SmartChoice™ Elite

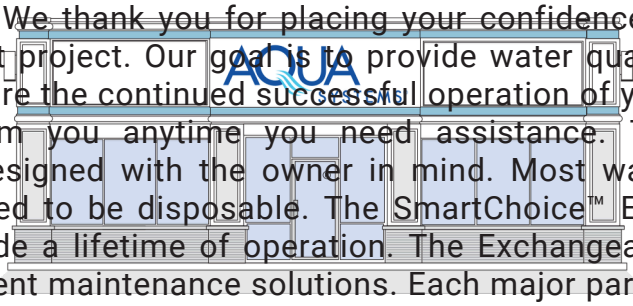
Water Softening Systems

Installation, Operation and Maintenance Manual

Single Tank Water Softening System
Twin Tank Water Softening System
High Efficiency Single Tank Water Softening System
High Efficiency Twin Tank Water Softening System
City Stack Water Filtration System
Stack Water Filtration Softening System

9/5/2025

Introduction



Welcome to the Aqua Systems® family of customers. We thank you for placing your confidence in Aqua Systems® to assist with your water improvement project. Our goal is to provide water quality solutions with lasting performance. We are here to ensure the continued successful operation of your water treatment system, and we want to hear from you anytime you need assistance. The SmartChoice™ Elite water conditioning system was designed with the owner in mind. Most water conditioning products on the market today are designed to be disposable. The SmartChoice™ Elite was designed to be a lasting appliance that can provide a lifetime of operation. The Exchangeable Component Maintenance System allows easy and efficient maintenance solutions. Each major part of the SmartChoice™ Elite is a replaceable component that is easily removed. Although it may be years before the first service is required, this system offers you the ultimate in long-term care. All components of the SmartChoice™ Elite are exchangeable with the factory. You have the option of exchanging the component yourself, or having an experienced service technician assist in maintenance. With either choice, the exchangeable component program ensures precise results and low cost. Each SmartChoice™ Elite is hand crafted by a skilled technician. The personal attention to detail assures you of the high quality craftsmanship Aqua Systems® is known for. The SmartChoice™ Elite is the solution for many common applications. It is also ideal for customized, built-to-suit requirements. The SmartChoice™ Elite can be tailored as a solution to most any application. Please be sure you let your dealer know if you have any special circumstances, or if you observe anything unusual about the water supply you are installing the system on. Please review this Installation, Operation, and Maintenance manual for valuable information that will help ensure successful results. Supplement manuals are available for specialized filters and custom tailored systems. Service manuals are also accessible on our web site at any time. If you have questions, please feel free to contact the factory or your local dealer. Aqua Systems® and our professional dealers are always prepared to assist you.

Owner Information

Owner Name _____

Serial Number _____

Date of Installation _____

Dealer Name _____

Model Number _____

Installer Name _____

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Contact your local Aqua Systems dealer
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aquasystems.com

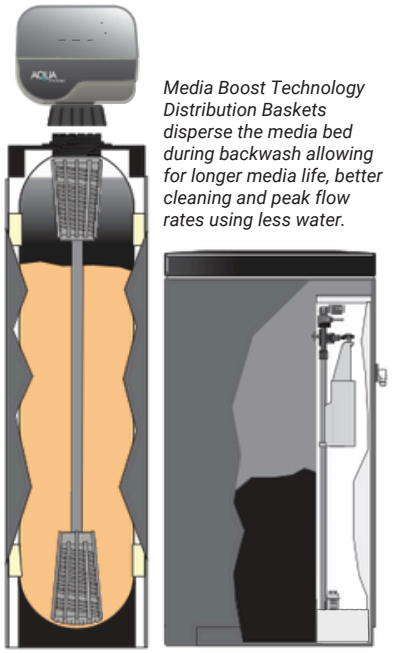
System Specs

Single Tank Water Softening System

The SmartChoice™ Elite family of products combines decades of experience with innovative patent-pending technology to provide the best in water conditioning for the home. With 10-year limited warranty, superior salt efficiency, and modular design, the SmartChoice™ Elite water softener is the answer for reliable operation and soft, clean water.

Features

- Media Boost Technology for superior backwash, flow rates, and enhanced efficiency
- SmartChoice™ Elite Total Water Management Valve
  - Screen can display dealer name and contact information
  - Multi-color back-lit display communicates operation health of the system
  - Easily upgradeable to Wi-Fi capability
- Exclusive Factory Exchange Program
- System regenerates when needed, based on water usage
- Premium Grade Ion Exchange Resin
- 1” High Flow Design
- Corrosion-Resistant Components
- No Fasteners, Screws, or Bolts
- 13x33” Matching Brine Tank with Safety Float (up to model 150)
- Thermal Tank Shroud (up to model 150)



Media Boost Technology Distribution Baskets disperse the media bed during backwash allowing for longer media life, better cleaning and peak flow rates using less water.

Options

- Wi-Fi Upgrade with AquaSense Monitoring App
- Salt Level Monitor (Shows Red Alert Screen when Low)
- Several Available Pipe Connections

Brine Tank Options				
Type	**Shape**	**Dimensions**	**Salt**	**Models**
Compact	Round	13” X 33”	150 lbs	100-150
Compact	Square	11” x 36”	150 lbs	100-150
Compact	Rectangle	15” x 17”	240 lbs	100-150
Standard	Round	18” x 40”	320 lbs	200-250

Model Number	Media Cubic Feet	Grains of Capacity			Flow Rate @ 10 psi	Flow Rate @ 15 psi	Media Tank Size Inches	Drain Flow Max GPM	Distributor Type
		15lb/ Cubic Feet	10lb Cubic Feet	6lb/ Cubic Feet*					
SCE100	1.0	32,000	28,000	22,500	10	13	9 x 48	1.7	Media Boost
SCE150	1.5	48,000	42,000	34,000	10.5	14	10 x 54	2.2	Media Boost
SCE200	2.0	64,000	56,000	45,000	12	16	12 x 52	2.7	Media Boost
SCE250	2.5	80,000	70,000	56,000	14	18	13 x 54	3.2	Media Boost

** Factory Salt & Capacity Setting*

- Not intended to be used to treat water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.
- Installation must comply with all state and local codes.
- To sanitize system after installation or service add household bleach to brine tank (1.2 Fluid oz).
- WARNING: Do not add chlorine bleach to brine tanks containing iron removing salt.
- See Aqua Systems SmartChoice™ Elite Limited Warranty for specific warranty details.

Operating Water Temperature Range:	Max 100° | Minimum 40° Max 120° |
Operating Ambient Temperature Range:	Minimum 40° Max 125 psi | Minimum 25
Operating Pressure Range:	psi 110v - 60 hz 0.5 Amperes Cube,
UL approved electrical components:	Pellet, or other Clean Grade of Salt
Recommended Salt:	Contact Dealer or Aqua Systems
Parts or Service:	

System Specs

High Efficiency Water Softening System

The SmartChoice™ Elite family of products combines decades of experience with innovative patent-pending technology to provide the best in water conditioning for the home. With a 10-year limited warranty, superior salt efficiency, and modular design, the SmartChoice™ Elite High Efficiency Water Softening System is the answer for reliable operation and soft, clean water.

Features

- High Efficiency operation can reduce water and salt usage by 50%
- Media Boost Technology for superior backwash, flow rates, and enhanced efficiency
  - Superior regeneration efficiency
  - SmartChoice™ Elite Total Water Management Valve
    - Multi-color backlit display communicates operation health of
    - the system
    - Screen can display dealer name & contact information Easily upgradeable to Wi-Fi Capability
- Regenerates when needed, based on water usage
- Exclusive Factory Exchange Program
- 1” High Flow Design
- Premium Grade Ultra High Efficiency Ion Exchange Resin
- Corrosion Resistant Components
- No Fasteners, Screws or Bolts
- 13”x33” Matching brine tank with Safety Float (9x48, 10x54 only)
- Thermal Tank Shrouds (9x48, 10x54 only)

Media Boost Technology Distribution Baskets disperse the media bed during backwash allowing for longer media life, better cleaning and peak flow rates using less water.

Options

- Wi-Fi Upgrade with AquaSense Monitoring App
- Optional Salt Level Monitor (Shows red alert when low)

Parameters

- Intended for clean water, such as municipal or city water
- Maximum Hardness - 35 Grains

Brine Tank Options				
Type	**Shape**	**Dimensions**	**Salt**	**Models**
Compact	Round	13” X 33”	150 lbs	844-1054
Compact	Square	11” x 36”	150 lbs	844-1054
Compact	Rectangle	15” x 17”	240 lbs	1054
Standard	Round	18” x 40”	320 lbs	1252

Model Number	Grains of Capacity		Grains/ lb. Salt	Cont FR 10 psi Drop	Peak FR 15 psi Drop	Media Tank Dia x Hgt	Water Used per Regen	Pipe Conn Size	Max Drain Flow gpm	Drain Size	Dist Type	Brine Line
	Capacity											
SCE948HE	36,000		6,000	6.8 gpm	9 gpm	9 x 48	34 Gal	3/4” - 1”	1.3	5/8”	Media Boost	3/8”
SCE1054HE	42,000		6,000	7.8 gpm	10.4 gpm	10 x 54	46 Gal	3/4” - 1”	1.7	5/8”	Media Boost	3/8”
SCE1252HE	60,000		6,000	10.9 gpm	12.5 gpm	12 x52	65 Gal	3/4” - 1”	2.2	5/8”	Media Boost	3/8”

** Factory Salt & Capacity Setting*

- Not intended to be used to treat water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.
- Installation must comply with all state and local codes.
- To sanitize system after installation or service add household bleach to brine tank (1.2 Fluid oz).
- WARNING: Do not add chlorine bleach to brine tanks containing iron removing salt.
- See SmartChoice™ Elite Limited Warranty for conditions and warranty period.

Operating Water Temperature Range:	Max 100° | Minimum 40°
Operating Ambient Temperature Range:	Max 120° | Minimum 40°
Operating Pressure Range:	Max 125 psi | Minimum 25 psi
UL approved electrical components:	110v - 60 hz 0.5 Amperes
Recommended Salt:	Cube, Pellet, or other Clean Grade of Salt
Parts or Service:	Contact Dealer or Aqua Systems

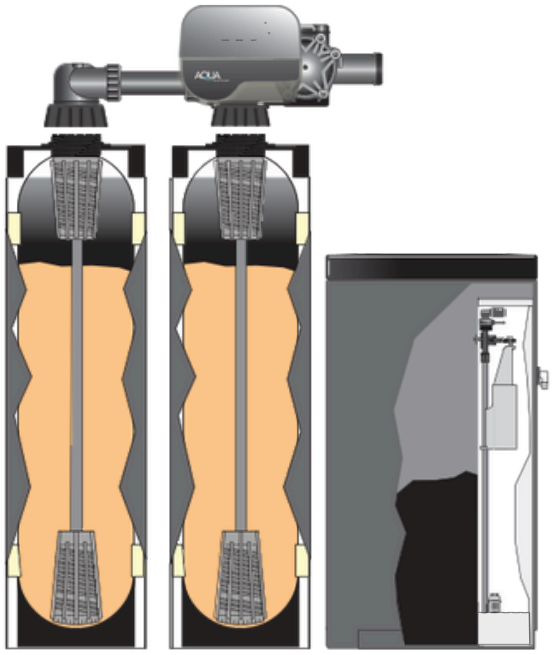
System Specs

Twin Tank Water Softening System

The SmartChoice™ Elite family of products combines decades of experience with innovative patent-pending technology to provide the best in water conditioning for the home. With a 10-year limited warranty, superior salt efficiency, and modular design, the SmartChoice™ Elite twin tank water softening system is the answer for reliable operation and soft, clean water.

Features

- Media Boost Technology for superior backwash, flow rates, and enhanced efficiency
- SmartChoice™ Elite Total Water Management Valve
  - Single Valve Controls both Media Tanks
  - Multi-color back-lit display communicates operation health of the system
  - Screen can display dealer name and contact information
  - Easily upgradeable to Wi-Fi Capability
- Regenerates with soft water when needed, based on water usage
- Provides soft water 24/7
- Exclusive Factory Exchange Program
- Premium Grade Ion Exchange Resin
- 1” High Flow Design
- Corrosion-resistant components
- No fasteners, screws, or bolts
- 13x33” Matching brine tank with Safety Float (up to model 150)
- Thermal tank shroud (up to model 150)



Media Boost Technology Distribution Baskets disperse the media bed during backwash allowing for longer media life, better cleaning and peak flow rates using less water.

Options

- Wi-Fi Upgrade with AquaSense Monitoring App
- Optional Salt Level Monitor (Shows Red Alert Screen when Low)
- Choice of Pipe Connections

Brine Tank Options				
Type	**Shape**	**Dimensions**	**Salt**	**Models**
Compact	Round	13” X 33”	150 lbs	100-150
Compact	Square	11” x 36”	150 lbs	100-150
Compact	Rectangle	15” x 17”	240 lbs	100-150
Standard	Round	18” x 40”	320 lbs	200-250

Number	Media Cubic Feet	Grains of Capacity			Flow Rate @ 10 psi	Flow Rate @ 15 psi	Media Tank Size Inches	Drain Flow Max GPM	Distributor Type
		15lb/ Cubic Feet	10lb Cubic Feet	6lb/ Cubic Feet*					
SCETW100	1.0	32,000	28,000	**22,500**	10	13	9 x 48	1.7	Media Boost
SCETW150	1.5	48,000	42,000	**34,000**	10.5	14	10 x 54	2.2	Media Boost
SCETW200	2.0	64,000	56,000	**45,000**	12	16	12 x 52	2.7	Media Boost
SCETW250	2.5	80,000	70,000	**56,000**	14	18	13 x 54	3.2	Media Boost

** Factory Salt & Capacity Setting*

- Not intended to be used to treat water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.
- Installation must comply with all state and local codes.
- To sanitize system after installation or service add household bleach to brine tank (1.2 Fluid oz).
- WARNING: Do not add chlorine bleach to brine tanks containing iron removing salt.
- See Aqua Systems SmartChoice™ Elite Limited Warranty for specific warranty details.

Operating Water Temperature Range: Max 100° | Minimum 40°
Operating Ambient Temperature Range: Max 120° | Minimum 40°
Operating Pressure Range: Max 125 psi | Minimum 25 psi
UL approved electrical components: 110v - 60 hz 0.5 Amperes
Recommended Salt: Cube, Pellet, or other Clean Grade of Salt
Parts or Service: Contact Dealer or Aqua Systems

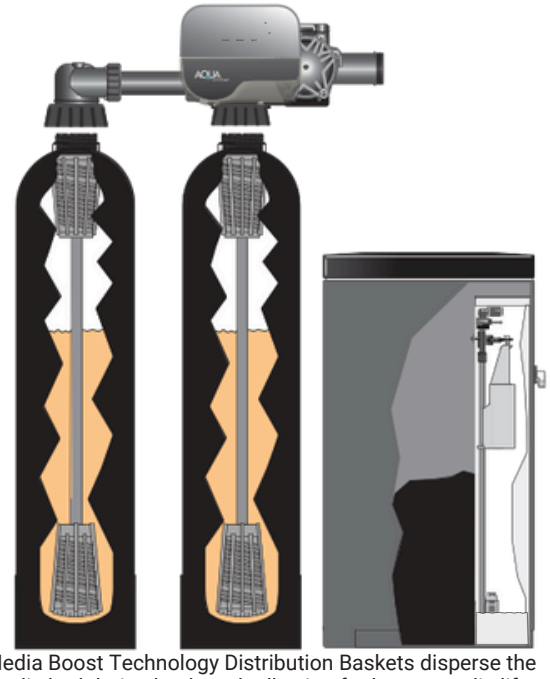
System Specs

High Efficiency Twin Tank Softening System

The SmartChoice™ Elite family of products combines decades of experience with innovative patent-pending technology to provide the best in water conditioning for the home. With a 10-year limited warranty, superior salt efficiency, and modular design, the SmartChoice™ Elite high efficiency twin water conditioning system is the answer for reliable operation and soft, clean water.

Features

- Media Boost Technology for superior backwash, flow rates, and enhanced efficiency
- High Efficiency operation can reduce water and salt usage by 50%
- SmartChoice™ Elite Total Water Management Valve
  - Single Valve Controls both Media Tanks
  - Multi-color backlit display communicates operation health of the system
  - Screen can display dealer name & contact information
- Regenerates when needed, based on water usage
- Provides soft water 24/7
- Superior regeneration efficiency
- Exclusive Factory Exchange Program
- Premium Grade Ultra High Efficiency Ion Exchange Resin
- 1” High Flow Design
- Corrosion Resistant Components
- No Fasteners, Screws or Bolts
- 13”x33” Matching brine tank with Safety Float (9x48, 10x54 only)
- Thermal Tank Shrouds (9x48, 10x54 only)



Media Boost Technology Distribution Baskets disperse the media bed during backwash allowing for longer media life, better cleaning and peak flow rates using less water.

Options

- Wi-Fi Upgrade with AquaSense Monitoring App
- Optional Salt Level Monitor (Shows red alert when low)

Brine Tank Options				
Type	**Shape**	**Dimensions**	**Salt**	**Models**
Compact	Round	13” X 33”	150 lbs	844-1054
Compact	Square	11” x 36”	150 lbs	844-1054
Compact	Rectangle	15” x 17”	240 lbs	1054
Standard	Round	18” x 40”	320 lbs	1252

Parameters

- Intended for clean water, such as municipal or city water
- Maximum Hardness - 35 Grains

Model Number	Grains of Capacity		Grains/ lb. Salt	Cont FR 10 psi Drop	Peak FR 15 psi Drop	Media Tank Dia x Hgt	Water Used per Regen	Pipe Conn Size	Max Drain Flow gpm	Drain Size	Dist Type	Brine Line
SCETW948HE	36,000		6,000	6.8 gpm	9 gpm	9 x 48	34 Gal	3/4” - 1”	1.3	5/8”	Media Boost	3/8”
SCETW1054HE	42,000		6,000	7.8 gpm	10.4 gpm	10 x 54	46 Gal	3/4” - 1”	1.7	5/8”	Media Boost	3/8”
SCETW1252HE	60,000		6,000	10.9 gpm	12.5 gpm	12 x52	65 Gal	3/4” - 1”	2.2	5/8”	Media Boost	3/8”

** Factory Salt & Capacity Setting*

- Not intended to be used to treat water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.
- Installation must comply with all state and local codes.
- To sanitize system after installation or service add household bleach to brine tank (1.2 Fluid oz).
- WARNING: Do not add chlorine bleach to brine tanks containing iron removing salt.
- See Aqua System SmartChoice™ Elite Limited Warranty for conditions and warranty period.

Operating Water Temperature Range:	Max 100° | Minimum 40° Max 120° | Minimum 40° Max 125 psi | Minimum 25 psi 110v - 60 hz 0.5 Amperes Cube, Pellet, or other Clean Grade of Salt
Operating Ambient Temperature Range:	
Operating Pressure Range:	
UL approved electrical components:	
Recommended Salt:	
Parts or Service:	Contact Dealer or Aqua Systems

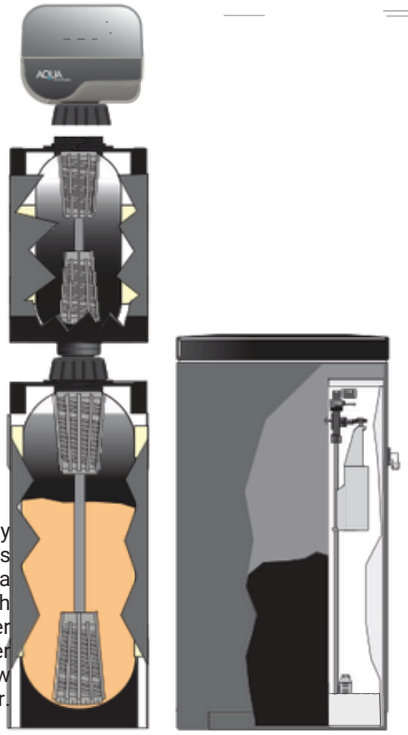
System Specs

City Stack Water Filtration System

The SmartChoice™ Elite family of products combines decades of experience with innovative patent-pending technology to provide the best in water conditioning for the home. With a 10-year limited warranty, superior salt efficiency, and modular design, the SmartChoice™ Elite City Stack Water Filtration System is the answer for reliable operation and soft, clean water.

Features

- Media Boost Technology for superior backwash, flow rates, and enhanced efficiency
- SmartChoice™ Elite Total Water Management Valve
  - Single Valve Controls both Media Tanks
  - Multi-color backlit display communicates operation health of the system
  - Screen can display dealer name & contact information
  - Easily upgradeable to Wi-Fi Capability
  - Differentiates between softener and filter
- Regenerates when needed, based on water usage
- Pre-fill brining for dry salt storage
- Lifetime seamless fiberglass-wrapped media tanks
- Exclusive Factory Exchange Program
- Premium Grade Ion Exchange Resin
- 1” High Flow Design
- Corrosion Resistant Components
- No Fasteners, Screws or Bolts
- 13”x33” Matching brine tank with Safety Float
- Thermal Tank Shrouds



Media Boost Technology Distribution Baskets disperse the media bed during backwash allowing for longer media life, better cleaning and peak flow rates using less water.

Available in a Twin Tank Model

Options

- Wi-Fi upgrade with AquaSense monitoring app
- Optional Salt Level Monitor (Shows Red Alert when Low)
- Carbon - Chlorine Reduction City Water
- Catalytic Carbon - Chloramine, H2S Reduction (Trace amounts)

Brine Tank Options				
Type	**Shape**	**Dimensions**	**Salt**	**Models**
Compact	Round	13” X 33”	150 lbs	100
Compact	Square	11” x 36”	150 lbs	100
Space Saver	Rectangle	15” x 17”	240 lbs	100
Standard	Round	18” x 40”	320 lbs	100

Model Number	Upper Tank Media	Grains of Capacity			H2S Reduct**	Cont FR 10 psi drop	Peak FR 15 psi drop	Iron Reduct*	Pipe Conn Size	Drain Flow Max GPM	Drain Size	Distributor Type	Brine Line Size
		15lb/cu ft	10lb/cu ft	6lb/cu ft*									
SCE100STKCF	Carbon	32,000	28,000	22,500	N/A	10 gpm	13 gpm	N/A	1” or 3/4”	2.7	5/8	Media Boost	3/8”
SCE100STKCC	Catalytic Carbon	32,000	28,000	22,500	1 ppm	10 gpm	13 gpm	.5 ppm	1” or 3/4”	2.7	5/8”	Media Boost	3/8”

** Factory Salt & Capacity Setting*

- Not intended to be used to treat water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.
- Installation must comply with all state and local codes.
- To sanitize system after installation or service add household bleach to brine tank (1.2 Fluid oz).
- WARNING: Do not add chlorine bleach to brine tanks containing iron removing salt.
- See Aqua Systems SmartChoice™ Elite Limited Warranty for conditions and warranty period.

