SAFE WATER TECHNOLOGIES, INC.

SERVICE MANUAL

SERVICE INSTRUCTIONS & ASSEMBLY DRAWINGS

FOR

TECH CONTROL VALVES

(TECH, TECH-CS, TECH-EE, TECH-TC)

FILTERS, SOFTENERS, CONDITIONERS

1 INCH TECH SERIES CONTROL VALVE MODEL: WS1

1.25 INCH TECH SERIES CONTROL VALVE MODEL: WS1.25

1 INCH TECH-CS SERIES CONTROL VALVE MODEL: WS1CS

1.25 INCH TECH-CS SERIES CONTROL VALVE MODEL: WS1.25CS

1 INCH TECH-EE SERIES CONTROL VALVE MODEL: WS1EE

1.25 INCH TECH-EE SERIES CONTROL VALVE MODEL: WS1.25EE

1 INCH TECH-TC SERIES CONTROL VALVE MODEL: WS1TC

1.25 INCH TECH-TC SERIES CONTROL VALVE MODEL: WS1.25TC

NOVEMBER 2022

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Introduction

This manual provides information about the service of the Safe Water Technologies 1 inch and 1.25 inch Tech Series Control Valves for use in water softener or water filter applications.

General Warnings

- 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.
- **Hydrocarbons such as kerosene, benzene, gasoline, etc., may damage products that contain o-rings or plastic components. Exposure to such hydrocarbons may cause the products to leak. DO NOT USE the product(s) contained in this document on water supplies that contain hydrocarbons such as kerosene, benzene, gasoline, etc.**
- **The Tech Series water meter should not be used as the primary monitoring device for critical or health effect applications.**
- Do not use Vaseline, oils, other hydrocarbon lubricants, or spray silicone anywhere. A silicone lubricant may be used on black o-rings but is not necessary. Avoid any type of lubricants, including silicone, on the clear lip seals.
- The nuts and caps are designed to be unscrewed or tightened by hand or with the WS1 Service Spanner Wrench (see page 41). If necessary, a pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place a screwdriver in the slots on the caps and/or tap with a hammer.
- Do not use pipe dope or other sealants on threads. Use Teflon tape on threaded inlet, outlet, and drain fittings. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.
- After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons, unplug the power source jack from the printed circuit board (black wire) and plug back in, or:

  1. For valves that use a Tech-TC circuit board (three buttons), press and hold the SET and ▼ buttons for three seconds. (The cover button may have other names like SET HOUR, CLOCK, or SET CLOCK, but the circuit board is labeled with SET.)
  2. For all other Tech Series valves, press and hold the NEXT and REGEN buttons for three seconds.

  This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version, and then reset the valve to the service position.
- All plumbing should be done in accordance with local plumbing codes. The pipe size for the drain line should be a minimum of 1/2 inch. Backwash flow rates in excess of 7 gpm (26.5 lpm), or length in excess of 20 feet (6.1 m), require 3/4 inch drain line.
- Solder joints near the drain must be made prior to connecting the drain line flow control fitting. Leave at least 6 inches between the drain line control fitting and solder joints when soldering pipes that are connected on the drain line control fitting. Failure to do this could cause interior damage to the drain line flow control fitting.
- When assembling the installation fitting package (inlet and outlet), connect the fitting to the plumbing system first and then attach the nut, split ring, and o-ring. Heat from soldering or solvent cements may damage the nut, split ring, and o-ring. Solder joints should be cool and solvent cements should be set before installing the nut, split ring, and o-ring. Avoid getting primer and solvent cement on any part of the o-rings, split rings, bypass valve, or control valve.
- Plug into an electrical outlet. Note: All electrical connections must be connected according to local codes. (Be certain the outlet is uninterrupted.)
- Install a grounding strap on metal pipes.

Table 1
Specifications

Minimum / Maximum Operating Pressures	20 psi (138 kPa) to 125 psi (862 kPa or 8.6 bar)	
Minimum / Maximum Operating Temperatures	40°F (4°C) to 110°F (43°C)	
AC Adapter	U.S.	International
Supply Voltage	100-120 VAC	100-240 VAC
Supply Frequency	50/60 Hz	50/60 Hz
Output Voltage	15 VDC	15 VDC
Output Current	500 mA	500 mA
No user serviceable parts are on the PC board, the motor, or the AC adapter. The means of disconnection from the main power supply is by unplugging the AC adapter from the wall.		

Table 2
Quick Reference Specifications

Service Flow Rate (includes bypass and meter)	1 inch Valve	27 gpm (102.2 lpm, 6.1 m^3/h) @ 15 psig (103 kPa) drop
	1.25 inch Valve	32 gpm (121.1 lpm, 7.3 m^3/h) @ 15 psig (103 kPa) drop
Backwash Flow Rate (includes bypass)	1 inch Valve	27 gpm (102.2 lpm, 6.1 m^3/h) @ 25 psig (172 kPa) drop
	1.25 inch Valve	30 gpm (113.5 lpm, 6.8 m^3/h) @ 25 psig (172 kPa) drop
CV Service	1 inch Valve	7.0
	1.25 inch Valve	8.8
CV Backwash	1 inch Valve	5.4
	1.25 inch Valve	6.4
Regenerant Refill Rate	0.5 gpm (1.9 lpm)	
Injectors	See Injector Order Information (page 7)	
Brine Line	20 psi (138 kPa) to 125 psi (862 kPa)	
Inlet / Outlet	40°F (4°C) to 110°F (43°C)	
Distributor Tube Sizing *	Size	Height
1 inch Valve	1.05 inch OD (3/4 inch NPS)	±0.5 inch
1.25 inch Valve	1.32 inch OD (1.0 inch NPS)	–0.5 to 0.25 inch **
1.25 inch Valve (International)	32 mm	–12.7 to 6.35 mm ***
Tank Connection	2.5 inch #8 NPSM	
Shipping Weight	4.5 lb (2.0 kg)	
PC Board Memory	Nonvolatile EEPROM (electrically erasable programmable read only memory)	
Compatible with Regenerants/Chemicals	Sodium chloride, potassium chloride, potassium permanganate, sodium bisulfite, chlorine, and chloramines	

* Height is based off the top of tank. Installer to verify proper engagement and allowance for tank expansion.
** Prior to January 2019: –3/4 to +0
*** Prior to January 2019: –19mm to +0mm

Control Valve Function

This glass-filled Noryl [1] (or equivalent) fully automatic control valve is designed as the primary control center to direct and regulate all cycles of a water softener or filter. When the Tech Series control valve is manufactured as a softener, the control valve can be ordered to perform downflow or upflow regeneration. When the Tech Series control valve is set up as a filter, the control valve can be set to perform downflow regeneration or simply backwash. The control valve can be set to regenerate on demand (consumption of a predetermined amount of water) and/or as a time clock (passage of a particular number of days). The control valve can be set so that a softener can meet the Water Quality Association (WQA) Standard S100 or NSF/ANSI Standard 44 efficiency rating.

NOTE: It is NOT recommended to change control valves from downflow to upflow brining or vice versa in the field. The valve bodies for downflow and upflow are unique to the regeneration type and should not be interchanged. A mismatch of valve body and regeneration piston will result in hard water bypass during service.

The control valve is compatible with a variety of regenerants and resin cleaners. The control valve is capable of routing the flow of water in the necessary paths to regenerate or backwash water treatment systems. The injector regulates the flow of brine or other regenerants. The control valve regulates the flow rates for backwashing, rinsing, and the replenishing of treated water into a regenerant tank, when applicable.

The control valve uses no traditional fasteners (e.g. screws); instead clips, threaded caps and nuts, and snap type latches are used. Caps and nuts only need to be firmly hand tightened because radial seals are used. Tools required to service the valve include one small blade screwdriver, one large blade screwdriver, pliers, and a pair of hands. A plastic wrench is available which eliminates the need for screwdrivers and pliers (see page 41). Disassembly for servicing takes much less time than comparable products currently on the market. Control valve installation is made easy because the riser can be cut 1/2 inch above to 1/2 inch below the top of the tank thread. The riser is held in place by an o-ring seal, and the control valve has a bayonet lock feature for upper distributor baskets.

The AC adapter comes with a 15 foot power cord and is designed for use with the control valve. The AC adapter is for dry location use only. In the case of a power outage, the control valve remembers all settings until the battery power is depleted. After the battery power is depleted, the only item that needs to be reset is the time of day; other values are permanently stored in the nonvolatile memory. The control valve battery is not rechargeable but is replaceable.

Control Valve Components

The Tech Series 1 inch & 1.25 inch Control Valves consist of the following components:

1. Drive Assembly
2. Drive Cap Assembly, Main Piston, and Regenerant Piston
3. Spacer Stack Assembly
4. Injector Cap, Screen, Injector Plug, and Injector
5. Refill Flow Control Assembly or Refill Port Plug
6. Drain Line Flow Control and Fitting Assembly
7. Water Meter or Meter Plug
8. Mixing Valve (optional)
9. Installation Fitting Assemblies
10. Bypass Valve (optional)

Note: The WS1 & WS1.25 share many of the same components. See page 46 for control valve identification.

1. Noryl is a trademark of SABIC.

Drive Assembly

The drive assembly consists of the following parts:

1. Drive Bracket
2. Printed Circuit (PC) Board
3. Motor
4. Drive Gears
5. Drive Gear Cover

The drive bracket holds the PC board, the motor, the drive gears, and the drive gear cover in place.

The PC board receives and retains information, displays the information, determines when to regenerate, and initiates regeneration. The display shows different types of information in the initial system setup (for softeners or filters), installer display settings, diagnostics, valve history, or user display settings.

The PC board powers the motor. The PC board's two-prong jack connects wires to the direct current (DC) motor. The motor is held in place on the drive bracket by a spring-loaded clip and a small bulge in the plastic, which fits in one of the slots on the motor housing. The motor turns the drive gears that drive the piston to cycle positions for backwashing, regeneration, rinsing, refill, or service. The motor is fully reversible (turns both ways) and changes the direction of rotation to change the direction of the piston motion. The motor is easily replaced if necessary.

There are three drive gears held in place by the drive gear cover. All three drive gears are the same size. A reflective coating is applied to the gears. As the center drive gear turns, a light shines on the coating and a light sensing diode determines if a light pulse was returned. The PC board counts the pulses and determines when to stop driving the motor.

Drive Cap Assembly, Main Piston, and Regenerant Piston

The drive gears turn the main gear of the drive cap assembly, which moves the piston. The screw-driven, horizontally moving piston stops at specific positions to direct the flow of water to backwash, regenerate, rinse, or refill. The PC board determines the position of the piston by counting pulses produced when the piston is moved. An optical sensor looking at one of the reduction drive gears generates these pulses. Each cycle position is defined by a number of pulses. The counter is zeroed each time the valve goes to the service position. The PC board finds the service position by noting the increase in current delivered to the motor when the mechanical stop at the service position is reached. This method of controlling piston position allows for greater flexibility and requires no switches or cams.

One of four main pistons is always used: (Note: Upflow options are not avaialble for Tech-TC Series control valves.)

1. A 1.25 inch diameter downflow piston is used when the WS1 control valve is used as a downflow softener, regenerating filter, or non-regenerating filter.
2. A 1.25 inch diameter upflow piston is used when the WS1 control valve is used as an upflow softener.
3. A 1.5 inch diameter downflow piston is used when the WS1.25 control valve is used as a downflow softener, regenerating filter, or non-regenerating filter.
4. A 1.5 inch diameter upflow piston is used when the WS1.25 control valve is used as an upflow softener.

If the control valve is used as a softener or a regenerating filter, a regenerant piston must be attached to the main piston. If the control valve is to be used on a system that does not require a regenerant to be added, the regenerant piston must be removed.

Spacer Stack Assembly

The spacer stack assembly provides the necessary flow passage for water during the different cycles. The all-plastic spacer stack assembly is a one-piece design which allows the stack to be removed using your fingers.

The exterior of the stack is sealed against the body bore with self lubricating EPDM o-rings, while the interior surface is sealed against the piston using slippery self-cleaning directional (one-way) silicone lip seals. The lip seals are clear in color and have a special slippery coating so that the piston does not need to be lubricated.

Injector Cap, Screen, Injector Plug, and Injector

The screen, injector, and/or injector plug(s) are installed under the injector cap in an easy-to-access location on top of the valve. The injector cap contains four slots so no water accumulates in the cap. The injector cap is designed to be hand tightened.

Under the injector cap there is an easy-to-clean, removable screen to prevent fouling of the injector. There are two holes under the injector cap labeled DN and UP. The holes will be filled with a plug or an injector.

The plug (P/N: LC-V3010-1Z) prevents water from traveling a certain pathway. The injector lets water pass through the pathway. The self-priming injector increases the velocity of the water, creating a zone of negative pressure that draws in the concentrated liquid regenerant, such as sodium chloride (brine), potassium permanganate, etc. The regenerant blends with the stream of water, which passes through the media to regenerate the bed.

The injector provides a consistent regenerant/water mixture ratio over the entire operating pressure range of the control valve. The injector provides good performance in a variety of applications, which may involve elevated drain lines and long regenerant draw lengths. Injectors are chosen by knowing the type, amount, and regenerant flow rate for a particular type of media. Guidelines can be found in the media manufacturer's literature. The color coded injectors give different regenerant draw, slow rinse, and total flow rates over the pressure range. See Table 3 (below) for color codings, and injector graphs (pages 42 to 45) for total, slow rinse, and draw flow rates.

The control valve has been manufactured to be one of the following:

1. Regeneration downflow 1 & 1.25 inch Tech control valve (for softeners or regenerating filters)
   — DN location contains injector, UP location contains plug
2. Regeneration upflow 1 & 1.25 inch Tech control valve (for softeners—not avaialble for Tech-TC Series valves)
   — UP location contains injector, other hole contains plug
3. No regenerant 1 & 1.25 inch Tech control valve (for non-regenerating filters)
   — DN location contains plug, UP location contains plug, refill elbow replaced by refill port plug (P/N: LC-V3195-01)

NOTE: It is not recommended to convert valves from upflow to downflow, or vice versa, in the field. Separate areas in the control valve are used to supply water to the injector for upflow or downflow valves.

