Installation, Operation and Maintenance

LOCKSMITH™

1½" and 2" Commercial Backwash Water Filtration Systems

Models: ACL-150, ACL-200, AMZL-150, AMZL-200, FLL-150, FLL-200

ACL, AMZL, and FLL Series Backwash Filtration Systems

WATTS®

Congratulations on your purchase of this Watts® Locksmith™ commercial water filtration solution.

You have made a great choice to protect your plumbing system against the damaging effects of hard water. This system has been engineered for trouble free operation and produced using top quality components. Simple programming, corrosion resistant mineral tank and an easy to service design ensures this system will be durable and easy to maintain.

Thank You!

The Watts Team

Backwashing filtration systems offer a range of benefits by removing sediment, chlorine, organic contaminants, and dissolved iron and manganese from the water supply. These systems help protect plumbing, water-using appliances, and fixtures from the buildup of particles, unpleasant tastes, and stains. By improving water quality, they also enhance the safety of drinking water, reducing exposure to harmful contaminants that can affect human health. Cleaner water supports overall wellness and reduces maintenance costs, while extending the lifespan of water heaters, fixtures, and other equipment, ensuring smooth operation with reduced downtime.

⚠ WARNING

Please read carefully before proceeding with installation. Your failure to follow any attached instructions or operating parameters may lead to the product's failure.

Keep this Manual for future reference.

⚠ WARNING

If you are unsure about installing your Watts backwash filtration system contact a Watts representative or consult a professional water treatment dealer or plumber.

You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product. FAILURE TO COMPLY WITH PROPER INSTALLATION AND MAINTENANCE INSTRUCTIONS COULD RESULT IN PRODUCT FAILURE WHICH CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY AND/OR DEATH. Watts is not responsible for damages resulting from improper installation and/or maintenance. Local building or plumbing codes may require modifications to the information provided. You are required to consult the local building and plumbing codes prior to installation. If this information is not consistent with local building or plumbing codes, the local codes should be followed.

Save manual for future reference.

Refer to the enclosed for operating parameters to ensure proper use with your water supply.

- As with all plumbing projects, it is recommended that a trained professional water treatment dealer or contractor install the water filtration system. Please follow all local plumbing codes for installing this water filtration system.
- Inspect the water filtration system for carrier shortage or shipping damage before beginning installation. Replace any damaged component immediately, before beginning installation.
- Use caution when installing soldered metal piping near the water filtration system. Heat can adversely affect the system's components.
- Use only lead-free solder and flux for sweat-solder connections, as required by state, province and federal codes.
- Handle all components of the system with care. Do not drop, drag or turn components upside down.
- Be sure the floor under the system is clean, level and strong enough to support the system while in operation.
- Install the system in a protected area.
- Do not attempt to treat water over 110°F (43°C) or under 34°F (1°C) with the system.
- Always connect the system to the main water supply pipe before the water heater.
  - The valve will withstand transportation and storage temperatures of -13°F (-25°C) to 131°F (55°C) and for short periods up to 158°F (70°C). If valve has been exposed to freezing conditions let valve warm up to room temperature before running water through it. The valve has been packaged to prevent damage from the effects of normal humidity, vibration and shock.
- Do not install in direct sunlight as overheating of electronics may occur and ultraviolet rays from the sun may cause damage. Exterior protection equipment is required for outdoor operation. Failure to follow outdoor installation requirements will void the warranty. Please consult Watts technicians before installing the system outside.
- Operating ambient temperature: 34° to 120°F (1° to 52°C).
- Operating water pressure range : 25 to 125psi (171 kPa to 8.6 bar).
- All plumbing connections to the system should be made using industry accepted best practices. Plumbing tape or paste may be used on metal inlet and outlet plumbing connections. Do not use paste type pipe thread sealants on the system's plastic plumbing connections.
- Do not use petroleum-based lubricants such as Vaseline®*, oils or hydrocarbon-based lubricants on O-rings or valve seals. Use only 100% silicone lubricants.
  - 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 contained in this document on water supplies that contain hydrocarbons such as kerosene, benzene, gasoline, etc.
- Use only the power transformer supplied with this water filtration system.
- All electrical connections must be completed according to local codes.
- The power outlet must be grounded.
- For installations where plastic plumbing is used, install an appropriate grounding strap across the inlet and outlet piping of the building's metal plumbing to ensure that a proper ground is maintained.
- To disconnect power, unplug the AC adapter from its power source.
- Observe drain line requirements.
- Support the full weight of the plumbing system with pipe hangers or other means.
- Do not allow this water filtration system to freeze. Damage from freezing will void this water filtration system's warranty.
- It is established that when daytime water pressure exceeds 80psi (5.5 bar), the maximum pressure rating of 125psi (8.6 bar) can be exceeded. A pressure regulator must be installed on this system or warranty is voided.
- Periodic cleaning and maintenance is required for system to function properly.
- Observe all warnings that appear in this manual.
- Keep the media tank in the upright position. Do not turn upside down or drop. Turning the tank upside down or laying the tank on its side can cause media to enter the valve.
- Use only regenerants designed for water conditioning. Do not use ice melting salt, block salt or rock salt.

How To Use This Manual

This installation manual is designed to guide the installer through the process of installing and starting up this commercial water filtration system.

This manual is a reference and will not include every system installation situation. The person installing this equipment should have:

- Training on the control valve.
- Knowledge of water filtration and how to determine proper control settings.
- Adequate plumbing skills.

* Vaseline® is a registered trademark of Unilever.

⚠ WARNING

Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

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Introduction

Principals of Filtration- Backwash Systems

Water filtration is the removal of contaminants or particles from water through a filtering medium. This process, in which water passes through a filter media (such as activated carbon, or other media types), then traps and removes particles, debris, and/or other contaminants. Over time, the filter media will become clogged with these trapped particles, reducing filtration efficiency.

Backwashing is a cleaning method used to restore the filter media by reversing the flow of water through the filter media. This reverse of flow forces the trapped particles to loosen and move out of the filter media, allowing the filtration system to function properly again. During this backwashing process, water is sent in the opposite direction of normal filtration flow. In filters that use granular media, the backwash causes the media to expand. With the increased velocity of the backwash and expansion of the filter bed, the accumulated dirt and debris is released and carried away through a drainage system. This process creates space for new contaminants to be captured during the next filtration cycle.

Backwashing is typically performed at regular intervals, depending on factors such as the volume of water processed, the number of contaminants, and the type of filter. The backwash cycle duration is automated, ensuring effective cleaning without wasting too much water or time. The backwash process is highly effective in maintaining filtration efficiency, especially in systems dealing with large amounts of particulates. It extends the life of the filter media and ensures the continued quality of the filtered water. It is a critical maintenance process that helps restore filter media, ensuring that filtration systems continue to operate efficiently by removing the particles that accumulate during normal filtration.

Regeneration occurs automatically and consists of 3 steps:

Step 1- Backwash

Approximate Duration 10 Minutes- Fresh water flow is directed reversed through the media bed to remove solid particles the media bed has captured, sending them to drain.

Step 2- Second Backwash (Optional)

Approximate Duration 8 Minutes- Fresh water flow is directed upward through the media bed to mix the media directly after slowrinse.

Step 3- Rapid Rinse

Approximate Duration 5 Minutes- After the conclusion of the backwash, fresh water will rinse over the filter media to ensure any residual particulate has been cleaned from the media before it returns to service.

Project Data Sheet

Installation Summary

Installation Date: _____

Installation Location: _____

Installer(s): _____

Phone Number: _____

Application Type: (Filtration)_____Other: _____

Water Source: _____

Water Test Results: _____

Hardness: _____ Iron: _____ pH:_____

Other: _____

_____

Misc:

Service Flow Rates: min._____max. _____

Tank Size: Diameter _____Height: _____

Resin or Media Volume: _____

Resin or Media Type: _____

Capacity: _____

Salt or Fill Setting per Regeneration: _____

Brine Tank Size: _____

Control Valve Configuration:

Valve Type: _____

Valve Part Number: _____

Valve Serial Number: _____

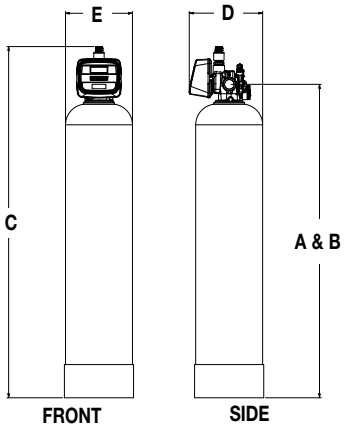
Regenerant Refill Control: _____ gpm/lpm

Injector Size: _____

Drain Line Flow Control: _____ gpm/lpm

System Specifications

Dimensions - Weights



Series ACL-150

Call customer service if you need assistance with technical details.

MODEL NO.	DIMENSIONS										SHIPPING WEIGHT	
	A		B		C		D		E			
	in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lb*	*kg*
NC12FL150	53¼	1353	53¼	1353	61	1550	12	305	12	305	161	73
NC14FL150	68¼	1734	68¼	1734	73⅝	1869	14	356	14	356	259	117
NC16FL150	68¼	1734	68¼	1734	73⅝	1869	16	406	16	406	314	142
NC18FL150	68¼	1734	68¼	1734	73⅝	1869	18	457	18	457	424	192
NC21FL150	65¼	1657	65¼	1657	70⅝	1793	21	533	21	533	547	248
NC24FL150	75¼	1911	75¼	1911	80⅝	2047	24	610	24	610	819	372

Series ACL-200

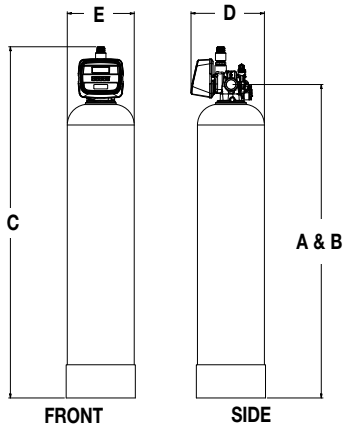
MODEL NO.	DIMENSIONS										SHIPPING WEIGHT	
	A		B		C		D		E			
	in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lb*	*kg*
NC12FL200	53½	1359	53½	1359	61⅝	1567	14	356	12	305	169	77
NC14FL200	68½	1740	68½	1740	74¼	1886	15	381	14	381	267	121
NC16FL200	68½	1740	68½	1740	74¼	1886	16	406	16	406	322	146
NC18FL200	68½	1740	68½	1740	74¼	1886	18	457	18	457	432	196
NC21FL200	65½	1664	65½	1664	73	1854	21	533	21	533	555	252
NC24FL200	75½	1918	75½	1918	83	2108	24	610	24	610	827	375
NC30FL200	75½	1918	75½	1918	83	2108	30	762	30	762	1195	542
NC36FL200	75½	1918	75½	1918	83	2108	36	914	36	914	1669	769

Specifications

MODEL NO.	MINERAL TANK			FLOW RATES FOR SERVICE AND BACKWASH	
	TANK SIZE	CARBON FT3	UNDERBED 1/2 X 1/4 - 1/4 X 1/8 - #20	SERVICE GPM 15 GPM FT2	BACKWASH GPM
NC12FL150	12 x 52	2	20	7.4	7
NC14FL150	14 x 65	3	50	11.1	10
NC16FL150	16 x 65	4	50	14.8	12
NC18FL150	18 x 65	5	100	18.5	16
NC21FL150	21 x 62	7	100	25.9	25
NC24FL150	24 x 72	10	200	37	30
NC12FL200	12 x 52	2	20	7.4	7
NC14FL200	14 x 65	3	50	11.1	10
NC16FL200	16 x 65	4	50	14.8	12
NC18FL200	18 x 65	5	100	18.5	16
NC21FL200	21 x 62	7	100	25.9	25
NC24FL200	24 x 72	10	200	37	30
NC30FL200	30 x 72	15	300	55.5	50
NC36FL200	36 x 72	20	500	74	70

System Specifications

Dimensions - Weights



Series AMZL-150

MODEL NO.	DIMENSIONS										SHIPPING WEIGHT	
	A		B		C		D		E			
	in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lb*	*kg*
NM12FL150	53¼	1353	53¼	1353	61	1550	12	305	12	305	161	73
NM14FL150	68¼	1734	68¼	1734	73⅝	1869	14	356	14	356	259	117
NM16FL150	68¼	1734	68¼	1734	73⅝	1869	16	406	16	406	314	142
NM18FL150	68¼	1734	68¼	1734	73⅝	1869	18	457	18	457	424	192
NM21FL150	65¼	1657	65¼	1657	70⅝	1793	21	533	21	533	547	248
NM24FL150	75¼	1911	75¼	1911	80⅝	2047	24	610	24	610	818	372

Series AMZL-200

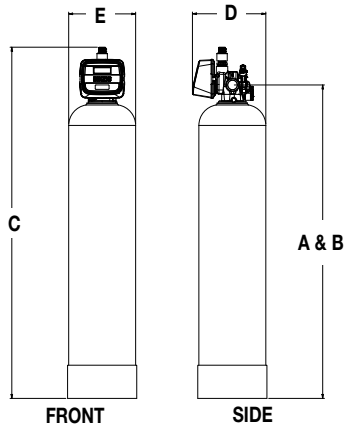
MODEL NO.	DIMENSIONS										SHIPPING WEIGHT	
	A		B		C		D		E			
	in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lb*	*kg*
NM12FL200	53½	1359	53½	1359	61⅝	1567	14	356	12	305	169	77
NM14FL200	68½	1740	68½	1740	74¼	1886	15	381	14	381	267	121
NM16FL200	68½	1740	68½	1740	74¼	1886	16	406	16	406	322	146
NM18FL200	68½	1740	68½	1740	74¼	1886	18	457	18	457	432	196
NM21FL200	65½	1664	65½	1664	73	1854	21	533	21	533	555	252
NM24FL200	75½	1918	75½	1918	83	2108	24	610	24	610	827	375
NM30FL200	75½	1918	75½	1918	83	2108	30	762	30	762	1195	542

Specifications

MODEL NO.	MINERAL TANK			FLOW RATES FOR SERVICE AND BACKWASH			
	TANK SIZE	TANK SIZE FT2	MICRO Z™ FT3	SERVICE GPM 10 GPM FT2	SERVICE GPM 15 GPM FT2	SERVICE GPM 20 GPM FT2	BACKWASH GPM
NM12FL150	12 X 52	0.79	2	7.9	11.8	15.7	10
NM14FL150	14 x 65	1.07	3	10.7	16.0	21.4	20
NM16FL150	16 x 65	1.40	4	14.0	20.9	27.9	20
NM18FL150	18 x 65	1.77	5	17.7	26.5	35.3	30
NM21FL150	21 x 62	2.40	7	24.0	36.1	48.1	40
NM24FL150	24 x 72	3.14	10	31.4	47.1	62.8	50
NM12FL200	12 X 52	0.79	2	7.9	11.8	15.7	10
NM14FL200	14 x 65	1.07	3	10.7	16.0	21.4	20
NM16FL200	16 x 65	1.40	4	14.0	20.9	27.9	20
NM18FL200	18 x 65	1.77	5	17.7	26.5	35.3	30
NM21FL200	21 x 62	2.40	7	24.0	36.1	48.1	40
NM24FL200	24 x 72	3.14	10	31.4	47.1	62.8	50
NM30FL200	30 x 72	4.91	15	49.1	73.6	98.1	80

System Specifications

Dimensions - Weights



Series FLL-150

MODEL NO.	DIMENSIONS										SHIPPING WEIGHT	
	A		B		C		D		E			
	in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lb*	*kg*
NF12FL150	53¼	1353	53¼	1353	61	1550	12	305	12	305	161	73
NF14FL150	68¼	1734	68¼	1734	73⅝	1869	14	356	14	356	259	117
NF16FL150	68¼	1734	68¼	1734	73⅝	1869	16	406	16	406	314	142
NF18FL150	68¼	1734	68¼	1734	73⅝	1869	18	457	18	457	424	192
NF21FL150	65¼	1657	65¼	1657	70⅝	1793	21	533	21	533	547	248

Series FLL-200

MODEL NO.	DIMENSIONS										SHIPPING WEIGHT	
	A		B		C		D		E			
	in.	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lb*	*kg*
NF12FL200	53½	1359	53½	1359	61⅝	1567	14	356	12	305	169	77
NF14FL200	68½	1740	68½	1740	74¼	1886	15	381	14	381	267	121
NF16FL200	68½	1740	68½	1740	74¼	1886	16	406	16	406	322	146
NF18FL200	68½	1740	68½	1740	74¼	1886	18	457	18	457	432	196
NF21FL200	65½	1664	65½	1664	73	1854	21	533	21	533	555	252
NF24FL200	75½	1918	75½	1918	83	2108	24	610	24	610	827	375

Specifications

MODEL NO.	TANK SIZE	MINERAL TANK TANK SIZE FT2	FILOX® FT3	FLOW RATES FOR SERVICE AND BACKWASH SERVICE GPM MAX	BACKWASH GPM 19 GPM FT2
NF12FL150	12 X 52	0.79	2	12	15
NF14FL150	14 x 65	1.07	3	18	20
NF16FL150	16 x 65	1.40	4	24	26
NF18FL150	18 x 65	1.77	5	30	34
NF21FL150	21 x 62	2.40	7	42	46
NF12FL200	12 x 52	0.79	2	12	15
NF14FL200	14 x 65	1.07	3	18	20
NF16FL200	16 x 65	1.40	4	24	26
NF18FL200	18 x 65	1.77	5	30	34
NF21FL200	21x 62	2.40	7	42	46
NF24FL200	24 x 72	3.14	10	60	60

