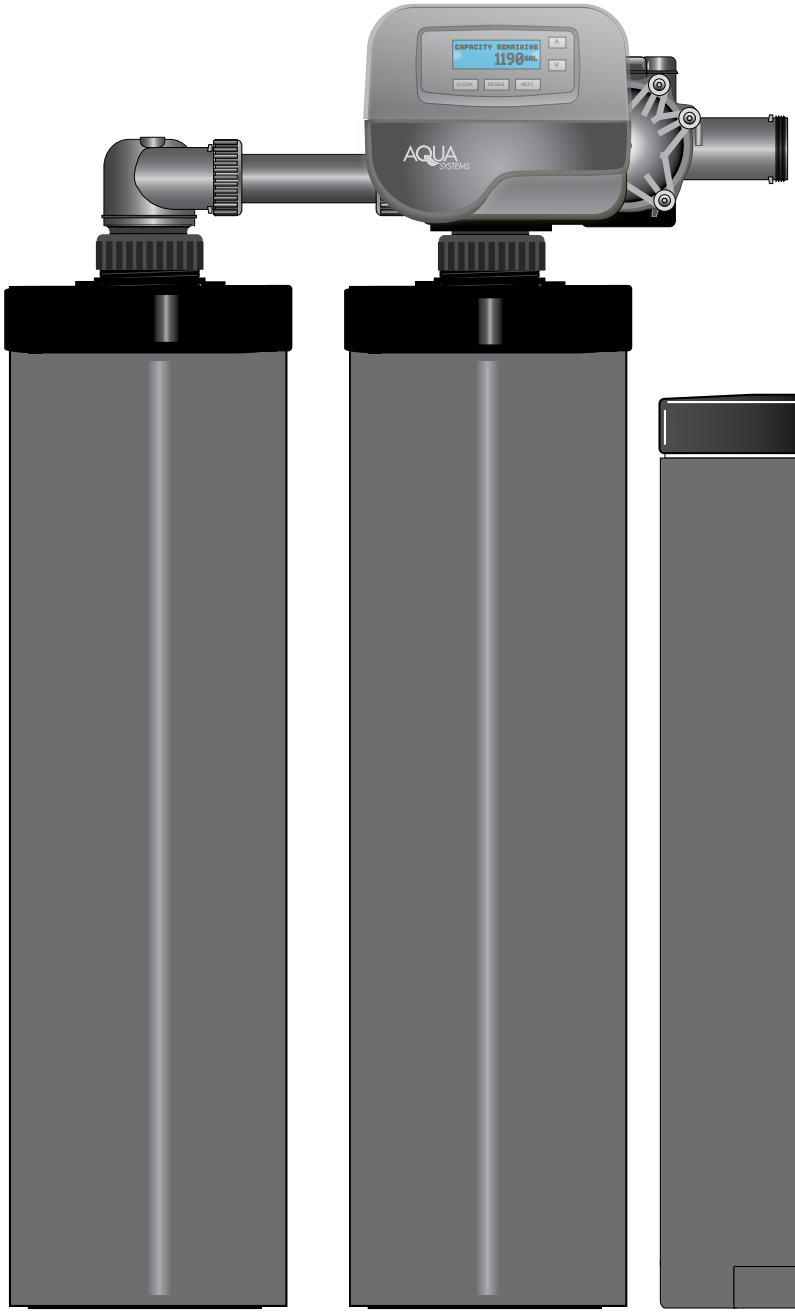
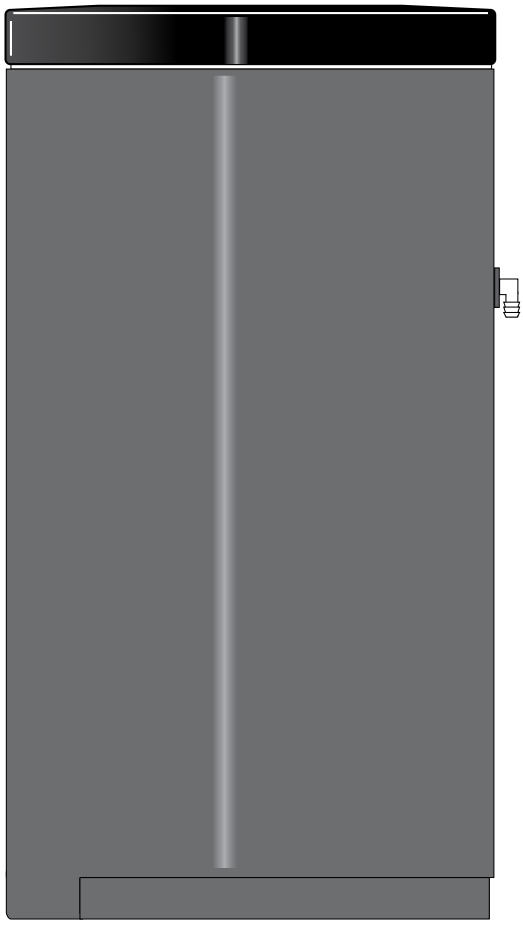
SmartChoice™ Gen II iTwin

Water Conditioning System



Installation, Operation,
and Maintenance Manual



AQUA SYSTEMS®

7785 East US Hwy 36
Avon, IN 46123
(317) 272-3000 • (800) 447-5582

For Nearest Store:
www.ilovemywater.com

© 2013 New Aqua LLC

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™ 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™ 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™ 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™ 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™ 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™ is the solution for many common applications. It is also ideal for customized, built-to-suit requirements. The SmartChoice™ 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.

Visit us on the web at www.aquasystems.com

Owner Information

Owner Name _____ Serial Number _____

Date of Installation _____ Dealer Name _____

Model Number _____ Installer Name _____

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Table of Contents

Owner Information 2
Introduction 2
How the SmartChoice™ Works 4
Pre Install Review 5
Requirements for Proper Operation: 5
Location Data 5
Pre Assembly 6
Bypass Operation 7
Installation 8
Softener Placement 8
Brine System Placement 9
Start Up 11
Disinfection: 11
Programming 12
Installer Displays/Settings: 13
User Displays/Settings: 14
Service 15
Parts Diagrams 18-30
Troubleshooting 31-34
Notes 35

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

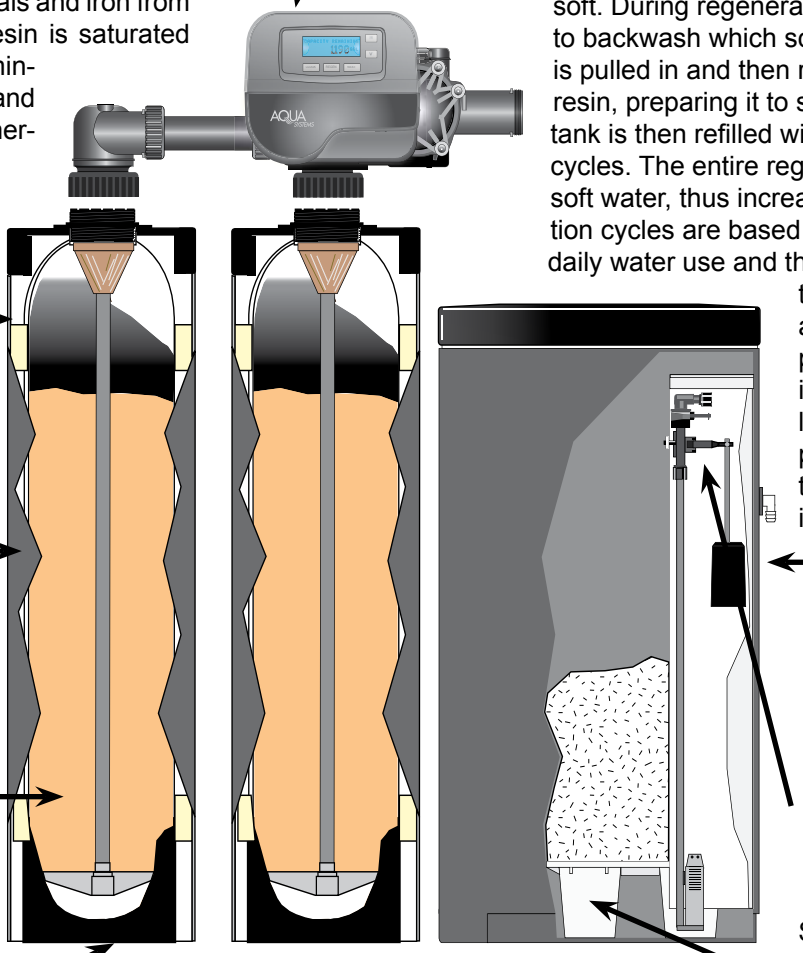
How the SmartChoice™ Works

Resin Scrubber Vortech™* Design: VT Models

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 Resin 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.

The Control Valve: routes the water flow through the system and controls the operating cycles while giving soft water 24 hr a day and 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 at the preset time. Cycles can also be predetermined and programmed in the control if so desired. Also, in problem waters, the control is programmed to backwash the resin twice resulting in increased iron removal.



Resin tanks can be exposed or covered with a jacket or insulated cabinet.

Historically, resin 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 fit in almost any space and are blow molded for strength and durability.

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

Salt shelf permits use of almost any type of salt and eliminates bridging and mush by keeping the salt dry.

The Vortech™ bottom plate distributor.
Unlike conventional distributors, the Vortech™ significantly improves the efficiency of the system by reducing backwash rates by at least 30% and reducing pressure loss through the system up to 40%. The innovative design of the bottom plate achieves a much greater resin cleaning ability coupled with lower water use yet is gentle on the resin, thus extending its service life.

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.

* Vortech™ tanks are manufactured by ENPRESS LLC

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Pre Install Review

Requirements for Proper Operation:

Water Pressure: The system will operate on a minimum of 20 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 eliminate the 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 _____

Iron in ppm _____ **x 4 =** _____
(multiply x 4)

Total Compensated Hardness _____
(add adj. iron and hardness)

Use the Total Compensated Hardness number for Hardness Setting in start up programming. (Page 14)

Bypassed Hard Water Lines:

Rear Outside Spigot _____

Front Outside Spigot _____

Kitchen Cold _____

Other _____

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Pre Assembly

1. Carefully remove system from carton and inspect. The system boxes should contain:

    a. Softener (Two media tanks)
    b. Control Valve
    c. Bypass Valve and Intertank Connectors
    d. Owner's Manual

2. Remove brine system from carton and inspect. The box should contain:

    a. Brine Tank assy.
    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. Next attach the desired fitting kit to the bypass. It attaches in the same manner as the bypass.