Operating Water Temperature Range:	Max 100° | Minimum 40°
Operating Ambient Temperature Range:	Max 120° | Minimum 40°
Operating Pressure Range:	Max 125 psi | Minimum 25 psi
UL approved electrical components:	110v - 60 hz 0.5 Amperes
Recommended Salt:	Cube, Pellet, or other Clean Grade of Salt
Parts or Service:	Contact Dealer or Aqua Systems

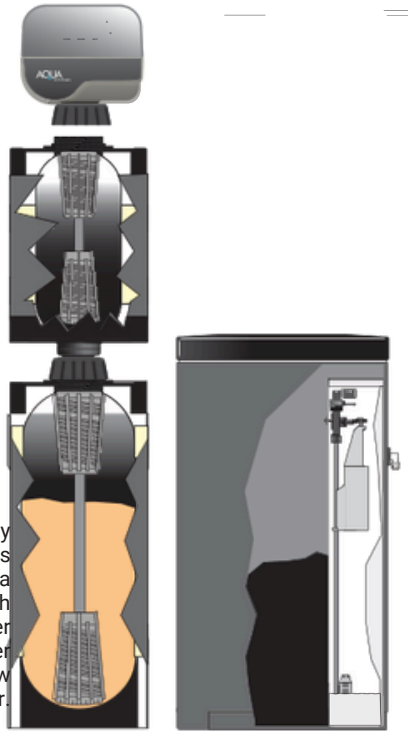
System Specs

Stack Water Filtration Softening System

The SmartChoice™ Elite family of products combines decades of experience with innovative patent-pending technology to provide the best in water conditioning for the home. With a 10-year limited warranty, superior salt efficiency, and modular design, the SmartChoice™ Elite Stack Water Filtration Softening System is the answer for reliable operation and soft, clean water.

Features

- Media Boost Technology for superior backwash, flow rates, and enhanced efficiency
- SmartChoice™ Elite Total Water Management Valve
  - Single Valve Controls both Media Tanks
  - Multi-color backlit display communicates operation health of the system
  - Screen can display dealer name & contact information
  - Easily upgradeable to Wi-Fi Capability
- Regenerates when needed, based on water usage
- Pre-fill brining for dry salt storage
- Lifetime seamless fiberglass-wrapped media tanks
- Exclusive Factory Exchange Program
- Premium Grade Ion Exchange Resin
- Corrosion Resistant Components
- No Fasteners, Screws or Bolts
- 13”x33” Matching brine tank with Safety Float
- Thermal Tank Shrouds



Media Boost Technology Distribution Baskets disperse the media bed during backwash allowing for longer media life, better cleaning and peak flow rates using less water.

Available in a Twin Tank Model

Options

- Wi-Fi upgrade with AquaSense monitoring app
- Choice of Salt Tank Sizes
- Optional Salt Level Monitor (Shows Red Alert when Low)
- KDF 85 - Iron Bacteria, H2S Reduction (Trace Amounts)
- KDF 55 - Chlorine Reduction

Brine Tank Options				
Type	**Shape**	**Dimensions**	**Salt**	**Models**
Compact	Round	13” X 33”	150 lbs	100
Compact	Square	11” x 36”	150 lbs	100
Space Saver	Rectangle	15” x 17”	240 lbs	100
Standard	Round	18” x 40”	320 lbs	100

Model Number	Upper Tank Media	Grains of Capacity			H2S Reduct**	Cont FR 10 psi drop	Peak FR 15 psi drop	Iron Reduct*	Pipe Conn Size	Drain Flow Max GPM	Drain Size	Distributor Type	Brine Line Size
		15lb/cu ft	10lb/cu ft	6lb/cu ft*									
SCE100STKKDF 85	KDF 85	32,000	24,000	22,500	1 ppm	10 gpm	13 gpm	5 ppm	1” or 3/4”	5.3	5/8”	Media Boost	3/8”
SCE100STKKDF 55	KDF 55	32,000	24,000	22,500	N/A	10 gpm	13 gpm	.5 ppm	1” or 3/4”	5.3	5/8”	Media Boost	3/8”

** Factory Salt & Capacity Setting*

- Not intended to be used to treat water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.
- Installation must comply with all state and local codes.
- To sanitize system after installation or service add household bleach to brine tank (1.2 Fluid oz).
- WARNING: Do not add chlorine bleach to brine tanks containing iron removing salt.
- See Aqua Systems SmartChoice™ Elite Limited Warranty for conditions and warranty period.

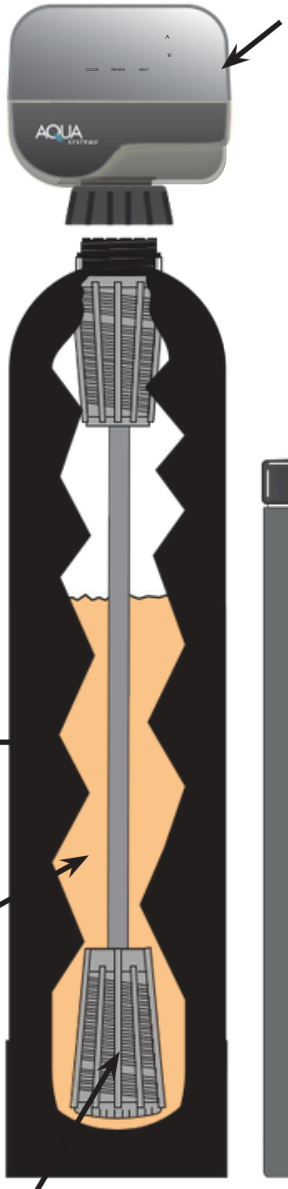
Operating Water Temperature Range:	Max 100° | Minimum 40° Max 120° |
Operating Ambient Temperature Range:	Minimum 40° Max 125 psi | Minimum 25
Operating Pressure Range:	psi 110v - 60 hz 0.5 Amperes Cube,
UL approved electrical components:	Pellet, or other Clean Grade of Salt
Recommended Salt:	Contact Dealer or Aqua Systems
Parts or Service:	

How it Works

Single Tank Water Softening System

The performance of a water softener is dependent on two key functions; a resin bed that cleans the water and precision equipment that cleans the resin. The two most significant elements that differentiate SmartChoice™ Elite softeners are the quality of the components and ease of use (setup and service).

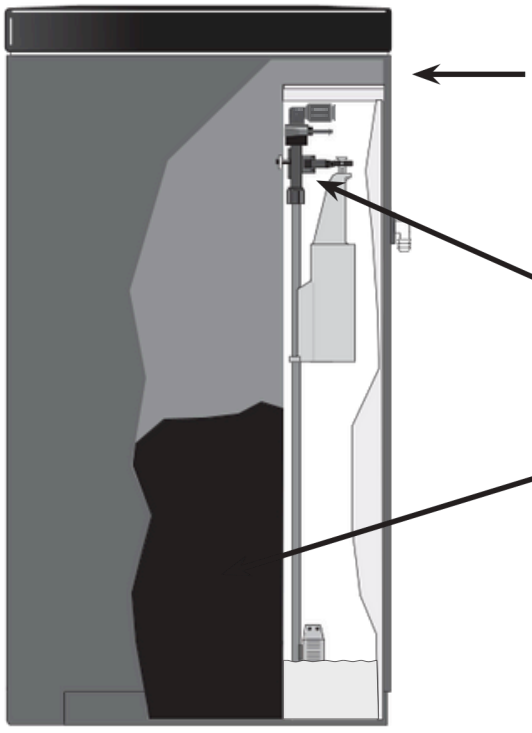
The Media Tank: Contains media called resin. The resin attracts and collects minerals from hard water. Once the resin is saturated with hardness minerals it must be cleaned and regenerated. Once regenerated, the resin is ready to soften more water.



The Control Valve: routes the water flow through the system and controls the operating cycles. Hard water passes through the resin bed to become soft. During regeneration, water flow is reversed to backwash which cleans the resin bed. Brine is pulled in and then rinsed out to regenerate the resin, preparing it to soften more water. The brine tank is then refilled with soft, fresh water for future cycles. Regeneration cycles are based on digital logic, calculating daily water use and then scheduling a cycle at the preset time, thus maximizing efficiency over standard controls. Cycles can be custom programmed making the SmartChoice™ Elite adaptable to virtually any application.

Historically, Media tank construction was metal. To eliminate destructive corrosion, modern tanks are made with a molded liner that is wrapped in fiberglass for exceptional strength and durability.

Resin is made of cross-linked polystyrene to provide a long life of softening capacity.



Brine tanks are available in a variety of sizes to match the capacity needed for each size of resin tank/system capacity.

Safety shut off provides total brine system shut down to protect against brine overflow.

Salt

Media Boost Technology: The Media Boost Technology distributor collects the water that has been softened in the service cycle and routes it to the outlet of the control valve. It also aids in lifting and “fluffing” the resin bed for the brining cycle.

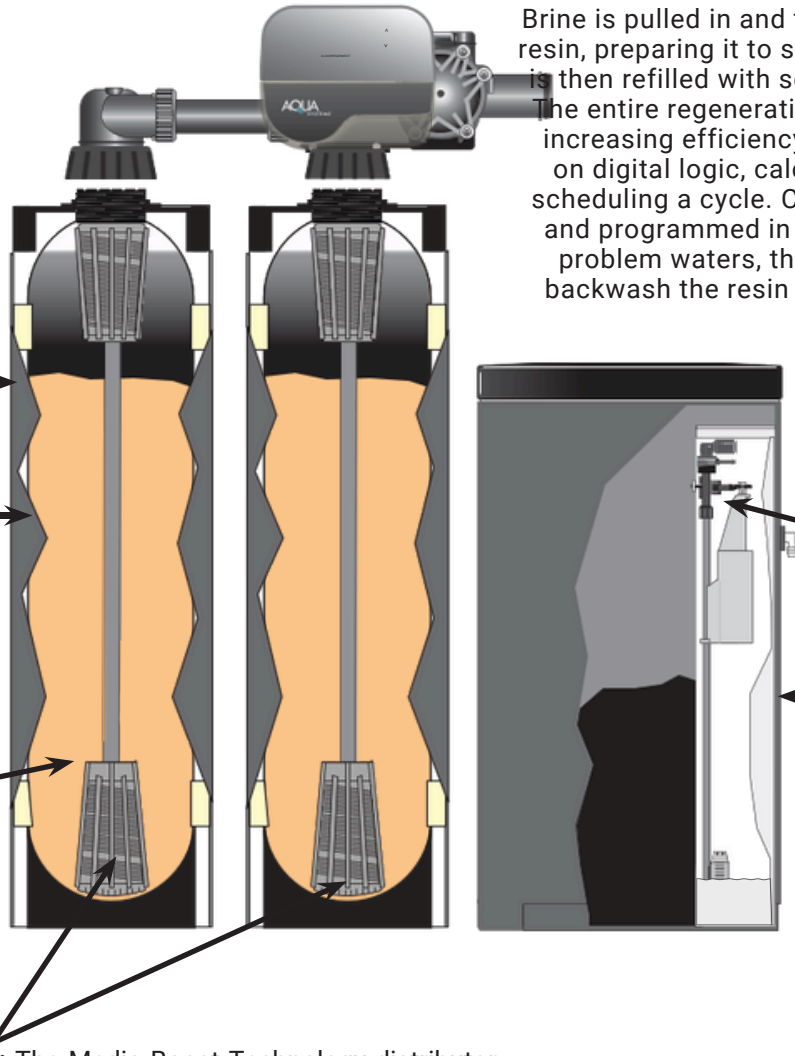
The Brine System: stores salt and water to make brine which is used for regenerating the resin. Resin can be regenerated with sodium from sodium chloride (softener salt) or potassium from potassium chloride.

How it Works

Twin Tank Water Softening System

The performance of a water softener is dependent on two key functions; a resin bed that cleans the water and precision equipment that cleans the resin. The three most significant elements that differentiate one softener from another are the volume of resin, the type of control valve, and the backwash system. **The Media Tank:** contains media called resin. The resin attracts and collects minerals and iron from hard water. Once the resin is saturated with hardness and iron minerals it must be cleaned and regenerated. Once regenerated, the resin is ready to soften more water. Media tanks can be exposed or covered with a jacket or insulated cabinet.

The Control Valve: routes the water flow through the system and controls the operating cycles while giving soft water 24 hr a day, 7 days a week. Hard water passes through the resin bed to become soft. During regeneration, water flow is reversed to backwash which scrubs the resin bed. Brine is pulled in and then rinsed out to regenerate the resin, preparing it to soften more water. The brine tank is then refilled with soft, fresh water for future cycles. The entire regeneration is done using soft water, thus increasing efficiency. Regeneration cycles are based on digital logic, calculating daily water use and then scheduling a cycle. Cycles can also be predetermined and programmed in the control if so desired. Also, in problem waters, the control may be programmed to backwash the resin twice resulting in increased iron removal.



Historically, Media tank construction was metal. To eliminate destructive corrosion, modern tanks are made with a molded liner that is wrapped in fiberglass for exceptional strength and durability.

Resin is made of cross linked polystyrene to provide a long life of softening capacity.

Safety shut off provides total brine system shut down to protect against brine overflow.

Brine tanks are available in a variety of sizes to fit in almost any space and are blow molded for strength and durability.

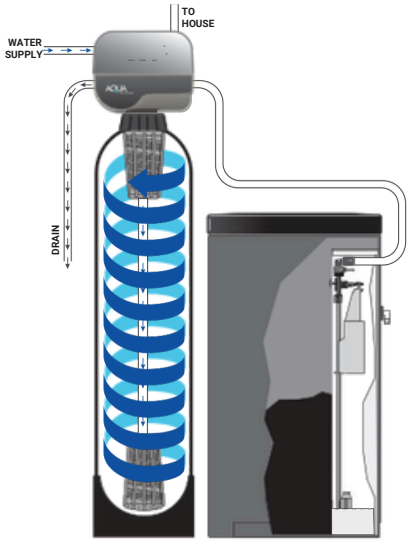
Media Boost Technology: The Media Boost Technology distributor collects the water that has been softened in the service cycle and routes it to the outlet of the control valve. It also aids in lifting and “fluffing” the resin bed for the brining cycle.

The Brine System: stores salt and water to make brine which is used for regenerating the resin. Resin can be regenerated with sodium from sodium chloride (softener salt) or potassium from potassium chloride.

Water Softener Regeneration

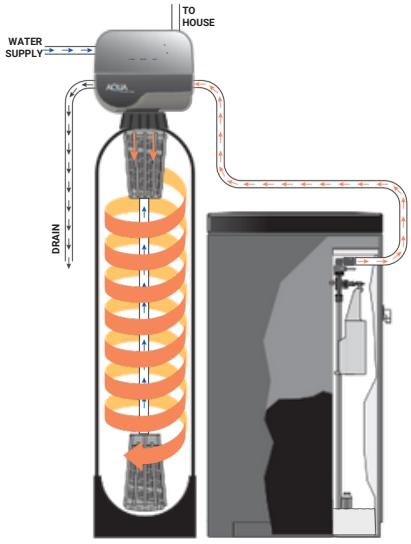
Step 1: Backwash

1. Reverse Water Flow: Water flows from the bottom to the top of the softener tank.
2. Expand Resin Bed: This process expands the resin beads, loosening any debris.
3. Flush Debris: Debris and accumulated particles are flushed out of the tank.
4. Duration: This step typically takes about 10 minutes.



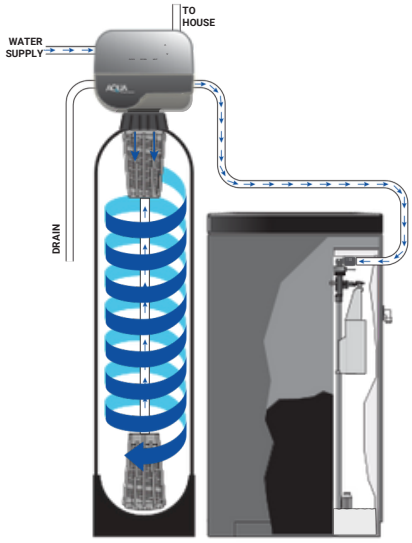
Step 2: Recharge

1. IntroduceBrineSolution: A salty brine solution is drawn into the media tank.
2. Clean Resin Beads: The brine strips hardness minerals from the resin beads, recharging them.
3. Discharge Waste: The hardness minerals and brine are flushed out to the drain.
4. Duration: This step can take between 30 to 100 minutes, depending on the system.



Step 3: Rinse

1. Waterflows through the media tank.
2. Complete Ion Exchange: This ensures any remaining brine and minerals are washed away.
3. Clean Resin Beads: Ensures the resin beads are thoroughly cleaned for optimal performance.
4. Duration: This step can take between 4 to 10 minutes depending on the system



Pre Install Review

Requirements for Proper Operation

Water Pressure: The system will operate on a minimum of 25 psi and a maximum of 125 psi. Flow Rate: A minimum of 5 gallons per minute is required for proper system operation. If less than 5 gpm is available, consult with your dealer for custom settings or configurations. Water Temperature: The range of water temperature to operate this system on is 40º F to 110º F

Drain: A drain should be within 20' of the system using 1/2" tubing. Over 20' should be 3/4" tubing. Maximum overhead height is 8'. Consult your dealer for any drain over 30'. Electricity: An uninterrupted 110 volt A.C. source is required to operate this system. Note: Make sure electrical source is not on a timer or a switch.

TIPS

Salt: Using a clean grade of salt will help reduce the need to clean out the brine tank. If the water supply contains iron, the use of an iron inhibiting salt can help the water quality. Ask your dealer for the recommended salt for your system. **Bypass:** When installing a water conditioner, it is required that the system have a bypass in place to be able to shut off the conditioner without turning off the water supply. **Freezing:** The water conditioner and the drain line must be protected from freezing temperatures. **Sand:** If sand or sediment is present in the water supply, a sediment filter should be installed ahead of the system.

Location Data

Sizing Information

Hardness _____gr./gal.

Iron _____ppm

pH _____

Other _____

Inlet Line Size _____

No. in Family _____

CALCULATION FOR HARDNESS SETTING

Hardness in gpg _____

Ironinppm _____ **x 4 =** _____

(multiply x 4)

TotalCompensated Hardness (addadj.ironand hardness) _____

Use the Compensated Hardness numberforHardness Setting in start up programming.*(Page 22)*

Bypassed Hard Water Lines

Rear Outside Spigot _____

Front Outside Spigot _____

Kitchen Cold _____

Other _____

Pre Assembly

1. Carefully remove system from carton and inspect. The system box should contain:
   a. Unit
   b. Bypass Valve
   c. Plumbing Connectors
2. Remove brine system from carton and inspect. The box should contain:
   a. Brine Tank assembly
   b. 5 ft. Poly Brine Line
3. Attach the bypass to the unit. (*see figure 1*). The bypass valve easily connects to the control valve body using nuts that only require hand tightening. Hand tighten nut connections between control valve and fittings, control valve and bypass valve, and bypass valve and installation fittings. The split ring retainer design holds the nut on and allows load to be spread over the entire nut surface area reducing the chance for leakage. The split ring design, incorporated into the bypass, allows approximately 2 degrees off axis alignment to the plumbing system. The bypass is designed to accommodate minor plumbing misalignments but is not designed to support the weight of a system or the plumbing.
4. Attach Connection Fitting:

figure 1

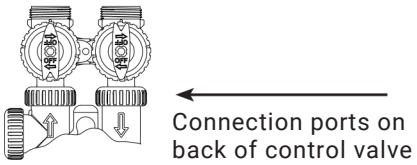
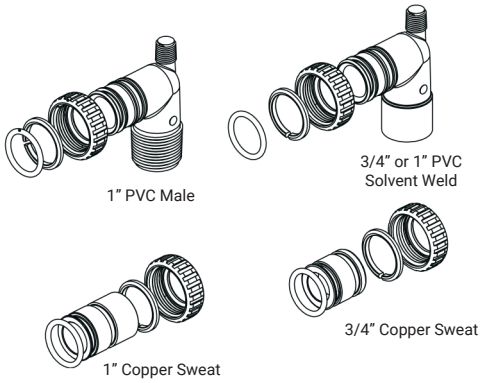


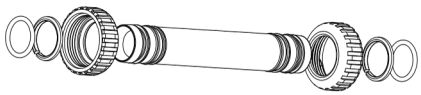
figure 2



Single Tank System: Attach the selected connection fitting kit to the bypass. The nuts, split rings, and o-rings install the same as the bypass. (*see figure 2*) Connection kit sizes available are 1" NPT PVC, 3/4" or 1" Solvent Weld, 1" Sweat Copper, 3/4" Sweat Copper, and other various sizes & types. See your dealer if a specific kit is desired other than the listed kits.

Twin Tank System: Assemble and attach the intertank connection fitting kit to the two media tanks. Looking at the display on the control vavle, the connection ports are to the left of the display and behind it. The other end connects to the second (flow through) tank. The nuts, split rings, and o-rings install the same as the bypass. *(see figure 3)*

figure 3



TIP

Do not use Vaseline, oils, or any petroleum lubricants on o-rings. A silicon lubricant may be used on black o-rings only.

Optional Salt Monitor

If the optional Salt Monitor is being installed at this time, refer to the included instructions with the monitor for installation and setup of the components.

CAUTION

When assembling the inlet/outlet fitting kit, connect the fittings to the plumbing first. Then attach the nut, split ring, and o-ring after the fitting has cooled or dried. Heat from soldering or PVC glue solvents may damage the nut, split ring, or o-ring.

Bypass Operation

The bypass valve is typically used to isolate the control valve from the plumbing system's water pressure in order to perform control valve repairs or maintenance. The SmartChoice™ Elite bypass valve is particularly unique in the water treatment industry due to its versatility and state of the art design features. The 1" full flow bypass valve incorporates four positions including a diagnostic position that allows service work on a pressurized system while still providing untreated bypassed water to the facility or residence. Its completely non-metallic, engineered material design allows for easy access and serviceability without the need for tools.