Ordering Information

Ordering Information for ACL-150 and ACL-200

MODEL NO.	ORDERING CODES	DESCRIPTION	PIPE SIZE IN.	SPACE REQUIRED W X D X H	WEIGHT LB.	WEIGHT KG
NC12FL150	68110920	2 Cubic Foot 1½" Carbon Filter with Auto Backwash	1½	15 x 13 x 64	161	73
NC14FL150	68110921	3 Cubic Foot 1½" Carbon Filter with Auto Backwash	1½	16 x 15 x 77	259	117
NC16FL150	68110922	4 Cubic Foot 1½" Carbon Filter with Auto Backwash	1½	18 x 17 x 77	314	142
NC18FL150	68110923	5 Cubic Foot 1½" Carbon Filter with Auto Backwash	1½	19 x 19 x 77	424	192
NC21FL150	68110924	7 Cubic Foot 1½" Carbon Filter with Auto Backwash	1½	24 x 23 x 84	547	248
NC24FL150	68110925	10 Cubic Foot 1½" Carbon Filter with Auto Backwash	1½	26 x 25 x 92	819	372
NC12FL200	68110927	2 Cubic Foot 2" Carbon Filter with Auto Backwash	2	16 x 13 x 64	169	77
NC14FL200	68110928	3 Cubic Foot 2" Carbon Filter with Auto Backwash	2	17 x 15 x 77	267	121
NC16FL200	68110929	4 Cubic Foot 2" Carbon Filter with Auto Backwash	2	18 x 17x 79	322	146
NC18FL200	68110930	5 Cubic Foot 2" Carbon Filter with Auto Backwash	2	20 x 19 x 77	432	196
NC21FL200	68110931	7 Cubic Foot 2" Carbon Filter with Auto Backwash	2	23 x 22 x 77	555	252
NC24FL200	68110932	10 Cubic Foot 2" Carbon Filter with Auto Backwash	2	25 x 25 x 88	827	375
NC30FL200	68110933	15 Cubic Foot 2" Carbon Filter with Auto Backwash	2	38 x 30 x 107	1195	542
NC36FL200	68110934	20 Cubic Foot 2" Carbon Filter with Auto Backwash	2	48 x 40 x 107	1669	769

Ordering Information for AMZL-150 and AMZL-200

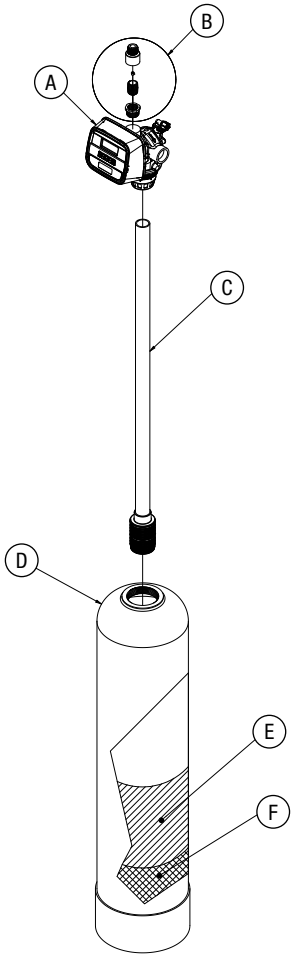
MODEL NO.	ORDERING CODES	DESCRIPTION	PIPE SIZE IN.	SPACE REQUIRED W X D X H	WEIGHT LB	WEIGHT KG
NM12FL150	68110935	2 Cubic Foot 1½" Micro Z with Auto Backwash	1½	15 x 13 x 64	161	73
NM14FL150	68110936	3 Cubic Foot 1½" Micro Z with Auto Backwash	1½	16 x 15 x 77	259	117
NM16FL150	68110937	4 Cubic Foot 1½" Micro Z with Auto Backwash	1½	18 x 17 x 77	314	142
NM18FL150	68110938	5 Cubic Foot 1½" Micro Z with Auto Backwash	1½	19 x 19 x 77	424	192
NM21FL150	68110939	7 Cubic Foot 1½" Micro Z with Auto Backwash	1½	24 x 23 x 84	547	248
NM24FL150	68110940	10 Cubic Foot 1½" Micro Z with Auto Backwash	1½	26 x 25 x 92	819	372
NM12FL200	68110942	2 Cubic Foot 2" Micro Z with Auto Backwash	2	16 x 13 x 64	169	77
NM14FL200	68110943	3 Cubic Foot 2" Micro Z with Auto Backwash	2	17 x 15 x 77	267	121
NM16FL200	68110944	4 Cubic Foot 2" Micro Z with Auto Backwash	2	18 x 17 x 79	322	146
NM18FL200	68110945	5 Cubic Foot 2" Micro Z with Auto Backwash	2	20 x 19 x 77	432	196
NM21FL200	68110946	7 Cubic Foot 2" Micro Z with Auto Backwash	2	23 x 22 x 77	555	252
NM24FL200	68110947	10 Cubic Foot 2" Micro Z with Auto Backwash	2	25 x 25 x 88	827	375
NM30FL200	68110948	15 Cubic Foot 2" Micro Z with Auto Backwash	2	38 x 30 x 107	1195	542

Ordering Information for FLL-150 and FLL-200

MODEL NO.	ORDERING CODES	DESCRIPTION	PIPE SIZE IN.	SPACE REQUIRED W X D X H	WEIGHT LB	WEIGHT KG
NF12FL150	68110905	2 Cubic Foot 1½" Filox with Auto Backwash	1½	15 x 13 x 64	161	73
NF14FL150	68110906	3 Cubic Foot 1½" Filox with Auto Backwash	1½	16 x 15 x 77	259	117
NF16FL150	68110907	4 Cubic Foot 1½" Filox with Auto Backwash	1½	18 x 17 x 77	314	142
NF18FL150	68110908	5 Cubic Foot 1½" Filox with Auto Backwash	1½	19 x 19 x 77	424	192
NF21FL150	68110909	7 Cubic Foot 1½" Filox with Auto Backwash	1½	24 x 23 x 84	547	248
NF12FL200	68110912	2 Cubic Foot 2" Filox with Auto Backwash	2	16 x 13 x 64	169	77
NF14FL200	68110913	3 Cubic Foot 2" Filox with Auto Backwash	2	17 x 15 x 77	267	121
NF16FL200	68110914	4 Cubic Foot 2" Filox with Auto Backwash	2	18 x 17 x 79	322	146
NF18FL200	68110915	5 Cubic Foot 2" Filox with Auto Backwash	2	20 x 19 x 77	432	196
NF21FL200	68110916	7 Cubic Foot 2" Filox with Auto Backwash	2	23 x 22 x 77	555	252
NF24FL200	68110917	10 Cubic Foot 2" Filox with Auto Backwash	2	25 x 25 x 88	827	375

Set Up

Unpack system and make sure all components are accounted for according to the diagram below according to your specific series number. If any components are missing or damaged contact your Watts representative. If they can not be reached contact Watts customer service at 1-800-659-8400.



Operating Parameters

Water Pressure. . . . . .30 psi to 125 psi (205 kPa to 8.5 bar)
Temperature . . . . . .34 - 110°F (1 - 43°C)

ACL Series

pH . . . . . .6 to 8.5
Oil and H2S . . . . . .None Allowed
Iron. . . . . .Less than 1 ppm
Total Chlorine . . . . . .Less than 5 ppm

AMZL Series

pH . . . . . .6 to 8.5
Oil and H2S . . . . . .None Allowed

FLL Series

pH . . . . . .6.56 to 9
H2S . . . . . .Up to 3 ppm
Iron. . . . . .Up to 10 ppm
Manganese . . . . . .Up to 5 ppm

Water known to have heavy loads of dirt and debris may require pre-filtration prior to the water softening system.

For all other guideline information please contact your Watts representative.

Quantity of Major Components

COMPONENT LABEL	COMPONENT	ACL-150 & ACL-200	AMZL-150 & AMZL-200	FLL-150 & FLL-200
A	Number of Control Valves	1	1	1
B	Number of Drain Line Flow Controllers*	1	1	1
C	Number of Distributor Tubes*	1	1	1
D	Number of Mineral Tanks	1	1	1
E	Media**	Type and Quantity Varies Depending on System Size		
F	Gravel**	Quantity Varies Depending on System Size		

* Drain line flow controllers may come factory assembled on control valve's drain port depending on size. Distributor tubes ship inside mineral tanks.

** Water filtering systems that use mineral tanks larger than 12" in diameter are not factory loaded with media and gravel. For unloaded systems, the media is in bags and ship on the system pallet. The proper amount of media is supplied for each mineral tank used.

System Installation

Pre-Installation Considerations

- A minimum of 25psi of water pressure is required for regeneration valve to operate effectively.
- A continuous 115 volt, 60 Hertz current supply is required. Make certain the current supply is always hot and cannot be turned off with another switch.
- Condition of existing plumbing should be free from lime and iron buildup. Piping that is built up heavily with lime and/or iron should be replaced. If piping is clogged with iron, a separate iron filter unit should be installed ahead of the water filter system.
- The system must be located close to a drain.
- Always provide for the installation of a bypass valve.
- The full weight of the plumbing system must be supported by pipe hangers or other means.
- Do not install the system where it would block access to the water heater, main water shutoff, water meter, or electrical panels.
- Install the system in a place where water damage is least likely to occur if a leak develops.
- If applicable, use di-electric unions where dissimilar metals are present.

NOTICE

The main control valve and all plumbing connections have right-hand threads. Turn clockwise to install.

NOTICE

If O-ring lubricant is required, only use a silicone based compound formulated for potable water O-ring applications. Watts recommends Ordering Code #68102757 Silicone Lubricant. The use of other types of lubricants may attack the control's plastic or rubber components. Petroleum-based lubricants can cause swelling in rubber parts, including O-rings and seals.

⚠ WARNING

Do not exceed water pressure of 125psi (8.6 bar). Do not exceed 110°F (43°C). Do not subject unit to freezing conditions.

General Installation Instructions

NOTICE

Installation diagrams and additional details are available on pages 13-14 of this manual.

1. Turn off water heater.
2. Turn off the main water supply to the building and open a treated water faucet (cold and hot) to relieve any pressure within the plumbing system.
3. Place the mineral tank into its final position for installation.
4. Unloaded mineral tank will need to be loaded with media and gravel following the instructions below:
   a. Inspect the distributor screen for damage, and make sure the screen is present before loading the mineral tank with media. Before proceeding with installation, replace any damaged components immediately.
   b. Cap the top open end of the distributor tube with tape and plastic sheeting to keep all media and foreign debris from entering the distributor tube. This cap must be secure and not come off during media loading.
   c. Place the distributor tube, screen end down, into the mineral tank and center it in the bottom. The top of the distributor tube should be flush with the top of the tank. Test the tape cap to make sure it can not come off during the media loading process.
   d. Make sure the plastic and tape cap is secure to the top of the distributor tube, place a funnel on the top of the tank and load first the gravel (if different sizes of gravel are used load the largest gravel first, then the smaller gravel) then the softening resin into the tank. The cap must not come off of the distributor tube during the loading of the media.
   e. Remove the funnel from the top of the tank and plastic cap and tape from the top of the distributor tube. DO NOT PULL UP ON THE DISTRIBUTOR TUBE when removing the cap. The distributor tube top must remain flush with the top of the tank.
   f. Clean any media from the threads and top of the mineral tank. Media in the threads and on the O-ring sealing surface of the tank can cause tank thread damage and prevent the control valve's O-ring seal from sealing properly.
   g. Lubricate the O-rings on the bottom of the control valve (distributor tube port O-ring and top of tank O-ring). Use nonpetroleum based silicone lubricant only.
   h. Press the upper diffuser into the base of the control valve until it is fully engaged, then place the control valve on top of the tank. When performing this step, seat the top of the distributor tube inside the distributor port located on the bottom of the control valve first, then press the control valve down until the control valve threads come in contact with the tank threads. This ensures that the distributor tube is properly seated into the bottom of the control valve.
   i . Tighten the control valve onto the tank with a clockwise rotation. Be careful not to cross thread the control valve to tank connection or over tighten it. A hand tight fit is appropriate for the control valve torque. DO NOT use a wrench. Tank or control valve damage could result. DO NOT apply thread sealant or plumbing tape on the control valve to tank threaded connection.
5. *Connect the cold water supply to the inlet port of the water filtration system's control valve. When constructing the supply line, install an inlet water isolation valve and plumbing union fitting (user supplied) in the supply line of the control valve and close the isolation valve. The union fitting should be located between the isolation valve and the system's inlet port.
6. *Install an inlet water sample port in the supply line and close it.
7 . * If risk of vacuum exists, install Watts # 0556031 vacuum relief valve in the supply line to protect the system against vacuum damage.
8. When constructing this outlet water line, install an outlet water isolation valve and plumbing union fitting (user supplied) in the outlet line and close the isolation valve. The union fitting should be located between the outlet of the control valve and the outlet isolation valve.

System Installation

9. *Install an outlet water sample port on the outlet water line of the system and close it.
10. *Install a bypass valve between the inlet and outlet plumbing water lines and close it.
11. *If not already factory installed on the control valve, attach the drain line flow controller directly to the control valve's drain port. See page 13 for Drain and Brine Connection Detail. The flow arrow on the drain line flow controller must point towards the drain receptacle. Only plumbing tape is allowed on the drain line flow controller fitting threads.

⚠ WARNING

Operating a system without a drain line flow controller will cause all media to flow out of the system through the drain line.

12. *Construct the drain line routing it to an appropriate drain receptacle abiding buy all local building and plumbing codes. DO NOT construct drain line to elevations that exceed 4 feet above the drain port of the control valve, or reduce the drain line diameter to smaller than that of the drain line flow controller. Install a plumbing union fitting in the drain line close to the drain line flow controller. The drain line must be anchored to the floor.
13. If applicable, install a metal bonding strap across metal inlet and outlet plumbing lines to maintain electrical continuity.
14. Plug in the 15V power supply transformer into a 115V 60Hz power outlet and program the system according to the System Type and application requirements following the Control Valve Programming section of this manual.

The system is now ready for Start Up.

* See Installation Diagrams pages 13-14 of this manual for additional information.

Start Up Instructions

1. Ensure all inlet and outlet isolation valves and the bypass valves are in the closed position and the treated water faucet hot and cold side are in the open position.
2. Open the main water supply valve to the building.
3. Check for leaks and repair as needed.
4. Press and hold Regen button for >3 sec to manually start the regen cycle, place the system into the backwash position. Once the system cycles into the backwash position, unplug the control valve from the power outlet to keep the system in the backwash position.
5. Open the inlet isolation valve slightly until water can be heard flowing through the isolation valve and allow the mineral tank to fill with water. Air will come out of the drain line until the mineral tank is full of water. Once full, close the inlet isolation valve and let the tank sit for 24 hours to allow the media to thoroughly soak.
6. After 24 hours of pre-soaking, open the inlet valve fully and allow water to flow to the drain, initiating the initial backwash to flush the media bed of any color or fines. Continue flushing the media bed until the water at the drain runs clear.
7. After media bed flushing is complete, plug the system back into the power outlet and return the control valve to the service position by advancing through each step of regeneration by pressing the regen button. See Manually Initiating a Regeneration on page 28 of this manual.
8. Program the system according to the System Type following the Control Valve Programming section of this manual.
9. Fully open the outlet isolation valve.
10. Ensure the bypass valve is in the closed position.
11. Check for leaks and repair as needed.
12. Allow water to flow from the hot and cold side treated faucet until all air has been purged from the plumbing system. Then close both the hot and cold side treated water faucet.
13. Turn on water heaters.
    Start up is now complete and the system is ready for operation.

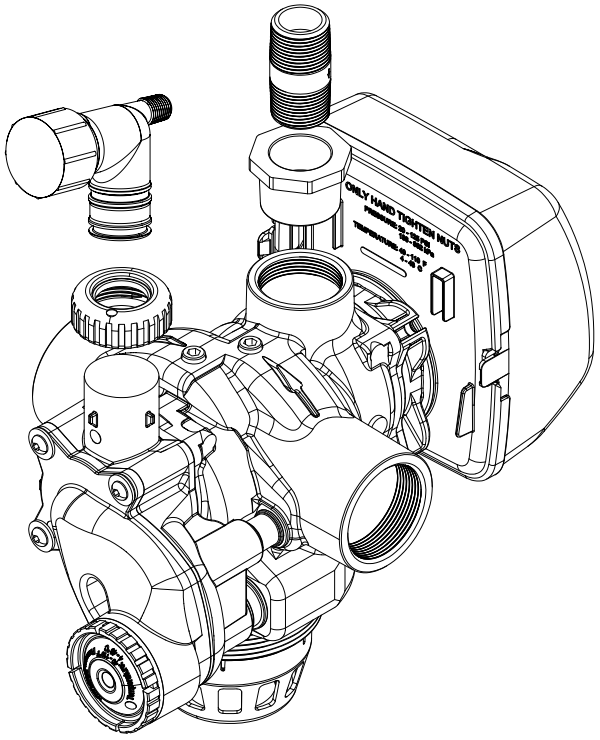
Installation Diagrams

ACL, AMZL, and FLL Systems

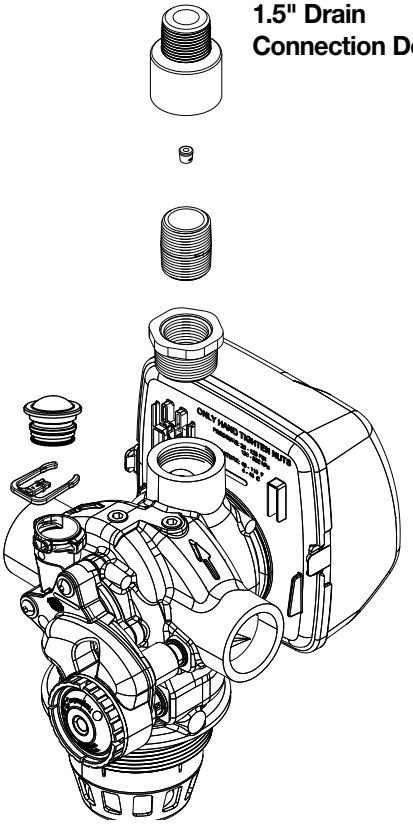
Installation Reference Notes For All System Installation Drawings:

1. All dimensions shown in table are in inches, unless otherwise noted and are ± 1 inch (25mm).
2. All items shown in phantom line are to be provided by others.
3. All dimensions are subject to change without any notice.
4. Install unions fittings on inlet, outlet and drain plumbing connections.
5. Provide a 2 feet minimum clearance above mineral tank for filling media.
6. A GFCI equipt electrical outlet should be provided within 5 feet of equipment location.
7. Use dielectric unions on plumbing connections of control valve when dissimilar metals are present.
8. Provided system shall not be subject to any vacuum. If risk of vacuum is present, install siphon break on drain line and install vacuum relief valve Watts ordering code # 0556031 on inlet line.
9. Do not install drain line directly to a drain. For proper drain connection follow all national, state and local codes. Do not construct drain line to elevations that exceed 4 feet above the control valve's drain port.
10. The full weight of the piping and valves must be supported by pipe hangers or other means.
11. Inlet and outlet headers need to be sized according to flow rate requirements by others.
12. Power requirements: 115v/60hz 2.7 Amps per control valve unless otherwise specified.
13. Limit inlet pressure to not exceed maximum published operating pressure.