4. 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 2*)

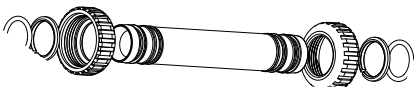
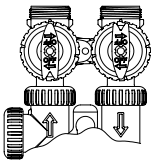


figure 2

Tip:

Take a moment to fill out the information sections in the Owner's Manual. It can be a valuable tool in the future to have all the installation data available to answer any questions.



Connection ports on back of control valve

figure 1

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.

Tip:

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

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.

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

3/4" or 1" PVC
Sovent Weld

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™ 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, all plastic 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

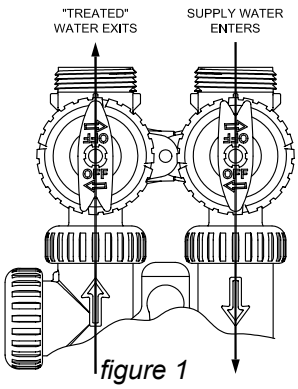


figure 1

BYPASS OPERATION

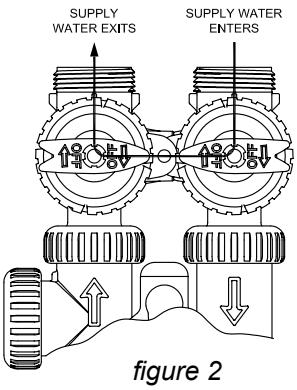


figure 2

DIAGNOSTIC MODE

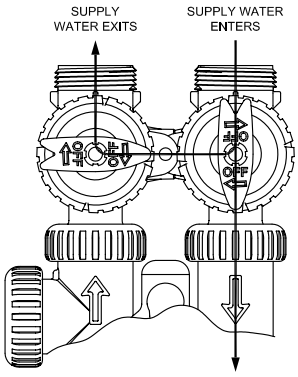


figure 3

SHUT OFF MODE

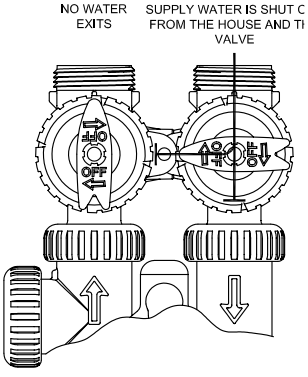


figure 4

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Installation

Softener Placement

1. Find a location with accesibility to:
   A. The main inlet water supply or pre-plumbed connection point
   B. Adequate drain fixture, capable of 5 gallons per minute flow
   C. Electrical Outlet

2. Place tanks 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 tanks on the floor.

3. Once situated, install the interconnecting tubes between the two resin tanks (*see figure 1*).

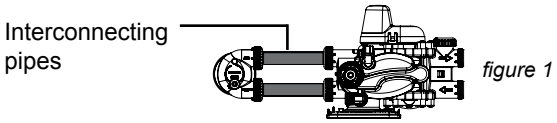


figure 1

3. There should be a minimum of 12' of **Water Line** between the softener and the water heater.

4. Before connecting the lines:
   a. Turn off electric or gas to water heater.
   b. Turn off main water supply to building and drain off pressure to all cold water outlets.
   c. Determine which outlets are to be bypassed and make provisions to connect them before the softener.
   d. It is highly recommended to provide an inlet shut off valve near the unit.
   e. 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.

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 (if the nut isn't used). Teflon tape is not necessary on the nut connection or caps 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.

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

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

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.

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.

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.

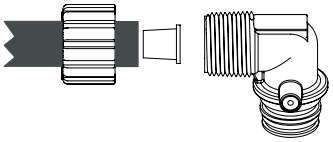

Drain Fitting

figure 1

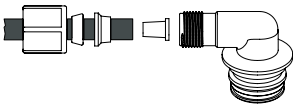

Brine Fitting

figure 2

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 11.

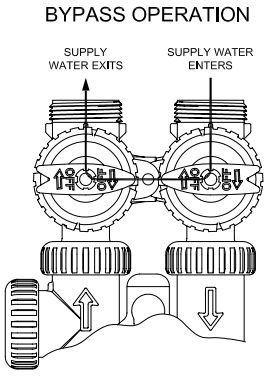
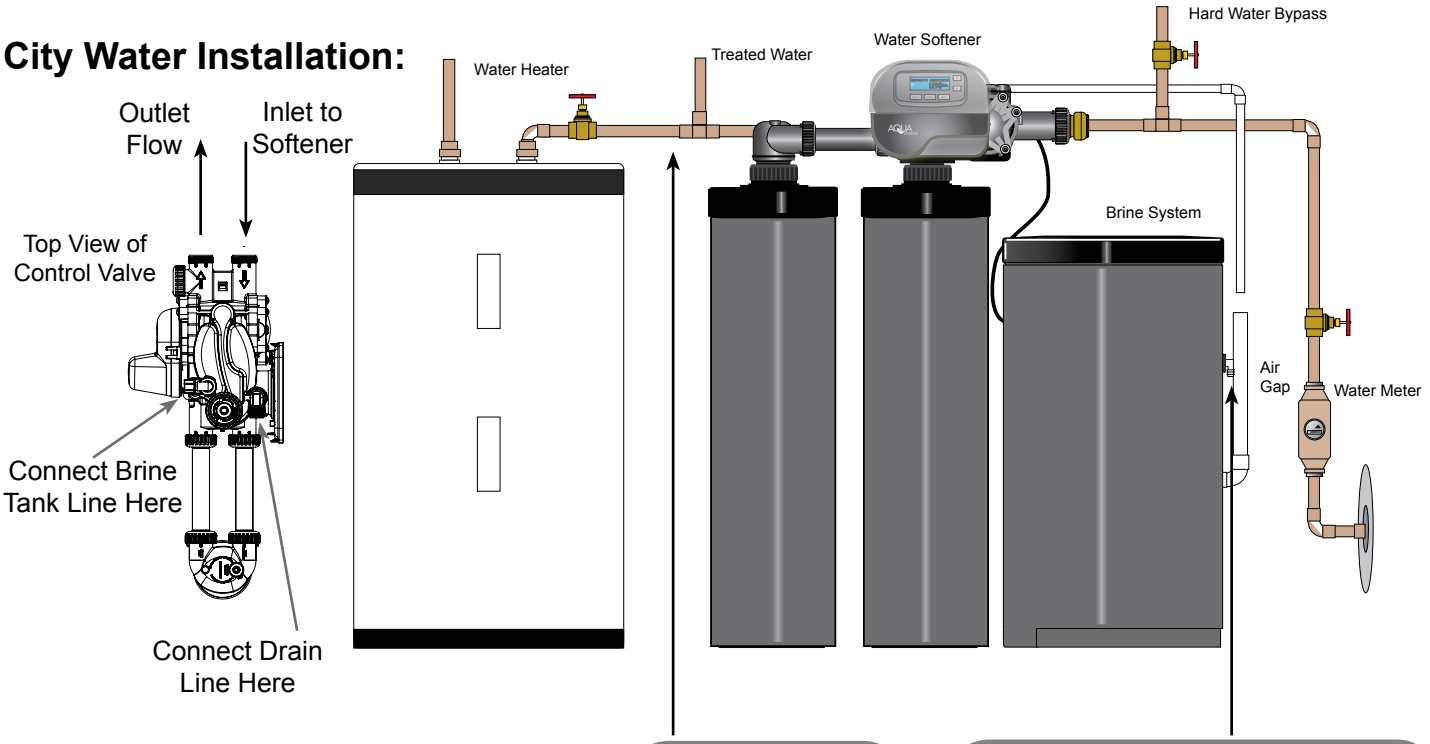


figure 3

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Installation

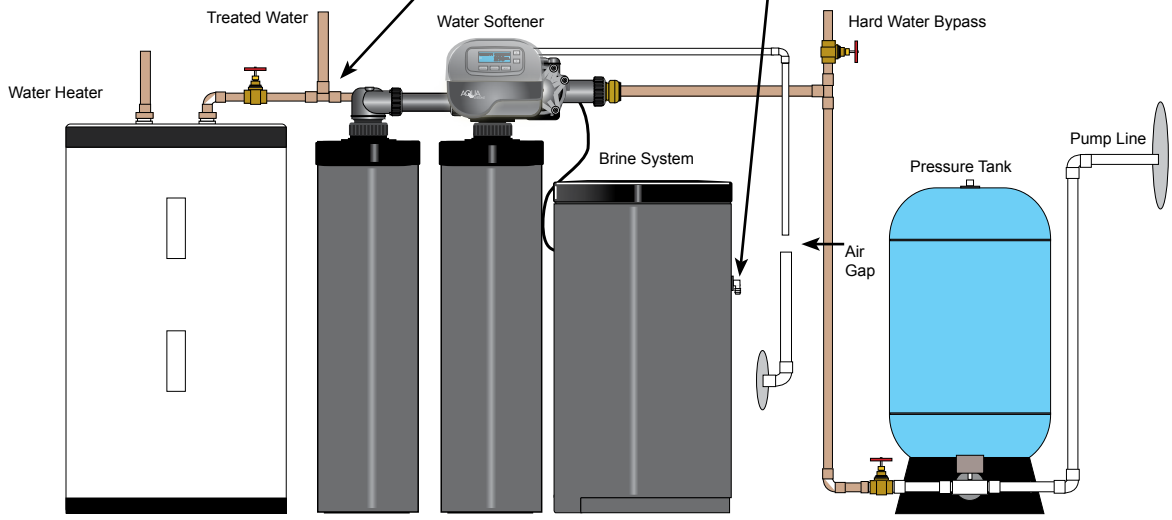
City Water Installation:



Note:
Minimum of 12 feet of line between softener and 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:



© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Start Up

Put Unit into Service:

1. 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” mode and will flash 12:00 on the display.

3. Set the current time of day. (*see page 12)*

4. Push and hold the “REGEN” button for 3 seconds. The system will advance to the “Backwash” position.

5. Slowly open the inlet to the bypass. (*see page 7, figure 3*)

6. Water will run to the drain. Let it run 5 minutes or until the the water to drain is clear.

7. Push “ REGEN” button and release. The control will advance to the “BRINE” position. Let cycle run for several minutes to confirm the water is removed from the brine tank to a level below the salt shelf.

8. Push “ REGEN” button and release. (see note at right) The control will advance to the next cycle. Keep pushing “REGEN” button until the control reaches the “FILL” position. Let the control complete this cycle automatically to fill the brine tank to the proper level. The control will then return to the service (“SOFTENING”) position.

9. Repeat steps 4, 6, 7, & 8 to rinse the second tank. The only exception being when in brine draw (step 7) when it gets to draw, skip letting it run for several minutes and advance immediately to step 8.

