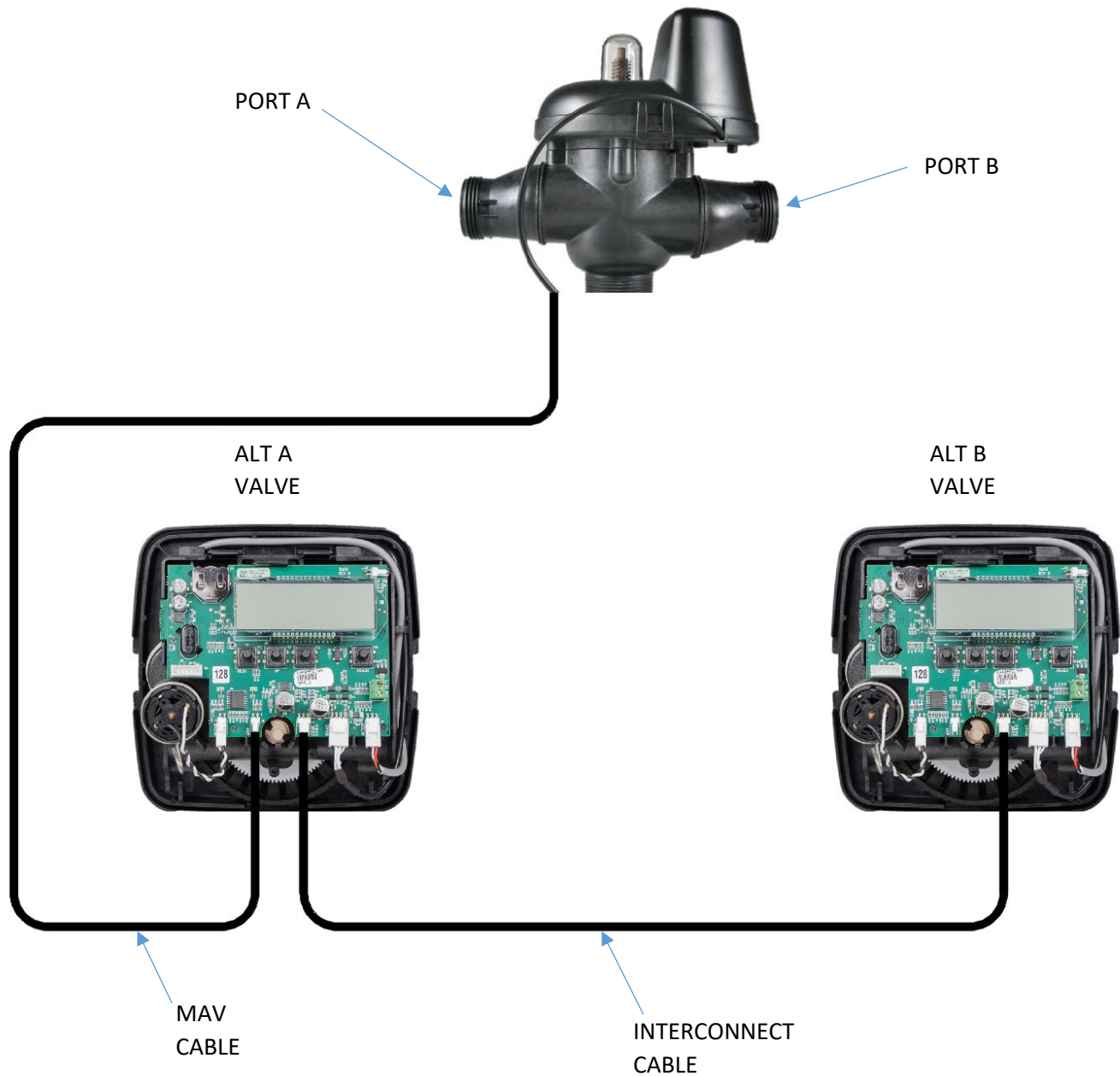
The inlet handle points in the direction of flow and the outlet handle points to the center of bypass valve, system water pressure is allowed to the control valve and the plumbing system while not allowing water to exit from the control valve to the plumbing.

SHUT OFF MODE



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).

1.14) Wiring



Connect the MAV cable to ALT A control valve's MAV port.

Connect the interconnect cable between both valves on interconnect ports.

Note: - ALT B unit will be shipped with connected interconnect cable

1.15) ALT A Control Valve Wiring



Use Phillip's screwdriver to remove the screw and cover.



Weave the MAV cable and interconnect cable through the strain relief. Place the cover over the strain relief and fasten the screw.

2) PROGRAMMING AND START UP

2.1) Regeneration and Error Screens

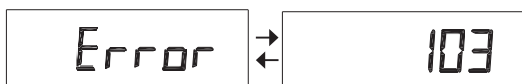


Regen Screen

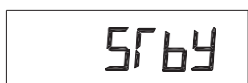
Displays the time remaining in the current cycle. Pressing REGEN advances to the next cycle.

Error Screen

Alternated flashing Error and error code every 3 seconds. Clear by disconnecting the power supply at the PC board and reconnecting, or press NEXT and REGEN simultaneously for 3 seconds.



In Alternator Systems when a unit is waiting to initiate the first cycle step of regeneration, "REGEN Pndg" is displayed.



"STby" is displayed in Alternator Systems when a valve is in Standby state.



"REGEN Pndg RINSE FILL" is displayed whenever a zero-capacity tank has transferred to an off-line state and is currently waiting to initiate the second portion of a regeneration cycle. Viewed only when Delayed Rinse and Fill is set to ON.

2.2) Button Operation



Scrolls to the next display.

REGEN

- 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



Change Variable being displayed.



Key sequence to lock and unlock program settings

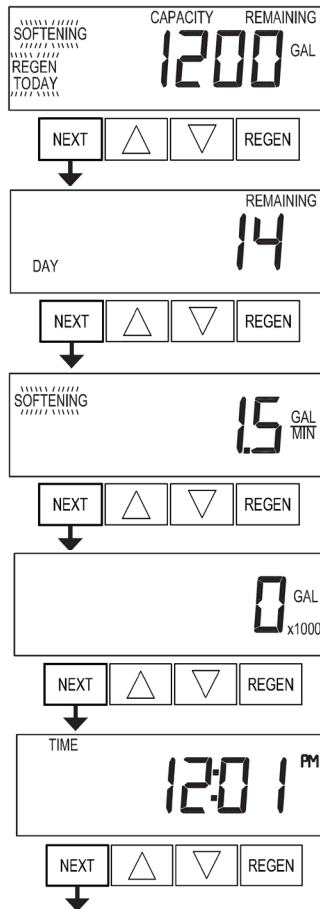
Holding for 3 seconds initiates a control reset. The software version is displayed and the piston returns to the home/service position, resynchronizing the valve



Used with valve type 1.0 twin, 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.

2.3) User Displays

When the system is operating, one of five displays may be shown. Pressing NEXT will alternate between the displays shown below.



User 1

Typical user display. Shows volume remaining to regeneration. This screen will not be viewed if the control is set for time-clock operation.

User 2

Displays number of days to next regeneration.

User 3

Flow Rate.

Displays present flow rate.

User 4

Displays total volume in gallons since last reset. If a meter is not used this display will be shown but 0 will be displayed.

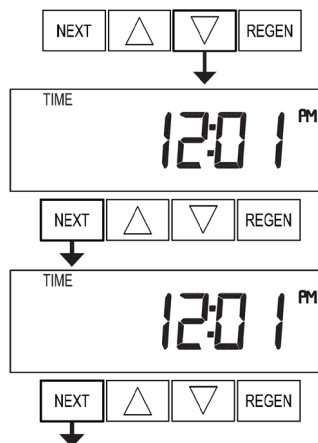
PRESS ▼ FOR 3 SECONDS TO RESET TO 0.

User 5

Shows current time.

User Display 1

2.4) Setting Time of Day



User display-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.

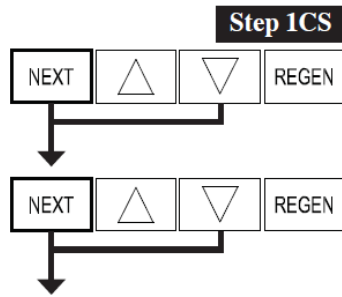
2.5) Startup Instructions

- Plug in transformers of both valves to wall socket.
- Pour some water in brine tank so that water level reaches air check valve.
- One control valve must show status “Standby” and other one must displays the time of day.
- Press and hold “REGEN” button on valve which shows time of day.

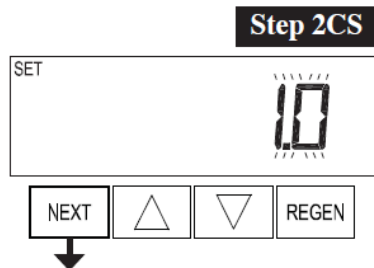


- This valve must initiate the immediate regeneration while other valve becomes online showing time of day. The MAV motor starts turning to change the flowing port.
- Slowly turn the inlet side handle of bypass valve halfway, the air must exit through the drain for first few minutes.
- When drain water flows steady, turn the inlet side handle of bypass valve fully open. Allow the backwash cycle to run for at least 3 minutes with full opened inlet.
- Press the “REGEN” button once to advance the regeneration to brine cycle. Confirm the water suction in brine line by lifting the brine tank cover.
- Press the “REGEN” button again to advance the regeneration to 2nd Backwash cycle.
- When the countdown for 2nd backwash starts, press the REGEN button again to advance the regeneration to rinse cycle.
- Allow the valve to run rinse cycle for full amount of time.
- When valve automatically advances to fill cycle, check for leaks and then press the REGEN button to finish the regeneration.
- Fully open the outlet side of the bypass valve, then open the test port downstream of this valve.
- Confirm the “SOFTENING” blinking on display to verify the meter working. Shut off the test port when water comes clear out of it.
- Now press and hold REGEN button on other valve to start the regeneration.
- Follow the above given sequence for regeneration in backwash cycle, brine cycle, 2nd Backwash cycle and rinse cycle.
- Check for leaks during fill cycle and let the fill cycle to run for full amount of time so that valve can fill correct amount of water in brine tank to dissolve salt.

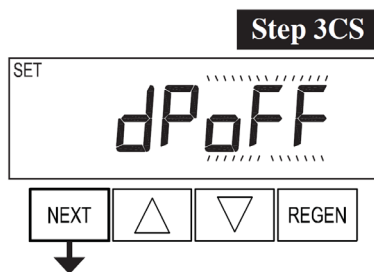
2.6) Configuration Settings



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



Step 2CS – Use ▲ or ▼ to select 1.0 for 1" valve.



Step 3CS – Selecting the use of an outside signal to initiate a regeneration. Selection only matters if a connection is made to the two pin connector labeled DP SWITCH located on the printed circuit board.

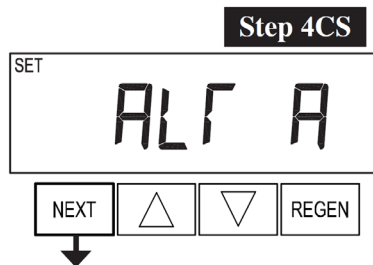
Select **OFF** - feature not used. Other options are described below.

on0 – If the dP switch is closed for an accumulative time of 2 minutes a regeneration will be signaled to the unit.

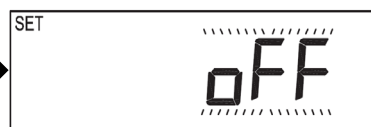
dEL – If the dP switch is closed for an accumulative time of 2 minutes a regeneration will occur at the scheduled delayed regeneration time.

Hold – If the dP switch is closed a regeneration will be prevented from occurring while there is switch closure.

Press NEXT to go to Step 4CS. Press REGEN to return to previous step.



Step 4CS – Select the first unit as "UNIT A" and second unit as "UNIT B". Register units A or B according to the plumbing of MAV and wiring on PC boards. (See section MAV)



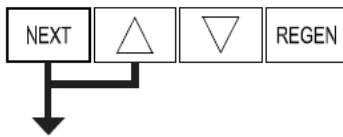
Step 5CS – Select delay "OFF" for rinse and fill cycle. The rinse and fill cycles of regeneration can be delayed until the

remaining capacity of online unit is less than 10% of total capacity. Press NEXT to exit OEM Configuration Setup. Press REGEN to return to previous step.

EXIT TO DISPLAY SCREENS

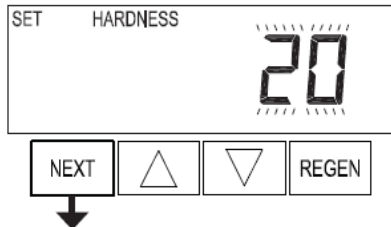
2.7) Installer Display Settings

Step 1I



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

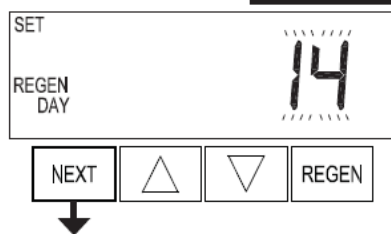
Step 2I



Step 2I – Hardness: Set the amount of influent hardness using ▲ or ▼. If “oFF” or a number was selected in Step 1I.

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.

If value is set in days (allowable range from 1 to 28) regeneration initiation will be called for on that day regardless of actual water usage. Set Day Override using ▲ or ▼:

- number of days between regeneration (1 to 28); or
- “oFF”.

See Setting Options Table for more detail on setup.

Press NEXT to go to step 4I. Press REGEN to return to previous step.

Step 4I



Step 4I – Next Regeneration Time (hour): Set the hour of day for regeneration using ▲ or ▼. The default time is 2:00. This display will show “REGEN on 0 GAL” if “on 0” is selected in Set Regeneration Time Option in OEM Softener System Setup or OEM Filter System Setup.

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

Step 5I

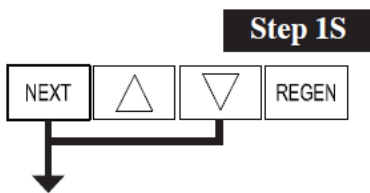


Step 5I – Next Regeneration Time (minutes): Set the minutes of day for regeneration using ▲ or ▼. This display will not be shown if “on 0” is selected in Set Regeneration Time Option in OEM Softener System Setup or OEM Filter System Setup.

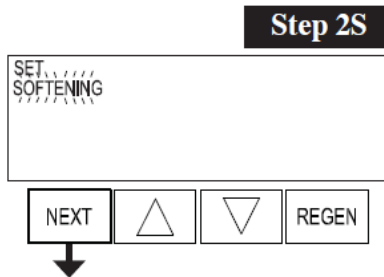
Press NEXT to exit Installer Display Settings. Press REGEN to return to previous step.

Exit Installer Display Settings

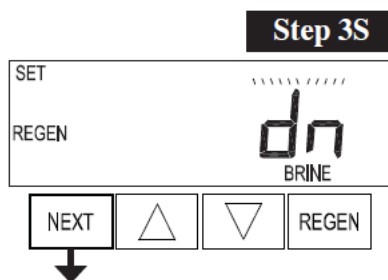
2.8) OEM Softener System Setup



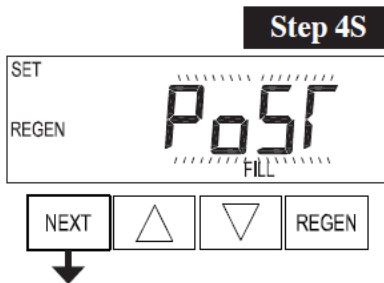
Step 1S - Press NEXT and ▼ simultaneously for 5 seconds and release. If screen in Step 2S does not appear, the lock on valve programming has been activated. To unlock press ▼, NEXT, ▲, REGEN in sequence, then press NEXT and ▼ simultaneously for 5 seconds and release.