2" Drain Connection Detail



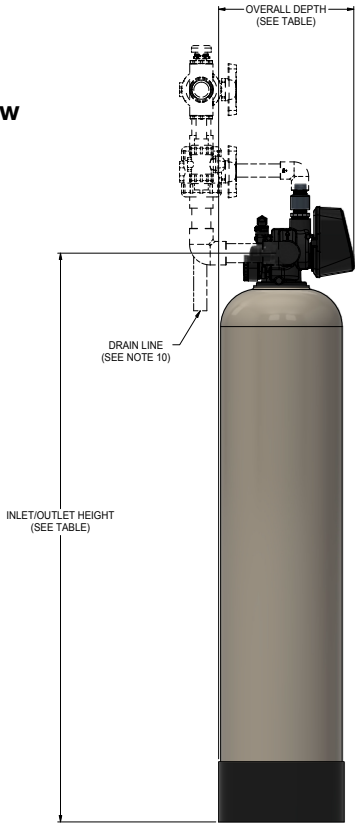
1.5" Drain Connection Detail



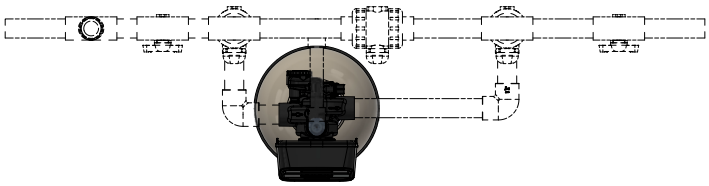
Installation Diagrams

ACL, AMZL, and FLL Systems

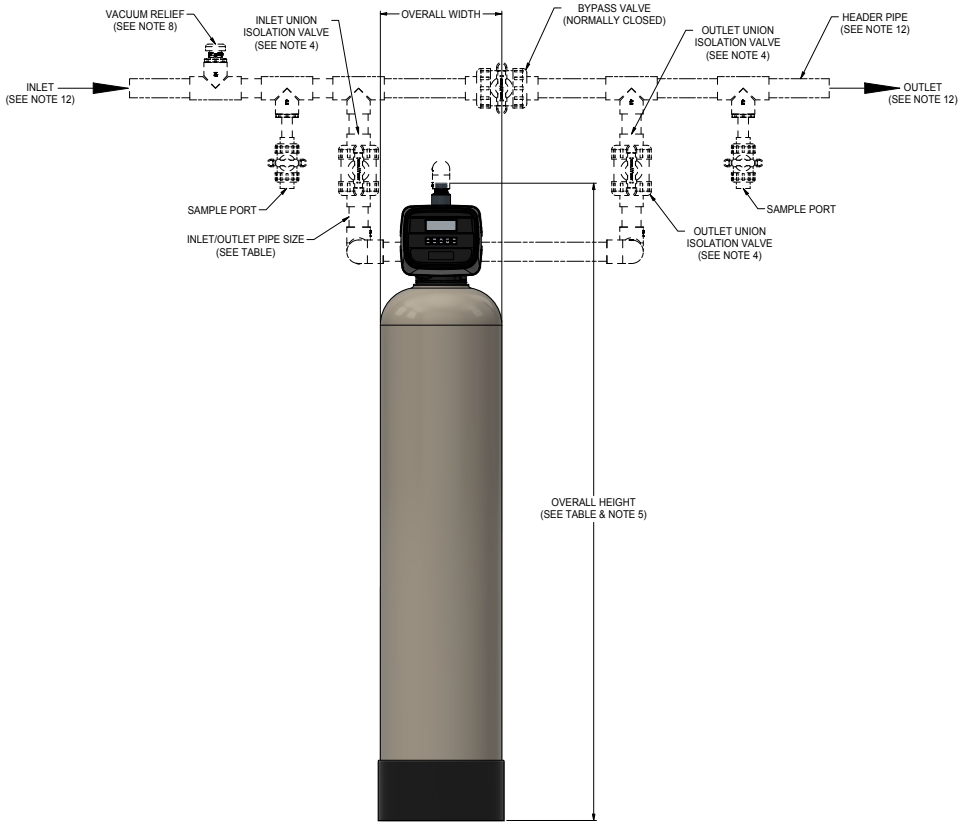
Side View



Top View



Front View



Controller Electrical Connections

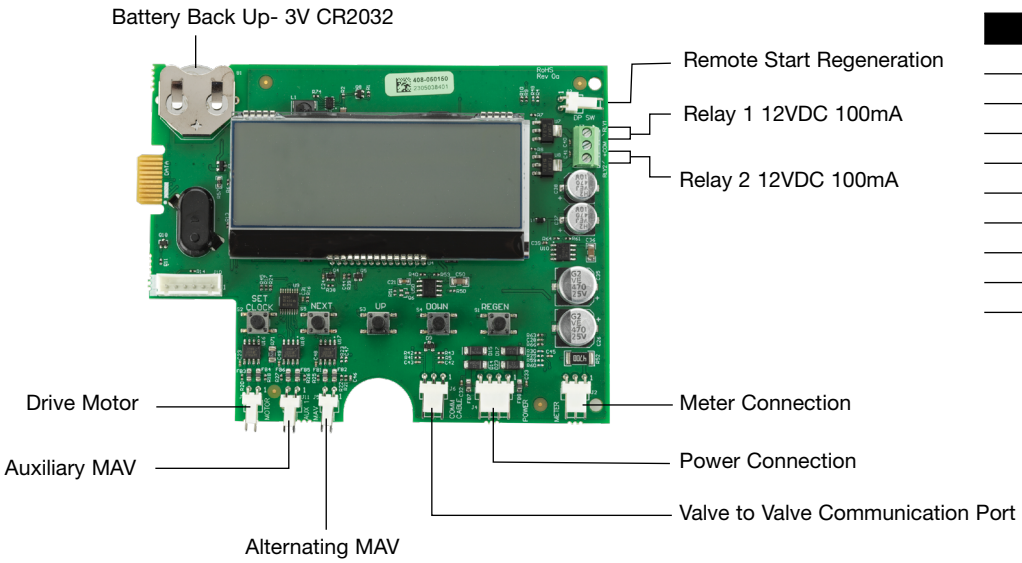
Electrical Connections:

NOTICE

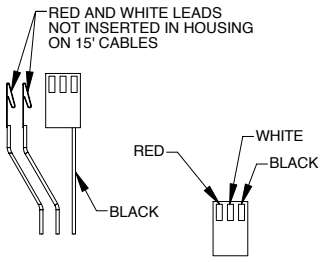
Power supply and drive motor cables include cable harnesses that are already connected to the control board.

If these cable need to be disconnected from the control board, pull on the white connectors while rocking side to side. DO NOT pull on the wires. To reconnect, push the white cable connectors firmly into position on to the control board until they are fully mated.

See Controller Electrical Connection Diagram below for additional information.



ITEM	BOARD LABEL
1	Battery
2	Drive Motor
3	Auxiliary MAV
4	Alternating MAV
5	Comm Port
6	Power
7	Remote Start Regen
8	Relay Terminal
9	Flow Meter



Meter Wiring

Wire Gauge:	22
Red:	Positive
Black:	Negative
White:	Signal (Meter Output)
Voltage Requirement:	4 – 24 VDC
Output Signal:	0.4 Hz – 47.5 Hz
Terminals:	Molex 41572 or 40445
Housing:	Molex 22-01-3037 (Series 2695 White Housing)

Voltage and mA

AC ADAPTER	U.S.	INTERNATIONAL
Supply Voltage	120 VAC	230 VAC
Supply Frequency	60 Hz	50 Hz
Output Voltage	12 VAC	12 VAC
Output Current	500 mA	500 mA

NOTICE

Relay Driver Output Type: Dual Solid-State 12 VDC wet contacts - N.O.

Relay Driver Output Capacity: 12 VDC @100 mA per relay output (total current through both outputs not to exceed 200 mA).

***Note:* Check for proper mounting dimensions on valve backplate prior to mounting an external relay under control cover.**

We recommend that each externally wired relay contain a suppressor diode, which is normally placed across the relay coil in order to protect the control against back EMF at relay coil deactivation.

Wiring For Correct On/Off Operation

PC Board Relay Terminal Block	Relay
RELAY1	Coil -
COM	Coil +
RELAY2	Coil -

OEM General Programming 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 Configuration Setup
- OEM Softener System Setup
- OEM Filter System Setup
- Installer Display Settings
- User Display Settings
- Diagnostics
- Valve History

Once the OEM Configuration has been set, the other procedures can be accessed in any order. Details on each of the procedures are provided on the following pages.

Tables 1 and 2 show examples when the valve is set up as a softener or filter.

Table 1: Regeneration Cycles Softening

DOWNFLOW REGENERANT REFILL AFTER RINSE	DOWNFLOW REGENERANT PRE-FILL	UPFLOW REGENERANT REFILL AFTER RINSE	UPFLOW REGENERANT PRE-FILL
1st Cycle: Backwash	1st Cycle: Fill	1st Cycle: UP Brine	1st Cycle: Fill
2nd Cycle: dn Brine	2nd Cycle: Softening	2nd Cycle: Backwash	2nd Cycle: Softening
3rd Cycle: Backwash	3rd Cycle: Backwash	3rd Cycle: Rinse	3rd Cycle: UP Brine
4th Cycle: Rinse	4th Cycle: dn Brine	4th Cycle: Fill	4th Cycle: Backwash
5th Cycle: Fill	5th Cycle: Backwash		5th Cycle: Rinse
	6th Cycle: Rinse		

Table 2: Regeneration Cycles Filtering

DOWNFLOW REGENERANT REFILL AFTER RINSE
1st Cycle: Backwash
2nd Cycle: dn Brine
3rd Cycle: Backwash
4th Cycle: Rinse
5th Cycle: Fill

The control valve with a water meter can be set for Demand Initiated Regeneration (DIR) only, time clock operation only, or DIR and time clock (whichever comes first), depending upon what settings are selected for Day Override and Volume Capacity.[1] See Table 3.

If a control valve does not contain a meter, the valve can only act as a time clock. Day Override should be set to any number and Volume Capacity should be set to *OFF*.

DIR	TIME CLOCK	RESERVE CAPACITY	SOFTENER	FILTER		SETTINGS[2]	
				REGENERANT	BACKWASH ONLY	DAY OVERRIDE	VOLUME CAPACITY
Yes		Automatically calculated	Yes			Off	Auto
Yes		If desired enter a value less than estimated capacity	Yes	Yes	Yes	Off	Any Number
Yes	Yes	Automatically calculated	Yes			Any Number	Auto
Yes	Yes	If desired enter a value less than estimated capacity	Yes	Yes	Yes	Any Number	Any Number
	Yes	None	Yes	Yes	Yes	Any Number	Off

For DIR Softeners, there are 2 options for setting the Volume Capacity. The Volume Capacity is automatically calculated if set to *AUTO*. Reserve capacity is automatically estimated based on water usage if *AUTO* is used. The other option is to set the Volume Capacity to a specific number. If a specific number is set, reserve capacity is zero unless the value is manually set (i.e., the manufacturer intentionally sets the volume capacity number below the calculated capacity of the system).

[1] See Installer Display Settings, OEM Softener System Setup, and OEM Filter System Setup for explanations of Day Override and Volume Capacity.
[2] Day Override and Volume Capacity cannot both be set to *OFF* at the same time.

OEM General Programming Instructions

A unique feature of this control valve is the ability to display actual water usage for the last 63 days. The values are initially stored as dashes, meaning the value is unknown. As days pass, values are stored as *0* for no flow or the actual volume of water. The system begins counting water usage at the regeneration time. If no regeneration time can be set (i.e., when the valve is set for immediate regeneration), the system begins counting water usage at 12 a.m. Day 1 is yesterday, day 2 the day before yesterday, etc. As new values are added, the oldest history disappears.

Another unique feature is that the valve automatically calculates a reserve capacity when set up as a softener with Volume Capacity set to *AUTO* and Regeneration Time Option set to *DELAYED REGEN* or *DELAY + IMMEDIATE*. The actual reserve capacity is compared to the capacity remaining immediately prior to the preset regeneration time. Regeneration will occur when capacity remaining is less than the reserve capacity determined for that day. The actual reserve capacity is calculated by using the estimated reserve capacity and adjusting it up or down for actual usage.

The estimated reserve capacity for a given day of the week is the maximum value stored for the last 3 non-trivial water usages in 7-day intervals. Non-trivial water use is defined as more than 20 gallons in a single day.

To lock out access to settings modifications except hardness, day override, time of regeneration, and time of day by anyone but the manufacturer, press ▼, NEXT, ▲, and CLOCK in sequence after settings are made. To unlock so other displays can be viewed and changes can be made, press ▼, NEXT, ▲, and CLOCK in sequence.

When in operation, normal user displays such as time of day, volume remaining before regeneration, present flow rate, or days remaining before regeneration are shown. When stepping through a procedure, if no buttons are pressed within 5 minutes, the display returns to a normal user display. Any changes made prior to the 5 minute time-out are incorporated.

To quickly exit OEM Softener System Setup, OEM Filter System Setup, Installer Display Settings, Diagnostics, or Valve History, press CLOCK. Any changes made prior to the exit are incorporated.

To clear the service call reminder, press ▼ and ▲ simultaneously while the reminder screen is displayed.

When desired, all information in diagnostics and programming may be reset to defaults when the valve is installed in a new location. To reset to defaults, press NEXT and ▼ simultaneously to go to the Treatment Type display. Press ▼ and ▲ simultaneously to reset programming and diagnostic values to defaults. Screen will return to User Display.

Sometimes, it is desirable to have the valve initiate and complete 2 regenerations within 24 hours and then return to the preset regeneration procedure. It is possible to do a double regeneration if Regeneration Time Option is set to *DELAYED REGEN* or *DELAY + IMMEDIATE*. To do a double regeneration:

1. Press REGEN once. *REGEN TODAY* will flash on the display.
2. Press and hold REGEN for 3 seconds until the valve regeneration initiates.

Once the valve has completed the immediate regeneration, the valve will regenerate one more time at the preset regeneration time.

For Valve Type 1.0T, press and hold CLOCK and ▲ for about 3 seconds to initiate an exchange of 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.

Proportional Brining:

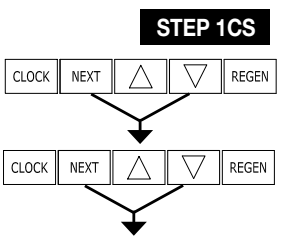
If the system is set up as a pre-fill upflow softener, the control valve can also be set to normal or proportional brining.

This step will appear after Step 4S and before Step 5S if the system is set up appropriately. The following options can be selected:

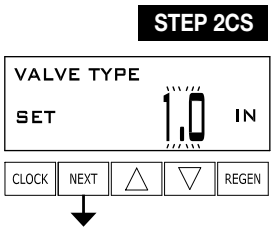
- *NORMAL FILL:* System always pre-fills with the salt level selected.
- *PROPORTIONAL FILL:* The actual salt fill time will be calculated by dividing the actual volume of treated water used by the full volumetric capacity, then multiplying this value by the maximum salt fill time.

Press NEXT to go to the next step. Press REGEN to return to the previous step.

OEM Configuration Setup

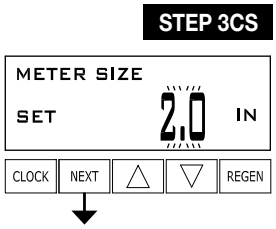


Step 1CS – Press NEXT and ▼ simultaneously for 3 seconds and release. Then, press NEXT and ▼ simultaneously for 3 seconds again and release. If screen in Step 2CS does not appear in 5 seconds, the lock on the valve is activated. To unlock, press ▼, NEXT, ▲, and CLOCK in sequence, and try again.



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" twin valve.

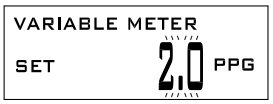
Press NEXT to go to Step 3CS. Press REGEN to exit OEM cycle sequence.

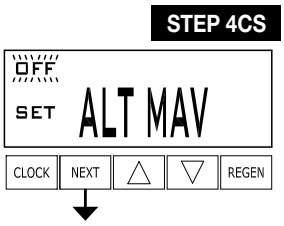


Step 3CS – Meter Size: Use ▼ or ▲ to select which size flow meter is to be used with the valve: 1.0r, 1.5, 2.0 or 3.0. Variable meter pulses of 0.1 – 150.0 PPG can also be selected.

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 previous step.





Step 4CS – Use ▼ or ▲ to select one of the following options:

- *SEPARATE SOURCE:* The control valve has a separate source during the regeneration cycle.
- *NO HARD BYPASS:* The control valve operates with a no hard water bypass.
- *ALT A or ALT B:* The control valve acts as an alternator.
- *PROGRESSIVE FLOW:* The control valve operates as a progressive flow system.
- *SYSTEM CONTROLLER:* The control valve operates with a Watts Locksmith™ system controller.
- *OFF:* None of these features are used.

Only use Watts no hard water bypass valves or Watts motorized alternating valves (MAV) with these selections. Watts 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.