10. When the control has reached the service position, fill the brine tank with salt. Open the outlet handle on bypass. (*see page 7, figure 1*)

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

To Disinfect the System:

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.

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.

Note:

When pushing the “REGEN” button to advance cycles, let the control reach the next cycle before pushing the “REGEN” button again.

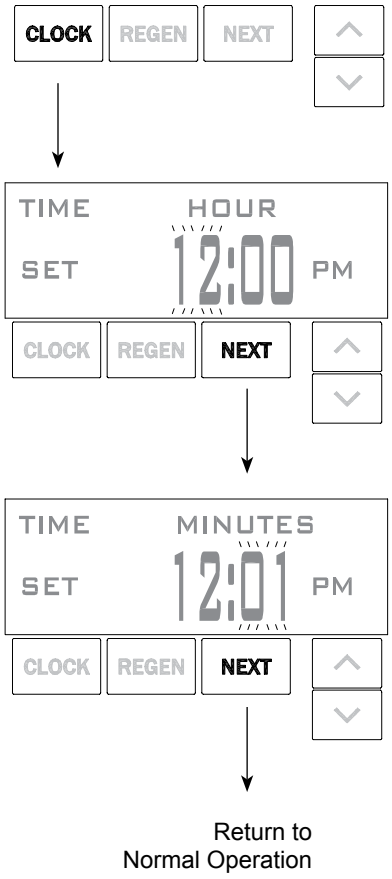
Disinfection:

The materials of construction of the 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 conditioner after 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 should be disinfected after installation, some will require periodic disinfection during their normal life.

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Programming

Set Time of Day:



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:

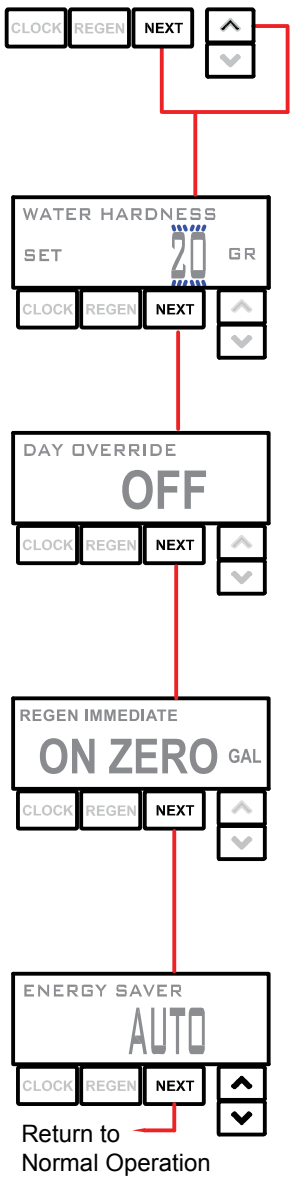
If the power goes out, the current time will remain correct as long as batter has sufficient charge (up to 2 years). If the battery expires, the screen will state “Low Battery”. The battery should be replaced and the time reset. All other programming will be retained.

Displayed when battery voltage is low. Display alternates with previously selected display. Battery is a coin cell CR2032.

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Programming

Installer Displays/Settings:



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 6. 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 iTwin 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.

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 Alter Screen.

This is the default setting

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Programming

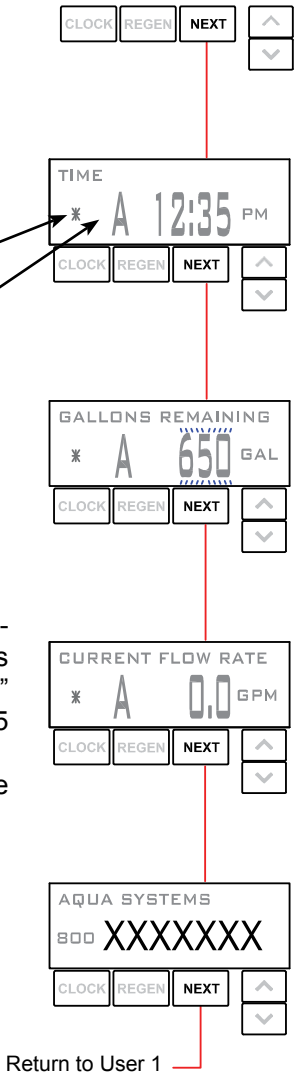
User Displays/Settings:

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

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

Denotes which tank is in service - "A" is the tank under the valve, "B" is the tank under the flow thru adalpter.

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.



User 1
Time of Day Screen

User 2
Capacity Remaining Screen
Flashes once Reserve Capacity is reached

User 3
Current Flow Rate Screen - Displays Water Flow through System

User 4
Contact Screen - Displays Dealer Name and Phone Number (If programmed)

Regeneration Mode:

1. This system regenerates when one tanks capacity is all used, whatever the time is, but before it starts the second tank is put into service to maintain soft water availability.

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 standby for when the other tank needs to regenerate.

4. To initiate a manual regeneration immediately, press and hold the "REGEN" button for three seconds until the system starts the regen.

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Service

Removing & Reinstalling SmartChoice™ Control Valve:

Removing the Control Valve from the Media Tank:

1. Turn Bypass to the "Bypass" Position. *(see diagram on page 7, 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*
6. Loosen the connection nuts between the valve and the bypass. Also remove intertank connectors *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 nuts to remove the valve and 2nd tank flow adapter from the media tanks. *see figure 2*

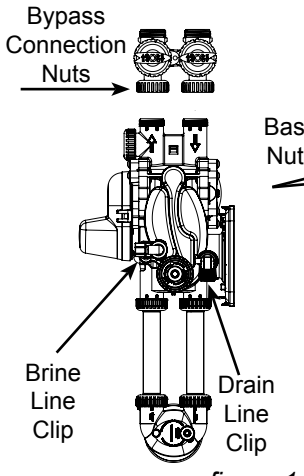


figure 1

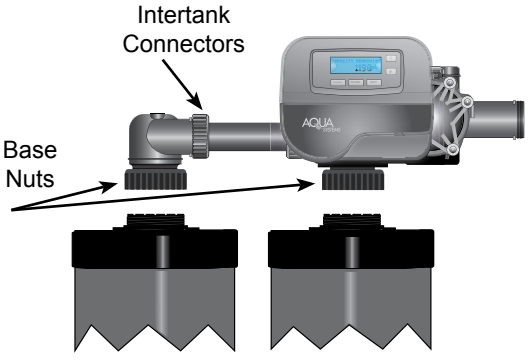


figure 2

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.

Note:

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

Note:

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

Note:

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

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Service

Re-installing a replacement Control Valve:

1. Place the new control valve over the base connection, insert the connnection fitting into the base. *see page 16 figure 2*
2. Thread the base nut on to the base adapter - do not tighten more than hand tight. Then place the flow through tank adapter on the second tank then thread the base nut the same as for the valve.
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 connnection 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 it's position and install the lock cllip. *(see page 16 figure 1)*
8. Insert the Drain line into it's position and install the lock clip. *(see page 16 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.
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.

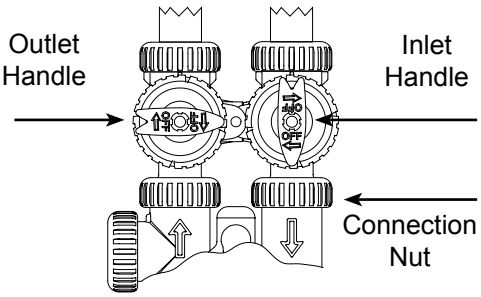


figure 3

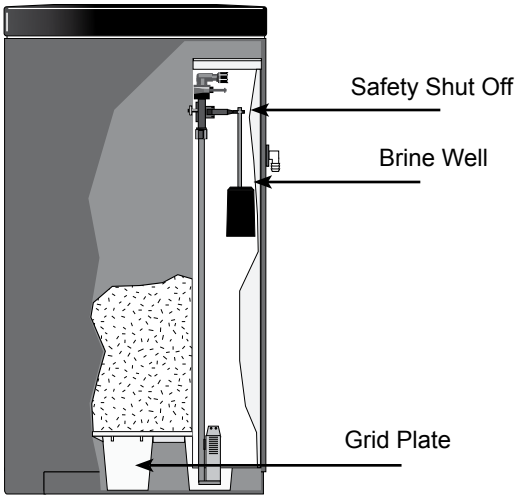
Note:
When turning water back on, if there are any leaks detected, immediately turn off the water, loosen the leaky fitting or fittings, check o-rings - clean and reseat, and re-connect fittings. Turn on water and make sure there are no leaks before continuing return to service.

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Service

Cleaning the Brine Tank:

