



Plus
AQUA MAGIC
1.5EE

Owner and Operational Manual

Model: _____

Serial Number: _____

Install Date: _____

Installed By: _____

Service Phone: _____

Sold By: _____



Please read this manual carefully before proceeding with installation. Your failure to follow any of these instructions or operating parameters may lead to personal injury or damage to the equipment and/or personal property. Do not use this water treatment system with water that is microbiologically unsafe or of unknown quality, without adequate disinfection before or after the system. This water treatment system contains replaceable treatment components critical for effective performance. It is the user's responsibility to periodically test the product water to verify the system is performing satisfactorily. Failure to properly maintain this water treatment system may cause a health risk.

Save this manual for future reference

Table of Contents

Introduction/General Warnings	4
WS1.5P General Specifications	6
WS1.5P Drive Cap Assembly, Pistons, Stack Assembly, & Main Body	7
WS1.5PB Drive Cap Assembly, Pistons, Stack Assembly, & Main Body	8
WS1.5P Regenerant Components	9
WS1.5" Injectors	10
WS2P General Specifications	11
WS2P Drive Cap Assembly, Pistons, Stack Assembly, & Main Body	12
WS2 Injector Valve Body, Refill Flow Control, and Injector	13
WS2" and 2" QC Injectors.....	14
WS1.5" Injector Flow Graphs: U.S. Units.....	15
WS1.5" Injector Flow Graphs: Metric Units	16
WS2" Injector Flow Graphs: U.S. Units.....	17
WS2" Injector Flow Graphs: Metric Units	18
Fitting Kits.....	19
Drain Line Flow Control Washers.....	21
Troubleshooting Procedures	22

Introduction

This manual is for 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 service of a particular water treatment system. This manual is not intended to be used as a manual for a complete water softener or filter.

General Warnings



- **Slip Hazard:** Valve may leak during service.
- Keep areas free of water spills.



Disconnect from electrical power prior to servicing the valve.



Pressure hazard; depressurize valve before servicing.



- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH of CHILDREN**.
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.

Service and maintenance should be performed by qualified personnel only.

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

USE ONLY SILICONE-BASED LUBRICANTS ON ALL CLACK COMPONENTS. HYDROCARBONS WILL DAMAGE COMPONENTS THAT CONTAIN O-RINGS AND/OR PLASTIC. THIS CAN CAUSE LEAKS OR BREAKAGE. DO NOT USE LUBRICANTS THAT CONTAIN HYDROCARBONS SUCH AS VASELINE®/PETROLEUM JELLY, WD-40®, ETC. DO NOT USE CLACK CONTROL VALVE PRODUCTS ON WATER SUPPLIES THAT CONTAIN HYDROCARBONS SUCH AS BENZENE, GASOLINE, KEROSENE, ETC. THIS WATER METER SHOULD NOT BE USED AS THE PRIMARY MONITORING DEVICE FOR CRITICAL OR HEALTH EFFECT APPLICATIONS

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 Teflon tape on the threaded inlet, outlet, and drain fittings. Teflon 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 and pistons, reset the PC board. This can be done by unplugging the power source from the printed circuit board (black wire) and plugging it back in or by pressing and holding NEXT and REGEN buttons for 3 seconds. 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 1". Backwash flow rates in excess of 25 GPM (94.6 Lpm) or length in excess of 20' (6.1 m) with no air-gap or vacuum breaker to protect the system will require 1½" 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 glass-filled Noryl¹ (or equivalent) fully automatic control valve is designed as the primary control center to direct and regulate all cycles of a water softener or filter.

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 replenishing of treated water into a regenerant tank, when applicable.

Control valve installation is made easy because the distributor tube can be cut ½" above to ½" 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 power adapter comes with a 15-foot power cord and is designed for use with the control valve. The power adapter is for dry location use only. The control valve remembers all settings until the battery power is depleted if the power goes out. After the battery power is depleted, the only item that needs to be reset is the time of day; other values are permanently stored in the nonvolatile memory. The control valve battery is not rechargeable but is replaceable.

No user-serviceable parts are on the PC board, the motor, or the power adapter. The means of disconnection from the main power supply is by unplugging the power adapter from the wall.

EQUIPMENT IS NOT FOR USE IN AN ATEX ENVIRONMENT.

¹Noryl is a trademark of SABIC.

WS1.5P/PB General Specifications

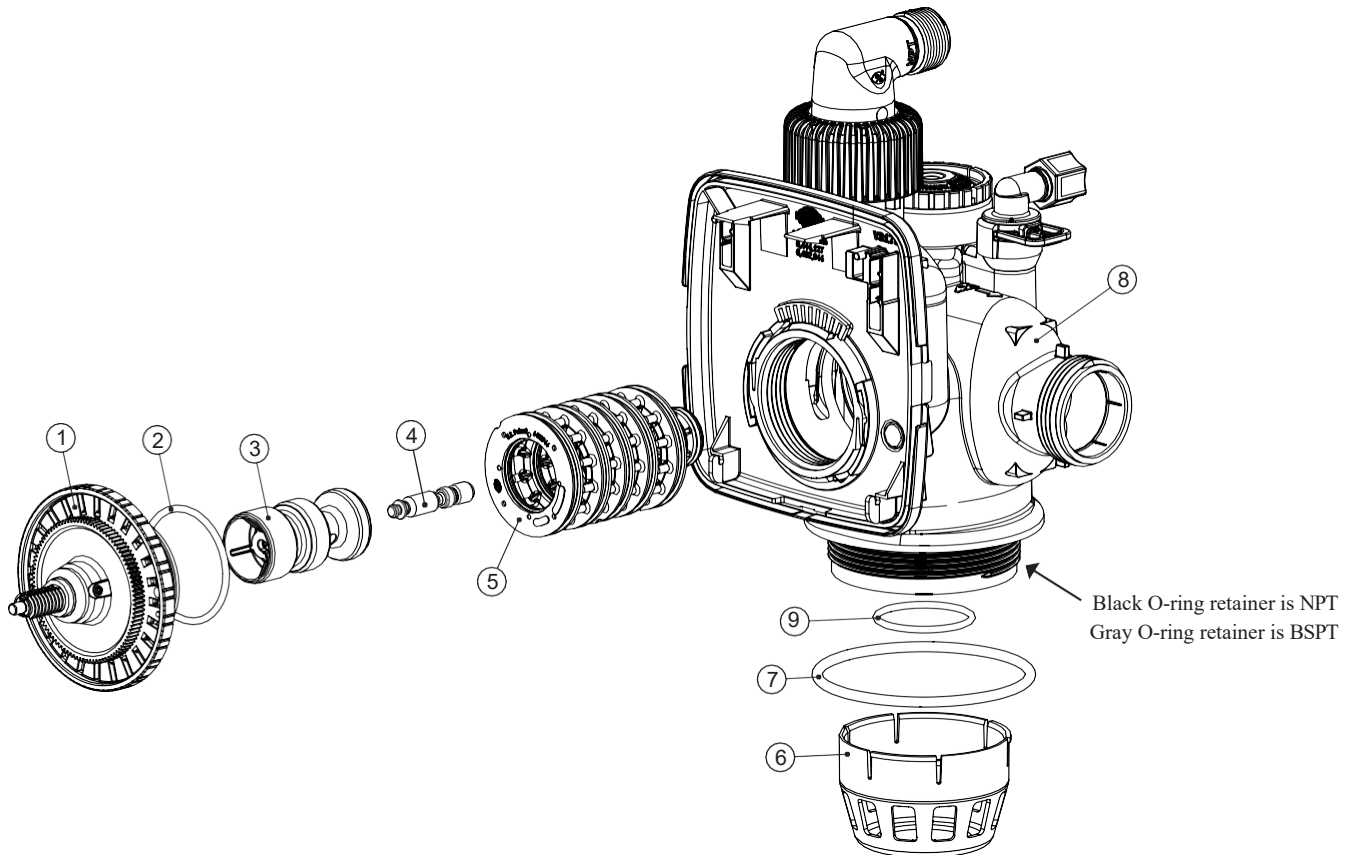
Minimum/Maximum Operating Pressures	20 – 125 psi (138 kPa – 862 kPa)	
Minimum/Maximum Operating Temperatures	40°F – 110°F (4°C – 43°C)	
Power Adapter:	U.S.	International
Supply Voltage	100 VAC – 120 VAC	200 VAC – 240 VAC
Supply Frequency	50/60 Hz	50/60 Hz
Output Voltage	15VDC	15VDC
Output Current	500 mA	500 mA
Service flow rate	WS1.5P Valve: 60 gpm @ 15 psi drop (227 lpm, 13.6 m ³ /h) WS1.5PB Valve: 48 gpm @ 15 psi drop (181 lpm, 10.9 m ³ /h)	
Backwash flow rate	WS1.5P Valve: 43 gpm @ 25 psi drop (163 lpm, 9.8 m ³ /h) WS1.5PB Valve: 43 gpm @ 25 psi drop (163 lpm, 9.8 m ³ /h)	
Meter:		
Accuracy	±5%	
Flow Range	0.75 – 75 gpm (2.8 – 284 lpm)	
Inlet/Outlet	1.5" Male NPT or BSPT	
Drain line	1" Male Elbow NPT or 1" BSPT	
Brine line	½" OD polytube compression	
Tank connection	4"-8 UN	
Height from top of tank	10.75"	
PC board memory	Nonvolatile EEPROM	
Valve material	Glass-filled composite	
Regenerant/chemical compatibility	Sodium chloride, potassium chloride, potassium permanganate, sodium bisulfite, chlorine, and chloramines	
Regeneration	Downflow or upflow	
Tank applications	12" – 24" diameter	

WS1.5P Drive Cap Assembly, Pistons, Stack Assembly, & Main Body

Drawing No.	Order No.	Description	Quantity
1	V3004	WS1 DRIVE CAP ASSEMBLY	1
2	V3135	O-RING 228	1
3	V3407	WS125/15 PISTON DOWNFLOW ASSEMBLY (AMBER)	1
	V4042	WS112/15 PISTON UPFLOW ASSEMBLY (BLACK)	
4	V3174*	WS1 REGENERANT PISTON	1
5	V3430-01	WS1.5 SPACER STACK ASSEMBLY	1
6	D1300	TOP BAFFLE DIFFUSER 1.5/55MM	1
7	V3419	O-RING 347	1
8	V4400-NPT	WS15P NPT BODY ASSEMBLY	1
	V4400-BSPT	WS15P BSPT BODY ASSEMBLY	
9	V3641	O-RING 225 FOR VALVE BODIES WITH NPT THREADS	1
	V3441	O-RING 226 FOR VALVE BODIES WITH BSPT THREADS	1

*V3174 Regenerant Piston not used for Backwash Only valves. Use V3010-15Z Injector Plug and V3195-01 Refill Port Plug Assembly.

