
AQT-315

POWERFLO SERIES



AQUATROL™
CONTROL VALVES


SERVICE MANUAL

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Water Pressure	Minimum 25 PSI
Electrical Supply	Uninterrupted AC. Check voltage compatibility
Existing	Free of any deposits or build-ups inside pipes
Softener	Locate close to drain and connect according to plumbing codes
Bypass Valves	Always provide for bypass valve if unit is not equipped with one

CAUTION	
	Do not exceed 120 PSI water pressure
	Do not exceed 100°F water temperature
	Do not subject unit to freezing conditions

Installation Instructions

1. Place the softener tank where you want to install the unit making sure the unit is level and on a firm base.
(Maximum 4 feet apart for twin units.)
2. All plumbing should be done in accordance with local plumbing codes. The pipe size for the drain line should be the same size as the drain line flow control female connection. Water meters are to be installed on soft water outlets. Twin units with (1) one meter shall be installed on common soft water outlets of units.
3. Solder joints near the drain must be done prior to connecting the Drain Line Flow Control fitting. Leave at least 6" between the DLFC and solder joints when soldering when the pipes are connected on the DLFC. Failure to do this could cause interior damage to the DLFC.
4. Teflon tape is the only sealant to be used on the drain fitting. The drain from twin units may be run through a common line.
5. Make sure that the floor is clean beneath the salt storage tank and that it is level
6. Place approximately 1" of water above the grid plate (if used) in your salt tank. Salt may be place in the unit at this time.
7. On units with by-pass, place in by-pass position. Turn on main water supply. Open a cold soft water tap nearby and let run a few minutes or until the system is free from foreign material (usually solder) that may have resulted from the installation.
8. Place the by-pass in service position.
9. Manually index the softener control into "service" position and let water flow into the mineral tank. When water flow stops, open a cold water tap nearby and let run until air pressure is relieved.
10. Electrical: All electrical connections must be connected according to codes. Use electrical conduit if applicable. See Wiring Diagram section for more information.
11. Plug into power supply

How To Set Days On Which Water Conditioner Is To Regenerate:

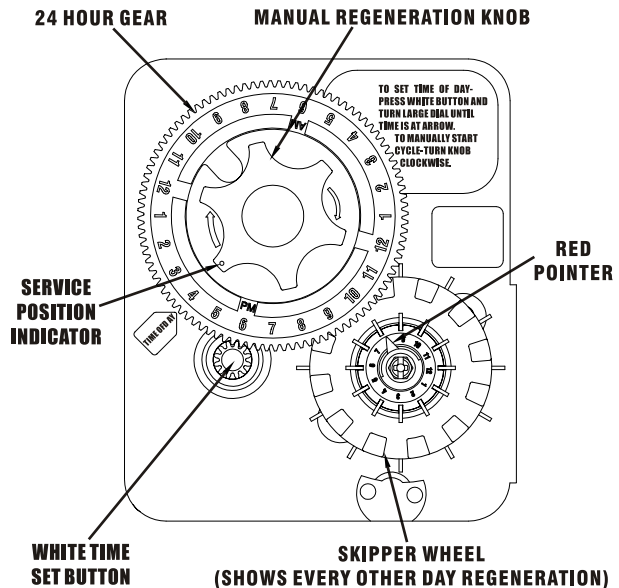
Rotate the skipper wheel until the number "1" is at the red pointer. Set the days that regeneration is to occur by sliding tabs on the skipper wheel outward to expose trip fingers. Each tab is one day. Finger at red pointer is tonight. Moving clockwise from the red pointer, extend or retract fingers to obtain the desired regeneration schedule.

How To Set The Time Of Day:

Press and hold the white button in to disengage the drive gear. Turn the large gear until the actual time of day is at the time of day pointer. Release the white button to again engage the drive gear.

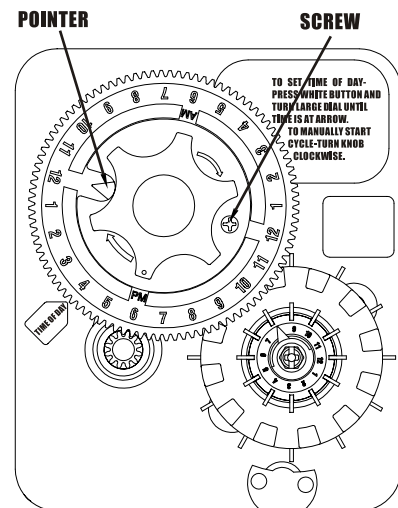
How To Manually Regenerate Your Water Conditioner At Any Time:

Turn the manual regeneration knob clockwise. This slight movement of the manual regeneration knob engages the program wheel and starts the regeneration program. The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing. Even though it takes three hours for this center knob to complete one revolution, the regeneration cycle of your unit might be set only one half of this time. In any event, conditioned water may be drawn after rinse water stops flowing from the water conditioner drain line.



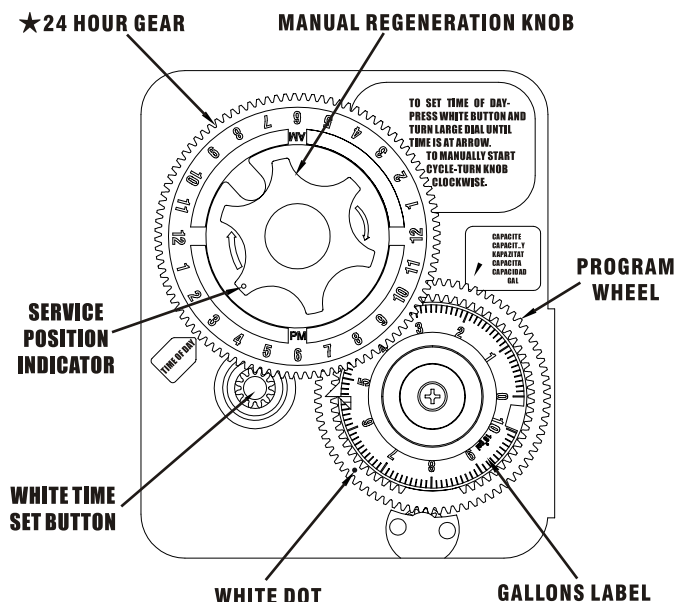
How To Adjust Regeneration Time:

1. Disconnect the power source.
2. Locate the three screws behind the manual regeneration knob by pushing the white button in and rotating the 24 hour dial until each screw appears in the cut out portion of the manual regeneration knob.
3. Loosen each screw slightly to release the pressure on the time plate from the 24 hour gear.
4. Locate the regeneration time pointer on the inside of the 24 hour dial in the cut out.
5. Turn the plate so the desired regeneration time aligns next to the raised arrow.
6. Push the white button in and rotate the 24 hour dial. Tighten each of the three screws.
7. Push the white button and locate the pointer one more time to ensure the desired regeneration time is correct.
8. Reset the time of day and restore power to the unit.