Table 3
Injector Order Information

Injector Part Number	Injector Color	Typical Tank Diameter *	
		Down	Up **
LC-V3010-1A	Black	6 inch	8 inch
LC-V3010-1B	Brown	7 inch	9 inch
LC-V3010-1C	Violet	8 inch	10 inch
LC-V3010-1D	Red	9 inch	12 inch
LC-V3010-1E	White	10 inch	13 inch
LC-V3010-1F	Blue	12 inch	14 inch
LC-V3010-1G	Yellow	13 inch	16 inch
LC-V3010-1H	Green	14 inch	18 inch
LC-V3010-1I	Orange	16 inch	22 inch
LC-V3010-1J	Light Blue	18 inch	—
LC-V3010-1K	Light Green	22 inch	—

* Actual tank size used may vary depending on the design and application of the system. Tank diameter is an *approximation* for the following:
A. Downflow softener using standard mesh synthetic cation exchange media regenerating with sodium chloride.
B. Upflow softener using standard mesh synthetic cation exchange media regenerating with sodium chloride, an inlet water pressure of 30 to 50 psi (2.1 to 3.4 bar), and water temperature of 60°F (15.6°C) or higher. Higher pressures or lower temperatures would need smaller injectors to avoid lifting the bed.

** Not applicable for Tech-TC control valves

Refill Flow Control Assembly or Refill Port Plug

The refill flow control assembly consists of an elbow, flow control retainer, and flow control washer. The flow control retainer fits in the elbow. The flow control retainer houses the flow control washer which controls the flow rate when the regenerant tank is being refilled. The flow control is a flexible washer-like part with a small orifice and a precision molded contour that delivers a steady 0.5 gpm regenerant tank refill rate at varying inlet pressures.

Refill is accomplished with filtered water on filters and soft water on water softeners.

The refill flow control elbow assembly is attached to the control valve with a locking clip. The locking clip allows the elbow to rotate 270 degrees so the outlet can be orientated towards the regenerant tank.

The control valve has a standard refill elbow to which a 3/8 inch flexible tube can be connected. An optional elbow can be ordered which accommodates a 1/2 inch flexible tube for a high regenerant draw rate situation (G injectors and larger). Both elbows use the same refill flow control and retainer.

If the control valve is to be used as a non-regenerant filter control valve, the refill elbow is removed and replaced with a refill port plug (P/N LC-V3195-01).

Drain Line Flow Control and Fitting Assembly

The drain line flow control assembly includes a drain line flow control and a fitting. The drain line flow control allows proper media bed expansion by regulating the flow rate to the drain. The drain line flow control is a flexible washer-like part with an orifice and a precision molded contour. The flow rates are within ± 10% over the pressure range of 20 psi to 125 psi (1.4 bar to 8.6 bar). See Table 4 (below) for flow rate information.

Table 4
Drain Line Flow Control and Fitting Assembly Information

Drain Line Fitting	Drain Line Flow Control Part Number	Number on Drain Line Flow Control	Backwash Flow Rate (gpm)	Backwash Flow Rate (lpm)
3/4 inch	LC-V3162-007	007	0.7	2.6
3/4 inch	LC-V3162-010	010	1.0	3.8
3/4 inch	LC-V3162-013	013	1.3	4.9
3/4 inch	LC-V3162-017	017	1.7	6.4
3/4 inch	LC-V3162-022	022	2.2	8.3
3/4 inch	LC-V3162-027	027	2.7	10.2
3/4 inch	LC-V3162-032	032	3.2	12.1
3/4 inch	LC-V3162-042	042	4.2	15.9
3/4 inch	LC-V3162-053	053	5.3	20.1
3/4 inch	LC-V3162-065	065	6.5	24.6
3/4 inch	LC-V3162-075	075	7.5	28.4
3/4 inch	LC-V3162-090	090	9.0	34.1
3/4 inch	LC-V3162-100	100	10.0	37.9
1 inch	LC-V3190-090	090	9.0	34.1
1 inch	LC-V3190-100	100	10.0	37.9
1 inch	LC-V3190-110	110	11.0	41.6
1 inch	LC-V3190-130	130	13.0	49.2
1 inch	LC-V3190-150	150	15.0	56.8
1 inch	LC-V3190-170	170	17.0	64.3
1 inch	LC-V3190-200	200	20.0	75.7
1 inch	LC-V3190-250	250	25.0	94.6

The drain line flow control and fitting are located on top of the control valve and replaceable without the use of special tools.

The drain line flow control can be installed in the standard 3/4 inch drain line elbow, which accommodates 5/8 inch polytube or 3/4 inch NPT drain line connections. The optional nut and polytube insert for the 3/4 inch drain line elbow is designed for use with flexible polytube only. The 3/4 inch drain line elbow can be rotated 180 degrees so the outlet can be orientated to the nearest drain. The same retainer is used for all drain line flow controls for the 3/4 inch fitting. Drain line flow controls designed for the 3/4 inch fitting are available for flow rates ranging from 0.7 to 10 gpm (2.6 to 37.9 lpm).

An optional 1 inch straight drain line fitting is available to accommodate drain line flow rates ranging from 9 to 25 gpm (34.1 to 94.6 lpm). This fitting is straight but still connects to the control valve using the same locking clip. The drain line flow control is located between two fitted parts (the fitting acts as the retainer). The nut is unscrewed to access the drain line flow control.

Water Meter or Meter Plug

Tech-TC Series control valves do not use a water meter.

The water meter is installed on the outlet side of the control valve. The water meter uses a turbine to measure gallons of treated water. The turbine rotates with the flow of water and reports its rate of rotation through Hall effect [2] circuitry to the printed circuit (PC) board. This rotation permits the PC board to record the total volume of treated water and the flow rate. The small, centrally located magnet is shielded from water, which substantially reduces iron-fouling problems with the turbine.

NOTE: This water meter should not be used as the primary monitoring device for critical or health effect applications.

Operating Pressure: 20 psi minimum / 125 psi maximum
Operating Temperature: 40°F minimum / 110°F maximum

The turbine is accurate to within ± 5% over a wide operating flow rate range (0.25 gpm [0.95 lpm] up to control valve maximums) and has a very low pressure drop. Water used for regeneration is not metered. If the control valve is set to prefill the regenerant, water used between the prefill cycle up to the start of the regeneration cycle is metered. If the control valve is in regeneration mode (e.g. a backwash cycle) and there is a water demand, that water usage is not metered.

When facing the front of the control valve, the water meter is positioned on the left-hand side of the control valve. Allow sufficient clearance to clean and repair the water meter without disconnecting the plumbing or disassembling any other parts of the control valve.

Control valves can be ordered with a meter plug (i.e. no electronics or turbine) rather than a water meter if desired. Control valves without meters should only be set up for time clock operation (i.e. no water meter, no demand-initiated regeneration). Control valves with water meters provide a wider variety of useful information. See Operation & Instruction Manuals for more information concerning specific Tech Series Control Valves.

Mixing Valve (Optional)

The mixing valve is installed on the outlet side of the control valve. It is used to blend raw water with treated water.

To adjust the blended water, close the mixing valve. Open a water faucet to the desired flow rate. Open the mixing valve until the desired hardness is reached. Close the faucet.

2. Some semiconductor materials exhibit a phenomenon in the presence of a magnetic field that is adaptable to sensing devices. When a current is passed through one pair of wires attached to a semiconductor, another pair of wires properly attached and oriented with respect to the semiconductor will develop a voltage proportional to the magnetic field present and the current in the other pair of wires. Holding the exciting current constant and moving a permanent magnet near the semiconductor produces a voltage output proportional to the movement of the magnet. Hall effect devices provide a high speed response, excellent temperature stability, and no physical contact.

Installation Fitting Assemblies

The installation fittings are used to connect the optional bypass or the control valve to the plumbing system. See pages 33 to 36 for available fitting assemblies.

The installation fitting assemblies are sold in pairs and consist of two fittings, two nuts, two split rings, and two o-rings. The installation fitting assemblies and the bypass valve are sold separately from the control valve.

Both elbow fittings have a unique drill out feature to allow a 1/4 inch NPT connection to the inlet and/or outlet which can be used for a RO feed, test ports, pressure tap ports, etc.

Bypass Valve (Optional)

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 WS1 bypass valve is particularly unique in the water treatment industry due to its versatility and state-of-the-art design features. The 1 inch full flow bypass valve incorporates four positions, including a diagnostic position that allows service personnel to work on a pressurized system while still providing untreated bypass water to the facility or residence. Its completely non-metallic, all-plastic design allows for easy access and serviceability without the need for tools.

The bypass body and rotors are glass-filled Noryl [3] (or equivalent) and the nuts and caps are glass-filled polypropylene. All seals are self-lubricating EPDM to help prevent valve seizing after long periods of non-use. Internal o-rings can easily be replaced if service is required.

The bypass consists of two interchangeable plug valves that are operated independently by red arrow-shaped handles. The handles identify the flow direction of the water. The plug valves enable the bypass valve to operate in four positions.

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 (page 11).

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 (page 11).

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 (page 11).

4. Shut Off Position: The inlet handle points to the center of the bypass valve, and the outlet handle points in the direction of the 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 (page 11).

3. Noryl is a trademark of SABIC.

Bypass Valve Operation

Figure 1. NORMAL OPERATION

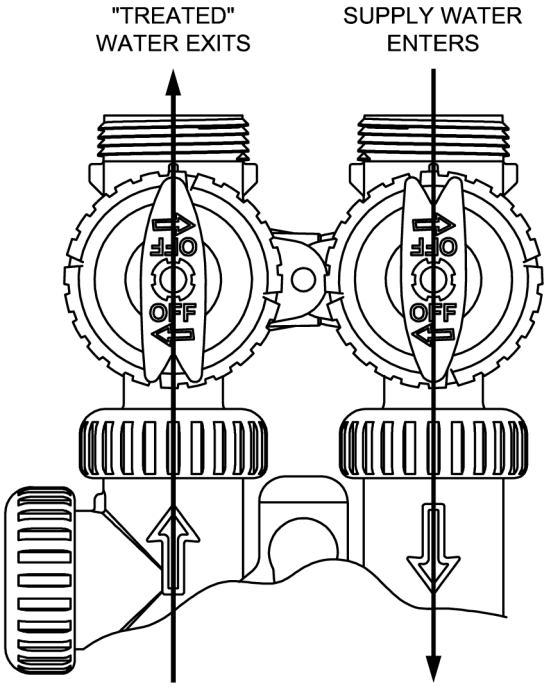


FIgure 2. BYPASS OPERATION

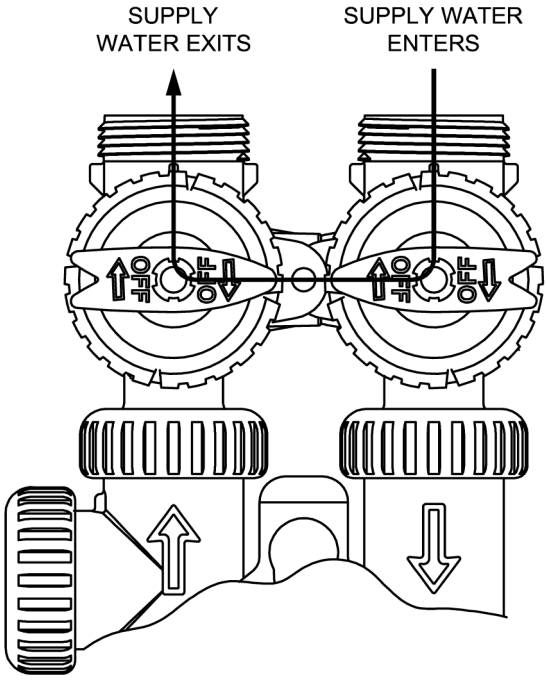


Figure 3. DIAGNOSTIC MODE

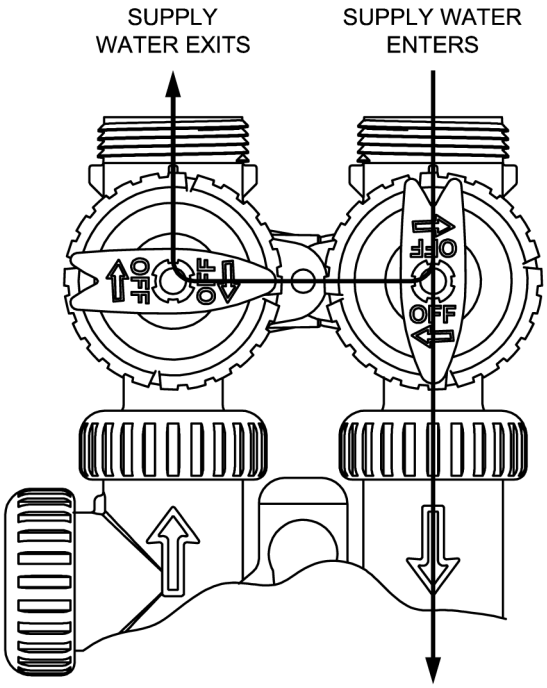
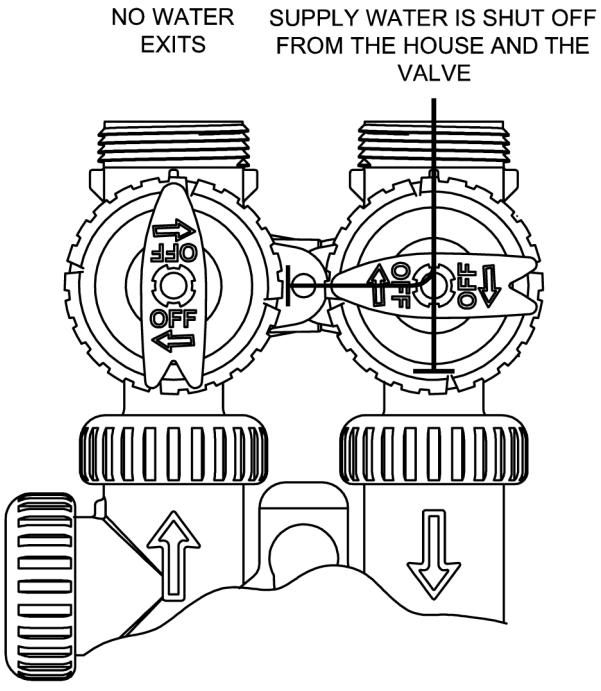


FIgure 4. SHUT OFF MODE



Installation

Allow one foot of clearance to service the control valve.