Step 2S – Choose SOFTENING using ▲ or ▼. Press NEXT to go to Step 3S. Press REGEN to exit OEM Softener System Setup.



Step 3S – Choose Downflow Brining Direction using ▲ or ▼. This screen is not viewed when Step 2S is set to Filtering. Press NEXT to go to Step 4S. Press REGEN to return to previous step.

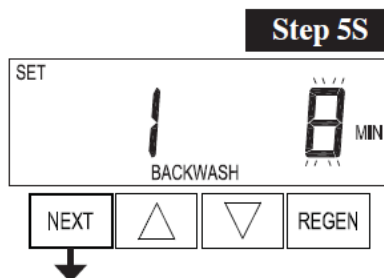


Step 4S – Set Refill location using ▲ or ▼:

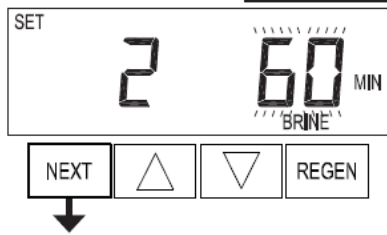
- “PoSt” to refill the brine tank after the final rinse; or
- “PrE” to refill the brine tank four hours before the regeneration time set.

This screen is not viewed when Step 2S is set to Filtering.

Press NEXT to go to Step 5S. Press REGEN to return to previous step.



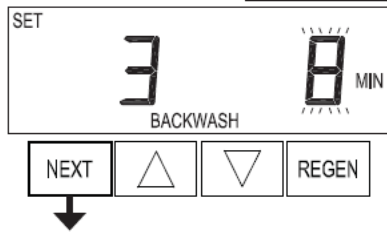
Step 5S – Select the time for the first cycle using ▲ or ▼. Press NEXT to go to Step 6S. Press REGEN to return to previous step.

Step 6S

Step 6S – Select the time for the second cycle using ▲ or ▼.

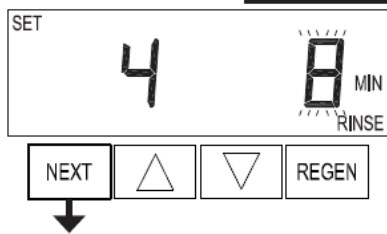
NOTE: The display will flash between cycle number and time, and brine direction (UP or dn).

Press NEXT to go to Step 7S. Press REGEN to return to previous step.

Step 7S

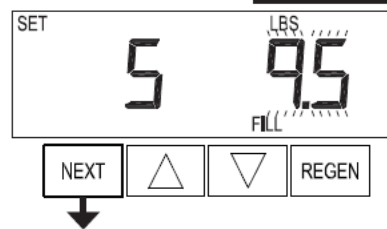
Step 7S – Select the time for the third cycle using ▲ or ▼.

Press NEXT to go to Step 8S. Press REGEN to return to previous step.

Step 8S

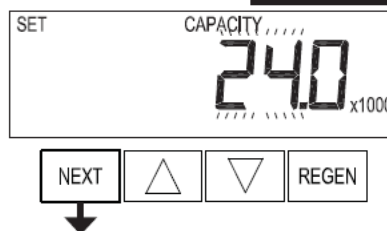
Step 8S – Select the time for the fourth cycle using ▲ or ▼.

Press NEXT to go to Step 9S. Press REGEN to return to previous step.

Step 9S

Step 9S – Select the pounds for the fifth cycle using ▲ or ▼.

Press NEXT to go to Step 10S. Press REGEN to return to previous step.

Step 10S

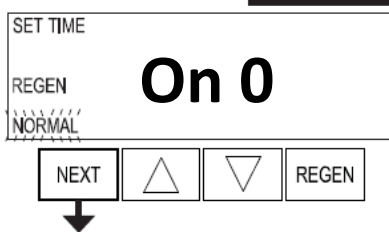
Step 10S – Set System Capacity using ▲ or ▼. The System Capacity setting should be based on the volume of resin and LBS of salt fill set in Step 9S. Press NEXT to go to Step 11S. Press REGEN to return to previous step.

Step 11S

Step 11S – Set Volume Capacity using ▲ or ▼. If value is set to:

- “AUTO” capacity will be automatically calculated and reserve capacity will be automatically estimated;
- “oFF” regeneration will be triggered solely by the day override setting (see Installer Display/Settings Step 4I);
- a number, regeneration will be triggered by the value specified (in Gallons).

If “oFF” or a volume is used, the hardness display will not be allowed to be set in Installer Display Settings Step 2I. See Setting Options Table for more detail. Press NEXT to go to Step 12S. Press REGEN to return to previous step.

Step 12S

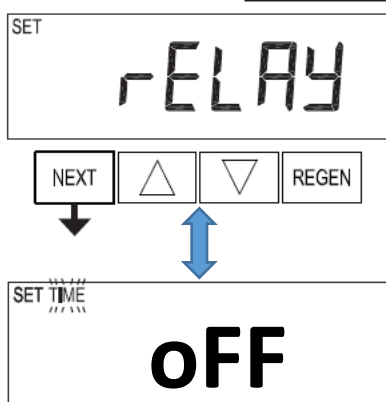
Step 12S – Set Regeneration Time Options using ▲ or ▼. If value is set to:

- “NORMAL” means regeneration will occur at the preset time;
- “on 0” means regeneration will occur immediately when the volume capacity reaches 0 (zero); or
- “NORMAL + on 0” means regeneration will occur at one of the following:

- the preset time when the volume capacity falls below the reserve or the specified number of days between regenerations is reached whichever comes first; or
- immediately after 10 minutes of no water usage when the volume capacity reaches 0 (zero).

This step will not appear if Step 11S is set to oFF.

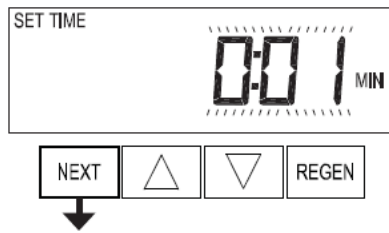
Press NEXT to go to Step 13S. Press REGEN to return to previous step.

Step 13S

Step 13S – Set Relay Operation using ▲ or ▼. The choices are:

- Time on: Relay activates after a set time at the beginning of a regeneration and then deactivates after a set period of time. The start of regeneration is defined as the first backwash cycle or Dn brine cycle, whichever comes first.
- Gallons softening on: Relay activates after a set number of gallons have been used while in service and then deactivates after the meter stops registering flow and the set time period has expired.
- Gallons Softening Regen on: Relay activates after a set number of gallons have been used while in service, or during regeneration, and then deactivates after the meter stops registering flow and the set time period has expired.
- ERROR: Relay closes whenever the valve enters error mode, and immediately deactivates when error mode is exited. If set to ERROR, Steps 14S and 15S will not be shown.
- Off: If set to Off, Steps 14S and 15S will not be shown.

Press NEXT to go to Step 14S. Press REGEN to return to previous step.

Step 14S

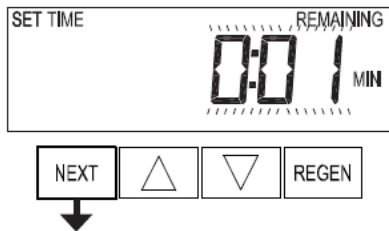
Step 14S – Set Relay Actuation Time or Gallons using ▲ or ▼. The choices are:

- Relay Actuation Time: After the start of a regeneration the amount of time that should pass prior to activating the relay. The start of regeneration is defined as the first backwash cycle, Dn brine cycle or UP brine cycle whichever comes first. Ranges from 1 second to 200 minutes.

- Relay Actuation Gallons: Relay activates after a set number of gallons has passed through the meter.

Ranges from 1 to 200 gallons.

Press NEXT to go to Step 15S. Press REGEN to return to previous step.

Step 15S

Step 15S – Set Relay Deactivate Time using ▲ or ▼.

- If Set Time on is selected in Step 13S the relay will deactivate after the time set has expired. Ranges from 1 second to 200 minutes.

- If Set Gallons Softening on or Set Gallons Softening Regen on is selected in Step 13S the relay will deactivate after the time set has expired or after the meter stops registering flow, whichever comes first.

Ranges from 1 second to 20 minutes.

Press NEXT to exit OEM Softener System Setup. Press REGEN to return to previous step.

Exit OEM Softener System Setup

2.9) Specifications

1" Simplex Specifications	Model #	EWS SD130	EWS SD145	EWS SD160	EWS SD175	EWS SD190	EWS SD1120	EWS SD1150	EWS SD1180	EWS SD1210
	Mineral Tank	9x48	10x54	12x52	13x54	14x65	16x65	18x65	18x65	21x62
	Brine Tank	18x33	18x33	18x33	18x40	24x41	24x41	24x41	24x41	24x41
Salt Dose per Regeneration	15 lbs/ft ³	15	22.5	30	37.5	45	60	75	90	105
	10 lbs/ft ³	10	15	20	25	30	40	50	60	70
Capacity	15 lbs/ft ³	30	45	60	75	90	120	150	180	210
	10 lbs/ft ³	27	40.5	54	67.5	81	108	135	162	189
Flow Pressure Drop (gpm)	15psi	14	14	18	19	19	20	22	21	22
	25psi	21	21	24	25	26	27	27	27	27
Flow	Critical Max Flow	3.5	4.5	6.5	7.5	8.5	11	14	14	19
	Backwash Flow	2.2	2.7	3.2	4.2	5.3	6.5	9	9	11

2.10) Programming Summary

OEM Softener System Setup								
Model # ↓	Mineral Tank	Brine Tank	5S	6S	7S	8S	9S	10S
Step →			Backwash Mins	Brine Mins	2nd Backwash Mins	Rinse Mins	Salt LBS	System Capacity Kgr
EWS SD130	9x48	18x33	6	60	4	4	15 (10)	30.0 (27.0)
EWS SD145	10x54	18x33	6	60	4	4	22.5 (15)	45.0 (40.5)
EWS SD160	12x52	18x40	6	60	4	4	30 (20)	60.0 (54.0)
EWS SD175	13x54	18x40	6	60	4	4	37.5 (25)	75.0 (67.5)
EWS SD190	14x65	24x50	6	60	4	4	45 (30)	90.0 (81.0)
EWS SD1120	16x65	24x50	6	60	4	4	60 (40)	120.0 (108.0)
EWS SD1150	18x65	24x50	6	60	4	4	75 (50)	150.0 (135.0)
EWS SD1180	18x65	24x50	6	60	4	4	90 (60)	180.0 (162.0)
EWS SD1210	21x62	24x50	6	60	4	4	105 (70)	210.0 (189.0)

Configuration Settings			
Step #	2CS	3CS	4CS
Option	1.0	oFF	Alt A or B

Step 4CS will be A if outlet of unit is connected to A port of MAV and MAV wire is connected to this PC board.

OEM Softener System Setup						
Step #	2S	3S	4S	11S	12S	13S
Option	Softening	Down	Post	Auto	on 0	Off

2.11) Flow Controls and Injectors

Model #	Mineral Tank	Brine Tank	Injector		Drain Flow Control		
			Color	Order #	Flow GPM	Drain Line Size	Order #
EWS SD130	9x48	18x33	Red	CLK V30101D	2.2	3/4"	CLK V3162027
EWS SD145	10x54	18x33	White	CLK V30101E	2.7		CLK V3162027
EWS SD160	12x52	18x40	Blue	CLK V30101F	3.2		CLK V3162032
EWS SD175	13x54	18x40	Yellow	CLK V30101G	4.2		CLK V3162042
EWS SD190	14x65	24x41	Green	CLK V30101H	5.3		CLK V3162053
EWS SD1120	16x65	24x41	Orange	CLK V30101I	6.5		CLK V3162065
EWS SD1150	18x65	24x50	Light Blue	CLK V30101J	9.0		CLK V3162090
EWS SD1180	18x65	24x50	Light Blue	CLK V30101J	9.0		CLK V3162090
EWS SD1210	21x62	24x50	Light Green	CLK V30101K	11.0	1"	CLK V3190110

3) CONTROL VALVE

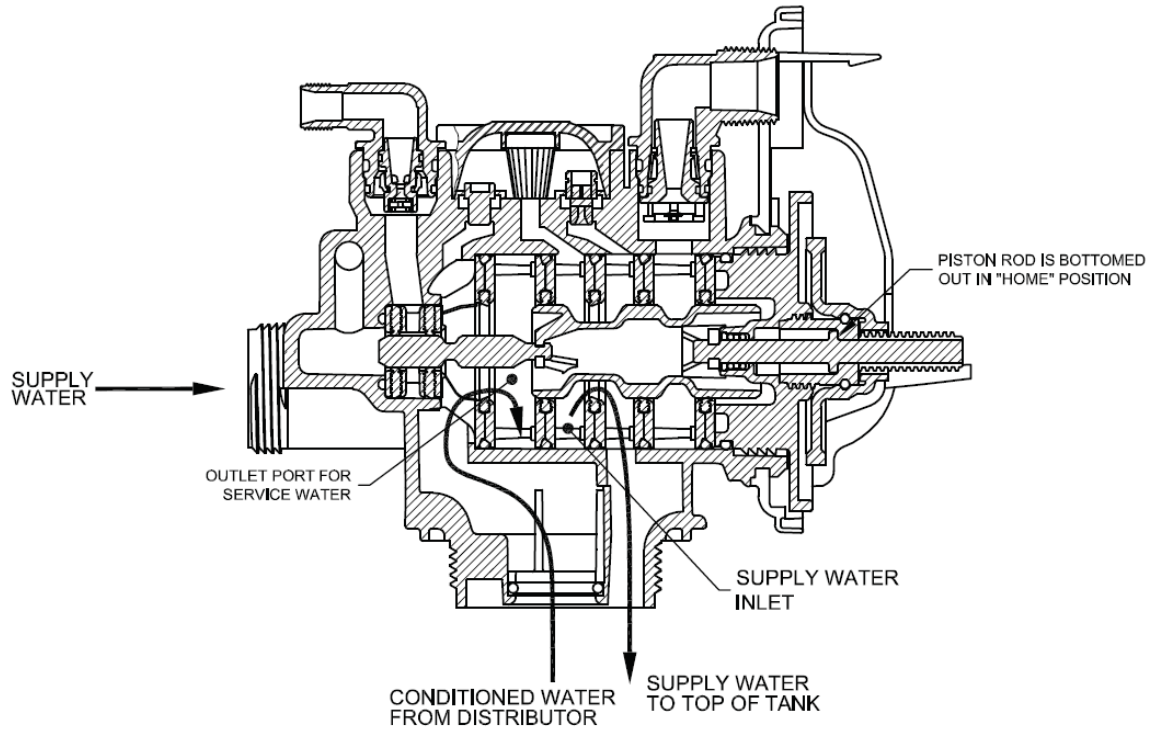
3.1) Control Valve Function and Cycles of Operation

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.