AQT-315 Timer Delay

Start-up Setting Procedures



NOTE:

To set meter capacity rotate manual knob 1-360° revolution to set the gallons.

Typical Programming Procedure

Calculate the gallon capacity of the system, subtract the necessary reserve requirement and set the gallons required by lifting the gallon dial and rotating it so that the number of gallons required is aligned with the white dot on the program wheel gear. Release and check for firm engagement with gear.

Note: To set meter capacity at initial start-up, either:

1. Rotate the manual regeneration knob one full revolution.
 - or
 2. Rotate the program wheel manual clockwise and align white dot with capacity arrow.
- This procedure must be followed any time the program wheel setting is changed.

How To Set The Time Of Day:

Press and hold the white button in to disengage the drive gear.

Turn the large gear until the actual time of day is opposite of the time of day pointer.

Release the white button to again engage the drive gear.

How To Manually Regenerate Your Water Conditioner At Any Time:

Turn the manual regeneration knob clockwise one "click".

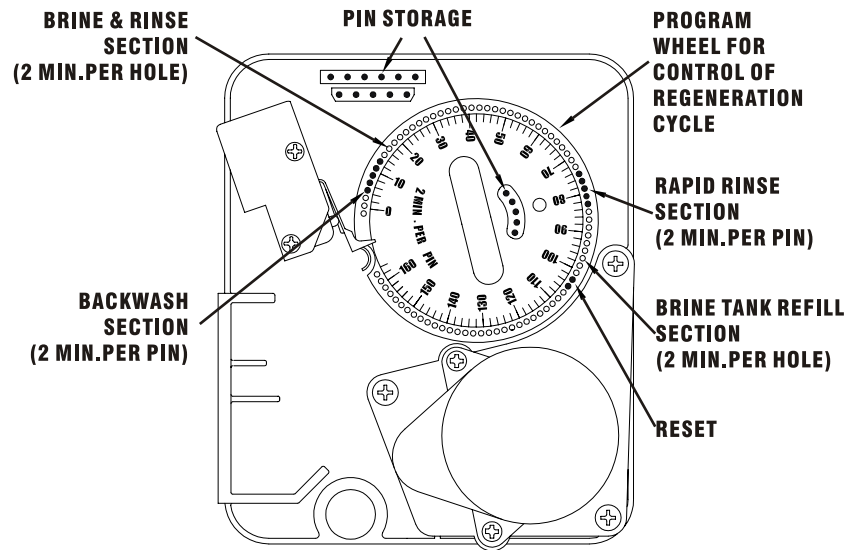
This slight movement of the manual regeneration knob engages the program wheel and starts the regeneration program.

The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing. Even though it takes three hours for this center knob to complete one revolution, the regeneration cycle of your unit might be set for only on half of this time.

In any event, conditioned water may be drawn after rinse water stops flowing from the water conditioner drain line.

Immediate Regeneration Times:

These timers do not have a 24 hour gear. Setting the gallons on the program wheel and manual regeneration procedure are the same as previous instructions.



How To Set The Regeneration Cycle Program:

The regeneration cycle program on your water conditioner has been factory preset, however, portions of the cycle or program may be lengthened or shortened in time to suit local conditions.

Timer Setting Procedure:

How To Change The Length Of The Backwash Time:

The program wheel as shown in the drawing is in the service position. As you look at the numbered side of the program wheel, the group of pins starting at zero determines the length of time your unit will backwash.

For example: If there are six pins in this section, the time of backwash will be 12 min. (2 min. per pin). To change the length of backwash time, add or remove pins as required. The number of pins times two equals the backwash time in minutes.

How To Change The Length Of Brine And Rinse Time:

The group of holes between the last pin in the backwash section and the second group of pins determines the length of time that your unit will brine and rinse (2 min. per hole).

To change the length of brine and rinse time, move the rapid rinse group of pins to give more or fewer holes in the brine and rinse section. Number of holes times two equals brine and rinse time in minutes.

How To Change The Length Of Rapid Rinse:

The second group of pins on the program wheel determines the length of time that your water conditioner will rapid rinse (2 min. per pin)

To change the length of refill time, add or remove pins at the higher numbered end of this section as required. The number of pins times two equals the rapid rinse time in minutes.

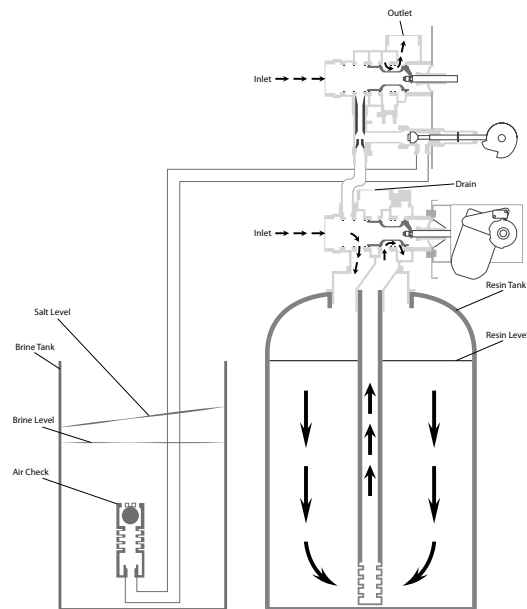
How To Change The Length Of Brine Tank Refill Time:

The second group of holes in the program wheel determines the length of time that your water conditioner will refill the brine tank (2 min. per hole).