** Inlet/Outlet fitting kits are sold separate, see page 10 for fitting selection.

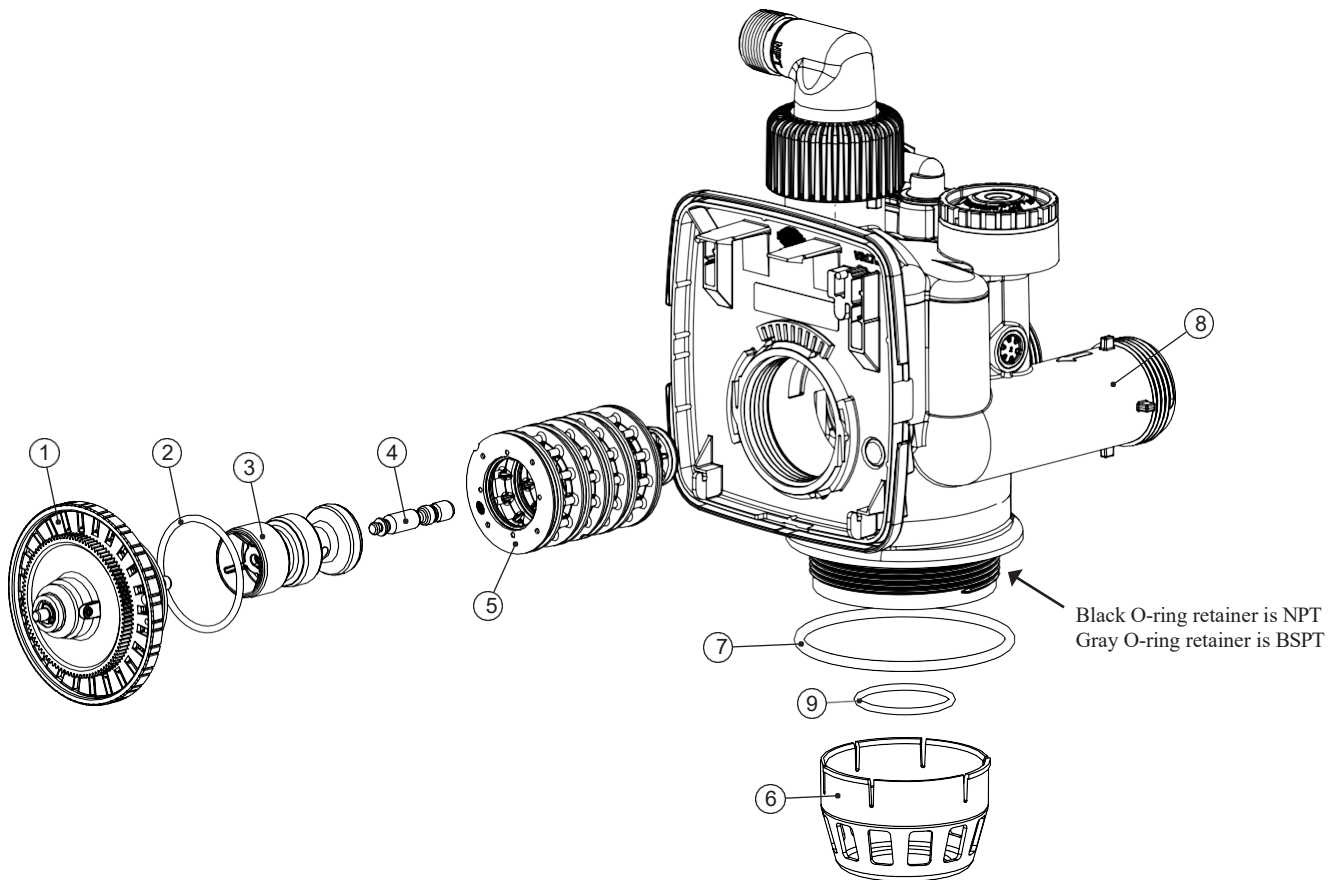


WS1.5PB Drive Cap Assembly, Pistons, Stack Assembly, & Main Body

Drawing No.	Order No.	Description	Quantity
1	V3004	WS1 DRIVE CAP ASSEMBLY	1
2	V3135	O-RING 228	1
3	V3407	WS125/15 PISTON DOWNFLOW ASSEMBLY (AMBER)	1
	V4042	WS112/15 PISTON UPFLOW ASSEMBLY (BLACK)	
4	V3174*	WS1 REGENERANT PISTON	1
5	V3430-01	WS1.5 SPACER STACK ASSEMBLY	1
6	D1300	TOP BAFFLE DIFFUSER 1.5/55MM	1
7	V3419	O-RING 347	1
8	V4900-NPT	WS15P NPT BODY ASSEMBLY	1
	V4900-BSPT	WS15P BSPT BODY ASSEMBLY	
9	V3641	O-RING 225 FOR VALVE BODIES WITH NPT THREADS	1
	V3441	O-RING 226 FOR VALVE BODIES WITH BSPT THREADS	1

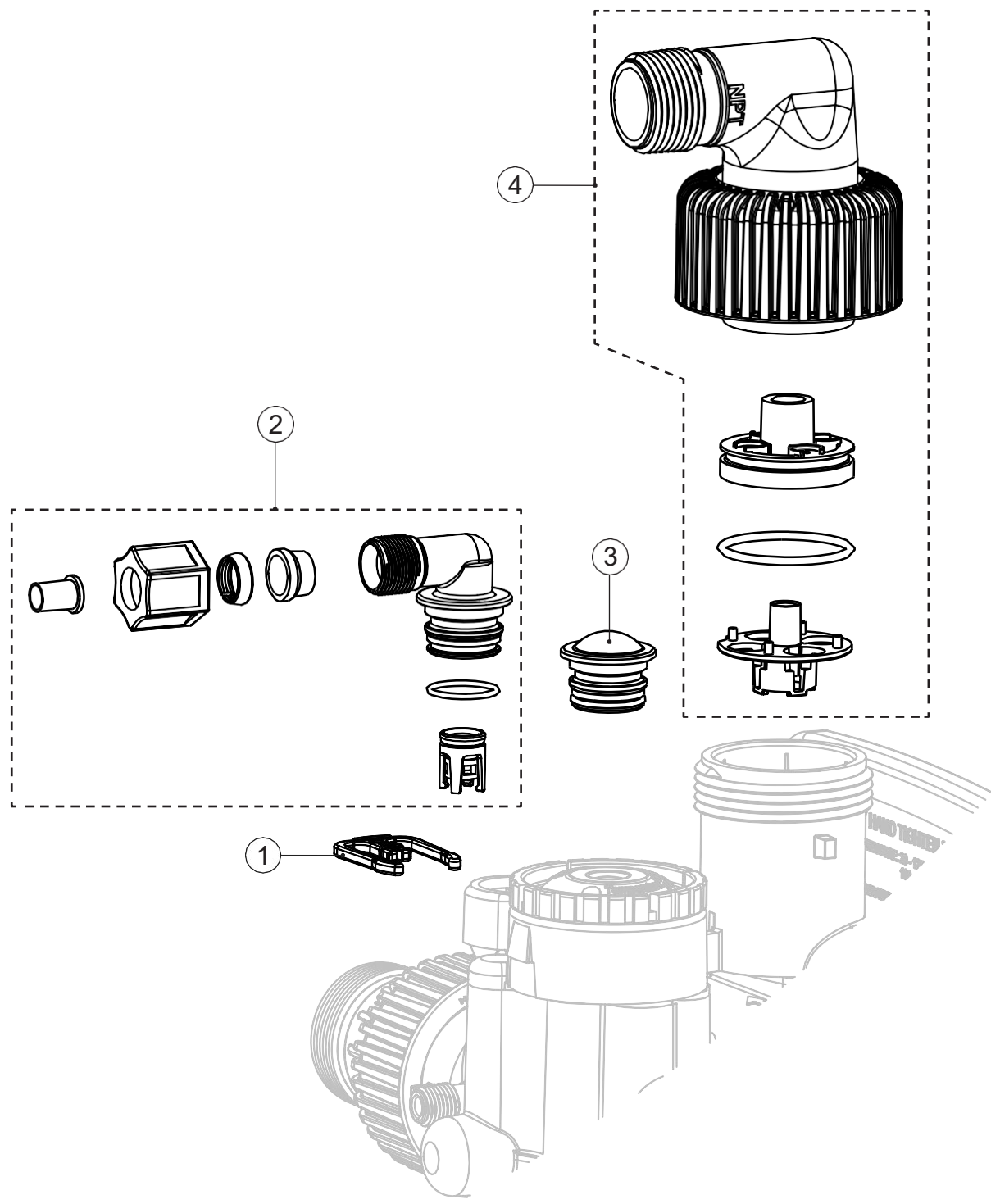
*V3174 Regenerant Piston not used for Backwash Only valves. Use V3010-15Z Injector Plug and V3195-01 Refill Port Plug Assembly.

** Inlet/Outlet fitting kits are sold separate, see page 10 for fitting selection.



WS1.5P Regenerant Components

Drawing No.	Order No.	Description	Quantity
1	H4615	RETAINING CLIP	1
2	V3498	WS15 BRINE ELBOW ASY W/RFC 1/2	1
3	V3195-01	REFILL PORT PLUG ASY	1
4	V4430-04NPT	WS15P NPT DRAIN KIT	1
	V4430-04BSPT	WS15P BSPT DRAIN KIT	



WS1.5" Injectors

Drawing No.	Order No.	Description	Nozzle Color	Downflow Typical Tank Diameter ¹	Quantity
1	V3010-15B	WS1.5 Injector Assy B	Violet	12"	1
	V3010-15C	WS1.5 Injector Assy C	Red	13"	
	V3010-15D	WS1.5 Injector Assy D	White	14"	
	V3010-15E	WS1.5 Injector Assy E	Blue	16"	
	V3010-15F	WS1.5 Injector Assy F	Yellow	18"	
	V3010-15G	WS1.5 Injector Assy G	Green	21"	
	V3010-15H	WS1.5 Injector Assy H	Orange	24"	
2	V3010-15Z	WS1.5 Injector Plug		N/A	

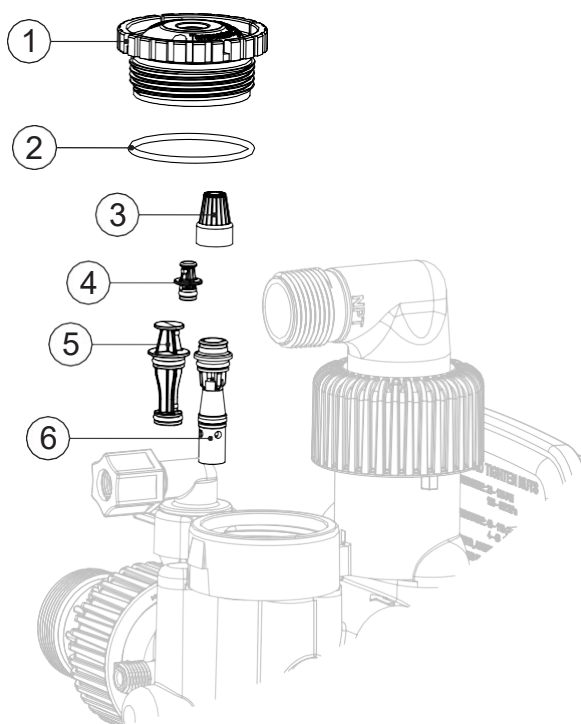


V3010-15B – V3010-15H injectors include one V3416 O-Ring 012 (lower) and one V3171 O-Ring 013 (upper).

For upflow brine applications, it is recommended that the injector be downsized 2 tank sizes minimum. Refer to the injector graphs for verifying proper selection.

WS1.5P Regenerant Components

Drawing No.	Order No.	Description	Quantity
1	V4349	WS15P INJECTOR CAP	1
2	V3152	O-RING 135	1
3	V4120	INJECTOR SCREEN	1
4	V4350-15Z	WS15P INJECTOR FEED PLUG	1
5	V3010-15Z	WS15 INJECTOR PLUG ASY	1 or 2
6	V3010-15X	WS15 INJECTOR ASY	1 or 0