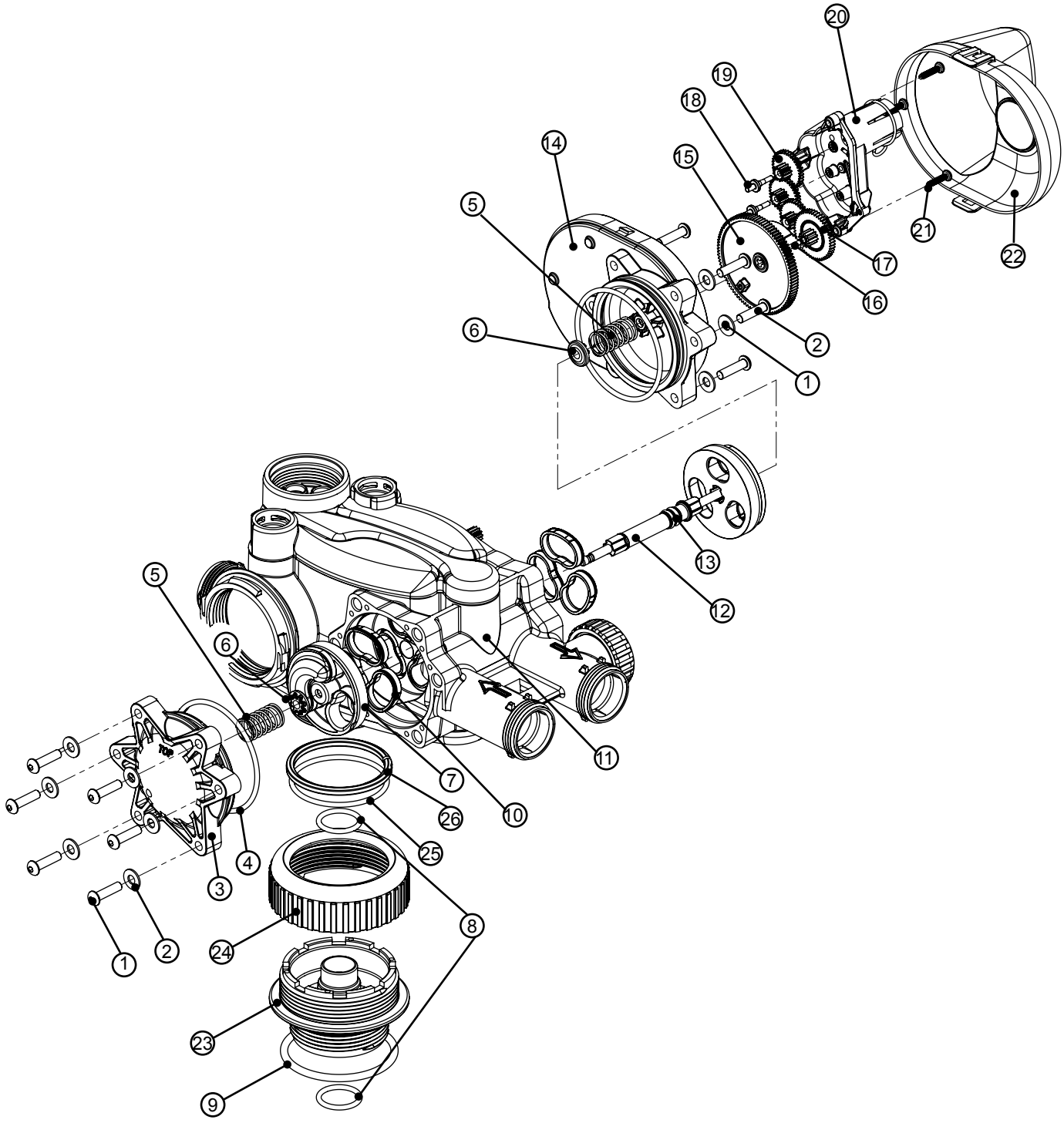
1. Remove the brine tank cover.
2. Scoop out as much old salt as possible.
3. Disconnect brine tubing from safety brine valve at brine well.
4. Remove safety brine valve from brine well.
5. Place a hand in brine well to hold overflow nut and remove two piece overflow.
6. Remove brine well and grid plate (salt shelf) 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. see note at right
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” above grid plate on a round brine tank or 6” above the grid plate on a square or a rectangle brine tank.
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 11.
15. Put on brine tank cover.



Note:
If grid plate is used and it is damaged or cracked, replace with new one.

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Parts Diagrams



© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

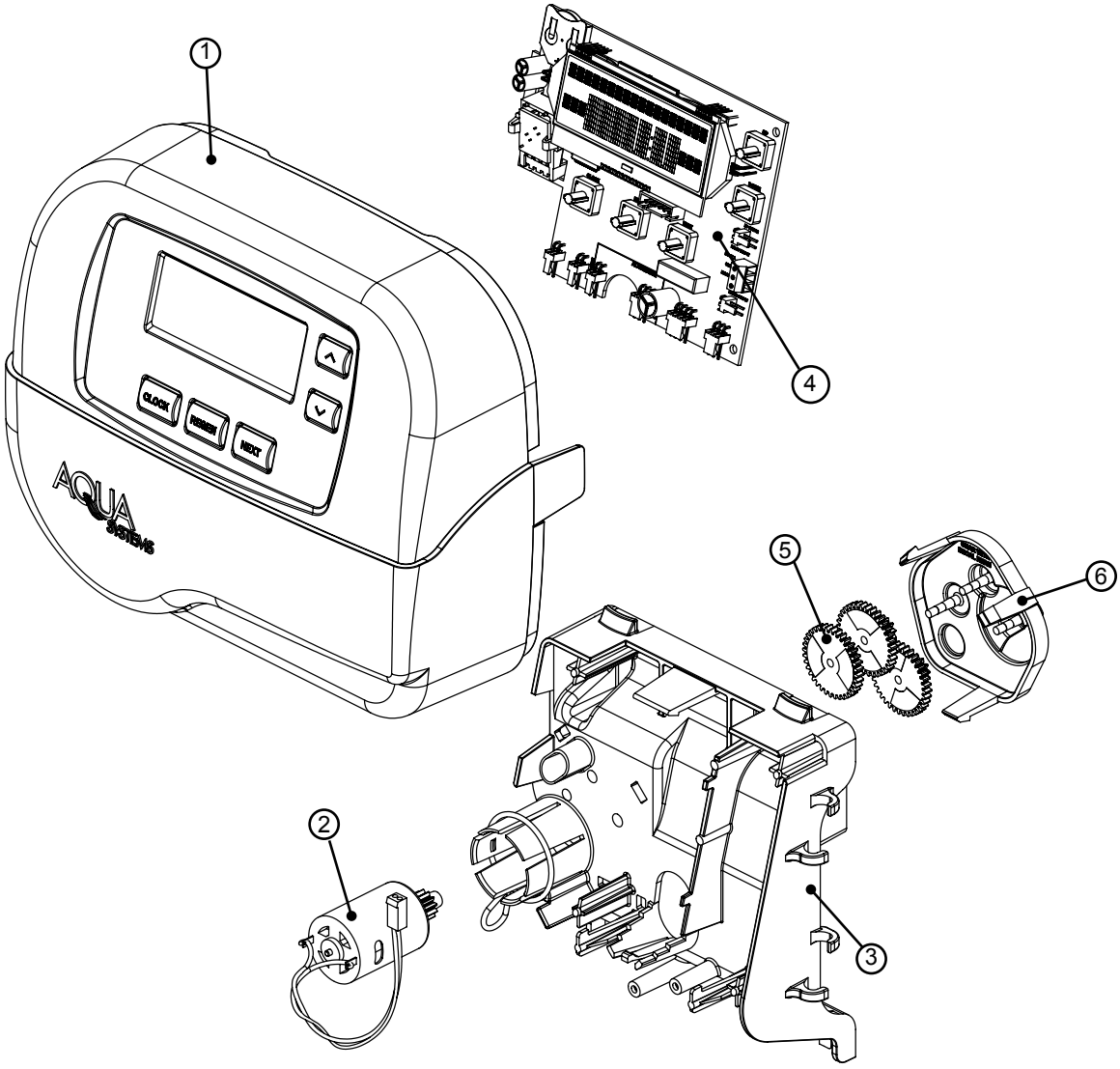
Parts List

Valve Body Assembly

No.	Part No.	Description	Qty
1	02910235	SCREW BHC 1/4-20 X 1 SS	12
2	02910236	WASHER FLAT SS 1/4	12
3	02910237	T1 TRANSFER CAP ASY	1
4	02910238	O-RING 236	2
5	02910239	T1 TRANSFER SPRING	2
6	02910240	T1 TRANSFER SPRING SUPPORT	2
7	02910241	T1 ROTOR DISK ASY	2
8	02910126	O-RING 215 (DISTRIBUTOR TUBE)	4
9	02910166	O-RING 337	1
10	02910242	T1 TRANSFER SEAL	6
11	02910243	T1 BODY SFT WTR REGEN	1
12	02910244	T1 TRANSFER DRIVE SHAFT ASY	1
13	02910245	O-RING 110	2
14	02910246	T1 TRANSFER DRIVE CAP ASY	1
15	02910247	T1 TRANSFER DRIVE GEAR ASY	1
16	02910248	T1 TRANSFER DRIVE GEAR AXLE	1
17	02910249	T1 TRANSFER REDUCTION GEAR	1
18	02900240	WS2H BYPASS REDUCTION GEARAXLE	3
19	02910132	WS1 DRIVE REDUCING GEAR 12X36	3
20	02910150	WS1.5&2ALT/2BY REDUCGEARCVRASY	1
21	02910251	SCREW #8-1 PHPN T-25 SS	3
22	02910252	T1 COVER ASSEMBLY	1
23	02910182	TANK ADAPTER	2
24	02910183	TANK NUT	2
25	02910188	O-RING 231	2
26	02910184	SPLIT RING	2
NOT SHOWN	02910253	T1 TRANSFER MOTOR ASY	1
NOT SHOWN	02910148	WS1 NUT 1 QC	1
NOT SHOWN	02910254	TWIN TANK METER ASY	1
NOT SHOWN	02910255	T1 INTERCONNECT FITTING ASY	1
NOT SHOWN	02910256	1191 IN/OUT HEAD QC	1

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Parts Diagrams



Electronic Control Assembly

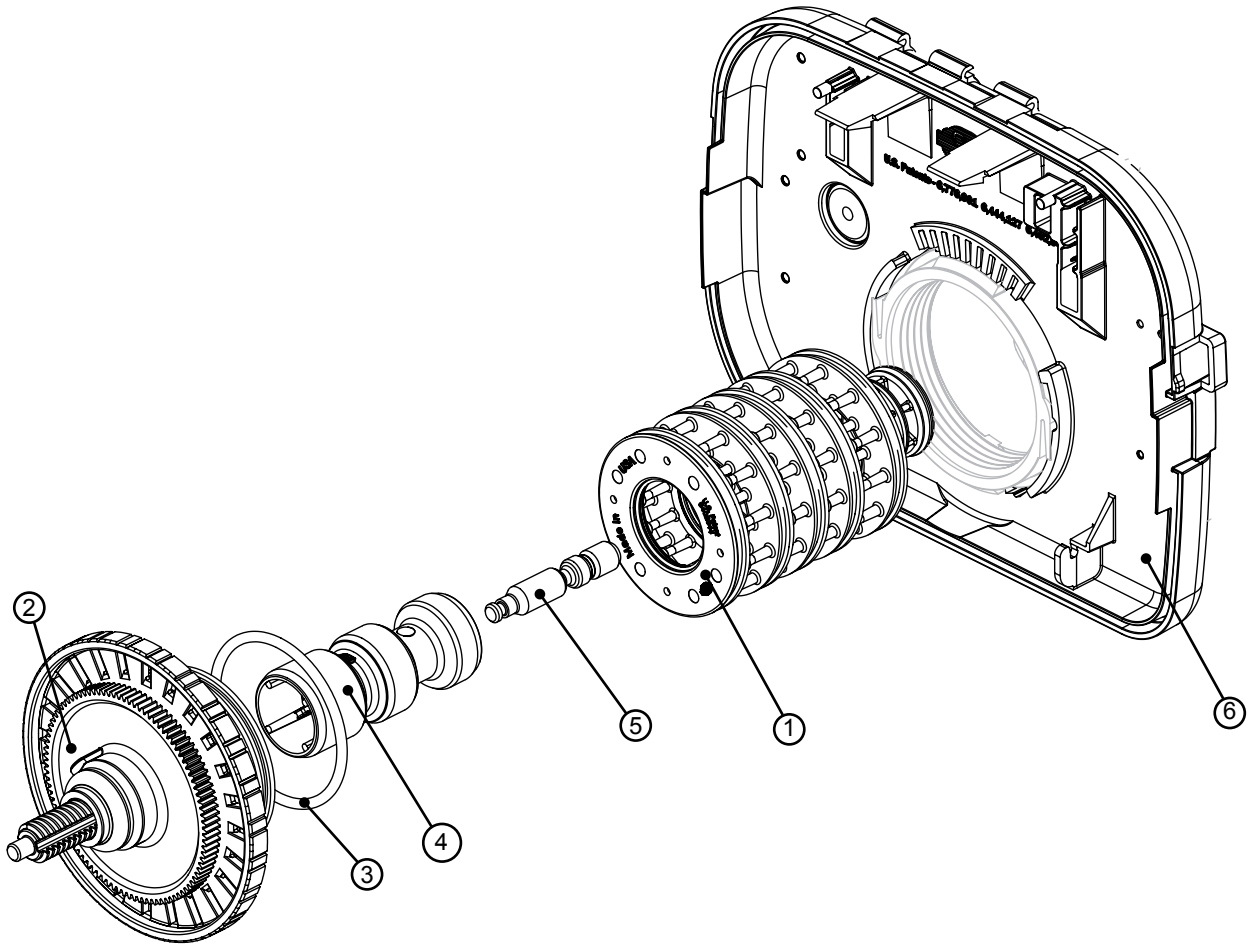
No.	Part No.	Description	Qty.
1	02910301	SCII Front Cover Assy	1
2	02910128	Motor	1
3	02910127	Drive Bracket and Spring Clip	1
4	02910299	SCII "AQX" PC Board	1
5	02910132	Drive Gear 12 x 36	3
6	02910131	Drive Gear Cover	1
(2 - 6)	02910106	Drive Assy (includes parts 2 - 6)	(1)
Not Shown	02910302	Clear Display Cover	1
Not Shown	02910166	Transformer 110v - 12v	1