To change the length of refill time, move the two pins at the end of the second group of holes as required.

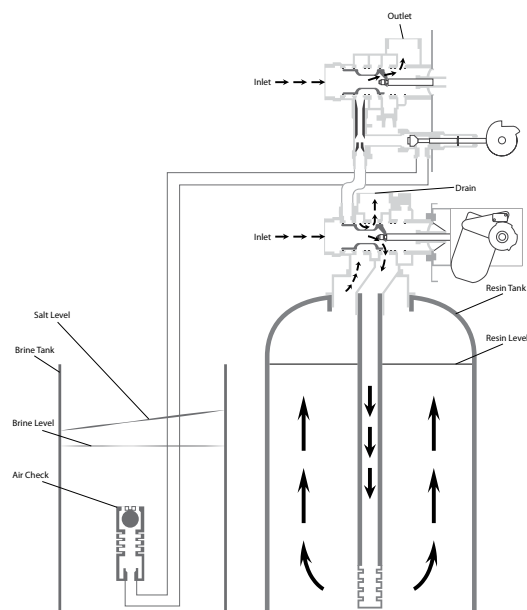
The regeneration cycle is complete when the outer microswitch is tripped by the two pin set at the end of the brine tank refill section.

The program wheel, however, will continue to rotate until the inner micro-switch drops into the notch on the program wheel.



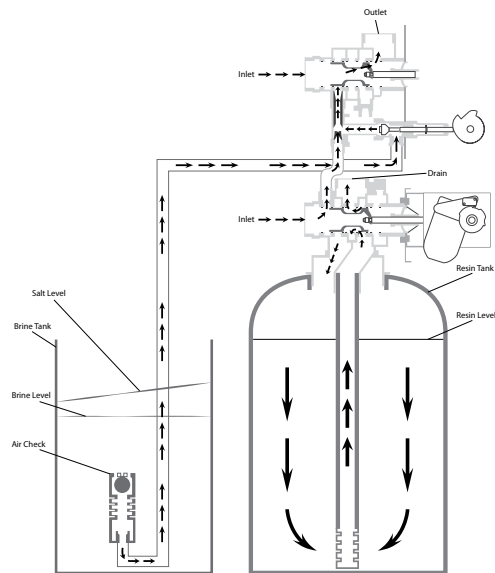
1) Service Position

Hard water enters unit at valve inlet and flows down through the mineral in the mineral tank. Conditioned water enters center tube through the bottom distributor, then flows up through the center tube, around the piston, and out the outlet of the valve.



2) Backwash Position

Hard water enters unit at valve inlet and flows through the piston and down the center tube, through the bottom distributor and up through the mineral, around the piston and out the drain line.

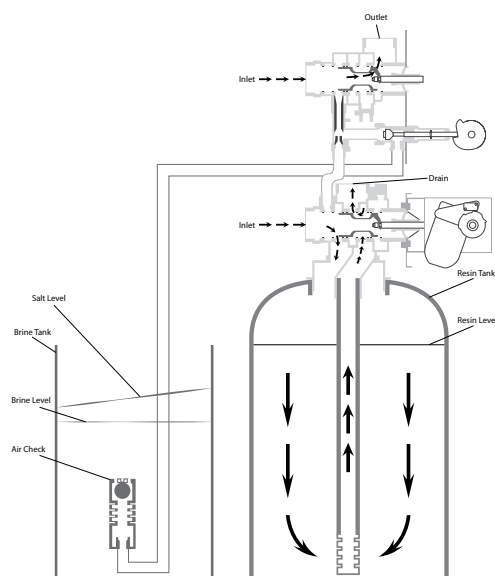


3) Brine Position

Hard water enters unit at valve inlet - flows up into injector housing and down through nozzle and orifice to draw brine from the brine tank - brine flows down the center tube through bottom of tank, up through the mineral to top of tank, around the piston and out the drain line.

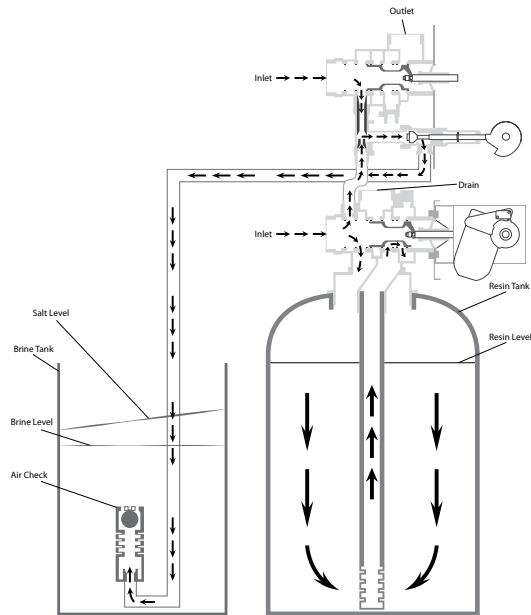
4) Slow Rinse Position

Hard water enters unit at valve inlet - flows up into injector housing and down through nozzle and orifice - around the piston - down through center tube and bottom distributor - flows up the mineral, around piston and out through the drain line.