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

Configuring the Control Valve for Separate Source Operation:

Select *SEPARATE SOURCE* for control operation. For separate source operation, the 3-wire connector is not used. Selection requires that a connection to a Watts 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 Separate Source, 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, the MAV will remain in its current state until the error is corrected and reset.

Configuring the Control Valve for No Hard Water Bypass Operation:

Select *NO HARD BYPASS* for control operation. For no hard water bypass operation, the 3-wire connector is not used. Selection requires that a connection to a MAV or Watts 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 No Hard Bypass, the MAV will be driven closed before the first regeneration cycle that is not Fill, or 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 remain in its current state until the error is corrected and reset.

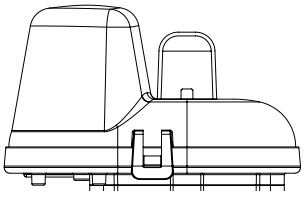
OEM Configuration Setup

Configuring the Control Valve to Act as an Alternator:

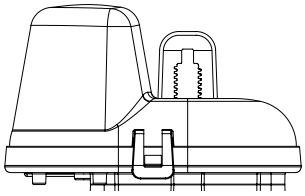
Prior to starting the programming steps, connect the interconnect cable to each control valve board's 3-pin connector labeled COMM CABLE. Also connect the meter cord to either control valve to the 3-pin connector labeled *METER*.

		SOFTENER VALVE PROGRAMMING STEPS	
OEM Configuration Setup	Step 4CS	Set to *ALT A* Connect the outlet plumbing of the ALT A valve to the MAV's A port and connect the MAV's two pin wire connector to the two pin connector labeled MAV on the ALT A valve	Set to *ALT B* Connect the outlet plumbing of the 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 9S	Set to *AUTO*	Set to *AUTO*
Softener System Setup	Step 10S	Set Regeneration Time Option to *IMMEDIATE*	Set Regeneration Time Option to *IMMEDIATE*
Installer Display Setting	Step 4I	Set Day Override to *OFF*	Set Day Override to *OFF*

If set up for a filter, set Volume Capacity in Step 4F; set Regeneration Time Option in Step 5F to *IMMEDIATE*; and set Day Override in Step 3I to *OFF*.



Retracted
Valve A in Service Position =
MAV piston rod retracted



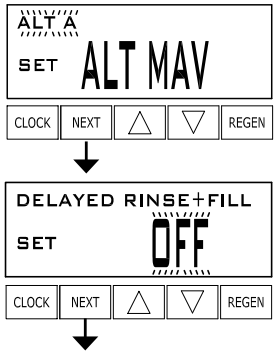
Extended
Valve B in Service Position =
MAV piston rod extended

Watts 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.

For Watts alternator systems using CLS-150 and CLS-200 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 are complete, the valve will re-enter standby mode until requested to come online for service.

CLS-150 and CLS-200 Valves

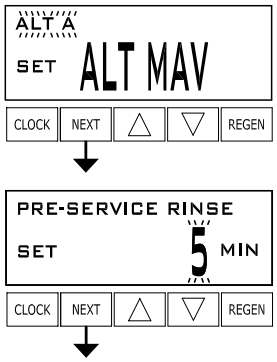


OEM Configuration Setup

For Watts Corporation alternator systems using the CLS-200 Valve, when NEXT is pressed after selecting *ALT A* or *ALT B*, a display will allow the user to set the amount of pre-service rinse time for the standby tank just prior to returning to service.

With *1.0T* set, the same display appears and is set in a similar manner.

CLS-200 Valve



Configuring the Control Valve for Progressive Flow Operation:

Select *PROGRESSIVE FLOW* for control operation. Operation in progressive flow mode requires 2 – 4 valves plumbed in parallel, each with a separate flow meter and no hard water bypass unit. For proper progressive flow operation, 3-wire communication cables are required to connect to each valve in the system via the 3-pin comm cable connector.

Note: All cabling must be connected before starting initial valve programming. Once all valves in the system have their comm cable inputs connected AND are fully programmed, press and hold NEXT and REGEN on each valve to perform a reset and initiate normal system operation.

Press NEXT to go to the Unit Name display. Set the unit name as required by the position of the control valve in the system. Each valve needs to be set to *PROGRESSIVE FLOW* and have different addresses: 1, 2, 3, and 4. Valve 1 will be the controlling valve of the system.

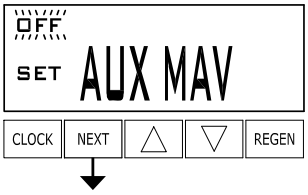
If setting Valve 1, press NEXT to go to the Add Another Unit display and set the required flow rate adder value. The Add Another Unit setting will add or subtract the number of units currently in service based on the overall flow rate through the system. The Add Another Unit display will only appear on Valve 1.

Configuring the Control Valve to Operate with Watts Locksmith™ System Controller:

Select *SYSTEM CONTROLLER* to link the control valve to the Watts Locksmith™ system controller. For communication between the control valve and the system controller, a 3-wire communication cable is required.

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

STEP 5CS



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

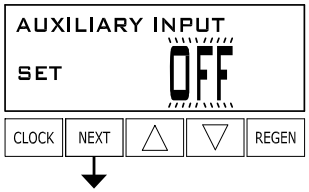
- *TIME:* Allows auxiliary MAV to switch positions at a set time in relation to the start of regeneration for a preset duration, independently of the actual regeneration status.
- *SEP SOURCE:* Allows auxiliary MAV to switch positions before the start of regeneration and then switch back at the end of regeneration.
- *OFF:* Deactivates this output.

Only use Watts MAVs with these selections. Watts no hard water bypass valves (1" or 1.25" V3070FF or V3070FM) are not designed to be used with the Time or Separate Source functions.

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

OEM Configuration Setup

STEP 6CS



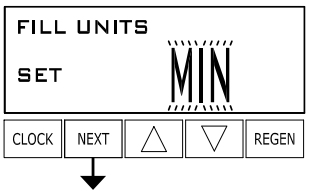
Step 6CS – Auxiliary Input: Allows the use of an outside signal to control the initiation of a regeneration. Selection only matters if a connection is made to the 2-pin connector labeled *DP SWITCH* located on the printed circuit board. Use ▼ or ▲ to select one of the following options:

- *OFF*: Feature not used.
- *MMED REG*: 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 is fully transitioned, the regeneration begins immediately. If this option is selected, the Delayed Rinse and Fill feature will not be available for CLS-150 and CLS-200 control valves programmed for twin alternating.
- *DELAY REG*: 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* switch tanks immediately. At the delayed regeneration time, the triggered unit will regenerate. If this option is selected, the Delayed Rinse and Fill feature will not be available for CLS-150 and CLS-200 control valves programmed for twin alternating.
- *HOLD REG*: 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 7CS or to exit Configuration Setup. Press REGEN to return to previous step.

STEP 7CS

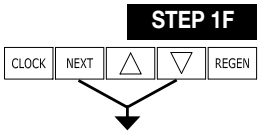


RETURN TO NORMAL MODE

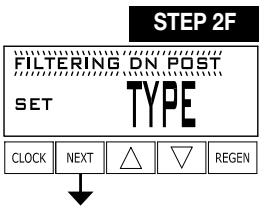
S**tep 7CS –** Fill Units: If set as a softener and Step 2CS is set to *1.5*, use ▼ or ▲ to set Fill Units to *LBS* or *MIN*.

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

OEM Filter System Setup

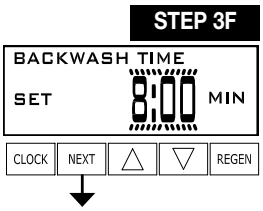


Step 1F – Press NEXT and ▼ simultaneously for 3 seconds and release. If screen in Step 2F does not appear in 5 seconds, the lock on the valve is activated. To unlock, press ▼, NEXT, ▲, and CLOCK in sequence, and try again.



Step 2F – Use ▼ or ▲ to select *FILTERING DN POST*.

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

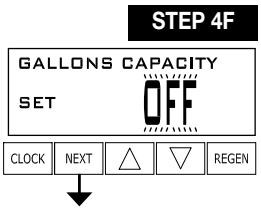


Step 3F – Use ▼ or ▲ to select the time for the first cycle. Value ranges and units will vary depending on the cycle, see Table 6 for more detail. Press NEXT to set the value for the next cycle. Repeat for all cycles.

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

Table 6: Filtering Cycle Sequence Ranges

CYCLE	UNITS	RANGE	DEFAULT
Backwash	Minutes	1 – 120 or OFF	8
Rinse	Minutes	1 – 120 or OFF	4
Draw (Up or Down)	Minutes	1 – 160 or OFF	60
Fill (all but 2" valve)	Gallons	0.05 – 20 or OFF	0.95
Fill (2" valve)	Minutes	0.1 – 99 or OFF	6

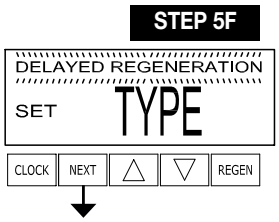


Step 4F – Volume Capacity: Use ▼ or ▲ to select one of the following options:

- *OFF:* Regeneration will be based solely on the Day Override set in Step 3I.
- A number: Regeneration initiation will be based off the value specified.

See Setting Options Table for more detail.

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:

- *DELAYED REGENERATION:* Regeneration will occur at the preset time.
- *IMMEDIATE REGENERATION:* Regeneration will occur immediately when the volume capacity reaches 0 (zero).
- *DELAY + IMMEDIATE REGENERATION:* 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 4CS is set to *ALT A* or *ALT B* or Step 2CS is set to *1.0T*.

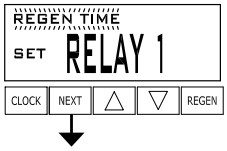
This display will not appear if Step 4F is set to *OFF*.

See Setting Options Table for more detail.

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

OEM Filter System Setup

STEP 6F

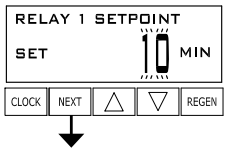


Step 6F – Relay 1 Output: Use ▼ or ▲ to select one of the following options:

- *REGEN TIME*: Relay activates a set time after the start of regeneration and deactivates after a set period of time. The start of regeneration is defined as the first regeneration cycle that is NOT Fill, Softening, or Filtering.
- *VOLUME*: 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.
- *REGEN VOLUME*: Relay activates after a set volume of water has been used while in service or during regeneration and deactivates after the meter stops registering flow and the set time period has expired.
- LOW SALT LEVEL: Relay activates when the Salt Level Alarm set in Step 10S is triggered and will deactivate until the salt level is reset. This relay will continue operation during a power outage or during error mode. 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) or Step 7F. Press REGEN to return to previous step.

STEP 6F(A)

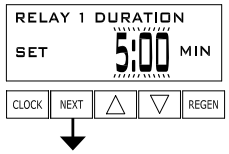


Step 6F(A) – Relay 1 Actuation: Use ▼ or ▲ to set the actuation value. The unit and range will vary depending on the selection in Step 6F.

- Regen Time: Set the length of time after the start of regeneration prior to relay activation (Range: 0 – 500 minutes). The start of regeneration is defined as the first regeneration cycle that is NOT Fill, Softening, or Filtering.
- Volume or Regen Volume: Set the volume of water that will be treated prior to relay activation (Range: 0.1 – 20,000 gallons).

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

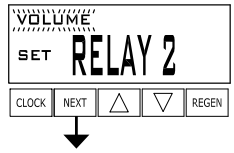
STEP 6F(B)



Step 6F(B) – Relay 1 Duration Time: Use ▼ or ▲ to set the length of time the relay will stay active prior to deactivation (Range: 1 second – 500 minutes). If Step 6F is set to *VOLUME* or *REGEN VOLUME*, the relay will deactivate after the time set has expired or after the meter stops registering flow, whichever comes first.

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

STEP 7F



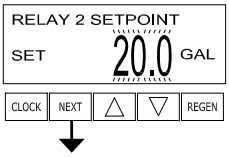
Step 7F – Relay 2 Output: Use ▼ or ▲ to select one of the following options:

- *REGEN TIME*: Relay activates a set time after the start of regeneration and deactivates after a set period of time. The start of regeneration is defined as the first regeneration cycle that is NOT Fill, Softening, or Filtering.
- *VOLUME*: 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.
- *REGEN VOLUME*: Relay activates after a set volume of water 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 MONITOR*: Relay activates when the control enters an error state and immediately deactivates when the control exits the error state. Step 7F(A) and Step 7F(B) will not appear if this option is selected.
- *OFF*: Feature not used. Step 7F(A) and Step 7F(B) will not appear if this option is selected.

Press NEXT to go to Step 7F(A) or Step 8F. Press REGEN to return to previous step.

OEM Filter System Setup

STEP 7F(A)

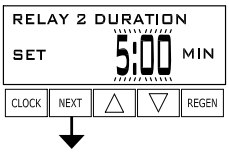


Step 7F(A) – Relay 2 Actuation: Use ▼ or ▲ to set the actuation value. The unit and range will vary depending on the selection in Step 7F.

- Regen Time: Set the length of time after the start of regeneration prior to relay activation (Range: 0 – 500 minutes). The start of regeneration is defined as the first regeneration cycle that is NOT Fill, Softening, or Filtering.
- Volume or Regen Volume: Set the volume of water that will be treated prior to relay activation (Range: 0.1 – 20,000 gallons).

Press NEXT to go to Step 7F(B). Press REGEN to return to previous step.

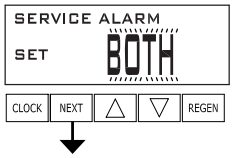
STEP 7F(B)



Step 7F(B) – Relay 2 Duration Time: Use ▼ or ▲ to set the length of time the relay will stay active prior to deactivation (Range: 1 second – 500 minutes). If Step 7F is set to *VOLUME* or *REGEN VOLUME*, the relay will deactivate after the time set has expired or after the meter stops registering flow, whichever comes first.

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

STEP 8F

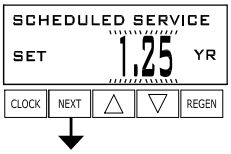


Step 8F – Scheduled Service Alarm: Use ▼ or ▲ to select one of the following options:

- *TIME*: Activates the service alarm after a set duration of time.
- *GALLONS*: Activates the service alarm after a set volume of water is treated.
- *BOTH*: Activates the service alarm after a set duration of time and after a set volume of water is treated, whichever comes first.
- *OFF*: Disables this feature. Step 8F(A) – Step 8F(D) will not appear if this option is selected.

Press NEXT to go to Step 8F(A) or to exit OEM Filter System Setup. Press REGEN to return to previous step.

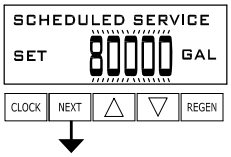
STEP 8F(A)



Step 8F(A) – Service Alarm Time: Use ▼ or ▲ to set the length of time between service alarms (Range: 0.25 – 9.75 years). This display will only appear if Step 8F is set to *TIME* or *BOTH*.

Press NEXT to go to Step 8F(B) or Step 8F(C). Press REGEN to return to the previous step.

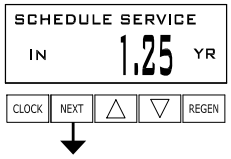
STEP 8F(B)



Step 8F(B) – Service Alarm Volume: Use ▼ or ▲ to set the volume of water treated between service alarms. This display will only appear if Step 8F is set to *GALLONS* or *BOTH*.

Press NEXT to go to Step 8F(C) or Step 8F(D). Press REGEN to return to the previous step.

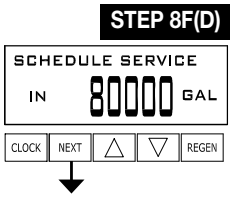
STEP 8F(C)



Step 8F(C) – Status Display (Time): Time remaining until service alarm generation. This display will only appear if Step 8F is set to *TIME* or *BOTH*. To reset this value to the value set in Step 8F(A), press ▼ and ▲ simultaneously for 3 seconds.

Press NEXT to go to Step 8F(D) or to exit OEM Filter System Setup. Press REGEN to return to previous step.

STEP 8F(D)



Step 8F(D) – Status Display Volume: Capacity remaining until service alarm generation. This display will only appear if Step 8F is set to *GALLONS* or *BOTH*. To reset this value to the value set in Step 8F(B), press ▼ and ▲ simultaneously for 3 seconds.

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

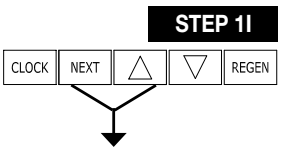
Setting Options Table

SYSTEM TYPE	REGENERATION OPTION	REGENERATION TYPE	DAY OVERRIDE	OPERATION DESCRIPTION
Softening	Auto	Normal	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.
Softening	Auto	Normal	OFF	Regeneration occurs at the next regeneration time when volume capacity falls below the reserve capacity.
Softening or Filtering	20 – 1,500,000 Gallons	Normal	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.
Softening or Filtering	20 – 1,500,000 Gallons	Normal	OFF	Regeneration occurs at the next regeneration time when volume capacity reaches 0.
Softening or Filtering	OFF	Normal	1 – 28 days	Time Clock operation. Regeneration occurs at the next regeneration time the specified number of days is reached.
Softening	Auto or 20 – 1,500,000 Gallons	On 0	1 – 28 days	Regeneration occurs immediately when volume capacity reaches 0, or the specified number of days is reached, whichever comes first.
Softening or Filtering	20 – 1,500,000 Gallons	On 0	OFF	Regeneration occurs immediately when volume capacity reaches 0.
Softening	Auto	Normal + On 0	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, or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.
Softening or Filtering	20 – 1,500,000 Gallons	Normal + On 0	1 – 28 days	Regeneration occurs at the next regeneration time the specified number of days is reached or regeneration occurs after 10 minutes of no water usage when volume capacity reaches 0.
Softening	Auto	Normal + On 0	OFF	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.

