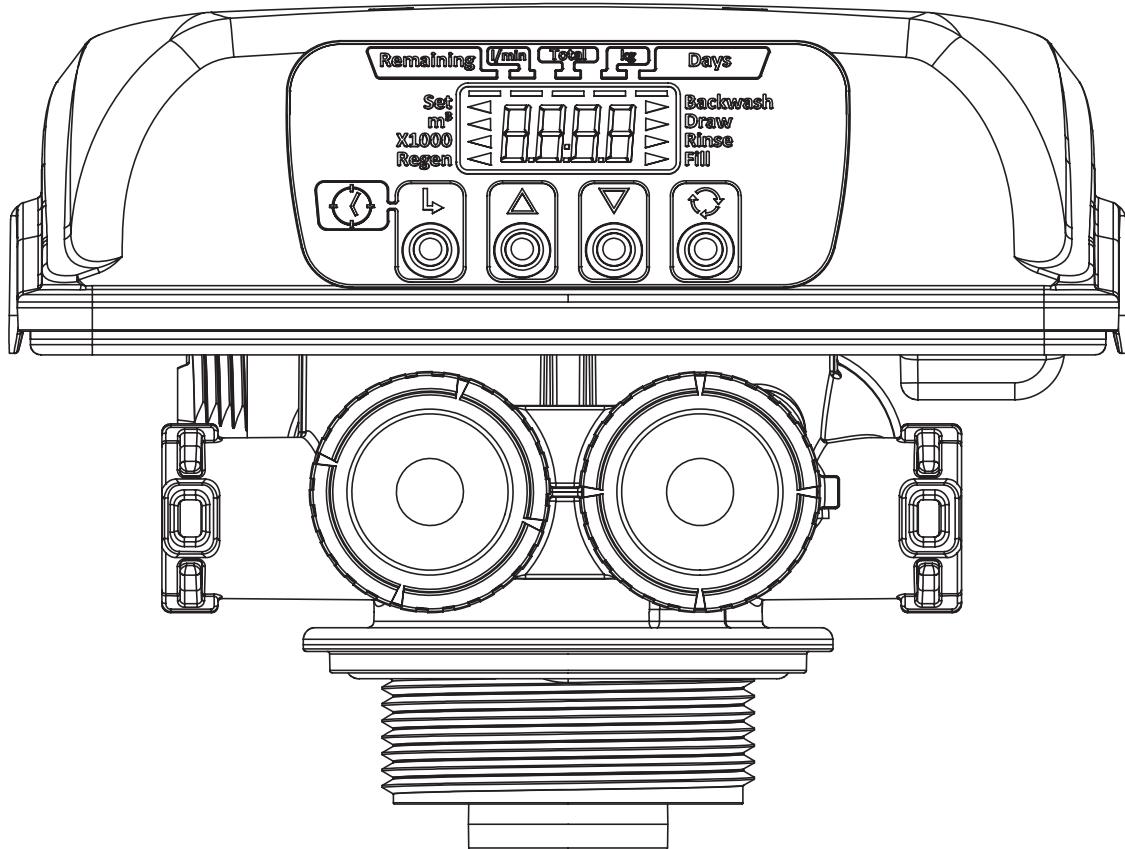




## Water specialist disc valve programming and service manual

Руководство по настройке и эксплуатации  
управляющего клапана для систем очистки воды  
Ecosoft WS1 DV



CERTIFICATES OF ECOSOFT / СЕРТИФИКАТЫ ECOSOFT



ISO  
9001:2015



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## 1. INTRODUCTION

This manual is about a control valve to be used on water softeners or water filters. The manual is designed to aid water treatment equipment manufacturers in the selection of the various control valve options. Information in this manual is different than what is needed for installation and servicing of a particular water treatment system. This manual is not intended to be used as a manual for a complete water softener or filter. Certain parts of the manual will serve as aids to manufacturers in the writing and layout of the manuals for installers and service personnel.

### General Warnings (Must appear in OEM's manual)

The following general warnings and the specifications in Table 1 must appear in the OEM's System Manual.

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

**HYDROCARBONS SUCH AS KEROSENE, BENZENE, GASOLINE, ETC., MAY DAMAGE PRODUCTS THAT CONTAIN O-RINGS OR PLASTIC COMPONENTS. EXPOSURE TO SUCH HYDROCARBONS MAY CAUSE THE PRODUCTS TO LEAK. DO NOT USE THE PRODUCT(S) CONTAINED IN THIS DOCUMENT ON WATER SUPPLIES THAT CONTAIN HYDROCARBONS SUCH AS KEROSENE, BENZENE, GASOLINE, ETC.**

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

Do not use Vaseline, oils, other hydrocarbon lubricants or spray silicone anywhere. A silicone lubricant may be used on blacko-rings but is not necessary.

The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place a screwdriver in the slots on caps and/or tap with a hammer.

Do not use pipe dope or other sealants on threads. Use Tefl on tape on the threaded inlet, outlet and drain fittings. Tefl on tape is not necessary on the nut connection or caps because of o-ring seals.

After completing any valve maintenance involving the drive assembly or the drive cap assembly unplug power source jack from the printed circuit board (black wire) and plug back in or press and hold NEXT and REGEN buttons for approximately 3 seconds. This resets the electronics and establishes the service position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

All plumbing should be done in accordance with local plumbing codes. The pipe size for the drain line should be a minimum of  $\frac{1}{2}$ ". Backwash flow rates in excess of 7 gpm (26.5 lpm) or length in excess of 20' (6.1m) require  $\frac{3}{4}$ " drain line.

Solder joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" between the drain line control fitting and solder joints when soldering pipes that are connected on the drain line control fitting. Failure to do this could cause interior damage to the drain line flow control fitting.

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 may damage the nut, split ring or o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring and o-ring. Avoid getting primer and solvent cement on any part of the o-rings, split rings, bypass valve or control valve.

Plug into an electrical outlet. Note: All electrical connections must be connected according to local codes. (Be certain the outlet is uninterrupted.)

Install grounding strap on metal pipes.

This fully automatic control valve is designed as the primary control center to direct and regulate all cycles of a water softener or filter. When the control valve is manufactured as a softener, the control valve can be ordered to perform downflow or upflow regeneration. When the control valve is set up as a filter, the control valve can be set to perform downflow regeneration or simply backwash. The control valve can be set to regenerate on demand (consumption of a predetermined amount of water) and/or as a time clock (passage of a particular number of days). The control valve can be set so that a softener can meet the Water Quality Association (WQA) Standard S100 or NSF/ANSI Standard 44 efficiency rating.

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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 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 up 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.

## 2. OEM GENERAL INSTRUCTIONS

The control valve offers multiple procedures that allow the valve to be modified to suit the needs of the installation. These procedures are:

- OEM System Setup
- Installer Displays & Settings
- User Displays

These procedures can be accessed in any order. Details on each of the procedures are provided below and on the following pages.

When in operation, normal user displays show the time of day or days remaining before regeneration. When stepping through a procedure, if no buttons are pressed within five minutes the display returns to a normal user display. Any changes made prior to the five minute time out are incorporated.

To reinitialize the control valve, check to make sure the control is in the User Display. Then simultaneously press NEXT and REGEN or unplug power source plug on the circuit board, wait approximately 3 seconds and plug back in.

## 3. BUTTON OPERATION AND FUNCTION

 UP or DOWN	Either button changes the value of the setting being viewed
 NEXT	<ol style="list-style-type: none"> <li>1. Moves to the next display</li> <li>2. While viewing Time of Day, press and hold for 3 seconds to change the time of day</li> </ol>
 REGEN	<ol style="list-style-type: none"> <li>1. Toggles a manually initiated delayed regeneration on or off</li> <li>2. Holding for more than 3 seconds forces an immediate regeneration</li> <li>3. Moves back one display while in programming mode</li> <li>4. Pressing during regeneration immediately advances the valve to the next regeneration cycle step</li> </ol>
 and	Re-homes valve, displays the software version, and resets a manually initiated regeneration request
	Key sequence to lock and unlock software. With software locked, USER and INSTALLER levels may still be viewed and set as desired.

## 4. CONTROL VALVE FUNCTION AND CYCLES OF OPERATION

**Cycle Sequence/Adjustable Cycle Default Times (minutes)**

System Type	Fill Type	Draw Type	Fill	Service	Back-wash	Draw	Back-wash	Rinse	Fill
Soft	Post	Down			8	60	8	8	4.25 kg
Soft	Pre	Down	4.25 kg	240	8	60	8	8	
Soft	Post	Up				60	8	8	4.25 kg
Soft	Pre	Up	4.25 kg	240		60	8	8	
FLT1	N/A	N/A			8			4	
FLT2	Post	Down			8	60	8	8	4.25 kg

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The control valve with a water meter can be set for the following:

- Demand Initiated Regeneration (DIR) only
- Time Clock operation only
- DIR and/or Time Clock, whichever occurs first, depending upon what settings are selected for Day Override and Volume Capacity

See Setting Options Table.

If a control valve does not contain a meter, the valve can only act as a time clock, and day override should be set to any number and gallon capacity should be set to OFF.

Reserve Capacity is automatically estimated based on water usage if RES is used.

If a specific Volume Capacity is set, reserve capacity is zero.

The control valves can be set to regenerate immediately or at the next regeneration time by changing the Regeneration Type Option (Step 3S). There are three choices for settings:

1. DELY means regeneration will occur at the preset regeneration time.
2. On 0 means regeneration will occur when the gallons capacity reaches zero.
3. RES means the regeneration will occur at the preset regeneration time when the calculated reserve amount has been reached.