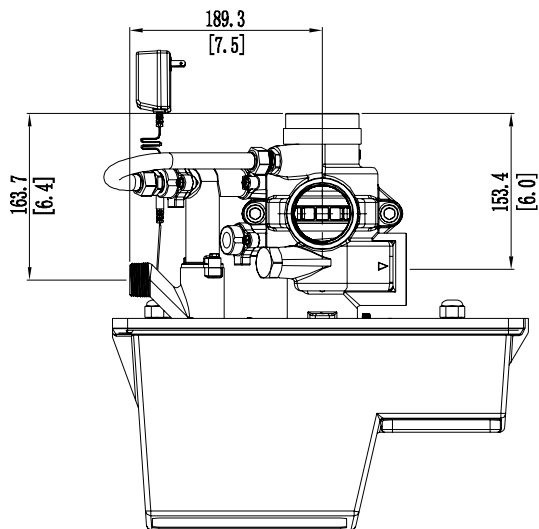
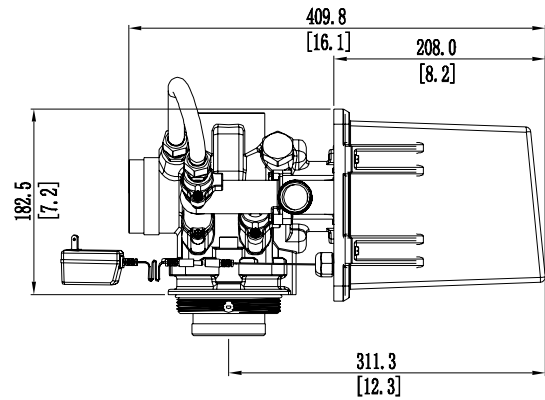
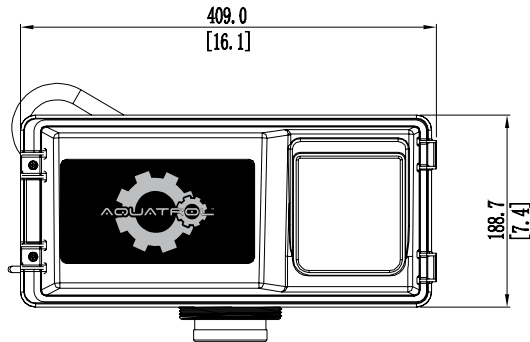
5) Rapid Rinse

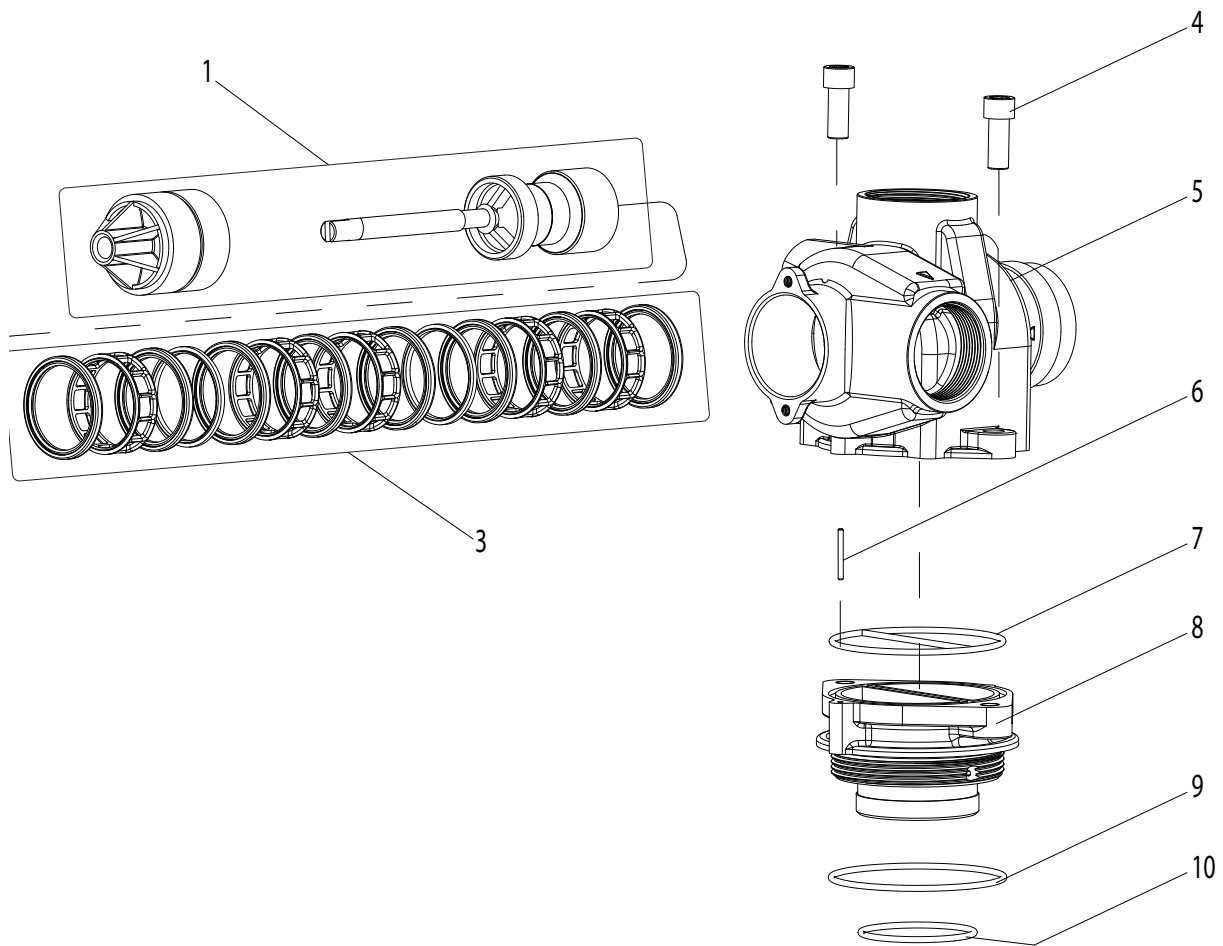
Hard water flows directly from inlet down through the mineral into the bottom distributor and up through the center tube - around the piston and out the drain line.



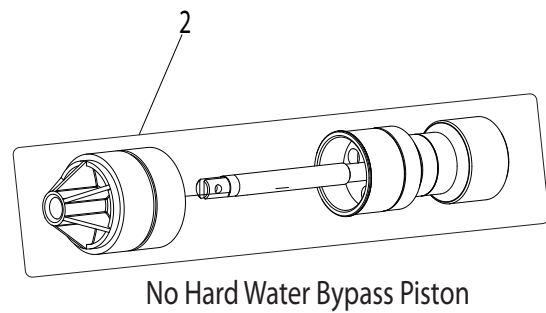
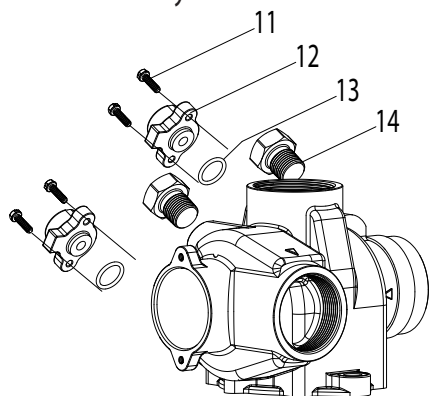
6) Brine Tank Fill Position

Hard water enters unit at valve inlet -flows up through the injector housing and through the brine valve to fill brine tank.