1. Normal Operation Position: The inlet and outlet handles point in the direction of flow indicated by the engraved arrows on the control valve. Water flows through the control valve during normal operation and this position also allows the control valve to isolate the media bed during the regeneration cycle. *(see figure 1)* **2. Bypass Position:** The inlet and outlet handles point to the center of the bypass, the control valve is isolated from the water pressure contained in the plumbing system. Untreated water is supplied to the plumbing system. *(see figure 2)* **3. Diagnostic Position:** The inlet handle points in the direction of flow and the outlet handle points to the center of bypass valve, system water pressure is allowed to the control valve and the plumbing system while not allowing water to exit from the control valve to the plumbing. *(see figure 3)* **4. Shut Off Position:** The inlet handle points to the center of the bypass valve and the outlet handle points in the direction of flow, the water is shut off to the plumbing system. If water is available on the outlet side of the softener it is an indication of water bypass around the system (i.e. a plumbing connection somewhere in the building bypasses the system). *(see figure 4)*

BYPASS VALVE OPERATION

NORMAL OPERATION

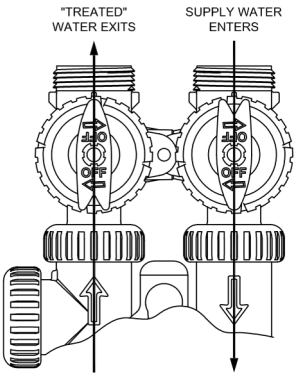


figure 1

BYPASS OPERATION

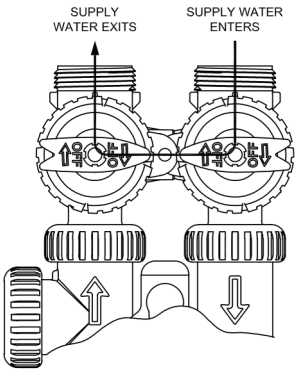


figure 2

DIAGNOSTIC MODE

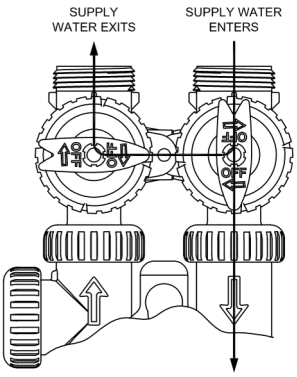


figure 3

SHUT OFF MODE

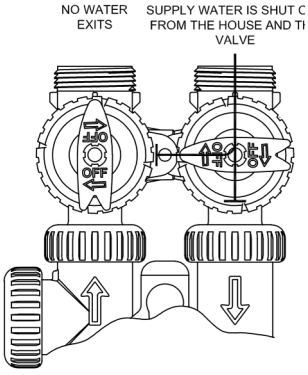


figure 4

Installation

Unit Placement

1. Find a location with accessibility to:

- The main inlet water supply or pre-plumbed connection point
- Adequate drain fixture, capable of 5 gallons per minute flow
- Electrical Outlet

2. Place unit in the desired location. If the floor is not level the unit may be leveled with the built in adjustable base by lightly tapping the unit on the floor.

3. There should be a minimum of 12' of **Water Line** between the softener and the water heater. If this is not possible you will need to install a check valve and a hot water expansion tank between the unit and the water heater.

4. Before connecting the lines:
- Turn off electric or gas to water heater.
- Turn off main water supply to building and drain off pressure to all cold water outlets.
- Determine which outlets are to be bypassed and make provisions to connect them before the softener.
- It is highly recommended to provide an inlet shut off valve near the unit.
- The inlet water line should be a minimum of 3/4" in size. If yours is smaller, consult your dealer for required adjustments.

5. With the above considerations, connect the water line to the inlet of the unit which is designated by a gray arrow on the bypass pointing toward the control valve.

6. Connect the outlet which is designated by a gray arrow pointing away from the control valve to the water line that feeds the rest of the building.

7. If the plumbing system is metal pipe (ex. - copper), install a jumper ground wire and grounding clamps between the inlet and outlet pipes to retain continuity of the plumbing.

TIP

If there is a three way bypassin the existing plumbing, inspect it to make sure the bypass valve shuts off 100% when closed.

All plumbing must be done in accordance with local plumbing codes.

CAUTION

The control valve, fittings and/or bypass are designed to accommodate minor plumbing misalignments but are not designed to support the weight of a system or the plumbing.
Do not use Vaseline, oils, other hydrocarbon lubricants or spray silicone anywhere. A silicon lubricant may be used on black o-rings but is not necessary. **Avoid any type of lubricants, including silicone, on red or clear lip seals.**
The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench. If necessary, pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place screwdriver in slots on caps and/or tap with a hammer.
Do not use pipe dope or other sealants on threads. Teflon tape must be used on the threads of the 1" NPT elbow or the 1/4" NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connection or caps (if not using the connection nut) because of o-ring seals.
When assembling the installation fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring and o-ring. Heat from soldering or solvent cements may damage the nut, split ring or o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring and o-ring. Avoid getting primer and solvent cement on any part of the o-rings, split rings, bypass valve or control valve.

Installation

8. Connect the drain on the softener to an approved air gap drain. When using 5/8” poly tubing for the drain line, connect the nut to the line as illustrated in *figure 1*. If copper line is used, be sure to pre-sweat and cool pipe and fittings before attaching to drain fitting on unit.

Brine System Placement

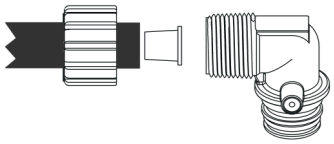
9. Find a smooth, level location clean and free of debris for the brine system. Locate and place the brine system within 15 feet of the softener (15 feet maximum brine line distance). Connect the brine line to the brine tank and the softener with the supplied 3/8” O.D. poly tubing (*see figure 2*). 10. Connect overflow fitting with 5/8” poly tubing and run to a floor drain or through the floor to the crawl space. **Note:** This is a gravity drain and must run at a downward slope from the fitting. It would only be used in the event of a malfunction in the system.

Turning on Water

1. With all plumbing connections made, make sure the bypass is in the “bypass” position (*see figure 3*). Slowly turn on the water supply valve until lines are pressurized. At a nearby faucet, turn on cold water and let it run for 2 - 3 minutes to flush debris (solder, pipe tape, glue, etc.) from the plumbing. Check for water leaks. If any leaks are found, repair them immediately before proceeding. 2. After confirming no leaks exist, proceed to start up instructions on page 20.

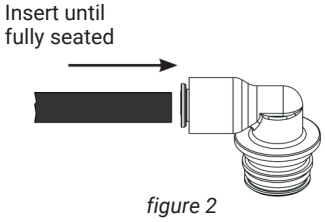
CAUTION

Make sure all plumbing connections are completed before turning on water. Check for and repair any leaks before proceeding with start up of system.



Drain Fitting

figure 1



Brine Fitting

figure 2

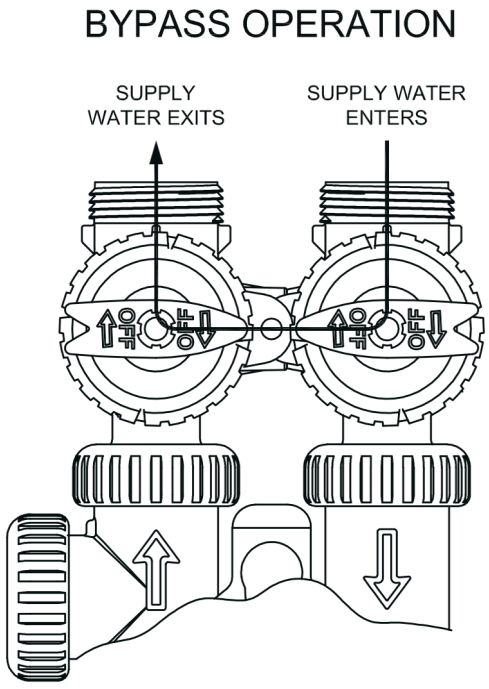
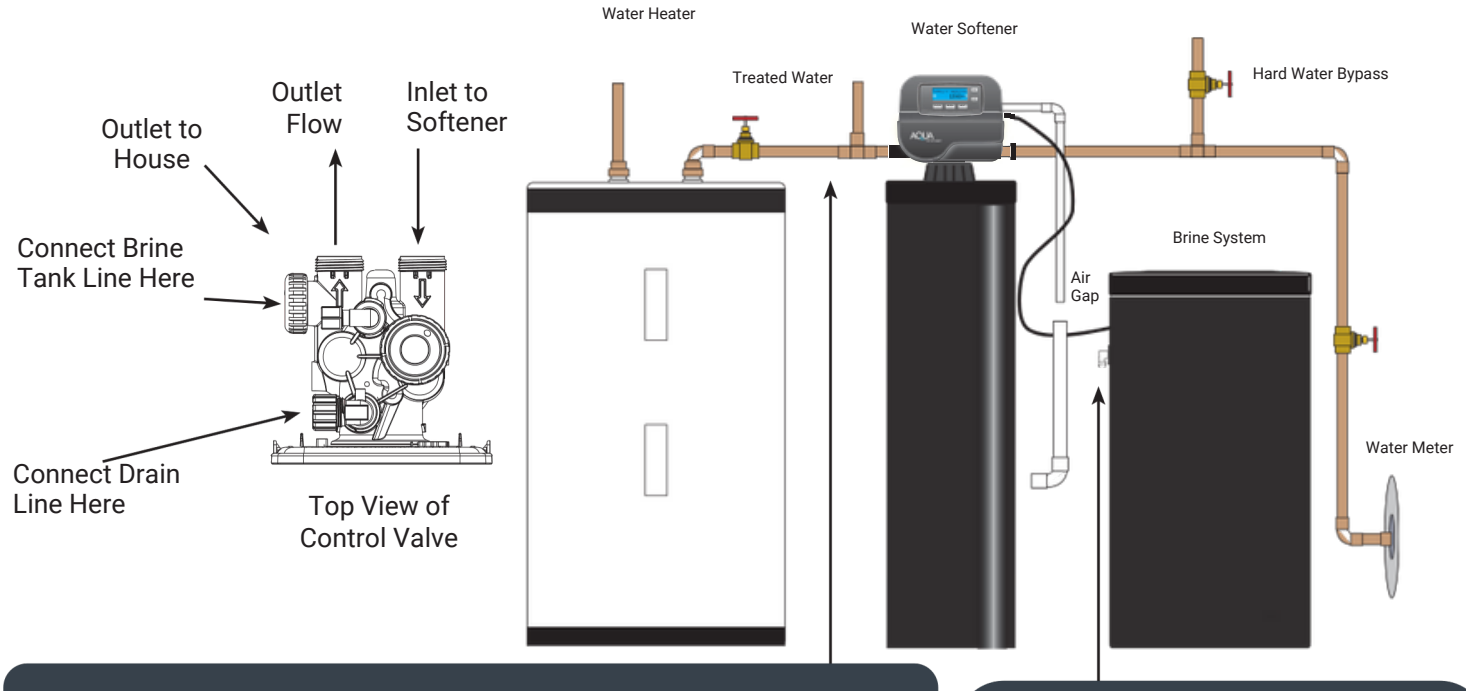


figure 3

Single Tank Water Softening System

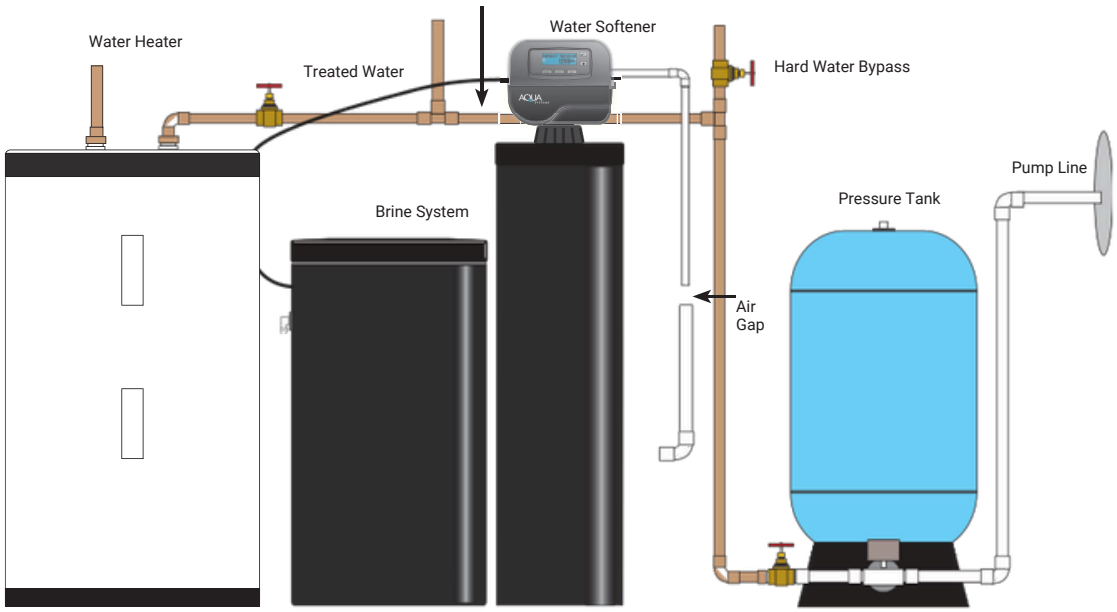
City Water Installation



NOTE
Minimum of 12 feet of line between softener and water heater. If this is not possible you will need to install a check valve and a hot water expansion tank between the unit and the water heater.

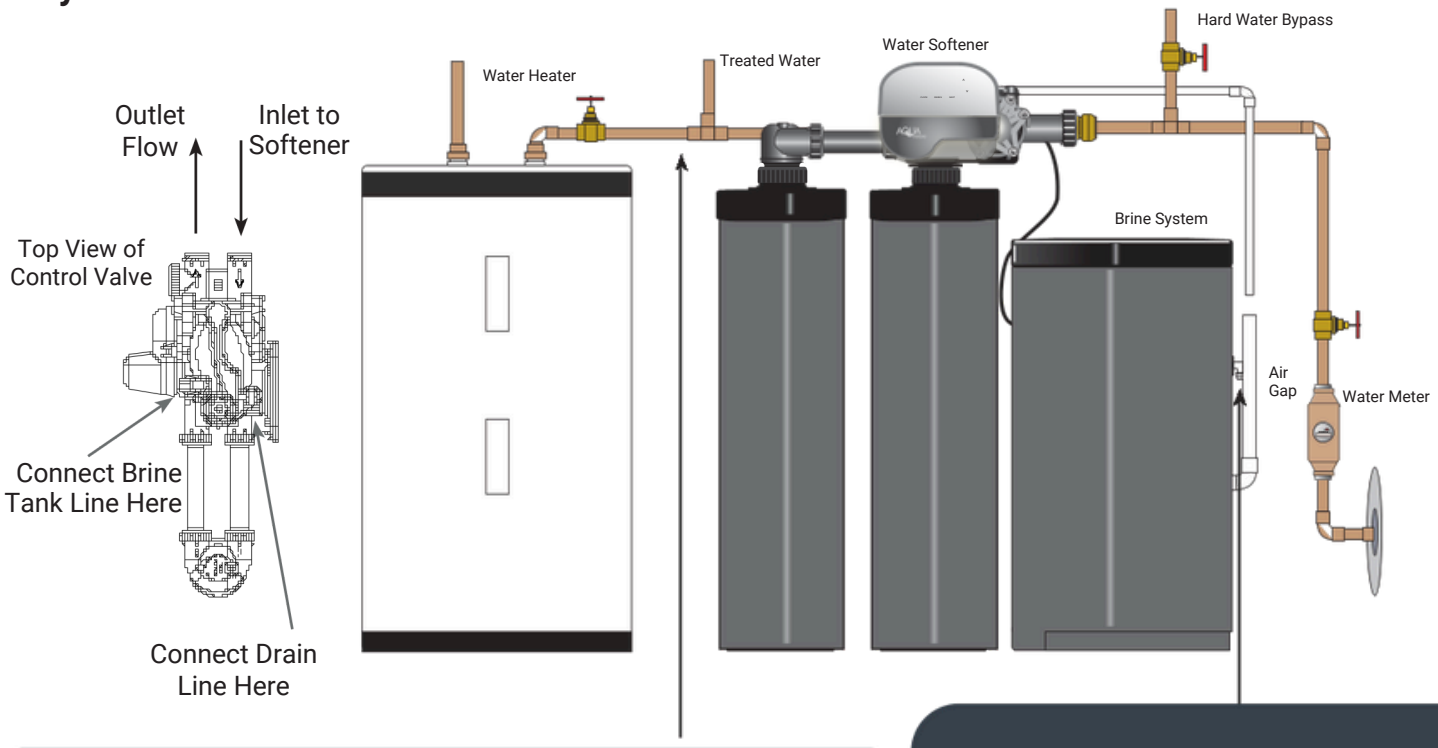
NOTE
Overflow gravity drain - Connect hose and run to floor drain or through floor to crawl space. This is used only in the event of a malfunction.

Well Water Installation



Twin Tank Water Softening System

City Water Installation



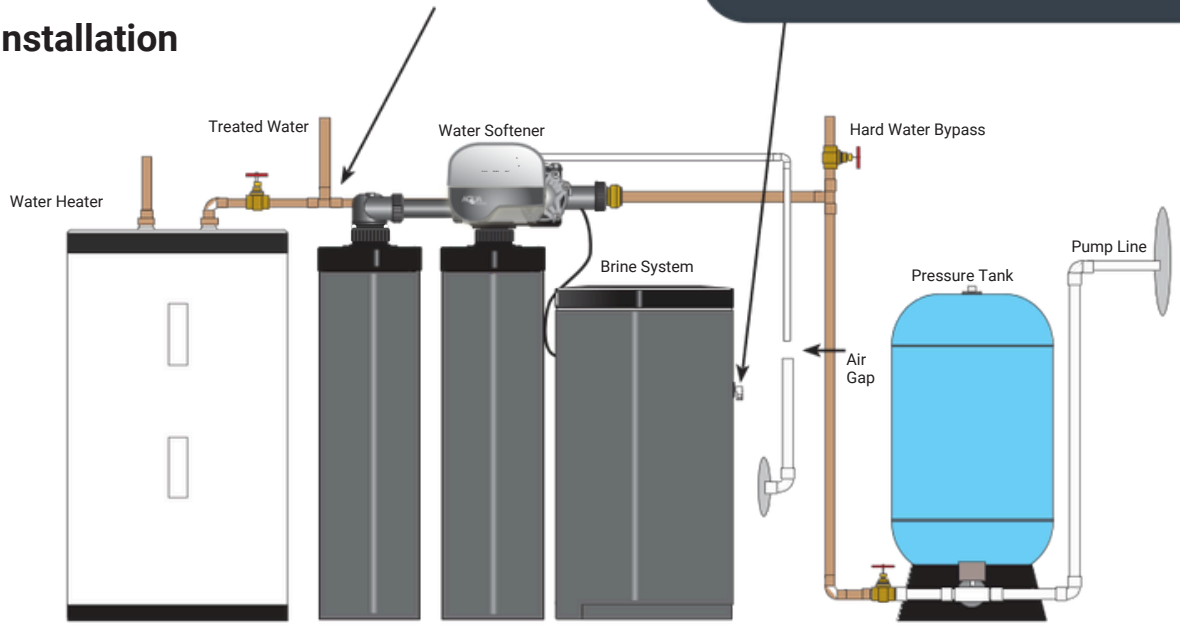
NOTE

Minimum of 12 feet of line between softener and water heater. If this is not possible you will need to install a check valve and a hot water expansion tank between the unit and the water heater.

NOTE

Overflow gravity drain - Connect hose and run to floor drain or through floor to crawl space. This is used only in the event of a malfunction.

Well Water Installation



Start Up

Put Unit into Service

1. Add 4” to 6” of water to the brine (if there is no salt shelf which is normal). Add 6” of water to the brine tank if tank has a salt shelf, about 1” above shelf.

2. Plug the transformer into a 110 volt receptacle. The control will place itself in the ”Softening” (or “Filtering”) mode and flash 12:00 on the display.

3. Set the current time of day. *(see page 21)*

4. Push and hold “Regen” button for 3 seconds to advance valve into a regen. On prefill units the first cycle will be “Fill”. Press “Regen” button a second time, the second cycle will be “Softening” (this is the pause cycle to give the unit time for the water to dissolve salt to make brine). Press “Regen” button a third time, the third cycle will be “Backwash”.

5. Once unit is in the Backwash cycle, slowly open inlet valve on the bypass valve to purge all air from the unit. Once air is purged, fully open inlet valve on the bypass valve and check for leaks. Check that the drain is able to handle regeneration water flow.

NOTE

Make sure that the electrical outlet used is an uninterrupted outlet (such as outlet that is operated by a switch).

All electrical connections must be connected according to local codes. When pushing the “REGEN” button to advance cycles, let the control reach the next cycle before pushing the “REGEN” button again.

6. Water will run to the drain. Let it run 5 minutes or until the the water to drain is clear. If filter, skip steps 9-11.

7. Push “ REGEN” button and release. The control will advance to the “BRINE” position. Let cycle run for minute to confirm the control is drawing (has a suction at the brine elbow).

8. Push “ REGEN” button and release. *(see note)* The control will advance to the next cycle. Advance through cycles using the “REGEN” button until the control reaches the service (“SOFTENING”) position.

9. When the control has reached the service position, fill the brine tank with salt. Open the outlet handle on bypass *(see page 15, figure 1)*.

10. Let cold faucet run for 2-3 minutes then test for soft water.

11. Proceed to the Programming instructions. After programming, the system should be disinfected.

To Disinfect the System

The materials of construction ofthe modern water conditioner will not promote bacterial growth, nor will these materials contaminate a water supply. However, the normal conditions that exist during shipment, storage and installation make it advisable to disinfect a conditionerafter installation, before the conditioner is used to treat potable water. In addition, during normal use, a conditioner may become fouled with organic matter, or in some cases, with bacteria from the water supply. Therefore every conditioner shouldbe disinfected after installation, some will require periodic disinfection during their normal life.

1. Add 1.2 fluid ounce of 5.25% sodium hypochlorite solution (household bleach; Clorox, Bo Peep, etc.) for each cubic foot of resin to the brine well of the brine tank. (the 4” tube with a cap on it inside of the brine tank)

2. Press “REGEN” for 3 seconds to start a normal regeneration. Allow the system to complete the regeneration.

Programming

Set Time of Day

Return to
Normal Operation

1. Press “SET CLOCK”
2. Current Time (hour): Set the hour of the day using “Up” or “Down” buttons. AM/PM toggles after 12. Press “NEXT” to go to step 3.
3. Current Time (minutes): Set the minutes of the day using “Up” or “Down” buttons. Press “NEXT” to exit Set Clock. Press “REGEN” to return to previous step.