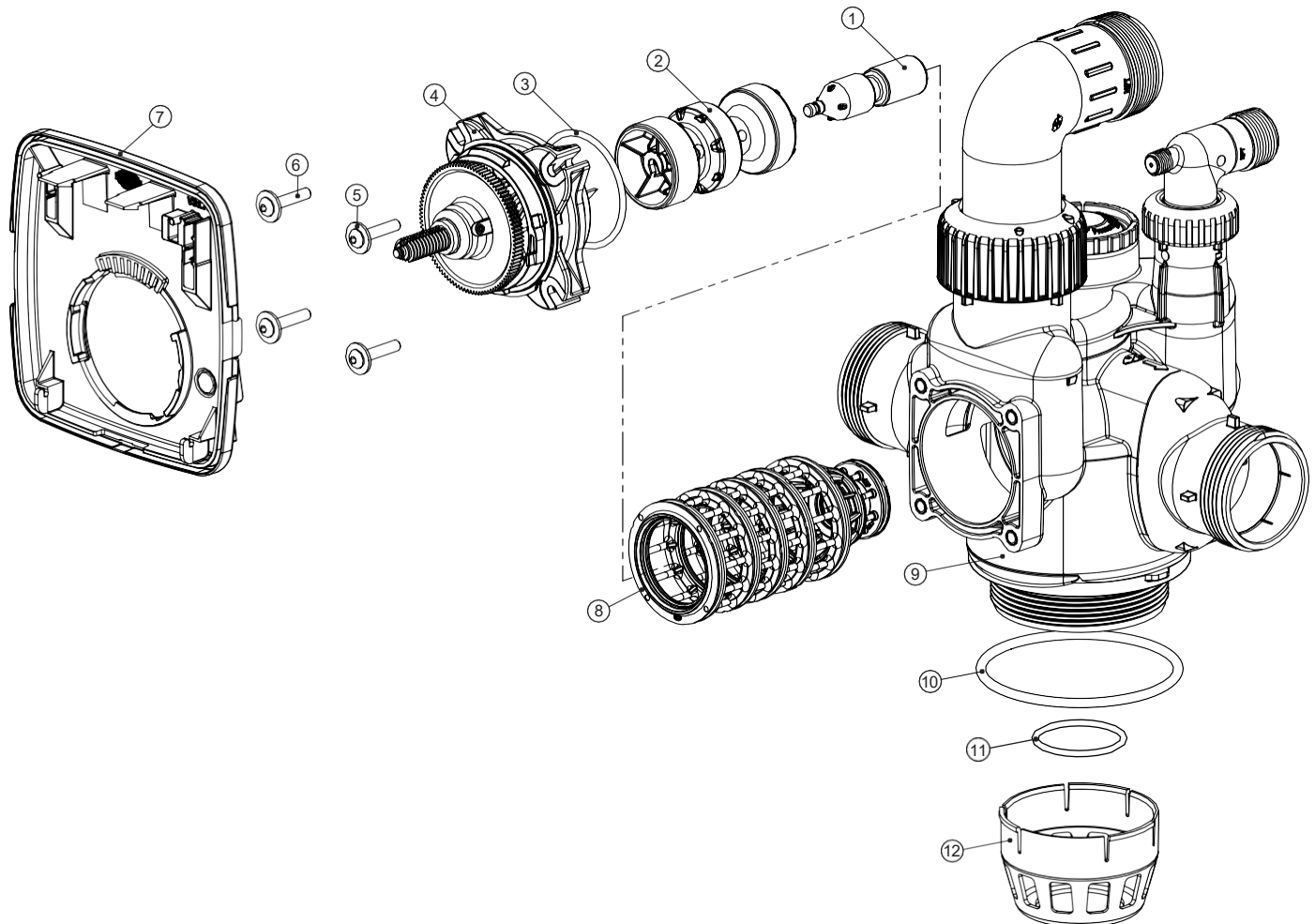
WS2P General Specifications

Minimum/Maximum Operating Pressures	20 – 125 psi (138 kPa – 862 kPa)	
Minimum/Maximum Operating Temperatures	40°F – 110°F (4°C – 43°C)	
Power Adapter:	U.S.	International
Supply Voltage	100 VAC – 120 VAC	100 VAC – 240 VAC
Supply Frequency	50/60 Hz	50/60 Hz
Output Voltage	15VDC	15VDC
Output Current	500 mA	500 mA
Service flow rate	95 gpm @ 15 psi drop (359 lpm, 21.6 m ³ /h)	
Backwash flow rate	85 gpm @ 25 psi drop (322 lpm, 19.3 m ³ /h)	
Meter:		
Accuracy	±5%	
Flow Range	1.5 – 150 gpm (2.8 – 284 lpm)	
Inlet/Outlet	2" QC fitting optional straight or 90°	
Drain line	2" Male BSPT 90° QC elbow	
Brine line	1" Male NPT elbow, ¾" x 1" w/ ½" OD polytube compression	
Tank connection	4"-8 UN	
Height from top of tank	12.5"	
PC board memory	Nonvolatile EEPROM	
Valve material	Glass-filled composite	
Regenerant/chemical compatibility	Sodium chloride, potassium chloride, potassium permanganate, sodium bisulfite, chlorine, and chloramines	
Regeneration	Downflow or upflow (must be ordered, cannot be converted)	
Tank applications	Water Softeners: 12"-48" Water Filters: 12"-36"	

WS2P Drive Cap Assembly, Pistons, Stack Assembly, & Main Body

Drawing No.	Order No.	Description	Quantity
1	V3726*	WS2/QC/P DN BRINE PISTON	1
	V3745	WS2/QC/P UP BRINE PISTON	
2	V3725	WS2 PISTON DOWNFLOW ASSEMBLY (AMBER IN COLOR)	1
	V4059	WS2 PISTON UPFLOW ASSEMBLY (BLACK IN COLOR)	
3	V3452	O-RING 230	1
4	V3728	WS2 DRIVE CAP ASSEMBLY	1
5	V3724	WASHER FLAT SS 1/4	4
6	V3642	BOLT BHCS S/S 1/4-20X1.25	4
7	BACKPLATE	REFER TO PROGRAMMING AND COVER DRAWING MANUAL	1
8	V3729	WS2 STACK DOWNFLOW ASSEMBLY (BLACK IN COLOR)	1
	V3729-01	WS2 STACK UPFLOW ASSEMBLY (BLACK AND GREY IN COLOR)	
9	V4800-NPT	WS2P NPT BODY ASSEMBLY ("D" NEAR INLET ARROW, BLACK DISTRIBUTOR RING)	1
	V4800-BSPT	WS2P BSPT BODY ASSEMBLY ("D" NEAR INLET ARROW, GREY DISTRIBUTOR RING)	
	V4800UP-NPT	WS2P NPT UPFLOW BODY ASSEMBLY ("U" NEAR INLET ARROW, BLACK DISTRIBUTOR RING)	
	V4800UP-BSPT	WS2P BSPT UPFLOW BODY ASSEMBLY ("U" NEAR INLET ARROW, GREY DISTRIBUTOR RING)	
10	V3419	O-RING 347	1
11	V3641	O-RING 225 FOR NPT VALVE BODIES WITH BLACK DISTRIBUTOR RING	1
	V3441	O-RING 226 FOR BSPT VALVE BODIES WITH GREY DISTRIBUTOR RING	1
12	D1300	TOP BAFFLE DFSR CLACK 1.5/50MM	1

* V3726 WS2 Brine Piston must also be used for Backwash Only valves.



WS2 Injector Valve Body, Refill Flow Control, and Injector

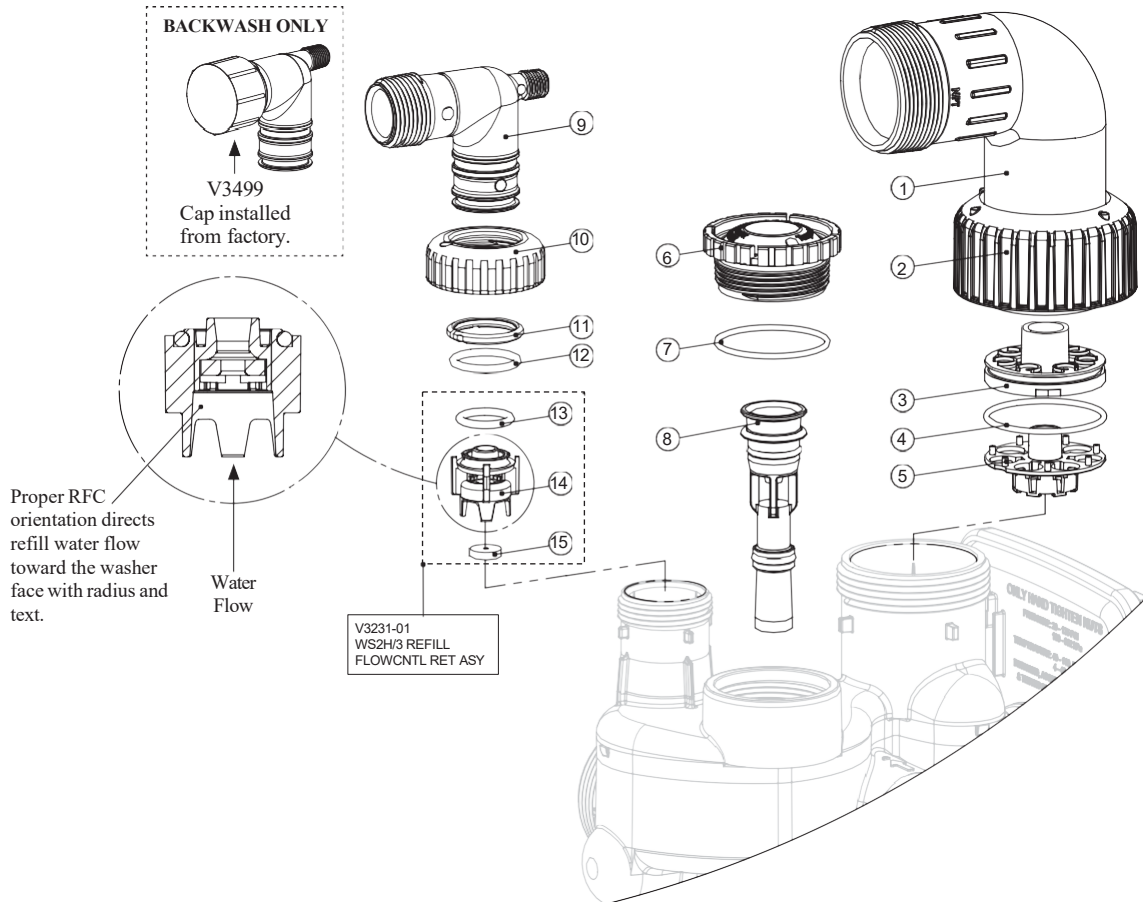
Drawing No.	Order No.	Description	Qty
1	V4460-07NPT	WS2P NPT DRAIN KIT	1
	V4460-07BSPT	WS2P BSPT DRAIN KIT	
6	V3477	WS2H INJECTOR CAP	1
7	V3152	O-RING 135	1
8	See Page 11	WS2/2H INJECTOR ASSY	1
9	V3149	WS1 FTG 1 MALE NPT ELBOW	1
10	V3151	WS1 NUT 1 QC	1
11	V3150	WS1 SPLIT RING	1
12	V3105	O-RING 215	1
13	V3277	O-RING 211	1
14	V3231	WS2H REFILL FLOWCNTRL RETAINER	1
15	V3162-022*	WS1 DLFC 022 FOR 3/4	1
Not Shown	V3797**	WS1 FTG 1 MALE BSPT ELBOW	1 (BSPT only)
Not Shown	V3961***	FITTING KIT WS2 1/2 POLYTUBE	Optional

*Any V3162-XXX flow control may be used. WS2 valves are shipped with a V3162-022 (2.2 gpm) flow control. Flow control sizes range from 0.7 up to 10 gpm. WS2 valves can only be set for minutes of fill because various sizes of flow controls can be used. To calculate for pounds or kilograms of salt, take minutes of fill times the flow rate of the flow control being used to arrive at the number of gallons of water be added to the brine tank. Each gallon of water will dissolve approximately 3 pounds of salt.

** BSPT Valves also include a V3797 WS1 FTG 1 MALE BSPT ELBOW

***Use of V3961 may severely reduce brine draw rates.

Backwash Only Valves include a V3499 but do not include the following parts: V3189, H4915, V3162-022, V3231, and V3277.



WS2" and 2" QC Injectors

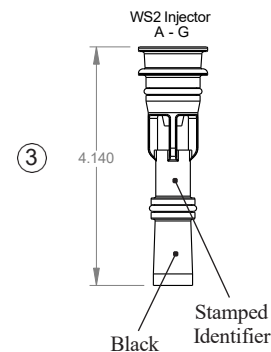
Drawing No.	Order No.	Description	Identifier	Downflow Typical Tank Diameter ¹	Quantity
Not Shown	V3010-2R-15B **	WS2 / 2H Injector Assembly R, W/V3010-15B	Violet	12"	1
	V3010-2S-15C **	WS2 / 2H Injector Assembly S, W/V3010-15C	Red	13"	
	V3010-2T-15D **	WS2 / 2H Injector Assembly T, W/V3010-15D	White	14"	
	V3010-2U-15E **	WS2 / 2H Injector Assembly U, W/V3010-15E	Blue	16"	
3	V3010-2A	WS2 / 2H Injector Assembly A	Stamped A	18"	
	V3010-2B	WS2 / 2H Injector Assembly B	Stamped B	21"	
	V3010-2C	WS2 / 2H Injector Assembly C	Stamped C	24"	
	V3010-2D	WS2 / 2H Injector Assembly D	Stamped D	30"	
	V3010-2E	WS2 / 2H Injector Assembly E	Stamped E	36"	
	V3010-2F	WS2 / 2H Injector Assembly F	Stamped F	42"	
	V3010-2G	WS2 / 2H Injector Assembly G	Stamped G	48"	

** V3010-2X-15X Injectors contain a V3010-2-15 WS2 injector adapter with a WS1.5 injector inside

V3010-2X injectors and the V3010-2-15 Adapter include a V3283 O-RING 117 and a V3284 O-RING 114. The V3010-2-15 Adapter allows the 2" valve to be used on smaller tank sizes. The V3010-2-15 adapter can be used with any V3010-15X injector. The V3010-15X injector includes one V3416 O-RING 012 (lower) and one V3171 O-RING 013 (upper).

1. Actual injector size may vary depending on the design and application of the system. The injectors are sized for a typical downflow softener using standard mesh synthetic cation exchange media regenerating with sodium chloride. See the injector graphs on the following pages to meet specific applications. Variances in drain and draw line restrictions will affect injector performance.

For upflow brine application, downsize your injector by 2 tank sizes minimum and refer to the injector graphs for verifying proper selection.



Fitting Kits

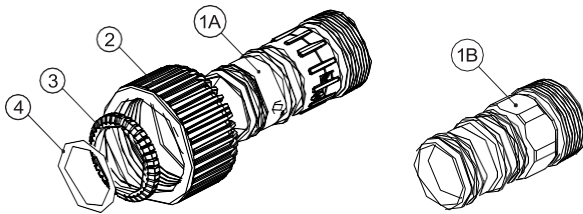
USE ONLY SILICONE BASED LUBRICANTS ON ALL CLACK COMPONENTS
HYDROCARBONS WILL DAMAGE COMPONENTS THAT CONTAIN O-RINGS AND OR PLASTIC. THIS CAN CAUSE LEAKS OR BREAKAGE. DO NOT USE LUBRICANTS THAT CONTAIN HYDROCARBONS SUCH AS VASELINE®/PETROLEUM JELLY, WD-40®, ETC. DO NOT USE CLACK CONTROL VALVE PRODUCTS ON WATER SUPPLIES THAT CONTAIN HYDROCARBONS, SUCH AS BENZENE, GASOLINE, KEROSENE, ETC.