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Parts Diagrams

Piston & Seal Assembly

No.	Part No.	Description	Qty.
1	02910111	Spacer Stack Assy	1
2	02910110	Drive Cap Assy	1
3	02910141	O-Ring 228	1
4	02910124	Piston Downflow Assy	1
5	02910160	Regenerate Piston	1
6	02917000	SCII Backplate	1

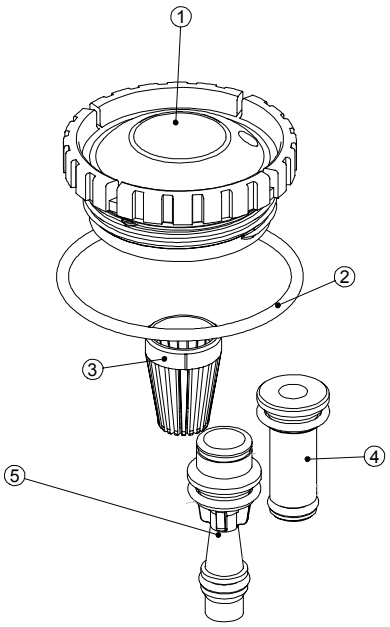


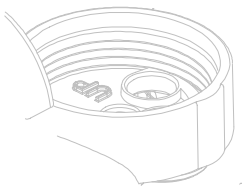
© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Parts Diagrams

Injector Assy

No.	Part No.	Description	Qty.
1	02910163	Injector Cap	1
2	02910149	O-Ring 135	1
3	02910164	Injector Screen	1
4	02910123	Injector Assy Z Plug	1
5	02910112	Injector Assy A Black	1
	02910113	Injector Assy B Brown	
	02910114	Injector Assy C Violet	
	02910115	Injector Assy D Red	
	02910116	Injector Assy E White	
	02910117	Injector Assy F Blue	
	02910118	Injector Assy G Yellow	
	02910119	Injector Assy H Green	
	02910120	Injector Assy I Orange	
	02910121	Injector Assy J Light Blue	
	02910122	Injector Assy K Light Green	
Not Shown	02910158	O-Ring 11 (Injector)	1
Not Shown	02910159	O-Ring 13 (Injector)	1



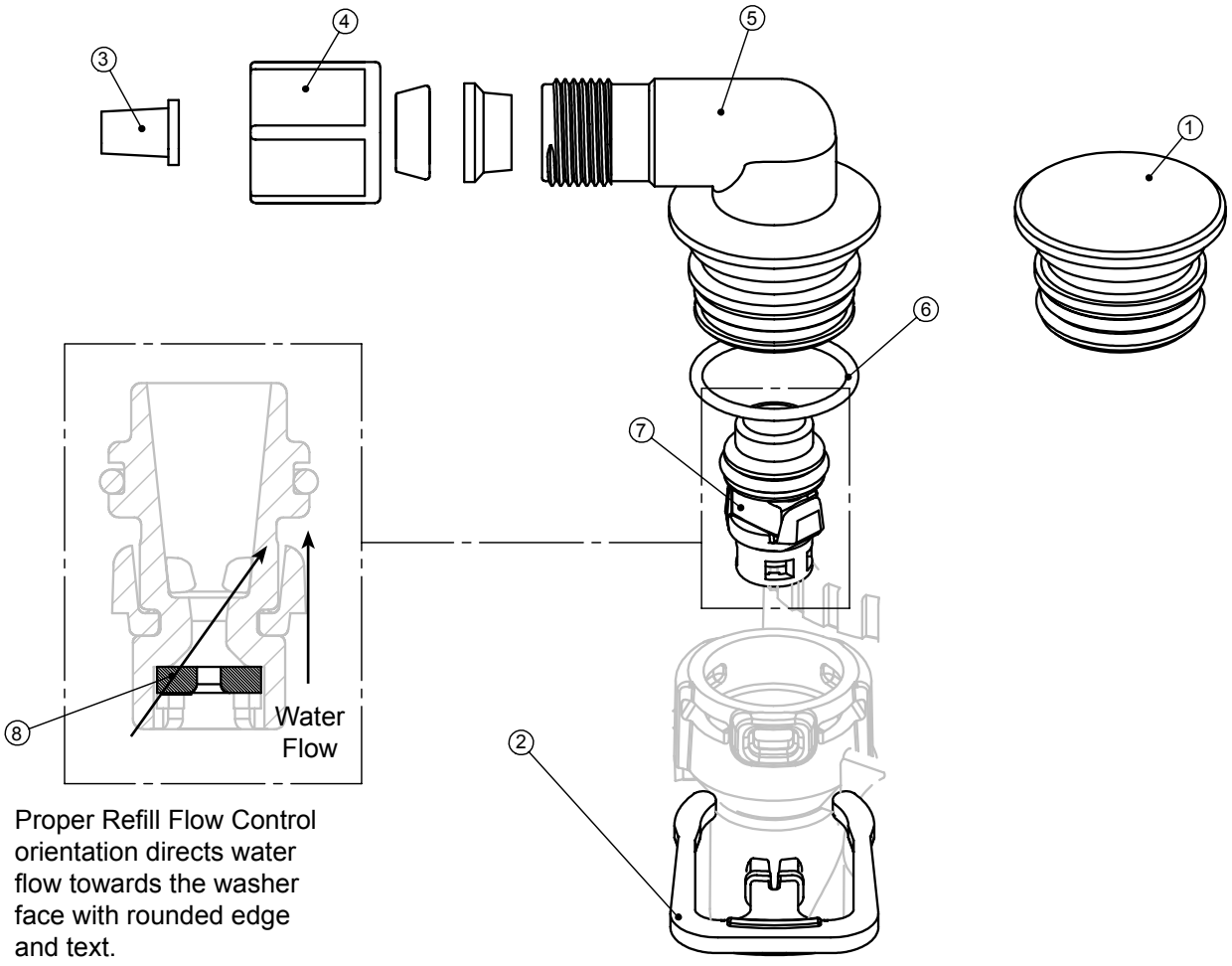


© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Parts Diagrams

Refill Port

No.	Part No.	Description	Qty.
1	02910173	Refill Port Plug Assy	Required for Backwash Only Systems
2	03310730	Elbow Locking Clip	1
3	03310738	Polytube Insert 3/8"	1
4	03310732	Nut 3/8"	1
5	03310740	Elbow Cap	1
6	02910154	O-Ring 019	1
7	02910155	Refill Flow Control Retainer Assy	1
8	02910167	Refill Flow Control	1
Not Shown	03310725	Elbow 1/2" w/ Nut and Insert	Option



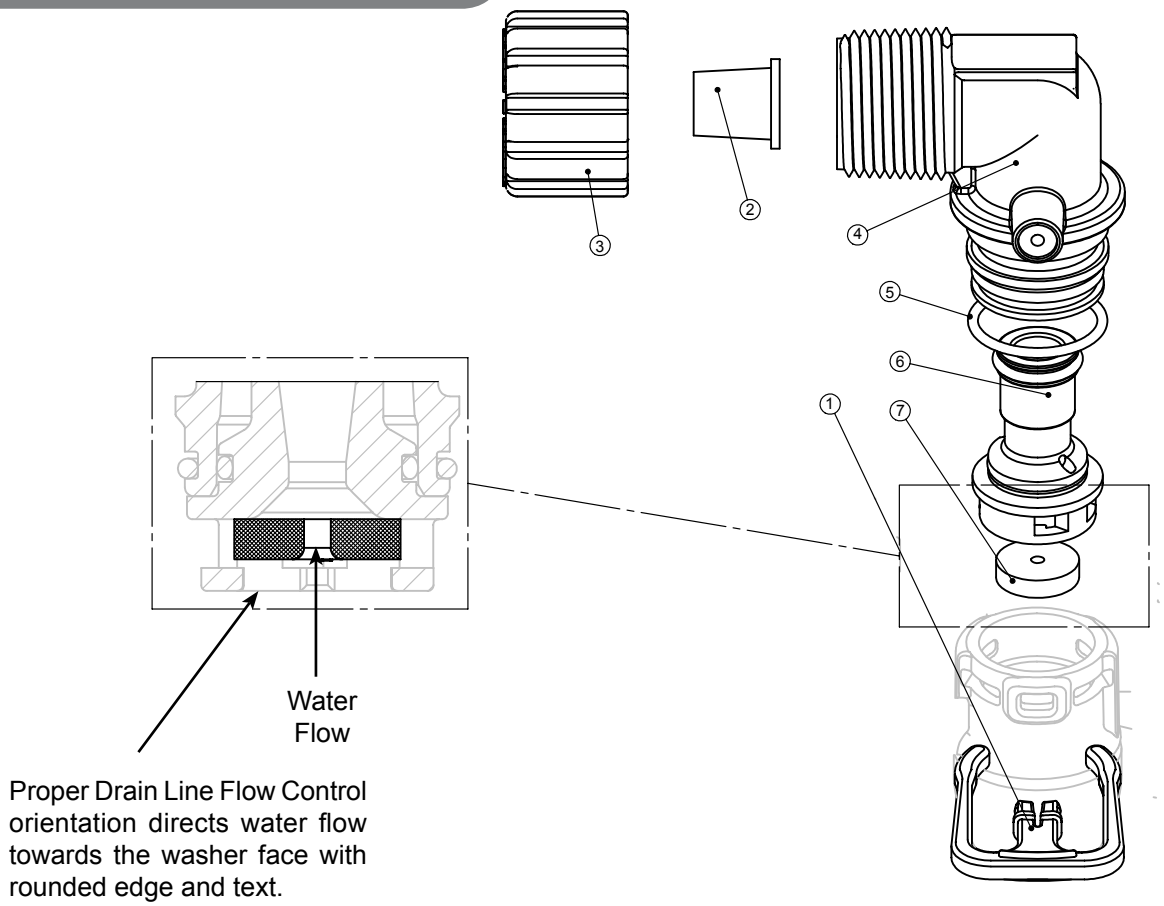
Proper Refill Flow Control orientation directs water flow towards the washer face with rounded edge and text.