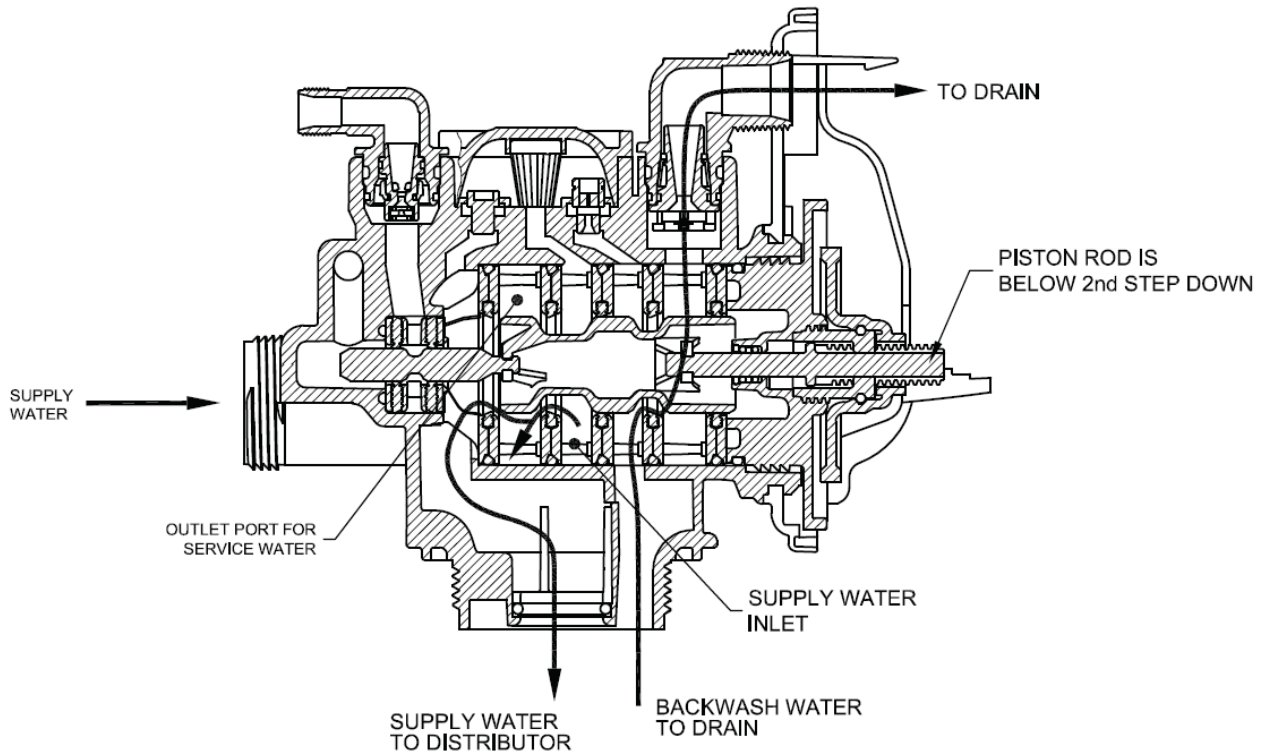
The control valve uses no traditional fasteners (e.g. screws); instead clips, threaded caps and nuts and snap type latches are used. Caps and nuts only need to be firmly hand tightened because radial seals are used. Tools required to service the valve include one small blade screw driver, one large blade screw driver, pliers and a pair of hands. A plastic wrench is available which eliminates the need for screwdrivers and pliers. 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 $\frac{1}{2}$ " above to $\frac{1}{2}$ " below the top of 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 AC adapter power pack comes with a 15 foot power cord and is designed for use with the control valve. The AC adapter power pack is for dry location use only. The control valve remembers all settings for up to 8 hours if the power goes out and the battery is not depleted. After 8 hours, the only item that needs to be reset is the time of day; other values are permanently stored in the nonvolatile memory. If a power loss lasts less than 8 hours and the time flashes on and off, the time of day should be reset and the non-rechargeable battery should be replaced.