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:

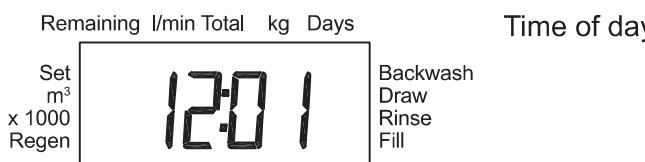
1. Press and release REGEN. The regeneration annunciator will flash on the display and the regeneration will occur at the delayed regeneration time. The user can cancel the request by pressing and releasing REGEN. NOTE: This method of manually initiating regeneration is NOT allowed when the Regeneration Type is set to On 0.
2. Press and hold REGEN for approximately 3 seconds to immediately start the regeneration. The user cannot cancel this request, except by resetting the control by pressing NEXT and REGEN simultaneously for 3 seconds.

## 5. SETTING OPTIONS TABLE

<b>System Type</b>	<b>Regeneration Option</b>	<b>Capacity</b>	<b>Day Over-ride</b>	
Soft	RES	0.10-200 kg	1-28 days	Regeneration occurs at the next regeneration time when volume capacity falls below the reserve capacity, or the specified number of days is reached, whichever comes first
Soft	RES	0.10-200 kg	OFF	Regeneration occurs at the next regeneration time when volume capacity falls below the reserve capacity
Soft	Delayed	.02-5700 m <sup>3</sup>	1-28 days	Regeneration occurs at the next regeneration time when volume capacity reaches 0, or the specified number of days is reached, whichever comes first
Soft	Delayed	.02-5700 m <sup>3</sup>	OFF	Regeneration occurs at the next regeneration time when volume capacity reaches 0
Soft	Delayed	OFF	1-28 days	Time Clock operation. Regeneration occurs at the next regeneration time the specified number of days is reached.
Soft	On 0	.02-5700 m <sup>3</sup>	1-28 days	Regeneration occurs immediately when volume capacity reaches 0, or the specified number of days is reached, whichever comes first
Soft	On 0	.02-5700 m <sup>3</sup>	OFF	Regeneration occurs immediately when volume capacity reaches 0
FLT1	Delayed	.02-5700 m <sup>3</sup>	1-28 days	Regeneration occurs at the next regeneration time when volume capacity reaches 0, or the specified number of days is reached, whichever comes first
FLT1	On 0	.02-5700 m <sup>3</sup>	OFF	Regeneration occurs immediately when volume capacity reaches 0
FLT2	Delayed	.02-5700 m <sup>3</sup>	1-28 days	Regeneration occurs at the next regeneration time when volume capacity reaches 0, or the specified number of days is reached, whichever comes first
FLT2	On 0	.02-5700 m <sup>3</sup>	OFF	Regeneration occurs immediately when volume capacity reaches 0

## 6. USER SCREENS

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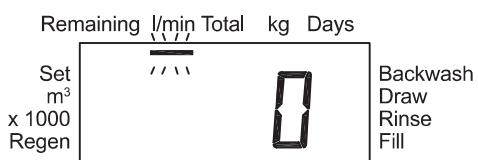
Time of day



Volume remaining until regeneration



Number of days until the next regeneration

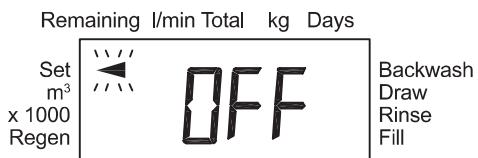


Current flow rate in LPM. Flow rate bar will flash when water is flowing.

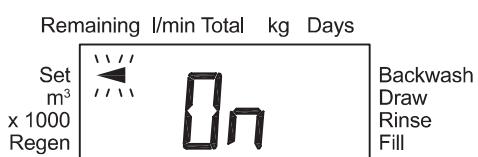


Display of the error code for the type of failure detected by the control

Code	Description of Error
101	Unable to start; motor output energized but no movement
102	Valve motor stalled; unable to find proper park position
103	Valve motor ran too long; unable to find proper park position
104	Valve unable to find home position

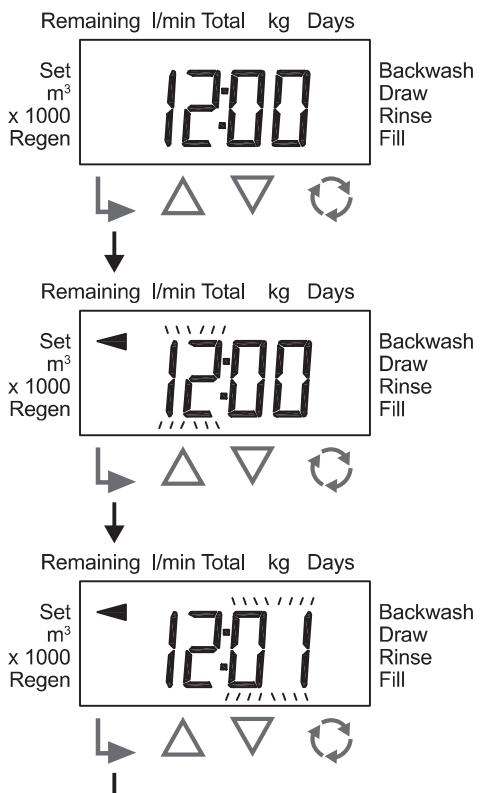


Display shown when programming is LOCKED



Display shown when programming is UNLOCKED

## 7. SET TIME OF DAY



From the Time of Day display, press and hold NEXT until the SET indicator and the hour flash

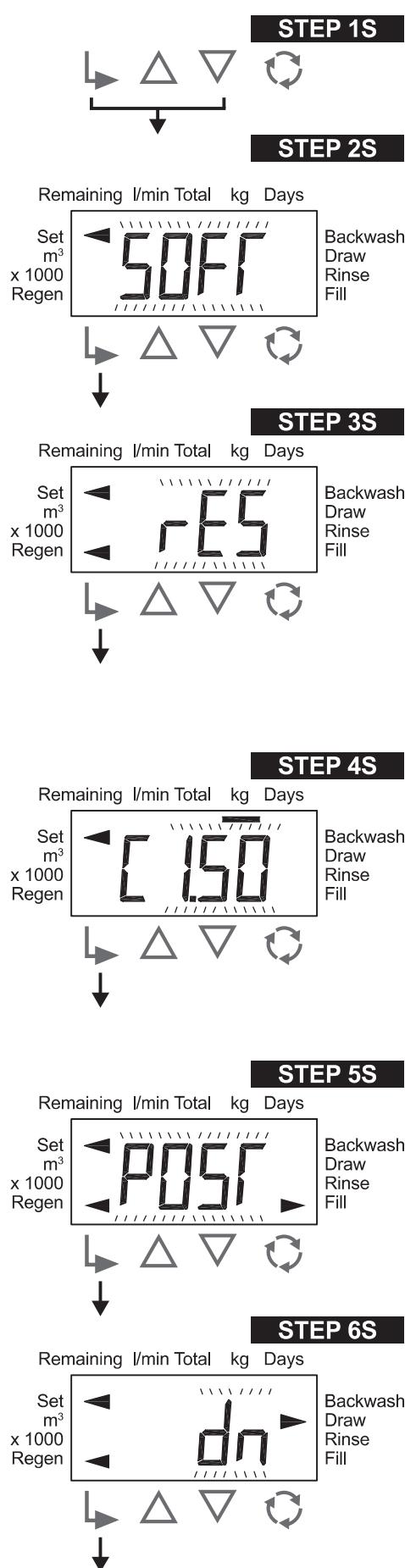
Use UP or DOWN to set the hour. Press NEXT to go to the next display.

Use UP or DOWN to set the minutes. Press NEXT to return to user level displays.

**RETURN TO  
NORMAL MODE**

## 8. OEM SYSTEM SETUP

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**STEP 1S** – From normal mode, press DOWN and NEXT simultaneously for about 3 seconds and release

**STEP 2S** – System Type – Use UP or DOWN to select System Type.

SOFT – only softening related settings are viewed

FLT1 – only first Iter settings for BACKWASH and RINSE are viewed

FLT2 – only first regeneration related settings are viewed

Press NEXT to go to Step 3S. Press REGEN to exit OEM System Setup.

**STEP 3S** – Regeneration Type - Use UP or DOWN to select Regeneration Type.

RES – Delayed regeneration with variable reserve, at the time of day set in Step 4I

DELY – Delayed regeneration at the time of day set in Step 4I

ON 0 – Immediate regeneration when Capacity Remaining reaches zero

RES is only available when Step 2S is set to SOFT.

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

**STEP 4S** – Ionic Capacity - Use UP or DOWN to select Ionic Capacity

(kg of CaCO<sub>2</sub>).

This display appears if Step 3S is set to RES.

Remaining l/min Total kg Days

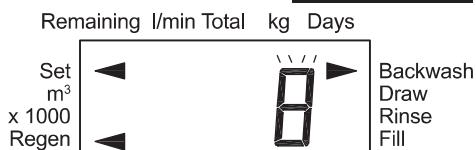
Set m<sup>3</sup>  
x 1000 Regen  
**5.00**  
Backwash Draw Rinse Fill

If DELY or ON 0 is selected in Step 3S, Volume Capacity can be set, from 0.02 m<sup>3</sup> - 5700 m<sup>3</sup> or OFF. Press NEXT to go to Step 5S. Press REGEN to return to previous step.

**STEP 5S** – Fill Type - Use UP or DOWN to select POST or PRE. This display only appears if Step 2S is set to SOFT. Press NEXT to go to Step 6S. Press REGEN to return to previous step.

**STEP 6S** – Regenerant Draw Type - Use UP or DOWN to select DN or UP regenerant draw. This display only appears if Step 2S is set to SOFT. Press NEXT to go to Step 7S. Press REGEN to return to previous step.

NOTE: The following displays show the settings when set to SOFT, POST and DN. When set to FLT1, FLT2, PRE or UP, the order and number of cycles will differ.

**STEP 7S**

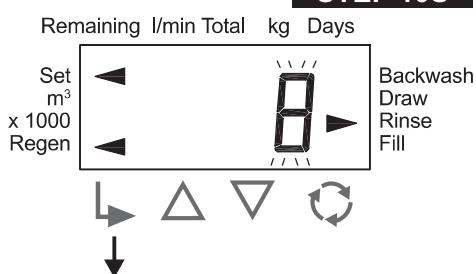
**STEP 7S** – Adjust the length of the backwash from 1-95 minutes or OFF using UP or DOWN. Press NEXT to go to Step 8S. Press REGEN to return to previous step.