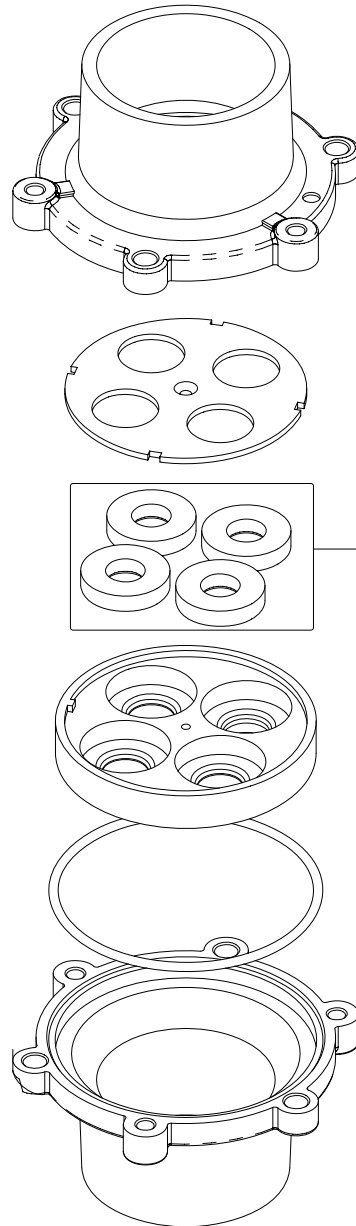


Filter Valve Body



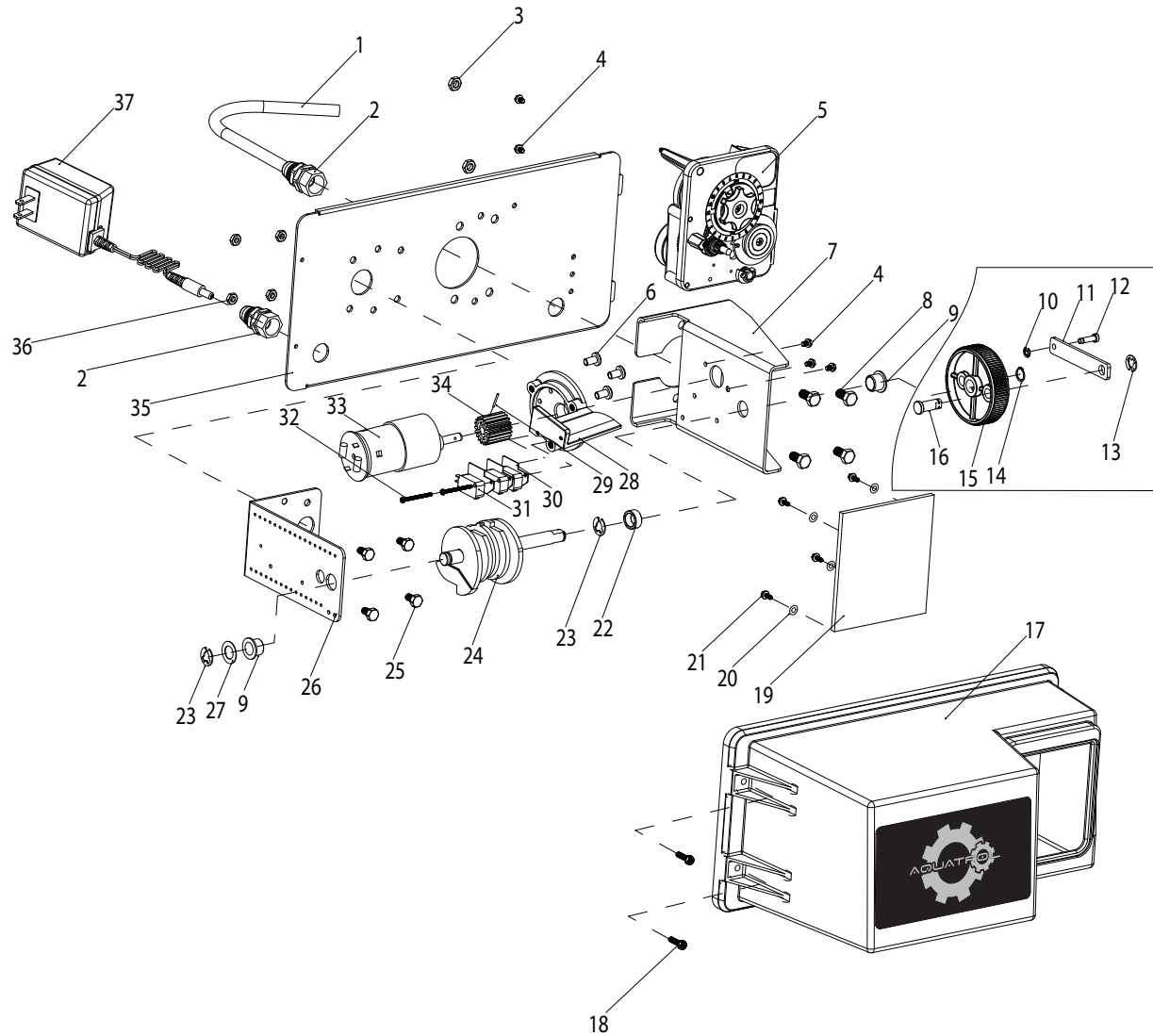
Item No.	Quantity	Part No.	Description
1	1	A-60106-00	Piston HW, AQT-315, AQT-390 Upper
2	1	A-60113-01	Piston NHW, AQT-315, AQT-390 Upper
3	1	A-60131	Seals & Spacers, AQT-315, AQT-390 Upper
4	2	A-02057F	Screw, Body
5	1	A-15114	Body, Valve, AQT-315
6	1	A-00108F	Straight Pin
7	1	A-15112	Seal, Valve Body-Adapter
8	1	A-15117-01	Adapter
9	1	A-13575	O-ring
10	1	A-15247	O-ring
11	4	A-12473	Screw, Plug, Injector
12	2	A-16341-02	Plug, Injector, 180
13	2	A-15246	O-ring, Plug, Injector
14	2	A-31509F	Screw, Male Plug