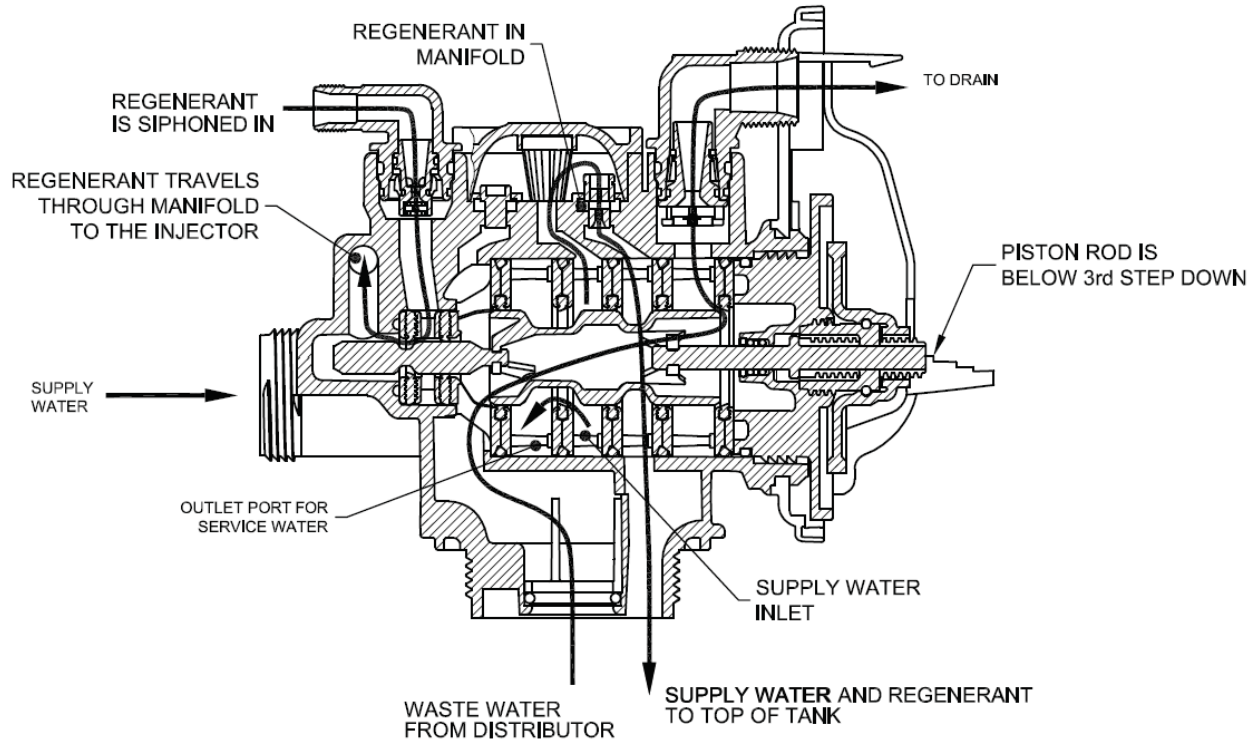
3.2) Flow Diagrams



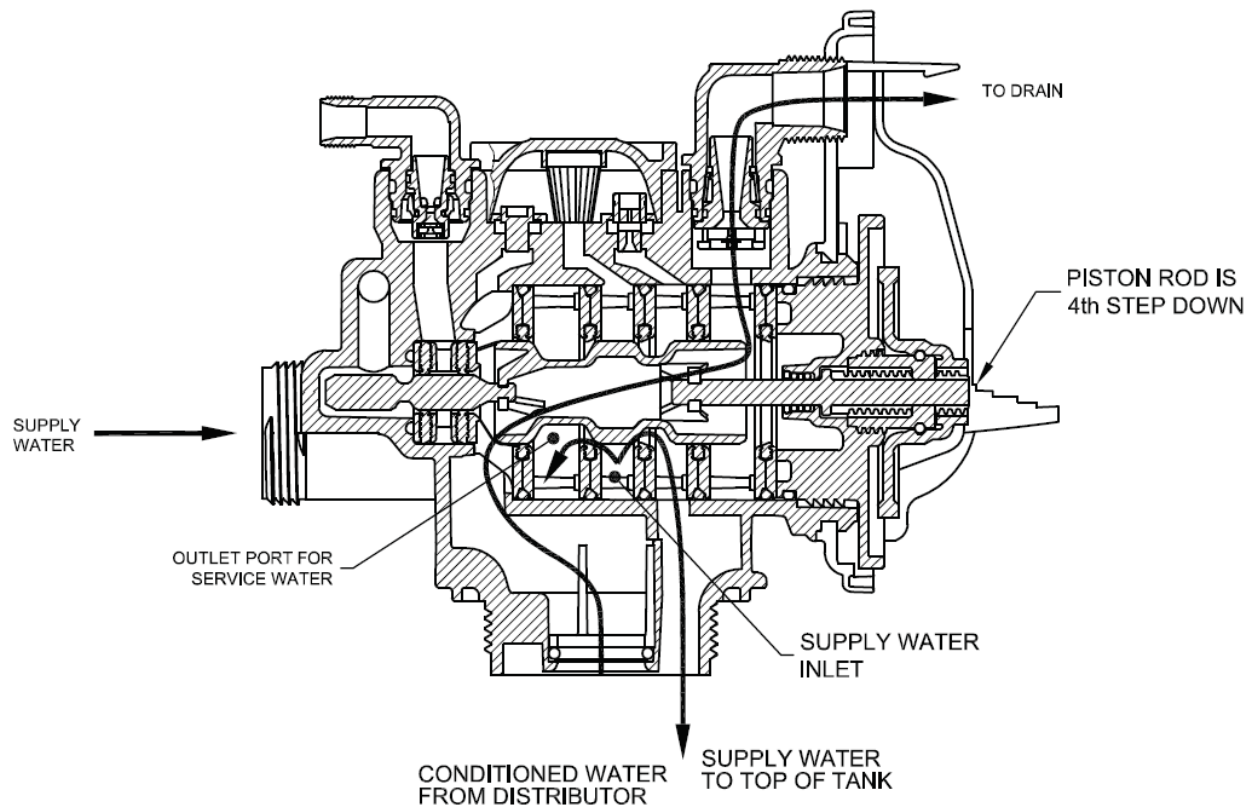
SERVICE



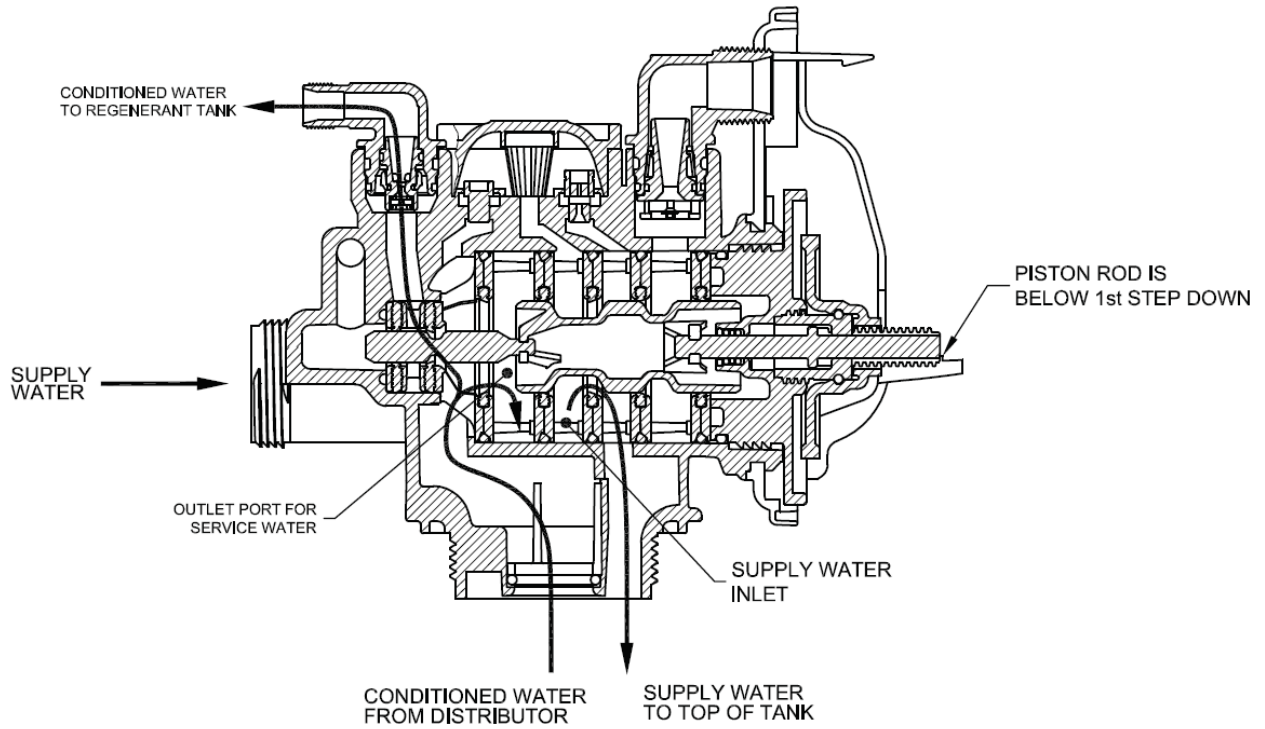
BACKWASH CYCLE



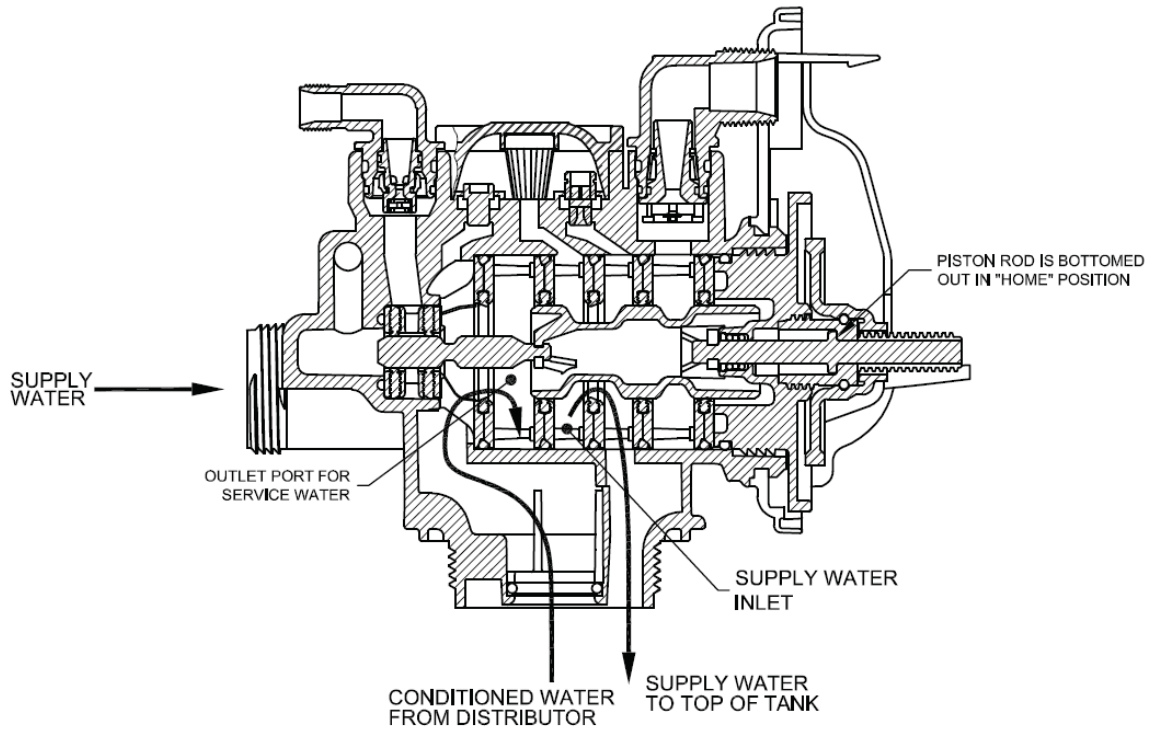
BRINE CYCLE



RINSE CYCLE



FILL CYCLE



SERVICE

3.3) Components of Control Valve

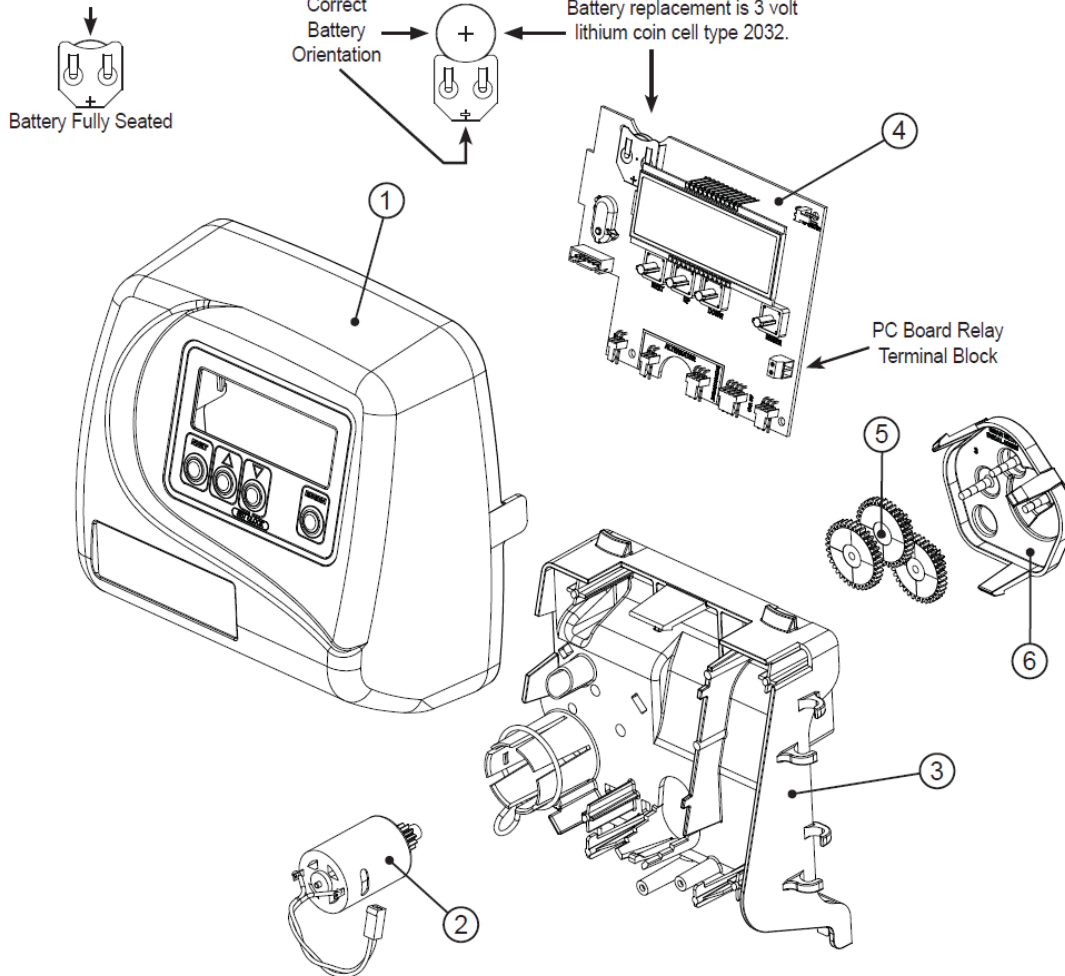
3.3.1) Front Cover and PC Board

Drawing No.	Order No.	Description	Quantity
1	CLK V3175EE01	WS1EE FRONT COVER ASSEMBLY	1
2	CLK V310701	WS1 MOTOR	1
3	CLK V310601	WS1 DRIVE BRACKET & SPRING	1
4	CLK V3408EE04BOARD	WS1THRU/2 EE PCB 5 DIGIT	1
5	CLK V3110	WS1 DRIVE GEAR 12X36	3
6	CLK V3109	WS1 DRIVE GEAR COVER	1
Not Shown	CLK V3186	WS1 AC ADAPTER 120V-12V	1
	CLK V318601	WS1 AC ADAPTER CORD ONLY	
Not Shown	CLK V3178	WS1 Drive Back Plate	1

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

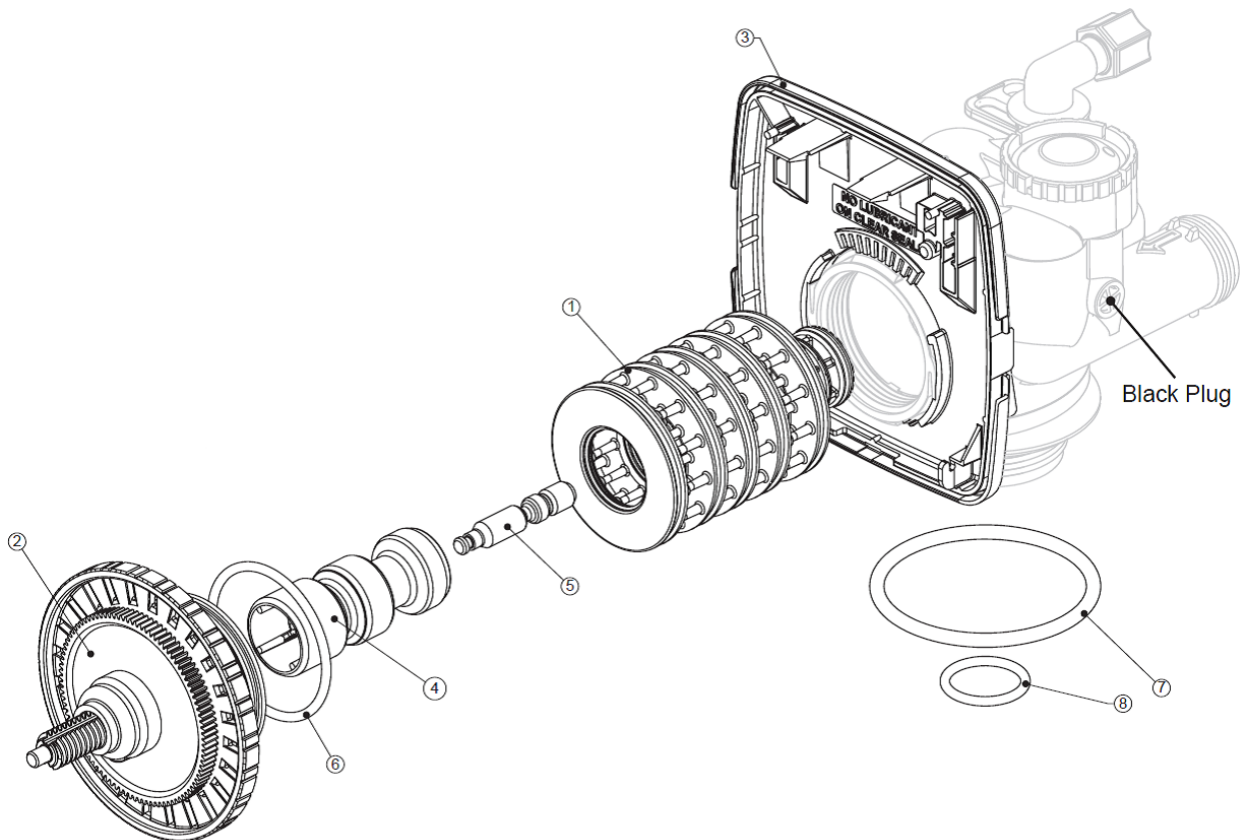
Wiring for Correct On/Off Operation	
PC Board Relay Terminal Block	Relay
RLY 1	Coil -
+ COM	Coil +

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



3.3.2) Drive assembly, Piston and Spacer stack

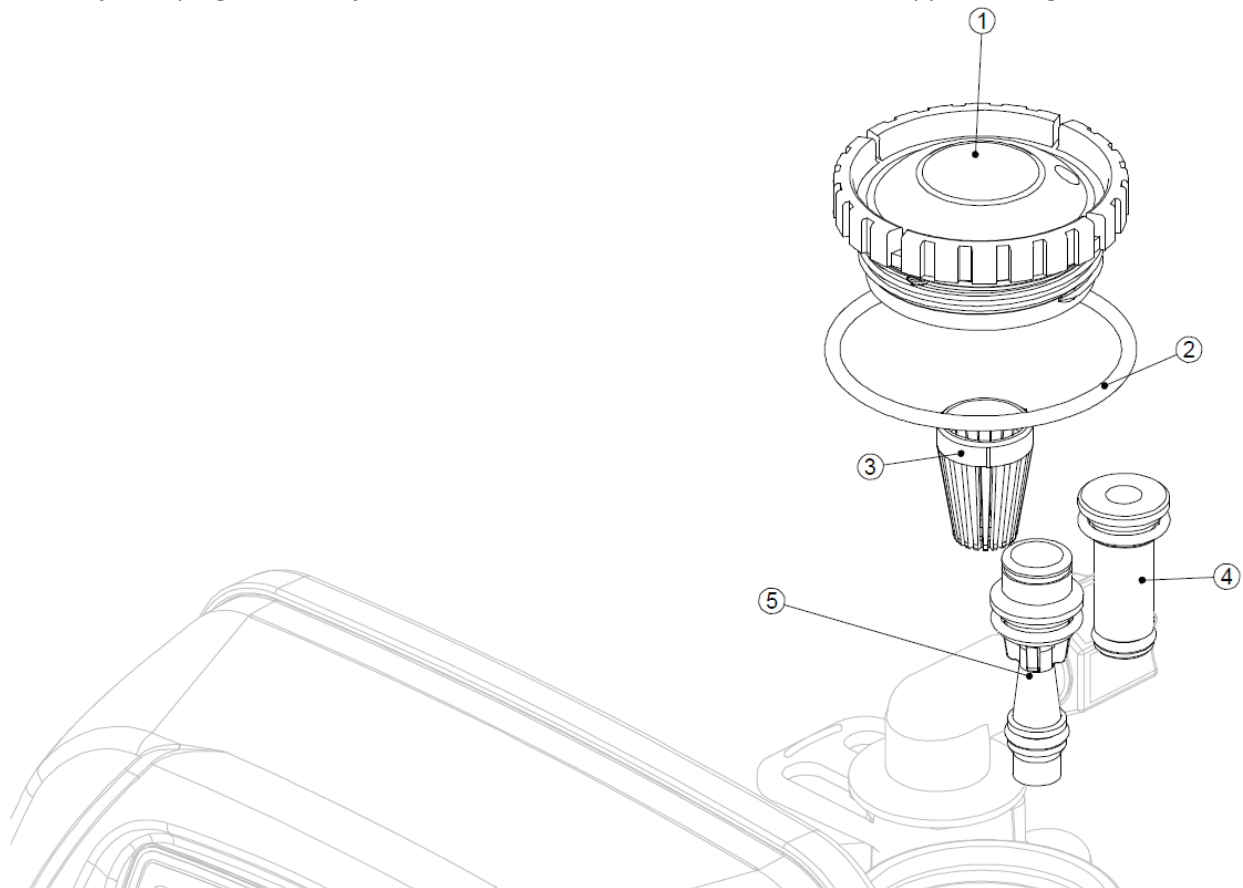
Drawing No.	Order No.	Description	Quantity
1	CLK V3005	WS1 Spacer Stack Assembly	1
2	CLK V3004	Drive Cap ASY	1
3	CLK V3178	WS1 Drive Back Plate	1
4	CLK V3011	WS1 Piston Downflow ASY	1
5	CLK V3174	WS1 Regenerant Piston	1
6	CLK V3135	O-ring 228	1
7	CLK V3180	O-ring 337	1
8	CLK V3105	O-ring 215 (Distributor Tube)	1
Not Shown	CLK V3001	WS1 Body ASY Downflow	1



3.3.3) Injector Assembly

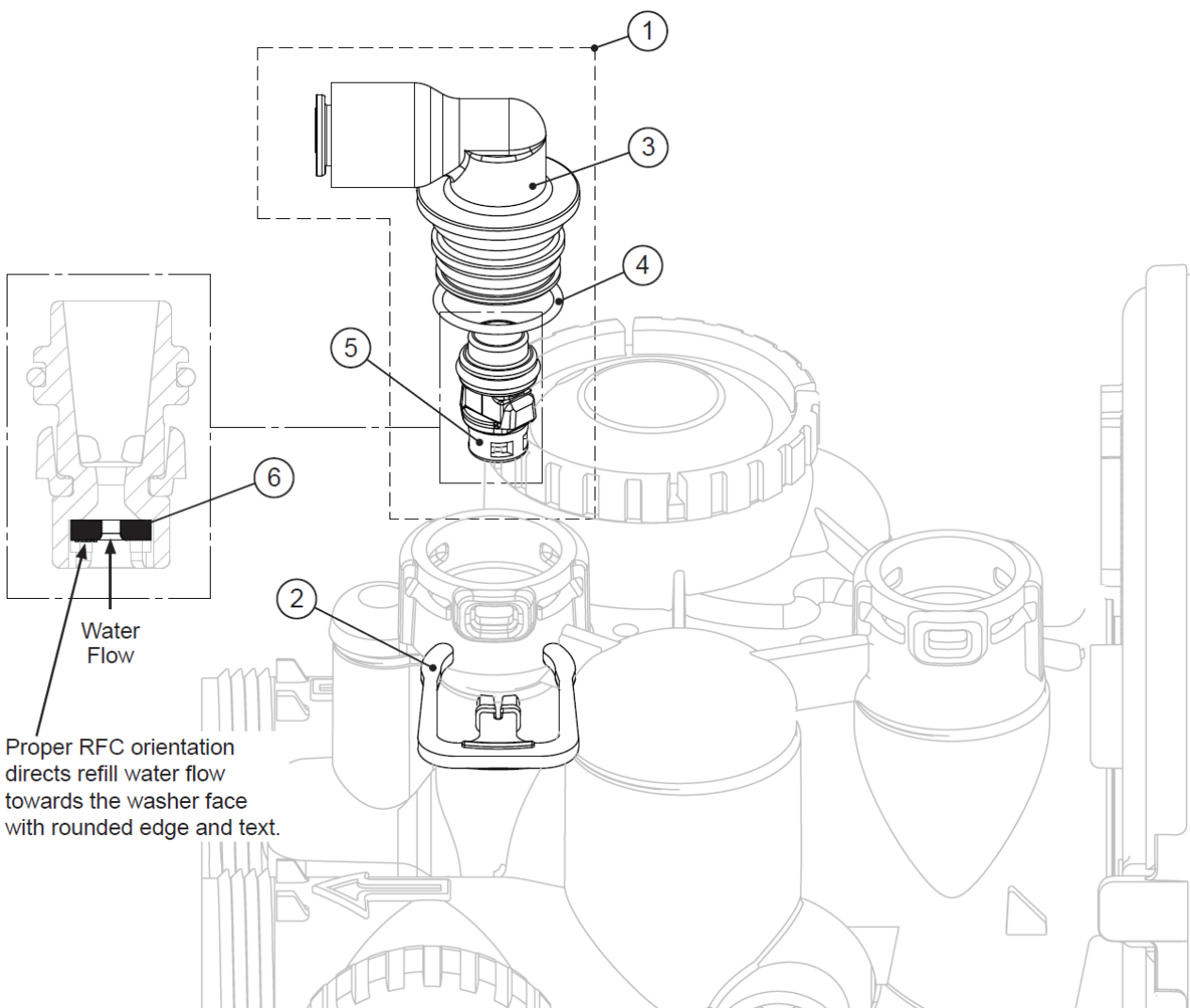
Drawing No.	Order No.	Description	Quantity
1	CLK V3176	INJECTOR CAP	1
2	CLK V3152	O-RING 135	1
3	CLK V317701	INJECTOR SCREEN CAGE	1
4	CLK V30101Z	WS1 INJECTOR ASY Z PLUG	1
5	CLK V30101A	WS1 INJECTOR ASY A BLACK	1
	CLK V30101B	WS1 INJECTOR ASY B BROWN	
	CLK V30101C	WS1 INJECTOR ASY C VIOLET	
	CLK V30101D	WS1 INJECTOR ASY D RED	
	CLK V30101E	WS1 INJECTOR ASY E WHITE	
	CLK V30101F	WS1 INJECTOR ASY F BLUE	
	CLK V30101G	WS1 INJECTOR ASY G YELLOW	
	CLK V30101H	WS1 INJECTOR ASY H GREEN	
	CLK V30101I	WS1 INJECTOR ASY I ORANGE	
	CLK V30101J	WS1 INJECTOR ASY J LIGHT BLUE	
	CLK V30101K	WS1 INJECTOR ASY K LIGHT GREEN	
Not Shown	CLK V3170	O-RING 011	*
Not Shown	CLK V3171	O-RING 013	*