**STEP 8S**

**STEP 8S** – Adjust the length of the regenerant draw from 1-180 minutes or OFF using UP or DOWN. This display will not appear if Step 2S is set to FLT1. Press NEXT to go to Step 9S. Press REGEN to return to previous step.

**STEP 9S**

**STEP 9S** – Adjust the length of the second backwash from 1-95 minutes or OFF using UP or DOWN. This display will not appear if Step 2S is set to FLT1. Press NEXT to go to Step 10S. Press REGEN to return to previous step.

**STEP 10S**

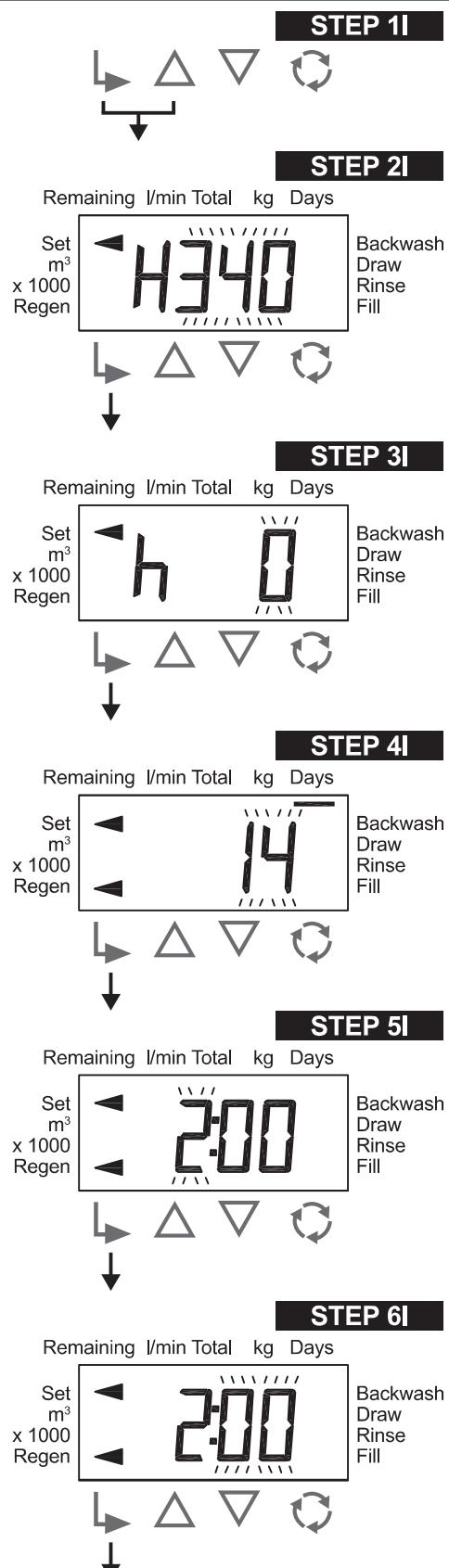
**STEP 10S** – Adjust the length of rinse from 1-95 minutes or OFF using UP or DOWN. Press NEXT to go to Step 11S. Press REGEN to return to previous step.

**STEP 11S**

**STEP 11S** – Adjust the length of fill from 0.05-90.0 Kg. of NaCl or OFF using UP or DOWN. This display will not appear if Step 2S is set to FLT1. Press NEXT to exit OEM System Setup. Press REGEN to return to previous step.

**RETURN TO  
NORMAL MODE**

## 9. OEM INSTALLER SETTINGS



**STEP 1I** – From normal mode, press UP and NEXT simultaneously for about 3 seconds and release.

**STEP 2I** – Inlet Water Hardness (PPM) - Set the amount of infl uent hardness using UP or DOWN. Press NEXT to go to Step 3I. Press REGEN to exit OEM Installer Settings.

This screen will only be displayed when “rES” is selected in step 3S.

**STEP 3I** – Service Water Hardness (PPM) - If a mixing valve is installed in the valve, service hardness needs to be set. Setting range is always less than the setting in Step 2I. This screen will only be displayed when ‘rES’ is selected in Step 3S.

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

**STEP 4I** – Day Override - Adjust day override from 1 - 28 days or OFF using UP or DOWN. Press NEXT to go to Step 5I. Press REGEN to return to previous step.

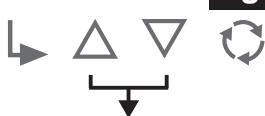
**STEP 5I** – Time of Regeneration, Hour - Set the time (hour) for regeneration using UP or DOWN. The default time is 2:00 a.m. This display will show “on 0” if “on 0” is selected in Step 3S. Press NEXT to go to Step 6I. Press REGEN to return to previous step.

**STEP 6I** – Time of Regeneration, Minutes - Set the time (minutes) for regeneration using UP or DOWN. The default time is 2:00 a.m. This display will not appear if “on 0” is selected in Step 3S. Press NEXT to exit Installer Settings. Press REGEN to return to previous step.

**RETURN TO  
NORMAL MODE**

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## 10. DIAGNOSTICS



### STEP 1D

**STEP 1D** – From normal mode, press UP and DOWN simultaneously for 3 seconds and release.

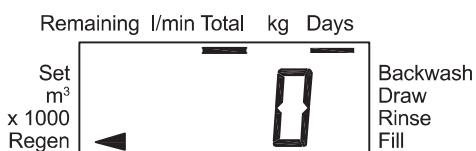
### STEP 2D

**STEP 2D** – Software version. Press NEXT to go to Step 3D. Press REGEN to exit Diagnostics.



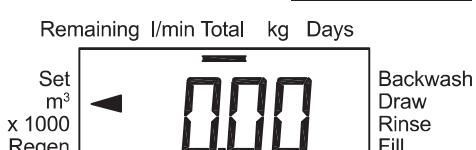
### STEP 3D

**STEP 3D** – Days Since Last Regeneration. Press NEXT to go to Step 4D. Press REGEN to return to previous step.



### STEP 4D

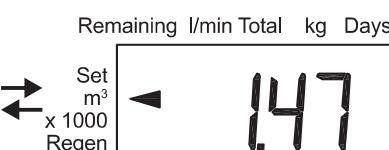
**STEP 4D** – Volume Since Last Regeneration. Press NEXT to go to Step 5D. Press REGEN to return to previous step.



### STEP 5D

**STEP 5D** – Reserve Capacity – Displays the actual reserve

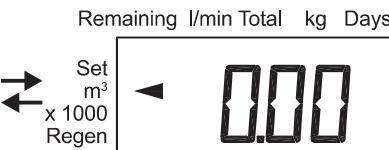
capacity calculated for yesterday. This screen will only be displayed when "rES" is selected in step 3S. Press NEXT to go to Step 6D. Press REGEN to return to previous step.



### STEP 6D

**STEP 6D** – Treated Water Usage – Displays the volume of

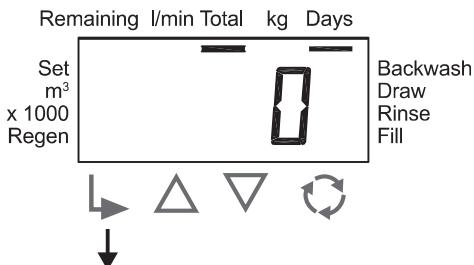
treated water per day for the past 63 days. REGEN indicator is activated for days on which a regeneration



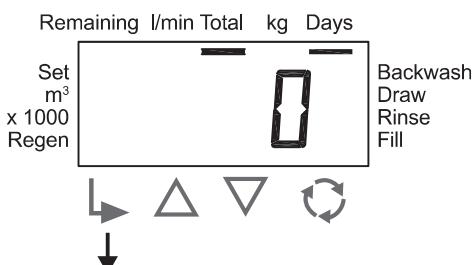
occurred. d0 = Today, d1 = Yesterday. Press NEXT to go to Step 7D. Press REGEN to return to previous step.

**STEP 7D**

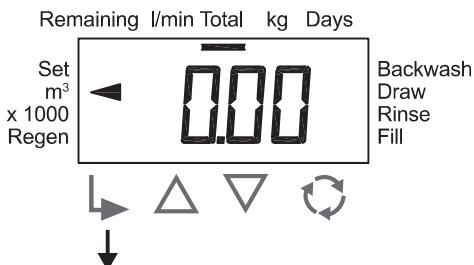
**STEP 7D – Total Days in Service.** Press NEXT to go to Step 8D. Press REGEN to return to previous step.

**STEP 8D**

**STEP 8D – Total Regenerations.** Press NEXT to go to Step 9D. Press REGEN to return to previous step.

**STEP 9D**

**STEP 9D – Total Volume of Treated Water since display was last reset.** This display can be reset by pressing and holding DOWN for about 3 seconds. Press NEXT to go to Step 10D. Press REGEN to return to previous step.

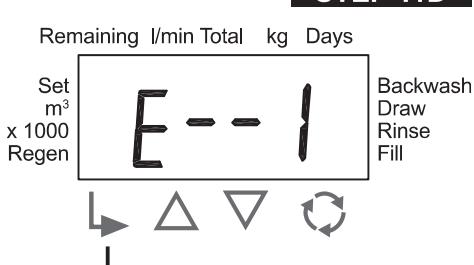
**STEP 10D**

**STEP 10D – Motor Drive Current History – Displays the motor drive current measured during the initial 0.5 seconds after leaving Brine Draw.**

Measured every fifth regeneration, up to 99 occurrences. Press NEXT to go to Step 11D. Press REGEN to return to previous step.