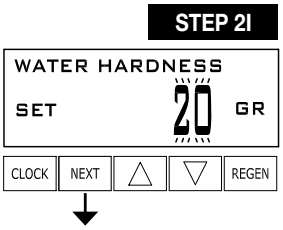
NOTICE

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

Installer Display Settings

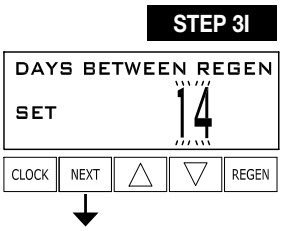


Step 1I – Press NEXT and ▲ simultaneously for 3 seconds.



Step 2I – Hardness: Use ▼ or ▲ to set the amount of hardness in grains of hardness as calcium carbonate per gallon (Range: 1 – 150 grains). The grains per gallon can be increased if soluble iron needs to be reduced. This display will not appear if Volume Capacity is set to anything other than *AUTO*.

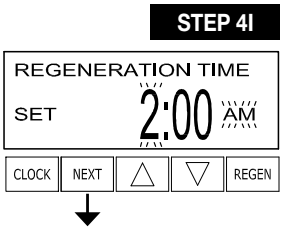
Press NEXT to go to Step 3I. Press REGEN to return to the previous step.



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

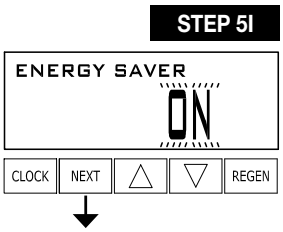
- A number (1 – 28): Regeneration initiation will be called for every set number of days even if sufficient volume of water was not used to call for a regeneration.
- *OFF*: Regeneration initiation is based solely on volume used.
- See Setting Options Table for more detail.

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



Step 4I – Next Regeneration Time: Use ▼ or ▲ to set the hour of day for regeneration. a.m./p.m. toggles after 12. The default time is 2:00 a.m. This display will not appear if Regeneration Time Option is set to *IMMEDIATE REGENERATION*. Press NEXT to set the minutes.

Once the minutes are set, press NEXT to go to Step 5I. Press REGEN to return to previous step.



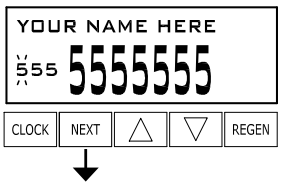
Step 5I – Energy Saver: Use ▼ or ▲ to select one of the following options:

- *ON*: Display backlight will turn off after 5 minutes of inactivity and turn on when a button is pushed.
- *OFF*: Display backlight is always on.

Press NEXT to exit Installer Display Settings or press and hold CLOCK and ▲ to go to Step 6I. Press REGEN to return to previous step.

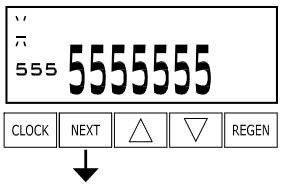
RETURN TO NORMAL MODE

Contact Screens:



Step 6I – Service Alarm Phone Number: Use ▼ or ▲ to set first digit of phone number. Press NEXT to advance to the next digit. Press REGEN to return to the previous digit.

Once all digits are set, press NEXT to go to Step 7I.



Step 7I – Service Alarm Banner Text: Use ▼ or ▲ to set the first character of the banner text. Press NEXT to advance to the next character. Press REGEN to return to the previous character. There is a maximum of 55 characters in the banner text.

Once all characters are set, press NEXT to exit Installer Display Settings.

User Display Settings

General Operation:

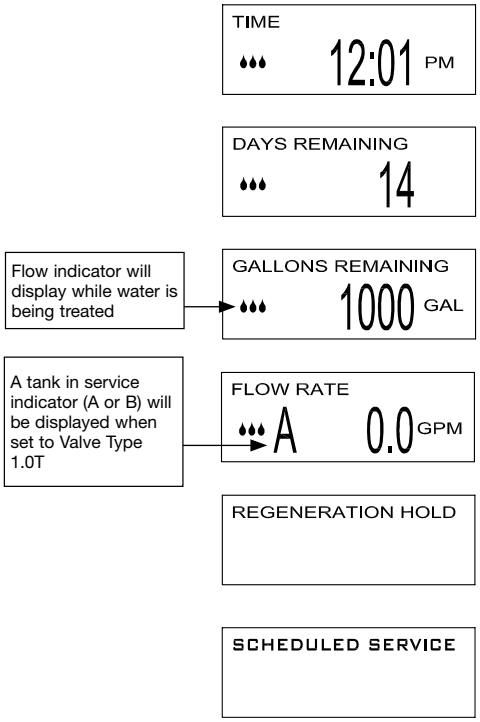
When the system is operating, one of several displays may be shown. The displays normally rotate; however, pressing NEXT will pause on the selected display for 5 minutes. Press NEXT to alternate between the displays. One of the displays is always the current time of day. Days Remaining is the number of days left before the system goes through a regeneration cycle. Gallons Remaining is the capacity that will be treated before the system goes through a regeneration cycle. Press ▼ while on the Gallons Remaining display to decrease the capacity remaining in 10 gallon increments and also increase the volume used in Diagnostics Steps 3D, 4D, and 5D and Valve History Step 4VH.

Flow Rate shows the current rate treated water is flowing through the system. If the dP switch is closed, the display will show *REGENERATION DP* or *REGENERATION HOLD*.

To clear the Service Call reminder, press ▲ and ▼ simultaneously while the number and banner text screen is displayed.

If the system has called for a regeneration that will occur at the preset time of regeneration, the words *REGEN TODAY* will alternate with the header on the display.

If a water meter is installed, the flow indicator flashes on the display when water is being treated (i.e., water is flowing through the system).



Additional Displays:

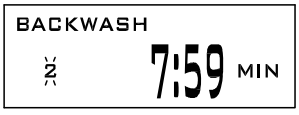
REGEN PENDING is displayed in alternator systems whenever a unit is waiting to initiate the first cycle step of regeneration. The name of an active MAV will also be indicated in this display.

STAND BY is displayed in alternator systems when a valve is in standby mode. The name of an active MAV will also be indicated in this display.

DELAYED RINSE+FILL PENDING 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*.

Regeneration Mode:

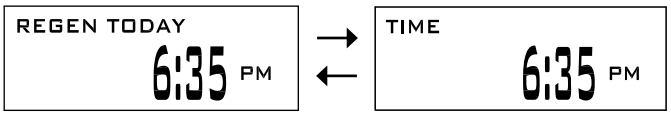
Typically, a system is set to regenerate at a time of low water usage. An example of a time with low water usage is when a household is asleep. If there is a demand for water when the system is regenerating, untreated water will be used.



When the system begins to regenerate, the display will change to include information about the step of the regeneration process and the time remaining for that step to be completed. The system runs through the steps automatically and will reset itself to provide treated water when the regeneration has been completed.

User Display Settings

Manual Regeneration:



Sometimes, there is a need to regenerate the system sooner than when the system calls for it, usually referred to as manual regeneration. There may be a period of heavy water usage because of guests or a heavy laundry day.

To initiate a manual regeneration at the preset delayed regeneration time when the Regeneration Time Option is set to *DELAYED REGENERATION* or *DELAY + IMMEDIATE REGENERATION*, press and release REGEN. The words *REGEN TODAY* will flash on the display to indicate that the system will regenerate at the preset delayed regeneration time. Press REGEN again to cancel the request.

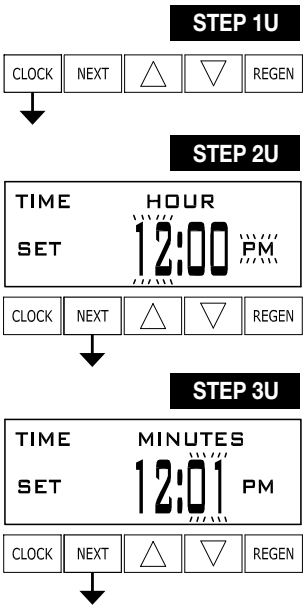
Note: If the Regeneration Time Option is set to *IMMEDIATE REGENERATION*, there is no set delayed regeneration time, so *REGEN TODAY* will not activate if REGEN is pressed.

To initiate a manual regeneration immediately, press and hold the REGEN button for 3 seconds. The system will begin to regenerate immediately. The request cannot be canceled.

Note: For softeners, if brine tank does not contain salt, fill with salt and wait at least 2 hours before regenerating.

Set Time of Day:

The user can also set the time of day. Time of day should only need to be set if the battery has been depleted because of extended power outages or when daylight saving time begins or ends. If an extended power outage occurs, the time of day will flash, which indicates the time of day should be reset and the non-rechargeable battery replaced.



RETURN TO NORMAL MODE

Step 1U – Press CLOCK.

Step 2U – Current Time (hour): Use ▼ or ▲ to set the hour of the day. a.m./p.m. toggles after 12. Press NEXT to go to Step 3U.

Step 3U – Current Time (minutes): Use ▼ or ▲ to set the minutes of the day. Press NEXT to exit Set Time of Day. Press REGEN to return to previous step.

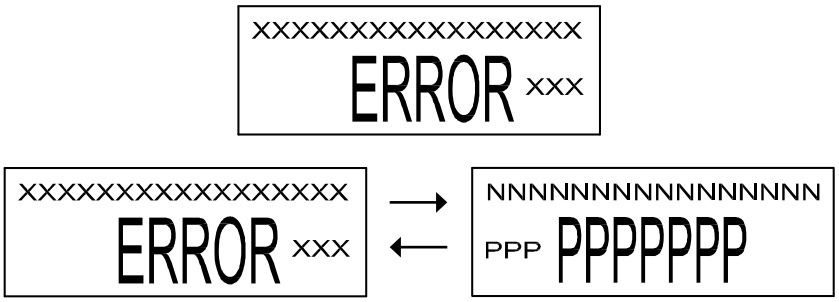
User Display Settings

Power Loss:

If the power goes out the system will keep time until the battery is depleted. If an extended power outage occurs, the time of day will flash on and off which indicates the time of day should be reset and the non rechargeable battery replaced. The system will remember the rest.

Error Message:

If the word *ERROR* and a number are displayed, contact the OEM for help. This indicates that the valve was not able to function properly. If the number and banner text in the Contact Screens has been edited, the 2 displays below will alternate.

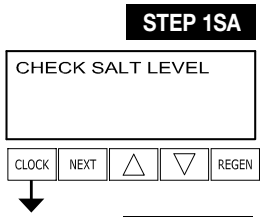


Salt Alarm:

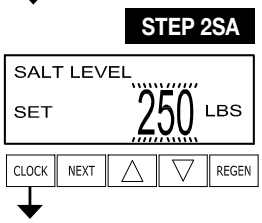
If the Salt Level Alarm was set in Step 10S, the following screens will be shown among the User displays.

When the salt remaining has gone below the set point, the display will show *CHECK SALT LEVEL*.

Resetting the Salt Level Display:

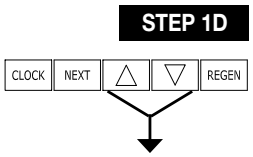


Step 1SA – Press NEXT until the Check Salt Level display appears. Press CLOCK to go to Step 2SA.

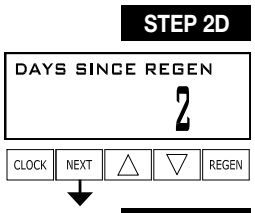


Step 2SA – Set pounds of salt (Range: 0 – 10,000 pounds). Press CLOCK to exit.

Diagnostics

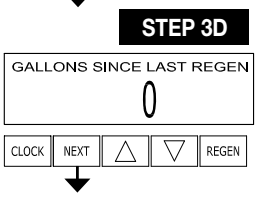


Step 1D – Press ▼ and ▲ simultaneously for 3 seconds.



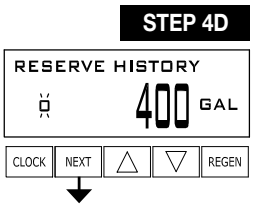
Step 2D – Days Since Last Regeneration.

Press NEXT to go to Step 3D. Press REGEN to exit Diagnostics.



Step 3D – Volume Since Last Regeneration: This display will show zero if a water meter is not installed.

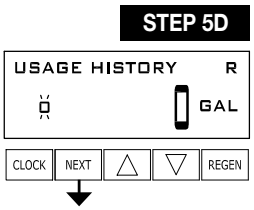
Press NEXT to go to Step 4D. Press REGEN to return to previous step.



Step 4D – 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 screen is not displayed if filter, time clock, meter immediate, alternator, or volume override regeneration is selected.

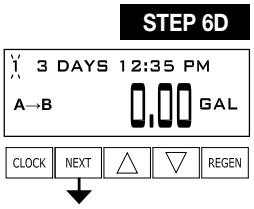
Press NEXT at any time to go to Step 5D. Press REGEN to return to previous step.



Step 5D – Usage History, Last 63 Days: Use ▼ or ▲ to scroll through the volume of water treated on each of the last 63 days. Day 0 is today, day 1 is yesterday, etc. If a regeneration occurred on the day, the letter R 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 6D. Press REGEN to return to previous step.

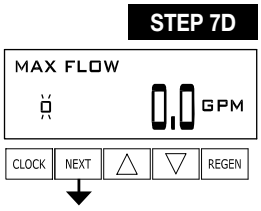


Step 6D – Tank Transfer History: This display will only appear if Step 2CS is set to *1.0T*.

Use ▼ or ▲ to scroll through the last 10 tank transfers. This display shows:

- The transfer number (1 – 10)
- The tank transferring (A or B)
- How many days ago the transfer occurred (99-day maximum)
- The volume used at time of tank transfer
- Time of transfer

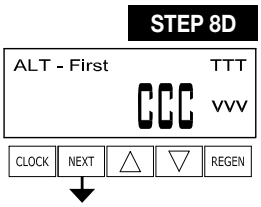
Press NEXT to go to Step 7D. Press REGEN to return to previous step.



Step 7D – Maximum Flow Rate, Last 7 Days: Use ▼ or ▲ to scroll through the maximum flow rate in gallons per minute that occurred on each of the last 7 days. This display will show zero if a water meter is not installed.

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

Diagnostics



Step 8D – MAV Drive History: Use ▼ or ▲ to scroll through the drive time histories of all active MAV drives. The display is read as follows:

- TTT: Measured MAV drive time
- VVV: Measured MAV drive voltage
- CCC: Total number of drives (in or out); + indicates piston drive out of MAV; - indicates piston drive into MAV

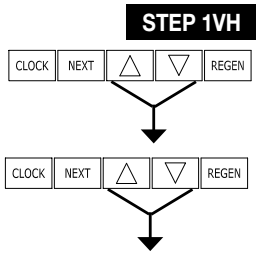
Note: When a MAV is replaced, it is recommended that the diagnostics screen for that MAV be cleared. That is done by selecting the + or – screen for that MAV. Press and hold ▼ and ▲ for about 3 seconds. Failure to do this may result in inconsistent MAV operation.

When a MAV error occurs, the Drive History will automatically be reset. To view previously recorded history, press and hold CLOCK and ▲. The display will be similar to the normal MAV Drive History display, with the addition of EEE: MAV error code present at the time of reset. If the display shows dashes, there was no MAV error before the reset.

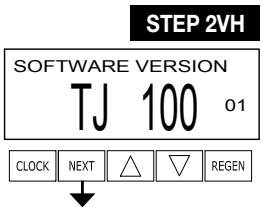
Press NEXT to exit Diagnostics. Press REGEN to return to previous step.

When desired, all information in Diagnostics and programming may be reset to defaults when the valve is installed in a new location. To reset to defaults, press NEXT and ▼ simultaneously to go to the Treatment Type display. Press ▼ and ▲ simultaneously to reset diagnostic and programming values to defaults. Screen will return to User display.

Valve History

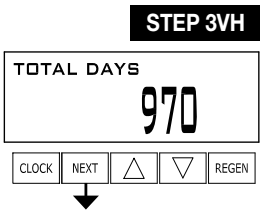


Step 1VH – Press ▼ and ▼ simultaneously for 3 seconds and release. Then, press ▼ and ▼ simultaneously for 3 seconds again and release.



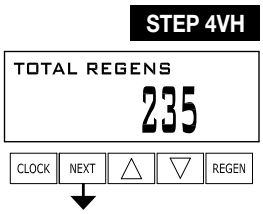
Step 2VH – Software Version.

Press NEXT to go to Step 3VH. Press REGEN to exit Valve History.



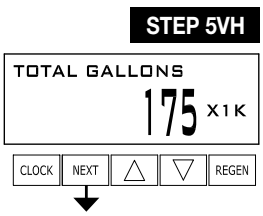
Step 3VH[5] – Total Days Since Startup.

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



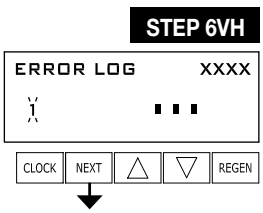
Step 4VH – Total Regenerations Since Startup.

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



Step 5VH – Total Volume Used Since Startup: This display will show zero if a water meter is not installed.

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



Step 6VH – Error Log: Use ▼ or ▲ to scroll through the last 10 errors generated by the control during operation. The motor position count at the time of drive error detection is recorded in the top line of the display.

Press NEXT to exit Valve History. Press REGEN to return to previous step.

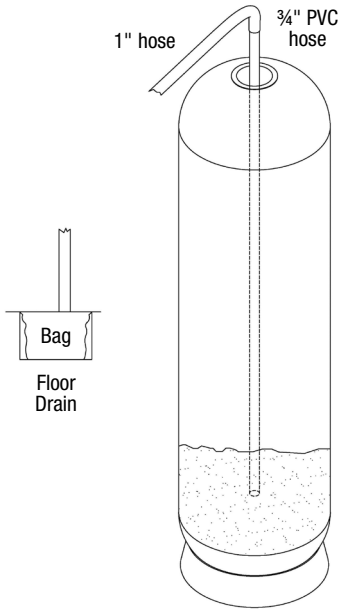
RETURN TO NORMAL MODE

[5] Values in Step 2VH – Step 5VH cannot be reset.