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



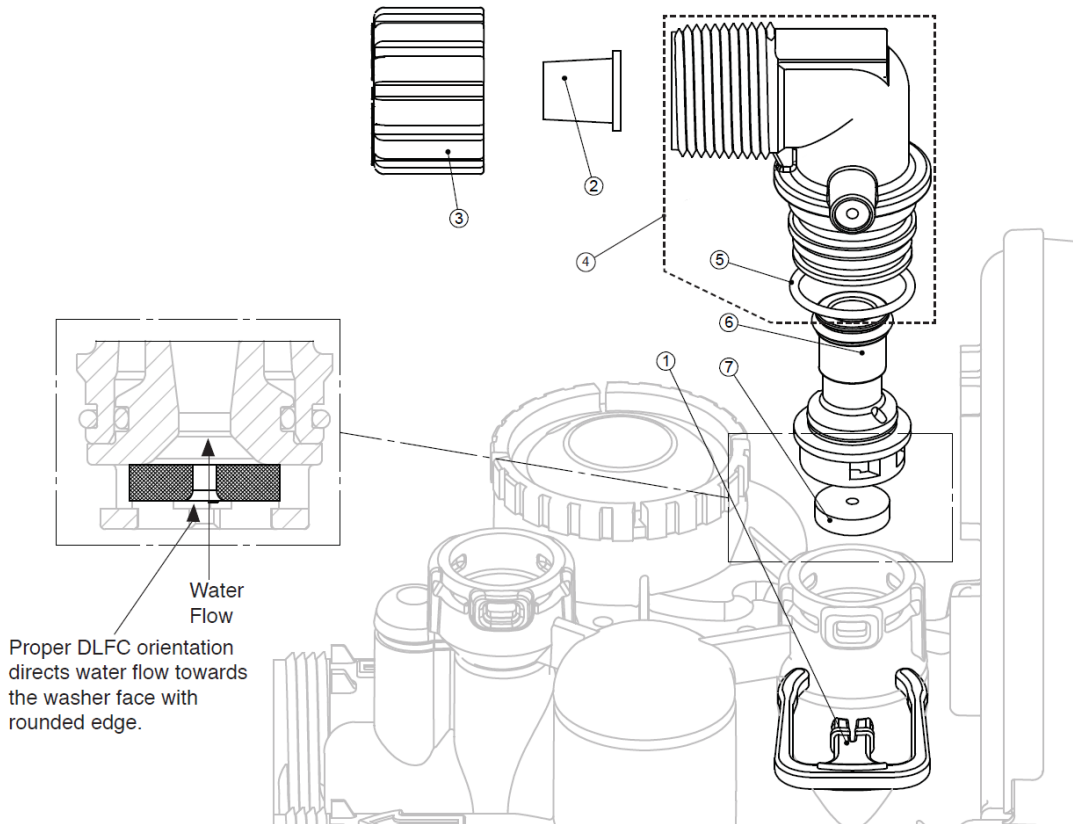
3.3.4) Brine Tank Line Flow Control

Drawing No.	Order No.	Description	Quantity
1	CLK V4144-01	Elbow 3/8" Liquifit Asy w/RFC	1
2	CLK H4615	Elbow Locking Clip	1
3	CLK H4628	Elbow 3/8" Liquifit	1
4	CLK V3163	O-ring 019	1
5	CLK V316501	WS1 RFC Retainer Asy (0.5 gpm)	1
6	CLK V3182	WS1 RFC	1
Not Shown	CLK V3552	WS1 Brine Elbow Asy w/RFC	Option
Not Shown	CLK H4650	Elbow 1/2" with nut and insert	Option



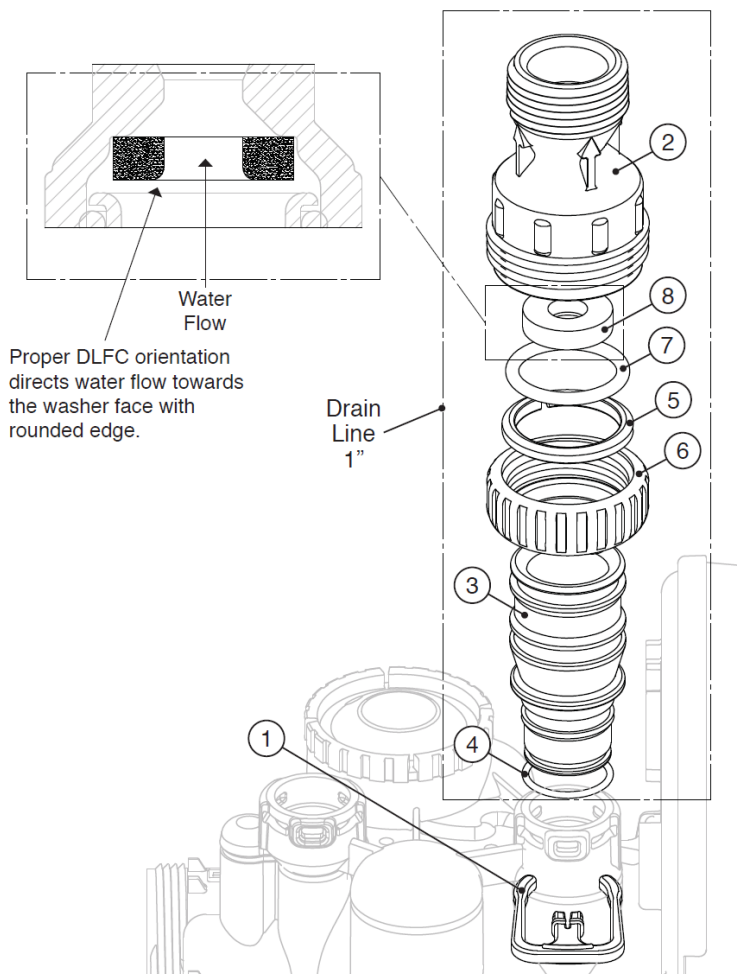
3.3.5) Drain Line Flow Control

Drain Line 3/4"			
Drawing No.	Order No.	Description	Quantity
1	H4615	Elbow Locking Clip	1
2	PKP10TS8BULK	Polytube insert 5/8	Option
3	CLK V3192	WS1 Nut 3/4 Drain Elbow	Option
4	CLK V315801	WS1 Drain Elbow 3/4 Male	1
	CLK V315802	WS1 Drain Elbow 3/4 Male No Silencer	
5	CLK V3163	O-ring 019	1
6	CLK V315901	WS1 DLFC Retainer ASY	1
7	CLK V3162007	WS1 DLFC 0.7 gpm for 3/4	One DLFC must be used if 3/4 fitting is used
	CLK V3162010	WS1 DLFC 1.0 gpm for 3/4	
	CLK V3162013	WS1 DLFC 1.3 gpm for 3/4	
	CLK V3162017	WS1 DLFC 1.7 gpm for 3/4	
	CLK V3162022	WS1 DLFC 2.2 gpm for 3/4	
	CLK V3162027	WS1 DLFC 2.7 gpm for 3/4	
	CLK V3162032	WS1 DLFC 3.2 gpm for 3/4	
	CLK V3162042	WS1 DLFC 4.2 gpm for 3/4	
	CLK V3162053	WS1 DLFC 5.3 gpm for 3/4	
	CLK V3162065	WS1 DLFC 6.5 gpm for 3/4	
	CLK V3162075	WS1 DLFC 7.5 gpm for 3/4	
	CLK V3162090	WS1 DLFC 9.0 gpm for 3/4	
CLK V3162100	WS1 DLFC 10.0 gpm for 3/4		



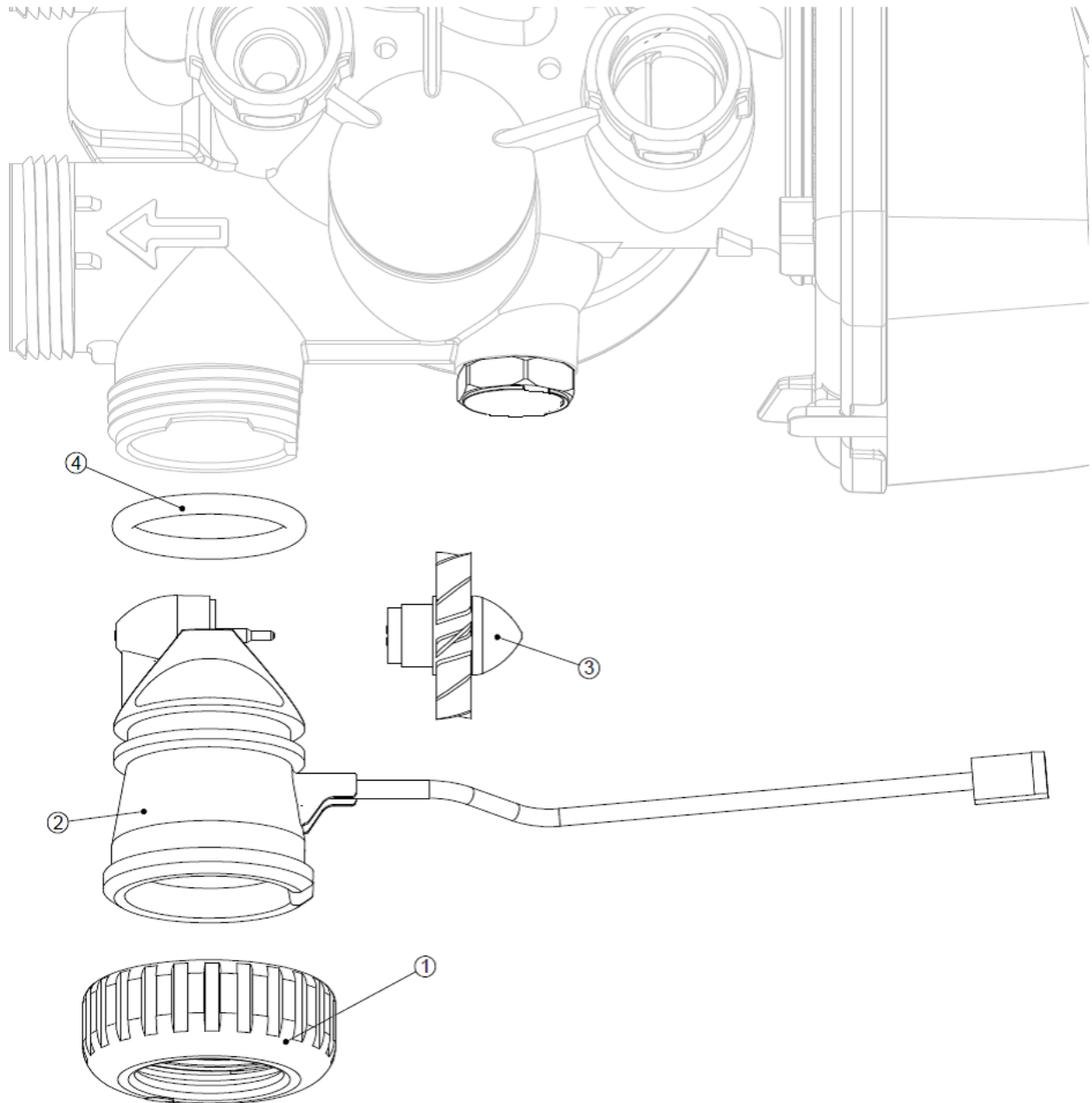
Drain Line 1"			
Drawing No.	Order No.	Description	Quantity
1	H4615	Elbow Locking Clip	1
2*	CLK V3166	WS1 Drain FTG Body 1	1
	CLK V316601	FTG Flow Control Body	
3*	CLK V3167	WS1 Drain FTG Adapter 1	1
4*	CLK V3163	O-ring 019	1
5*	CLK V3150	WS1 Split Ring	1
6*	CLK V3151	WS1 Nut 1" QC	1
7*	CLK V3105	O-ring 215	1
8	CLK V3190090	WS1 DLFC 9.0 gpm for 1"	One DLFC must be used if 1" fitting is used
	CLK V3190100	WS1 DLFC 10.0 gpm for 1"	
	CLK V3190110	WS1 DLFC 11.0 gpm for 1"	
	CLK V3190130	WS1 DLFC 13.0 gpm for 1"	
	CLK V3190150	WS1 DLFC 15.0 gpm for 1"	
	CLK V3190170	WS1 DLFC 17.0 gpm for 1"	
	CLK V3190200	WS1 DLFC 20.0 gpm for 1"	
	CLK V3190250	WS1 DLFC 25.0 gpm for 1"	

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



3.3.6) Outlet Meter Assembly

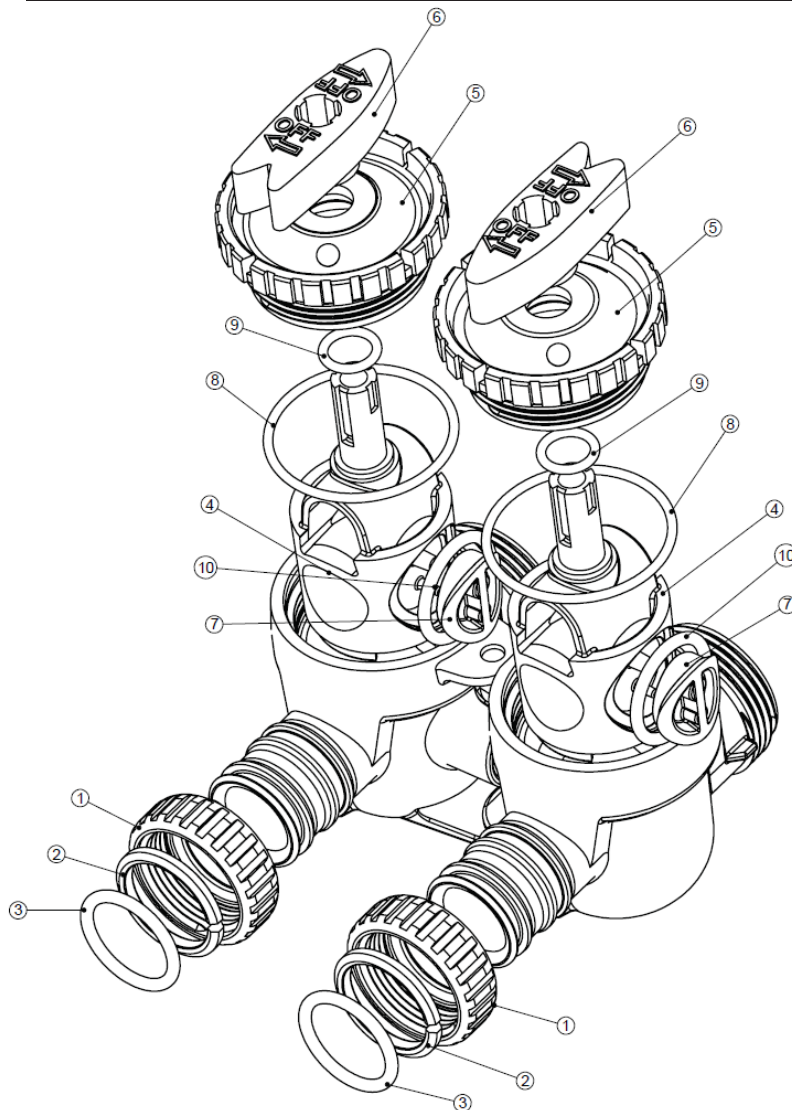
Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 Nut 1" QC	1
2	CLK V3003	WS1 Meter ASY	1
3	CLK V311801	WS1 Turbine ASY	1
4	CLK V3105	O-ring 215	1