**STEP 11D**

**STEP 11D – Error Log -** This display shows a history of the last 10 errors generated by the control during operation. Press ▲ or ▼ to view each error recorded. Press NEXT



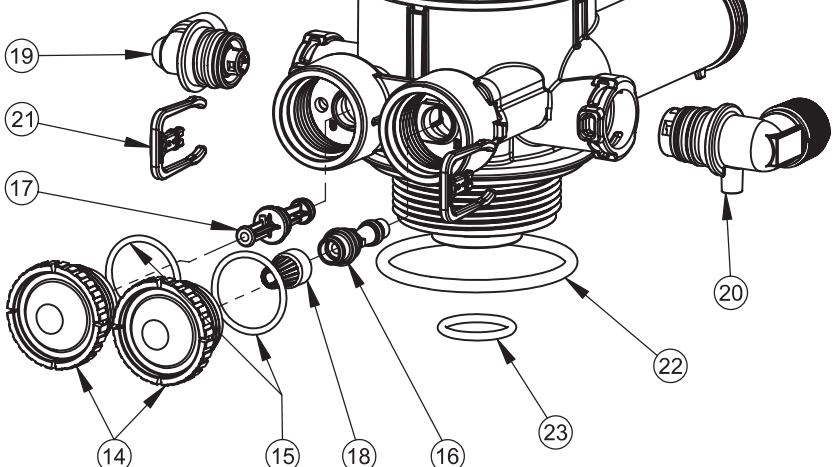
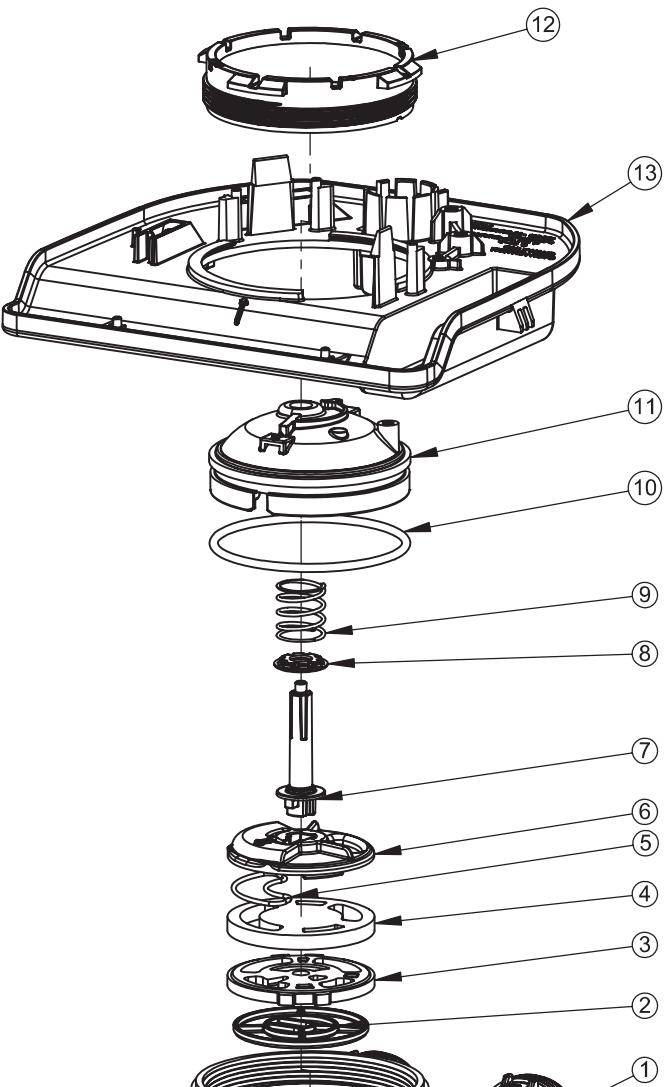
to exit Diagnostics. Press REGEN to return to previous step.

Code	Description of Error
101	Unable to start; motor output energized but no movement
102	Valve motor stalled; unable to find proper park position
103	Valve motor ran too long; unable to find proper park position
104	Valve unable to find home position

**RETURN TO  
NORMAL MODE**

## 11. DV INTERNAL COMPONENTS

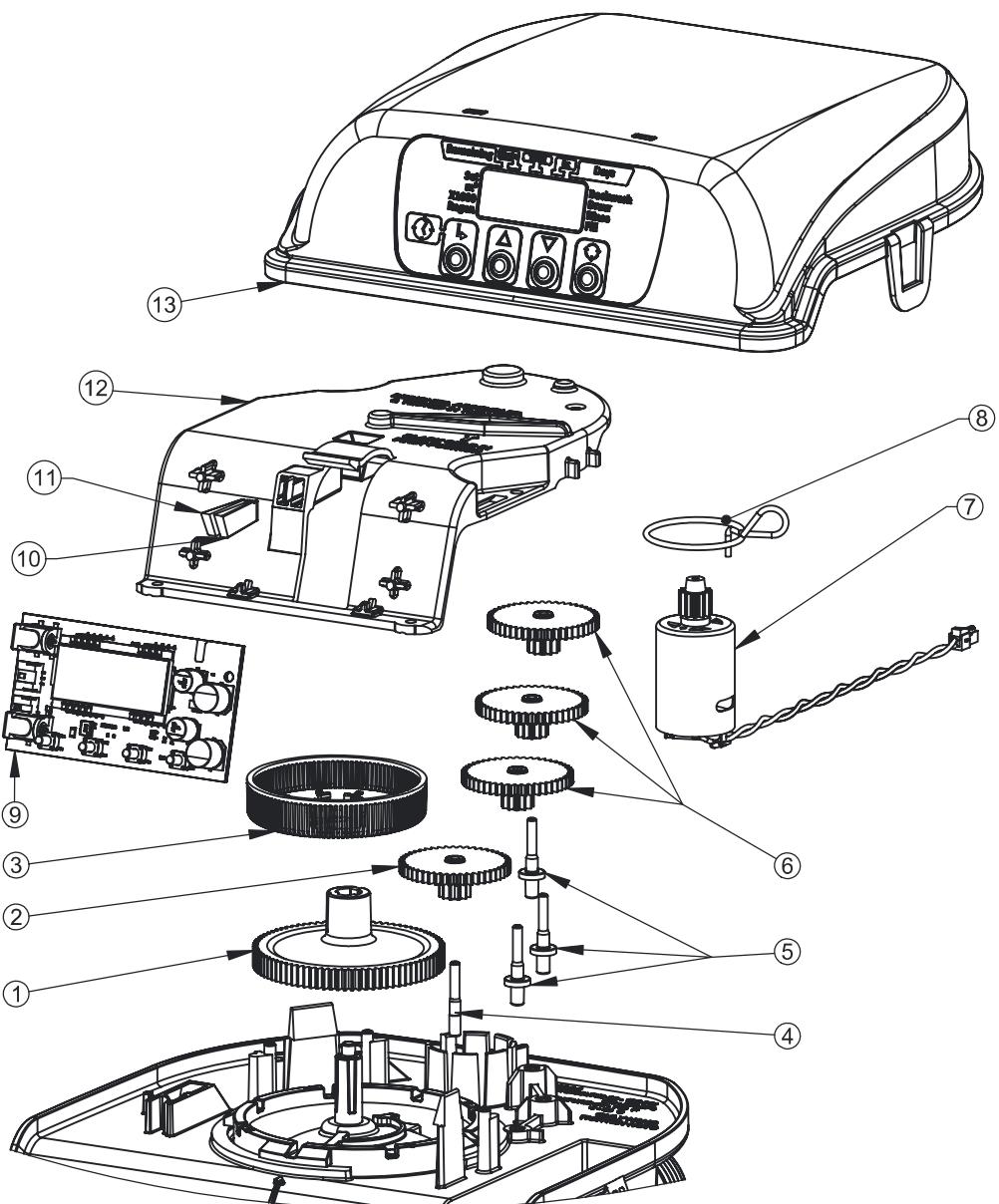
Draw-ing No.	Order No.	Description	Quan-tity
1	V4101	DV Body Assembly	1
2	V4103	DV Gasket	1
3	V4104	DV Ceramic Base Disc	1
4	V4105	DV Ceramic Top Disc	1
5	V4222	DV Disc Seal	1
6	V4106	DV Disc Drive Cap	1
7	V4110	DV Drive Shaft	1
8	V4125	DV Spring Support	1
9	V4135	DV Compression Spring	1
10	V4108	O-ring 235	1
11	V4107-01	DV Main Cap Assembly	1
12	V4111	DV Lock Ring	1
13	V4114	DV Back Plate	1
14	V4152	DV Injector Cap	2
15	V4196	O-ring 124	2
16	V3010-XX	WS1 Injector Assembly	1
17	V4121-1Z	DV Injector Asy Z Plug	1
18	V4120	DV Injector Screen	1
19	V4144-01	Elbow 3/8 Liquifit CV W/RFC	1
20	V3962	WS1 Drn Elb&Retain WO/Sil Asy	1
21	H4615	Clip Retaining 474/ WS1	1
22	V3180	O-ring 337	1
23	V3105	O-ring 215	1



## 12. DV FRONT COVER AND DRIVE ASSEMBLY

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Drawing No.	Order No.	Description	Quantity
1	V4115	DV Main Drive Gear	1
2	V4235	DV Reduction Gear 9x48	1
3	V4116	DV Encoder Wheel	1
4	V4012	T1/DV Drive Gear Axle	1
5	V4117	DV Reduction Gear Axle	3
6	V4195	DV Reduction Gear 12x48	3
7	V4133-01	DV Drive Motor Asy JST	1
8	V3113	WS1 Spring Clip	1
9	V4123PI-01BOARD	DV PI PCB	1
10	V4128	DV Encoder Guide Right	1
11	V4127	DV Encoder Guide Left	1
12	V4118	DV Drive Bracket	1
13	V4119-01W	DV Front Cover Metric Asy White	1