Fitting Installation Instructions:

- Installation fittings are designed to accommodate minor plumbing misalignments, but are not designed to support the weight of a system or the plumbing.
- Teflon tape must be used on the fitting threads.
- Slide nut on first, then the split ring and O-ring.
- Hand tighten the nut only.

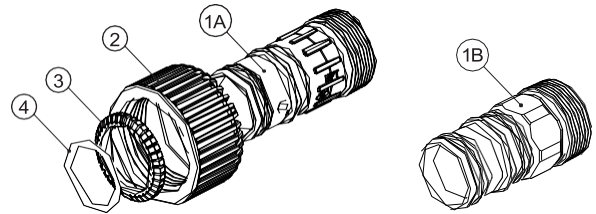
Clack Order No. V4430-01 (Plastic) / V4430-11 (Stainless) Description: WS15P QC to NPT Fitting Kit

Drawing No.	Order No.	Description	Quantity
1A	V4353	WS15P QC TO NPT FITTING, PLASTIC	2
1B	V4610-01	WS15P QC TO NPT FITTING, STAINLESS STEEL	2
2	V4344	WS15P QC NUT	2
3	V4345	WS15P SPLIT RING	2
4	V4367	O-RING 222	2



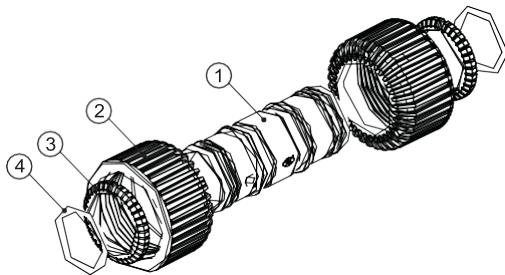
Clack Order No. V4430-02 (Plastic) / V4430-12 (Stainless) Description: WS15P QC to BSPT Fitting Kit

Drawing No.	Order No.	Description	Quantity
1A	V4355	WS15P QC TO BSPT FITTING, PLASTIC	2
1B	V4611-01	WS15P QC TO BSPT FITTING, STAINLESS STEEL	2
2	V4344	WS15P QC NUT	2
3	V4345	WS15P SPLIT RING	2
4	V4367	O-RING 222	2



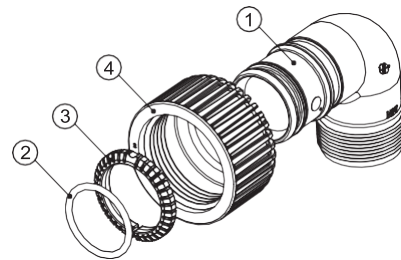
Clack Order No. V4430-03 Description: WS15P QC to QC Fitting Kit

Drawing No.	Order No.	Description	Quantity
1	V4354	WS15P QC TO QC FITTING	1
2	V4344	WS15P QC NUT	2
3	V4345	WS15P SPLIT RING	2
4	V4367	O-RING 222	2



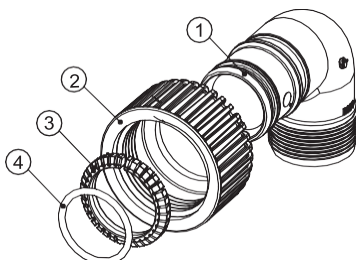
Clack Order No. V4430-07 Description: WS1.5 PLASTIC ELBOW QC TO NPT

Drawing No.	Order No.	Description	Quantity
1	V4432NPT	1.5 PLASTIC QC TO NPT ELBOW	2
2	V4367	O-RING -222	2
3	V4345	1.5 SPLIT RING	2
4	V4344	QC NUT 1.5 PLASTIC	2



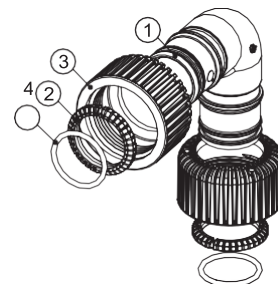
Clack Order No. V4430-08 Description: WS1.5 PLASTIC ELBOW QC TO BSPT

Drawing No.	Order No.	Description	Quantity
1	V4432BSPT	1.5 PLASTIC QC TO BSPT ELBOW	2
2	V4344	QC NUT 1.5 PLASTIC	2
3	V4345	1.5 SPLIT RING	2
4	V4367	O-RING -222	2



Clack Order No. V4430-09 Description: WS1.5 PLASTIC ELBOW QC TO QC

Drawing No.	Order No.	Description	Quantity
1	V4432QC	1.5 PLASTIC QC TO QC ELBOW	1
2	V4345	1.5 SPLIT RING	2
3	V4344	QC NUT 1.5 PLASTIC	2
4	V4367	O-RING -222	2

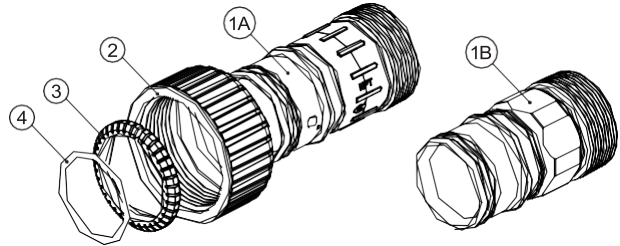
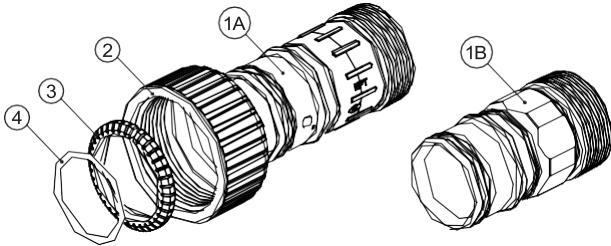


Clack Order No. V4460-01/V4460-11
Description: WS2PQC to NPT Fitting Kit

Drawing No.	Order No.	Description	Quantity
1A	V4415	WS2P QC TO NPT FITTING, PLASTIC	2
1B	V4620-01	WS2P QC TO NPT FITTING, STAINLESS STEEL	2
2	V4417	WS2P QC NUT	2
3	V4418	WS2P SPLIT RING	2
4	V3441	O-Ring 226	2

Clack Order No. V4460-02/V4460-12
Description: WS2PQC to BSPT Fitting Kit

Drawing No.	Order No.	Description	Quantity
1A	V4416	WS2P QC TO BSPT FITTING, PLASTIC	2
1B	V4621-01	WS2P QC TO BSPT FITTING, STAINLESS STEEL	2
2	V4417	WS2P QC NUT	2
3	V4418	WS2P SPLIT RING	2
4	V3441	O-Ring 226	2

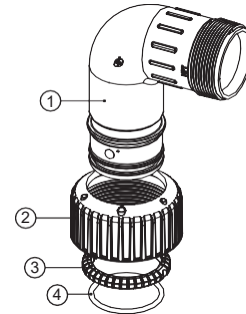
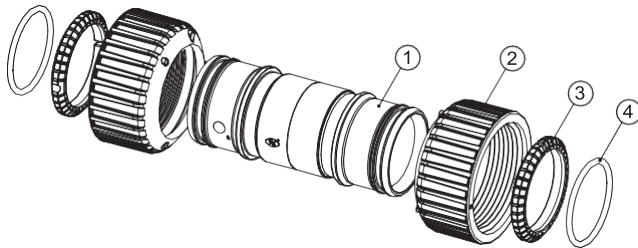


Clack Order No. V4460-03
Description: WS2 PLASTIC QC FITTING ASSY

Drawing No.	Order No.	Description	Quantity
1	V4439	WS2 PLASTIC QC TO QC	1
2	V4417	WS2 QC NUT	2
3	V4418	WS2 QC SPLIT RING	2
4	V3441	O-RING - 226	2

Clack Order No. V4460-04
Description: WS2P QC TO NPT ELBOW ASSY

Drawing No.	Order No.	Description	Qty.
1	V4462NPT	2 PLASTIC QC TO NPT ELBOW	2
2	V4417	WS2 QC NUT	2
3	V4418	WS2 QC SPLIT RING	2
4	V3441	O-RING - 226	2

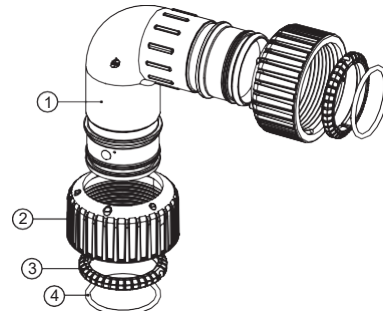
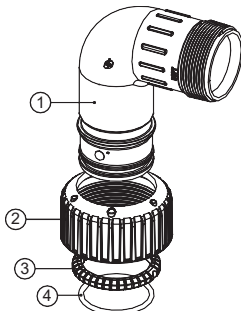


Clack Order No. V4460-05
Description: WS2P QC TO BSPT ELBOW ASSY

Drawing No.	Order No.	Description	Qty.
1	V4462BSPT	2 PLASTIC QC TO BSPT ELBOW	2
2	V4417	WS2 QC NUT	2
3	V4418	WS2 QC SPLIT RING	2
4	V3441	O-RING - 226	2

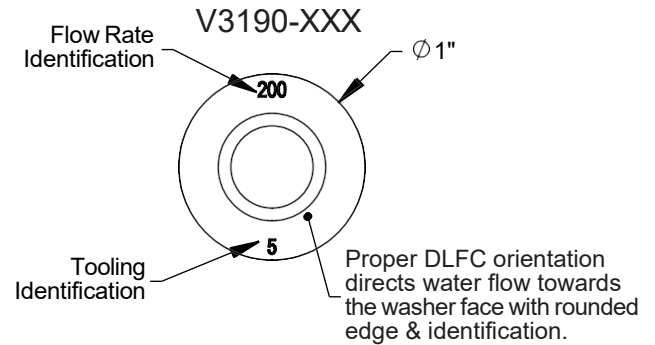
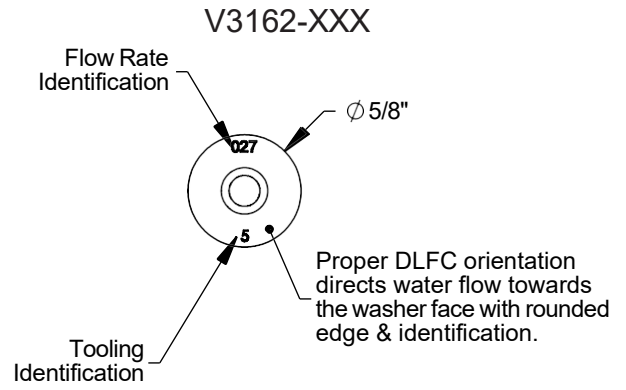
Clack Order No. V4460-06
Description: WS2P QC TO QC ELBOW ASSY

Drawing No.	Order No.	Description	Qty.
1	V4462QC	2 PLASTIC QC TO QC ELBOW	1
2	V4417	WS2 QC NUT	2
3	V4418	WS2 QC SPLIT RING	2
4	V3441	O-RING - 226	2



Drain Line Flow Control Washers

Order No.	Description
V3162-007	0.7 GPM Drain line flow control
V3162-010	1.0 GPM Drain line flow control
V3162-013	1.3 GPM Drain line flow control
V3162-017	1.7 GPM Drain line flow control
V3162-022	2.2 GPM Drain line flow control
V3162-027	2.7 GPM Drain line flow control
V3162-032	3.2 GPM Drain line flow control
V3162-042	4.2 GPM Drain line flow control
V3162-053	5.3 GPM Drain line flow control
V3162-065	6.5 GPM Drain line flow control
V3162-075	7.5 GPM Drain line flow control
V3162-090	9.0 GPM Drain line flow control
V3162-100	10.0 GPM Drain line flow control
V3190-090	9.0 GPM Drain line flow control
V3190-100	10.0 GPM Drain line flow control
V3190-110	11.0 GPM Drain line flow control
V3190-130	13.0 GPM Drain line flow control
V3190-150	15.0 GPM Drain line flow control
V3190-170	17.0 GPM Drain line flow control
V3190-200	20.0 GPM Drain line flow control
V3190-250	25.0 GPM Drain line flow control



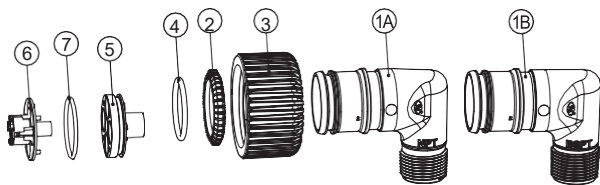
All DLFC housings ship without DLFC installed.

WS1.5P: Up to 5x V3162-XXX DLFC may be installed in V4430. Select 1 – 5 flow controls from table for proper backwash flow, based on media manufacturer's recommendations.