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

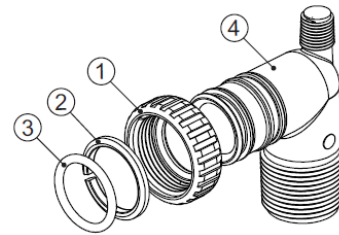
3.3.7) Bypass Valve Components

Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 Nut 1" Quick Connect	2
2	CLK V3150	WS1 Split Ring	2
3	CLK V3105	O-Ring 215	2
4	CLK V3145	WS1 Bypass 1" Rotor	2
5	CLK V3146	WS1 Bypass Cap	2
6	CLK V3147	WS1 Bypass Handle	2
7	CLK V3148	WS1 Bypass Rotor Seal Retainer	2
8	CLK V3152	O-ring 135	2
9	CLK V3155	O-ring 112	2
10	CLK V3156	O-ring 214	2

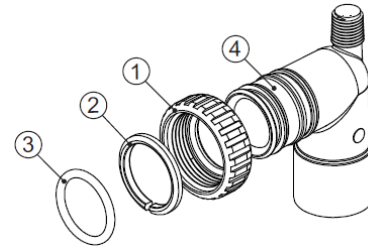


3.3.8) Installation Fitting Assemblies

V3007 WS1 Fitting 1" PVC Male NPT Elbow Assembly			
Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 NUT 1" QUICK CONNECT	2
2	CLK V3150	WS1 SPLIT RING	2
3	CLK V3105	O-RING 215	2
4	CLK V3149	WS1 FITTING 1 PVC MALE NPT ELBOW	2

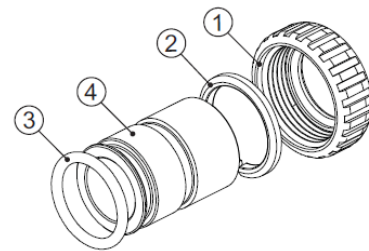


V3007-01 WS1 Fitting 3/4" & 1" PVC Solvent 90° Assembly			
Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 NUT 1" QUICK CONNECT	2
2	CLK V3150	WS1 SPLIT RING	2
3	CLK V3105	O-RING 215	2
4	CLK V3189	WS1 FITTING 3/4&1 PVC SOLVENT 90	2



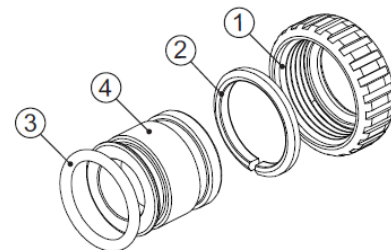
V3007-02LF WS1 Fitting 1" Brass Sweat Assembly LF			
Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 NUT 1" QUICK CONNECT	2
2	CLK V3150	WS1 SPLIT RING	2
3	CLK V3105	O-RING 215	2
4	CLK V3188LF	WS1 FITTING 1 BRASS SWEATASSEMBLY LF	2

Do not install in California.

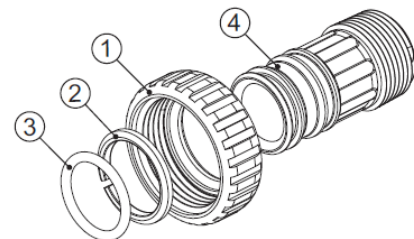


V3007-03LF WS1 Fitting 3/4" Brass Sweat Assembly LF			
Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 NUT 1" QUICK CONNECT	2
2	CLK V3150	WS1 SPLIT RING	2
3	CLK V3105	O-RING 215	2
4	CLK V318801LF	WS1 FITTING 3/4 BRASS SWEAT LF	2

Do not install in California.

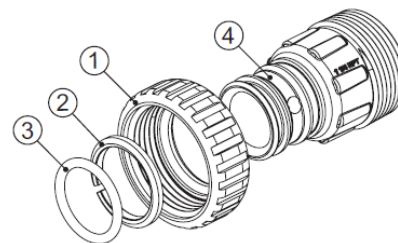


V3007-04 WS1 Fitting 1" Plastic Male NPT Assembly			
Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 NUT 1" QUICK CONNECT	2
2	CLK V3150	WS1 SPLIT RING	2
3	CLK V3105	O-RING 215	2
4	CLK V3164	WS1 FITTING 1" PLASTIC MALE NPT	2

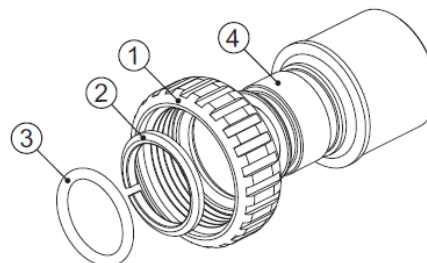


SOFTENER INSTALLATION AND USER GUIDE

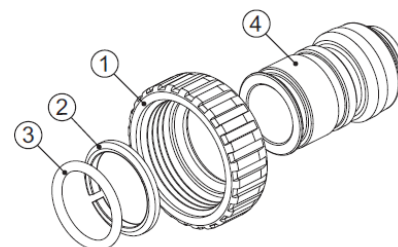
V3007-05 WS1 Fitting 1-1/4" Plastic Male NPT Assembly			
Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 NUT 1" QUICK CONNECT	2
2	CLK V3150	WS1 SPLIT RING	2
3	CLK V3105	O-RING 215	2
4	CLK V3317	WS1 FITTING 1-1/4" PLASTIC MALE NPT	2



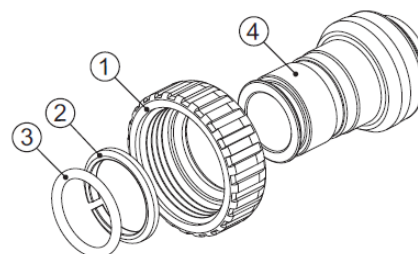
V3007-09LF WS1 Fitting 1-1/4" & 1-1/2" Brass Sweat Assembly LF			
Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 NUT 1" QUICK CONNECT	2
2	CLK V3150	WS1 SPLIT RING	2
3	CLK V3105	O-RING 215	2
4	CLK V3375LF	WS1 FITTING 1-1/4" & 1-1/2" BRASS SWEAT	2



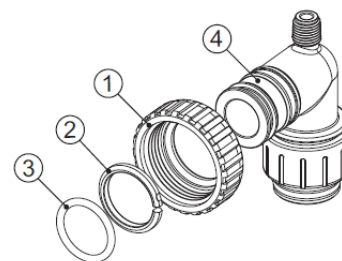
V3007-12LF WS1 Fitting 3/4" Brass SharkBite Assembly LF			
Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 NUT 1" QUICK CONNECT	2
2	CLK V3150	WS1 SPLIT RING	2
3	CLK V3105	O-RING 215	2
4	CLK V3628LF	WS1 FTG 3/4 BRASS SHARKBITE LF	2



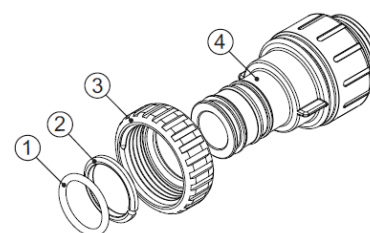
V3007-13LF WS1 Fitting 1" Brass SharkBite Assembly LF			
Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 NUT 1" QUICK CONNECT	2
2	CLK V3150	WS1 SPLIT RING	2
3	CLK V3105	O-RING 215	2
4	CLK V3629LF	WS1 FTG 1" BRASS SHARKBITE LF	2



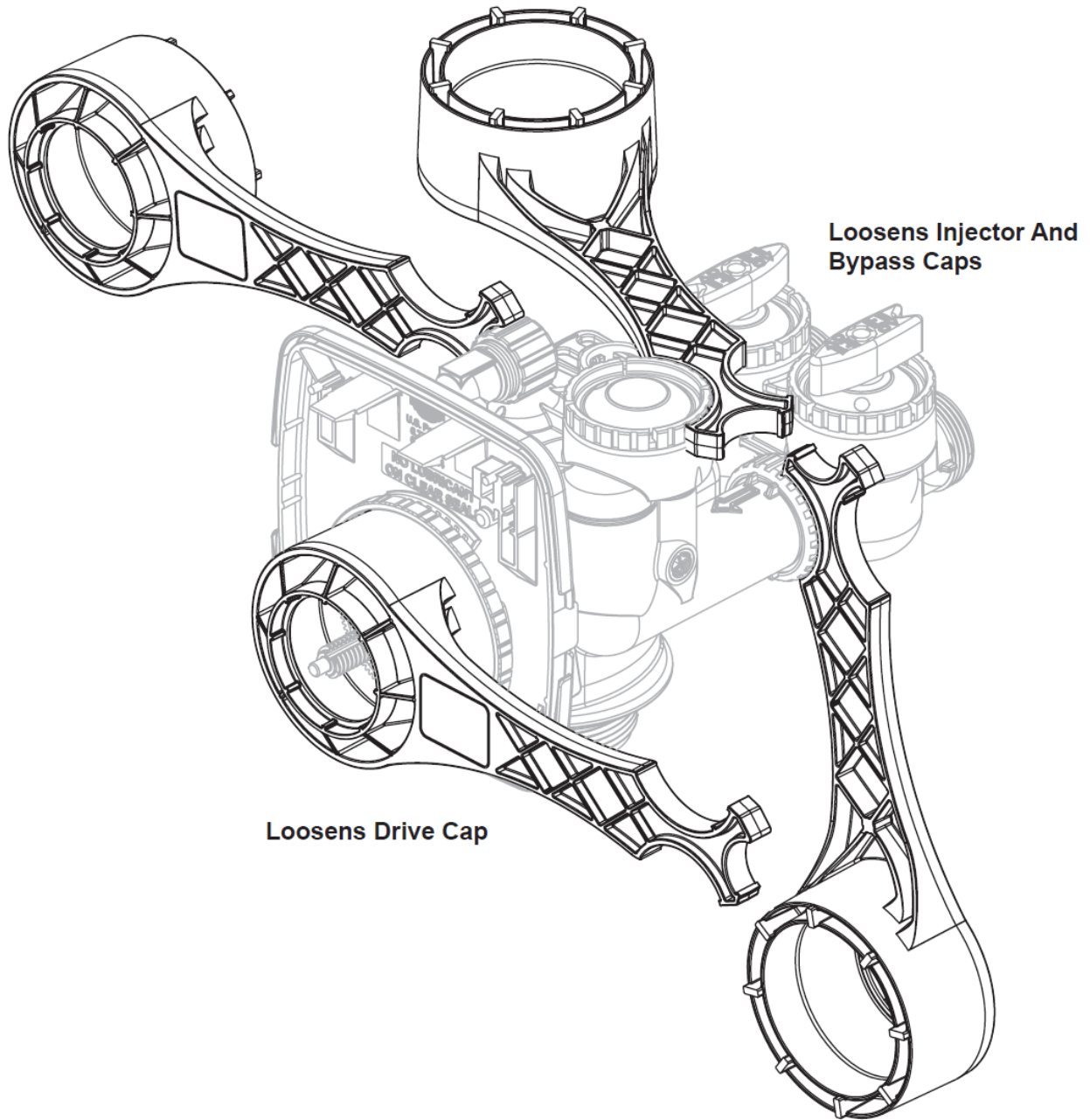
V3007-15 WS1 FTG 3/4 JG QC 90 Assembly			
Drawing No.	Order No.	Description	Quantity
1	CLK V3151	WS1 NUT 1 QC	2
2	CLK V3150	WS1 SPLIT RING	2
3	CLK V3105	O-RING 215	2
4	CLK V3790	WS1 ELBOW 3/4 QC W/STEM	2



V3007-17 WS1 FTG 1" JG QC Assembly			
Drawing No.	Order No.	Description	Quantity
1	CLK V3105	O-RING 215	2
2	CLK V3150	WS1 SPLIT RING	2
3	CLK V3151	WS1 NUT 1 QC	2
4	CLK V4045	WS1 FTG 1 INCH QC	2

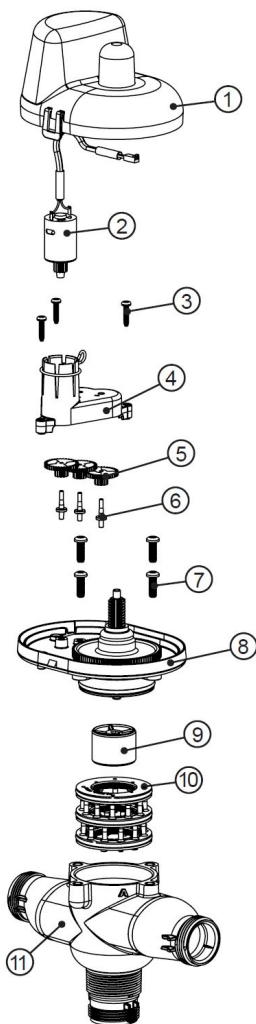


3.3.9) Service Spanner Wrench

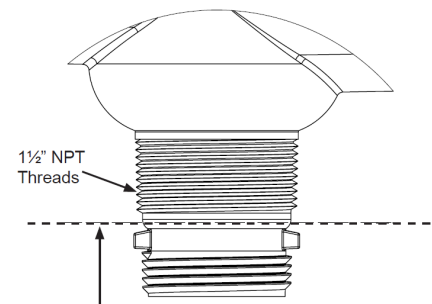


3.4 Motorized Alternating Valve (MAV)

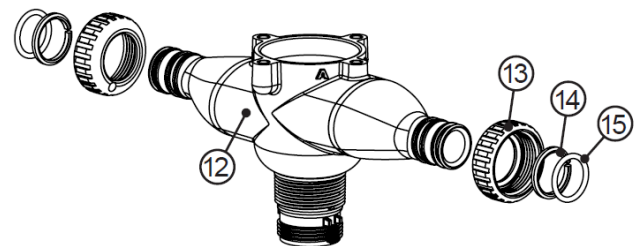
Drawing No.	Order No.	Description	Quantity	
			V3069FF	V3069MM
1	CLK V3073	MAV/NOHWBY COVER ASY	1	1
2	CLK V3476	WS MOTOR ASY 8 FT	1	1
3	CLK V3592	SCREW #8-3/4 PHPN T-25 SS	3	3
4	CLK V326201	WS1.5&2ALT/2BY	1	1
5	CLK V311001	WS1 DRIVE REDUCING GEAR PLAIN	3	3
6	CLK V3264	WS2 BYPASS REDUCTION GEAR AXLE	3	3
7	CLK V3527	SCREW 1/4-20 X 3/4 BHSCS SS	4	4
8	CLK V3072	MAV/NOHWBY 1/125/15 DRIVE ASY	1	1
9	CLK V350601	MAV/NOHRD 1/125/15 PISTON	1	1
10	CLK V3074	MAV/NOHWBY 1/125/15 STACK ASY	1	1
11	CLK V3504FF	MAV BODY 1/125 ASY F-F	1	N/A
12	CLK V3504MM	MAV BODY 1/125 ASY M-M	N/A	1
13	CLK V3151	WS1 NUT 1 QC	N/A	2
14	CLK V3150	WS1 SPLIT RING	N/A	2
15	CLK V3105	O-RING 215	N/A	2
Not Shown	CLK V347401	WS ALT MAV 1/125 CORD 8FT BLK	1	1



Female ports, labeled A or B, may be connected using Clack fitting packages. The motorized alternating valve outlet accepts Clack fitting packages or may be removed to use 1½ NPT threaded outlet.