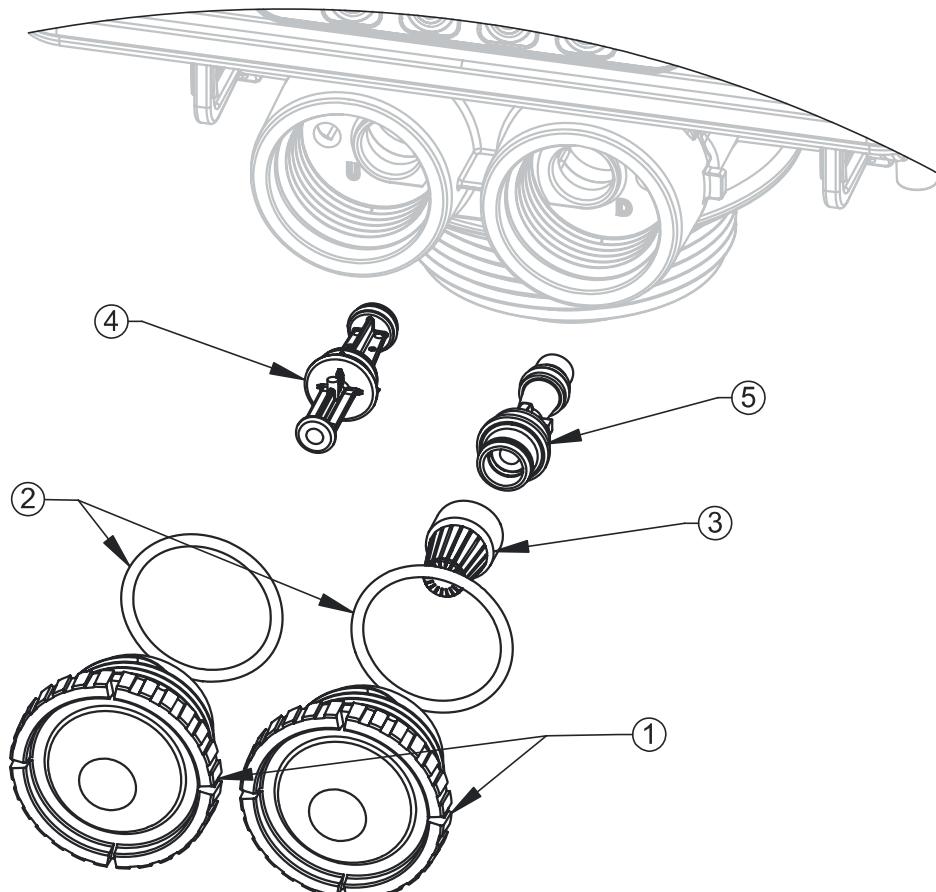


### 13. INJECTOR CAP, INJECTOR SCREEN, INJECTOR, PLUG AND O-RING

Drawing No.	Order No.	Description	Quantity
1	V4152	Injector Cap	1
2	V4196	O-ring 124	1
3	V4120	Injector Screen Cage	1
4	V4121	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. For a filter that only backwashes, injector plugs are located in both holes.



## 14. INJECTOR ORDER INFORMATION

ENG

Injector Order Number	Injector Color	Typical Tank Diameter	
		Down	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"	22"
V3010-1J	Light Blue	18"	
V3010-1K	Light Green	22"	

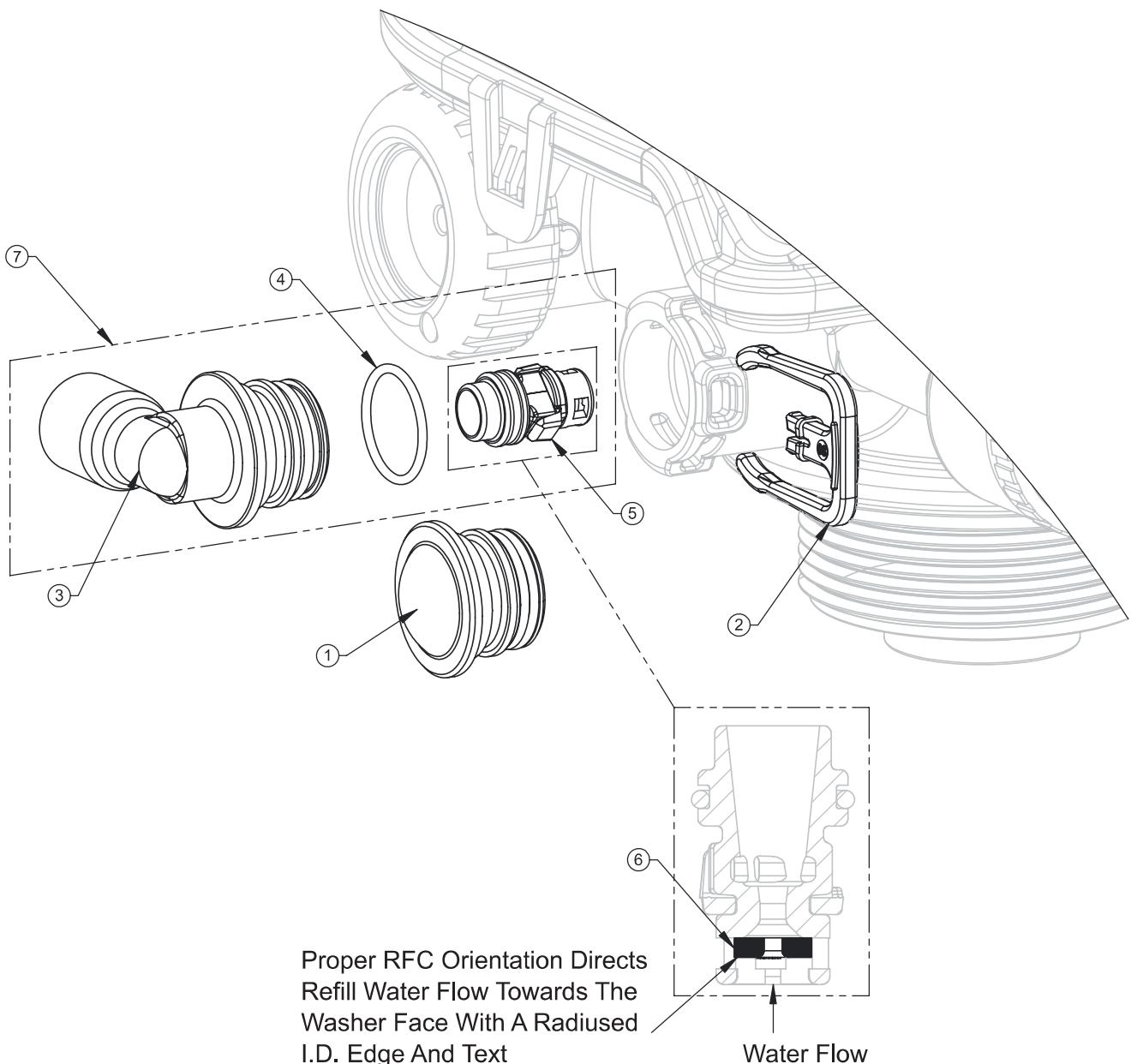
Actual tank size used may vary depending on the design and application of the system. Tank diameter is an approximation for the following:

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.

## 15. REFILL FLOW CONTROL ASSEMBLY AND REFILL PORT PLUG

Drawing No.	Order No.	Description	Quantity
1	V3195-01	WS1 Refill Port Plug Asy	1
2	H4615	Elbow Locking Clip	1
3	H4628	Elbow 3/8" Liquifit	1
4	V3163	O-ring 019	1
5	V3165-01*	WS1 RFC Retainer Asy (0.5 gpm)	1
6	V3182	WS1 RFC	
7	V4144-01	Elbow 3/8 Liquifit Asy w/RFC	
Not Shown	V3552	WS1 Brine Elbow Asy w/RFC	Option
Not Shown	H4650	Elbow 1/2" with nut and insert	Option

\* Assembly includes V3182 WS1 (0.5 gpm) RFC.



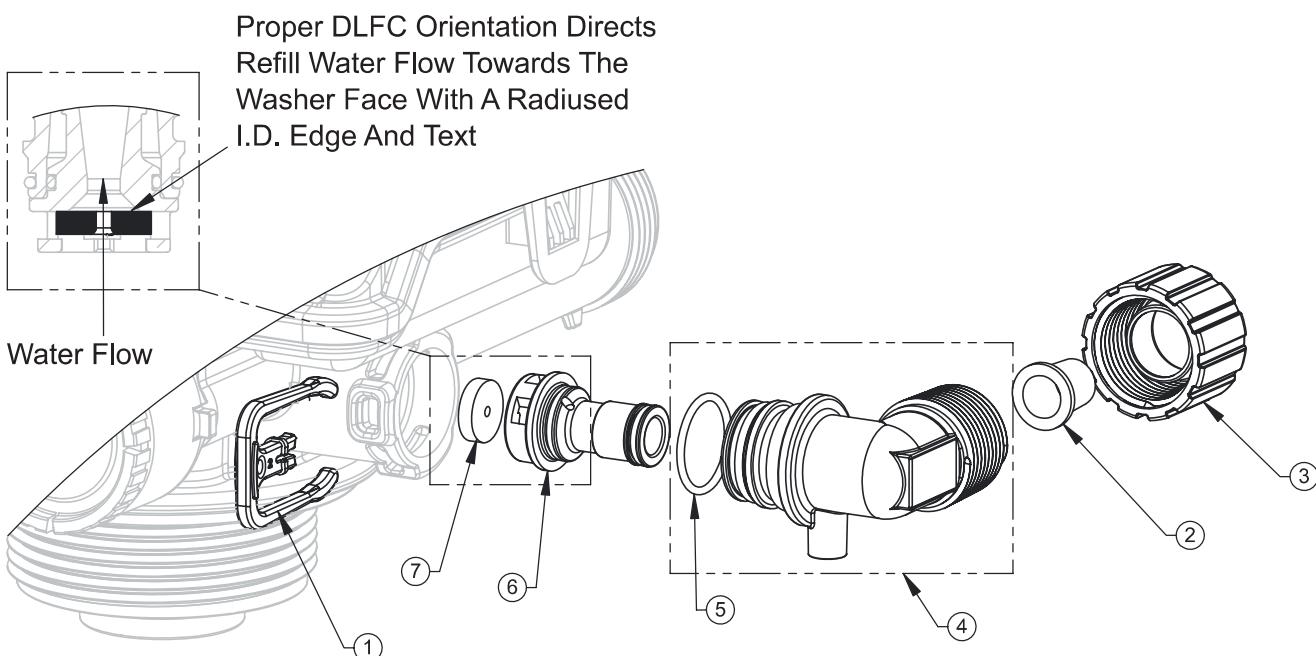
**16. DRAIN LINE – 3/4"**

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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
	V3158-02	WS1 Drain Elbow 3/4 Male No Silencer	
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: V4057 WS1 DRN ELBOW&RETAIN W/SIL ASY or V3962 WS1 DRN ELB&RETAIN WO/SIL 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).