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Parts Diagrams

3/4” Drain Assy

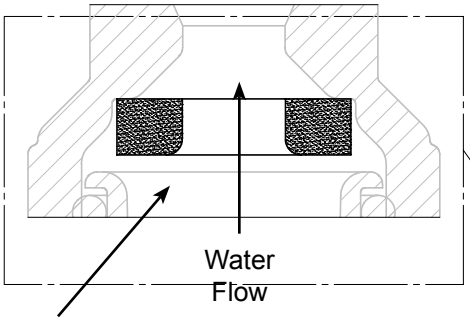
No.	Part No.	Description	Qty.
1	03310730	Elbow Locking Clip	1
2	02950122	Polytube Insert 5/8"	1
3	02950121	Nut 3/4" Drain Elbow	1
4	02910152	Drain Elbow 3/4" Male Assy	1
5	02910154	O-Ring 019	1
6	02910153	DLFC Retainer Assy	1
7	02950124	DLFC 0.7 gpm for 3/4"	One DLFC must be used if 3/4" fitting is used
	02950125	DLFC 1.0 gpm for 3/4"	
	02950126	DLFC 1.3 gpm for 3/4"	
	02950127	DLFC 1.7 gpm for 3/4"	
	02950128	DLFC 2.2 gpm for 3/4"	
	02950129	DLFC 2.7 gpm for 3/4"	
	02950130	DLFC 3.2 gpm for 3/4"	
	02950131	DLFC 4.2 gpm for 3/4"	
	02950132	DLFC 5.3 gpm for 3/4"	
	02950133	DLFC 6.5 gpm for 3/4"	
	02950134	DLFC 7.5 gpm for 3/4"	
	02950135	DLFC 9.0 gpm for 3/4"	
	02950136	DLFC 10.0 gpm for 3/4"	



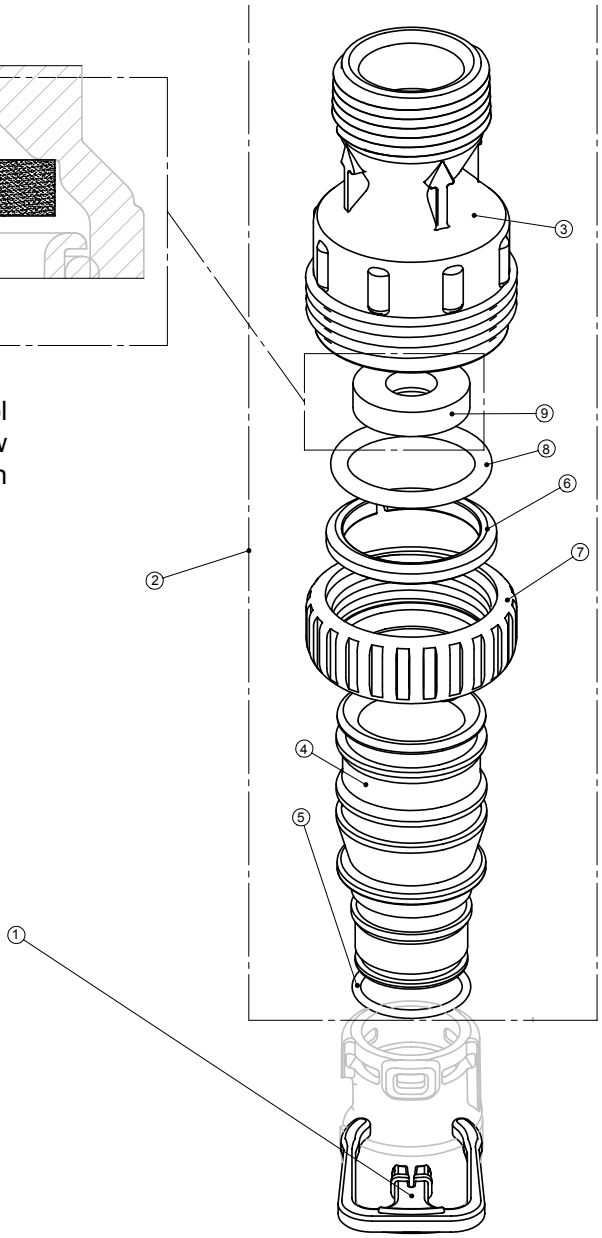
Proper Drain Line Flow Control orientation directs water flow towards the washer face with rounded edge and text.

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Parts Diagrams



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



Drain Assy 1”

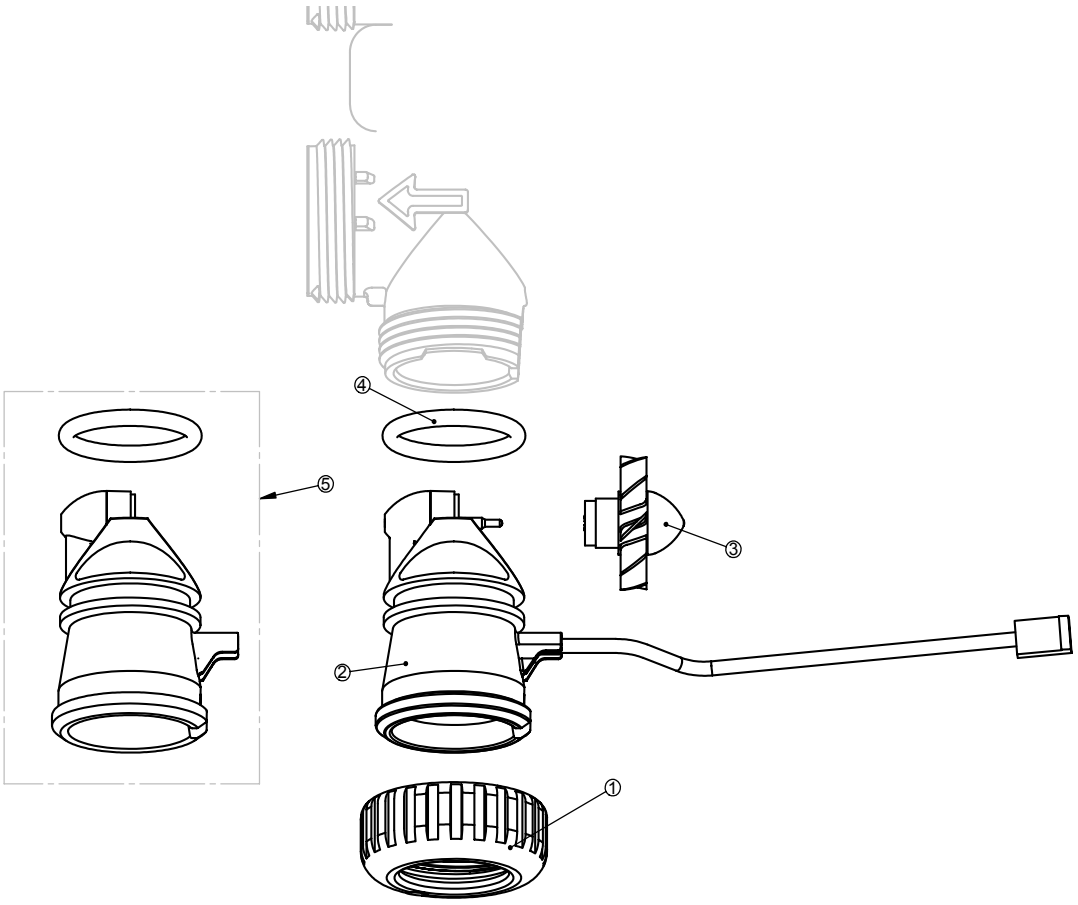
No.	Part No.	Description	Qty.
1	03310730	Elbow Locking Clip	1
2	02950122	Drain Fitting 1" Straight	1
3	02950121	Drain Fitting 1" Body	1
4	02910152	Drain Fitting 1" Adapter	1
5	02910154	O-Ring 019	1
6	02910153	Split Ring	1
7	02950124	Nut 1" QC	One DLFC must be used if 1" fitting is used
8	02950125	O-Ring 215	
9	02950126	DLFC 9.0 gpm for 1"	
	02950127	DLFC 10.0 gpm for 1"	
	02950128	DLFC 11.0 gpm for 1"	
	02950129	DLFC 13.0 gpm for 1"	
	02950130	DLFC15.0 gpm for 1"	
	02950131	DLFC 17.0 gpm for 1"	
	02950132	DLFC 20.0 gpm for 1"	
	02950133	DLFC 25.0 gpm for 1"	

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Parts Diagrams

Meter Assy

No.	Part No.	Description	Qty.
1	02910148	Nut 1" QC	1
2	02910108	Meter Assy	1
3	02910140	Turbine Assy	1
4	02910126	O-Ring 215	1
5	02910109	Meter Plug Assy	1