NOTE

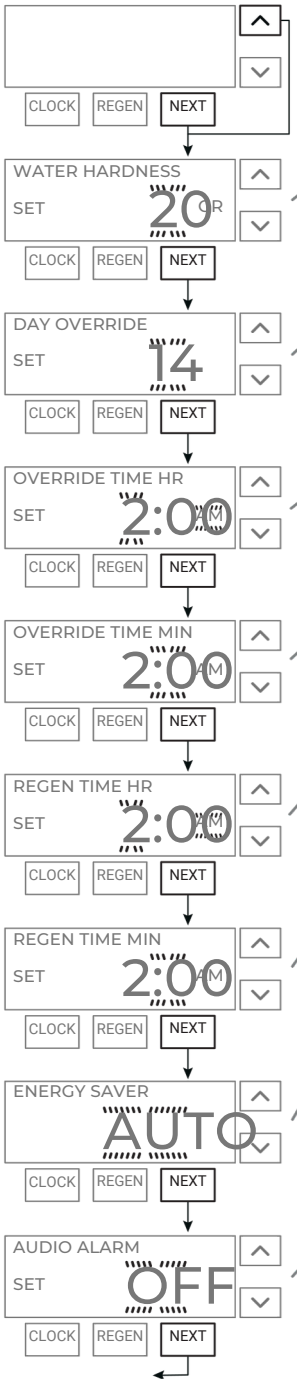
If the power goes out, the current time will remain correct as long as battery has sufficient charge (up to 2 years). If the battery expires, the screen will state “Low Battery”. The battery should be replaced and the time reset. All other programming will be retained.

Displayed when battery voltage is low. Display alternates with previously selected display.

ENERGY SAVER FEATURE WITH ENHANCED ELECTRONICS

The Energy Saver function manages the display backlight in the SmartChoice™ Elite control. An option is available on the enhanced circuit boards. The option is Energy Saver / AUTO. This feature combines the benefit of the Energy Saver, that turns the backlight off when buttons are not in use, but it will activate the backlight when a User Alert Screen is triggered. Red Screen User Alerts, which include Salt Monitoring, Service Alarm and Error Screens will activate the Display light, and keep it on until the Alert condition is cleared.

Installer Displays/Settings



Return to
Normal Operation

1. Press “NEXT” and “Up” simultaneously for 3 seconds.

2. Hardness: Set the amount of hardness in grains per gallon of hardness. Use the “Total Compensated Hardness” number from page 13. Use the “Up” and “Down” buttons to set the hardness number. Press “NEXT” to go to the next step.

3. Day Override: Maximum allowable days between regenerations. Can be set to “OFF” to regenerate based only on gallons used. If a number is set (1-28), regeneration is based on gallons unless the specified number of days is reached. The system then regenerates at the programmed time and the gallon capacity is reset. Press “NEXT” to go to the next step.

4. Day Override Regeneration Time (hour): Set the hour of day for regeneration using the “Up” or “Down” buttons. Press “NEXT” to set minutes. Not shown if Day Override is set to “OFF”.

5. Day Override Regeneration Time (minutes): Set the minutes of day for regeneration using the “Up” or “Down” buttons. Press “NEXT” to set REGEN time. Not shown if Day Override is set to “OFF”.

6. Regeneration Time (hour): Set the hour of day for regeneration using the “Up” or “Down” buttons. Press “NEXT” to set minutes.

7. Regeneration Time (minutes): Set the minutes of day for regeneration using the “Up” or “Down” buttons. Press “NEXT” to set energy saver.

8. Energy Saver: Use the “Up” or “Down” buttons to activate or cancel the energy saver. The default is set to “AUTO”.

   “OFF” = Backlight always on.

   “ON” = Backlight off after 5 minutes of inactivity.

   “AUTO” = Like “ON” except will automatically turn on backlight for alert screens. Press “NEXT” to set audio alarm.

9. Audio Alarm: use “up” or “down” buttons set to “off”, *Contact your local dealer if “on” is selected for proper programming and operation.

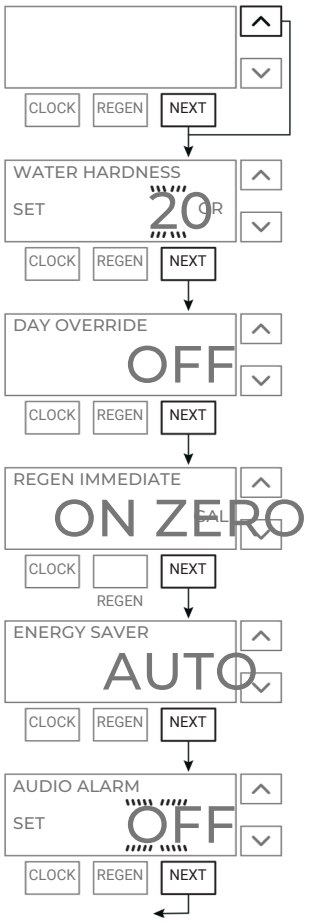
10. Press “NEXT” to exit program and return to normal operation.

AUTO

Energy Saver / AUTO will turn the display backlight off after 5 minutes of no button activity. Display backlight will turn on with the first push of any button. Other functions of that button will be ignored on the first push. Display backlight will turn on with the activation of any User Alert Screen.

This is the default setting

Installer Displays/Settings



1. Press “NEXT” and “Up” simultaneously for 3 seconds. Hardness: Set the amount of hardness in
2. grains per gallon of hardness. Use the “Total Compensated Hardness” number from page 13. Use the “Up” and “Down” buttons to set the hardness number. Press “NEXT” to go to the next step.
3. Day Override: Is set to “OFF” since the Twin regenerates immediately when needed.

NOTE

To initiate a manual regeneration immediately, press and hold the “REGEN” button for three seconds until the system starts the regen cycle. For a manual regeneration at the normal scheduled time, push and release the “REGEN” button once. “REGEN TODAY” will alternate with the current screen display.

4. Regeneration Time: The iTwin control is set to Immediate Regeneration when the gallons remaining hits zero gallons. The system switches to the other tank for conditioned water before the first tank starts the regenration cycle. This is how 24 hour soft water availability is achieved.
5. Energy Saver: This setting is set to “AUTO” by default. This saves energy by turning off the backlit screen after 5 minutes of inactivety except during a Red Screen which is displaying an alert for attention needed.
6. Audio Alarm: use “up” or “down” buttons set to “off”, *Contact your local dealer if “on” is selected for proper programming and operation.

   Press “NEXT” to exit program and return to normal operation.

Return to Normal Operation

AUTO

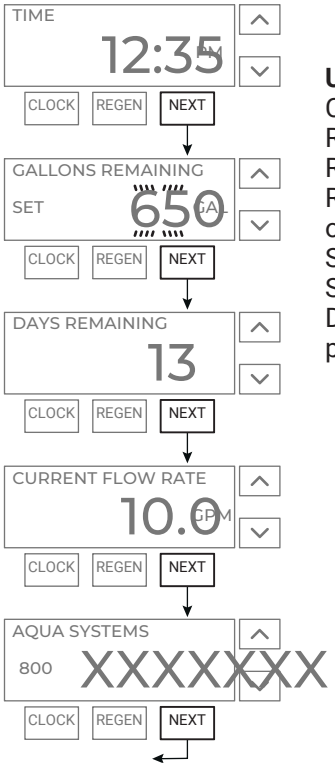
Energy Saver / AUTO will turn the display backlight off after 5 minutes of no button activity. Display backlight will turn on with the first push of any button. Other functions of that button will be ignored on the first push. Display backlight will turn on with the activation of any User Alert Screen. ***This is the default setting***

Programming

User Displays/Settings

Blue Screen = Softener
Green Screen = Filter
Red Screen = Error or Alert

"/" Will appear to rotate whenever flow is detected.



User 1 Time of Day Screen **User 2** Capacity Remaining Screen Flashes once Reserve Capacity is reached **User 3** Days Remaining Screen - Days until next REGEN if Volume not Used (if day override is set) **User 4** Current Flow Rate Screen - Displays Water Flow through System **User 5** Contact Screen - Displays Dealer Name and Phone Number (If programmed)

User screens will continuously scroll, switching views every 10 seconds. If the screens are manually scrolled by pushing the "NEXT" button, the screen will remain constant for 5 minutes then continue to scroll. * Error and Alert screens will take precedence over the normal scrolling.

Return to User 1

Regeneration Mode

1. Typically a systemis 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.
2. 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.

3. Sometimes there is a need to regenerate the system, sooner than 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.
4. To initiate a manual regeneration immediately, press and hold the "REGEN" button for three seconds until the system starts the REGEN. To initiate a regeneration at the normal scheduled time, push and release the "REGEN" button. The display will alternate from the current screen to "REGEN TODAY".

Removing the Control Valve from the Media Tank

1. Turn Bypass to the “Bypass” Position. *(see diagram on page 15, figure 2)*
2. Push REGEN button for 3 seconds to engage cycle - this will relieve the pressure in the system. *(see note at right)*
3. Once water has stopped running through the drain line, the pressure has been relieved off of the system.
4. Once the pressure is relieved, remove the drain line from the control by pulling the lock clip. *(see figure 1)*
5. Next, remove the brine line that is connected to the salt tank by pulling the lock clip. *(see figure 1)*

NOTE

Make sure the valve moves to the “Backwash” cycle - Look at the message on the digital display. If “Backwash” is not the first cycle on your system, wait until the control stops at the first cycle. Then press the REGEN button again and wait for the valve to complete changing to the next cycle. Repeat this until you see “Backwash” designated on the display. Once you have engaged the backwash cycle, unplug the system from the electrical outlet.

Make sure that the water pipes are supported when the system has been pulled off of the connection fittings.

Have a towel handy to absorb any water that spills during this service.

Normal Threads - Facing the unit from the front, loosen the base nut by turning from left to right.

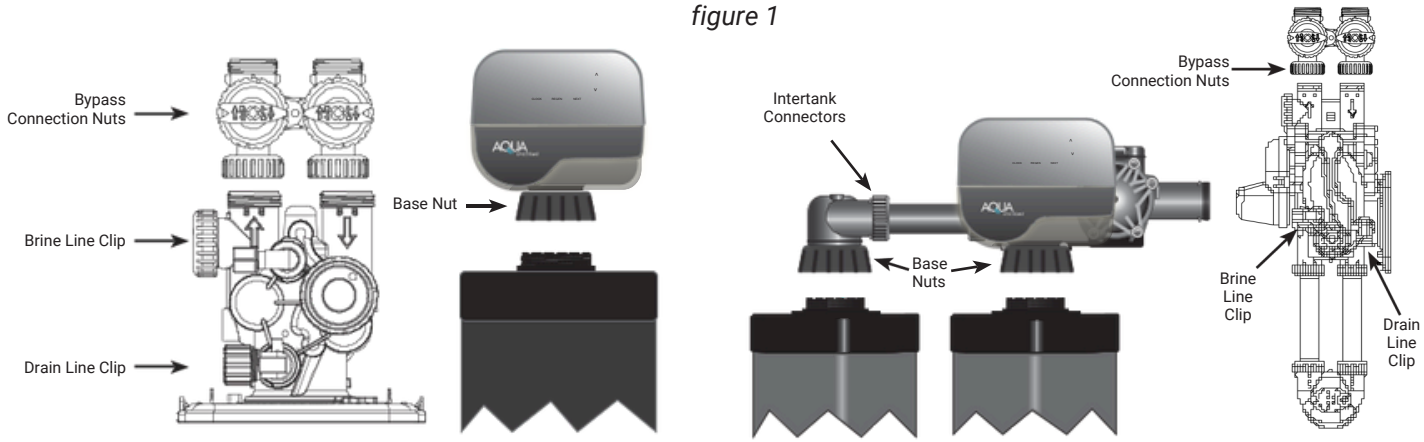
Single Tank Water Softening System:

6. Loosen the connection nuts between the valve and the bypass. *(see figure 1).*
7. Once the nuts are loose you may pull the system away from the plumbing. *(see note at right)*
8. With the system off of the plumbing, you can loosen the base nut to remove the valve from the media tank. *(see figure 1)*

Twin Tank Water Softening System:

6. Loosen the connection nuts between the valve and the bypass. *(see figure 1).*
7. Remove intertank connectors *(see figure 1)*
8. Once the nuts are loose you may pull the system away from the plumbing. *(see note)*
9. With the system off of the plumbing, you can loosen the base nuts to remove the valve and 2nd tank flow adapter from the media tanks. *(see figure 1)*

figure 1



Re-installing a replacement Control Valve

1. Place the control valve over the base connection, insert the connection fitting into the base. *(see page 25 figure 1)*
2. Thread the base nut on to the base adapter - do not tighten more than hand tight.
3. Once the control valve is mounted on the media tank, move the system to align with the pipe connections.
4. Slide the system onto the pipe connections at the bypass valve.
5. Thread the connection nuts onto the valve threads - clockwise thread direction.
6. Do not over tighten, these connections have an O-Ring seal, Hand Tight Only.
7. Insert Brine Line into its position and install the lock clip. *(see page 25 figure 1)*
8. Insert the Drain line into its position and install the lock clip. *(see page 25 figure 1)*
9. Plug unit into the electrical outlet.
10. Press “Next” and “REGEN” buttons to reset control.
11. Set clock to current time of day. *(see page 21)*
12. Carefully turn water on to the system, open just the inlet valve handle on the bypass. *(see figure 3)*
13. Examine all connections to ensure that there is a 100% seal with No Water Leaks.
14. Press “REGEN” for 3 seconds to start a regeneration.
15. Let the system finish a complete regeneration.
16. Open the second valve handle (outlet) on the bypass. *(see figure 3)*

CAUTION

Tighten base and connection nut fittings **Hand Tight** only.

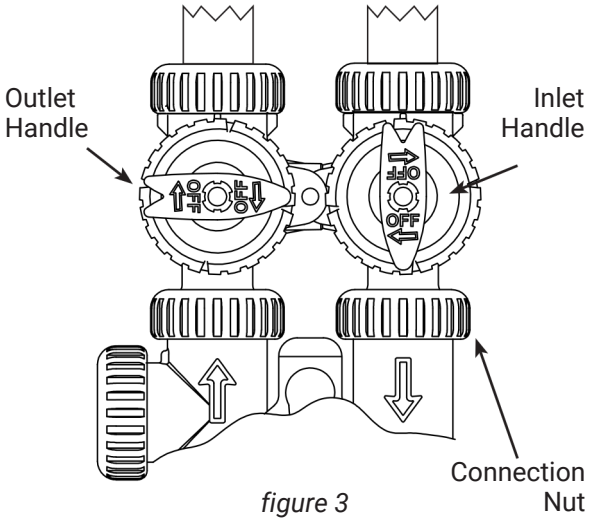
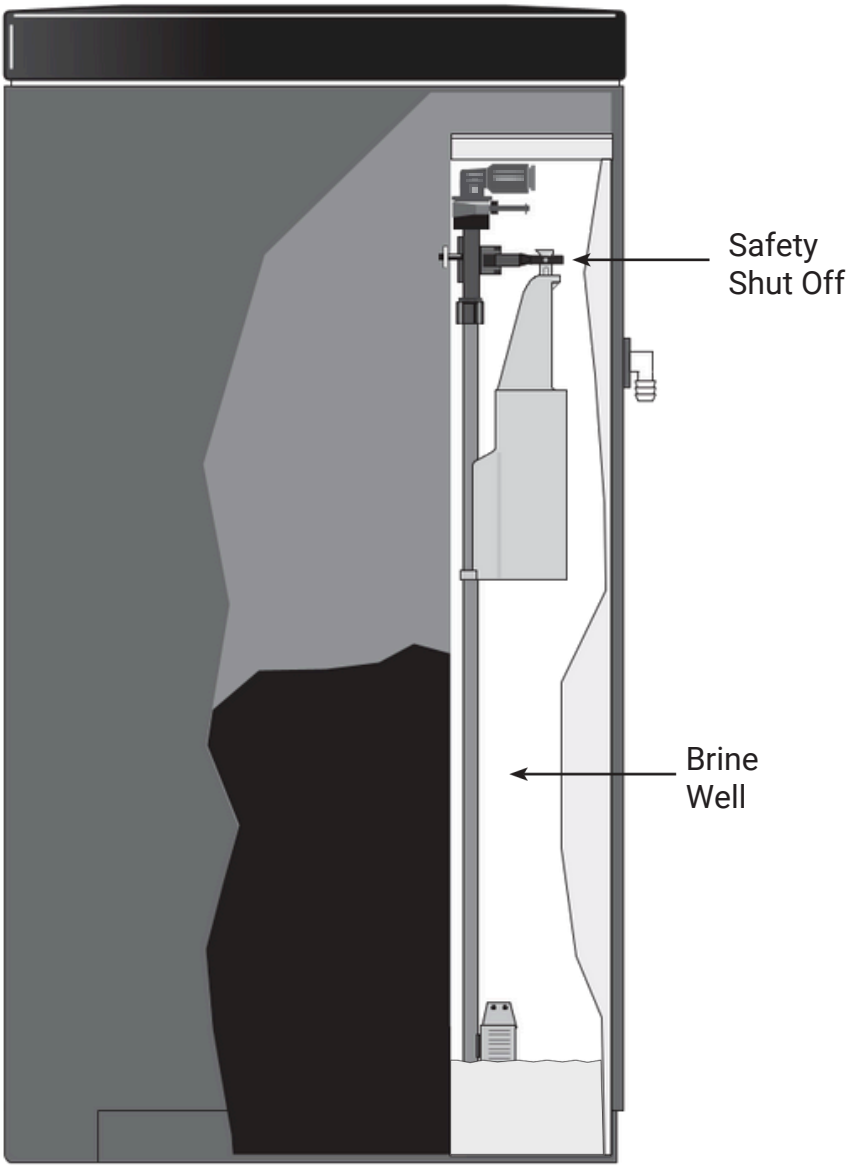


figure 3

NOTE

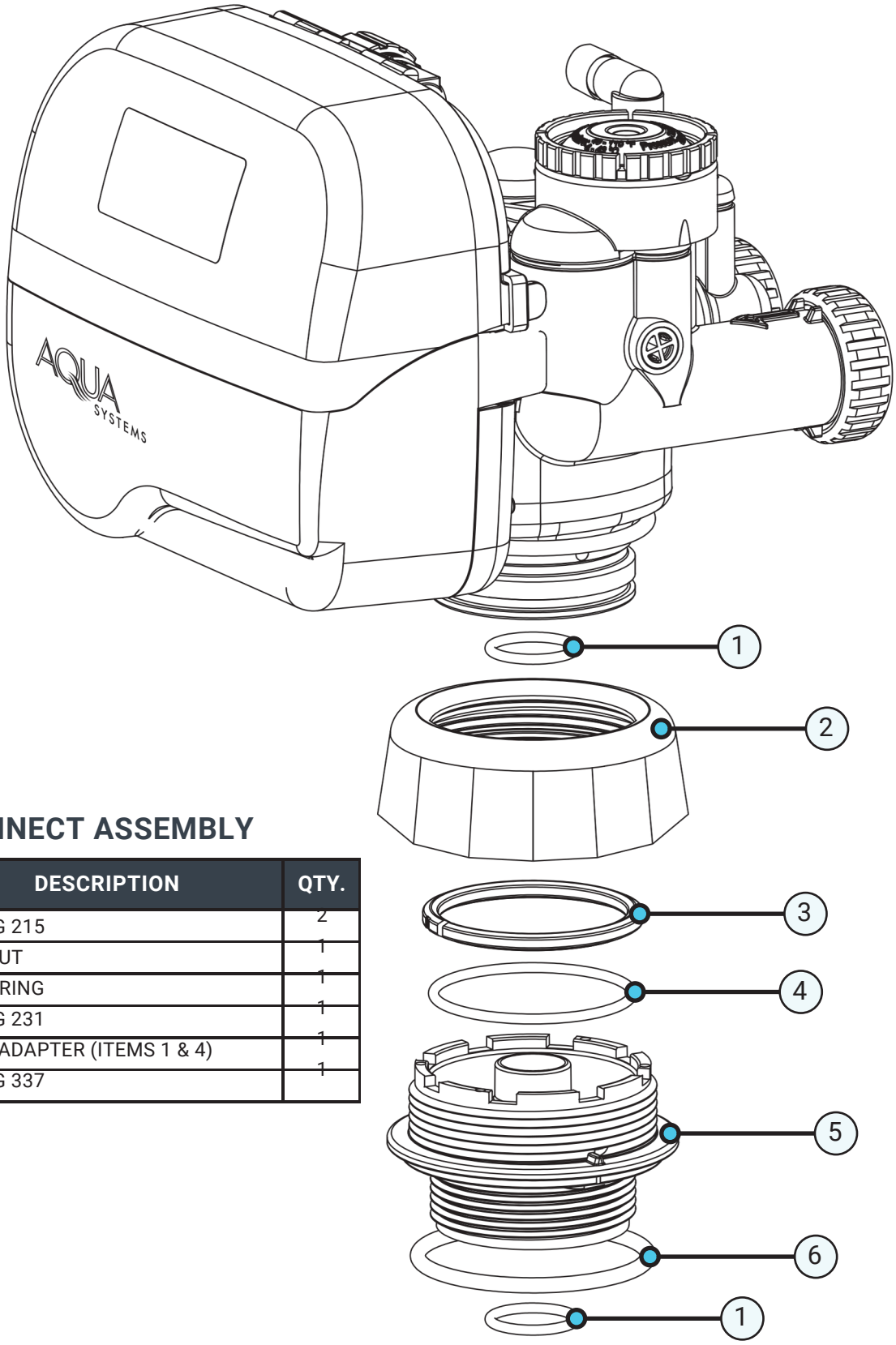
When turning water back on, if there are any leaks detected, immediately turn off the water, loosen the leaky fitting or fittings, check o-rings - clean and reseat, and re-connect fittings. Turn on water and make sure there are no leaks before continuing return to service.

Cleaning the Brine Tank



1. Remove the brine tank cover.
2. Scoop out as much old salt as possible.
3. Disconnect brine tubing from safety brine valve at brine well.
4. Remove safety brine valve from brine well.
5. Place a hand in brine well to hold overflow nut and remove two piece overflow.
6. Remove brine well from the brine tank.
7. Remove any remaining salt and impurities from brine tank.
8. Using clean water and a brush or rag, wipe and rinse inside of brine tank. Also wipe and rinse the grid plate and brine well.
9. Reassemble brine tank reversing steps 3 - 6.
10. Put brine tank in place making sure there is no debris or foreign material beneath it.
11. Reconnect brine tubing to safety brine valve.
12. Add water to the brine tank to a level of 4” to 6”
13. Add new salt. Do not use any of the old salt that came out of the brine tank.
14. Follow the disinfection instructions listed on page 20.
15. Put on brine tank cover.