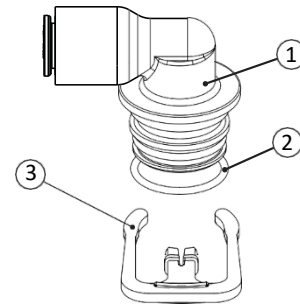
Quick Connect Nut Threads can be cut off to allow access to 1½" NPT Threads. Deburr and clean edge after cutting. **NOTE:** Teflon tape is required when using the 1½" NPT Threads.



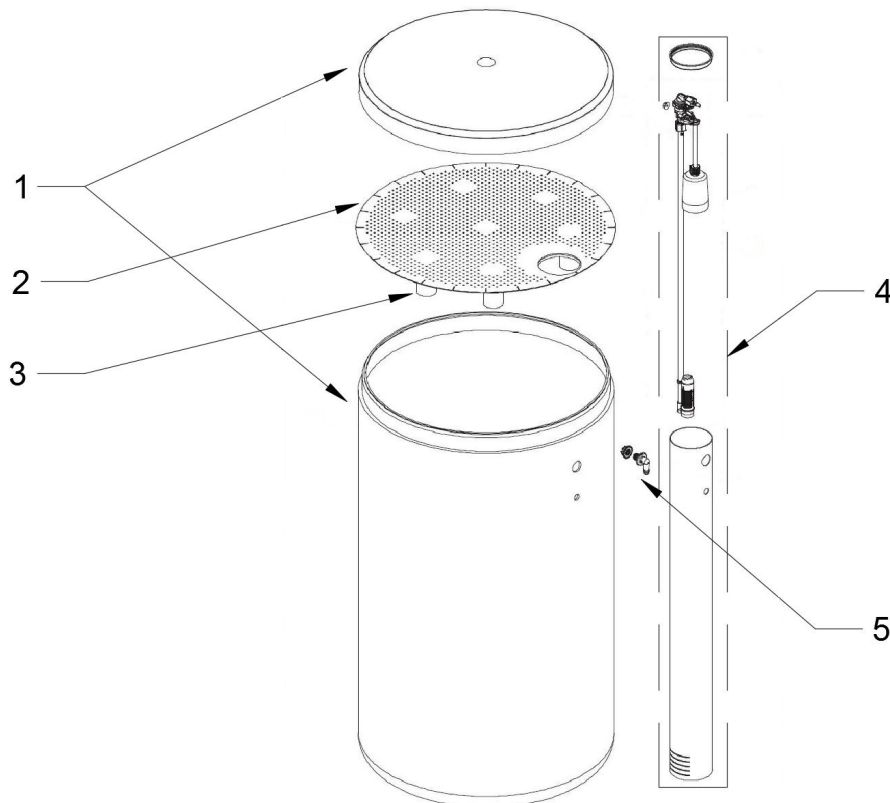
Male ports, labeled A or B, may be connected directly to a Clack 1" or 1.25" control valve outlet or to a V3191-01 vertical bypass adapter assembly. The motorized alternating valve outlet accepts Clack fitting packages or may be removed to use 1½" NPT threaded outlet.

4) BRINE TANK ASSEMBLY

SAFETY FLOAT BRINE ELBOW			
Item No.	Part No.	Description	Qty.
1		Quick Connect Elbow	1
2	CV3163	O-Ring 019	1
4	CH4615	Elbow locking clip	1



BRINE TANK ASSEMBLY				
Item	Part No.	Description	Models	Qty.
1	CLK BT1833	Brine Tank with Cover	18"x33"	1
	CLK BT1840B		18"x40"	1
	CLK BT2450BKR		24"x50"	1
2	CLK H107202	Salt Grid Platform with legs	18"x33" & 18"x40"	1
	CLK H1080	Salt Grid Platform without legs	24"x50"	1
3	CLK H1089	24" Salt Grid Legs		7
4	CLK H470028	Float Brine Valve Assembly	18"x33"	1
	CLK H470036		18"x40"	1
	CLK H 470039BTKIT			1
	CLK H 4900BVK			1
5	CLK V3007	2 Piece Overflow Set	24"x50"	1
	1.0 X 0.75 RB PVC			1
	CLK H 1018		18"x33", 18"x40" & 24"x50"	1



5) QUICK REFERENCE GUIDE

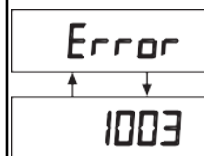
Manual Regeneration



Immediate Regeneration: - Press and hold "REGEN" button for more than 3 seconds. Press "REGEN" button to advance the unit to next cycle in regeneration.

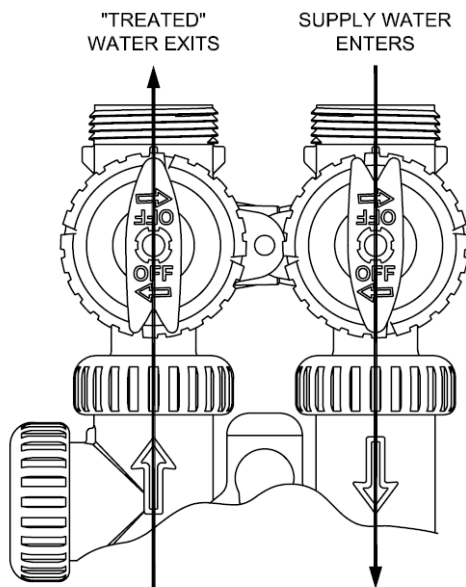
Delayed Regeneration: - Press and release "REGEN" button once the "REGEN TODAY" will be flashing on screen. Now the regeneration will occur tonight at preset time. The delayed regeneration can be cancelled by pressing "REGEN" button again.

Note: - If brine tank needs to be refilled please fill the salt at least two hours before regeneration.



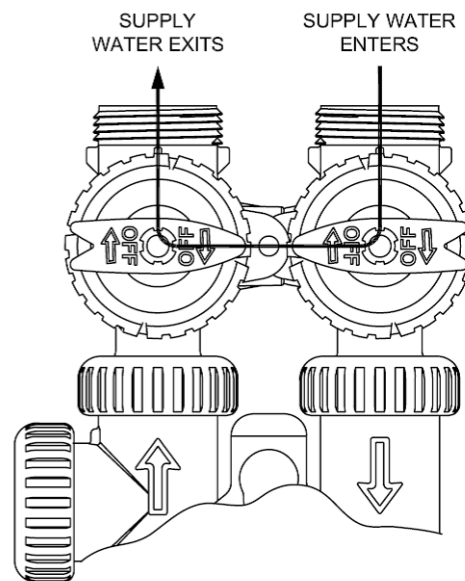
This error screen and error number will toggle. Contact Service Technician or OEM and report the error code.

NORMAL OPERATION



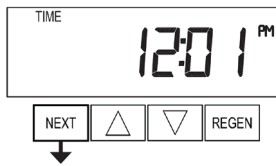
The inlet handle arrow must be in the direction of unit and outlet handle must direct away from the unit as given above.

BYPASS OPERATION



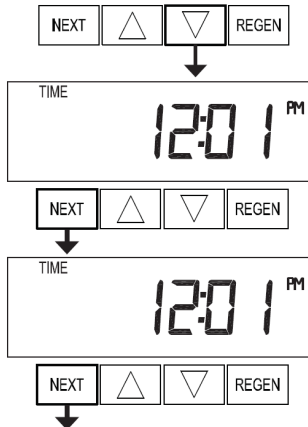
To shut off supply to the Unit the bypass valve handle must be in direction given above.

General Operation



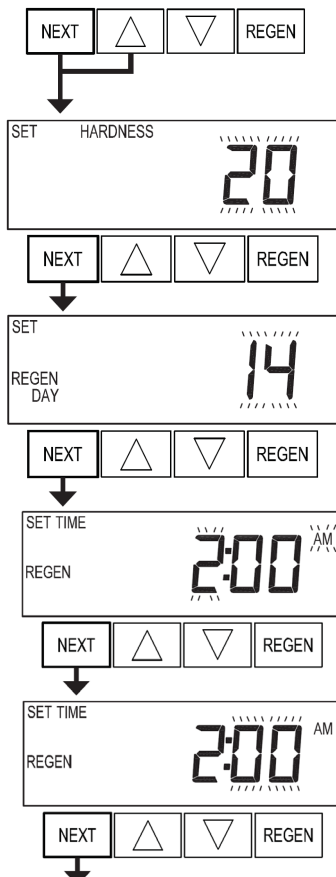
Pressing "NEXT" button will toggle the displays with current time of day, current flow rate, days remaining in regeneration, total volume used and volume remaining.

To Set Time of Day



- Press and hold "DOWN" arrow button.
- Hours will flash press up and down buttons to adjust hours to current hour of day. Then press "NEXT" button.
- By pressing up and down buttons adjust minutes. Then press "NEXT" button.
- The time is set and the valve display will return to normal display.

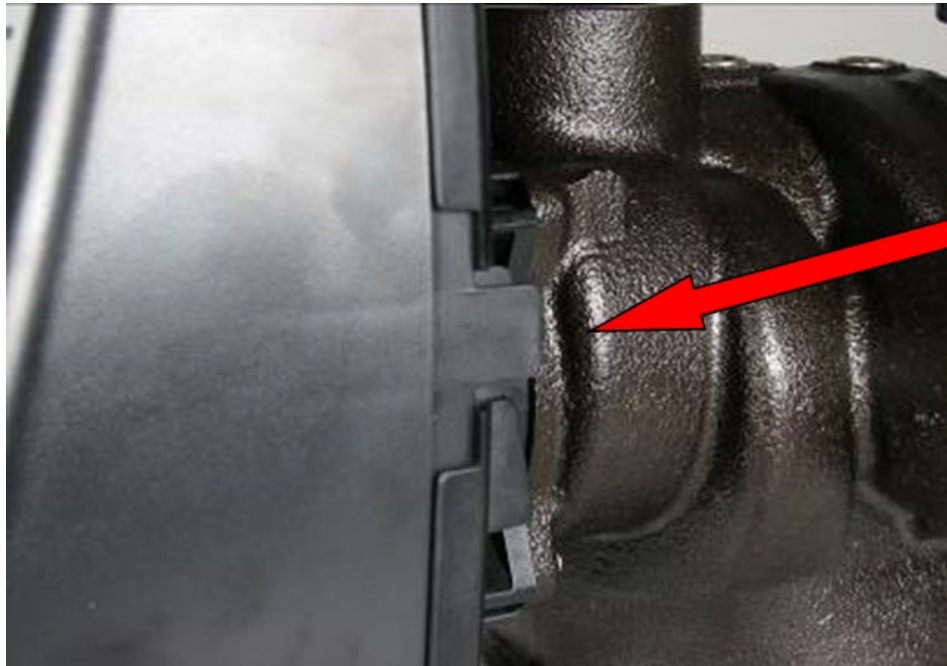
Installer Settings



- Press "NEXT" and "UP" arrow button simultaneously.
- Adjust hardness by pressing "UP" and "DOWN" arrow buttons then press "NEXT" button.
- Adjust day override or the number of days between regenerations by using "UP" and "DOWN" arrow buttons.
- Adjust hour of the time of regeneration by using "UP" and "DOWN" buttons. Then press "NEXT" button.
- Adjust minutes of time of regeneration by pressing "UP" and "DOWN" arrow buttons. Press "NEXT" to save and return to normal operation.