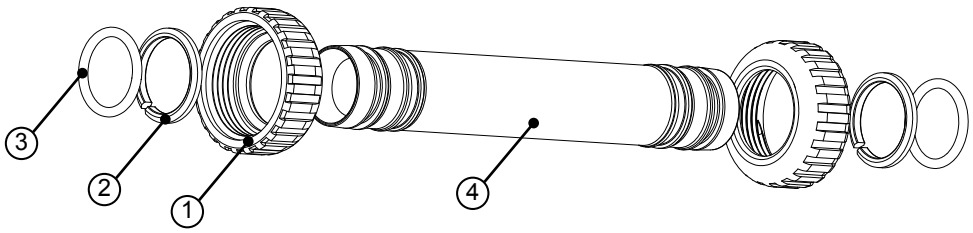


© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Parts Diagrams

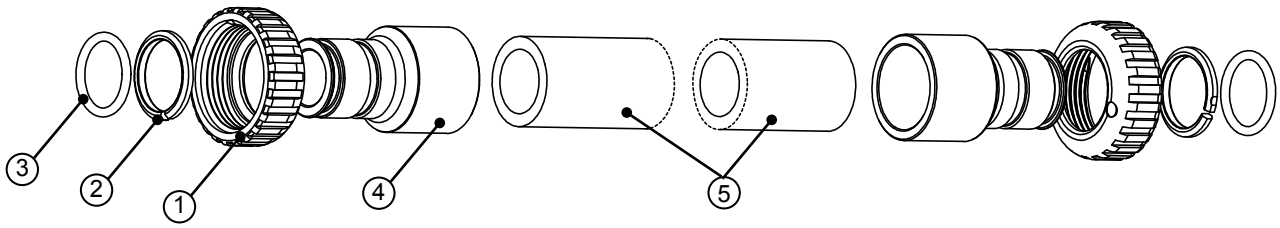
Interconnect Assy up to 10” Tanks

No.	Part No.	Description	Qty
1	02910148	WS1 NUT 1" QUICK CONNECT	4
2	02910147	WS1 SPLIT RING	4
3	02910126	O-RING 215	4
4	CALL	T1 INTERCONNECT FITTING	2
1 - 4	02910255	T1 INTERCONNECT FITTING ASSY	1



Interconnect Assy for 12” to 21” Tanks

No.	Part No.	Description	Qty
1	02910148	WS1 NUT 1” QUICK CONNECT	4
2	02910147	WS1 SPLIT RING	4
3	02910126	O-RING 215	4
4	CALL	WS1 FITTING 1¼”&1½” PVC SOLVENT	4
5	08803199 N	PIPE PVC SCH 80 1¼”	4’
1-5	02950095	INTERCONNECT KIT FOR 12”-21” TANKS	1



© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

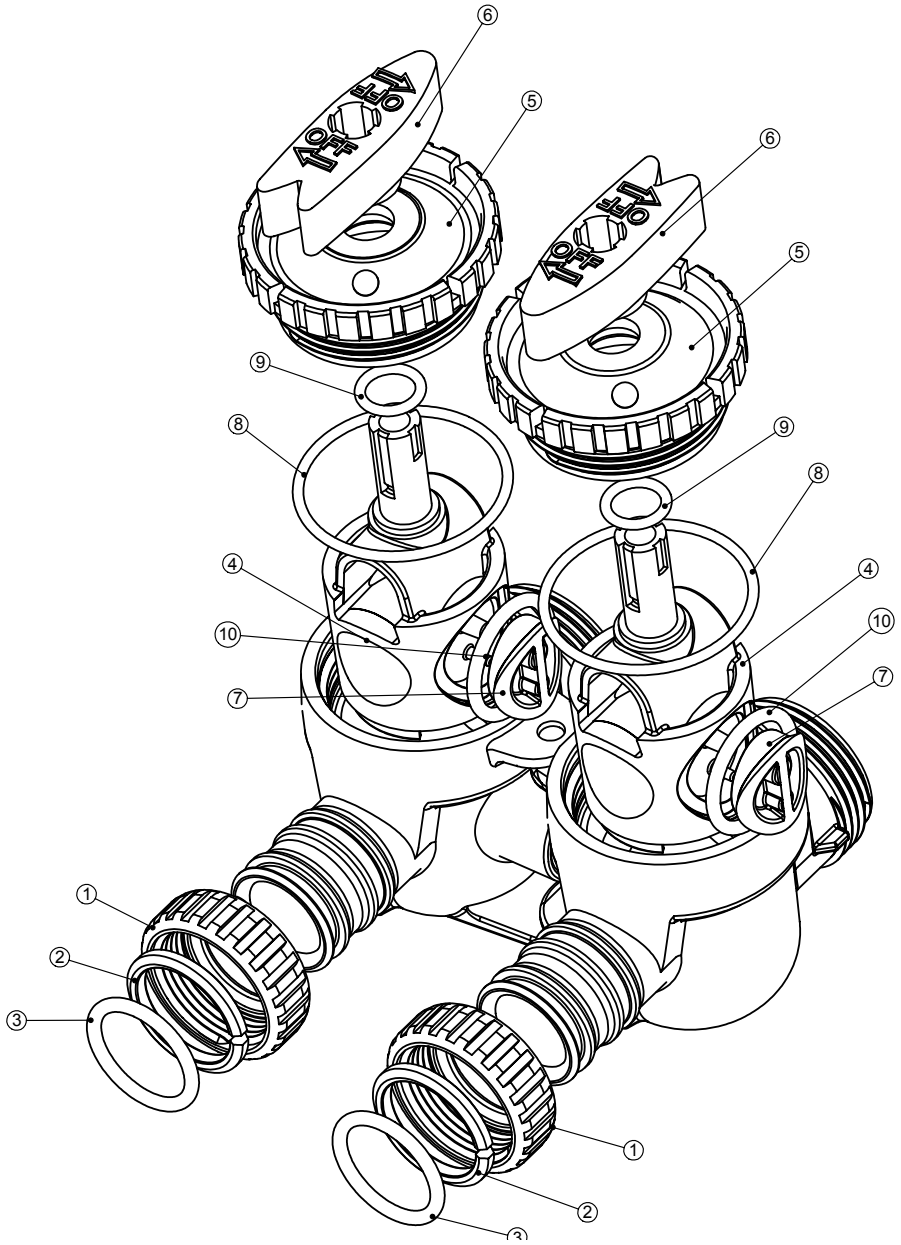
Parts Diagrams

Vertical Adapter Assy (Not Shown)

Part No.	Description	Qty.
02910148	Nut 1" Quick Connect	2
02910147	Split Ring	2
02910126	O-Ring 215	2
02950120	Bypass Vertical Adapter Assy	2

Bypass Valve

No.	Part No.	Description	Qty.
1	02910148	Nut 1" Quick Connect	2
2	02910147	Split Ring	2
3	02910126	O-Ring 215	2
4	02910142	Bypass 1" Rotor	2
5	02910143	Bypass Cap	2
6	02910187	Bypass Handle Gray	2
7	02910144	Bypass Rotor Seal Retainer	2
8	02910149	O-Ring 135	2
9	02910150	O-Ring 112	2
10	02910151	O-Ring 214	2