A-60711
DLFC, 2" NPT



DLFC Buttons
(4 X DLFC)

* DLFC Button / Washer Options (x 4, can be mixed)	
A-17942	DLFC Washer, 5 gpm
A-17943	DLFC Washer Flow 8 gpm
A-17944	DLFC Washer Flow 9 gpm
A-16529	DLFC Washer Flow 10 gpm
A-16735	DLFC Washer Flow 12 gpm
A-16736	DLFC Washer Flow 15 gpm
A-16528	DLFC Washer Flow 20 pm
A-16737	DLFC Washer Flow 25 gpm



Item No.	Quantity	Part No.	Description
1	1	A-17470	Cable Guide, Meter
2	1	A-17470-00	Screw Cap
3	2	A-16346	Nut, Timer
4	2	A-11225	Screw, Timer
5*	1		Timer, Mechanical
6	3	A-10016S	Screw, Motor Mounting
7	3	A-15120-01	Motor, Bracket
8	2	A-11224	Hex Bolt, Motor Bracket
9	2	A-16052	Bushing
10	1	A-11898	Retainer
11	1	A-16047	Connecting Link
12	1	A-11709	Pin-drive Link
13	1	A-11774	Retaining Ring
14	1	A-16050	Retaining Ring
15	1	A-16046	Drive Gear, Kit (includes #10 - #16), 315/390
16	1	A-16048	Drive Bearing
17	1	A-60240	Valve Cover
18	1	A-60240	Screw, Cover
19	1	A-60240	Transparent Panel
20	1	A-60240	Washer
21	1	A-60240	Screw
22	1	A-16052-1	Bushing, Cam
23	2	A-16051	Retaining Ring
24	1	A-16494-03	Cam
25	4	A-10231	Hex Bolt, Bracket, Brine Valve
26	1	A-16053	Bracket, Brine Valve
27	1	A-16059	Washer, SS
28	3	A-17797	Bracket, Switch Mounting 315/390
29	1	A-11381	Roll Pin
30	3	A-10302	Insulator, Switch
31	3	A-10218	Switch
32	2	A-40080	Screw, Switch
33	1	A-30018F	Motor 24V, AQT-275, 285, 290 Up, 315, 390 Up & Low
34	1	A-16045-3G	Drive Pinion, Motor 3rd Gen.
35	1	A-19304	Back Plate
36	4	A-11235	Nut
37	1	A-07190F	Transformer, 24V, 60Hz, for Mechanical and NX

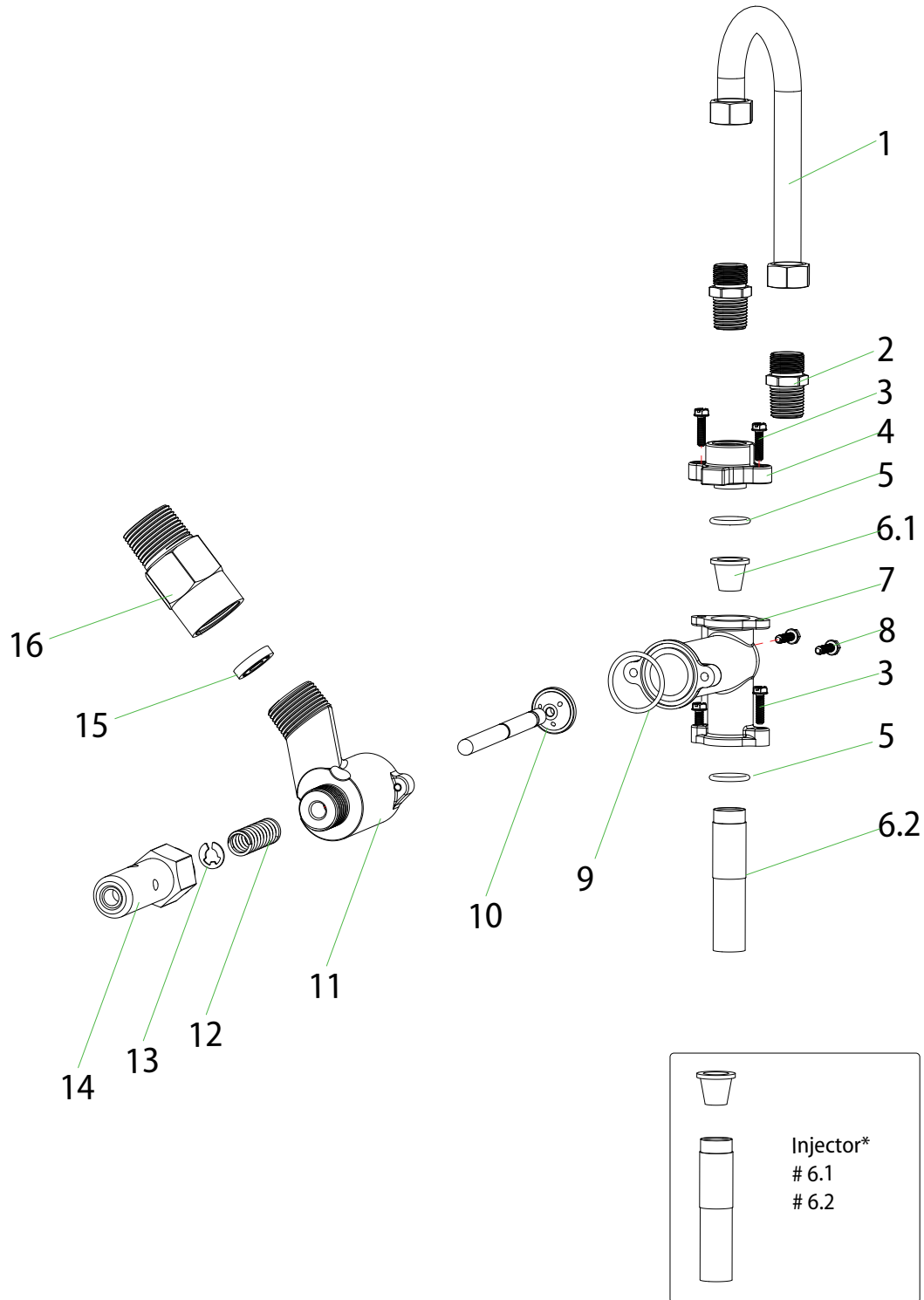
180 Brine System

Assembly



PN 1 - 14 ----- A-60277 --- Brine Valve, Short Stem, Less BLFC, 1" for AQT-315 & AQT-390