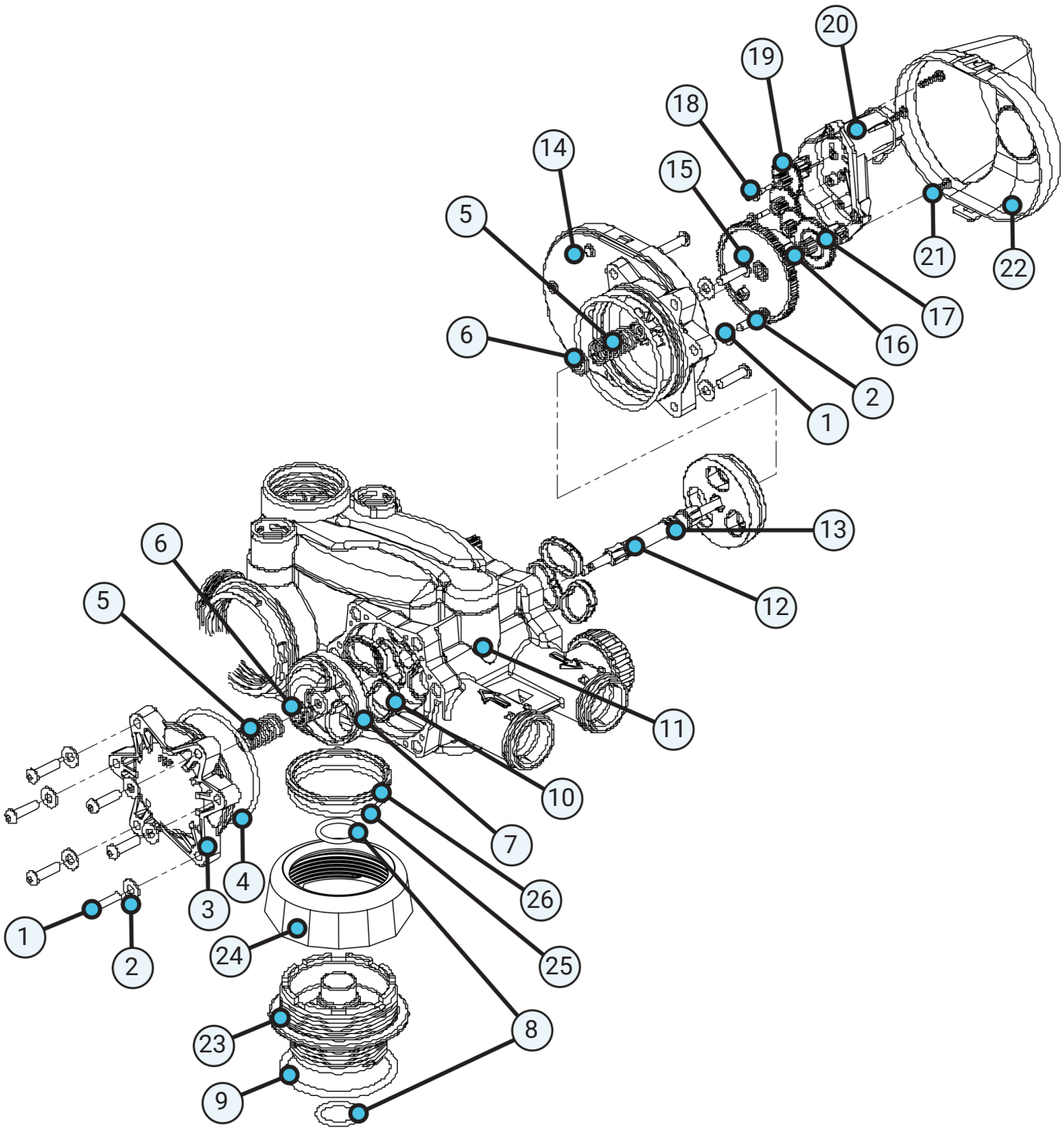
Parts Diagrams



QUICK CONNECT ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY.
1	V3105	O-RING 215	2
2	V4515	HEX NUT	1
3	V3313	SPLIT RING	1
4	V3315	O-RING 231	1
5	V3012	TANK ADAPTER (ITEMS 1 & 4)	1
6	V3180	O-RING 337	1

Twin Tank Water Softening System



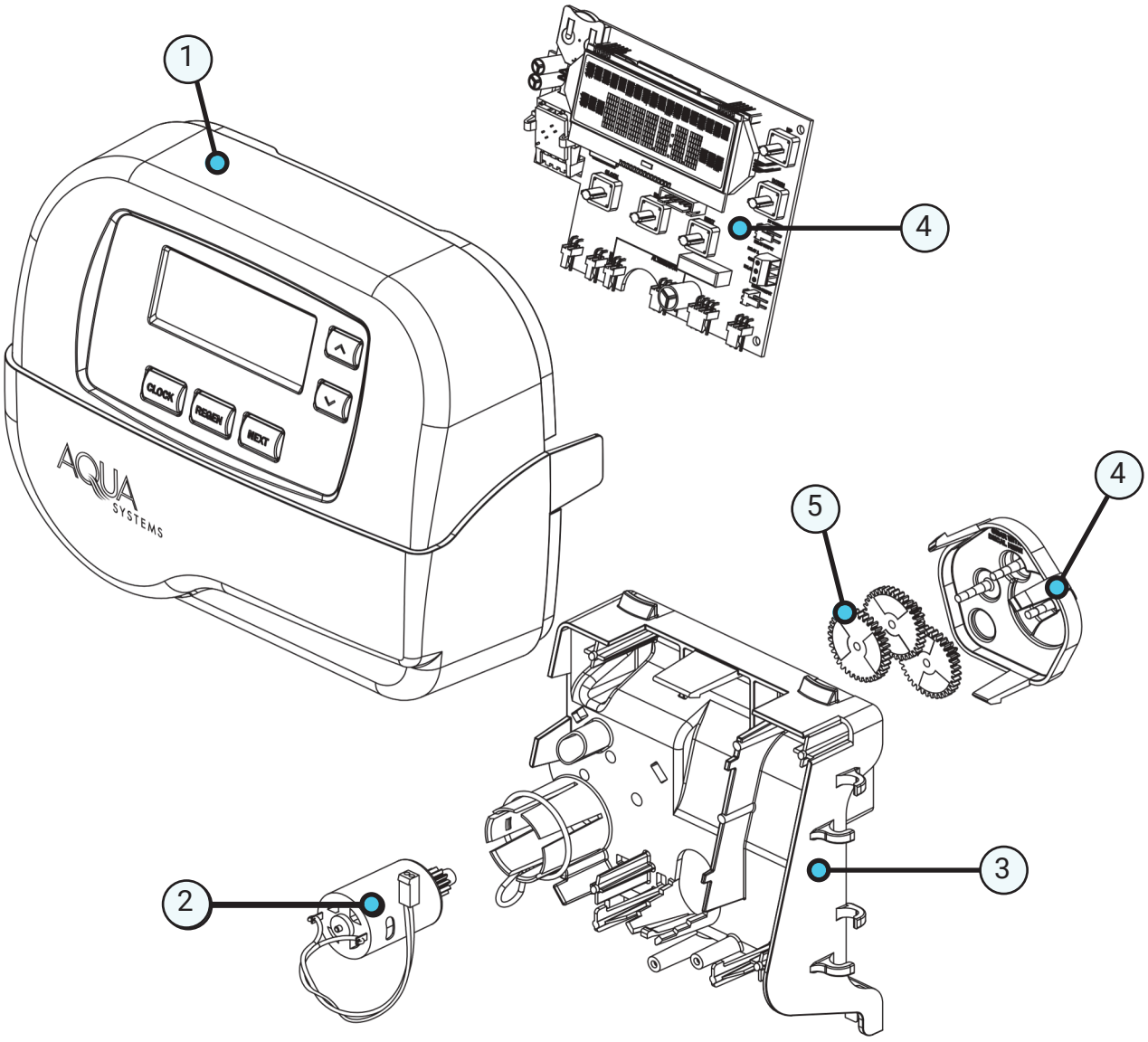
VALVE BODY ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY.
1	V3470	SCREW BHC 1/4-20 X 1 SS	12
2	V3724	WASHER FLAT SS 1/4	12
3	V4005-01	T1 TRANSFER CAP ASSY	1
4	V4029	O-RING 236	2
5	V4015	T1 TRANSFER SPRING	2
6	V4014	T1 TRANSFER SPRING SUPPORT	2
7	V4036	T1 ROTOR DISK ASSY	2
8	V3105	O-RING 215 (DISTRIBUTOR TUBE)	4
9	V3180	O-RING 337	1
10	V4016	T1 TRANSFER SEAL	6
11	V3031-AS	T1 BODY SFT WTR REGEN	1
12	V4023	T1 TRANSFER DRIVE SHAFT ASSY	1
13	V3287	O-RING 110	2
14	V4006-01	T1 TRANSFER DRIVE CAP ASSY	1
15	V4011-01	T1 TRANSFER DRIVE GEAR ASSY	1
16	V4012	T1 TRANSFER DRIVE GEAR AXLE	1
17	V4013	T1 TRANSFER REDUCTION GEAR	1
18	V3264	WS2H BYPASS REDUCTION GEARAXLE	3
19	V3110	WS1 DRIVE REDUCING GEAR 12X36	3
20	V3262-01	WS1.5&2ALT/2BY REDUCGEARCVRASSY	1
21	V3592	SCREW #8-1 PHPN T-25 SS	3
22	V4049	T1 COVER ASSEMBLY	1
23	V3012	TANK ADAPTER	2
24	V4515	HEX NUT	2
25	V3315	O-RING 231	2
26	V3313	SPLIT RING	2
NOT SHOWN	V4043	T1 TRANSFER MOTOR ASSY	1
NOT SHOWN	V3151	WS1 NUT 1 QC	1
NOT SHOWN	V4055	TWIN TANK METER ASSY	1
NOT SHOWN	V4017-01	T1 INTERCONNECT FITTING ASSY	1
NOT SHOWN	D1400-02	1191 IN/OUT HEAD QC	1

Parts Diagrams

FRONT COVER AND DRIVE ASSEMBLY

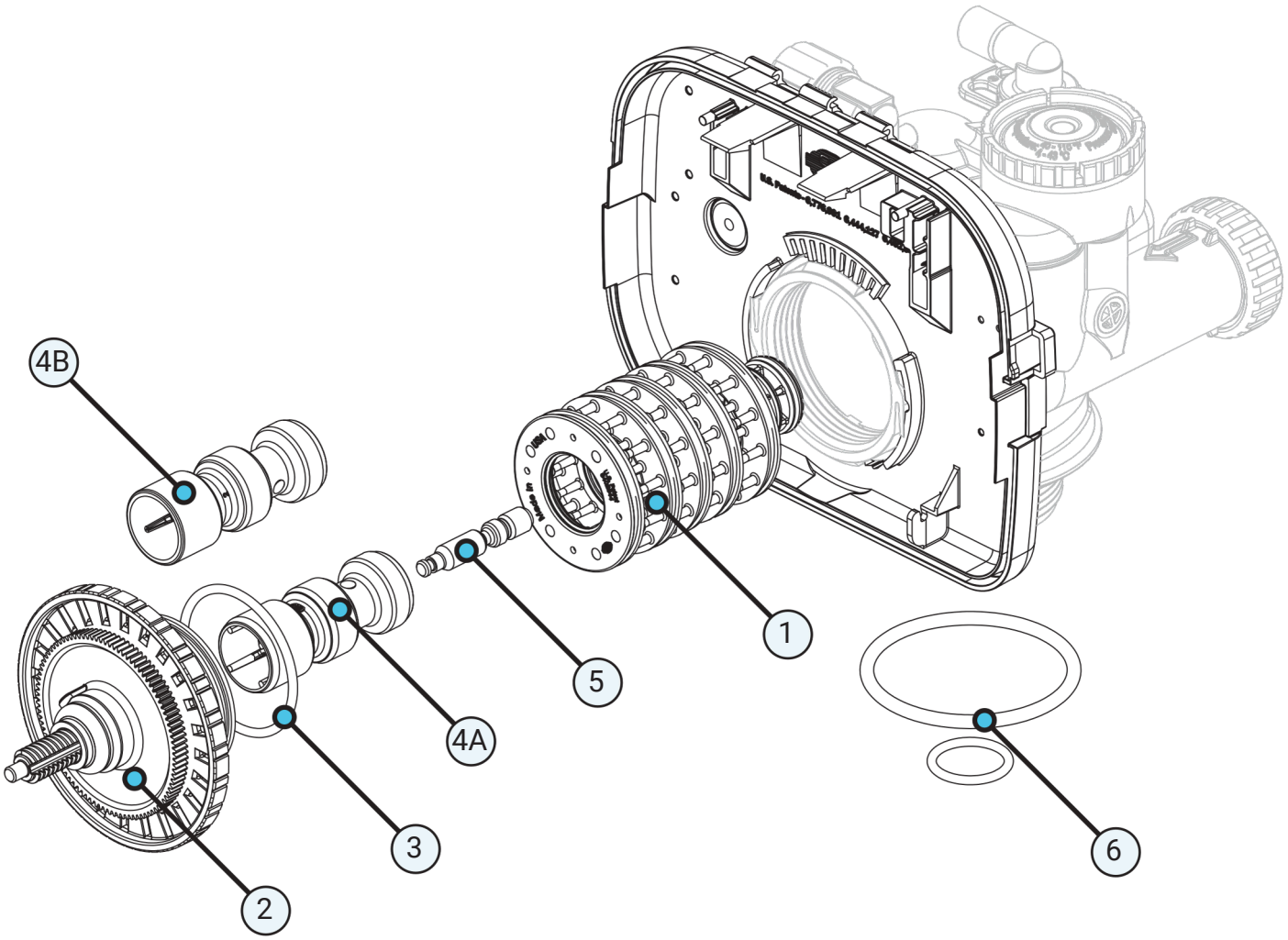
NO.	PART NO.	DESCRIPTION	QTY.
1	V3604-01H	V3604-01H DARK GRAY VALVE COVER ASSY	1
2	V3107-01	MOTOR	1
3	V3002-A	DRIVE BRACKET AND SPRING CLIP	1
4	V4081AW-01BOARD	“AW” PC BOARD	1
5	V3110	DRIVE GEAR 12 X 36	3
6	V3109	DRIVE GEAR COVER	1
NOT SHOWN	V3605	CLEAR DISPLAY COVER	1
NOT SHOWN	V3186-06	TRANSFORMER 110V-12VDC 2013	1



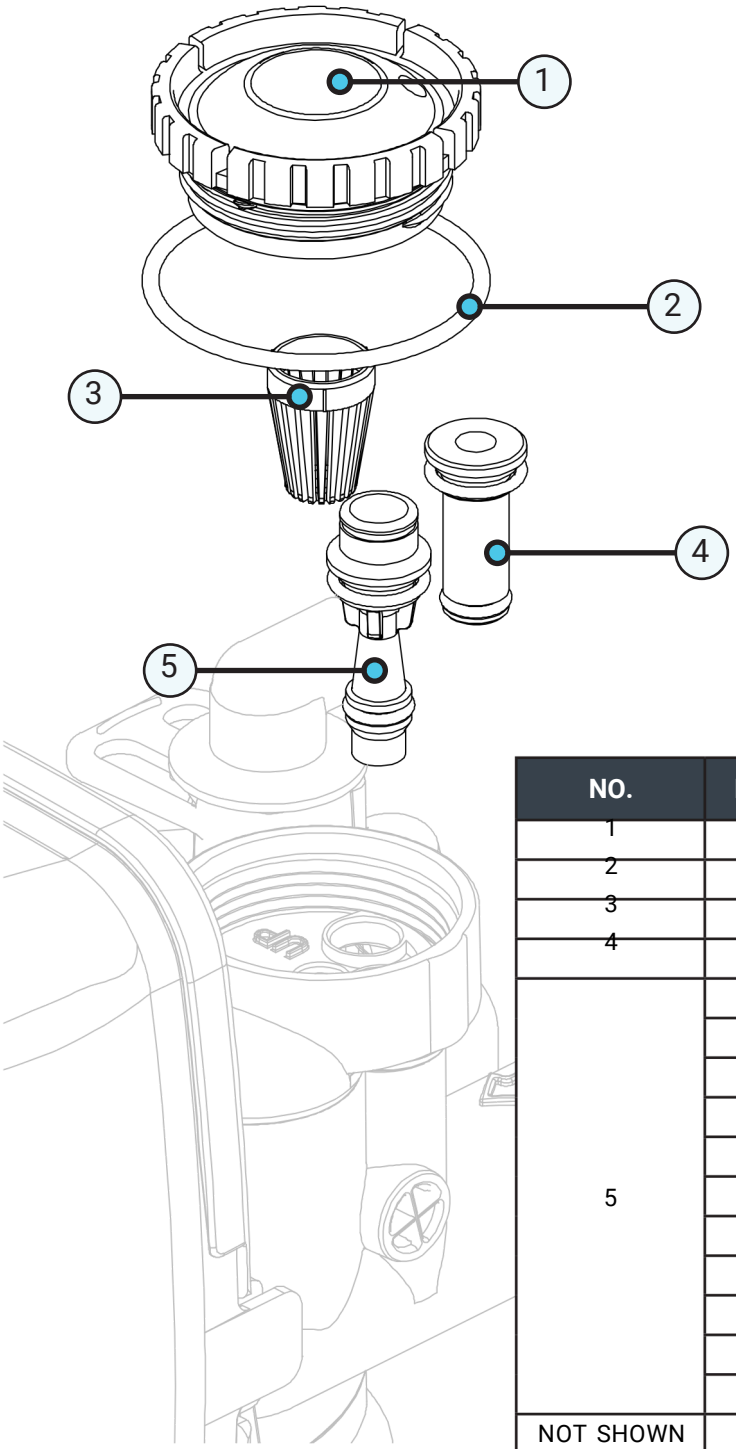
Parts Diagrams

DRIVE CAP ASSEMBLY, PISTON, REGENERANT PISTON, AND SPACER STACK ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY.
1	V 3005-02	SPACER STACK ASSY	1
2	V 3004	DRIVE CAP ASSY	1
3	V 3135	O-RING 228	1
4A	V 3011	PISTON DOWNFLOW ASSY	1
4B	V 3011-01	WS-1 PISTON UPFLOW ASSY	1
5	V 3174	REGENERATE PISTON	1
6	V 3180	O-RING 337	1



Parts Diagrams



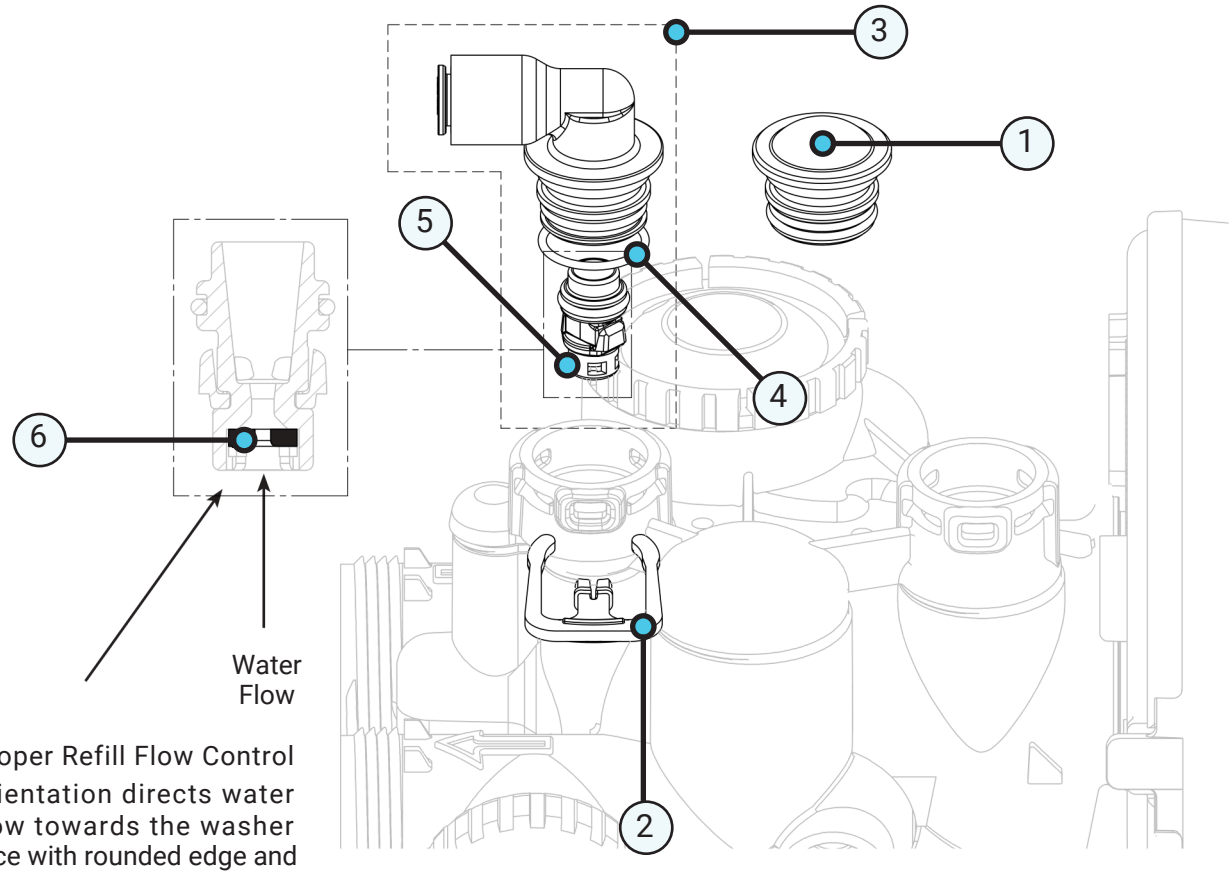
INJECTOR ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY.
1	V3176-01	INJECTOR CAP	1
2	V3152	O-RING 135	1
3	V3177-01	INJECTOR SCREEN	1
4	V3010-1Z	INJECTOR ASSY Z PLUG	1
5	V3010-1A	INJECTOR ASSY A BLACK	1
	V3010-1B	INJECTOR ASSY B BROWN	
	V3010-1C	INJECTOR ASSY C VIOLET	
	V3010-1D	INJECTOR ASSY D RED	
	V3010-1E	INJECTOR ASSY E WHITE	
	V3010-1F	INJECTOR ASSY F BLUE	
	V3010-1G	INJECTOR ASSY G YELLOW	
	V3010-1H	INJECTOR ASSY H GREEN	
	V3010-1I	INJECTOR ASSY I ORANGE	
	V3010-1J	INJECTOR ASSY J LIGHT BLUE	
	V3010-1K	INJECTOR ASSY K LIGHT GREEN	
	V3170	O-RING 11 (INJECTOR)	
NOT SHOWN	V3171	O-RING 13 (INJECTOR)	1
NOT SHOWN			1