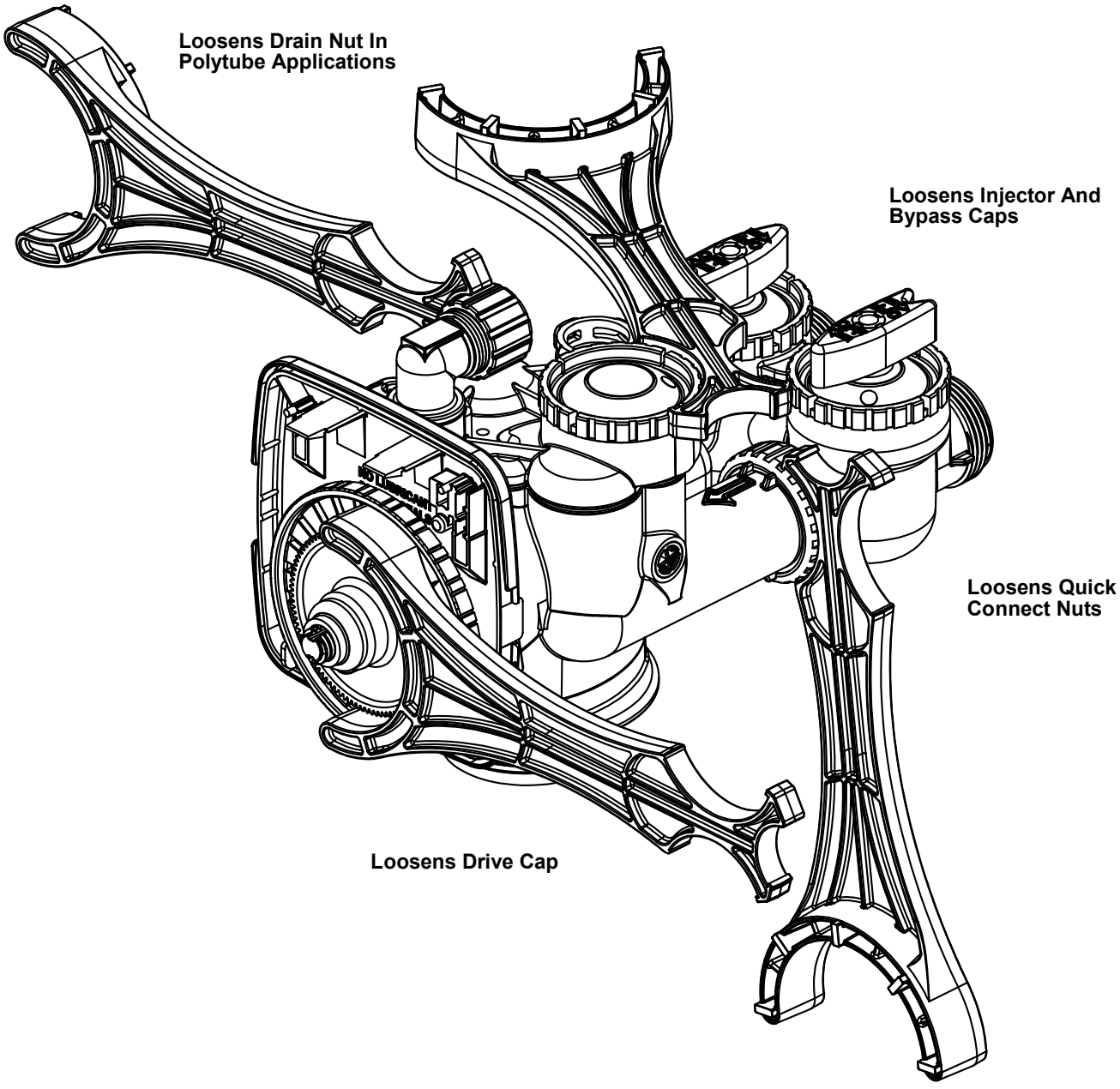


© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Parts Diagrams

Valve Wrench

No.	Part No.	Description	Qty.
Shown	02950123	Valve Wrench	1

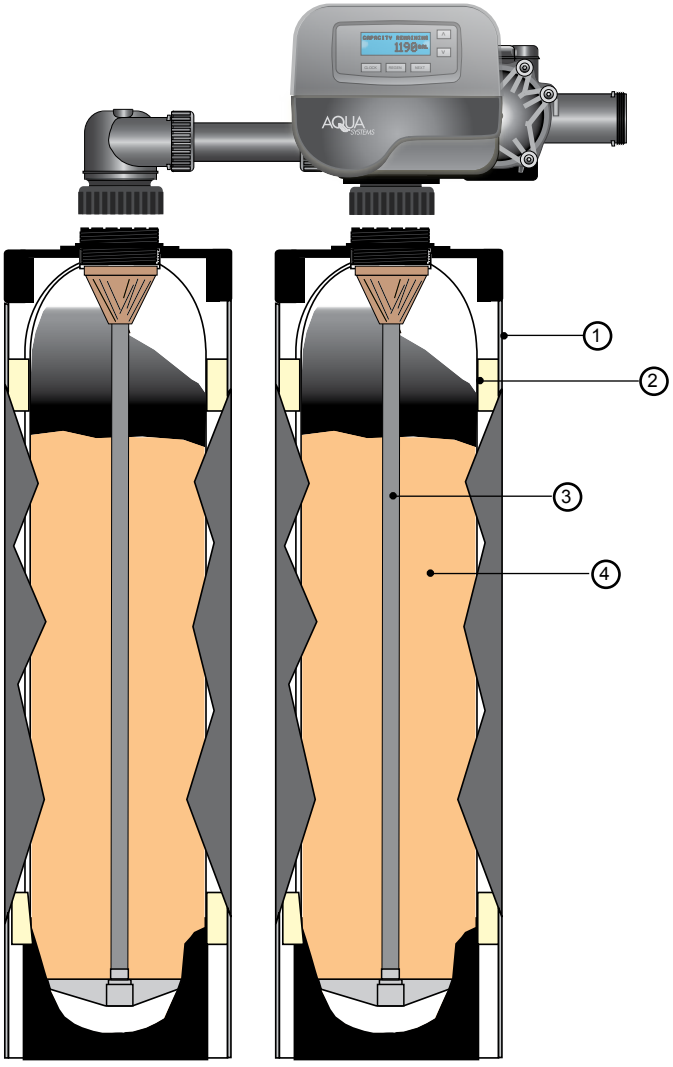


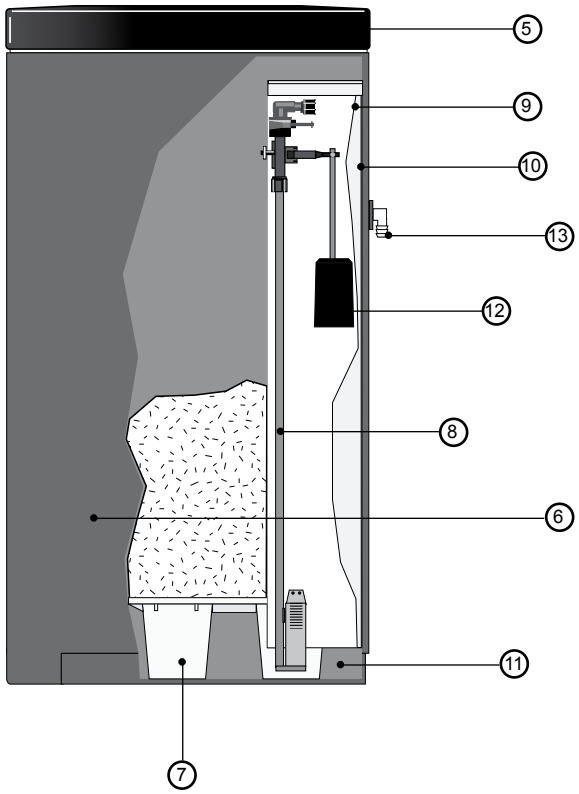
© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

System Parts Diagrams

Tank Assemblies

No.	Part No.	Description	Qty.
1a	04210895	Tank Shroud for 9" x 48" Tank	2
1b	04210902	Tank Shroud for 10" x 54" Tank	2
2	spec size	Resin Tank	2
3		Distributor Riser (incl w/ tank)	
4	03810800	High Capacity Resin	spec size
5	spec size	Brine Tank Cover	1
6a	03410xxx	Brine Tank w/IM Cover (spec size)	1
7	spec size	Salt Shelf	1
8	spec size	Brine Well	1
9	03310663	Brine Well Cap	1
10	03310720	474 Safety Brine Valve	1
11	03310715	474 Float Assy	1
12	03310710	474 Air Check Assy	1
13	03310654	Overflow Assy	1





© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Troubleshooting

Problem	Possible Cause	Solution
1. No Display on PC Board	a. No power at electric outlet	a. Repair outlet or use working outlet
	b. Control valve Power Adapter not plugged into outlet or power cord end not connected to PC board connection	b. Plug Power Adapter into outlet or connect power cord end to PC Board connection
	c. Improper power supply	c. Verify proper voltage is being delivered to PC Board
	d. Defective Power Adapter	d. Replace Power Adapter
	e. Defective PC Board	e. Replace PC Board
2. PC Board does not display correct time of day	a. Power Adapter plugged into electric outlet controlled by light switch	a. Use uninterrupted outlet
	b. Tripped breaker switch and/or tripped GFI	b. Reset breaker switch and/ or GFI switch
	c. Power outage	c. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	d. Defective PC Board	d. Replace PC Board
	a. Meter is not connected to meter connection on PC Board	a. Connect meter to three pin connection labeled METER on PC Board
	b. Restricted/ stalled meter turbine	c. Remove meter and check for rotation or foreign material
	c. Meter wire not installed securely into three pin connector	c. Verify meter cable wires are installed securely into three pin connector labeled METER
	d. Defective meter	d. Replace meter
	e. Defective PC Board	e. Replace PC Board
4. Control valve regenerates at wrong time of day	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
	b. Time of day not set correctly	b. Reset to correct time of day
	c. Time of regeneration set incorrectly	c. Reset regeneration time
	d. Control valve set at “on 0” (immediate regeneration)	d. Check programming setting and reset to NORMAL (for a delayed regen time)
	e. Control valve set at “NORMAL + on 0” (delayed and/ or immediate)	e. Check programming setting and reset to NORMAL (for a delayed regen time)
5. Time of day flashes on and off	a. Power outage	a. Reset time of day. If PC Board has battery back up present the battery may be depleted. See Front Cover and Drive Assembly drawing for instructions.
6. Control valve does not regenerate automatically when the REGEN button is depressed and held.	a. Broken drive gear or drive cap assembly	a. Replace drive gear or drive cap assembly
	b. Broken Piston Rod	b. Replace piston rod
	c. Defective PC Board	c. Defective PC Board
7. Control valve does not regenerate automatically but **does** when the REGEN button is depressed and held.	a. Meter is not connected to meter connection on PC Board	a. Connect meter to three pin connection labeled METER on PC Board
	b. Restricted/ stalled meter turbine	b. Remove meter and check for rotation or foreign material
	c. Incorrect programming	c. Check for programming error
	d. Meter wire not installed securely into three pin connector	d. Verify meter cable wires are installed securely into three pin connector labeled METER
	e. Defective meter	e. Replace meter
	f. Defective PC Board	f. Replace PC Board

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Troubleshooting

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

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Troubleshooting

Problem	Possible Cause	Solution
14. E1, Err – 1001, Err – 101 = Control unable to sense motor movement	a. Motor not inserted full to engage pinion, motor wires broken or disconnected	a. Disconnect power, make sure motor is fully engaged, check for broken wires, make sure two pin connector on motor is connected to the two pin connection on the PC Board labeled MOTOR. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. PC Board not properly snapped into drive bracket	b. Properly snap PC Board into drive bracket and then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Missing reduction gears	c. Replace missing gears
15. E2, Err – 1002, Err – 102 = Control valve motor ran too short and was unable to find the next cycle position and stalled	a. Foreign material is lodged in control valve	a. Open up control valve and pull out piston assembly and seal/ stack assembly for inspection. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Mechanical binding	b. Check piston and seal/ stack assembly, check reduction gears, check drive bracket and main drive gear interface. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Main drive gear too tight	c. Loosen main drive gear. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	d. Improper voltage being delivered to PC Board	d. Verify that proper voltage is being supplied. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
16. E3, Err – 1003, Err – 103 = Control valve motor ran too long and was unable to find the next cycle position	a. Motor failure during a regeneration	a. Check motor connections then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	b. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	c. Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Troubleshooting

Problem	Possible Cause	Solution
17. Err – 1004, Err – 104 = Control valve motor ran too long and timed out trying to reach home position	a. Drive bracket not snapped in properly and out enough that reduction gears and drive gear do not interface	a. Snap drive bracket in properly then Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
18. Err -1006, Err – 106, Err - 116 = MAV/ SEPS/ NHBP/ AUX MAV valve motor ran too long and unable to find the proper park position Motorized Alternating Valve = MAV Separate Source = SEPS No Hard Water Bypass = NHBP Auxiliary MAV = AUX MAV	a. 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
	b. MAV/ NHBP motor wire not connected to PC Board	b. Connect MAV/ NHBP motor to PC Board two pin connection labeled DRIVE. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	c. MAV/ NHBP motor not fully engaged with reduction gears	c. Properly insert motor into casing, do not force into casing Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	d. Foreign matter built up on piston and stack assemblies creating friction and drag enough to time out motor	d. Replace piston and stack assemblies. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
19. Err – 1007, Err – 107, Err - 117 = MAV/ SEPS/ NHBP/ 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	a. Foreign material is lodged in MAV/ NHBP valve	a. Open up MAV/ NHBP valve and check piston and seal/ stack assembly for foreign material. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.
	b. Mechanical binding	b. Check piston and seal/ stack assembly, check reduction gears, drive gear interface, and check MAV/ NHBP black drive pinion on motor for being jammed into motor body. Press NEXT and REGEN buttons for 3 seconds to resynchronize software with piston position or disconnect power supply from PC Board for 5 seconds and then reconnect.

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Notes

© 2013 New Aqua LLC dba Aqua Systems • 7785 East US Hwy 36 • Avon, IN 46123

Rev 0 12/13

© 2013 Aqua Systems®