The control valve will withstand transportation and storage temperatures of -13°F (-25°C) to 131°F (55°C), and for short periods up to 158°F (70°C). If the control valve has been exposed to freezing conditions, let the valve warm up to room temperature before running water through it. The control valve has been packaged to prevent damage from the effects of normal humidity, vibration, and shock.

Refill Flow Control Assembly or Refill Port Plug

Control valves that are setup for backwash only come equipped with a refill port plug. The refill port plug has no regenerant line connection.

Control valves that use a regenerant come equipped with a 3/8 inch refill flow control assembly. To switch to the 1/2 inch refill flow control assembly, remove the refill flow control and retainer (from the 3/8 inch refill elbow) by twisting and pulling out. Insert the refill flow control and retainer into the 1/2 inch refill elbow.

To complete the regenerant line connection, orientate the outlet in the desired direction and push the plastic insert into the polytube. Push the polytube into the nut. Do not use pipe dope or other sealants on threads. The threads for the compression nut do not need Teflon tape. Tighten the nut securely to create a pressure tight connection. A pliers or crescent wrench may be used to tighten or unscrew the nut. The nut, gripper, and retainer sleeve is a three-piece assembly that can come apart if removed from the elbow body. Parts must be reassembled exactly as shown in the Refill Flow Control Assembly drawing (page 29) to function properly. If the nut is completely removed from the body, slip the nut, plastic gripper, and retainer sleeve onto the tube, then tighten onto the fitting.

Drain Line Flow Control and Fitting Assembly

To determine which drain line flow control to use, obtain media bed expansion tables from the media manufacturer, choose a water temperature, and look up the desired backwash rate per square foot of bed area. Then calculate the backwash rate using the desired tank diameter. Using Table 4 (page 8), choose the drain line flow control that has the backwash flow rate closest to the calculated backwash rate. If choosing to use an external drain line flow control, use an elbow fitting that does not contain a hole.

If the drain line is a 5/8 inch flexible polytube, slide the nut onto the polytube, then place the polytube insert into the end of the polytube and tighten the nut onto the 3/4 inch drain line fitting. The nut is only designed for use with flexible polytube. Use other nuts if attaching different materials.

To access the drain line flow control, remove the locking clip by pulling it straight out. Pull the fitting out and replace the locking clip so that it is not misplaced. The drain line fitting is pressed in and has an o-ring seal.

In the 3/4 inch elbow, the white flow control retainer is pressed in and has an o-ring seal. The retainer can be removed by rotating and pulling. The flow control can be removed by prying upward with a small, flat blade screwdriver in one of the slots on the side. The drain line flow control and retainer can be chemically cleaned in dilute sodium bisulfite or vinegar, or replaced. Do not use a wire brush to clean the flow control or the washer. The washers are identified with three numbers, which correspond to the flow rate. When reinstalling, make sure the identifying number and the rounded inside diameter on the washer is visible when seated in the retainer. The white flow control washer retainer can also be removed and cleaned. Push the retainer in firmly when reinstalling.

In the 1 inch straight fitting, the retainer is the fitting. Unscrew the nut to access the flow control. The drain line flow control and the fitting can be chemically cleaned or replaced. Do not use a wire brush to clean the flow control or the fitting.

Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicone lubricant may be used on the black o-ring. Use a pliers or crescent wrench to tighten or unscrew the nut. Do not use a pipe wrench to tighten or loosen the nut. Do not use pipe dope or other sealants on the threads. Use Teflon tape on the threads of the drain line control fitting when installing a 3/4 inch NPT or 1 inch straight fitting.

Installation Fitting Assemblies

The installation fittings connect to the control valve or the bypass valve using nuts that only require hand tightening. Hand tightened nut connections between the control valve and installation fittings, the control valve and bypass valve, and the bypass valve and installation fittings allow for easy serviceability. Do not use a pipe wrench to tighten the nuts on the installation fittings. Hand tighten only.

The split ring retainer design holds onto the nut and allows the load to be spread over the entire nut surface area, thus reducing the chance for leakage. The split ring design incorporated into the installation fittings allows approximately two degrees off-axis alignment to the plumbing system. The installation fittings are designed to accommodate minor plumbing misalignments, but are not designed to support the weight of a system or the plumbing.

When assembling the installation fitting package, 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. Solvent cements and primers should be used in accordance with the manufacturer's instructions.

Slip the nut onto the fitting first, the split ring second, and the o-ring last. Hand tighten the nut. If the fitting is leaking, tightening the nut will not stop the leak. Remove the nut, remove the fitting, and check for damage or misalignment of the o-ring.

Do not use pipe dope or other sealant on threads. Use Teflon tape on the threaded inlet, outlet, and drain fittings. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.

Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicone lubricant may be used on black o-rings.

Bypass Valve

The bypass valve easily connects to the control valve body using nuts that only require hand tightening. Hand tightened nut connections between the control valve and the fittings, the control valve and the bypass valve, and the bypass valve and the installation fittings allow for easy serviceability. The split ring retainer design holds onto the nut and allows the 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 two 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.

Avoid getting primer and solvent cement on any part of the o-rings, split rings, bypass valve, or control valve. Do not use pipe dope or other sealant on threads. Teflon tape is not necessary on the caps because of o-ring seals.

Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicone lubricant may be used on black o-rings.

Mixing Valve

The mixing valve is an option on the control valve. If the control valve is ordered with a mixing valve it will be installed in the control valve assembly process.

To adjust the blended water, close the mixing valve. Open a water faucet to the desired flow rate. Open the mixing valve until the desired hardness is reached. Close the faucet.

NOTE: The use of the mixing valve requires modification to the valve body. These modifications should not be done in the field.

Service Instructions

NOTE: When servicing the control valve, water may leak from the valve. Water from the valve may create a slip hazard. Clean up ALL water spills.

ALWAYS disconnect the control valve from electrical power prior to servicing the valve.

Drive Assembly

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 power source plug connects to the four-pin jack. The motor plug connects to the two-pin jack on the left-hand side of the PC board. 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 approximately 45 degrees 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 piston(s), 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 backplate hold the drive bracket in place. Simultaneously lift the two tabs and gently ease the top of the drive bracket forward. The lower edge of the drive bracket has two notches that rest on the drive backplate. 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 backplate. Push the top of the drive bracket toward 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 backplate. If resistance is felt before latching, then the notches are not fully engaged; the piston rod is not in the hole; the wires are jammed between the drive bracket and drive backplate; or the gear is not engaging the drive cap assembly.

To inspect the drive gears, the drive gear cover needs to be removed. Before trying to remove the gear cover, the drive bracket must be removed from the drive backplate. (Refer to the instructions above regarding the removal of the drive bracket from the drive backplate. The drive gear cover can be removed from the drive bracket without removing the motor or the PC board.) 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. With the PC board facing up, push in and down on the large clip on the drive gear cover. Handle the cover and the gears carefully so that the gears do not fall off of the pegs in the cover.

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 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.

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 one quarter of a turn in either direction so the wires are vertical (up & down) 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. To reinstall the motor, move the spring clip loop to the right and hold. Gently turn the motor while inserting so that the gear on the motor meshes with the gears under the drive gear cover. Release the spring clip loop and continue to rotate the motor until the wires are horizontal and the motor housing engages the small plastic bulge inside the drive bracket motor retainer. Reconnect the motor plug to the two-pronged jack on the lower left-hand side of the PC board. If the motor will not easily engage with the drive gears when reinstalling, lift and slightly rotate the motor before reinserting. Reconnect the power plug.

Replace the valve cover. After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons, unplug the power source jack from the printed circuit board (black wire) and plug back in, or:

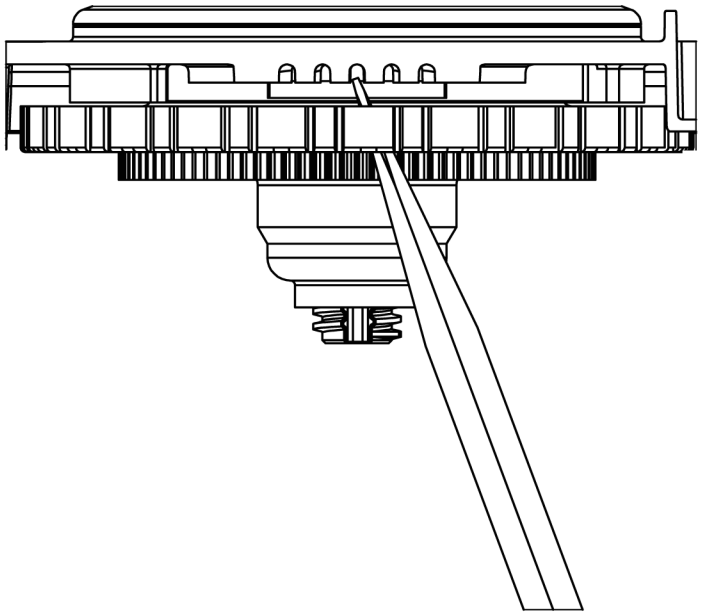
1. For valves that use a Tech-TC circuit board (three buttons), press and hold SET and DOWN buttons for three seconds. (The cover button may have other names like SET HOUR, CLOCK, or SET CLOCK, but the circuit board is labeled with SET.)
2. For all other Tech Series valves, press and hold NEXT and REGEN buttons for three seconds.

This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version, and then reset the valve to the service position.

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 inch to 1/2 inch flat blade screwdriver into one of the slots around the top 2 inches of the drive cap assembly so it engages the notches molded into the drive backplate around the top 2 inches of the piston cavity. (See Figure 5 below.) The notches are visible through the holes. Lever the screwdriver so the drive cap assembly turns counterclockwise. Once loosened, unscrew the drive cap assembly by hand and pull straight out.

Figure 5



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 disassembled 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 (downflow or upflow), and if a regenerant is used, a regenerant piston. Upflow is not applicable to Tech-TC Series control valves.

The regenerant piston (the small diameter piston behind the main piston) is removed from the main piston by pressing sideways and unsnapping it from its latch. Chemically clean in dilute sodium bisulfite or vinegar, or replace the regenerant piston if needed. To remove the main 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.

Reattach the main piston to the drive cap assembly. Reattach the regenerant piston (if needed) to the main piston. Reinsert the drive cap assembly and piston(s) 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 backplate. Make certain that the main drive gear still turns freely. The exact position of the piston(s) 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 involving the drive assembly or the drive cap assembly and piston(s), unplug the power source jack from the printed circuit board (black wire) and plug back in, or:

1. For valves that use a Tech-TC circuit board (three buttons), press and hold SET and DOWN buttons for 3 seconds. (The cover button may have other names like SET HOUR, CLOCK, or SET CLOCK, but the circuit board is labeled with SET.)
2. For all other Tech Series valves, press and hold NEXT and REGEN buttons for 3 seconds.

This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version, and then reset the valve to the service position.

NOTE: Refer to WS1 & WS1.25 Identification (page 46) to identify the main piston (not applicable for control valves that use a quick connect tank adapter).

Spacer Stack Assembly

NOTE: Refer to WS1 & WS1.25 Identification (page 46) to identify the spacer stack (not applicable for control valves that use a quick connect tank adapter).

To access the spacer stack assembly, remove the drive assembly, drive cap assembly and piston(s). The spacer stack assembly can be removed easily without tools by using a thumb and forefinger. Inspect the black o-rings and clear lip seals for wear or damage. Replace the entire stack if necessary. Do not disassemble the stack.

The spacer stack assembly may be chemically cleaned (dilute sodium bisulfite or vinegar) or wiped with a soft cloth.

The spacer stack assembly can be pushed into the control valve body bore by hand. Since the spacer stack assembly can be compressed, it is easier to use a blunt object (5/8 inch to 1-1/8 inch in diameter) to push the center of the assembly into the control valve body. The assembly is properly seated when at least four threads are exposed (approximately 5/8 inch). Do not force the spacer stack assembly into position. The control valve body bore interior can be lubricated with silicone to allow for easy insertion of the entire stack.

Reattach the drive cap assembly and piston(s), and the drive assembly.

After completing any valve maintenance involving the drive assembly or the drive cap assembly and pistons, unplug the power source jack from the printed circuit board (black wire) and plug back in, or:

1. For valves that use a Tech-TC circuit board (three buttons), press and hold SET and DOWN buttons for three seconds. (The cover button may have other names like SET HOUR, CLOCK, or SET CLOCK, but the circuit board is labeled with SET.)
2. For all other Tech Series valves, press and hold NEXT and REGEN buttons for 3 seconds.

This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version, and then reset the valve to the service position.

Table 5.
Valve Body Compliance Table

Application	Injector and/or Plug(s)	Main Piston	Regenerant Piston	Stack	Body *
1 inch Downflow Softener or Regenerating Filter	Injector in DN hole, Plug in UP hole	LC-V3011	LC-V3174	LC-V3005-02	LC-V3001 LC-V3001-01 (QC1) LC-V3001-02 (Mixing) LC-V3001-04 (QC2) LC-V3001-06 (Mixing QC2)
1 inch Backwash Only Filter	Plug in DN & UP holes, Install Refill Port Plug	LC-V3011	None	LC-V3005-02	LC-V3001 LC-V3001-01 (QC1) LC-V3001-02 (Mixing) LC-V3001-04 (QC2) LC-V3001-06 (Mixing QC2)
1 inch Upflow Softener	Injector in UP hole, Plug in unlabeled hole	LC-V3011-01	LC-V3174	LC-V3005-02	LC-V3001UP LC-V3001-01UP (QC1) LC-V3001-02UP (Mixing) LC-V3001-04UP (QC2) LC-V3001-06UP (Mixing QC2)
1.25 inch Downflow Softener or Regenerating Filter (1.32 inch Distributor)	Injector in DN hole, Plug in UP hole	LC-V3407	LC-V3174	LC-V3430-01	LC-V3020 LC-V3020-01 (Mixing)
1.25 inch Backwash Only Filter (1.32 inch Distributor)	Injector in DN hole, Plug in UP hole	LC-V3407	None	LC-V3430-01	LC-V3020 LC-V3020-01 (Mixing)
1.25 inch Downflow Softener or Regenerating Filter (32 mm Distributor)	Plug in DN & UP holes, Install Refill Port Plug	LC-V3407	LC-V3174	LC-V3430-01	LC-V3020-02 LC-V3020-03 (Mixing)
1.25 inch Backwash Only Filter (32 mm Distributor)	Plug in DN & UP holes, Install Refill Port Plug	LC-V3407	None	LC-V3430-01	LC-V3020-02 LC-V3020-03 (Mixing)
1.25 inch Upflow (1.32 inch Distributor)	Injector in UP hole, Plug in unlabeled hole	LC-V4042	LC-V3174	LC-V3430-01	LC-V3020UP
1.25 inch Upflow (32 mm Distributor)	Injector in UP hole, Plug in unlabeled hole	LC-V4042	LC-V3174	LC-V3430-01	LC-V3020-02UP LC-V3020-03UP (Mixing)

* QC1 and QC2 bodies are only available if referenced in the programming guide for that software.