## 17. DRAIN LINE FLOW CONTROL AND FITTING ASSEMBLY

The drain line flow control assembly includes a drain line flow control and a fitting. The drain line flow control allows proper medialed expansion by regulating the flow rate to the drain. The drain line flow control is a flexible washer-like part with an orifice and a precision molded contour. The flow rates are within  $\pm 10\%$  over the pressure range of 20 psi to 125 psi (1.4 bar to 8.6 bar). See table for flow rate information.

**Drain Line Flow Control and Fitting Assembly Information**

Drain Line Fitting	Drain Line Flow Control Order No.	Number on Drain Line Flow Control	Backwash Flow Rate (gpm)	Backwash Flow Rate (lpm)
3/4"	V3162-007	007	0.7	2.6
3/4"	V3162-010	010	1.0	3.8
3/4"	V3162-013	013	1.3	4.9
3/4"	V3162-017	017	1.7	6.4
3/4"	V3162-022	022	2.2	8.3
3/4"	V3162-027	027	2.7	10.2
3/4"	V3162-032	032	3.2	12.1
3/4"	V3162-042	042	4.2	15.9
3/4"	V3162-053	053	5.3	20.1
3/4"	V3162-065	065	6.5	24.6
3/4"	V3162-075	075	7.5	28.4
3/4"	V3162-090	090	9.0	34.1
3/4"	V3162-100	100	10.0	37.9
1"	V3190-090	090	9.0	34.1
1"	V3190-100	100	10.0	37.9
1"	V3190-110	110	11	41.6
1"	V3190-130	130	13	49.2
1"	V3190-150	150	15	56.8
1"	V3190-170	170	17	64.3
1"	V3190-200	200	20	75.7
1"	V3190-250	250	25	94.6

The drain line flow control and fitting are located on the side of the control valve and replaceable without the use of special tools.

The drain line flow control can be installed in the standard 3/4" drain line elbow, which accommodates 5/8" polytube or 3/4" NPT drain line connections. The optional nut and polytube insert for the 3/4" drain line elbow is designed for use with flexible polytube only. The 3/4" drain line elbow can be rotated 180 degrees so the outlet can be orientated to the nearest drain. The same retainer is used for all drain line flow controls for the 3/4" fitting. Drain line flow controls designed for the 3/4" fitting are available for flow rates ranging from 0.7 to 10 gpm (2.6 to 37.9 lpm).

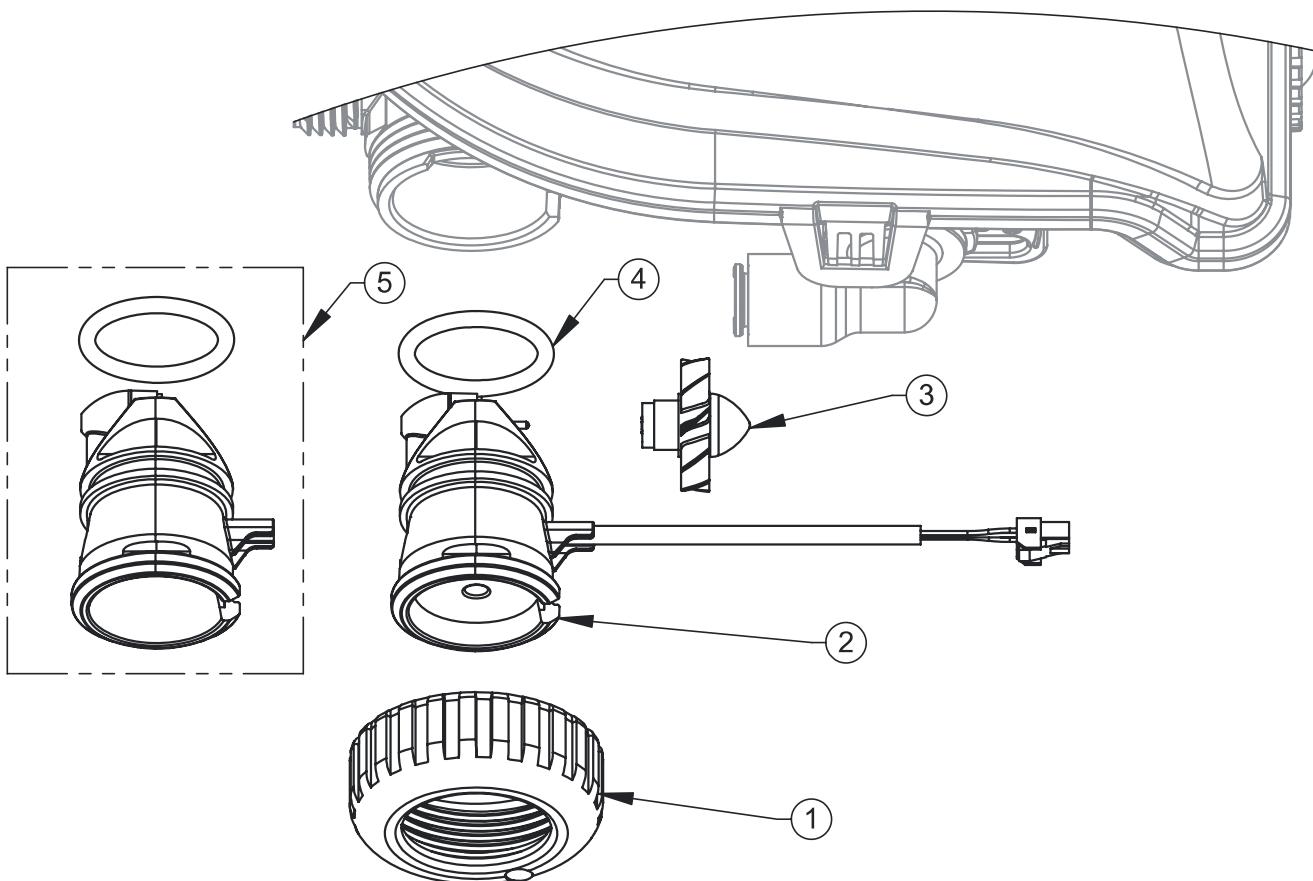
An optional 1" straight drain line fitting is available to accommodate drain line flow rates ranging from 9 to 25 gpm (34.1 to 94.6 lpm). This fitting is straight but still connects to the control valve using the same locking clip. The drain line flow control is located between two fitted parts (i.e. the fitting acts as the retainer). The nut is unscrewed to access the drain line flow control.

## 18. WATER METER, METER PLUG AND MIXING VALVE

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Drawing No.	Order No.	Description	Quantity
1	V3151	WS1 Nut 1" QC	1
2	V4173*	DV Meter Asy JST	1
3	V3118-01	WS1 Turbine ASY	1
4	V3105	O-ring 215	1
5	V3003-01	WS1 Meter Plug ASY	1
6	V3013	Mixing Valve	Option

\* Order number V4173 includes V3118-01 WS1 Turbine ASY and V3105 O-ring 215.



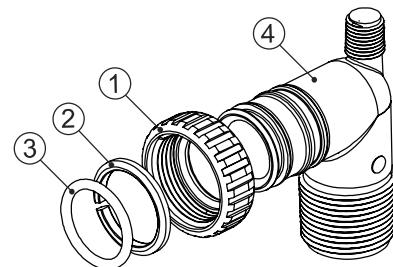
**THIS WATER METER SHOULD NOT BE USED AS THE PRIMARY MONITORING DEVICE FOR CRITICAL OR HEALTH EFFECT APPLICATIONS.**

## 19. INSTALLATION FITTING ASSEMBLIES

**Order No: V3007**

**Description: WS1 Fitting 1" PVC Male NPT Elbow Assembly**

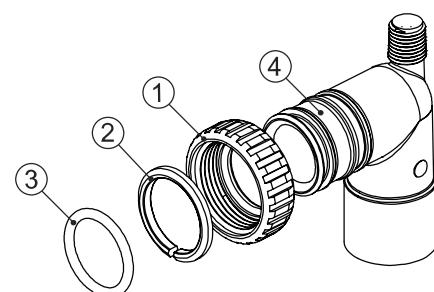
Draw-ing No.	Order No.	Description	Quan-tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3149	WS1 FITTING 1 PVC MALE NPT ELBOW	2



**Order No: V3007-01**

**Description: WS1 Fitting 3/4" & 1" PVC Solvent 90° ASY**

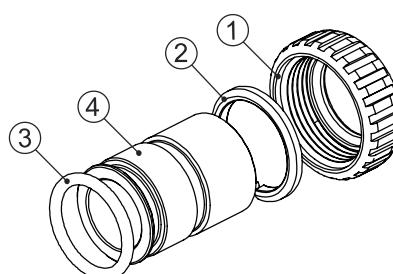
Draw-ing No.	Order No.	Description	Quan-tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3189	WS1 FITTING 3/4&1 PVC SOLVENT 90	2



**Order No: V3007-02LF**

**Description: WS1 Fitting 1" Brass Sweat Assembly LF**

Draw-ing No.	Order No.	Description	Quan-tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3188-LF	WS1 FITTING 1 BRASS SWEAT ASSEMBLY LF	2