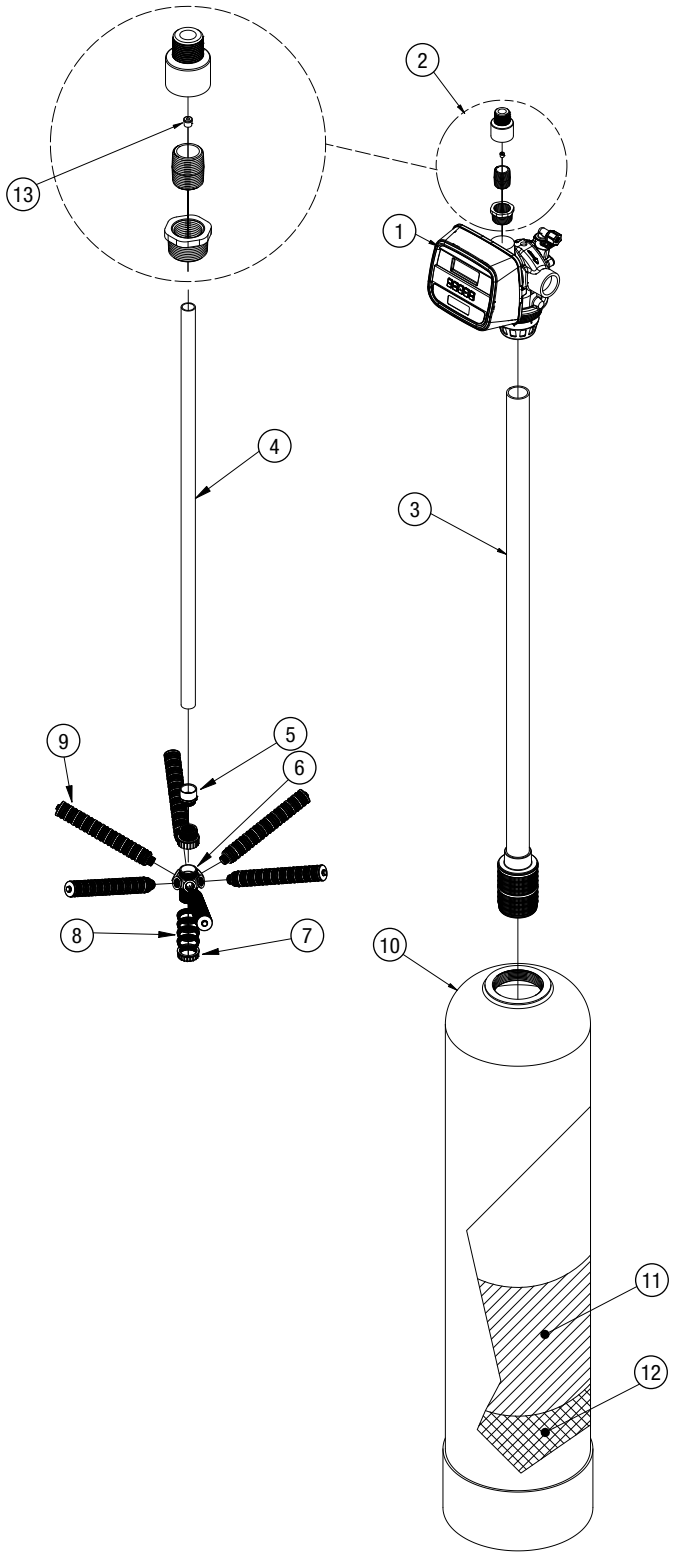
Replacing the Media

1. Mark the location of the mineral tanks on the floor incase they need to be moved once all water, media and gravel has been removed. This will help with realignment of the plumbing after media replacement. DO NOT attempt to move a mineral tank that contains media and or water.
2. Open the bypass valve.
3. Close the inlet and outlet isolation valves for the mineral tank needing media replacement
4. Locate “Manual Regeneration” on page 28 for the controller.
5. Follow the steps to place the system in the backwash position. This relieves any pressure inside the mineral tank. Once the system cycles into the backwash position, unplug the control valve from the power outlet to keep the system in the backwash position.
6. Disconnect the inlet, outlet, and drain union plumbing fittings. Then, if necessary for the removal of the control valve from the mineral tank, remove the remaining plumbing from the inlet, outlet and drain ports of the control valve.
7. Unplug the power cord.
8. Remove the control valve from the mineral tank by turning the control valve counter-clockwise when viewed from above. Keeping a firm grip on the control valve, continue to rotate until it can be lifted off of the top of the mineral tank. Store the control valve in a safe location.
9. Note the top of the distributor tube. It must be flush with the top of the tank. If it is above the top of the tank by more than ½" the distributor tube may have become disconnected from the distributor screen in the bottom of the mineral and must be reconnected.
10. Obtain a length of ¾" sch. 40 PVC that is the same height as the mineral tank and a length of 1" clear braided poly-vinyl hose. The hose must be long enough to reach the nearest floor drain. (Both of these can be acquired at a local hardware store).
11. Insert one end of the pipe inside the hose and the other end of the pipe into the top of the mineral tank and down into the media. Put the other end of the hose inside a water permeable bag and locate the bag over the floor drain.
12. Insert a garden hose into the bag side of the poly-vinyl hose to fill the hose and PVC pipe with water. Air will bubble out of the tank. Once all the air is out of the hose and pipe, remove the garden hose from the polyvinyl hose to establish a siphon. The media can then be siphoned into the bag. Use the garden hose to maintain a full water level in the mineral tank to. The bag end of the poly-vinyl hose must remain lower in elevation then the end of the PVC pipe in the mineral tank to maintain the siphon. The bag will retain the media while the water flows down the drain. Use caution not to allow media to enter the floor drain.
13. Continue to siphon media until it is completely evacuated from the mineral tank. Gravel will clogged the siphon hose and, if it must be removed due to fouling, or to repair or replace a damaged distributor tube and screen, must be evacuated by other means.
14. If replacing gravel, inspect lower distributor screens for damage and replace if necessary.
15. To add new media and reconnect control valve to mineral tank follow General Installation steps 3-4K located on page 11 of this manual.
16. Reconnect inlet, outlet, and drain plumbing to the control valve and tighten the plumbing union fittings on each of these plumbing lines.
17. Open the inlet isolation valve slightly until water can be heard flowing through the isolation valve and allow the mineral tank to fill with water. Air will come out of the drain line until the mineral tank is full of water. Once full, close the inlet isolation valve and let the tank sit for 24 hours to allow the media to thoroughly soak.
18. After 24 hours of pre-soaking, open the inlet valve fully and allow water to flow to the drain, initiating the initial backwash to flush the media bed of any color or fines. Continue flushing the media bed until the water at the drain runs clear.
19. Plug the system back in to the power outlet so that it will return to the service position.
20. Fully open inlet and outlet isolation valves and close bypass valve.
21. Check for leaks and repair as required.
22. Open hot and cold side of a treated water faucet to flush any air from the plumbing system.

If this is a multi-tank system replace media in each mineral tank according to this media replacement procedure.



Replacement Parts - ACL-AMZL-FLL-150 Major Components

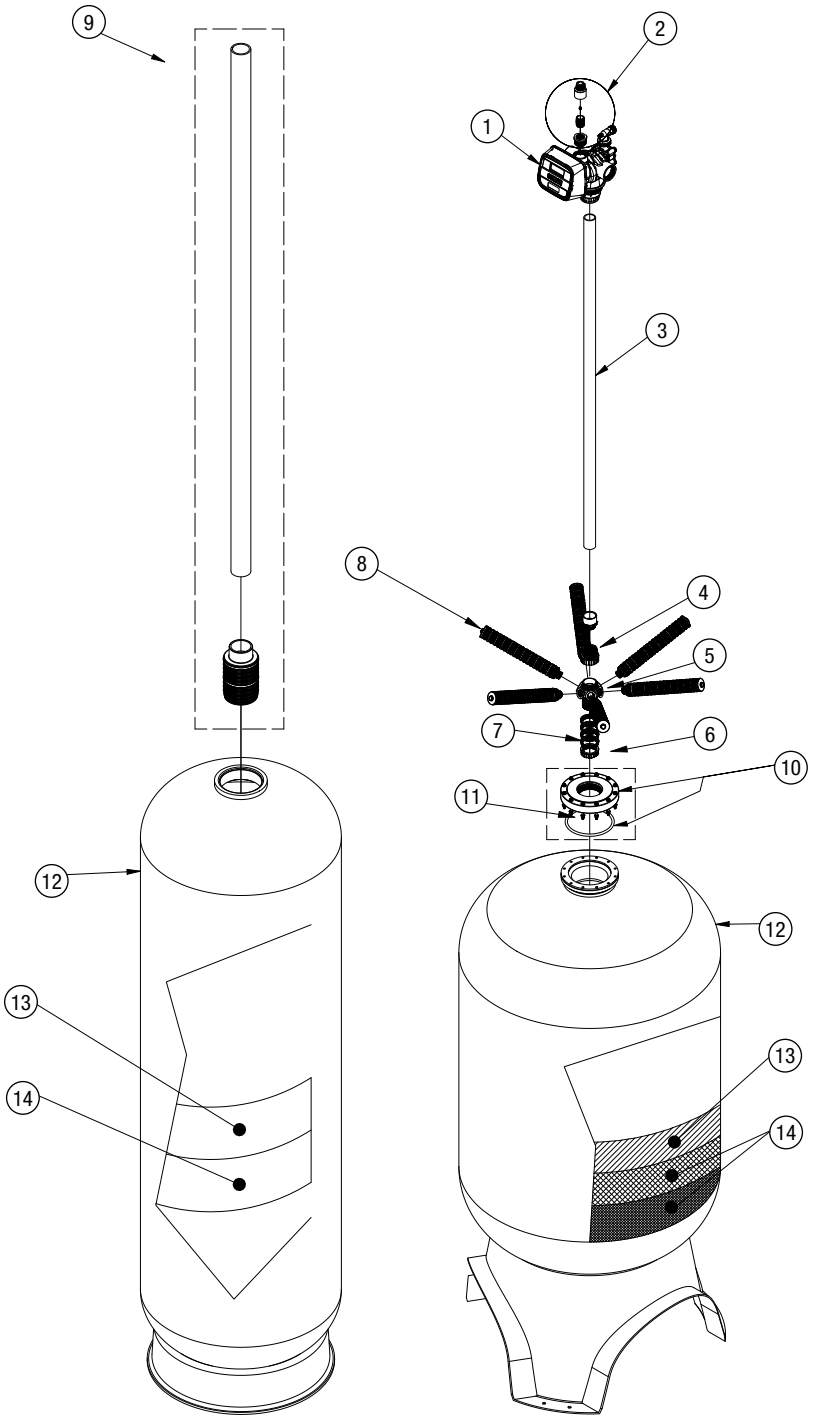


Replacement Parts - ACL-AMZL-FLL-150 Major Components

Major System Components

ITEM NO.	ORDERING CODES	DESCRIPTION
1	68111003	V15TJBTZ WS1.5 LOCK FLTR VLV
2	68108491	V2003-MCH FC PVC 1 MXM HSG F/5-10 GPM (USE -GPM)
2	68108487	V2003-A-MCH FC PVC 1 MXM HSG F/12 15 20 GPM (USE
2	68108498	V2005-A FC PVC 1.50 MXMHSG F/20-40 GPM (USE -GP
2	68108504	V2006 FC PVC 2 MXM HSG F/35-70 GPM (USE -GPM)
3	68101197	D5007 DIS RISER R2A PP 1.5X72
4	68103367	I7313 PIPE PVC SCH 40 1.50 GRAY
5	68101101	D2051 DIS KSH R2A GR ADAPTER 2M/1.5FXKSH
6	68101144	D2225 DIS KSH SO6 HUB ONLY 2.0
7	68101146	D2234 DIS KSH SO6 CAP F/SO6 HUB F KSH
8	68101147	D2235 DIS KSH DISCHARGE RING
9	68101151	D2254 DIS KSH LATERAL W/6 SCREEN 8.25 LENGTH
9	68101153	D2256 DIS KSH LATERAL W/8 SCREEN 10.75 LENGTH
9	68101155	D2259 DIS KSH LATERAL W/11 SCREEN 14.25 LENGTH
10	68100748	C1094-4N FTK 12X52 ALM POLY 4.0 W/BASE(9/CASE)
10	68100998	C9098-B FTK 14X65 BLK 4T W/BASE
10	68101000	C9099-4 FTK 16X65 ALM 4TW/BASE
10	68100691	C1029 FTK 18X65 ALM COMP 4.0 TOP W/BASE
10	68100694	C1030 FTK 21X62 ALM COMP4.0 TOP W/STD BASE
10	68100698	C1031 FTK 24X72 NAT COMP4.0 TOP ONLY W/STD BASE
11	68100398	A9231-AL MEDIA CRBN WATTS COCONUT 12X40 1CF/BG 2
11	68110370	A7200 MEDIA MICRO Z ZEOLITE 14 X 40 MESH 55#/CF
11	68100375	A8033 MEDIA FILOX .5CF/BAG
12	68100354	A7005A MEDIA GRAVEL FLINT #20 .125X.0625 50#/BAG
12	68100355	A7005B MEDIA GRAVEL FLINT #20 .125X.0625 SUPER S
12	68100356	A7006A MEDIA GRAVEL .25X.125 50#/BAG
13	68108570	V7103-06 FC BUTTON 6.0 GPM RED
13	68108571	V7103-07 FC BUTTON 7.0 GSG F/5-10 GPM (USE -GPM)
13	68108572	V7103-08 FC BUTTON 8.0 GPM GRN
13	68108573	V7103-09 FC BUTTON 9.0 GPM WHT/TAN
13	68108574	V7103-10 FC BUTTON 10.0 GPM ORG/BRICK RED
13	68108575	V7103-12 FC BUTTON 12.0 GPM BLK
13	68108576	V7103-15 FC BUTTON 15.0 GPM BLK
13	68108577	V7103-20 FC BUTTON 20.0 GPM BLK