Injector Cap, Screen, Injector Plug, and Injector

Unscrew the injector cap and lift off. Loosen the cap with a 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 insure 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.

NOTE: Two holes are labeled DN and UP. Check for compliance. (See Table 5 above.)

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 flat blade 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 the locking clip, push down on the elbow to reseat, and insert the locking clip.

Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicone 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 disconnect 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 backplate. To reinstall, rethread the water meter wire through the drive backplate and the side of the drive assembly. Reattach the drive assembly, the water meter, and power plugs.

NOTE: This water meter should not be used as the primary monitoring device for critical or health effect applications.

Operating Pressure: 20 psi minimum / 125 psi maximum
Operating Temperature: 40°F minimum / 110°F maximum

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, gently pull forward on the turbine to remove it from the shaft.

Do not use a wire brush to clean the turbine. 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 turbine 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 silicone 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 the nut.

Mixing Valve

To clean or replace the mixing valve, unthread the mixing valve from the valve body. Chemically clean the mixing valve with a dilute sodium bisulfite or vinegar solution. Do not use Vaseline, oils, or other unacceptable lubricants on o-rings. A silicone lubricant may be used on the o-ring. Before replacing the mixing valve in the valve body, turn the knob clockwise so that the mixing valve is in the open position. Failure to do this may cause damage to the mixing valve when it is screwed into the valve body.

To adjust the blended water, close the mixing valve. Open a water faucet to the desired flow rate. Open the mixing valve until the desired hardness is reached. Close the faucet.

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 red arrow shaped handles towards the center of the bypass valve and back 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 the nuts or caps. Do not place a screwdriver in the slots on the caps and/or tap with a hammer. To access the rotor, unscrew the cap and lift out the cap, rotor, and handle 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 the rotor. Reinstall the rotor.

When reinstalling the red arrow handles be sure that:

1. The handle pointers are lined up with the control valve body arrows, and the rotor seal o-ring and retainer on both rotors face to the right when being viewed from the front of the control valve; or
2. The arrows are pointing toward each other in the bypass position.

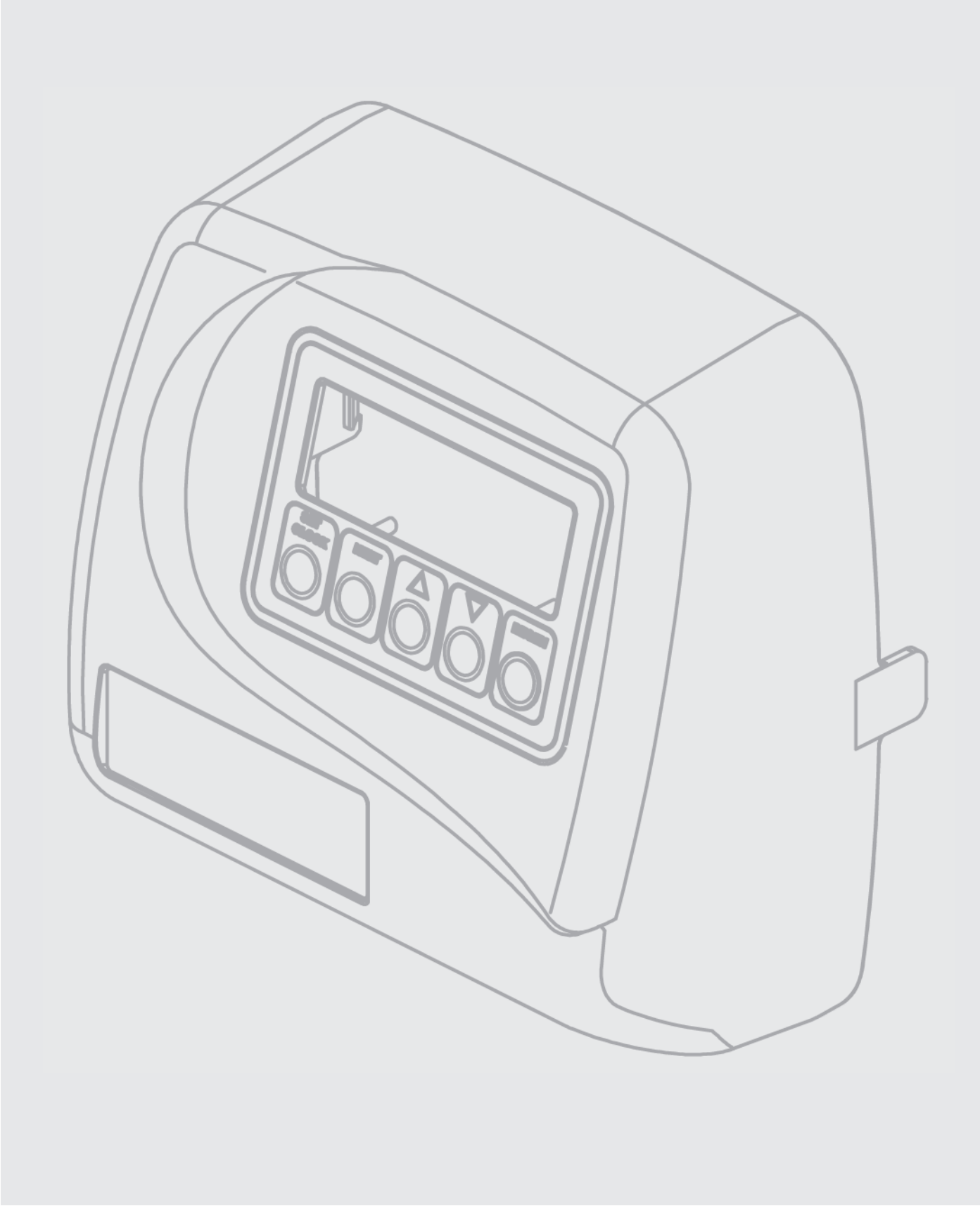
Since the handles are removable, they could be accidentally reinstalled 180 degrees from their correct orientation. To install the red arrow handles correctly, keep the handles pointed in the same direction as the arrows engraved on the control valve body while tightening the bypass valve caps.

After completing any valve maintenance involving the drive assembly, or the drive cap assembly and piston(s), unplug the power source jack from the printed circuit board (black wire) and plug back in, or:

1. For valves that use a Tech-TC circuit board (three buttons), press and hold SET and DOWN buttons for 3 seconds. (The cover button may have other names like SET HOUR, CLOCK, or SET CLOCK, but the circuit board is labeled with SET.)
2. For all other Tech Series valves, press and hold NEXT and REGEN buttons for 3 seconds.

This resets the electronics and establishes the service piston position. The display should flash all wording, then flash the software version, and then reset the valve to the service position.

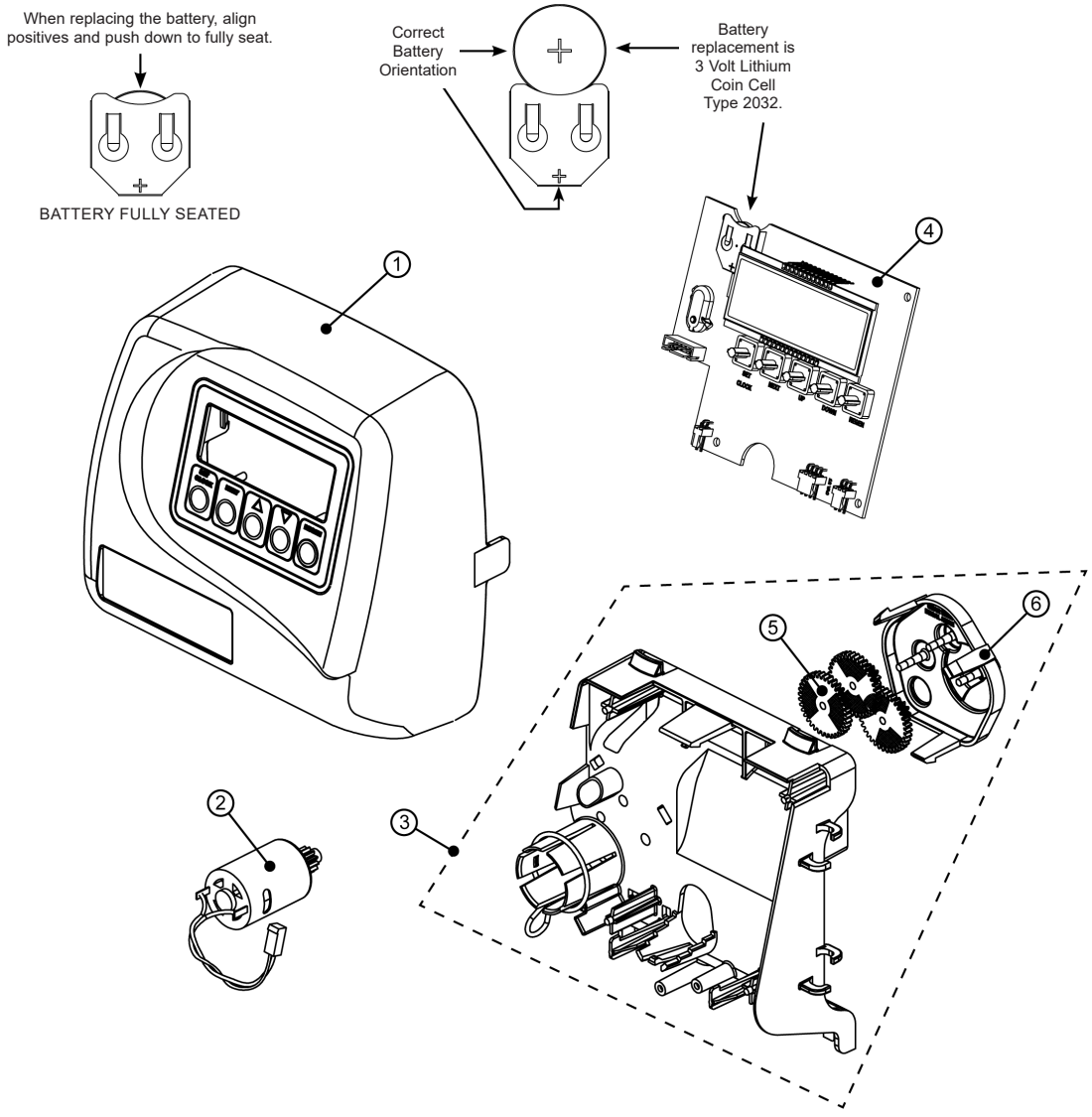
Drawings and Part Numbers



WS1 & WS1.25 Front Cover and Drive Assembly

Drawing No.	Part No.	Description	Quantity
1	LC-V3175-01	WS1 Front Cover Assembly	1
2	LC-V3107-01	WS1 Motor	1
3	LC-V3002-A	WS1 Drive Bracket Assembly	1
4	LC-V3108-11BOARD	WS1 PC Board XMEGA Replacement	1
5	LC-V3110	WS1 Drive Reducing Gear 12 x 36	3
6	LC-V3109	WS1 Drive Gear Cover	1
Not Shown	LC-V3186-06	WS1 US AC/DC Adapter 15V DC High Over Current Protection (HOCP)	1
	LC-V3186EU-06	WS1 EU AC/DC Adapter 15V DC High Over Current Protection (HOCP)	1
	LC-V3186UK-06	WS1 UK AC/DC Adapter 15V DC High Over Current Protection (HOCP)	1
	LC-V3186-01	WS1 AC/DC Adapter Cord Only 15 ft	1

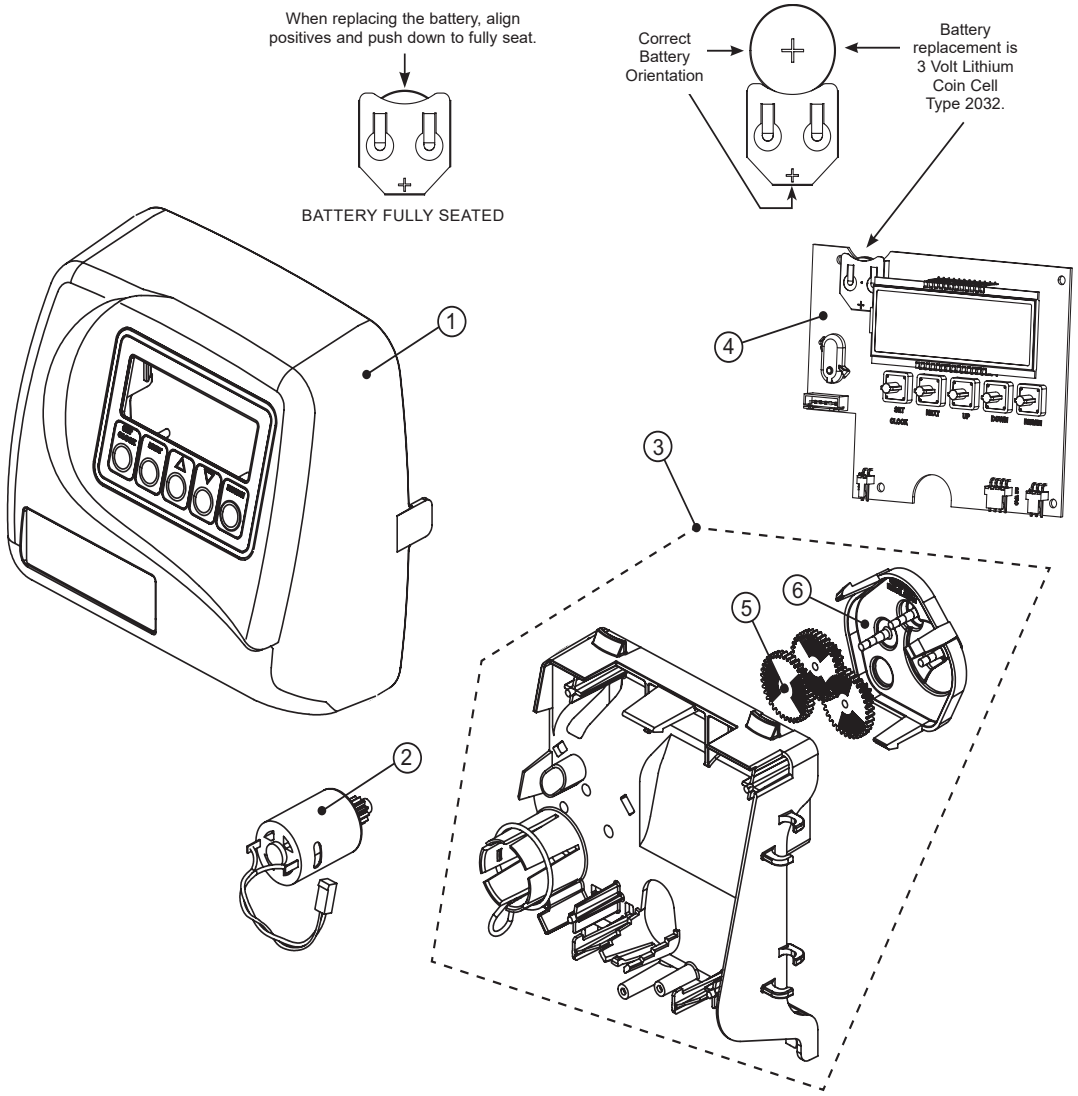
AC/DC Adapter	**US**	**International**
Supply Voltage	100–120V AC	100–240V AC
Supply Frequency	50/60 Hz	50/60 Hz
Output Voltage	15V DC	15V DC
Output Current	500 mA	500 mA