PN 10 - 14 ----- A-60036 --- Injector Body, 1" for AQT-315 & AQT-390



Item No.	Quantity	Part No.	Description
1	1	A-18703	Brine Tube
2	2	A-18702	Tube Fitting
3	6	A-12473	Screw
4	1	A-16341-01	Cap, Injector, BV-180
5	2	A-15246	O-Ring, Cap, Injector, BV-180
6.1*	1		Injector Nozzle
6.2*	1		Injector Throat
7	1	A-16340	Injector Body
8	2	A-12473	Screw
9	1	A-19054	O-Ring
10	1	A-16497-01	Brine Stem Assembly
11	1	A-18713	Brine Valve Body, BV-180
12	1	A-11772	Spring, BV-180
13	1	A-11774	Retaining Ring
14	1	A-16498-01	Stem Guide Assembly
15**	1		BLFC, Button
16	1	A-60710	BLFC, Brine Fitting, BV-180

* BLFC Button / Washer Options	
A-17942	BLFC Washer, 5 gpm
A-17943	BLFC Washer, 8 gpm
A-17944	BLFC Washer, 9 gpm
A-16529	BLFC Washer, 10 gpm
A-16735	BLFC Washer, 12 gpm
A-16736	BLFC Washer, 15 gpm
A-16528	BLFC Washer, 20 gpm
A-16737	BLFC Washer, 25 gpm

Troubleshooting

Problems, Cause & Corrections



Problem	Cause	Correction
1) Softener fails to regenerate.	A) Electrical service to unit has been interrupted.	A) Assure permanent electrical service (check fuse, plug, pull chain or switch).
	B) Timer is defective.	B) Replace timer.
	C) Power failure.	C) Reset time of day.
2) Hard water.	A) By-pass valve is open.	A) Close by-pass valve.
	B) No salt in brine tank.	B) Add salt to brine tank and maintain salt level above water level.
	C) Injector screen plugged.	C) Clean injector screen.
	D) Insufficient water flowing into brine tank.	D) Check brine tank fill time and clean brine line flow control if plugged.
	E) Hot water tank hardness.	E) Repeated flushing of the hot water tanks required.
	F) Leak at distributor tube.	F) Make sure distributor tube is not cracked. Check O-ring and tube pilot.
	G) Internal Valve Leak.	G) Replace seals and spacers and/or piston.
	H) Service Adapter did not return to service.	H) Check drive motor and switch.
3) Unit used too much salt.	A) Improper salt setting.	A) Check salt usage and salt setting.
	B) Excessive water in brine tank.	B) See problem No. 7.
4) Loss of water pressure.	A) Iron buildup in line to water conditioner.	A) Clean line to water.
	B) Iron buildup in water conditioner.	B) Clean control and add mineral cleaner to mineral bed. Increase frequency of regeneration.
	C) Inlet of control plugged due to foreign material broken loose from pipes by recent work done on plumbing system.	C) Remove piston and clean control.
5) Loss of mineral through drain line.	A) Air in water system.	B) Assure that well system has proper air eliminator control. Check for dry well conditions.
	B) improper size drain line flow control.	B) Check for proper drain rate.
6) Iron in conditioned water.	A) Fouled mineral bed.	A) Check backwash, brine draw and brine tank fill. Increase frequency of regeneration. Increase backwash time.
7) Excessive water in brine tank.	A) Plugged drain line flow control.	A) Clean flow control.
	B) Plugged injector system.	B) Clean injector and screen.
	C) Timer not cycling.	C) Replace timer.
	D) Foreign material in brine valve.	D) Replace brine valve seat and clean valve.
	E) Foreign material in brine line flow control.	E) Clean brine line flow control.

Problem	Cause	Correction
8) Softener fails to draw brine.	A) Drain line flow control is plugged.	A) Clean drain line flow control.
	B) Injector is plugged.	B) Clean injector.
	C) Injector screen plugged.	C) Clean screen.
	D) Line pressure is too low.	D) Increase line pressure to 20 P.S.I.
	E) Internal control leak.	E) Change seals, spacers and piston assembly
	F) Service adapter did not cycle.	F) Check drive motor and switches.
9) Control cycle continuously.	A) Misadjusted, broken or shorted switch.	A) Determine if switch or timer is faulty and replace it or replace complete power head.
10) Drain flows continuously.	A) Valve is not programming correctly.	A) Check timer program and positioning of control. Replace power head assembly if not positioned properly.
	B) Foreign material in control.	B) Remove power head assembly and inspect bore. Remove foreign material and check control in various regeneration positions.
	C) Internal control leak	C) Replace seals and piston assembly.

General Service Hints for Meter Control

Problem: Softener delivers hard water

Reason: Reserve capacity has been exceeded.