WS2P: At least 1x V3190-XXX and up to 7x V3162-XXX DLFC may be installed in the V4460. Select flow controls from table for proper backwash flow, based on media manufacturer's recommendations.

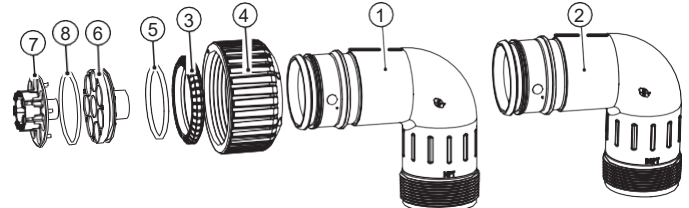
Clack Order No. V4430-04NPT OR V4430-04BSPT
Description: WS15P 1.5 Drain Elbow

Drawing No.	Order No.	Description	Quantity
1A	V4358	WS15P DRAIN ELBOW 1" NPT	1
1B	V4359	WS15P DRAIN ELBOW 1" BSPT	1
2	V4345	WS15P SPLIT RING	1
3	V4344	QC NUT 1.5 PLASTIC	1
4	V4367	O-RING 222	1
5	V4351	FLOW CONTROL HOUSING	1
6	V4352	FLOW CONTROL RETAINER	1
7	V4364	O-RING 129	1



Clack Order No. V4460-07NPT OR V4460-07BSPT
Description: WS2P 2 Drain Elbow

Drawing No.	Order No.	Description	Quantity
1	V4462NPT	2 PLASTIC QC TO NPT ELBOW	1
2	V4462BSPT	2 PLASTIC QC TO BSPT ELBOW	1
3	V4418	WS2 QC SPLIT RING	1
4	V4417	WS2 QC NUT	1
5	V3441	O-RING, -226	1
6	V4455	WS2 PLASTIC DLFC HOUSING	1
7	V4456	WS2 PLASTIC DLFC RETAINER	1
8	V3152	O-RING 137	1



Regeneration and Error Screens



Regen Screen

Displays the time remaining in the current cycle. Press REGEN to advance to the next cycle.



Error Screen

Alternated flashing Err and error code every 3 seconds. To clear, disconnect the power supply at the PC board and reconnect, or press NEXT and REGEN simultaneously for 3 seconds.



REGEN Pndg is displayed in alternator systems when a unit is waiting to initiate the first cycle step of regeneration.



STBY is displayed in alternator systems when a valve is in standby mode.



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*.

Button Operation and Function



Scrolls to the next display.

Press and release once to schedule a regeneration at the preset delayed regeneration time.

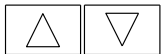


Press and release again to cancel the regeneration.

Press and hold for at least 3 seconds to initiate an immediate regeneration.

Press while in regeneration to advance to the next cycle.

Press while in the program levels to go back to the previous display.



Changes variable being displayed.



Key sequence to lock and unlock program settings.



Hold for 3 seconds to initiate 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 T and 1.5T. Hold for at least 3 seconds to cause 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.

Table 1
Regeneration Cycles and Times

Cycle	Range		
	Softening	Filtering Regen	Filtering Backwash
Backwash	1 – 120 min or OFF	1 – 120 min or OFF	1 – 120 min or OFF
Regenerant Draw/Slow Rinse (UP or DN)	1 – 180 min or OFF	1 – 180 min or OFF	N/A
Fast Rinse	1 – 120 min or OFF	1 – 120 min or OFF	1 – 120 min or OFF
Regenerant Refill	0.1 – 200 lb or OFF	0.05 – 20 gal or OFF	N/A
Regenerant Refill for 2.0" or 1.5" set to MIN (softening only)	0.1 – 99 min or OFF	0.1 – 99 min or OFF	N/A
Service	1 – 480 min or OFF	N/A	N/A

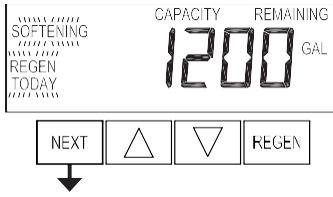
The user can initiate manual regeneration. The user has the option to request the manual regeneration at the delayed regeneration time or have the regeneration occur immediately:

1. Press and release REGEN. *REGEN TODAY* will flash on the display and regeneration will occur at the delayed regeneration time. Press and release REGEN to cancel the request.
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 approximately 3 seconds.

User Displays

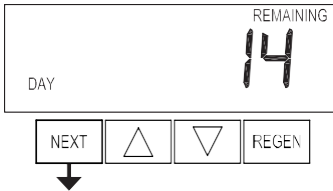
General Operation:

When the system is operating, one of 5 displays may be shown. Press NEXT to alternate between the displays shown below.



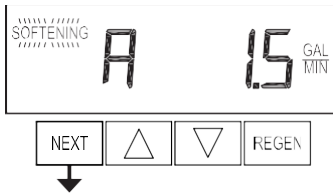
User 1

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.

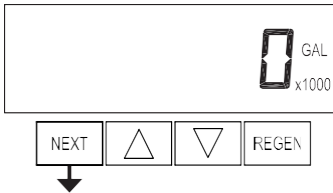


User 3

Flow Rate.

Displays present flow rate.

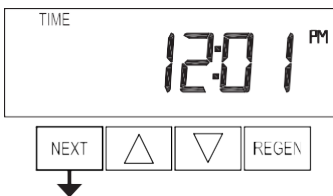
This display will not appear if Step 5CS is set to *ALTA* or *ALT b* and the valve is currently in standby. If Step 2CS is set to *1.0T* or *1.5T*, the display will indicate the tank currently in Service (*A* or *b*) in the left-most digit.



User 4

Displays total volume in gallons since last reset. If a meter is not used, this display will show zero.

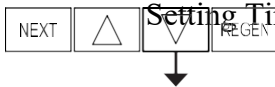
Press ▼ for 3 seconds to reset to 0.



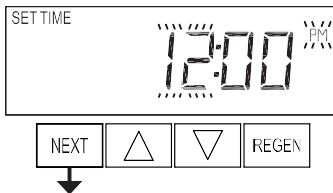
User 5

Shows current time.

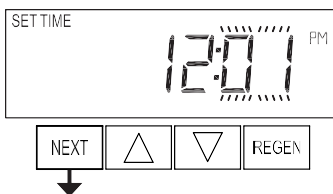
Setting Time of Day



Press NEXT until time of day is displayed. Then, press and hold ▼ until *SET TIME* is displayed and the hour flashes once. Press ▼ or ▲ until the correct hour is displayed.

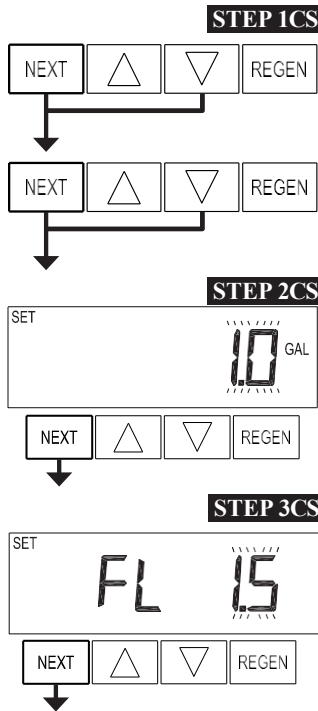


Then, press NEXT. The minutes will flash. Press ▼ or ▲ until the correct minute is displayed.



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

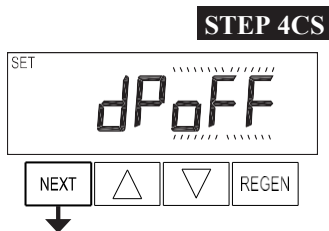
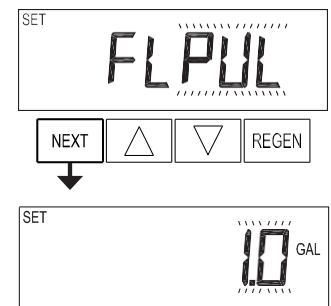
Configuration Settings



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

Step 2CS – Valve Type: Use ▼ or ▲ to select *1.0* for 1" valve, *1.25* for 1.25" valve, *1.5* for 1.5" valve, *2.0* for 2" valve, *1.0T* for 1.0" twin valve, or *1.5T* for 1.5" twin valve. Press NEXT to go to Step 3CS. Press REGEN to exit Configuration Settings.

Step 3CS – Meter Size: Use ▼ or ▲ to select which size flow meter is to be used with the valve: 1.0r, 1.5, 2.0, or 3.0. Variable meter pulses of 0.1 – 150 PPG can also be selected. This display will only appear if Step 2CS is set to *1.5* or *2.0*. Press NEXT to go to Step 4CS. Press REGEN to return to the previous step.



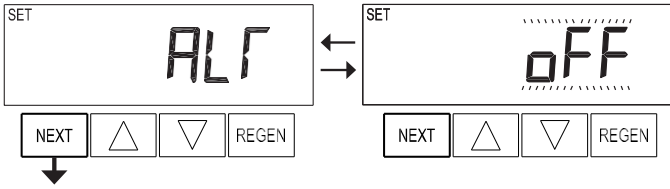
Step 4CS – Auxiliary Input: Allows for the use of an outside signal to control the initiation of a regeneration. Selection only needed if a connection is made to the 2-pin connector labeled *DP SWITCH* located on the printed circuit board. Use ▼ or ▲ to select one of the following options:

- *oFF*: Feature not used.
- *on0*: Regeneration will occur immediately if the dP switch is closed for 2 uninterrupted minutes. In a twin alternating system, the MAV will transition first to switch units so that the signaled unit can start regeneration. After the MAV has fully transitioned, the regeneration begins immediately. The Delayed Rinse and Fill feature will not be available for WS1 – WS1.5 control valves programmed for twin alternating if this option is selected.
- *dEL*: Regeneration will occur at the scheduled delayed regeneration time if the dP switch is closed for 2 uninterrupted minutes. In a twin alternating system, once the dP switch is triggered, the PC Board will display *REGEN TODAY*. At the delayed regeneration time, the control will switch tanks and the triggered unit will regenerate. The Delayed Rinse and Fill feature will not be available for WS1 – WS1.5 control valves programmed for twin alternating if this option is selected.
- *HoLd*: Regeneration will be prevented from occurring while the dP switch is closed. In a twin alternating system, the regeneration of a unit can be prevented upon switch closure. If the unit depletes the capacity down to zero, it will not be allowed to switch tanks to regenerate until the switch is open. The Delayed Rinse and Fill feature can be set in conjunction with this option if desired.

Note: In a twin alternating system each control must have a separate dP signal or dP switch. One dP signal or one dP switch cannot be used for both controls.

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

STEP 5CS



Step 5CS – ALT MAV Output: Use ▼ or ▲ to select one of the following options:

- *nHbP*: The control valve operates with a no hard water bypass.
- *SEPS*: The control valve has a separate source during the regeneration cycle.
- *SYS*: The control valve operates with a Clack system controller.
- *ALT A* or *ALT b*: The control valve acts as an alternator.
- *OFF*: None of these features are used.

This display will not appear if Step 2CS is set to 1.0T or 1.5T.

Only use Clack no hard water bypass valves or Clack motorized alternating valves (MAV) with these selections. Clack no hard water bypass valves (1" or 1.25" V3070FF or V3070FM) are not designed to be used with the Alternator or Separate Source functions.

Configuring the Control Valve for No Hard Water Bypass Operation:

Select *nHbP* for control operation. For no hard water bypass operation, the 3-wire communication cable is not used.

Selection requires that a connection to a MAV or a Clack no hard water bypass valve is made to the 2-pin connector labeled *MAV* located on the printed circuit board. If using a MAV, the A port of the MAV must be plugged and the B port connected to the valve outlet. When set to *nHbP*, the MAV will be driven closed before the first regeneration cycle that is not Fill, Softening, or Filtering and be driven open after the last regeneration cycle that is not Fill.

Note: If the control valve enters into an error state during regeneration, the no hard water bypass valve will return to the open position, if not already there.

Configuring the Control Valve for Separate Source Operation:

Select *SEPS* for control operation. For separate source operation, the 3-wire communication cable is not used.

Selection requires that a connection to a Clack motorized alternating valve (MAV) is made to the 2-pin connector labeled *MAV* located on the printed circuit board. The C port of the MAV must be connected to the valve inlet, the A port connected to the separate source used during regeneration, and the B port connected to the feed water supply.

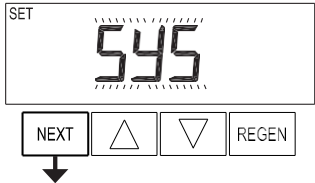
When set to *SEPS*, the MAV will be driven closed before the first regeneration cycle and be driven open after the last regeneration cycle.

Note: If the control valve enters into an error state during regeneration mode, the MAV will return to the open position, if not already there.