WS1CS & WS1.25CS Front Cover and Drive Assembly

Drawing No.	Part No.	Description	Quantity
1	LC-V3175-01	WS1 Front Cover Assembly	1
2	LC-V3107-01	WS1 Motor	1
3	LC-V3002-A	WS1 Drive Bracket Assembly	1
4	LC-V3108CS-03BOARD	WS1CS/WS1.25CS PC Board XMEGA SMT Replacement	1
5	LC-V3110	WS1 Drive Reducing Gear 12 x 36	3
6	LC-V3109	WS1 Drive Gear Cover	1
Not Shown	LC-V3186-06	WS1 US AC/DC Adapter 15V DC High Over Current Protection (HOCP)	1

AC/DC Adapter	**US**	**International**
Supply Voltage	100–120V AC	100–240V AC
Supply Frequency	50/60 Hz	50/60 Hz
Output Voltage	15V DC	15V DC
Output Current	500 mA	500 mA



WS1EE & WS1.25EE Front Cover and Drive Assembly

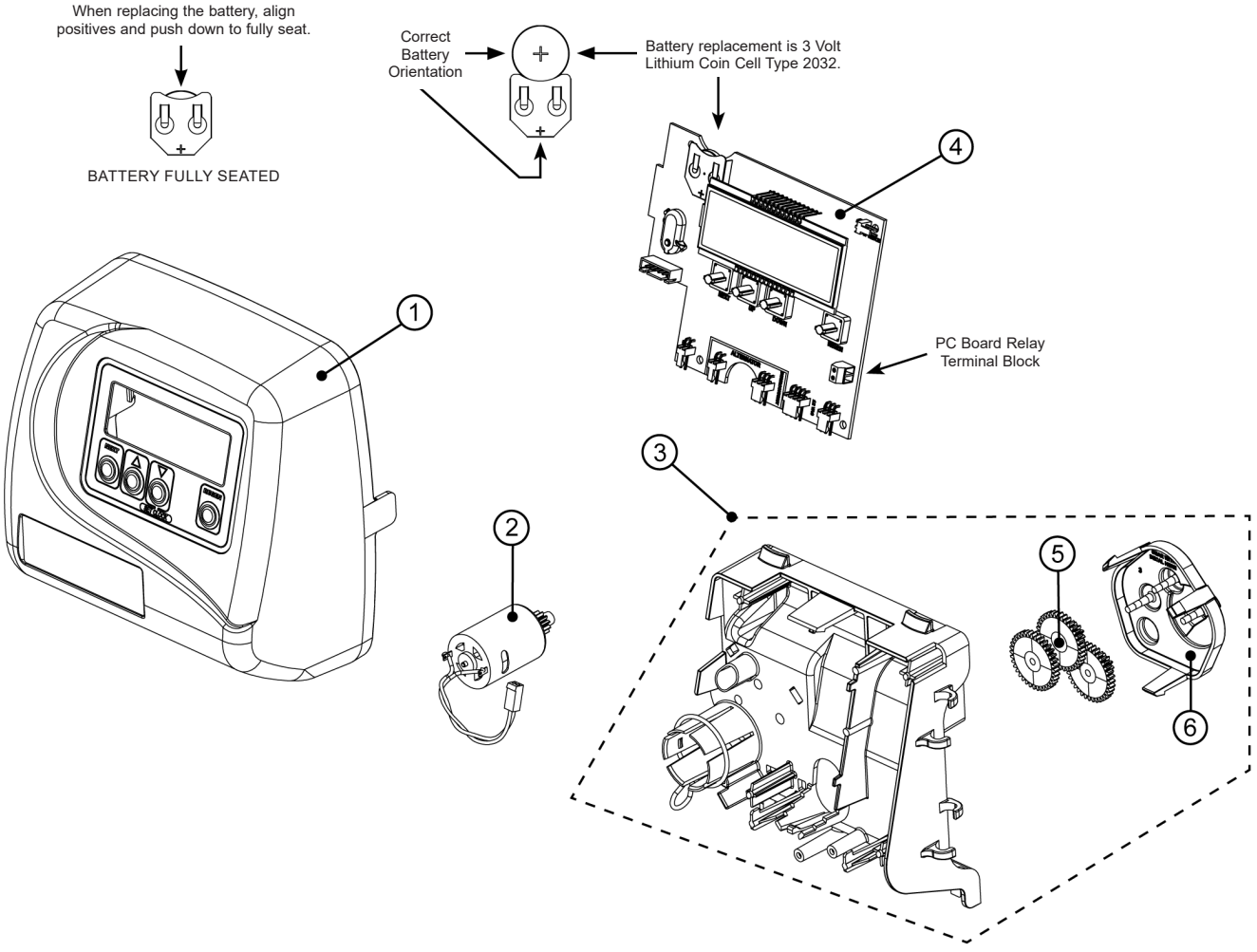
Drawing No.	Part No.	Description	Quantity
1	LC-V3175EE-01	WS1EE Front Cover Assembly	1
2	LC-V3107-01	WS1 Motor	1
3	LC-V3002-A	WS1 Drive Bracket Assembly	1
4	LC-V3408EE-04BOARD	WS1EE thru WS2EE PC Board 5-Digit Replacement	1
5	LC-V3110	WS1 Drive Reducing Gear 12 x 36	3
6	LC-V3109	WS1 Drive Gear Cover	1
Not Shown	LC-V3186-06	WS1 US AC/DC Adapter 15V DC High Over Current Protection (HOCP)	1
	LC-V3186-01	WS1 AC/DC Adapter Cord Only	1
	LC-3178	WS1 Drive Back Plate	1

AC/DC Adapter	**US**	**International**
Supply Voltage	100–120V AC	100–240V AC
Supply Frequency	50/60 Hz	50/60 Hz
Output Voltage	15V DC	15V DC
Output Current	500 mA	500 mA

Relay Driver Output Type: Single Solid-State 12V DC “wet” contact N.O.
Relay Driver Output Capacity: 12V DC @ 100mA.
NOTE: Check for proper mounting dimensions on valve backplate prior to mounting an external relay under the control cover.

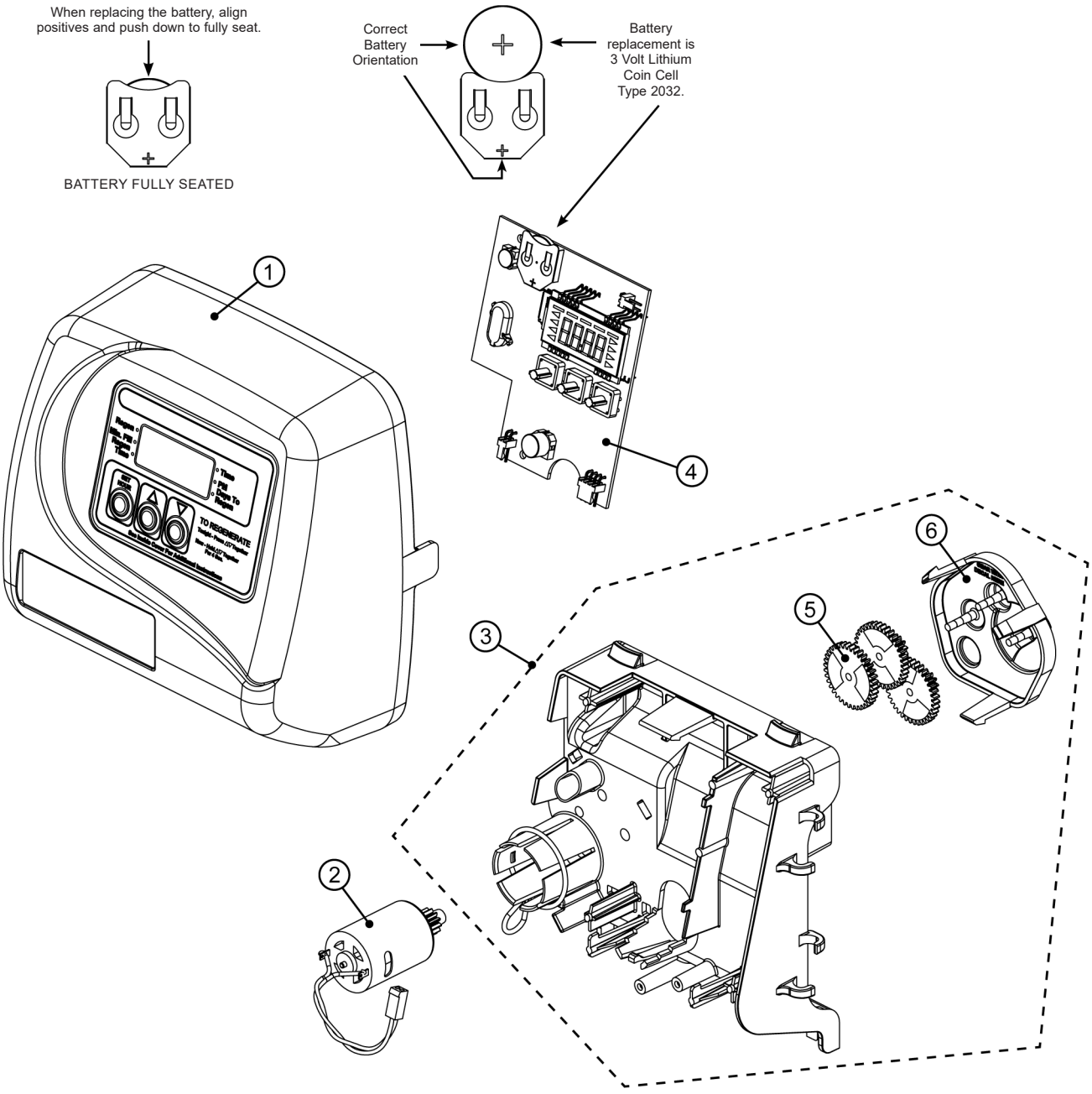
Wiring for Correct On/Off Operation

PC Board Relay Terminal Block . . . . . Relay
RLY 1 . . . . . Coil –
COM . . . . . Coil +



WS1TC & WS1.25TC Front Cover and Drive Assembly

Drawing No.	Part No.	Description	Quantity
1	LC-V3175TC-01	WS1TC Front Cover Assembly	1
2	LC-V3107-01	WS1 Motor	1
3	LC-V3002-A	WS1 Drive Bracket Assembly	1
4	LC-V3818TC-01BOARD	WS1TC/WS1.25TC PC Board 4-Digit Replacement	1
5	LC-V3110	WS1 Drive Reducing Gear 12 x 36	3
6	LC-V3109	WS1 Drive Gear Cover	1
Not Shown	LC-V3186-06	WS1 US AC/DC Adapter 15V DC High Over Current Protection (HOCP)	1
	LC-V3186EU-06	WS1 EU AC/DC Adapter 15V DC High Over Current Protection (HOCP)	1
	LC-V3186UK-06	WS1 UK AC/DC Adapter 15V DC High Over Current Protection (HOCP)	1
	LC-V3186-01	WS1 AC/DC Adapter Cord Only 15 ft	1