Replacement Parts - ACL-AMZL-FLL-200 Major Components



Replacement Parts - ACL-AMZL-FLL-200 Major Components

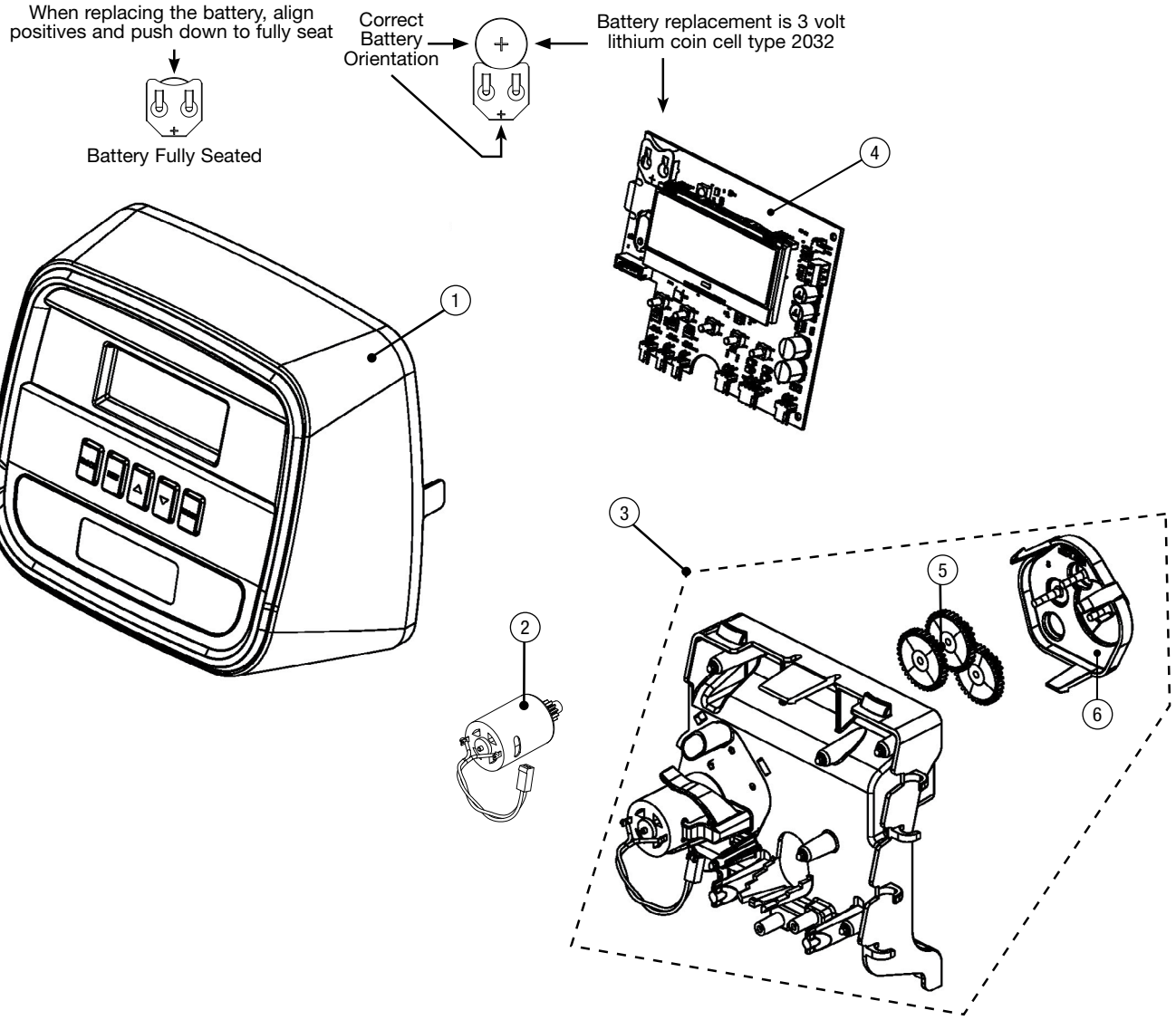
Major System Components

ITEM NO.	ORDERING CODES	DESCRIPTION
1	68111005	V2TJBTZ WS2 LOCK FLTR VLV
2	68108491	V2003-MCH FC PVC 1 MXM HSG F/5-10 GPM (USE -GPM)
2	68108487	V2003-A-MCH FC PVC 1 MXM HSG F/12 15 20 GPM (USE
2	68108498	V2005-A FC PVC 1.50 MXMHSG F/20-40 GPM (USE -GP
2	68108504	V2006 FC PVC 2 MXM HSG F/35-70 GPM (USE -GPM)
2	68108512	V2007 FC PVC 2.5 MXM HSG F/45-90 GPM (USE -GPM)
3	68103367	I7313 PIPE PVC SCH 40 1.50 GRAY
4	68101101	D2051 DIS KSH R2A GR ADAPTER 2M/1.5FXKSH
5	68101144	D2225 DIS KSH SO6 HUB ONLY 2.0
6	68101146	D2234 DIS KSH SO6 CAP F/SO6 HUB F KSH
7	68101147	D2235 DIS KSH DISCHARGE RING
8	68101151	D2254 DIS KSH LATERAL W/6 SCREEN 8.25 LENGTH
8	68101153	D2256 DIS KSH LATERAL W/8 SCREEN 10.75 LENGTH
8	68101155	D2259 DIS KSH LATERAL W/11 SCREEN 14.25 LENGTH
9	68101197	D5007 DIS RISER R2A PP 1.5X72
10	68106677	Q9058 TANK ADAPT BUSHING 6" FLANGE X 4"#8 THREAD PVC W/ORING FOR 30" & 36" SOFTENERS
11	68101188	D3341 BOLT SET SS18-8 F/6 SF 12/.25X3 NUT FLAT L
12	68100748	C1094-4N FTK 12X52 ALM POLY 4.0 W/BASE(9/CASE)
12	68100998	C9098-B FTK 14X65 BLK 4T W/BASE
12	68101000	C9099-4 FTK 16X65 ALM 4TW/BASE
12	68100691	C1029 FTK 18X65 ALM COMP 4.0 TOP W/BASE
12	68100694	C1030 FTK 21X62 ALM COMP4.0 TOP W/STD BASE
12	68100698	C1031 FTK 24X72 NAT COMP4.0 TOP ONLY W/STD BASE
12	68100703	C1037 FTK 30X72 NAT COMP 6.0FL TOP ONLY W/EXT BA
12	68100706	C1038 FTK 36X72 NAT COMP 6.0FL TOP ONLY W/EXT BA
13	68100398	A9231-AL MEDIA CRBN WATTS COCONUT 12X40 1CF/BG 2
13	68110370	A7200 MEDIA MICRO Z ZEOLITE 14 X 40 MESH 55#/CF
13	68100375	A8033 MEDIA FILOX .5CF/BAG
14	68100354	A7005A MEDIA GRAVEL FLINT #20 .125X.0625 50#/BAG
14	68100355	A7005B MEDIA GRAVEL FLINT #20 .125X.0625 SUPER S
14	68100356	A7006A MEDIA GRAVEL .25X.125 50#/BAG
15	68108569	V7103-05 FC BUTTON 5.0 GPM BLU
15	68108570	V7103-06 FC BUTTON 6.0 GPM RED
15	68108571	V7103-07 FC BUTTON 7.0 GSG F/5-10 GPM (USE -GPM)
15	68108572	V7103-08 FC BUTTON 8.0 GPM GRN
15	68108573	V7103-09 FC BUTTON 9.0 GPM WHT/TAN
15	68108574	V7103-10 FC BUTTON 10.0 GPM ORG/BRICK RED
15	68108575	V7103-12 FC BUTTON 12.0 GPM BLK
15	68108576	V7103-15 FC BUTTON 15.0 GPM BLK
15	68108577	V7103-20 FC BUTTON 20.0 GPM BLK

Replacement Parts - Front Cover and Drive Assembly

DRAWING NO.	ORDERING CODES	DESCRIPTION	QUANTITY
1	68111063	FRONT COVER ASSEMBLY	1
2	68104933	MOTOR	1
3		DRIVE BRACKET ASY	1
4	68111064	THRU/2 EE PCB 5 DIGIT REPL	1
5		DRIVE GEAR 12X36	3
6		DRIVE GEAR COVER	1
Not Shown	68104958	POWER SUPPLY US 15VDC HOCP	1
		POWER CORD ONLY	
Not Shown		DRIVE BACK PLATE	1

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



Replacement Parts - ACL-AMZL-FLL-150 Control Valve Body

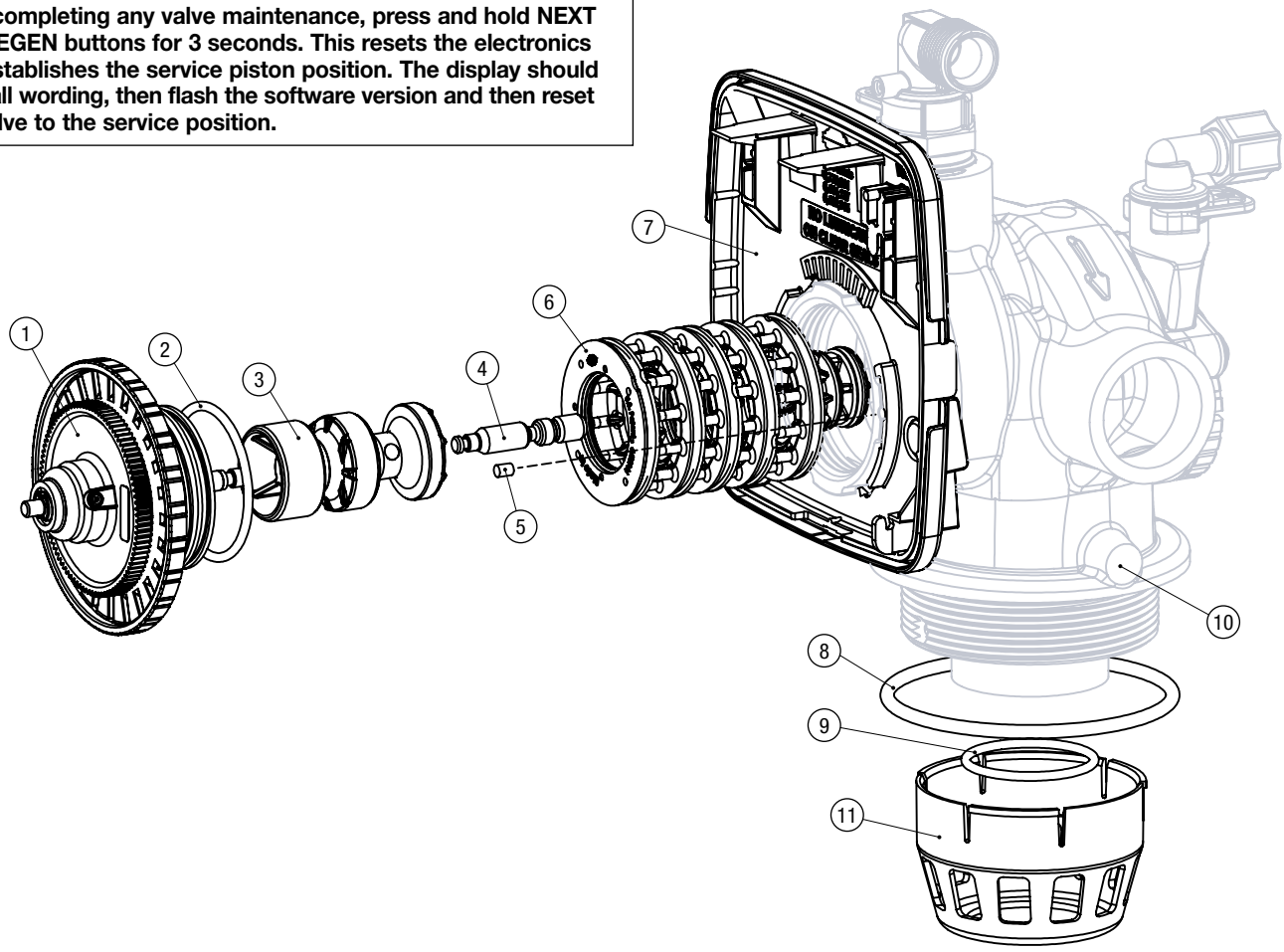
Drive Cap Assembly, Downflow Piston, Upflow Piston, Regenerant Piston, Spacer Stack Assembly and Main Body

ITEM NO.	ORDERING CODES	DESCRIPTION	QUANTITY
1	68105004	DRIVE CAP ASSEMBLY	1
2	68105006	O-RING 228 (Included with drive cap assembly)	1
3	68104975	CLS-150 PISTON DOWNFLOW ASSEMBLY (AMBER IN COLOR)	1
		CLS-150 PISTON UPFLOW ASSEMBLY (BLACK IN COLOR)	
4*	68104950	REGENERANT PISTON	1
5		CLS-150 BACKPLATE DOWEL	1
6	68104978	CLS-150 SPACER STACK ASSEMBLY	1
7	68111065	BACK PLATE	1
8		O-RING 347	1
9		O-RING 225 FOR VALVE BODIES WITH NPT THREADS	1
10		CLS-150 NPT VALVE BODY, W/V3468	1
NOT SHOWN		TEST PORT PLUG, 1/4" NPT	2
11		TOP BAFFLE DIFFUSER, 1.5/50MM	1

* 68104950 regenerant piston not used for backwash only valves. CLS-150 injector plug and 68105013 refill port plug assembly must be used for backwash only valves.

NOTICE

After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

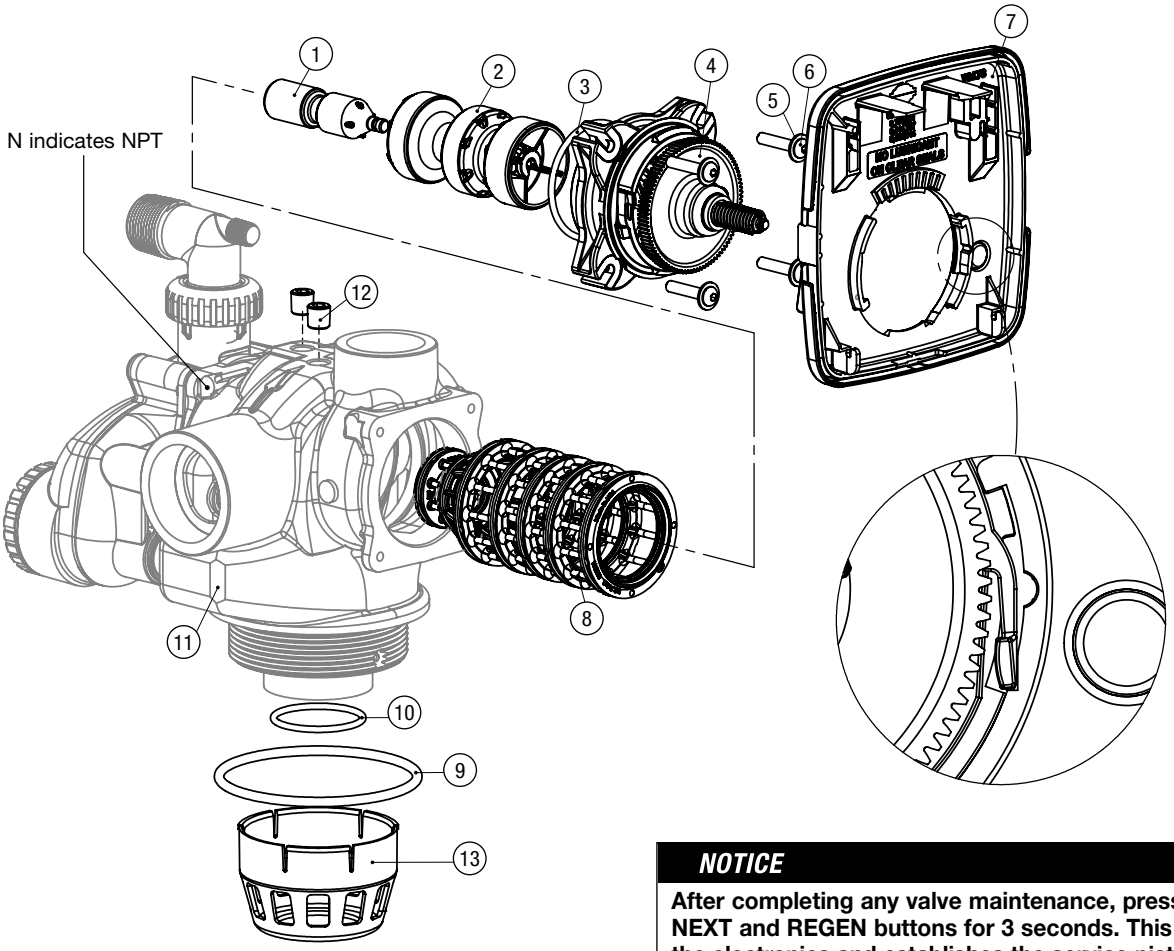


Replacement Parts - ACL-AMZL-FLL-200 Control Valve Body

Drive Cap Assembly, Downflow Piston, Upflow Piston, Regenerant Piston, Downflow or Upflow Spacer Stack Assembly and Main Body

DRAWING NO.	ORDERING CODES	DESCRIPTION	QUANTITY
1*		CLS-200 BRINE PISTON ASSEMBLY	1
2	68104985	CLS-200 PISTON DOWNFLOW ASSEMBLY (AMBER IN COLOR)	1
		CLS-200 PISTON UPFLOW ASSEMBLY (BLACK IN COLOR)	
3		O-RING 230	1
4		CLS-200 DRIVE CAP ASSEMBLY	1
5		WASHER FLAT SS 1/4	4
6		BOLT BHCS S/S 1/4-20X1.25	4
7	68111065	BACK PLATE	1
8	68111080	CLS-200 STACK DOWNFLOW ASSEMBLY (BLACK IN COLOR)	1
		CLS-200 STACK UPFLOW ASSEMBLY (BLACK AND GREY)	
9	68110710	O-RING 347	1
10	68110711	O-RING 225 FOR VALVE BODIES WITH NPT THREADS	1
11		CLS-200 BODY NPT	1
12		CLS-200 PLUG 1/4 HEX NPT	2
13		TOP BAFFLE DFSR 1.5/50MM	1

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



NOTICE

After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version and then reset the valve to the service position.

Replacement Parts - ACL-AMZL-FLL-150 Regenerate Components

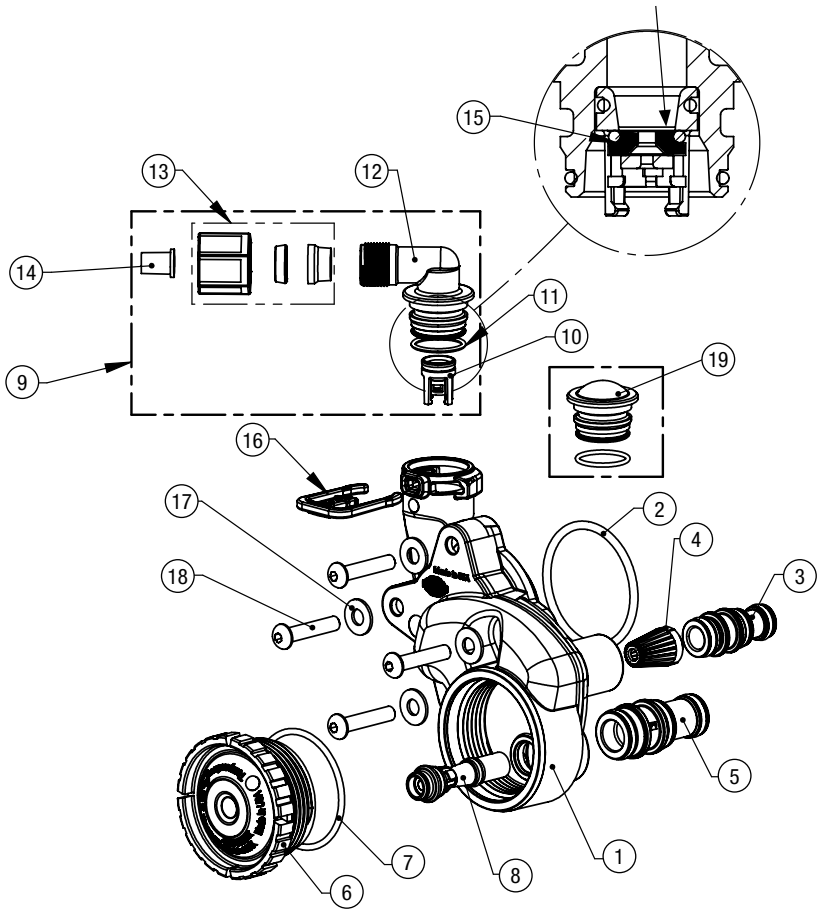
ITEM NO.	ORDERING CODES	DESCRIPTION	QUANTITY
1		CLS-150 INJECTOR BODY, WELDED ASSEMBLY	1
2		O-RING -226	1
3**		CLS-150 INJECTOR FEED TUBE DOWNFLOW (BLACK IN COLOR)	1
		CLS-150 INJECTOR FEED TUBE UPFLOW (GREY IN COLOR)	
4		INJECTOR SCREEN	1
5***		CLS-150 INJECTOR DRAW TUBE DOWNFLOW (BLACK IN COLOR)	1
		CLS-150 INJECTOR DRAW TUBE UPFLOW (GREY IN COLOR)	1
6		CLS-150 INJECTOR CAP	1
7	68105007	O-RING -135	1
8		CLS-150 INJECTOR	1
9	68104983*	REFILL FLOW CONTROL, 1/2"	1
10		CLS-150 REFILL RETAINER ASSEMBLY (0.5 GPM)	1
11		O-RING, -019	1
12		REGENERANT ELBOW W/FLOW CONTROL	1
13		NUT, COMPRESSION, 1/2" BLACK	1
14		INSERT, POLYTUBE 1/2"	1
15	68105011	REFILL FLOW CONTROL (0.5 GPM)	1
16	68104867	RETAINING CLIP	1
17		WASHER, FLAT STAINLESS STEEL	4
18		BOLT, BHCS STAINLESS STEEL 1/4-20X 1-1/4	4
19	68105013	REFILL PORT PLUG ASSY	1

*Contains a 68105011 0.5 gpm flow control

**CLS-150 Injector Feed Tubes each contain one O-RING 111 and two O-RING 112

***CLS-150 Injector Draw Tubes each contain one O-RING 113 and two O-RING 115

Proper RFC orientation directs refill water flow toward the washer face with radius and text.