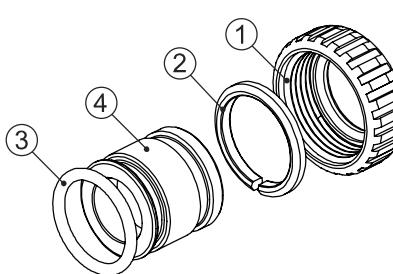


**DO NOT INSTALL IN CALIFORNIA**

**Order No: V3007-03LF**

**Description: WS1 Fitting 3/4" Brass Sweat Assembly LF**

Draw-ing No.	Order No.	Description	Quan-tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3188-01LF	WS1 FITTING 3/4 BRASS SWEAT LF	2

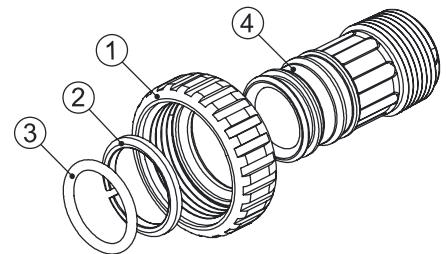


**DO NOT INSTALL IN CALIFORNIA**

**Order No: V3007-04**

**Description: WS1 Fitting 1" Plastic Male NPT Assembly**

Draw-ing No.	Order No.	Description	Quan- tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3164	WS1 FITTING 1" PLASTIC MALE NPT	2

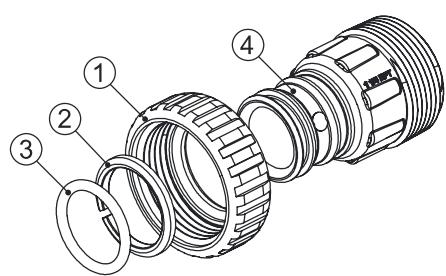


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**Order No: V3007-05**

**Description: WS1 Fitting 1-1/4" Plastic Male NPT Assembly**

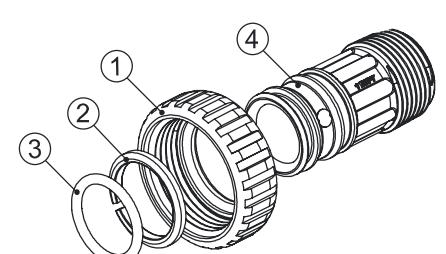
Draw-ing No.	Order No.	Description	Quan- tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3317	WS1 FITTING 1-1/4" PLASTIC MALE NPT	2



**Order No: V3007-06**

**Description: WS1 Fitting 1" Plastic Male BSPT Assembly**

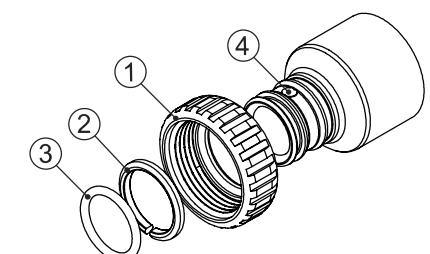
Draw-ing No.	Order No.	Description	Quan- tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3316	WS1 FITTING 1" PLASTIC MALE BSPT	2



**Order No: V3007-07**

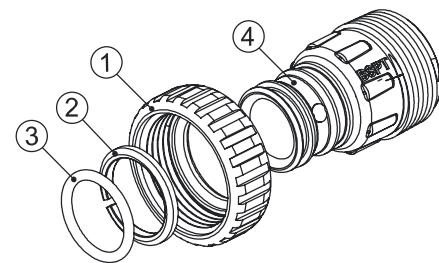
**Description: WS1 Fitting 1-1/4" & 1-1/2" PVC Solvent Assembly**

Draw-ing No.	Order No.	Description	Quan- tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3352	WS1 FITTING 1-1/4"&1-1/2" PVC SOLVENT	2

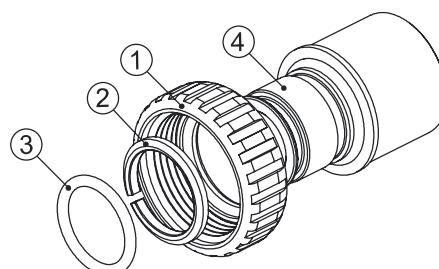


**Order No. V3007-08****Description: WS1 Fitting 1-1/4" Plastic Male BSPT Assembly**

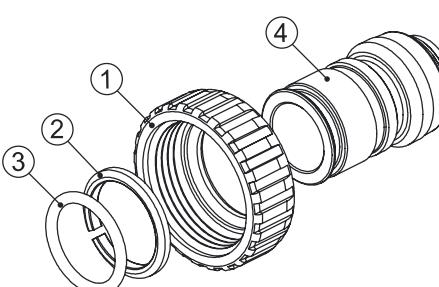
Draw- ing No.	Order No.	Description	Quan- tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3164	WS1 FITTING 1-1/4" PLASTIC MALE BSPT	2

**Order No: V3007-09LF****Description: WS1 Fitting 1-1/4" & 1-1/2" Brass Sweat Assembly LF**

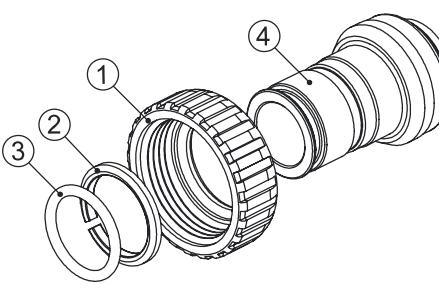
Draw- ing No.	Order No.	Description	Quan- tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3375-LF	WS1 FITTING 1-1/4" & 1-1/2" BRASS SWEAT LF	2

**Order No. V3007-12LF****Description: WS1 Fitting 3/4" Brass SharkBite Assembly LF**

Draw- ing No.	Order No.	Description	Quan- tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3628-LF	WS1 FTG 3/4 BRASS SHARKBITE LF	2

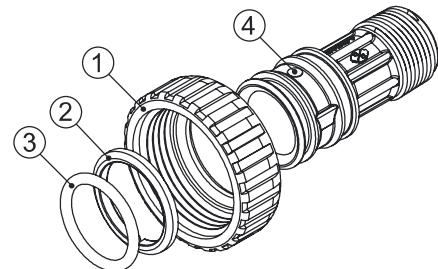
**Order No. V3007-13LF****Description: WS1 Fitting 1" Brass SharkBite Assembly LF**

Draw- ing No.	Order No.	Description	Quan- tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3352	WS1 FTG 1" BRASS SHARKBITE LF	2



**Order No. V3007-14****Description: WS1 Fitting 3/4" Plastic Male BSPT Assembly**

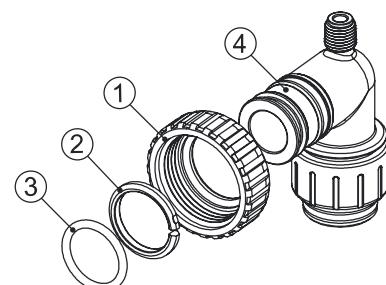
Draw-ing No.	Order No.	Description	Quan-tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3594	WS1 FITTING 3/4" PLASTIC MALE BSPT	2



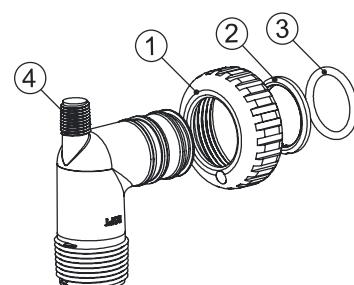
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**Order No. V3007-15****Description: WS1 FTG 3/4 JG QC 90 ASY**

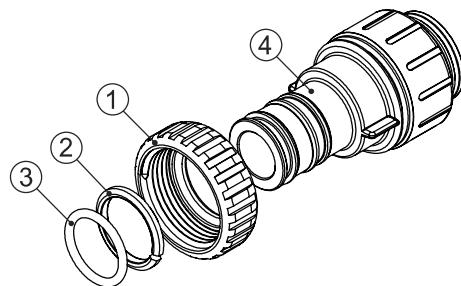
Draw-ing No.	Order No.	Description	Quan-tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3790	WS1 ELBOW 3/4 QC W/STEM	2

**Order No. V3007-16****Description: WS1 Fitting 1" PVC Male BSPT Elbow Assembly**

Draw-ing No.	Order No.	Description	Quan-tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3797	WS1 FTG 1" PVC MALE BSPT ELBOW	2

**Order No. V3007-17****Description: WS1 FTG 1" JG QC ASY**

Draw-ing No.	Order No.	Description	Quan-tity
1	V3151	WS1 NUT 1" QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V4045	WS1 FTG 1 INCH QC	2