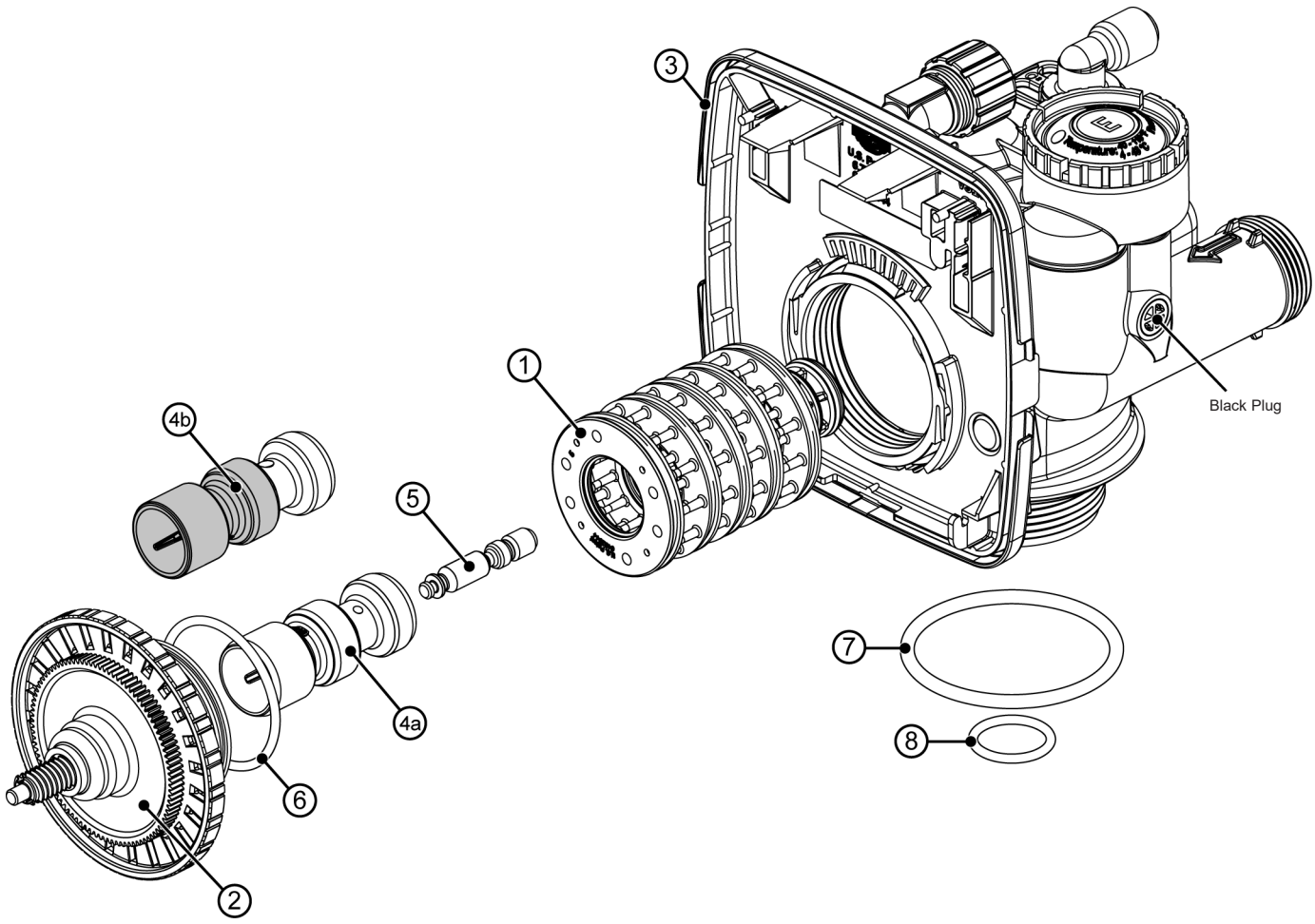


WS1 Drive Cap Assembly, Downflow Piston, Upflow Piston, Regenerant Piston, & Spacer Stack Assembly

Drawing No.	Part No.	Description	Quantity
1	LC-V3005-02	WS1 Spacer Stack Assembly	1
2	LC-V3004	Drive Cap Assembly	1
3	LC-V3178	WS1 Drive Backplate	1
4a	LC-V3011 *	WS1 Piston Downflow Assembly	1
4b	LC-V3011-01 *	WS1 Piston Upflow Assembly	1
5	LC-V3174	WS1 Regenerant Piston	1
6	LC-V3135	O-ring 228	1
7	LC-V3180	O-ring 337	1
8	LC-V3105	O-ring 215 (Riser)	1
Not Shown	LC-V3001	WS1 Body Downflow Assembly	1
	LC-V3001-02	WS1 Mixing Valve Body Downflow Assembly	1
	LC-V3001UP	WS1 Body Upflow Assembly	1
	LC-V3001-02UP	WS1 Mixing Valve Body Upflow Assembly	1

* P/N: LC-V3011 is labeled with DN and P/N: LC-V3011-01 is labeled with UP. Upflow option is not applicable to TC control valves.

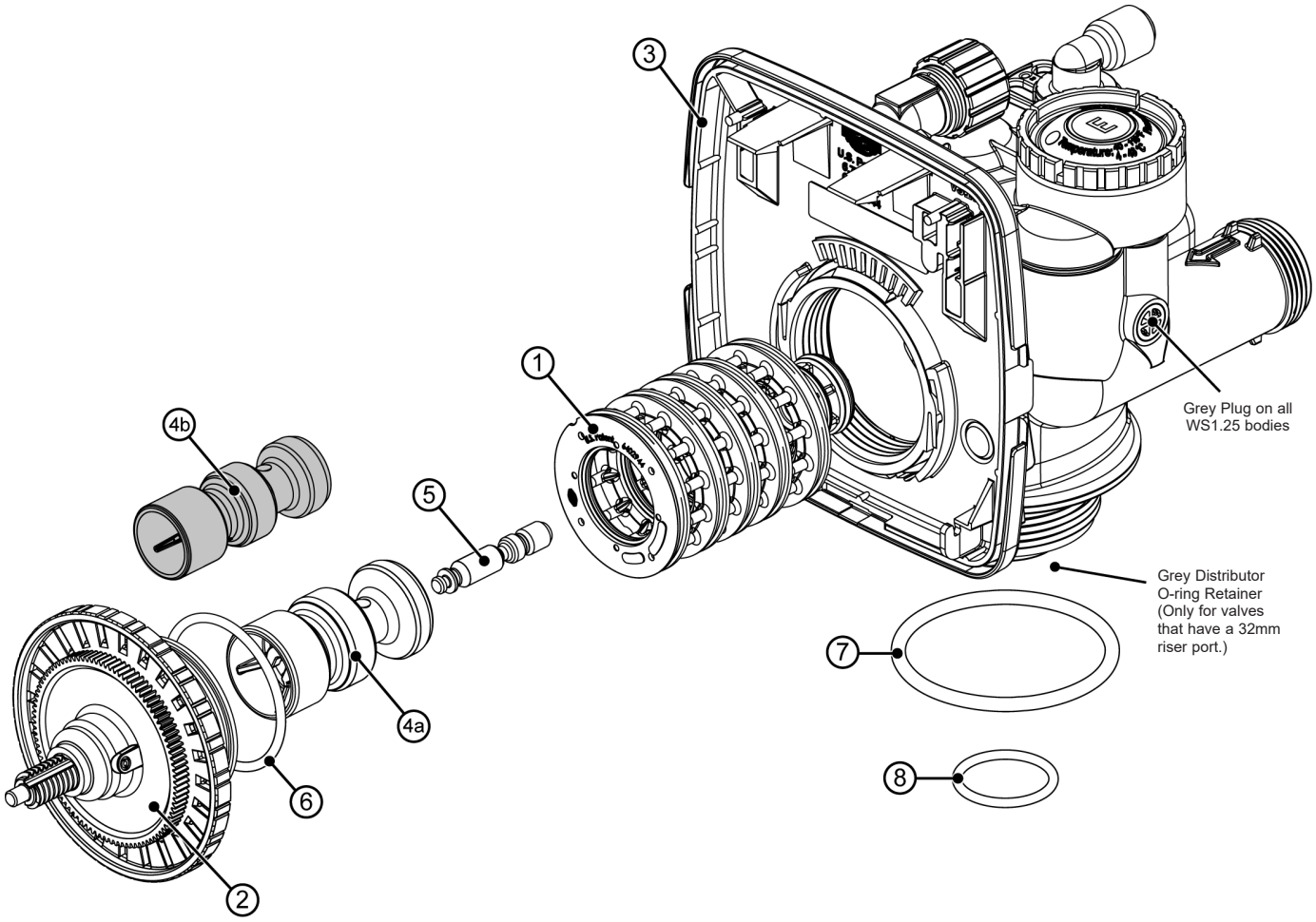
NOTE: The regenerant piston is not used in backwash only applications.



WS1.25 Drive Cap Assembly, Downflow Piston, Upflow Piston, Regenerant Piston, & Spacer Stack Assembly

Drawing No.	Part No.	Description	Quantity
1	LC-V3430-01	WS1.5 Spacer Stack Assembly	1
2	LC-V3004	Drive Cap Assembly	1
3	LC-V3178	WS1 Drive Backplate	1
4a	LC-V3407	WS1.25/1.5 Piston Downflow Assembly (amber)	1
4b	LC-V4042	WS1.25/1.5 Piston Upflow Assembly (black)	1
5	LC-V3174	WS1 Regenerant Piston	1
6	LC-V3135	O-ring 228	1
7	LC-V3180	O-ring 337	1
8	LC-V3358	O-ring 219 (Riser Port 1.32 inch)	1
	LC-V3357	O-ring 218 (Riser Port 32mm)	1
Not Shown	LC-V3020	WS1.25 Body Downflow Assembly (Riser Port 1.32 inch)	1
	LC-V3020-01	WS1.25 Mixing Valve Body Downflow Assembly (Riser Port 1.32 inch)	1
	LC-V3020-02	WS1.25 Body Downflow Assembly (Riser Port 32mm)	1
	LC-V3020-03	WS1.25 Mixing Valve Body Downflow Assembly (Riser Port 32mm)	1
	LC-V3020UP	WS1.25 Body Upflow Assembly (Riser Port 1.32 inch)	1
	LC-V3020-01UP	WS1.25 Mixing Valve Body Upflow Assembly (Riser Port 1.32 inch)	1
	LC-V3020-02UP	WS1.25 Body Upflow Assembly (Riser Port 32mm)	1
	LC-V3020-03UP	WS1.25 Mixing Valve Body Upflow Assembly (Riser Port 32mm)	1

NOTE: The regenerant piston is not used in backwash only applications.

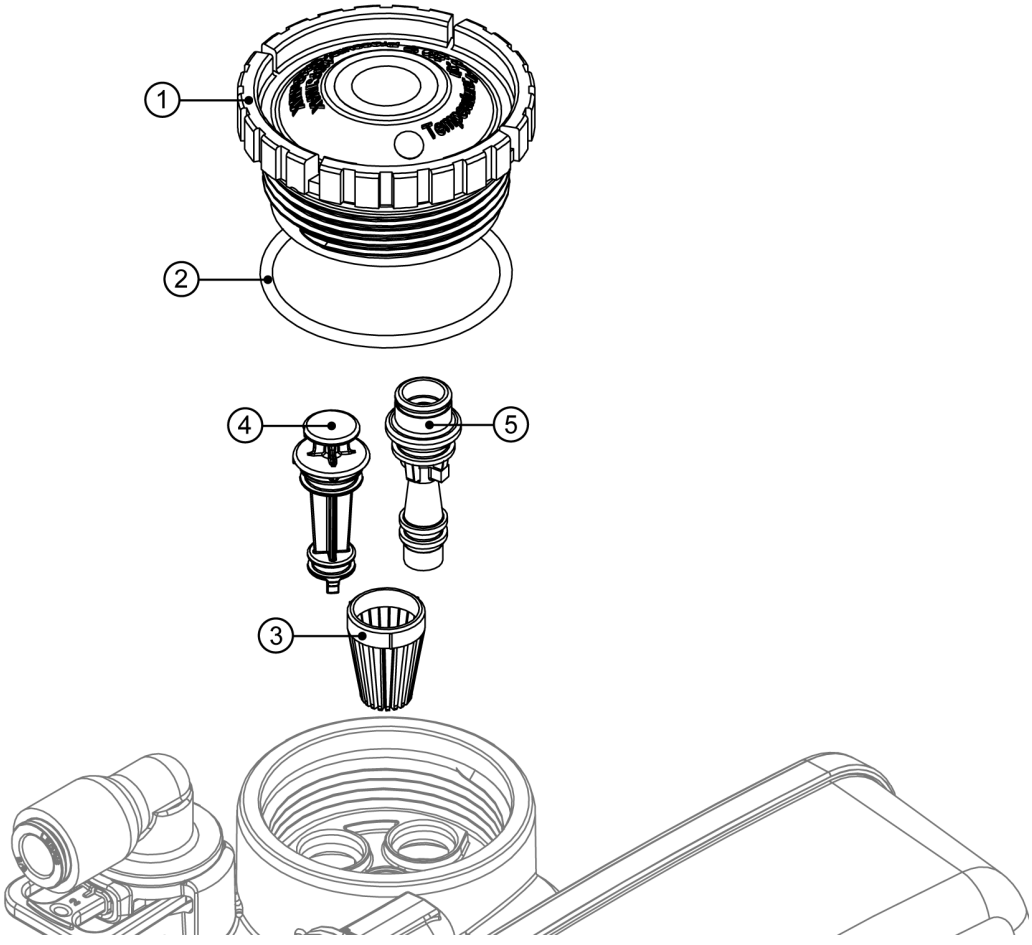


Injector Cap, Injector Screen, Injector, Plug, and O-Ring

Drawing No.	Part No.	Description	Quantity
1	LC-V3176	Injector Cap	1
2	LC-V3152	O-ring 135	1
3	LC-V3177-01	Injector Screen Cage	1
4	LC-V3010-1Z	WS1 Injector Assembly Z Plug	1
5	LC-V3010-1A	WS1 Injector Assembly A Black	1
	LC-V3010-1B	WS1 Injector Assembly B Brown	1
	LC-V3010-1C	WS1 Injector Assembly C Violet	1
	LC-V3010-1D	WS1 Injector Assembly D Red	1
	LC-V3010-1E	WS1 Injector Assembly E White	1
	LC-V3010-1F	WS1 Injector Assembly F Blue	1
	LC-V3010-1G	WS1 Injector Assembly G Yellow	1
	LC-V3010-1H	WS1 Injector Assembly H Green	1
	LC-V3010-1I	WS1 Injector Assembly I Orange	1
	LC-V3010-1J	WS1 Injector Assembly J Light Blue	1
	LC-V3010-1K	WS1 Injector Assembly K Light Green	1
Not Shown	LC-V3170	O-ring 011	*
	LC-V3171	O-ring 013	*

* The injector plug and the injector each contain one 011 (lower) and 013 (upper) o-ring.

NOTE: For upflow position, the injector is located in the UP hole, and the injector plug is in the other hole.
WS1 and WS1.25 upflow bodies are identified by having the DN marking removed.
Upflow option is not applicable to TC control valves.
For a filter that only backwashes, injector plugs are located in both holes.