Parts Diagrams

REFILL PORT

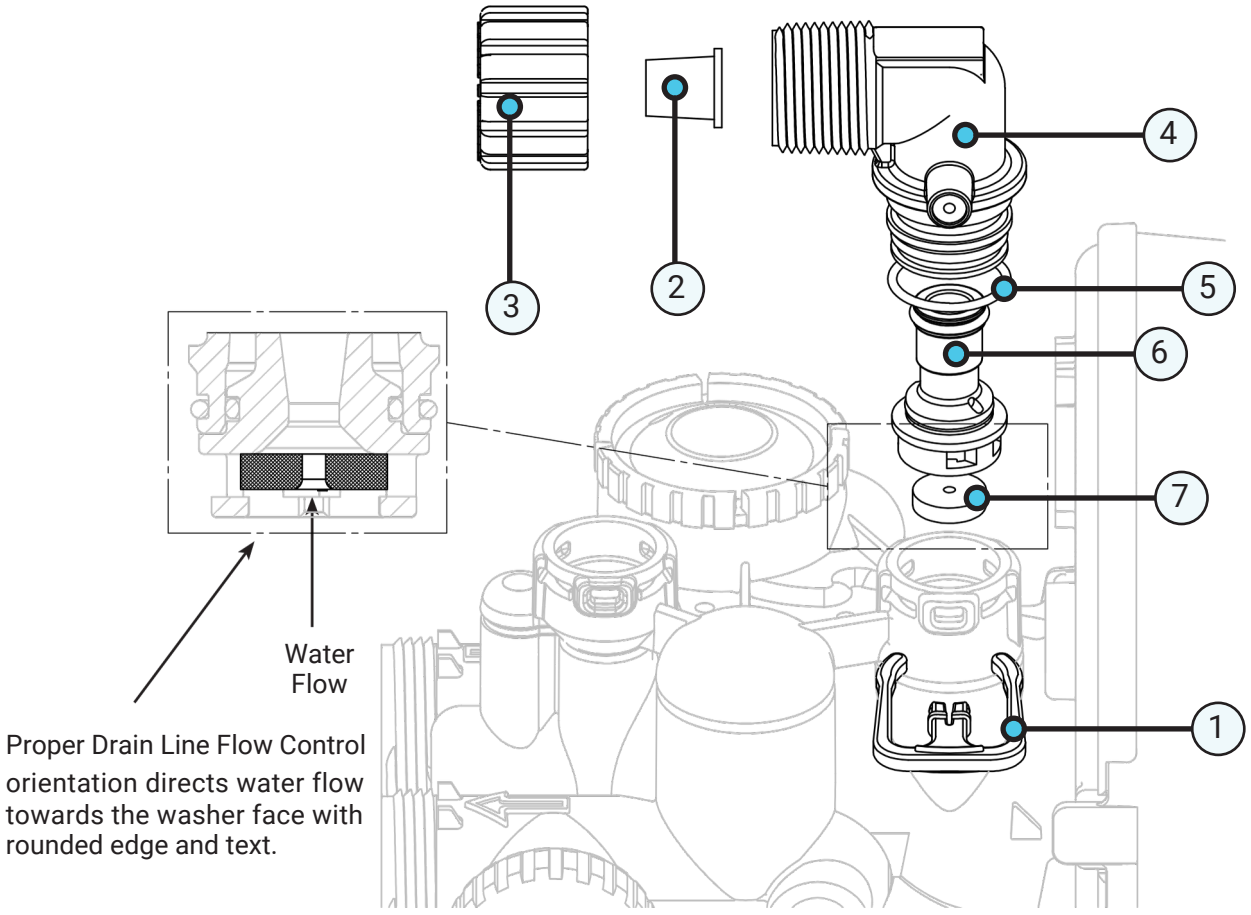
NO.	PART NO.	DESCRIPTION	QTY.
1	V 3195-01	REFILL PORT PLUG ASSY	REQUIRED FOR BACKWASH ONLY SYSTEMS
2	H 4615	ELBOW LOCKING CLIP	1
3	V 4144-01	ELBOW LIQUIFIT ASSY COMPLETE	1
4	V 3163	O-RING 019	1
5	V 3165-01	REFILL FLOW CONTROL RETAINER ASSY	1
6	V 3182	REFILL FLOW CONTROL	1
NOT SHOWN	H 4650	ELBOW 1/2" W/ NUT AND INSERT	OPTION



Proper Refill Flow Control orientation directs water flow towards the washer face with rounded edge and text.

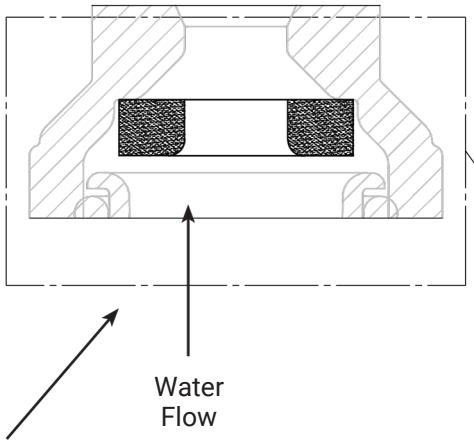
3/4” DRAIN ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY.
1	H 4615	ELBOW LOCKING CLIP	1
2	PKP107S8-BULK	POLYTUBE INSERT 5/8”	1
3	V 3192	NUT 3/4” DRAIN ELBOW	1
4	V 3158-02	DRAIN ELBOW 3/4” MALE ASSY W/O	1
5	V 3163	O-RING 019	1
6	V 3159-01	DLFC RETAINER ASSY	1
7	V 3162-007	DLFC 0.7 GPM FOR 3/4”	ONE DLFC MUST BE USED IF 3/4” FITTING IS USED
	V 3162-010	DLFC 1.0 GPM FOR 3/4”	
	V 3162-013	DLFC 1.3 GPM FOR 3/4”	
	V 3162-017	DLFC 1.7 GPM FOR 3/4”	
	V 3162-022	DLFC 2.2 GPM FOR 3/4”	
	V 3162-027	DLFC 2.7 GPM FOR 3/4”	
	V 3162-032	DLFC 3.2 GPM FOR 3/4”	
	V 3162-042	DLFC 4.2 GPM FOR 3/4”	
	V 3162-053	DLFC 5.3 GPM FOR 3/4”	
	V 3162-065	DLFC 6.5 GPM FOR 3/4”	
	V 3162-075	DLFC 7.5 GPM FOR 3/4”	
	V 3162-090	DLFC 9.0 GPM FOR 3/4”	
	V 3162-100	DLFC 10.0 GPM FOR 3/4”	

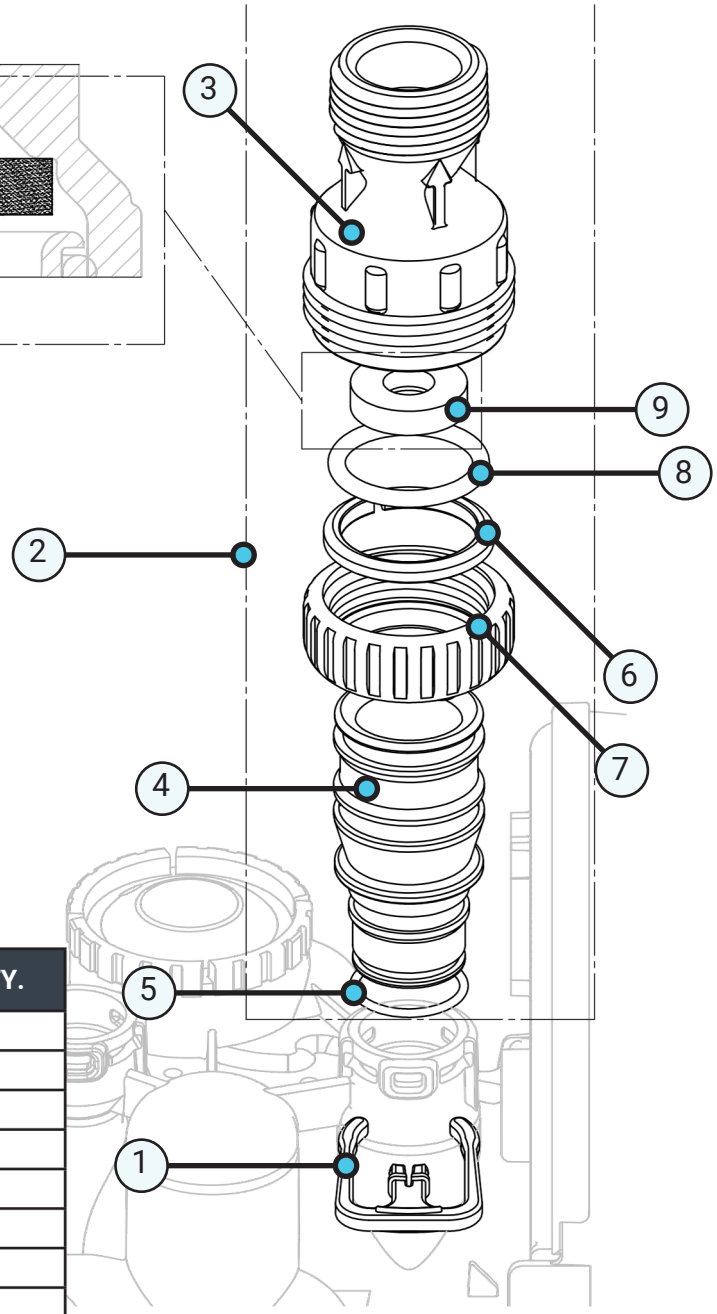


Proper Drain Line Flow Control orientation directs water flow towards the washer face with rounded edge and text.

Parts Diagrams



Proper Drain Line Flow Control orientation directs water flow towards the washer face with rounded edge and text.



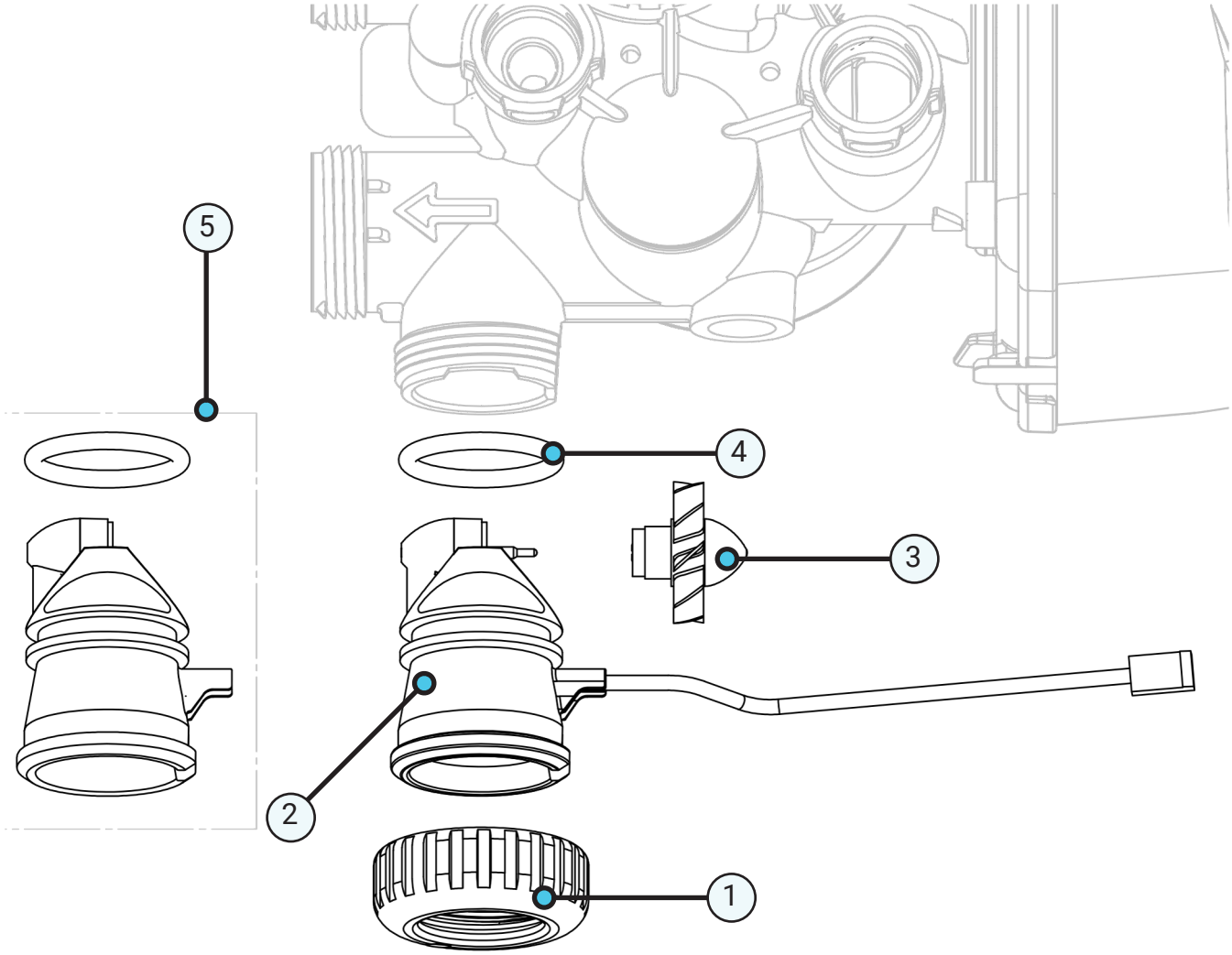
DRAIN ASSEMBLY 1”

NO.	PART NO.	DESCRIPTION	QTY.
1	H4615	ELBOW LOCKING CLIP	1
2	V3008-04	DRAIN FITTING 1” STRAIGHT W/O CV	1
3	V3166	DRAIN FITTING 1” BODY	1
4	V3167	DRAIN FITTING 1” ADAPTER	1
5	V3163	O-RING 019	1
6	V3150	WS1 SPLIT RING	1
7	V3151	NUT 1” QC	1
8	V3105	O-RING 215	1
9	V3190-090	DLFC 9.0 GPM FOR 1”	ONE DLFC MUST BE USED IF 1” FITTING IS USED
	V3190-100	DLFC 10.0 GPM FOR 1”	
	V3190-110	DLFC 11.0 GPM FOR 1”	
	V3190-130	DLFC 13.0 GPM FOR 1”	
	V3190-150	DLFC15.0 GPM FOR 1”	
	V3190-170	DLFC 17.0 GPM FOR 1”	
	V3190-200	DLFC 20.0 GPM FOR 1”	
	V3190-250	DLFC 25.0 GPM FOR 1”	

Parts Diagrams

METER ASSEMBLY

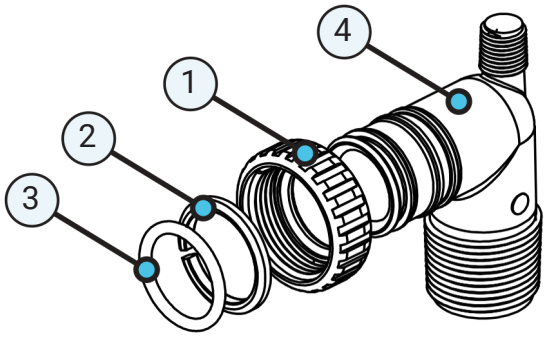
NO.	PART NO.	DESCRIPTION	QTY.
1	V3151	Nut 1” QC	1
2	V3003-05	Meter Assy	1
3	V3118-01	Turbine Assy	1
4	V3105	O-Ring 215	1
5	V3003-01	Meter Plug Assy	1



Parts Diagrams

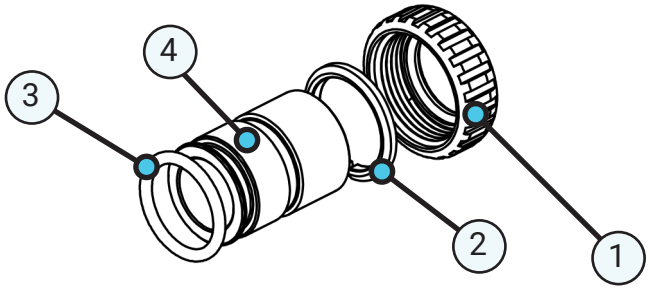
1” PVC MALE NPT ELBOW ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY.
1	V 3151	NUT 1” QUICK CONNECT	2
2	V 3150	WS1 SPLIT RING	2
3	V 3105	O-RING 215	2
4	V 3149	FITTING 1” PVC MALE NPT ELBOW	2



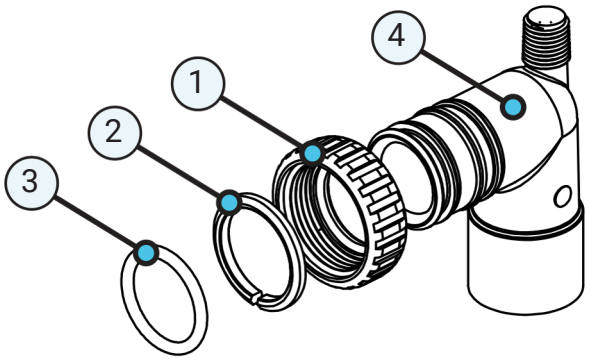
1” BRASS SWEAT ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY.
1	V 3151	NUT 1” QUICK CONNECT	2
2	V 3150	WS1 SPLIT RING	2
3	V 3105	O-RING 215	2
4	V 3188	FITTING 1” BRASS SWEAT	2



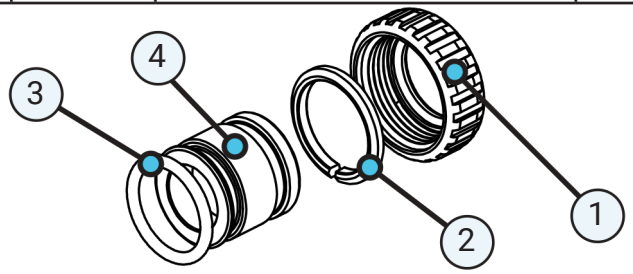
3/4” & 1” PVC SOLVENT ELBOW ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY.
1	V3151	NUT 1” QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3189	FITTING 3/4” & 1” PVC SOLVENT 90	2



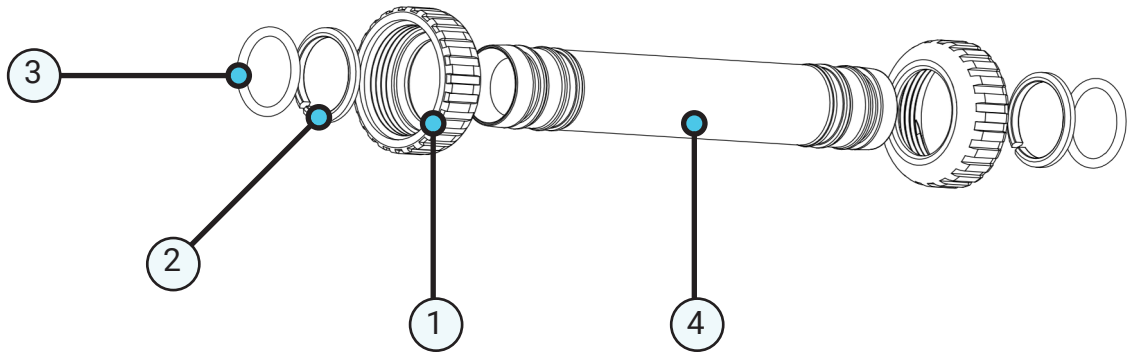
3/4” BRASS SWEAT ASSEMBLY

NO.	PART NO.	DESCRIPTION	QTY.
1	V3151	NUT 1” QUICK CONNECT	2
2	V3150	WS1 SPLIT RING	2
3	V3105	O-RING 215	2
4	V3188-1	FITTING 3/4” BRASS SWEAT	2



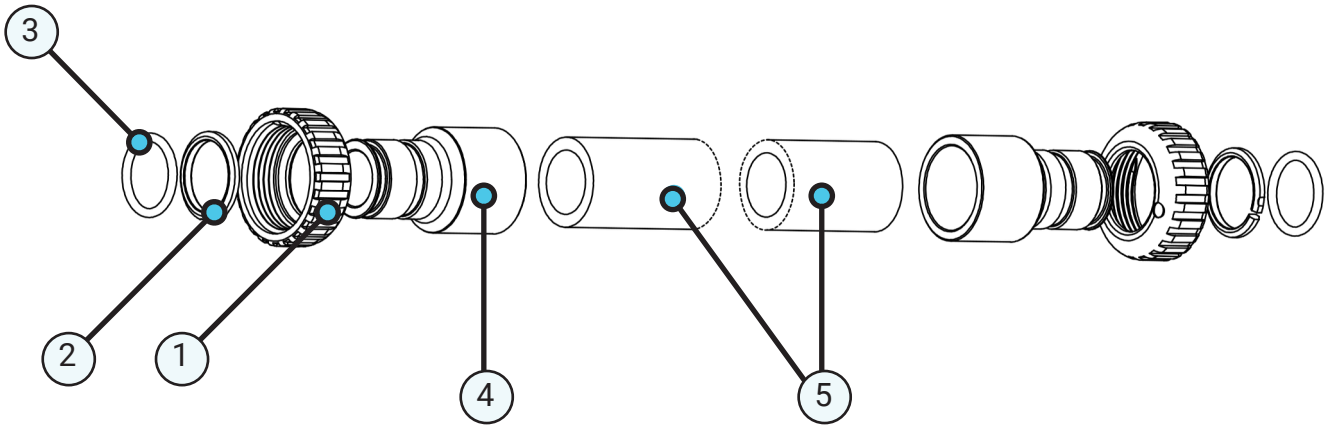
INTERCONNECT ASSEMBLY UP TO 10” TANKS

NO.	PART NO.	DESCRIPTION	QTY.
1	V3151	WS1 NUT 1" QUICK CONNECT	4
2	V3150	WS1 SPLIT RING	4
3	V3105	O-RING 215	4
4	CALL	T1 INTERCONNECT FITTING	2
1 - 4	V4017-01	T1 INTERCONNECT FITTING ASSY	1