Configuring the Control Valve to Operate with Clack System Controller:

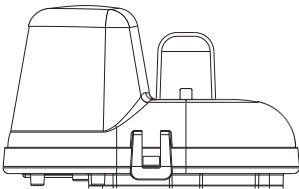
Select *SYS* to link control valve to the Clack system controller. For communication between the control valve and the system controller, a 3-wire communication cable is required.

Selection requires that a connection to a Clack no hard water bypass (V3070FF or V3070FM) be made to the 2-pin connector labeled *MAV* located on the printed circuit board for WS1 and WS1.25 control valves. For valve types WS1.5 and WS2, a connection from a Clack no hard water bypass (V3097-BSPT or V3098-BSPT) to the 2-pin connector labeled *MAV* located on the printed circuit board is required.



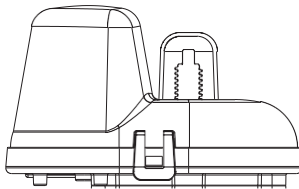
Configuring the Control Valve to Act as an Alternator:

Prior to starting the programming steps, connect the communication cable to each control valve board's 3-pin connector labeled <i>COMM CABLE</i> . Also connect the meter cord to either control valve to the 3-pin connector labeled <i>METER</i> .			
		Softener Valve Programming Steps	
Configuration Settings	Step 5CS	Set to <i>ALT A</i> Connect the outlet plumbing of ALT A valve to the MAV's A port and connect the MAV's 2-pin wire connector to the 2-pin connector labeled <i>DRIVE</i> on the ALT A valve.	Set to <i>ALT b</i> Connect the outlet plumbing of ALT b valve to the MAV's B port. No electrical connections are required between the ALT b valve and the MAV.
Softener System Setup	Step 6S	Set Ionic Capacity.	Set Ionic Capacity.
Softener System Setup	Step 7S	Set to <i>AUTO</i> .	Set to <i>AUTO</i> .
Softener System Setup	Step 8S	Set Regeneration Time Option to <i>on 0</i> .	Set Regeneration Time Option to <i>on 0</i> .
Installer Display Settings	Step 3I	Set Day Override to <i>oFF</i> .	Set Day Override to <i>oFF</i> .
If set up for a filter, set Volume Capacity in Step 4F; set Regeneration Time Option in Step 5F to <i>on 0</i> ; and set Day Override in Step 3I to <i>oFF</i> .			



Retracted

Valve A in Service Position = MAV piston rod retracted



Extended

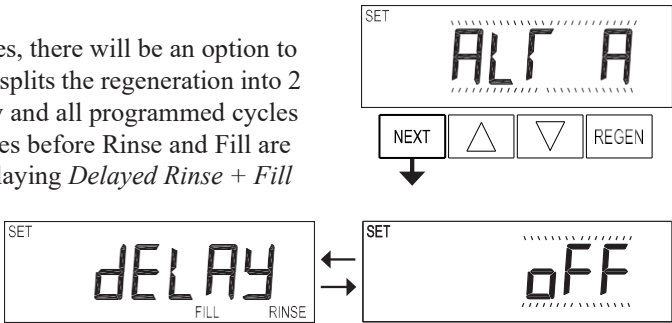
Valve B in Service Position = MAV piston rod extended

Clack Twin Alternator Operations:

- Twin alternating systems can be programmed with a day override setting combined with the normal volume-based regeneration programming. A twin alternating system in this configuration will then regenerate based on the volume used or the day override if there is a period of low water usage.
- Twin alternating systems can be programmed as a time clock only based regenerating system. In this configuration, the days remaining are counted only on the unit that is in service. The unit in standby mode only notes days in diagnostics, which results in time clock only twin regeneration initiation.
- Twin alternating systems can be programmed for a delayed regeneration time. The system will allow an immediate transfer of the MAV to switch tanks and place a fully regenerated unit in service once a unit becomes exhausted. The exhausted unit will then be placed into standby mode and allowed to have a delayed regeneration at the pre-set time.

WS1, WS1.25, and WS1.5 Valves

For Clack alternator systems using WS1, WS1.25, and WS1.5 valves, there will be an option to delay the last 2 cycles of regeneration (Rinse and Fill). This feature splits the regeneration into 2 portions. The first portion of the regeneration will start immediately and all programmed cycles before Rinse and Fill will be performed. After all programmed cycles before Rinse and Fill are completed, the control valve will drive to the service position (displaying *Delayed Rinse + Fill Pending*). When the volume of the online unit is depleted to 10% of its programmed capacity, the control valve will be triggered to finish the second portion of the regeneration. Once Rinse and Fill cycles are complete, the valve will re-enter standby mode until requested to come online for service. Set to *oFF* to deactivate this feature.

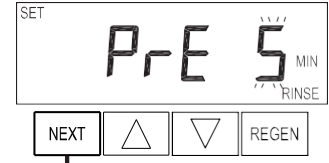
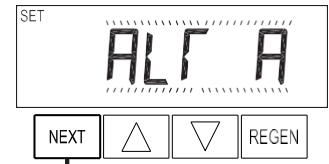


WS2 Valve

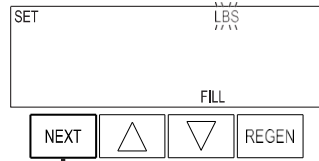
For Clack alternator systems using the WS2 valve, when NEXT is pressed after selecting *ALTA* or *ALT B*, a display will allow the user to set the length of pre-service rinse time for the standby tank just prior to returning to service. Set to *oFF* to deactivate this feature. With *1.0T* or *1.5T* set, the same display appears and is set in a similar manner.

Note: If the control valve is in an error state during regeneration mode, the MAV will close the B port and keep open the A port until the error is corrected and reset.

Press NEXT to go to Step 6CS. Press REGEN to return to previous step.



STEP 6CS

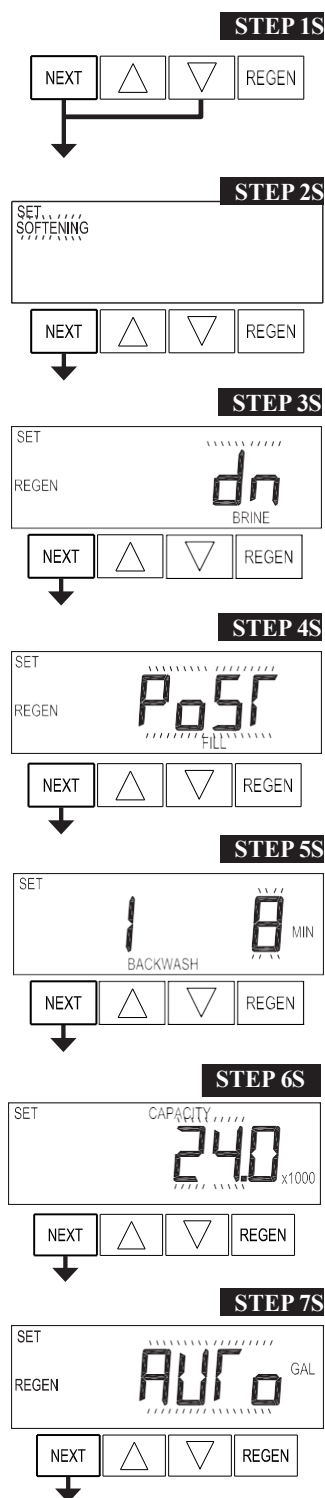


EXIT TO DISPLAY SCREENS

Step 6CS – Fill Units: If set as a softener, Step 2CS is set to *1.5* or *1.5T*, and Fill is part of the Regeneration Cycle Sequence, fill units of *MIN* or *LBS* can be selected.

Press NEXT to exit OEM Configuration Setup. Press REGEN to return to previous step.

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 the valve is activated. To unlock, press ▼, NEXT, ▲, and REGEN in sequence, and try again.

Step 2S – Treatment Type: Use ▼ or ▲ to select *SOFTENING*. Press NEXT to go to Step 3S. Press REGEN to exit OEM Softener System Setup.

Step 3S – Brining Direction: Use ▼ or ▲ to select *UP* or *dn*. Prior to selecting the upflow regeneration cycle, verify that the correct body, main piston, regenerant piston, and stack are being used and that the injector plug(s) are in the correct location. Refer to the Service Manual for drawings and part numbers. Press NEXT to go to Step 4S. Press REGEN to return to previous step.

Step 4S – Refill Option: Use ▼ or ▲ to select one of the following options:

- *PoST*: The brine tank refills after the final rinse.
- *PrE*: The brine tank refills 4 hours before the regeneration time set.

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

Step 5S – Cycle Durations: Use ▼ or ▲ to set the value for the first cycle. Value ranges and units will vary depending on the cycle, see Table 1 for more detail. Press NEXT to set the value for the next cycle. Repeat for all cycles. Once a value is set for all cycles, press NEXT to go to Step 6S. Press REGEN to return to previous step.

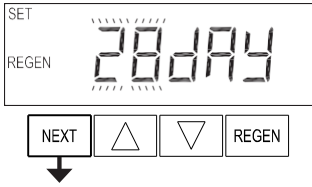
Step 6S – Ionic Capacity: Use ▼ or ▲ to set the ionic capacity. The ionic capacity is based on the volume of resin and LBS of salt fill previously selected. Press NEXT to go to Step 7S. Press REGEN to return to previous step.

Step 7S – Volume Capacity: Use ▼ or ▲ to select one of the following options:

- *AUTO*: Capacity will be automatically calculated and reserve capacity will be automatically estimated.
- *oFF*: If this option is selected, regeneration trigger must be set in Step 7S(A).
- A number: Regeneration initiation will be based on the value specified (in gallons).

See Setting Options Table for more detail. Press NEXT to go to Step 8S. Press REGEN to return to previous step.

STEP 7S(A)



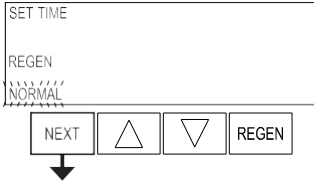
Step 7S(A) – Regeneration Trigger: Use ▼ or ▲ to select one of the following options:

- *28 day:* Regeneration will be triggered by Day Override set in Installer Settings.
- *7 day:* Regeneration will be triggered on specific days of the week.



This display will only appear if Step 7S is set to *OFF*. Press NEXT to go to Step 8S. Press REGEN to return to previous step.

STEP 8S



Step 8S – Regeneration Time Option: Use ▼ or ▲ to select one of the following options:

- *NORMAL:* Regeneration will occur at the preset time.
- *on 0:* Regeneration will occur immediately when the volume capacity reaches 0 (zero).
- *NORMAL + on 0:* 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).

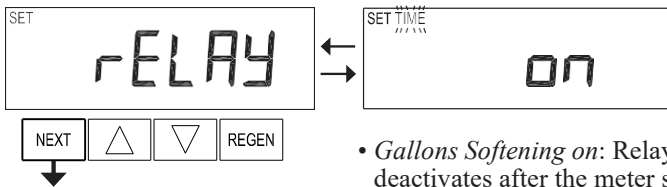
This option will not be available if Step 5CS is set to *ALTA* or *ALT b* or if Step 2CS is set to *1.0T* or *1.5T*.

This display will not appear if Step 7S is set to *OFF* or if Step 5CS is set to *SYS*.

See Setting Options Table for more detail.

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

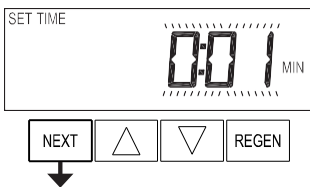
STEP 9S



Step 9S – Relay Output: Use ▼ or ▲ to select one of the following options:

- *Time on:* Relay activates a set time after the start of a regeneration and deactivates after a set period of time. The start of regeneration is defined as the first Backwash cycle, Dn Brine cycle, or UP Brine cycle whichever comes first.
 - *Gallons Softening on:* Relay activates after a set volume has been used while in service and deactivates after the meter stops registering flow and the set time period has expired.
 - *Gallons Softening Regen on:* Relay activates after a set volume has been used while in service or during regeneration and deactivates after the meter stops registering flow and the set time period has expired.
 - *ERROR:* Relay closes whenever the valve enters an error state and immediately deactivates when the control exits the error state. Step 9S(A) and Step 9S(B) will not appear if this option is selected.
 - *Off:* Feature not used. Step 9S(A) and Step 9S(B) will not appear if this option is selected.
- Press NEXT to go to Step 9S(A). Press REGEN to return to previous step.

STEP 9S(A)

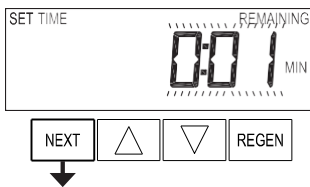


Step 9S(A) – Relay Setpoint Actuation: Use ▼ or ▲ to select one of the following options:

- *Relay Actuation Time:* Set the length of time after the start of regeneration prior to relay activation (Range: 1 second – 200 minutes). The start of regeneration is defined as the first Backwash cycle, Dn Brine cycle, or UP Brine cycle, whichever comes first.
- *Relay Actuation Gallons:* Set the number of gallons that will be treated prior to relay activation (Range: 1 – 200).