6) SERVICE INSTRUCTIONS

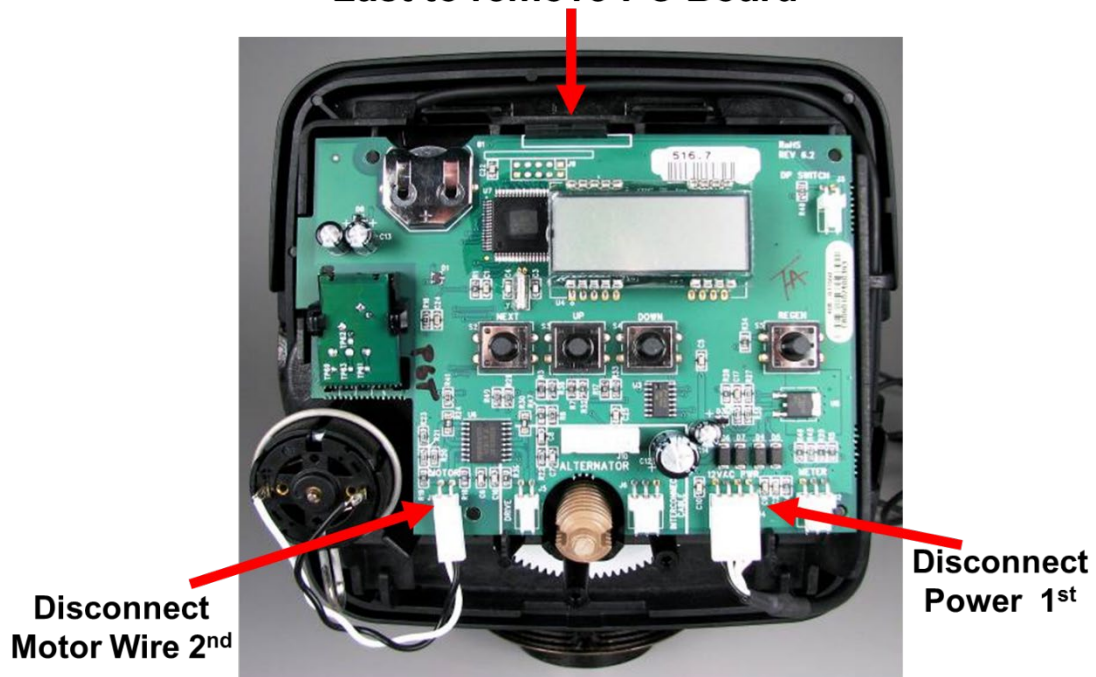
6.1) Front Cover Removal



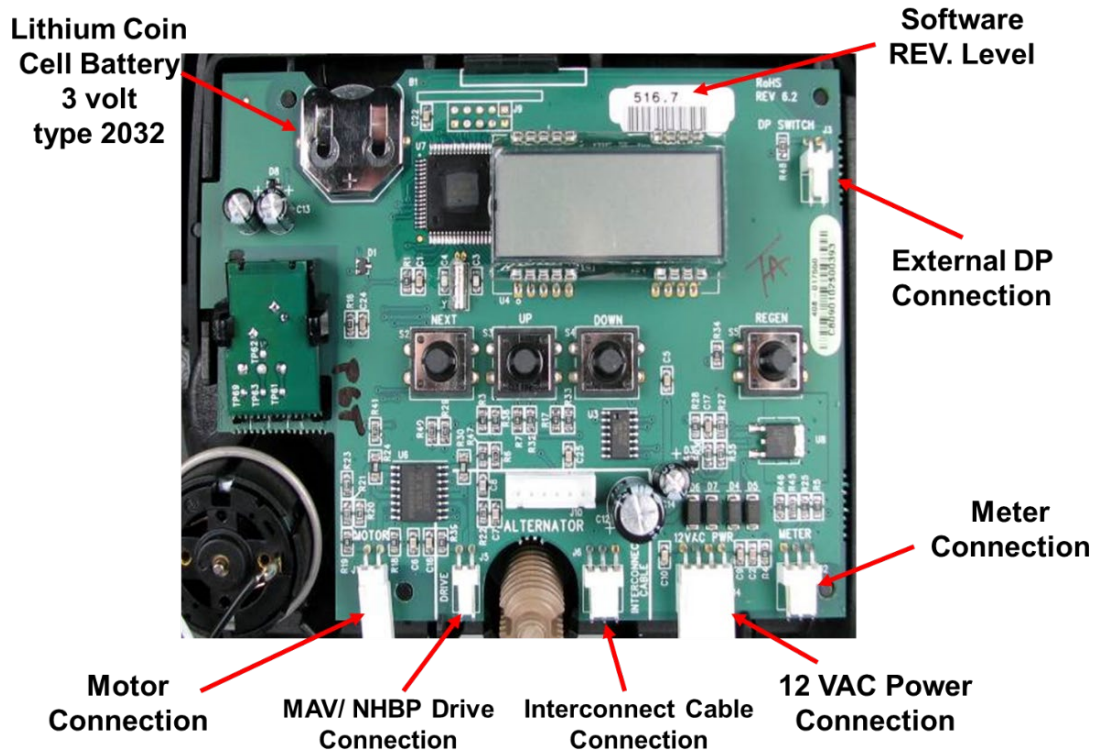
Pull out on each side of the covers locking tabs

6.2) PC Board Removal

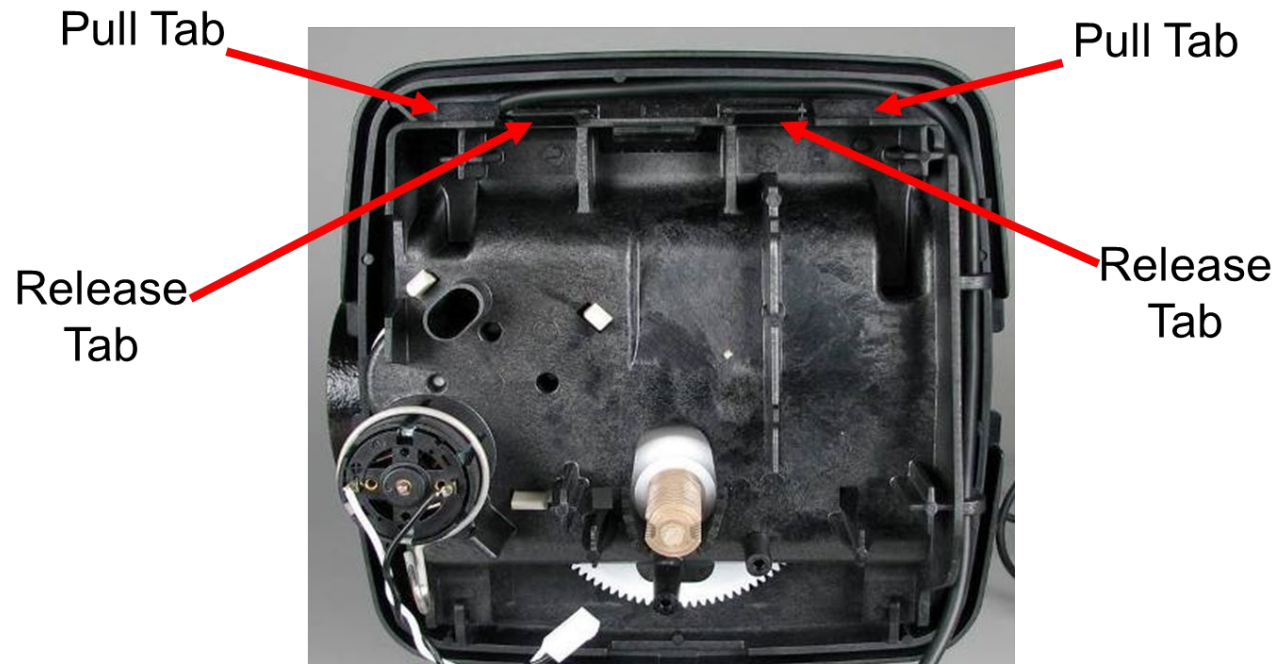
**Lift up on PC Board locking tab
Last to remove PC Board**



1. Lift up the locking tab and then pull out the PC board from top.
2. Disconnect the power cable first and then disconnect other cables.



6.3) Drive Bracket Removal



Lift up both release tabs with thumbs and use index fingers to pull out the pull tab



Motor can be removed by pressing the locking spring to the right and then pull the motor out.
Gearbox can be removed by pushing the beige colored locking tabs inwards.

6.4) Drive Cap Removal



Turn the drive cap counter clockwise with service wrench to loosen the cap.

Pull the drive cap out with the main piston and brine piston

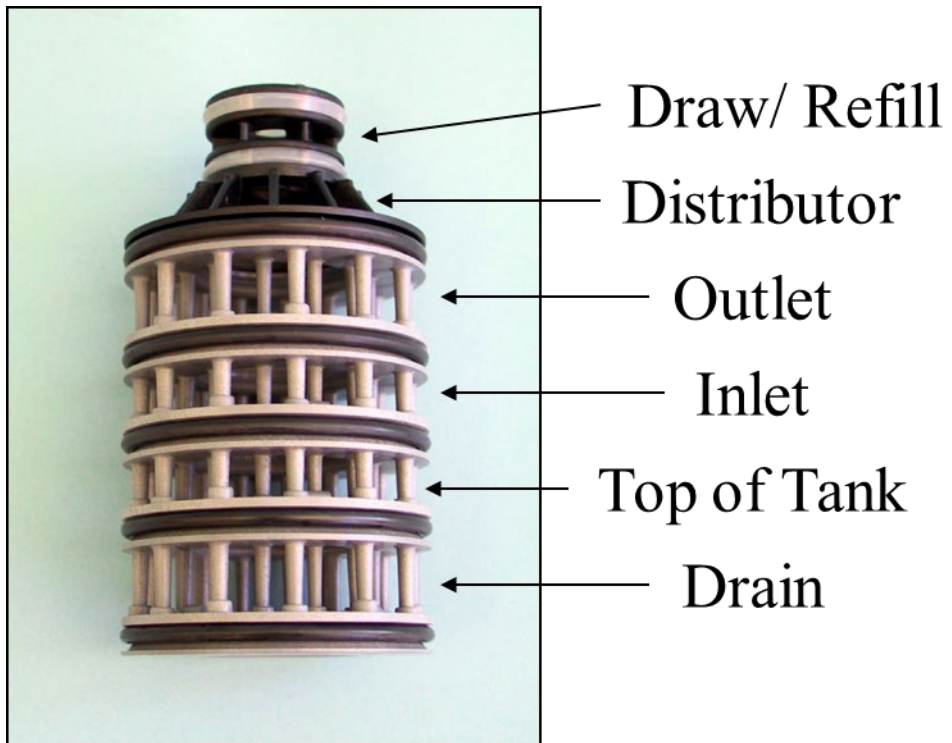


Snap off the brine piston from the main piston's horseshoe connection by putting side pressure towards the cavity

6.5) Spacer Stack Removal

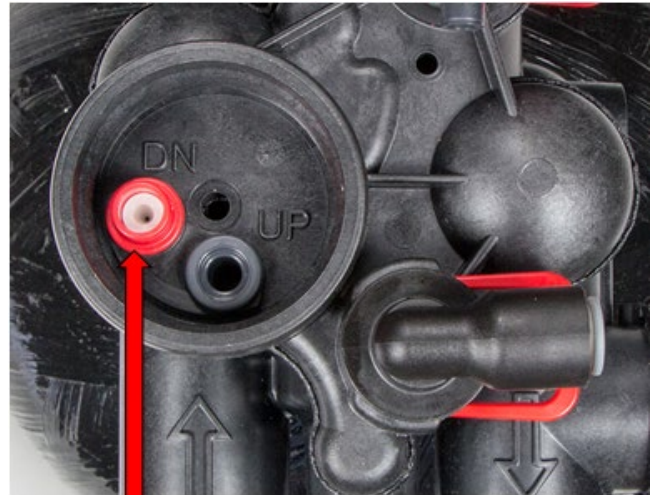


Spacer Stack assembly is removed by simply pulling out



Spacer Stack assembly is a single piece replaceable assembly

6.6) Injector Cap Removal



• **Downflow set up**

With closed end of WS1 service wrench drive cap can be removed by turning counter clockwise.

Injector must be installed in DN hole and UP hole must be plugged.



To remove injector use injector cap and scoop the top rim of injector with the bottom of the injector cap

7) TROUBLESHOOTING

7.1) Possible Error Codes

Possible Errors	
Code	Description
Err-1001	Control unable to sense motor movement
Err-101	
Err-1002	Control Valve motor ran too short
Err-102	
Err-1003	Control Valve motor ran too long and unable to find next cycle
Err-103	
Err-1004	Control Valve ran too long and timed out
Err-104	
Err-1006	MAV/NHWP motor ran too long
Err-106	
Err-1007	MAV/NHWP motor ran too short and stalled
Err-107	

7.2) Troubleshooting Procedures

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	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
3. Display does not indicate that water is flowing. Refer to user instructions for how the display indicates water is flowing	a. Bypass valve in bypass position	a. Turn bypass handles to place bypass in service position
	b. Meter is not connected to meter connection on PC Board	b. Connect meter to three pin connection labeled METER on PC Board
	c. Restricted/ stalled meter turbine	c. Remove meter and check for rotation or foreign material
	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
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
	ontrol valve set at "on 0" (immediate regeneration)	d. Check programming setting and reset to NORMAL (for a delayed regen time)
	ontrol 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 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 correct REGEN button(s) is depressed and held.	a. Bypass valve in bypass position	a. Turn bypass handles to place bypass in service position
	b. Meter is not connected to meter connection on PC Board	b. Connect meter to three pin connection labeled METER on PC Board
	c. Restricted/ stalled meter turbine	c. Remove meter and check for rotation or foreign material
	d. Incorrect programming	d. Check for programming error
	e. Meter wire not installed securely into three pin connector	e. Verify meter cable wires are installed securely into three pin connector labeled METER
	f. Defective meter	f. Replace meter
	g. Defective PC Board	g. Replace PC Board

SOFTENER INSTALLATION AND USER GUIDE

Problem	Possible Cause	Solution
8. Hard or untreated water is being delivered	a. Bypass valve is open or faulty	a. Fully close bypass valve or replace
	b. Media is exhausted due to high water usage	b. Check program settings or diagnostics for abnormal water usage
	c. Meter not registering	c. Remove meter and check for rotation or foreign material
	d. Water quality fluctuation	d. Test water and adjust program values accordingly
	e. No regenerant or low level of regenerant in regenerant tank	e. Add proper regenerant to tank
	f. Control fails to draw in regenerant	f. Refer to Trouble Shooting Guide number 12
	g. Insufficient regenerant level in regenerant tank	g. Check refill setting in programming. Check refill flow control for restrictions or debris and clean or replace
	h. Damaged seal/stack assembly	h. Replace seal/stack assembly
	i. Control valve body type and piston type mix matched	i. Verify proper control valve body type and piston type match
	j. Fouled media bed	j. 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 un-kink 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

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Problem	Possible	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.
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.

SOFTENER INSTALLATION AND USER GUIDE

Problem	Possible Cause	Solution
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	a. Control valve programmed for ALT A or b, nHbP, SEPS, or AUX MAV without 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 motor ran too short (stalled) while looking for proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP	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.

8) 5 YEAR WARRANTY

Commercial Duplex Alternating Water Softener

Thank you for your purchase of our COMMERCIAL DUPLEX ALTERNATING WATER SOFTENER. For proof of purchase, please retain your Invoice/Sales Order Copy.

Warranty ~ Offered

Excalibur Water Systems warrants its products to be free from defect in materials and workmanship to the original owner from the date on the proof of purchase as described below.

Warranty ~ Working Procedures

If during the suitable warranty period, a part is defective, then Excalibur Water Systems will repair or replace that part at no charge to the original owner, with the exception of charges for nominal shipping, service and/or installation.

Warranty ~ Coverage Outlined

Excalibur Water Systems guarantees, to the original owner, a period of 5 years, the CONTROL BODY to be free of defects in materials and workmanship and to perform its proper functions. To the original owner, a period of 5 years, the ELECTRONIC CONTROL VALVES as well as all parts to be free of defects in materials and workmanship and to perform their normal functions. To the original owner, the SALT TANK and the MINERAL TANKS will not rust, corrode, leak, burst or in any other form fail to perform their proper functions for a period of 10 YEARS.

Warranty ~ Service

In the event you require service, Excalibur Water Systems Dealer will provide all necessary service and installation for your Duplex Commercial Water Softener. To obtain warranty service within 30 days of discovery of the defect, notification must be given to Excalibur Water Systems.

General Provisions

The above warranties are effective provided the WATER SOFTENER is operated at water pressures not exceeding 110psi and at water temperatures not exceeding 110°F; also provided that the water softener is not subject to abuse, misuse, alteration, neglect, freezing, accident or negligence; and provided further that the water softener is not damaged as the result of any unusual force of nature such as, but not limited to flood, hurricane, tornado or earthquake. Excalibur Water Systems is excused if failure to perform its warranty obligations is the result of strikes, government regulation, materials shortages or other circumstances beyond its control.

THERE ARE NO WARRANTIES ON THE WATER SOFTENER BEYOND THOSE SPECIFICALLY DESCRIBED ABOVE. ALL IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, ARE DISCLAIMED TO THE EXTENT THEY MIGHT EXTEND BEYOND THE ABOVE PERIODS. THE SOLE OBLIGATION OF EXCALIBUR WATER SYSTEMS UNDER THESE WARRANTIES IS TO REPLACE OR REPAIR THE COMPONENT OR PART PROVES TO BE DEFECTIVE WITHIN THE SPECIFIED TIME PERIOD AND EXCALIBUR WATER SYSTEMS IS NOT LIABLE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES. NO DEALER, AGENT, REPRESENTATIVE OR OTHER PERSON IS AUTHORIZED TO EXTEND OR EXPAND THE WARRANTIES EXPRESSED ABOVE.

Certain provinces or states do not allow limitations on how long an implied warranty lasts or exclusions or limitations of incidental or consequential damage, therefore limitations and exclusions in this warranty may not apply to you. This warranty extends you specific legal rights as you may have other rights which vary from province to province or state to state.

Excalibur Water Systems is a manufacturer of water treatment products.

142 Commerce Park Drive

Barrie, Ontario Canada