Replacement Parts - ACL-AMZL-FLL-200 Regenerate Components

ITEM NO.	ORDERING CODE	DESCRIPTION	QUANTITY
1		CLS-200 INJECTOR CAP	1
2	68105007	O-RING 135	1
3		CLS-200 INJECTOR BODY ASSEMBLY	1
4		CLS-200H INJECTOR ASSEMBLY	1
5		CLS-200 INJ DRAW TUBE DOWNFLOW ASSEMBLY (BLACK IN COLOR)	1
		CLS-200 INJ DRAW TUBE UPFLOW ASSEMBLY (GREY IN COLOR)	
6		CLS-200 INJ FEED TUBE DOWNFLOW ASSEMBLY (BLACK IN COLOR)	1
		CLS-200 INJ FEED TUBE UPFLOW ASSEMBLY (GREY IN COLOR)	
7		O-RING 231	1
8		WASHER FLAT SS 1/4	4
9		BOLT BHCS S/S 1/4-20 x 2.25	4
10*	68104941	CLS-200 DLFC 022 FOR 3/4	1
11		CLS-200H REFILL FLOW CONTROL RETAINER	1
12		O-RING 211	1
13	68110030	O-RING 215	1
14	68110029	CLS-200 SPLIT RING	1
15	68104937	CLS-200 NUT 1 QC	1
16		CLS-200 FTG 1 MALE NPT ELBOW	1
17		CLS-200H FITTING CAP 1 IN THREADED	Optional
Not Shown		CLS-200 FTG 3/4 & 1 PVC SLVNT 90	Optional
Not Shown**		FTG KIT 494 BV 1/2 POLYTUBE	Optional

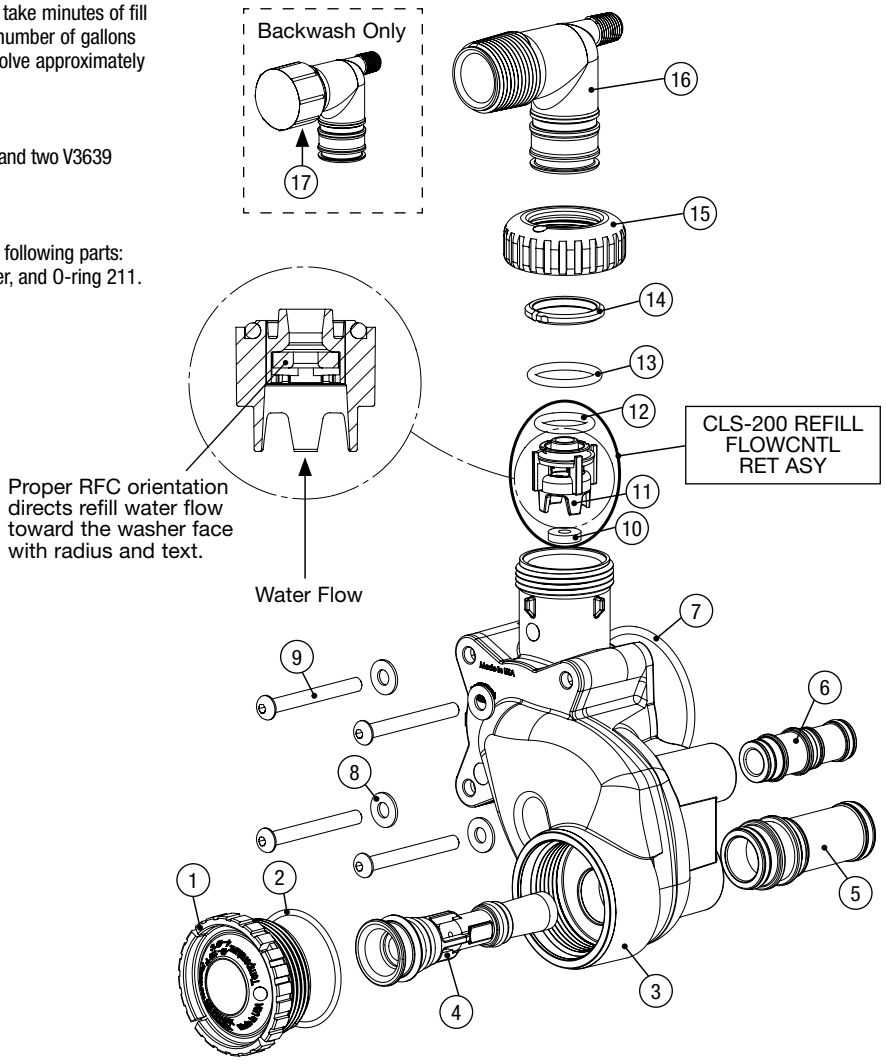
*Any CLS-200 flow control may be used. CLS-200 valves are shipped with a V3162-022 (2.2 gpm) flow control. Flow control sizes range from 0.7 up to 10 gpm. CLS-200 valves can only be set for minutes of fill because various sizes of flow controls can be used. To calculate for pounds or kilograms of salt, 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.

**Use of 1/2" Polytube may severely reduce brine draw rates.

CLS-150 Injector Draw Tubes each contain one D1262 O-RING 118 and two V3639 O-RING 119.

CLS-150 Injector Feed Tubes each contain three O-RING 113.

Backwash Only Valves include a Fitting Cap but do not include the following parts: 3/4" x 1" Fitting, 1/2" Polytube, Flow Control, Flow Control Retainer, and O-ring 211.



Troubleshooting

PROBLEM	POSSIBLE CAUSE	SOLUTION
No Display on PC Board	No power at electric outlet	Repair outlet or use working outlet
	Control valve Power Adapter not plugged into outlet or power cord end not connected to PC board connection	Plug Power Adapter into outlet or connect power cord end to PC Board connection
	Improper power supply	Verify proper voltage is being delivered to PC Board
	Defective Power Adapter	Replace Power Adapter
	Defective PC Board	Replace PC Board
PC Board does not display correct time of day	Power Adapter plugged into electric outlet controlled by light switch	Use uninterrupted outlet
	Tripped breaker switch and/or tripped GFI	Reset breaker switch and/ or GFI switch
	Power outage	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.
	Defective PC Board	Replace PC Board
Display does not indicate that water is flowing. Refer to user instructions for how the display indicates water is flowing	Bypass valve in bypass position	Turn bypass handles to place bypass in service position
	Meter is not connected to meter connection on PC Board	Connect meter to three pin connection labeled METER on PC Board
	Restricted/ stalled meter turbine	Remove meter and check for rotation or foreign material
	Meter wire not installed securely into three pin connector	Verify meter cable wires are installed securely into three pin connector labeled METER
	Defective meter	Replace meter
	Defective PC Board	Replace PC Board
Control valve regenerates at wrong time of day	Power outage	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.
	Time of day not set correctly	Reset to correct time of day
	Time of regeneration set incorrectly	Reset regeneration time
	Control valve set at “on 0” (immediate regeneration)	Check programming setting and reset to NORMAL (for a delayed regen time)
	Control valve set at “NORMAL + on 0” (delayed and/ or immediate)	Check programming setting and reset to NORMAL (for a delayed regen time)
Time of day flashes on and off	Power outage	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.
Control valve does not regenerate automatically when the REGEN button is depressed and held.	Broken drive gear or drive cap assembly	Replace drive gear or drive cap assembly
	Broken Piston Rod	Replace piston rod
	Defective PC Board	Defective PC Board
Control valve does not regenerate automatically but does when the REGEN button is depressed and held.	Bypass valve in bypass position	Turn bypass handles to place bypass in service position
	Meter is not connected to meter connection on PC Board	Connect meter to three pin connection labeled METER on PC Board
	Restricted/ stalled meter turbine	Remove meter and check for rotation or foreign material
	Incorrect programming	Check for programming error
	Meter wire not installed securely into three pin connector	Verify meter cable wires are installed securely into three pin connector labeled METER
	Defective meter	Replace meter
	Defective PC Board	Replace PC Board

Troubleshooting

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

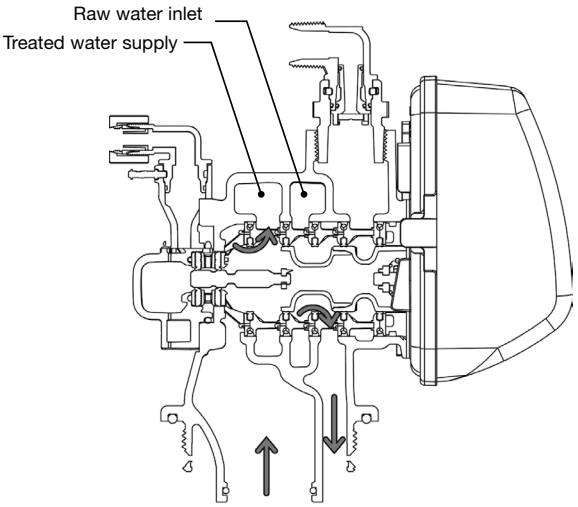
Troubleshooting- Controller Error Codes

PROBLEM	POSSIBLE CAUSE	SOLUTION
E1, Err – 1001, Err – 101 = Control unable to sense motor movement	Motor not inserted full to engage pinion, motor wires broken or disconnected	Disconnect power, make sure motor is fully engaged, check for broken wires, make sure two pin connector on motor is connected to the two pin connection on the PC Board labeled MOTOR. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	PC Board not properly snapped into drive bracket	Properly snap PC Board into drive bracket and then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	Missing reduction gears	Replace missing gears
E2, Err – 1002, Err – 102 = Control valve motor ran too short and was unable to find the next cycle position and stalled	Foreign material is lodged in control valve	Open up control valve and pull out piston assembly and seal/ stack assembly for inspection. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	Mechanical binding	Check piston and seal/ stack assembly, check reduction gears, check drive bracket and main drive gear interface. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	Main drive gear too tight	Loosen main drive gear. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	Improper voltage being delivered to PC Board	Verify that proper voltage is being supplied. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
E3, Err – 1003, Err – 103 = Control valve motor ran too long and was unable to find the next cycle position	Motor failure during a regeneration	Check motor connections then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
Err – 1004, Err – 104 = Control valve motor ran too long and timed out trying to reach home position	Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
Err -1006, Err – 106, Err - 116 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too long and unable to find the proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	Control valve programmed for ALT A or b, nHbP, SEPS, or AUX MAV with out having a MAV or NHBP valve attached to operate that function	Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect. Then re-program valve to proper setting.
	MAV/ NHBP motor wire not connected to PC Board	Connect MAV/ NHBP motor to PC Board two pin connection labeled DRIVE. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	MAV/ NHBP motor not fully engaged with reduction gears	Properly insert motor into casing, do not force into casing Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
Err – 1007, Err – 107, Err - 117 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too short (stalled) while looking for proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	Foreign material is lodged in MAV/ NHBP valve	Open up MAV/ NHBP valve and check piston and seal/ stack assembly for foreign material. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	Mechanical binding	Check piston and seal/ stack assembly, check reduction gears, drive gear interface, and check MAV/ NHBP black drive pinion on motor for being jammed into motor body. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

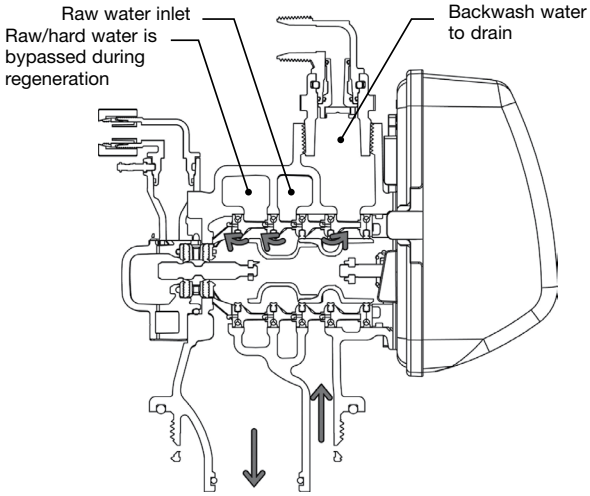
Water Softener Flow Diagrams

ACL-AMZL-FLL-150 Control Valve Cycle Positions

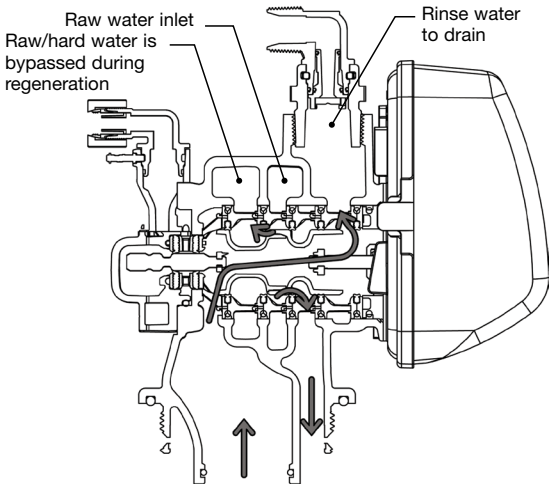
SERVICE



BACKWASH



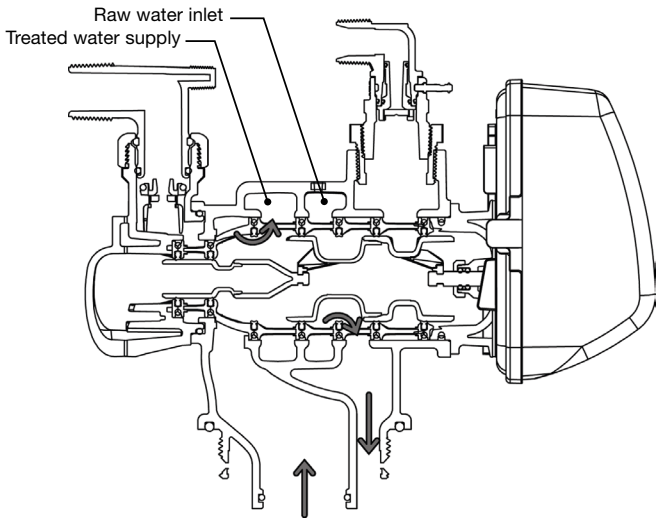
RINSE



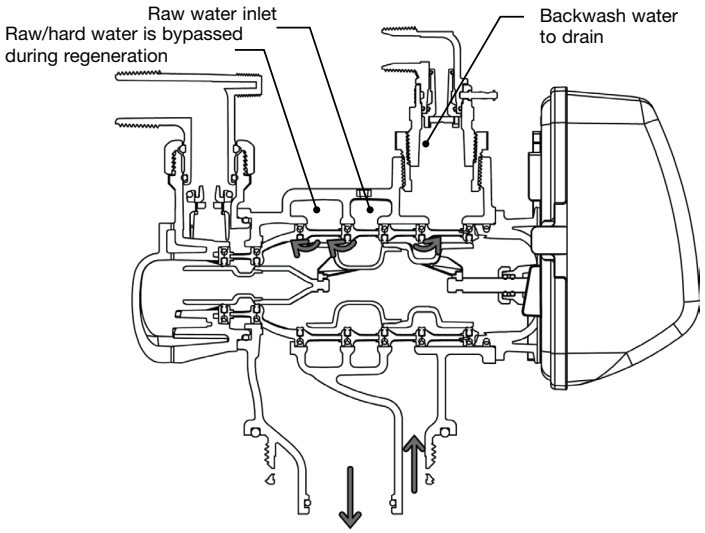
Water Softener Flow Diagrams

ACL-AMZL-FLL-200 Control Valve Cycle Positions

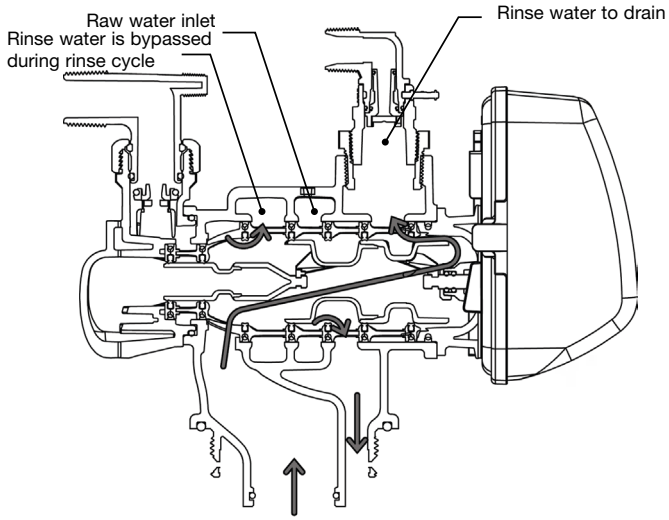
SERVICE



BACKWASH



RINSE



Warranty

WATER SOFTENERS/FILTERS Limited Warranty:

The Company warrants each fiberglass tank 13 inches in diameter and smaller to be free from defects in material and workmanship under normal usage for a period of ten years from the date of original shipment.
The Company warrants each fiberglass tank 14 inches in diameter and larger to be free from defects in material and workmanship under normal usage for a period of five years from the date of original shipment.
The Company warrants any size Salt Tank (Brine Tank) to be free from defects in material and workmanship under normal usage for a period of five years from the date of original shipment.
The Company warrants each Control valve to be free from defects in material and workmanship under normal usage for a period of five years from the date of original shipment.
The Company warrants diaphragm valve nests and related controls to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment.
The Company warrants all other components to be free from defects in material and workmanship under normal usage for a period of one year from the date of original shipment.
Water softener resins subjected to iron, manganese and chlorine levels greater than 1ppm are expressly not covered by this warranty. Manganese greensand media and expendable media such as activated carbon, Filox®, Micro-Z® and neutralizing media are also not covered by this warranty. In the event of a covered defect within the warranty period, the Company will, at its option, replace or recondition the product without charge.
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