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

STEP 9S(B)



Step 9S(B) – Relay Duration: Use ▼ or ▲ to set the length of time the relay will stay active prior to deactivation. If Step 9S is set to *Time on*, value range is 1 second – 200 minutes. If Step 9S is set to *Gallons Softening on* or *Gallons Softening Regen on*, value range is 1 second – 20 minutes.

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

EXIT OEM SOFTENER SYSTEM SETUP

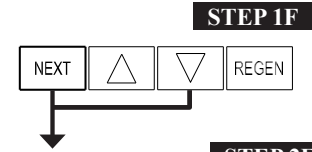
Setting Options Table

Filters should only use shaded options

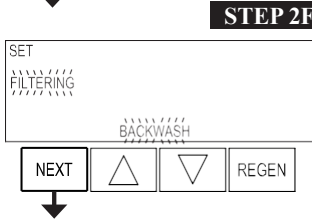
Volume Capacity	Regeneration Time Option	Day Override	Result ¹
AUTO	NORMAL	oFF	Reserve capacity automatically estimated. Regeneration occurs at the next regeneration time when volume capacity falls below the reserve capacity.
AUTO	NORMAL	Any number	Reserve capacity automatically estimated. Regeneration occurs at the next regeneration time when volume capacity falls below the reserve capacity or the specified number of days between regenerations is reached, whichever comes first.
Any number	NORMAL	oFF	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs at the next regeneration time when volume capacity reaches 0.
oFF	NORMAL (not adjustable)	Any number	Reserve capacity <u>not</u> automatically estimated. 28 day: Regeneration occurs at the next regeneration time when the specified number of days between regenerations is reached. 7 day: Regeneration will occur on the day(s) of the week set in Installer Settings.
Any number	NORMAL	Any number	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs at the next regeneration time when volume capacity reaches 0 or the specified number of days between regenerations is reached, whichever comes first.
AUTO	On 0	oFF	Reserve capacity automatically estimated. Regeneration occurs immediately when volume capacity reaches 0. Time of regeneration will not be allowed to be set because regeneration will always occur when volume capacity reaches 0.
Any number	On 0	oFF	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs immediately when volume capacity reaches 0.
AUTO	NORMAL + on 0	oFF	Reserve capacity automatically estimated. Regeneration occurs at the next regeneration time when volume capacity falls below the reserve capacity, or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.
AUTO	NORMAL + on 0	Any number	Reserve capacity automatically estimated. Regeneration occurs at the next regeneration time when volume capacity falls below the reserve capacity or the specified number of days between regenerations is reached, or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.
Any number	NORMAL + on 0	Any number	Reserve capacity <u>not</u> automatically estimated. Regeneration occurs at the next regeneration time when the specified number of days between regenerations is reached, or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.

¹ Reserve Capacity estimate is based on history of water usage. Reserve capacity estimate is not available with alternator systems or twin tank valves.

OEM Filter System Setup



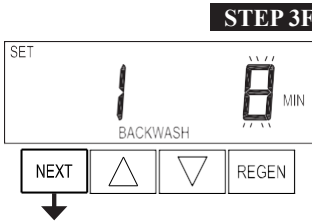
Step 1F – Press NEXT and ▼ simultaneously for 5 seconds and release. If screen in Step 2CS does not appear, the lock on the valve is activated. To unlock, press ▼, NEXT, ▲, and REGEN in sequence, and try again.



Step 2F – Treatment Type: Use ▼ or ▲ to select *FILTERING BACKWASH* or *FILTERING REGEN* (see table).

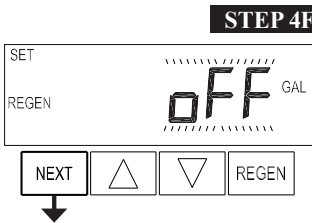


Press NEXT to go to Step 3F. Press REGEN to exit OEM Filter System Setup.



Step 3F – Cycle Durations: Use ▼ or ▲ to set the value for the first cycle. Value ranges and units will vary depending on the cycle, see Table 1 for more detail. Press NEXT to set the value for the next cycle. Repeat for all cycles.

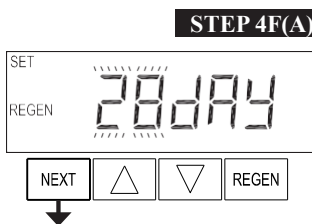
Once a value is set for all cycles, press NEXT to go to Step 4F. Press REGEN to return to previous step.



Step 4F – Volume Capacity: Use ▼ or ▲ to select one of the following options:

- *oFF*: If this option is selected, regeneration trigger must be set in Step 4F(A).
- A number: Regeneration initiation will be based on the value specified (in gallons). See Setting Options Table for more detail.

Press NEXT to go to Step 4F(A). Press REGEN to return to previous step.



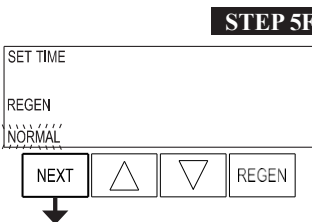
Step 4F(A) – Regeneration Trigger: Use ▼ or ▲ to select one of the following options:

- *28 day*: Regeneration will be triggered by Day Override set in Installer Settings.
- *7 day*: Regeneration will be triggered on specific days of the week.



This display will only appear if Step 4F is set to *oFF*

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



Step 5F – Regeneration Time Option: Use ▼ or ▲ to select one of the following options:

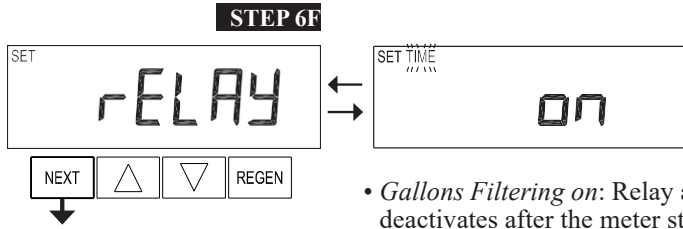
- *NORMAL*: Regeneration will occur at the preset time.
- *on 0*: Regeneration will occur immediately when the volume capacity reaches 0 (zero).
- *NORMAL + on 0*: Regeneration will occur at one of the following:
 - the preset time when the volume capacity falls below the reserve or the specified number 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 option will not be available if Step 5CS is set to *ALT A* or *ALT b* or if Step 2CS is set to *1.0T* or *1.5T*.

This display will not appear if Step 4F is set to *oFF* or if Step 5CS is set to *SYS*.

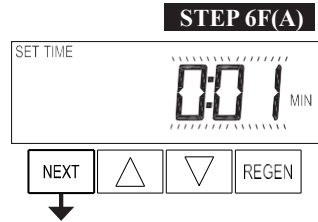
See Setting Options Table for more detail.

Press NEXT to go to Step 6F. Press REGEN to return to previous step.



Step 6F – Relay Output: Use ▼ or ▲ to select one of the following options:

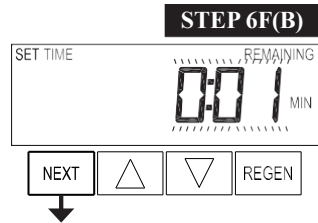
- *Time on:* Relay activates a set time after the start of a regeneration and deactivates after a set period of time. The start of regeneration is defined as the first Backwash cycle or Dn Brine cycle, whichever comes first.
- *Gallons Filtering on:* Relay activates after a set volume has been used while in service and deactivates after the meter stops registering flow and the set time period has expired.
- *Gallons Filtering Regen on:* Relay activates after a set volume has been used while in service or during regeneration and deactivates after the meter stops registering flow and the set time period has expired.
- *ERROR:* Relay closes whenever the valve enters an error state and immediately deactivates when the control exits the error state. Step 6F(A) and Step 6F(B) will not appear if this option is selected.
- *Off:* Feature not used. Step 6F(A) and Step 6F(B) will not appear if this option is selected. Press NEXT to go to Step 6F(A). Press REGEN to return to previous step.



Step 6F(A) – Relay Setpoint Actuation: Use ▼ or ▲ to select one of the following options:

- *Relay Actuation Time:* Set the length of time after the start of regeneration prior to relay activation (Range: 1 second – 200 minutes). The start of regeneration is defined as the first Backwash cycle or Dn Brine cycle, whichever comes first.
- *Relay Actuation Gallons:* Set the number of gallons that will be treated prior to relay activation (Range: 1 – 200).

Press NEXT to go to Step 6F(B). Press REGEN to return to previous step.



Step 6F(B) – Relay Duration: Use ▼ or ▲ to set the length of time the relay will stay active prior to deactivation. If Step 6F is set to *Time on*, value range is 1 second – 200 minutes. If Step 6F is set to *Gallons Filtering on* or *Gallons Filtering Regen on*, value range is 1 second – 20 minutes.

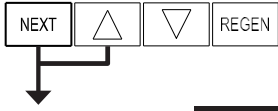
Press NEXT to exit OEM Filter System Setup. Press REGEN to return to previous step.

EXIT OEM FILTER SYSTEM SETUP

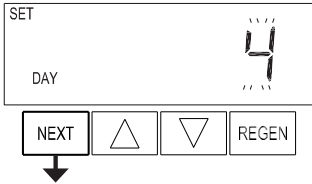
Installer Display Settings: 7 Day Regeneration

Note: These displays will only appear if Volume Capacity is set to *oFF* and Regeneration Trigger is set to *7 day*.

STEP 1I Step 1I – Press NEXT and ▲ simultaneously for about 5 seconds and release.



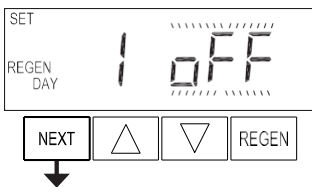
STEP 2I Step 2I – Current Day: Use ▼ or ▲ to set the current day of the week:



- 1: Sunday
- 2: Monday
- 3: Tuesday
- 4: Wednesday
- 5: Thursday
- 6: Friday
- 7: Saturday

Press NEXT to go to Step 3I. Press REGEN to exit Installer Display.

STEP 3I Step 3I – Regeneration Days: Use ▼ or ▲ to turn regeneration *on* or *oFF* for day 1 (Sunday).



Press NEXT to advance to day 2. Repeat for each day of the week. After completing day 7, press NEXT to go to Step 4I. Press REGEN to go to previous display.

STEP 4I Step 4I – Next Regeneration Time: Use ▼ or ▲ to set the hour of day for regeneration. The default time is 2:00. Press NEXT to set the minutes.



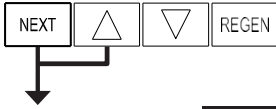
Once the minutes are set, press NEXT to go to exit Installer Display Settings. Press REGEN to return to previous step.

EXIT INSTALLER DISPLAY SETTINGS

Note: These displays will only appear if Volume Capacity is set to anything other than *oFF* or if Regeneration Trigger is set to *28 day*.

STEP 1I

Step 1I – Press NEXT and ▲ simultaneously for about 5 seconds and release.

**STEP 2I**

Step 2I – Hardness: Use ▼ or ▲ to set the amount of influent hardness.

This display will only appear if Step 7S is set to *AUTO*.

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

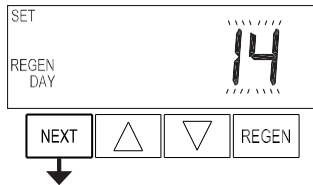
**STEP 3I**

Step 3I – Day Override: When Regeneration Trigger is set to *28 day*, sets the number of days between regenerations. When Volume Capacity is set to *AUTO* or a number, sets the maximum number of days between regenerations. Use ▼ or ▲ to select one of the following options:

- A number (1 – 28): Regeneration will be called for every set number of days even if sufficient volume of water was not used to call for a regeneration.
- *oFF*: Regeneration initiation is based solely on volume used.

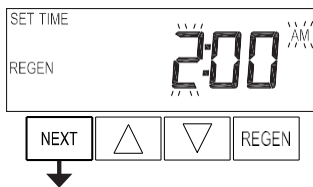
See Setting Options Table for more detail on setup.

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

**STEP 4I**

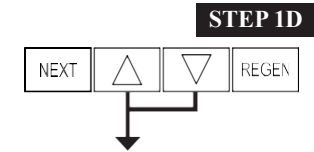
Step 4I – Next Regeneration Time: Use ▼ or ▲ to set the hour of day for regeneration. The default time is 2:00. This display will show *REGEN on 0 GAL* if Regeneration Time Option is set to *on 0*. Press NEXT to set the minutes.

Once the minutes are set, press NEXT to exit Installer Display Settings. Press REGEN to return to previous step.