INTERCONNECT ASSEMBLY FOR 12” TO 21” TANKS

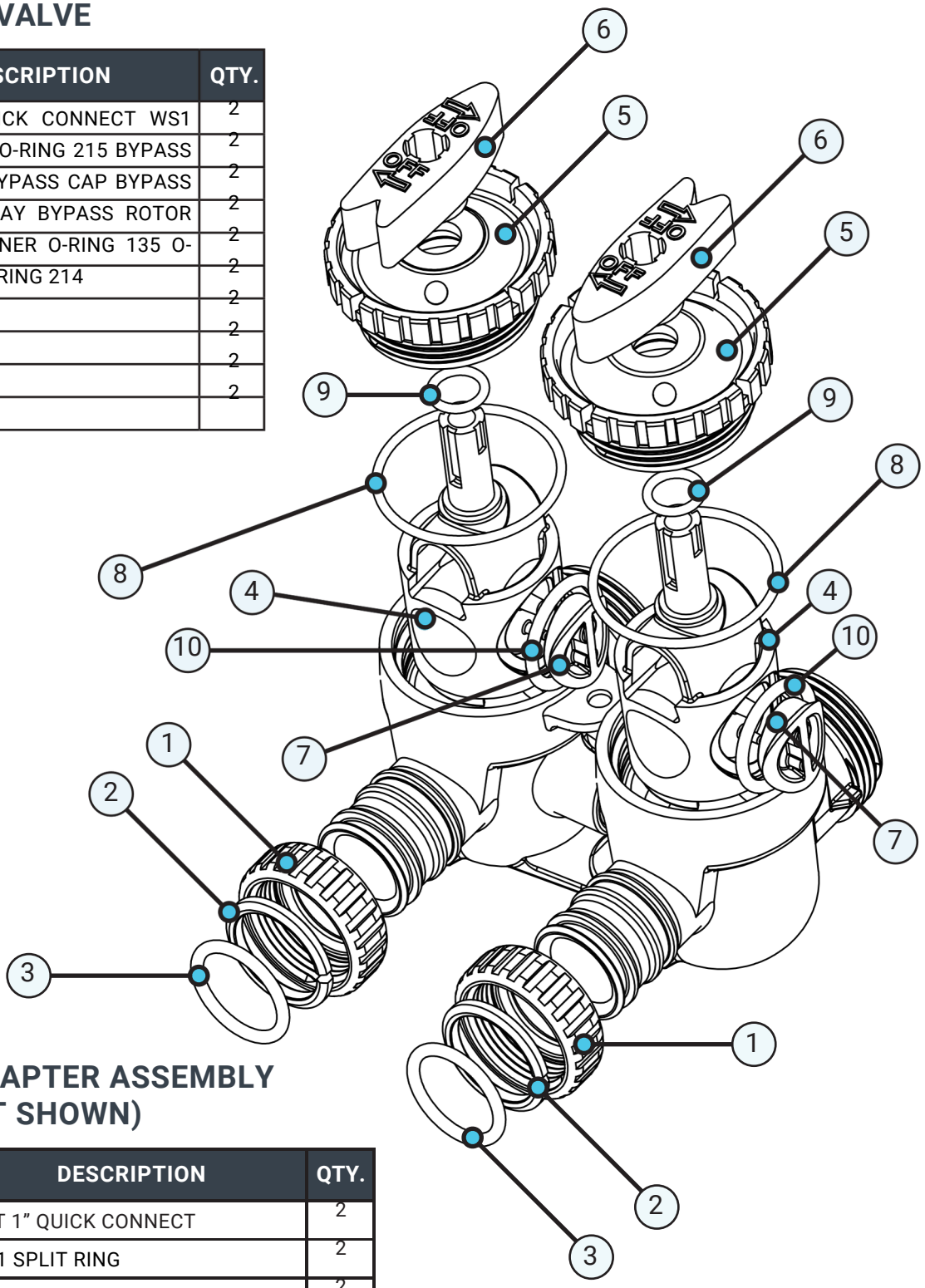
NO.	PART NO.	DESCRIPTION	QTY.
1	V 3151	WS1 NUT 1” QUICK CONNECT	4
2	V 3150	WS1 SPLIT RING	4
3	V 3105	O-RING 215	4
4	CALL	WS1 FITTING 1¼”&1½” PVC SOLVENT	4
5	08803199 N	PIPE PVC SCH 80 1¼”	4’
1-5	V 4052-01	INTERCONNECT KIT FOR 12”-21” TANKS	1



Parts Diagrams

BYPASS VALVE

NO.	PART NO.	DESCRIPTION	QTY.
1	V 3151	NUT 1" QUICK CONNECT WS1	2
2	V 3150	SPLIT RING O-RING 215 BYPASS	2
3	V 3105	1" ROTOR BYPASS CAP BYPASS	2
4	V 3145	HANDLE GRAY BYPASS ROTOR	2
5	V 3146	SEAL RETAINER O-RING 135 O-	2
6	V 3147-04	RING 112 O-RING 214	2
7	V 3148		2
8	V 3152		2
9	V 3155		2
10	V 3156		2

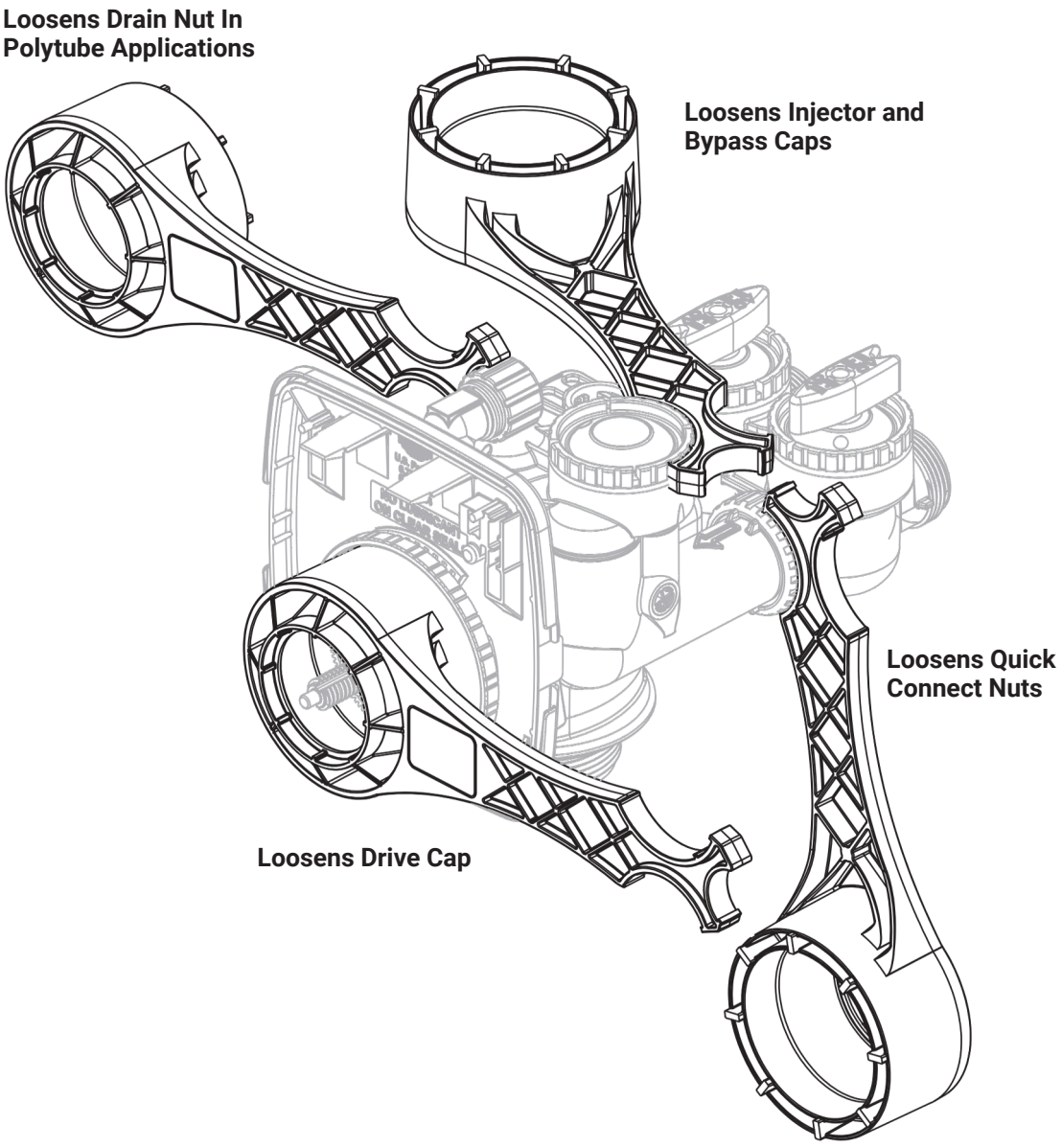


VERTICAL ADAPTER ASSEMBLY (NOT SHOWN)

NO.	PART NO.	DESCRIPTION	QTY.
NOT SHOWN	V 3151	NUT 1" QUICK CONNECT	2
NOT SHOWN	V 3150	WS1 SPLIT RING	2
NOT SHOWN	V 3105	O-RING 215	2
NOT SHOWN	V 3191-01	BYPASS VERTICAL ADAPTER ASSY	2

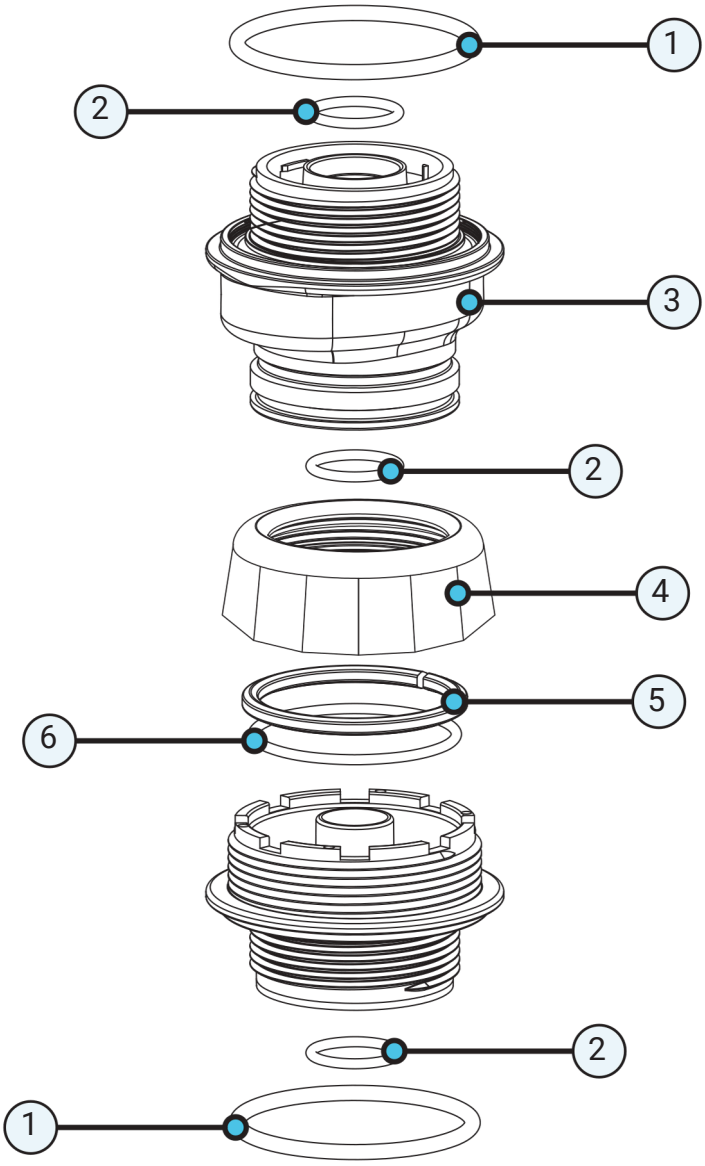
VALVE WRENCH

NO.	PART NO.	DESCRIPTION	QTY.
SHOWN	V3193-02	VALVE WRENCH	1



STACK CONNECTOR

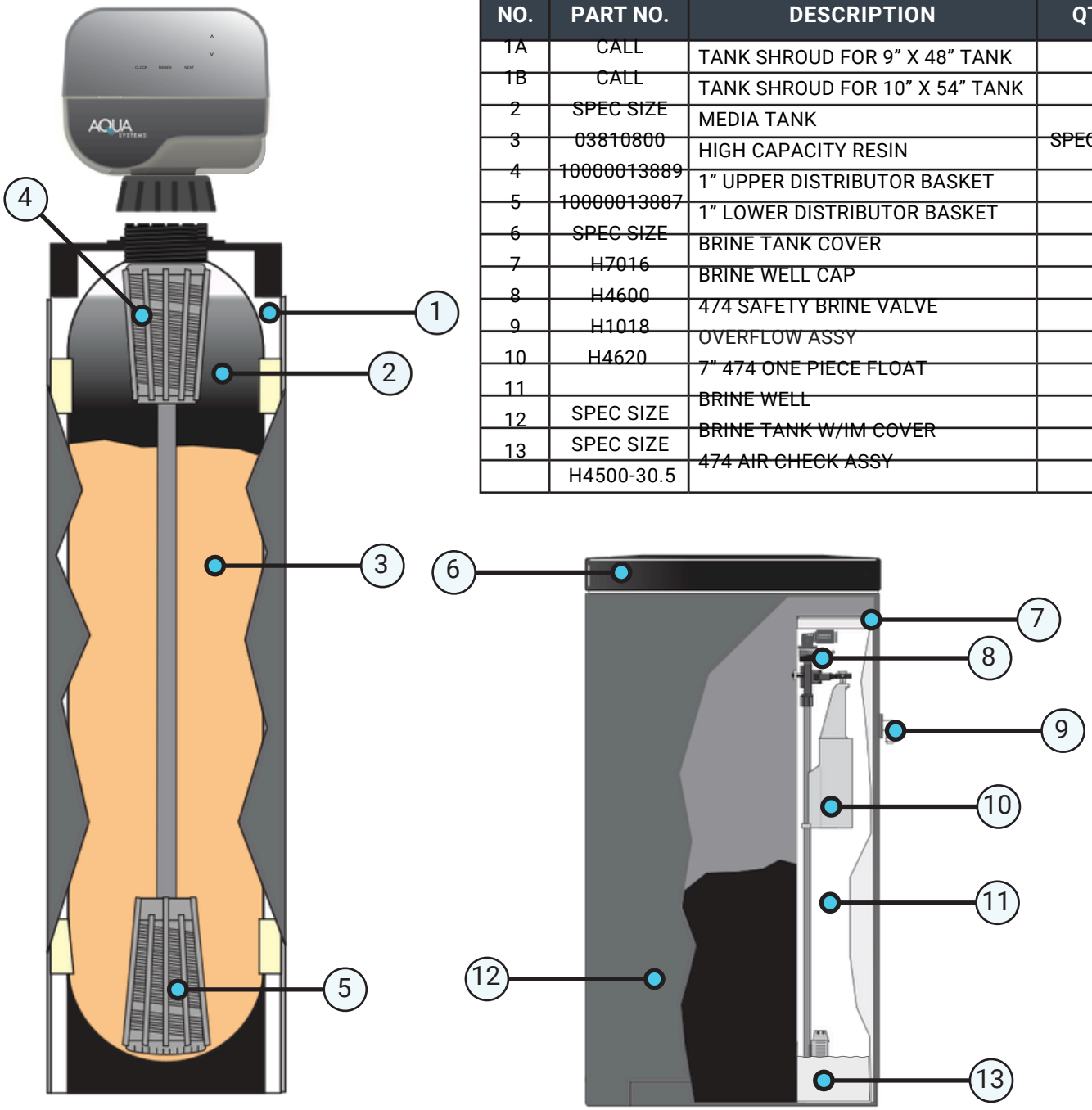
NO.	PART NO.	DESCRIPTION	QTY.
1	V 3180	O-RING 337	2
2	V 3105	O-RING 215	3
3	Q 1027- A S	CONNECTOR TANK 2-1/2 X 8	1
4	V 4515	HEX NUT	1
5	V 3313	SPLIT RING	1
6	V 3315	O-RING 231	1



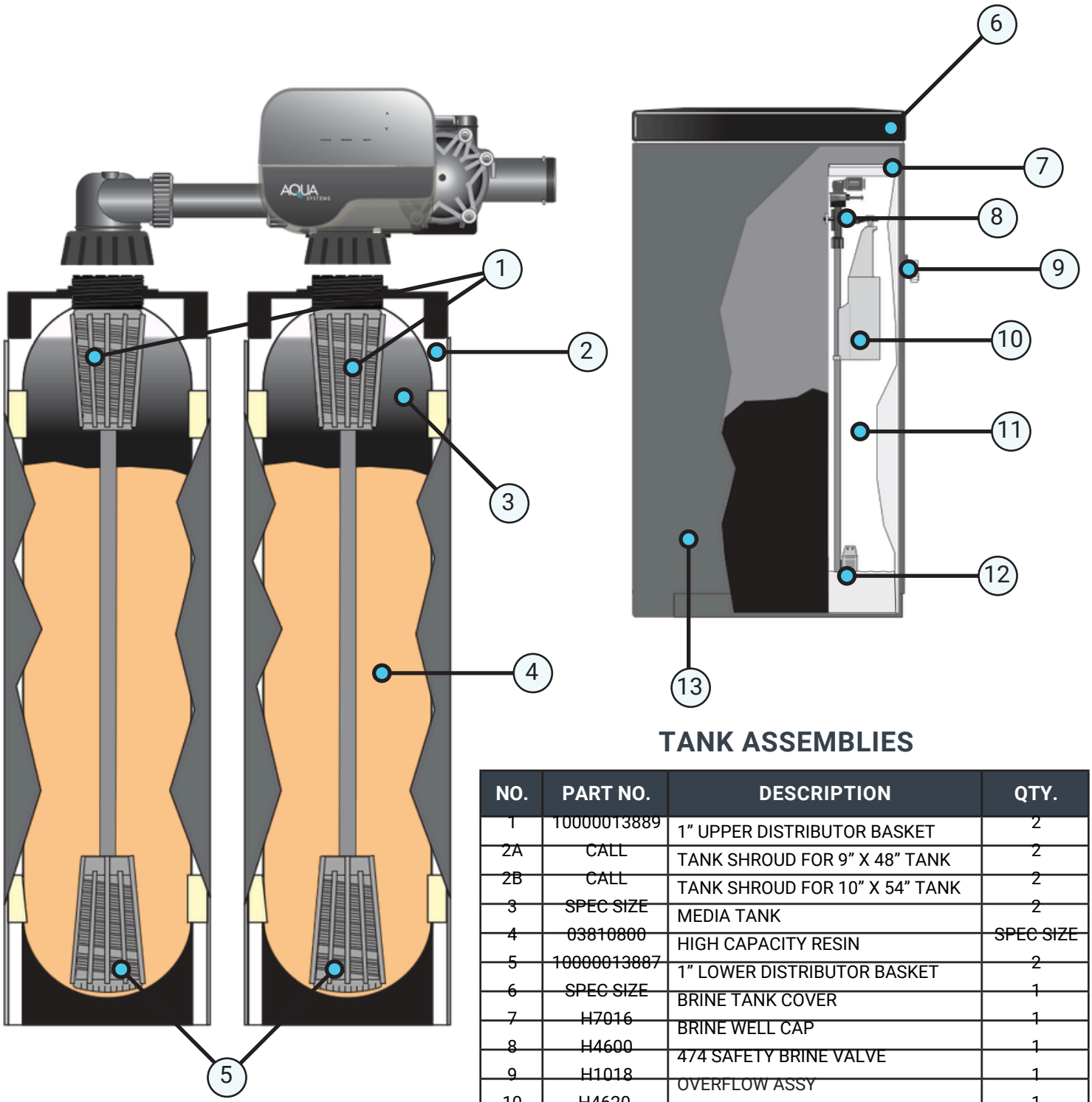
Single Tank Water Softening System

TANK ASSEMBLIES

NO.	PART NO.	DESCRIPTION	QTY.
1A	CALL	TANK SHROUD FOR 9” X 48” TANK	1
1B	CALL	TANK SHROUD FOR 10” X 54” TANK	1
2	SPEC SIZE	MEDIA TANK	1
3	03810800	HIGH CAPACITY RESIN	SPEC SIZE
4	10000013889	1” UPPER DISTRIBUTOR BASKET	1
5	10000013887	1” LOWER DISTRIBUTOR BASKET	1
6	SPEC SIZE	BRINE TANK COVER	1
7	H7016	BRINE WELL CAP	1
8	H4600	474 SAFETY BRINE VALVE	1
9	H1018	OVERFLOW ASSY	1
10	H4620	7” 474 ONE PIECE FLOAT	1
11		BRINE WELL	1
12	SPEC SIZE	BRINE TANK W/IM COVER	1
13	SPEC SIZE	474 AIR CHECK ASSY	1
	H4500-30.5		