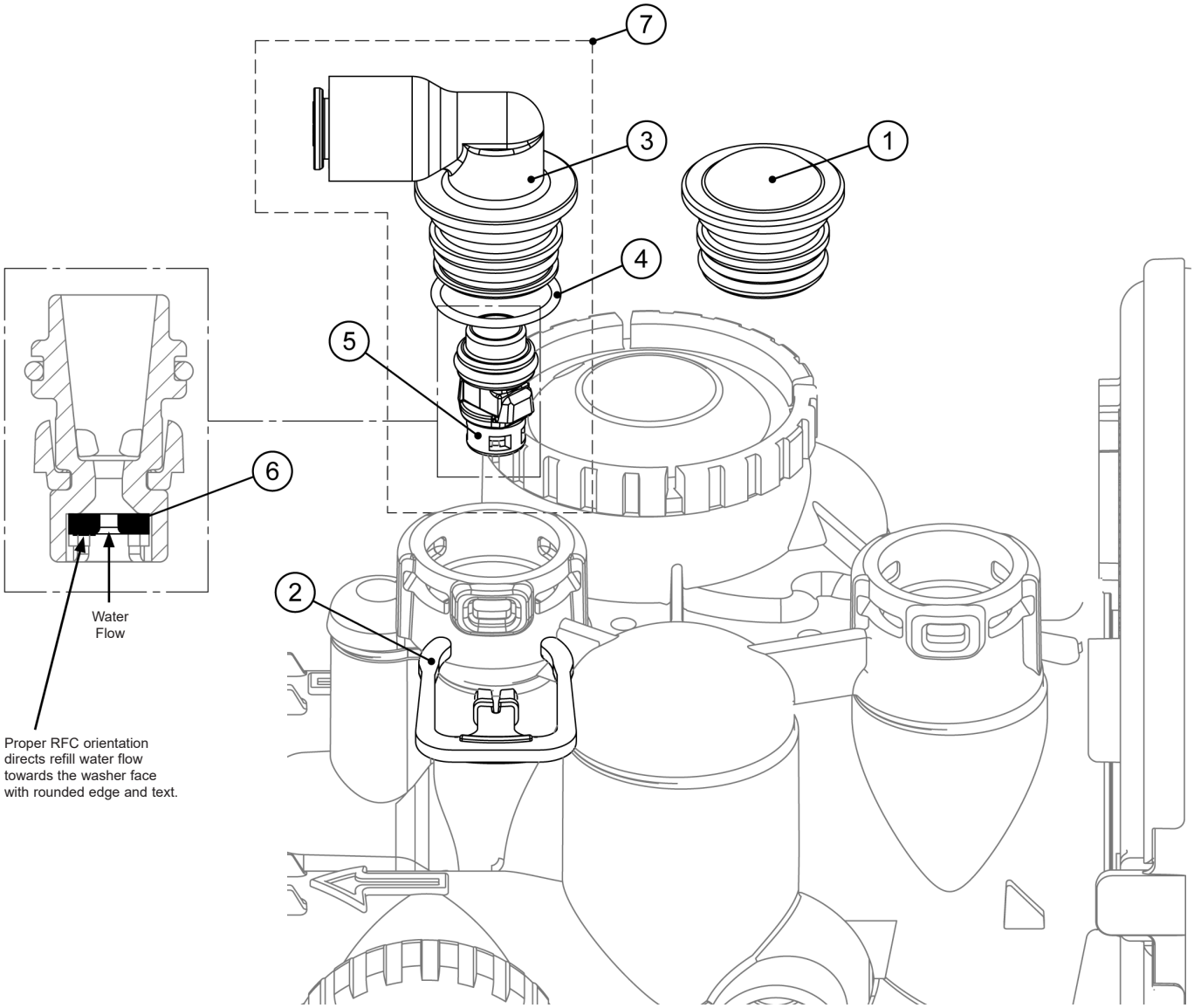


Refill Flow Control Assembly and Refill Port Plug

Drawing No.	Part No.	Description	Quantity
1	LC-V3195-01	WS1 Refill Port Plug Assembly	*
2	LC-H4615	Elbow Locking Clip	1
3	LC-H4628	Elbow 3/8 inch Brine Quick Connect	1
4	LC-V3163	O-ring 019	1
5	LC-V3165-01 **	WS1 Refill Flow Control Retainer Assembly (0.5 gpm)	1
6	LC-V3182	WS1 Refill Flow Control (0.5 gpm)	1
7	LC-V4144-01	Elbow 3/8 inch Brine Quick Connect with Refill Flow Control	1
Not Shown	LC-V3552	WS1 Brine Elbow Assembly with Refill Flow Control	Optional
Not Shown	LC-H4650	Elbow 1/2 inch with Nut and Insert	Optional

* This part is required for backwash only systems.

** Assembly includes Drawing No. 6 (Part No. LC-V3182).



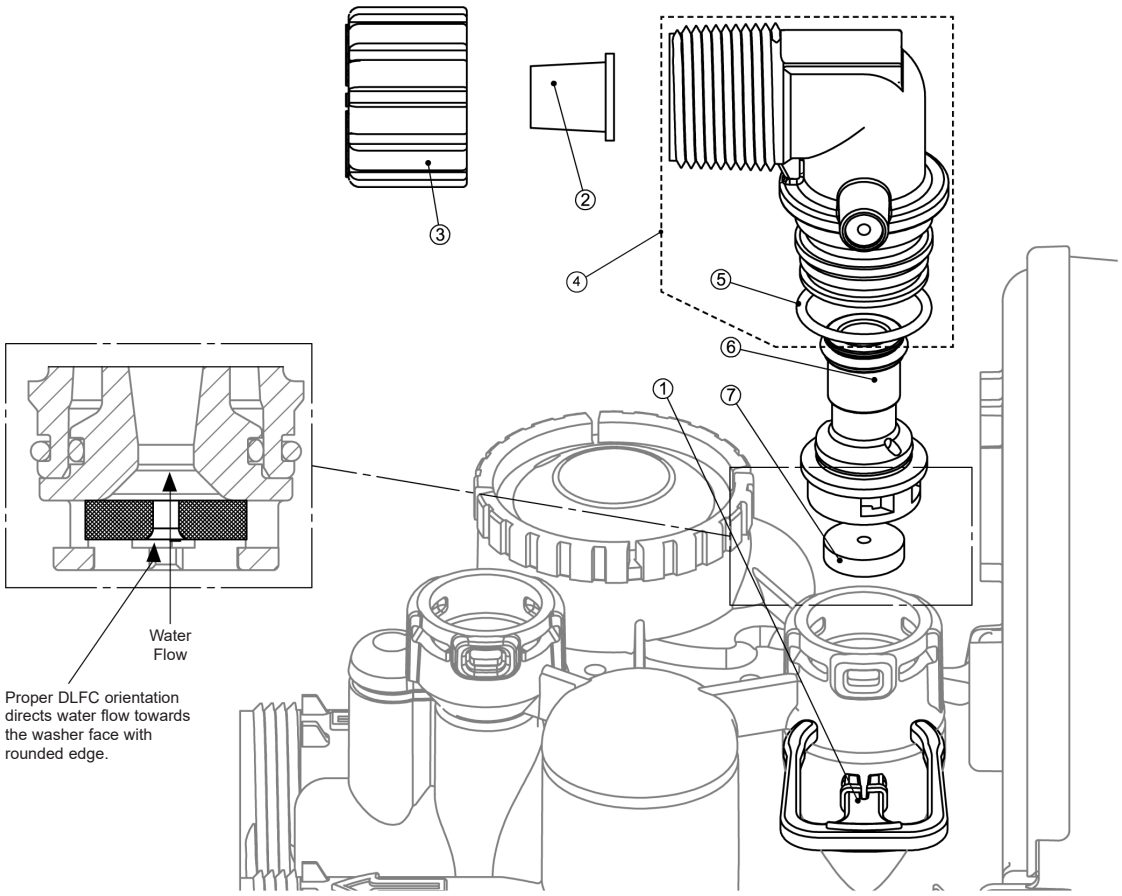
Drain Line – 3/4 Inch

Drawing No.	Part No.	Description	Quantity
1	LC-H4615	Elbow Locking Clip	1
2	LC-PKP10TS8-BULK	Polytube Insert 5/8 inch	Optional
3	LC-V3192	WS1 Nut 3/4 inch Drain Elbow	Optional
4 *	LC-V3158-01	WS1 Drain Elbow 3/4 inch Male with Silencer	1
	LC-V3158-02	WS1 Drain Elbow 3/4 inch Male without Silencer	1
5	LC-V3163	O-ring 019	1
6 *	LC-V3159-01	WS1 DLFC Retainer Assembly	1
7	LC-V3162-007	WS1 DLFC 0.7 gpm for 3/4 inch Fitting	**
	LC-V3162-010	WS1 DLFC 1.0 gpm for 3/4 inch Fitting	**
	LC-V3162-013	WS1 DLFC 1.3 gpm for 3/4 inch Fitting	**
	LC-V3162-017	WS1 DLFC 1.7 gpm for 3/4 inch Fitting	**
	LC-V3162-022	WS1 DLFC 2.2 gpm for 3/4 inch Fitting	**
	LC-V3162-027	WS1 DLFC 2.7 gpm for 3/4 inch Fitting	**
	LC-V3162-032	WS1 DLFC 3.2 gpm for 3/4 inch Fitting	**
	LC-V3162-042	WS1 DLFC 4.2 gpm for 03/4 inch Fitting	**
	LC-V3162-053	WS1 DLFC 5.3 gpm for 3/4 inch Fitting	**
	LC-V3162-065	WS1 DLFC 6.5 gpm for 3/4 inch Fitting	**
	LC-V3162-075	WS1 DLFC 7.5 gpm for 3/4 inch Fitting	**
	LC-V3162-090	WS1 DLFC 9.0 gpm for 3/4 inch Fitting	**
	LC-V3162-100	WS1 DLFC 10.0 gpm for 3/4 inch Fitting	**

* Drawing Number Parts 4 and 6 can be ordered as a complete assembly: Part No. LC-V4057, WS1 Drain Elbow and Retainer with Silencer Assembly or Part No. LC-V3962, WS1 Drain Elbow and Retainer without Silencer Assembly

** One Drain Line Flow Control (DLFC) must be used if 3/4 inch fitting is used.

NOTE: Valves are shipped without Drain Line Flow Control (DLFC) — Install DLFC before using. Valves are shipped without 3/4 inch nut for drain elbow (polytube installation only) and 5/8 inch polytube insert (polytube installation only).

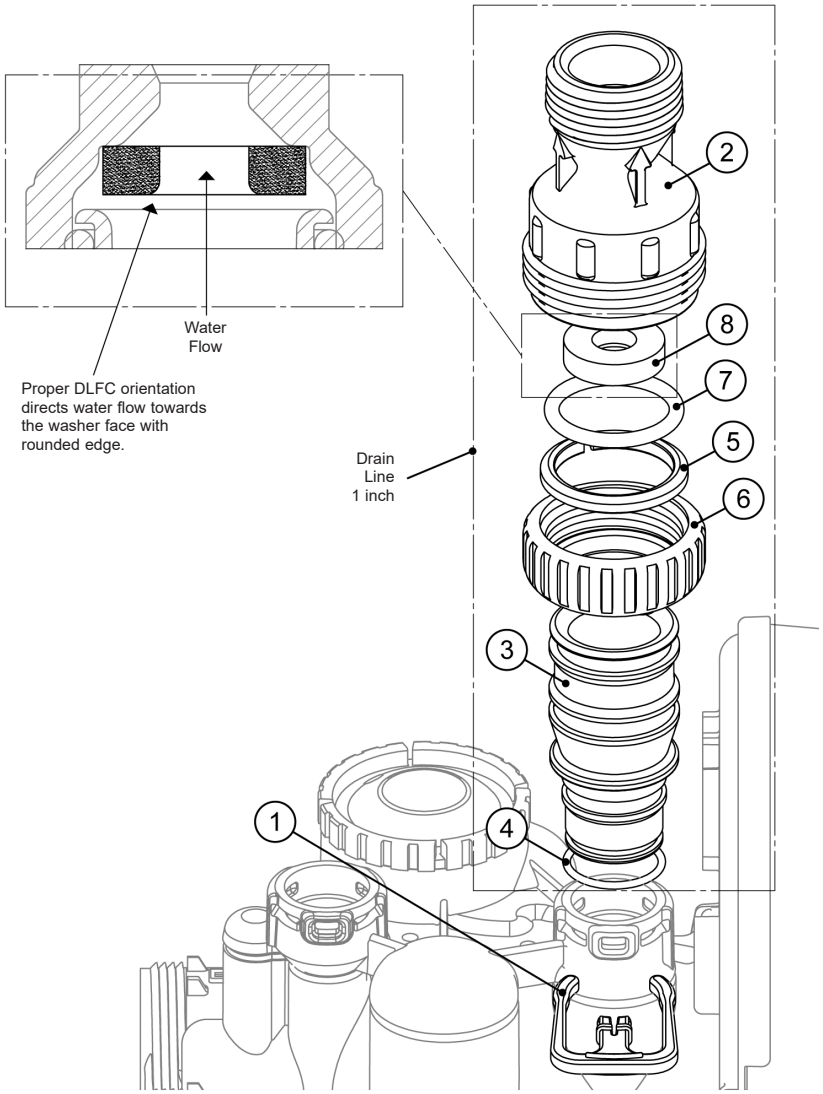


Drain Line – 1 Inch

Drawing No.	Part No.	Description	Quantity
1	LC-H4615	Elbow Locking Clip	1
2 *	LC-V3166	WS1 Drain Fitting Body 1 inch	1
	LC-V3166-01	WS1 Drain Fitting Body Female 1 inch	1
3 *	LC-V3167	WS1 Drain Fitting Adapter 1 inch	1
4 *	LC-V3163	O-ring 019	1
5 *	LC-V3150	WS1 Split Ring	1
6 *	LC-V3151	WS1 Nut 1 inch Quick Connect	1
7 *	LC-V3105	O-ring 215	1
8	LC-V3190-090	WS1 DLFC 9.0 gpm for 1 inch Fitting	**
	LC-V3190-100	WS1 DLFC 10.0 gpm for 1 inch Fitting	**
	LC-V3190-110	WS1 DLFC 11.0 gpm for 1 inch Fitting	**
	LC-V3190-130	WS1 DLFC 13.0 gpm for 1 inch Fitting	**
	LC-V3190-150	WS1 DLFC 15.0 gpm for 1 inch Fitting	**
	LC-V3190-170	WS1 DLFC 17.0 gpm for 1 inch Fitting	**
	LC-V3190-200	WS1 DLFC 20.0 gpm for 1 inch Fitting	**
	LC-V3190-250	WS1 DLFC 25.0 gpm for 1 inch Fitting	**