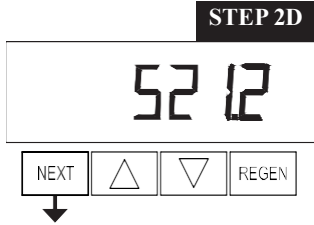


EXIT INSTALLER DISPLAY SETTINGS

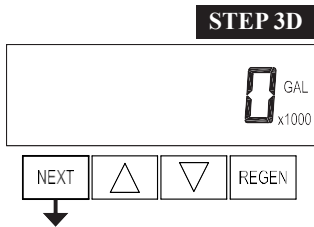
Diagnostics



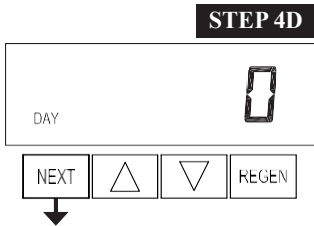
Step 1D – Press ▼ and ▲ simultaneously for 5 seconds and release. If screen in Step 2D does not appear, the lock on the valve is activated. To unlock, press ▼, NEXT, ▲, and REGEN in sequence, and try again.



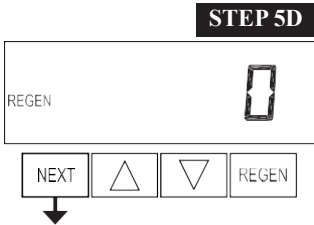
Step 2D – Software Version.
Press NEXT to go to Step 3D. Press REGEN to exit Diagnostics.



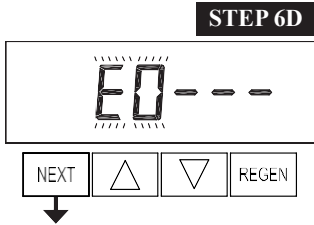
Step 3D – Total Volume Used Since Startup: This display will show zero if a water meter is not installed.
Press NEXT to go to Step 4D. Press REGEN to return to previous step.



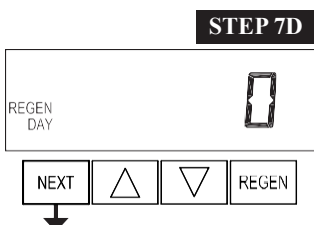
Step 4D – Total Days Since Startup.
Press NEXT to go to Step 5D. Press REGEN to return to previous step.



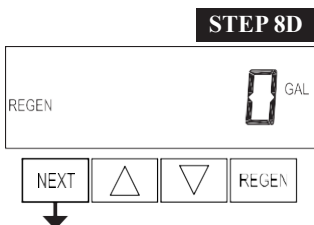
Step 5D – Total Regenerations Since Startup.
Press NEXT to go to Step 6D. Press REGEN to return to previous step.



Step 6D – Error Log: Use ▼ or ▲ to scroll through the last 10 errors generated by the control during operation.
Press NEXT to go to Step 7D. Press REGEN to return to previous step.

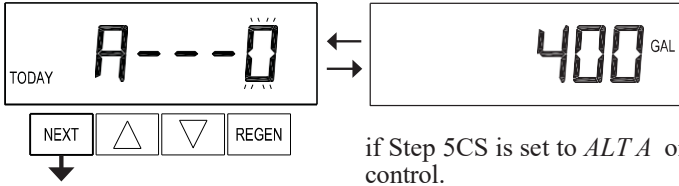


Step 7D – Days Since Last Regeneration.
Press NEXT to go to Step 8D. Press REGEN to return to previous step.



Step 8D – Volume Since Last Regeneration: This display will show zero when a water meter is not installed.
Press NEXT to go to Step 9D. Press REGEN to return to previous step.

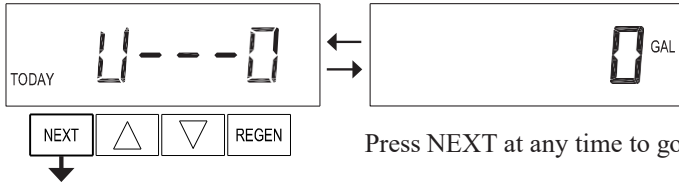
STEP 9D



Step 9D – Reserve History, Last 7 Days: If the valve is set up as a softener, a meter is installed, and Volume Capacity is set to *AUTO*, this display shows the reserve capacity for each of the last 7 days. Use ▼ or ▲ to scroll. Day 0 is today, day 1 is yesterday, etc.

This display will not appear if Step 2CS is set to *1.0T* or *1.5T*, if Step 5CS is set to *ALTA* or *ALT b*, or anytime the reserve capacity is not determined by the control.
Press NEXT at any time to go to Step 10D. Press REGEN to return to previous step.

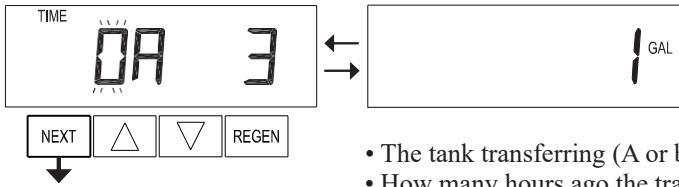
STEP 10D



Step 10D – Usage History, Last 63 Days: This display shows the volume of water treated on each of the last 63 days. Use ▼ or ▲ to scroll. Day 0 is today, day 1 is yesterday, etc. If a regeneration occurred on the day, the word *REGEN* will also be displayed. This display will show dashes if a water meter is not installed.

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

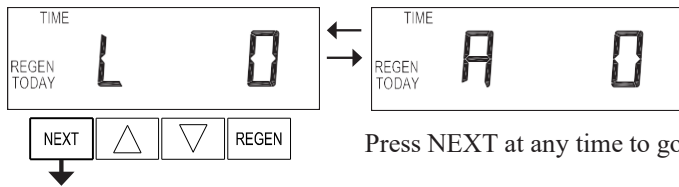
STEP 11D



Step 11D – Twin Tank Transfer History: This display will only appear if Step 2CS is set to *1.0T* or *1.5T*. Use ▼ or ▲ to scroll through the last 10 tank transfers. This display shows, from left to right:

- The transfer number (0 – 9) with 0 being the most recent transfer.
 - The tank transferring (A or b).
 - How many hours ago the transfer occurred (999 hour maximum).
- The display alternates with the volume that was treated before the tank transferred.
Press NEXT at any time to go to Step 12D. Press REGEN to return to previous step.

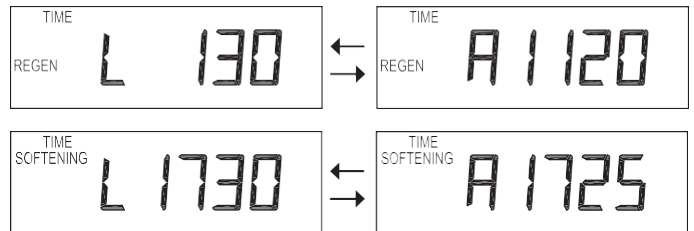
STEP 12D



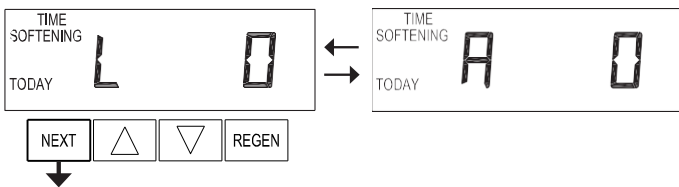
Step 12D – MAV Drive History (Retracted): This display shows the history of MAV output to drive the piston rod into the valve. This display will only appear if the MAV Output is active. *L* is the latest drive time and *A* is the average drive time. Drive time is measured in 1/100 of a second, meaning a 17.10 second move is displayed as *1710*.

Press NEXT at any time to go to Step 13D. Press REGEN to return to previous step.

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



STEP 13D



Step 13D – MAV Drive History (Extended): This display shows the history of MAV output to drive the piston rod out of the valve. This display will only appear if the MAV Output is active. *L* is the latest drive time and *A* is the average drive time. Drive time is measured in 1/100 of a second, meaning a 17.10 second move is displayed as *1710*.

Press and hold ▼ and ▲ for 3 seconds while in Step 13D to reset the MAV drive history in both the extended and retracted piston rod position. To view the old MAV drive history data, see Step 12D.
Press NEXT at any time exit Diagnostics. Press REGEN to return to previous step.

EXIT DIAGNOSTICS

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 connection	b. Plug Power Adapter into outlet or connect power cord end to PC board connection
	c. Improper power supply	c. Verify proper voltage is being delivered to PC board
	d. Defective Power Adapter	d. Replace Power Adapter
	e. Defective PC board	e. Replace PC board
2. PC Board does not display correct time of day	a. Power Adapter plugged into electric outlet controlled by light switch	a. Use uninterrupted outlet
	b. Tripped breaker switch and/or tripped GFI	b. Reset breaker switch and/or GFI switch
	c. Power outage	c. Reset time of day. If PC Board has battery back up present, the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	d. Defective PC Board	d. Replace PC Board
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 3-pin connection labeled <i>METER</i> 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 3-pin connector	d. Verify meter cable wires are installed securely into 3-pin connector labeled <i>METER</i>
	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
	d. Control valve set at "on 0" (immediate regeneration)	d. Check programming setting and reset to NORMAL (for a delayed regen time)
	e. Control valve set at "NORMAL + on 0" (delayed and/or immediate)	e. Check programming setting and reset to NORMAL (for a delayed regen time)
5. Time of day flashes on and off	a. Power outage	a. Reset time of day. If PC Board has battery back up present, the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
6. Control valve does not regenerate automatically when the REGEN button is depressed and held.	a. Broken drive gear or drive cap assembly	a. Replace drive gear or drive cap assembly
	b. Broken Piston Rod	b. Replace piston rod
	c. Defective PC Board	c. Replace PC Board
7. Control valve does not regenerate automatically but does when the REGEN button 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 3-pin connection labeled <i>METER</i> 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 3-pin connector	e. Verify meter cable wires are installed securely into 3-pin connector labeled <i>METER</i>
	f. Defective meter	f. Replace meter
	g. Defective PC Board	g. Replace PC Board

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 Troubleshooting 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 mismatched	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

Problem	Possible Cause	Solution
14. E1, Err – 1001, Err – 101 = Control unable to sense motor movement	a. Motor not inserted full to engage pinion, motor wires broken or disconnected	a. Disconnect power, make sure motor is fully engaged, check for broken wires, make sure 2-pin connector on motor is connected to the 2-pin connection on the PC Board labeled <i>MOTOR</i> . Press NEXT and REGEN 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 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 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 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 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 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 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 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 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 for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

Problem	Possible Cause	Solution
<p>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</p> <p>Motorized Alternating Valve = MAV</p> <p>Separate Source = SEPS</p> <p>No Hard Water Bypass = NHBP</p> <p>Auxiliary MAV = AUX MAV</p>	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 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 2-pin connection labeled <i>DRIVE</i> . Press NEXT and REGEN 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 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 for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
<p>19. Err – 1007, Err – 107, Err - 117 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too short (stalled) while looking for proper park position</p> <p>Motorized Alternating Valve = MAV</p> <p>Separate Source = SEPS</p> <p>No Hard Water Bypass = NHBP</p> <p>Auxiliary MAV = AUX MAV</p>	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 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 for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

Water Treatment System Warranty

This quality FRAKCO water softener is designed and built to provide many years of satisfactory performance under normal use. FRAKCO, INC. pledges to the original owner that for sixty months, all non-wearable items of the above-described water treatment system proven to be defective due to workmanship and/or materials will be replaced or repaired. Our pledge does not apply if the damage is caused by defective installation; water pressure in excess of eighty pounds per square inch; water temperature in excess of 110° F.; misuse; unauthorized alterations; freezing; accident; fire; neglect; or damage caused by shipping.

To obtain service under this warranty, notify FRAKCO, INC in writing of any defects in workmanship within thirty days of the appearance of such defects. Such written notice must include the date of purchase, the part number, and a description of the defect. Upon receiving such notice and determining that the defect is covered by this warranty, FRAKCO, INC. will replace or repair the defective item.

Replacement of a defective item will be at FRAKCO'S factory in Luverne, MN, and the purchaser must ship the defective item at its own expense to FRAKCO'S factory. Replacement items will be shipped by FRAKCO F.O.B. Luverne, Minnesota, with a shipping carton furnished. In the event certain models or colors of the replacement item are out of stock, FRAKCO, INC. may, after notifying the purchaser, furnish another model or color of the replacement item. The factory will not pay for service charges and will not perform any repair or service functions other than at its home office.

Please follow the enclosed instructions and local codes in installing your water treatment system. Failure to do so will void this warranty. Nothing in the warranty may be construed as involving the factory in the relationship between Dealer and Owner.

This warranty gives the purchaser specific legal rights. The purchase may also have implied warranty rights. In the event of a problem with warranty service or performance, the purchaser may be able to go to a Small Claims Court, a State Court, or a Federal District Court. This warranty complies with the 1975 Federal Warranty Law.

Model No. _____ Serial No. _____

Date Installed _____ Dealer _____

Address _____

*MANUFACTURED BY: FRAKCO, INC.
500 N BLUE MOUND AVE
LIVERNE, MINNESOTA 56156
WWW.FRAKCO.COM*