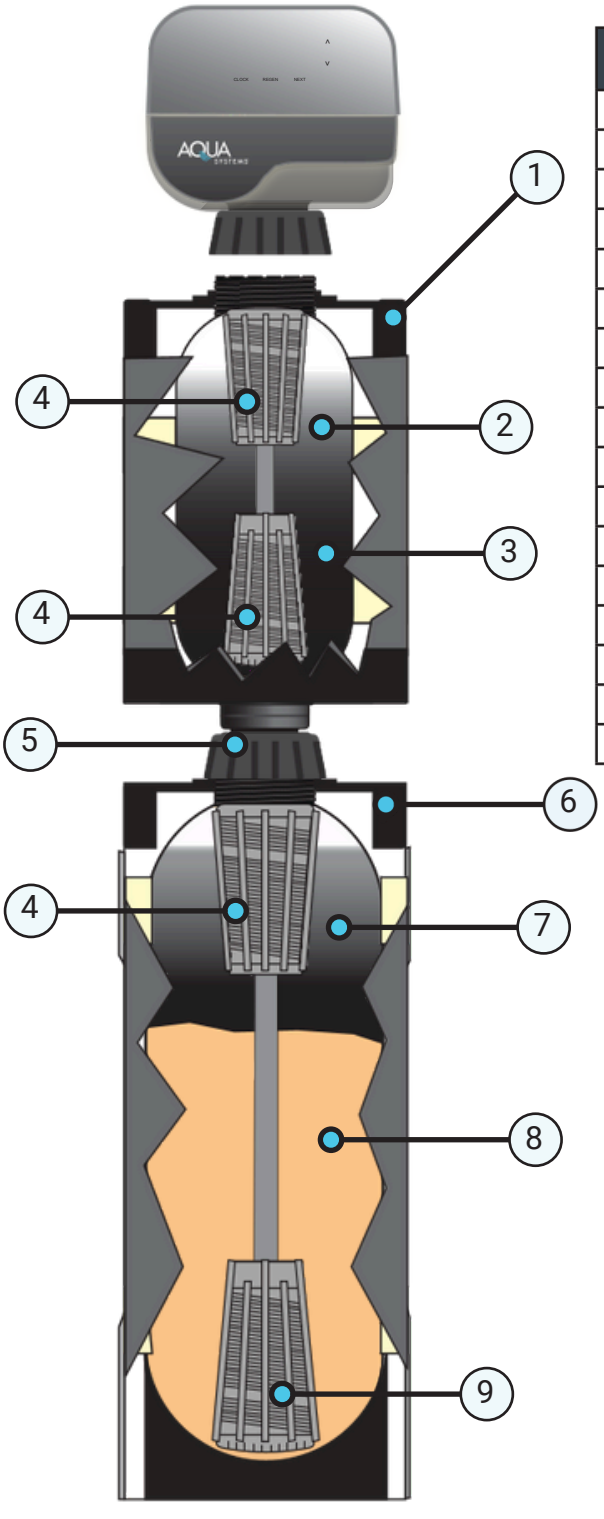
Twin Tank Water Softening System



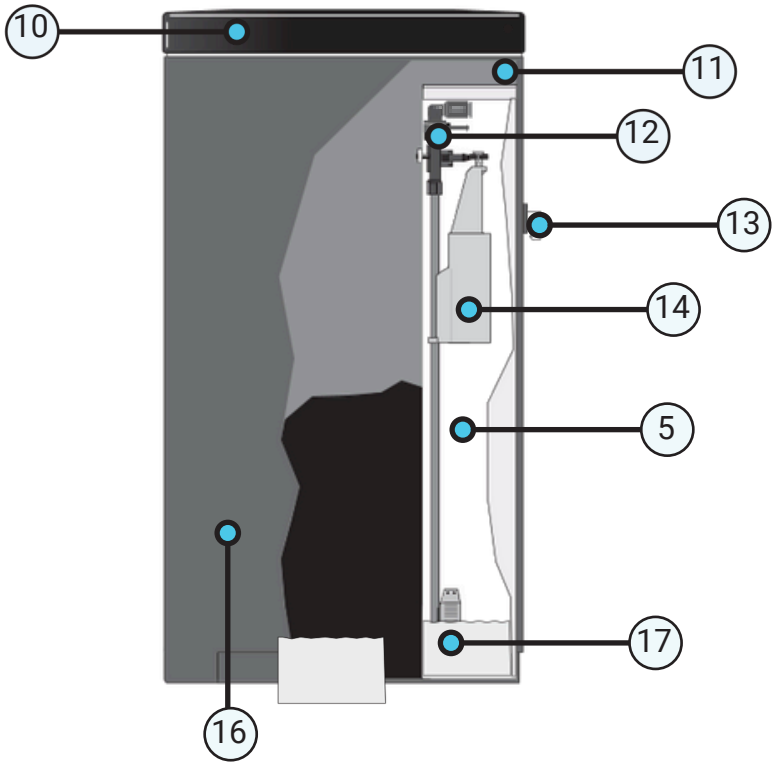
TANK ASSEMBLIES

NO.	PART NO.	DESCRIPTION	QTY.
1	10000013889	1" UPPER DISTRIBUTOR BASKET	2
2A	CALL	TANK SHROUD FOR 9" X 48" TANK	2
2B	CALL	TANK SHROUD FOR 10" X 54" TANK	2
3	SPEC SIZE	MEDIA TANK	2
4	03810800	HIGH CAPACITY RESIN	SPEC SIZE
5	10000013887	1" LOWER DISTRIBUTOR BASKET	2
6	SPEC SIZE	BRINE TANK COVER	1
7	H7016	BRINE WELL CAP	1
8	H4600	474 SAFETY BRINE VALVE	1
9	H1018	OVERFLOW ASSY	1
10	H4620	7" 474 ONE PIECE FLOAT	1
11		BRINE WELL	1
12	SPEC SIZE	474 AIR CHECK ASSY	1
13	H4500-30.5	BRINE TANK W/IM COVER	1
	SPEC SIZE		

TANK ASSEMBLIES



NO.	PART NO.	DESCRIPTION	QTY.
1	CALL	TOP TANK SHROUD	1
2	CALL	9" X 18" - 2.5" T & B OPENING TANK	1
3	CALL	UPPER TANK MEDIA	SPEC SIZE
4	10000013889	1" UPPER DISTRIBUTOR BASKET	3
5	Q1027-FW	CONNECTOR TANK 2-1/2" X 8" QC FW	1
6	CALL	BOTTOM TANK SHROUD	1
7	CALL	10" X 35" BLACK 2.5" T TANK	1
8	CALL	LOWER TANK MEDIA	SPEC SIZE
9			1
10	10000013887	1" LOWER DISTRIBUTOR BASKET	1
11	SPEC SIZE	BRINE TANK COVER	1
12	H7016	BRINE WELL CAP	1
13	H4600	474 SAFETY BRINE VALVE	1
14	H1018	OVERFLOW ASSY	1
15	H4620	7" 474 ONE PIECE FLOAT	1
16	SPEC SIZE	BRINE WELL	1
17	SPEC SIZE	BRINE TANK W/IM COVER	1
	H4500-30.5	474 AIR CHECK ASSY	



Drive Assembly

Always shut water off to the unit, depressurize, and unplug the system from the electrical outlet before performing service on the unit. Remove the valve cover to access the drive assembly.

Disconnect the power source plug (black wire) from the PC board prior to disconnecting the motor or water meter plugs from the PC board. The motor plug connects to the two-pin jack on the left-hand side of the PC board. The power source plug connects to the four-pin jack. The four-pin jack is between the two-pin and three-pin jacks. The water meter plug (gray wire) connects to the three-pin jack on the far right-hand side of the PC board.

The PC board can be removed separately from the drive bracket but it is not recommended. Do not attempt to remove the display panel from the PC board. Handle the board by the edges. To remove the PC board from the drive bracket, unplug the power, water meter and motor plugs from the PC board. Lift the middle latch along the top of the drive bracket while pulling outward on the top of the PC board. The drive bracket has two plastic pins that fit into the holes on the lower edge of the PC board. Once the PC board is tilted about 45° from the drive bracket it can be lifted off of these pins. To reinstall the PC board, position the lower edge of the PC board so that the holes in the PC board line up with the plastic pins. Push the top of the PC board towards the valve until it snaps under the middle latch, weave the power and water meter wires into the holders and reconnect the motor, water meter and power plugs.

The drive bracket must be removed to access the drive cap assembly and pistons or the drive gear cover. It is not necessary to remove the PC board from the drive bracket to remove the drive bracket. To remove the drive bracket start by removing the plugs for the power source and the water meter. Unweave the wires from the side holders. Two tabs on the top of the drive back plate hold the drive bracket in place. Simultaneously lift the two tabs and gently ease the top of the drive bracket towards your body. The lower edge of the drive bracket has two notches that rest on the drive back plate. Lift up and outward on the drive bracket to disengage the notches.

To reassemble seat the bottom of the drive bracket so the notches are engaged at the bottom of the drive back plate. Push the top of the drive bracket towards the two latches. The drive bracket may have to be lifted slightly to let the threaded piston rod pass through the hole in the drive bracket. Maintain a slight engaging force on top of the drive bracket while deflecting the bracket
slightly to the left by pressing on the side of the upper right corner. This helps the drive gears mesh with the drive cap assembly. The drive bracket is properly seated when it snaps under the latches on the drive back plate. If resistance is felt before latching, then notches are not fully engaged, the piston rod is not in hole, the wires are jammed between the drive bracket and drive back plate, or the gear is not engaging the drive cap assembly.

To inspect drive gears, the drive gear cover needs to be removed. The drive gear cover is held in place on the drive bracket by three clips. The largest of the three clips is always orientated to the bottom of the drive bracket. Before trying to remove the drive gear cover, the drive bracket must be removed from the drive back plate. The drive gear cover can be removed from the drive bracket without removing the motor or the PC board. Simultaneously, push in and down on the large clip at the bottom and the clip on the left-hand side of the drive bracket behind the PC board. Keep your other fingers behind the drive gear cover so the drive gears do not drop on the ground.

Replace broken or damaged drive gears. Do not lubricate any of the gears. Avoid getting any foreign matter on the reflective coating because dirt or oils may interfere with pulse counting.

The drive gear cover only fits on one way, with the large clip orientated towards the bottom. If all three clips are outside of the gear shroud on the drive bracket the drive gear cover slips easily into place.

Drive Assembly (Cont)

The drive bracket does not need to be removed from the drive plate if the motor needs to be removed. To remove the motor, disconnect the power and motor plugs from the jacks on the PC board. Move the spring clip loop to the right and hold. Rotate the motor at least a 1/4 turn in either direction before gently pulling on the wire connectors to remove the motor. Pulling directly on the wires without rotating the motor may break the wires off the motor. Replace the motor if necessary. Do not lubricate the motor or the gears. When reinstalling the motor gently turn the motor while inserting so that the gear on the motor meshes with the gears under the drive gear cover and the small plastic bulge engages one of the slots on the motor housing. Reconnect the motor plug to the two pronged jack on the lower left hand side of the PC board. If motor will not easily engage with drive gear when reinstalling, lift and slightly rotate motor before reinserting. Replace the valve cover. After completing any valve maintenance, press and hold “NEXT” and “REGEN” buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version (e.g. 154) and then reset the valve to the service position.

Drive Cap Assembly, Main Piston and Regenerant Piston

The drive assembly must be removed to access the drive cap assembly. The drive cap assembly must be removed to access the piston(s). The drive cap assembly is threaded into the control valve body and seals with an o-ring. To remove the drive cap assembly use the special plastic wrench or insert a 1/4” to 1/2” flat bladed screwdriver into one of the slots around the top 2” of the drive cap assembly so it engages the notches molded into the drive back plate around the top 2” of the piston cavity *(See figure 1)*. The notches are visible through the holes. Lever the screwdriver so the drive cap assembly turns counter clockwise. Once loosened unscrew the drive cap assembly by hand and pull straight out. The drive cap assembly contains the drive cap, the main drive gear, drive cap spline, piston rod and various other parts that should not be dissembled in the field. The only replaceable part on the drive cap assembly is the o-ring. Attached to the drive cap assembly is the main piston (down flow or up flow) and if a regenerant is used, a regenerant piston. The regenerant piston (the small diameter one behind the main piston) is removed from the main piston by unsnapping it from its latch. Chemically clean in dilute sodium bisulfite or vinegar or replace the regenerant piston if needed. To remove the main down flow or up flow piston fully extend the piston rod and then unsnap the main piston from its latch by pressing on the side with the number. Chemically clean in dilute sodium bisulfite or vinegar or replace the main piston.

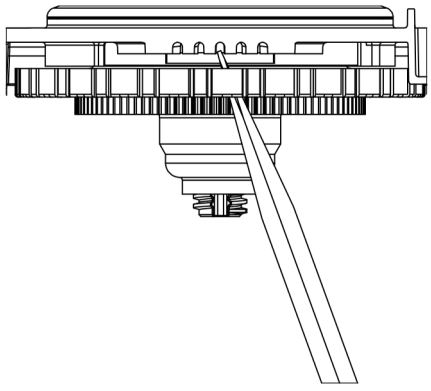


figure 1

Reattach the main piston to the drive cap assembly. Reattach the regenerant piston (if needed) to the main piston. Do not lubricate the piston rod, main piston or regenerant piston. Lubricant will adversely affect the red or clear lip seals. Reinsert the drive cap assembly and piston into the spacer stack assembly and hand tighten the drive cap assembly. Continue to tighten the drive cap assembly using a screwdriver as a ratchet until the black o-ring on the spacer stack assembly is no longer visible through the drain port.

Drive Cap Assembly, Main Piston and Regenerant Piston (Cont)

Reattach the main piston to the drive cap assembly. Reattach the regenerant piston (if needed) to the main piston. Do not lubricate the piston rod, main piston or regenerant piston. Lubricant will adversely affect the red or clear lip seals. Reinsert the drive cap assembly and piston into the spacer stack assembly and hand tighten the drive cap assembly. Continue to tighten the drive cap assembly using a screwdriver as a ratchet until the black o-ring on the spacer stack assembly is no longer visible through the drain port. Excessive force can break the notches molded into the drive back plate. Make certain that the main drive gear still turns freely. The exact position of the piston is not important as long as the main drive gear turns freely.

TIP

Excessive force can break the notches molded into the drive back plate. Make certain that the main drive gear still turns freely. The exact position of the piston is not important as long as the main drive gear turns freely.

Reattach the drive assembly to the control valve and connect all plugs.

After completing any valve maintenance, press and hold NEXT and REGEN buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version (e.g. 154) and then reset the valve to the service position.

Replace the motor if necessary. Do not lubricate the motor or the gears. When reinstalling the motor gently turn the motor while inserting so that the gear on the motor meshes with the gears under the drive gear cover and the small plastic bulge engages one of the slots on the motor housing. Reconnect the motor plug to the two pronged jack on the lower left hand side of the PC board. If motor will not easily engage with drive gear when reinstalling, lift and slightly rotate motor before reinserting.

Replace the valve cover. After completing any valve maintenance, press and hold “NEXT” and “REGEN” buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version (e.g. 154) and then reset the valve to the service position.

Injector Cap, Screen, Injector Plug and Injector

Unscrew the injector cap and lift off. Loosen cap with special plastic wrench or pliers if necessary. Attached to the injector cap is a screen. Remove the screen and clean if fouled.

The plug and/or injector can be pried out with a small screwdriver. The plug can be wiped clean. If the plug leaks replace the entire plug. The injector consists of a throat and a nozzle. Chemically clean the injector with vinegar or sodium bisulfite. The holes can be blown out with air. Both pieces have small diameter holes that control the flow rates of water to ensure that the proper concentration of regenerant is used. Sharp objects, which can score the plastic, should not be used to clean the injector. Scoring the injector or increasing the diameter of the hole could change the operating parameters of the injector.

Two holes are labeled DN and UP. Check for compliance with one of the following:

a. For down flow systems, the appropriate size injector is located in the “DN” hole, a plug is in the “UP” hole and that the piston is a combination of the down flow main piston and the regenerant piston;

b. For up flow systems, the appropriate size injector is located in the “UP” hole, a plug is in the “DN” hole and that the piston is a combination of the up flow main piston and the regenerant piston; or

c. For backwash only systems, a plug is in the “DN” hole and in the “UP” hole, and that the piston only has a down flow main piston (the regenerant piston must be removed) and a plug is in the refill flow control position.

Push the plug(s) and/or injectors firmly in place, replace the screen and hand tighten the injector cap.

Refill Flow Control Assembly or Refill Port Plug

To clean or replace the refill flow control, pull out the elbow-locking clip and then pull straight up on the elbow. Replace the elbow locking clip in the slot so that it is not misplaced. Twist to remove the white flow control retainer. The flow control can be removed by prying upward through the side slots of the retainer with a small blade flat screwdriver. Chemically clean the flow control or the white flow control retainer using dilute sodium bisulfite or vinegar. Do not use a wire brush. If necessary, replace the flow control, o-ring on the flow control retainer, or the o-ring on the elbow. Reseat the flow control so the rounded end is visible in the flow control. Reseat the white flow control retainer by pushing the retainer into the elbow until the o-ring seats. Remove locking clip, push down on elbow to reseat and insert locking clip. Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicon lubricant may be used on the o-ring on the elbow or the white retainer.

TIP

Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicon lubricant may be used on the o-ring on the elbow or the white retainer.

Water Meter or Meter Plug

The water meter assembly is connected to the PC board by a wire. If the entire water meter assembly is to be replaced, remove the control valve cover and remove the power source and water meter plugs from the PC board. Unlatch the drive assembly and lean it forward. Unthread the water meter wire from the side of the drive assembly and through the drive back plate. To reinstall, rethread the water meter wire through the drive back plate and the side of the drive assembly. Reattach the drive assembly and the water meter and power plugs. If no water meter wire is visible, then a plug is installed not a water meter. The water meter wire does not need to be removed from the PC board if the water meter is only being inspected and cleaned. To remove the water meter assembly, unscrew the meter cap on the left side of the control valve. Pliers may be used to unscrew the nut if necessary. With the nut removed, a slot at the top of the water meter is visible. Twist a flat blade screwdriver in the slot between the control valve body and the meter. When the meter is part way out it is easy to remove the water meter from the housing. Once the water meter is removed from the control valve body, use your fingers to gently pull forward on the turbine to remove it from the shaft. Do not use a wire brush to clean. Wipe with a clean cloth or chemically clean in dilute sodium bisulfite or vinegar. The turbine can be immersed in the chemical. Do not immerse electronics. If the turbine is scored or damaged or the bearings on the tur- bine are worn replace the turbine. Do not lubricate the turbine shaft. The turbine shaft bearings are prelubricated. Do not use Vaseline, oils, or other unacceptable lubricants on the o-ring. A silicon lubricant may be used on the black o-ring. Snap the turbine on the shaft and reinsert the water meter into the side slot. Hand tighten the nut. Do not use a pipe wrench to tighten nut.

Bypass Valve

The working parts of the bypass valve are the rotor assemblies that are contained under the bypass valve caps. Before working on the rotors, make sure the system is depressurized. Turn the gray arrow shaped handles towards the center of the bypass valve and back to the arrow direction several times to ensure rotor is turning freely. The nuts and caps are designed to be unscrewed or tightened by hand. If necessary a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place screwdriver in slots on caps and/or tap with a hammer. To access the rotor, unscrew the cap and lift the cap, rotor and handle out as one unit. Twisting the unit as you pull it out will help to remove it more easily. There are three o-rings: one under the rotor cap, one on the rotor stem and the rotor seal. Replace worn o-rings. Clean rotor. Reinstall rotor. When reinstalling the gray arrow handles be sure that:

1. O-rings on both rotors face to the right when being viewed from the front of the control valve when the handle pointers are lined up with the control valve body arrows; or
2. Arrows point toward each other in the bypass position.

Since the handles can be pulled off, they could be accidentally reinstalled 180˚ from their correct orientation. To install the gray arrow handles correctly, keep the handles pointed in the same direction as the arrows engraved on the control valve body while tightening the bypass valve caps. After completing any valve maintenance, press and hold “NEXT” and “REGEN” buttons for 3 seconds or unplug power source jack (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version (e.g. 154) and then reset the valve to the service position.

TIP

After completing any valve maintenance, press and hold “NEXT” and “REGEN” buttons for 3 seconds or unplug power source jack (black wire) and plug back in.

Troubleshooting

Problem	Possible Cause	Solution
Timer does not display time of day	Transformer unplugged No electric	`
	power at outlet Defective transformer	Repair outlet or use working outlet
	Defective PC board Switched outlet	Replace transformer
	Power outage Defective PC board	Replace PC board
Timer does not display correct time of day	Bypass valve in bypass position Meter	Use uninterrupted outlet
	connection disconnected	Reset time of day
	Restricted/stalled meter turbine	Replace PC board
No softening/filtering display when water is flowing	Defective meter Defective PC board	Put bypass valve in service position
	Power outages Time of day not set	Connect meter to PC board
	correctly Time of regeneration	Remove meter and check for rotation or foreign material
	incorrect Control valve set at "on 0"	Replace meter
	(immediate	Replace PC board
	regeneration)	Reset control valve to correct time of day
Control valve regenerates at wrong time of day	Control valve set at NORMAL + on 0	Reset to correct time of day
	Control valve has just been serviced	Reset regeneration time
		Check control valve set-up procedure regeneration time option
		Check control valve set-up procedure regeneration time option
SYSTEM ERROR - Red Screen showing "ERROR"; screen also lists cause of error *(see example below)*, some possible solutions are listed to the right. If not easily resolved, call an authorized dealer for service. If programmed in, the dealer phone number will show on one of the rotating screen displays.		Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve
	Foreign matter is lodged in control valve	Check piston and spacer stack assembly for foreign matter
	High drive forces on piston	Replace piston(s) and spacer stack assembly
	Control valve piston not in home position	Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve
	Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure	Check motor and wiring. Replace motor if necessary
	Drive gear label dirty or damaged, missing or broken gear	Replace or clean drive gear
	Drive bracket incorrectly aligned to back plate	Reseat drive bracket properly
	PC board is damaged or defective	Replace PC board
	PC board incorrectly aligned to drive bracket	Ensure PC board is correctly snapped on to drive bracket
	Motor not operating	Replace motor
	No electric power at outlet	Repair outlet or use working outlet
	Defective transformer	Replace transformer
	Defective PC board	Replace PC board
Control valve stalled in regeneration	Broken drive gear or drive cap assembly	Replace drive gear or drive cap assembly
	Broken piston retainer	Replace drive cap assembly
	Broken main or regenerate piston	Replace main or regenerate piston

Troubleshooting

Problem	Possible Cause	Solution
Control valve does not regenerate automatically when REGEN button is depressed and held	Transformer unplugged	Connect transformer
	No electric power at outlet	Repair outlet or use working outlet
	Broken drive gear or drive cap assembly	Replace drive gear or drive cap assembly
	Defective PC board	Replace PC board
Control valve does not regenerate automatically but does when REGEN button is depressed	By-pass valve in bypass position	Put bypass valve in normal operation position
	Meter connection disconnected	Connect meter to PC board
	Restricted/stalled meter turbine	Remove meter and check for rotation or foreign matter
	Defective meter	Replace meter
	Defective PC board	Replace PC board
	Set-up error	Check control valve set-up procedure
Time of day flashes on and off	Power has been out and the battery ha expired, or the NEXT and REGEN buttons were pressed to reset the control.	Replace battery (type CR2032) if it has expired Reset the time of day
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
Hard or untreated water is being delivered	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

Troubleshooting

Problem	Possible Cause	Solution
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 straighten 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
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

Troubleshooting

Problem	Possible Cause	Solution
E2, Err – 1002, Err – 102 = Control valve motor ran too short and was unable to find the next cycle position and stalled	Foreign materialislodgedincontrolvalve	Open up control valve andpull outpiston 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. Loosen main drive gear. Press NEXT
	Main drive gear too tight	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	a. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect. Then re-program valve to proper setting
	MAV/ NHBP motor wire not connected to PC Board	b. Connect MAV/ NHBP motor to PC Board two pin connection labeled DRIVE. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	MAV/ NHBP motor not fully engaged with reduction gears	c. Properly insert motor into casing, do not force into casing Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	d. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

Troubleshooting

Problem	Possible Cause	Solution
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 materialislodgedinMAV/NHBP valve	Open up MAV/ NHBP valveand 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.

Need Help?
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Notes

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