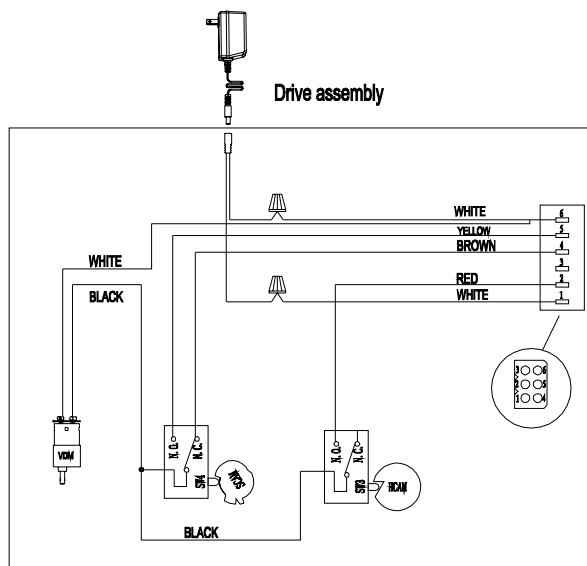
Correction: Check salt dosage requirements and reset program wheel to provide additional reserve.

Reason: Program wheel is not rotating with meter output.

Correction: Pull cable out of meter cover and rotate manually. Program wheel must move without binding and clutch must give positive clicks when program wheel strikes regeneration stop. If it does not, replace timer.

Reason: Meter is not measuring flow.

Correction: Check meter with meter checker.

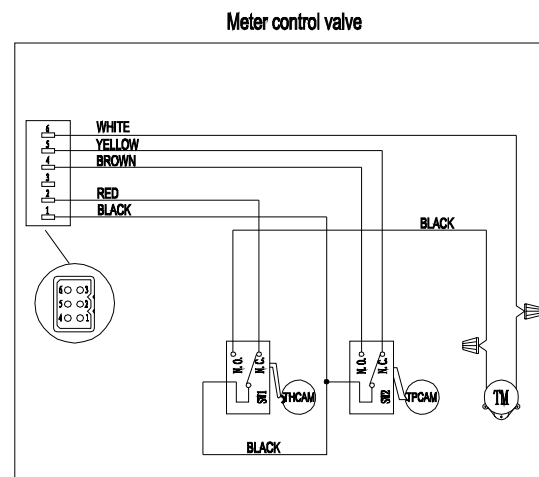
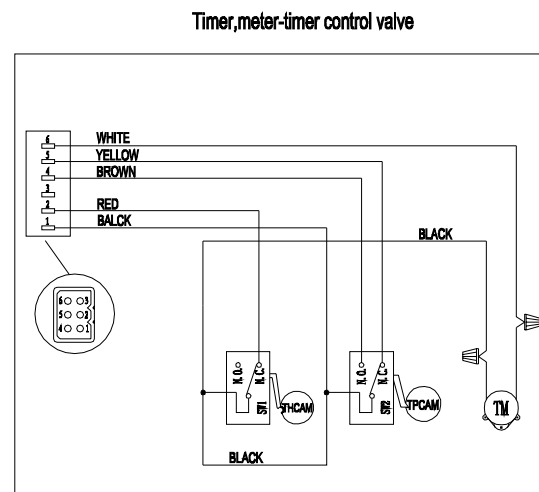


System #4 Immediate/Delayed Regeneration Valve Wiring

TM	Time Motor
VDM	Valve Drive Motor
SW1	Timer Homing Switch
SW2	Timer Program Switch
SW3	Valve Homing Switch
SW4	Valve Step Switch
SW5	Brine Cam Switch
THCAM	Timer Homing Cam
TPCAM	Timer Program Cam
HCAM	Valve Homing Cam
SCAM	Valve Step Cam
BVCAM	Brine Valve Cam

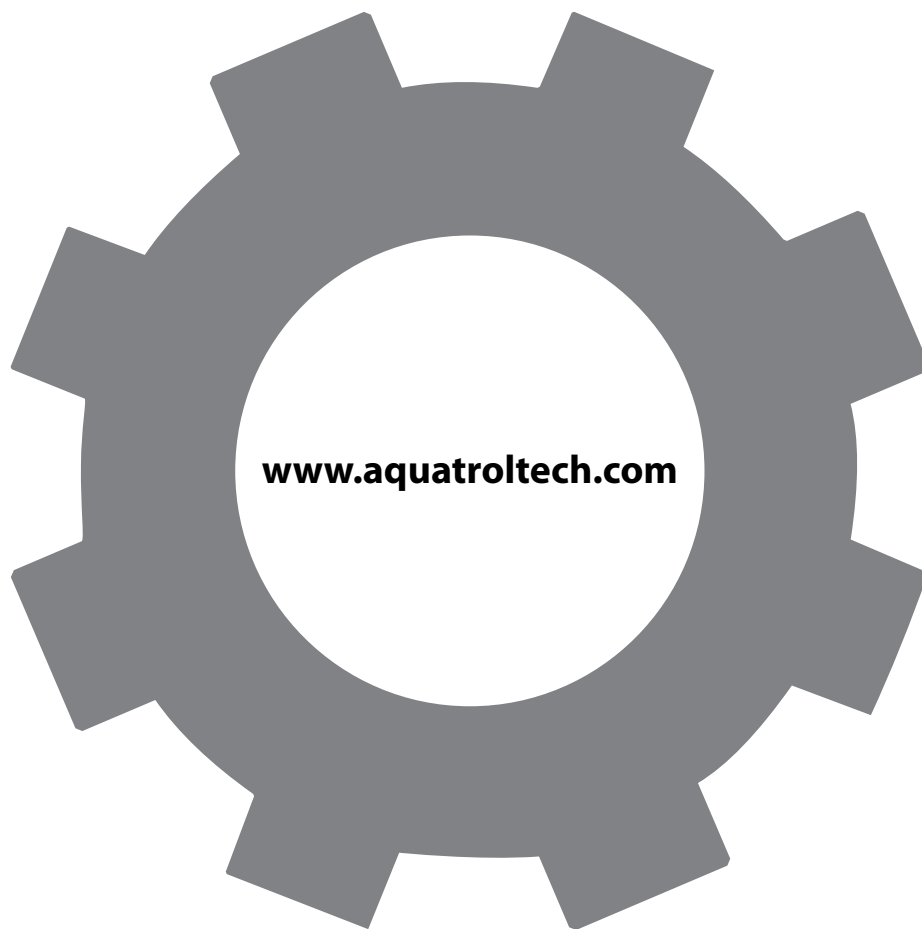
Note:

1. Single tank time clock, meter delayed, or meter immediate regeneration.
2. Valve shown in service position.



NOTES:

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