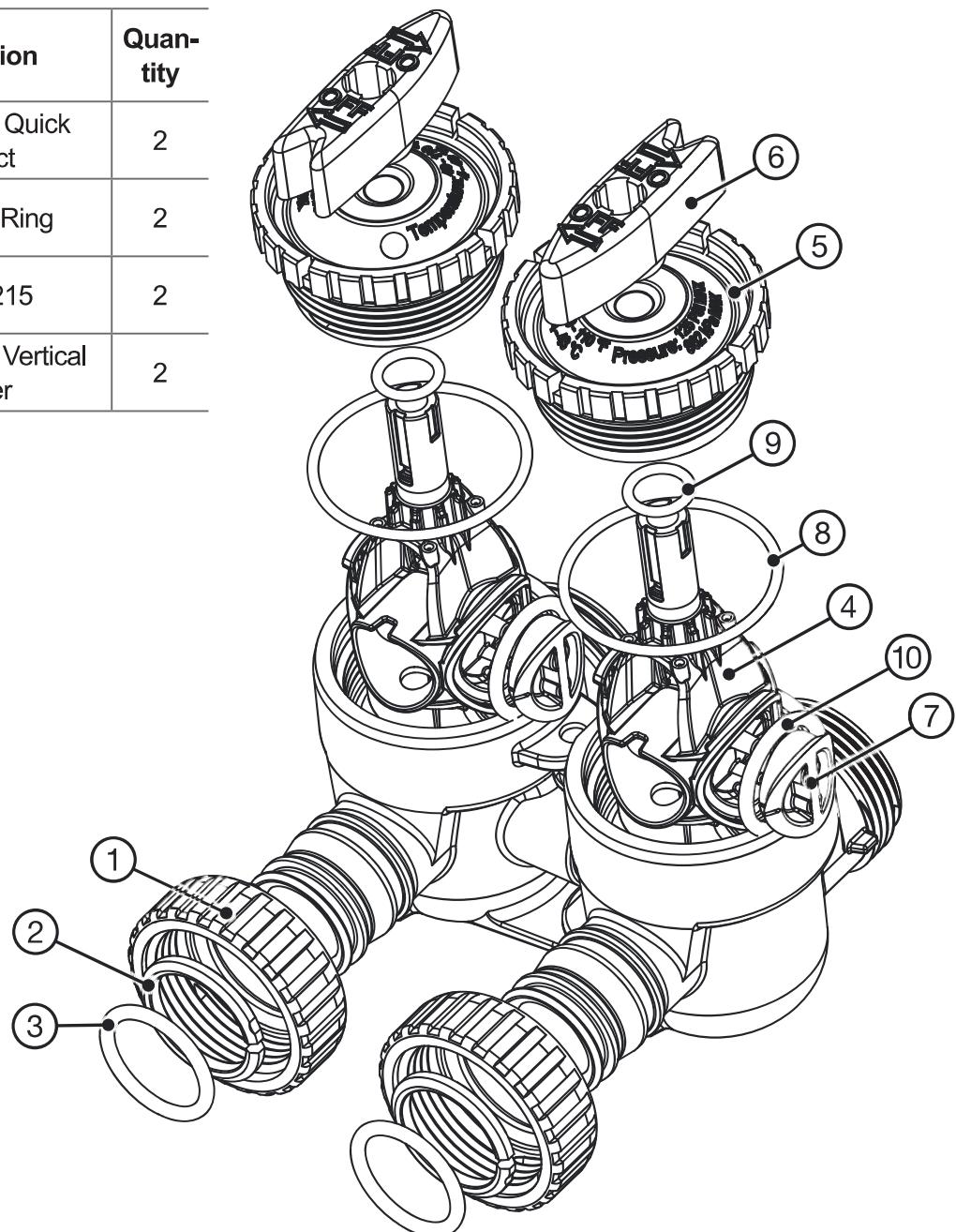


## 20. BYPASS VALVE

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

(Not Shown) Order No. V3191-01, Description: WS1 Bypass Vertical Adapter Assembly

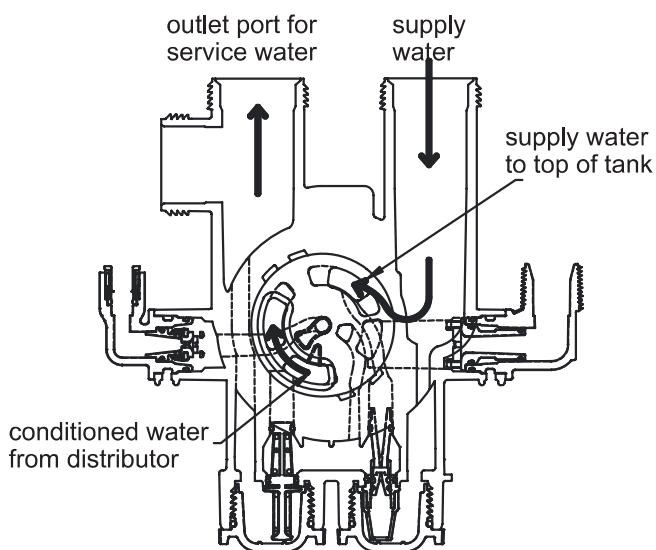
Order No.	Description	Quan-tity
V3151	WS1 Nut 1" Quick Connect	2
V3150	WS1 Split Ring	2
V3105	O-Ring 215	2
V3191	WS1 Bypass Vertical Adapter	2



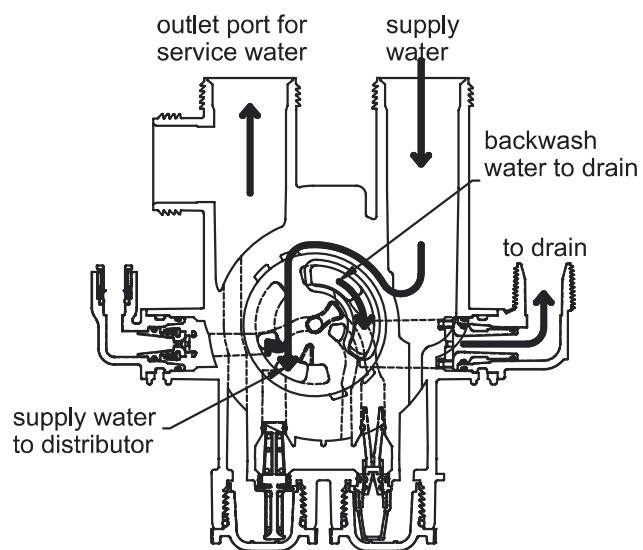
## 21. FLOW DIAGRAMS

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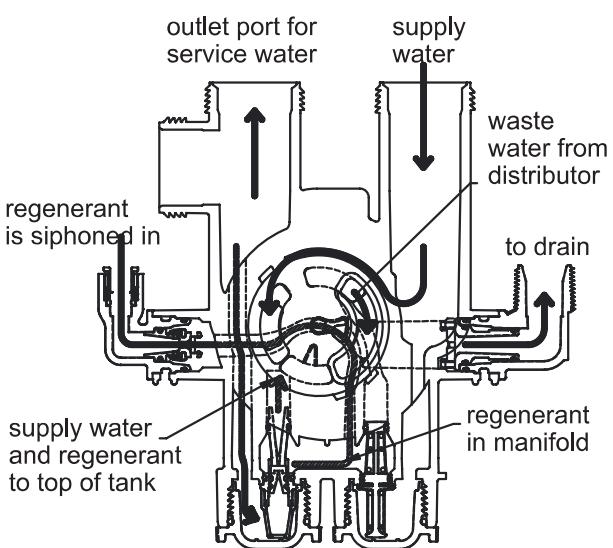
### SERVICE



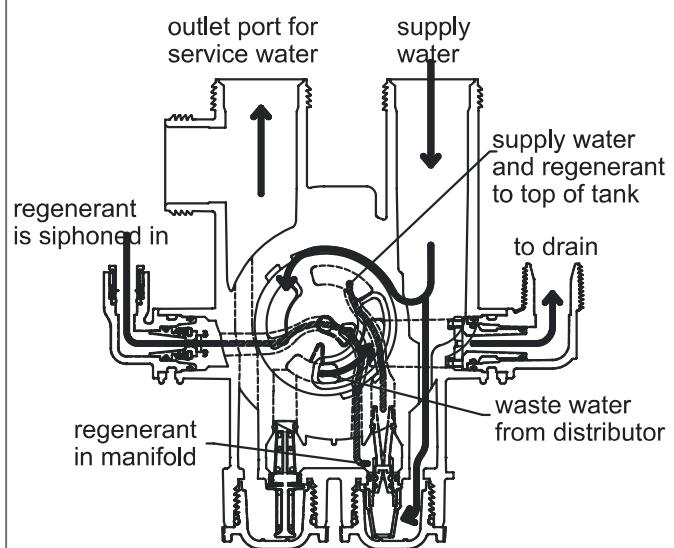
### BACKWASH



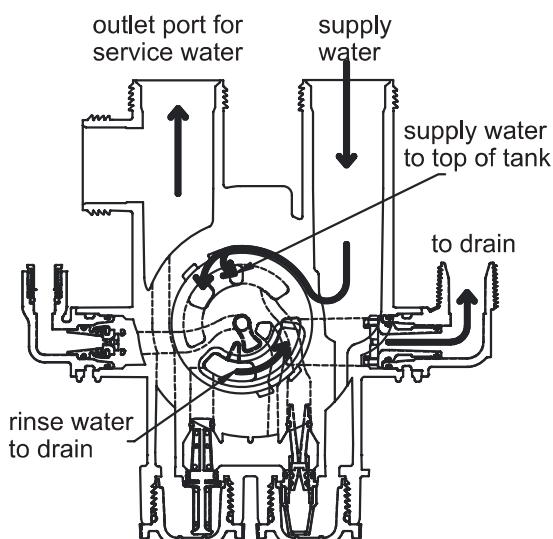
### UPFLOW BRINE



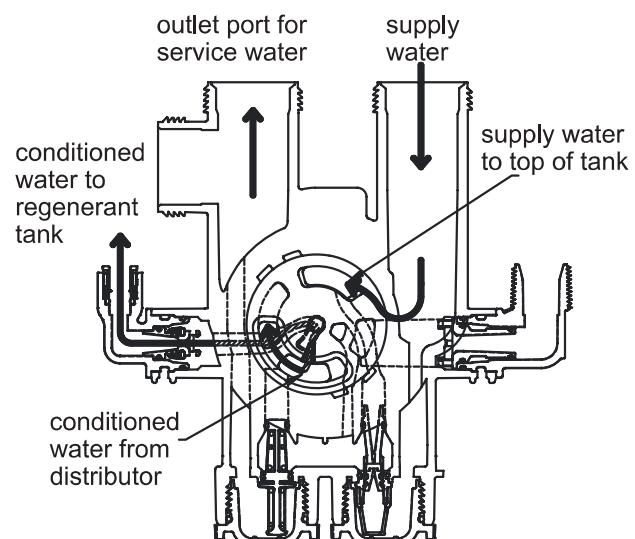
### DOWNGELOW BRINE



### RINSE



### FILL



## 22. SERVICE SPANNER WRENCH

**Order No. V3193-02**

### Service Spanner Wrench

Although no tools are necessary to assemble or disassemble the valve, the wrench (shown in various positions on the valve) may be purchased to aid in assembly or disassembly.