* Drawing Number Parts 2 through 7 can be ordered as a complete assembly: Part No. LC-V3008-02, WS1 Drain Fitting 1 inch Straight with Silencer or Part No. LC-V3008-04, WS1 Drain Fitting 1 inch Straight without Silencer

** One DLFC must be used if 1 inch fitting is used.



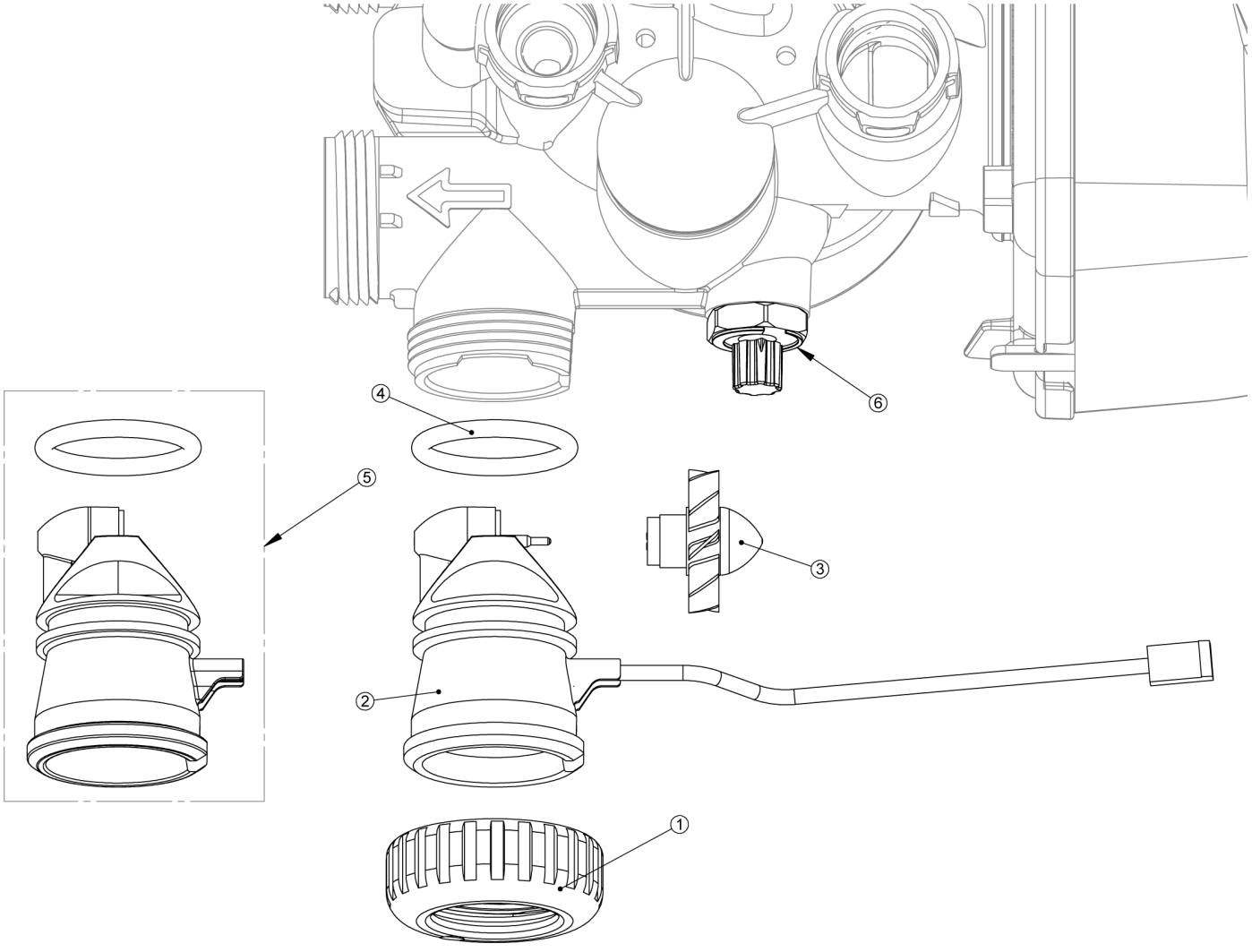
Water Meter, Meter Plug, and Mixing Valve

Drawing No.	Part No.	Description	Quantity
1	LC-V3151	WS1 Nut 1 inch Quick Connect	1
2	LC-V3003 *	WS1 Meter Assembly	1
3	LC-V3118-01	WS1 Turbine Assembly	1
4	LC-V3105	O-ring 215	1
5	LC-V3003-01	WS1 Meter Plug Assembly	1
6	LC-V3013	Mixing Valve	Optional

* Drawing Number Parts 3 and 4 included with assembly: Part No. LC-V3003, WS1 Meter Assembly.

This water meter should not be used as the primary monitoring device for critical or health effect applications.

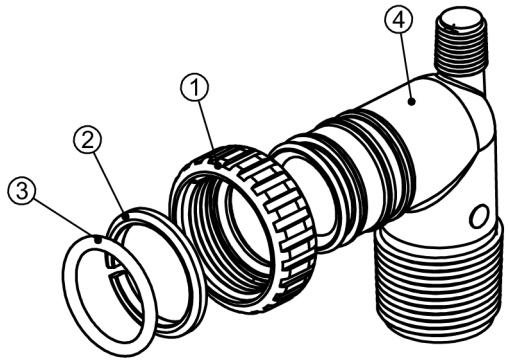
NOTE: A water meter is not applicable for a Tech-TC control valve.



Installation Fitting Assemblies

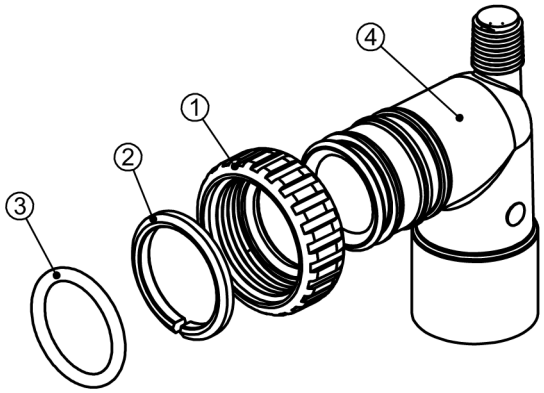
Part No: LC-V3007
Description: WS1 Fitting 1 Inch
PVC Male NPT Elbow Assembly

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3149	WS1 Fitting 1 inch PVC Male NPT Elbow	2



Part No: LC-V3007-01
Description: WS1 Fitting 3/4 Inch and 1 inch
PVC Solvent 90 degree Assembly

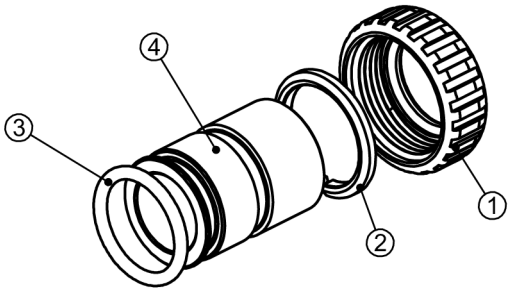
Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3189	WS1 Fitting 3/4 and 1 inch PVC Solvent 90 degree	2



Part No: LC-V3007-02LF
Description: WS1 Fitting 1 Inch
Brass Sweat Assembly Lead Free *

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3188-LF	WS1 Fitting 1 inch Brass Sweat Lead Free	2

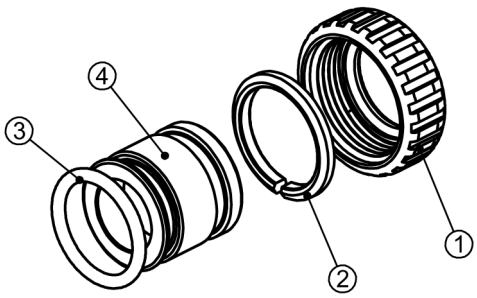
* Do not install in California.



Part No: LC-V3007-03LF
Description: WS1 Fitting 3/4 Inch
Brass Sweat Assembly Lead Free *

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3188-01LF	WS1 Fitting 3/4 inch Brass Sweat Lead Free	2

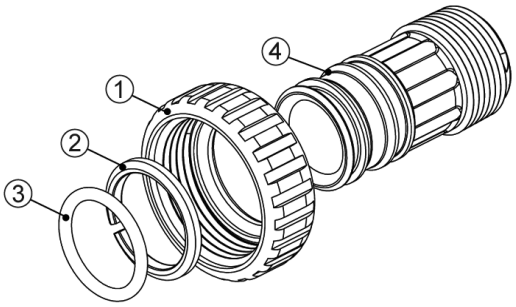
* Do not install in California.



Installation Fitting Assemblies

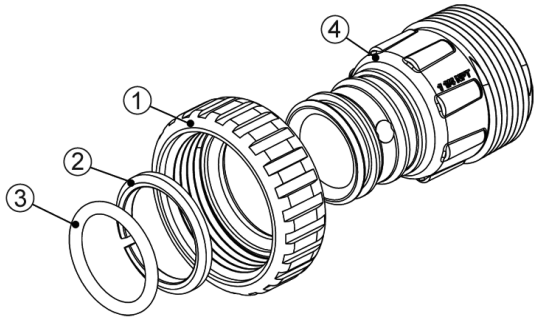
Part No: LC-V3007-04
Description: WS1 Fitting 1 Inch
Plastic Male NPT Assembly

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3164	WS1 Fitting 1 inch Plastic Male NPT	2



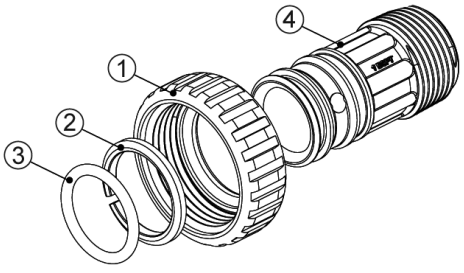
Part No: LC-V3007-05
Description: WS1 Fitting 1-1/4 Inch
Plastic Male NPT Assembly

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3317	WS1 Fitting 1-1/4 inch Plastic Male NPT	2



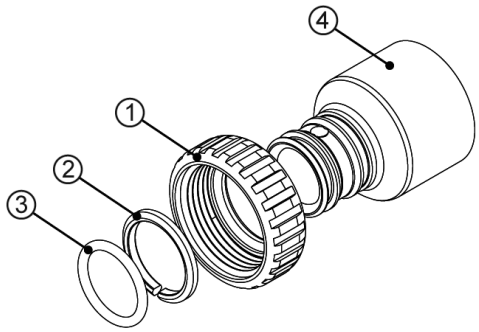
Part No: LC-V3007-06
Description: WS1 Fitting 1 Inch
Plastic Male BSPT Assembly

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3316	WS1 Fitting 1 inch Plastic Male BSPT	2



Part No. LC-V3007-07
Description: WS1 Fitting 1-1/4 Inch and 1-1/2 Inch
PVC Solvent Assembly

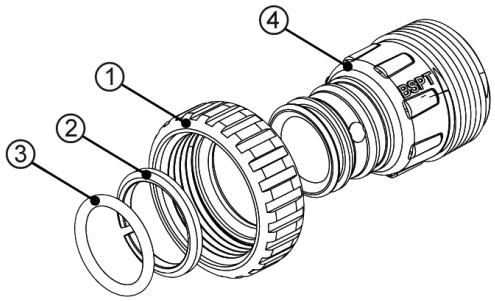
Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3352	WS1 Fitting 1-1/4 inch and 1-1/2 inch PVC Solvent	2



Installation Fitting Assemblies

Part No: LC-V3007-08
Description: WS1 Fitting 1-1/4 Inch
Plastic Male BSPT Assembly

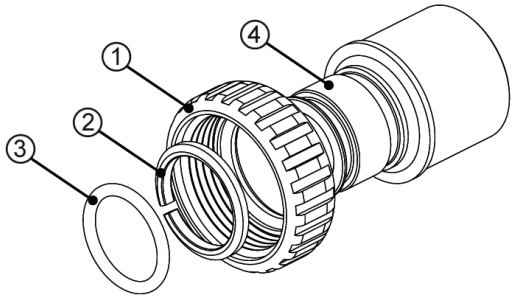
Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3361	WS1 Fitting 1.25 inch Plastic Male BSPT	2



Part No: LC-V3007-09LF
Description: WS1 Fitting 1-1/4 Inch and 1-1/2 inch
Brass Sweat Assembly Lead Free *

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3375-LF	WS1 Fitting 1-1/4 inch and 1-1/2 inch Brass Sweat Lead Free	2

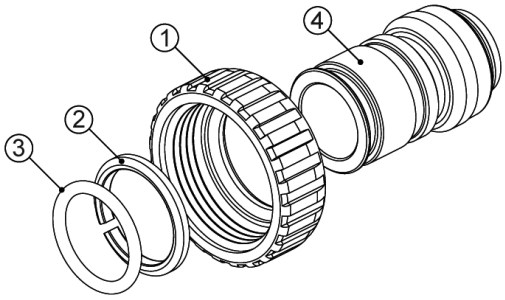
* Do not install in California.



Part No: LC-V3007-12LF
Description: WS1 Fitting 3/4 Inch
Brass SharkBite Assembly Lead Free *

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3628-LF	WS1 Fitting 3/4 inch Brass SharkBite Lead Free	2

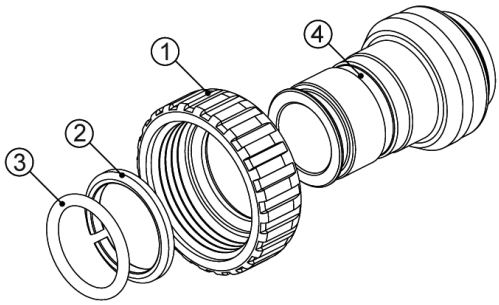
* Do not install in California.



Part No: LC-V3007-13LF
Description: WS1 Fitting 1 Inch
Brass SharkBite Assembly Lead Free *

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3629-LF	WS1 Fitting 1 inch Brass SharkBite Lead Free	2

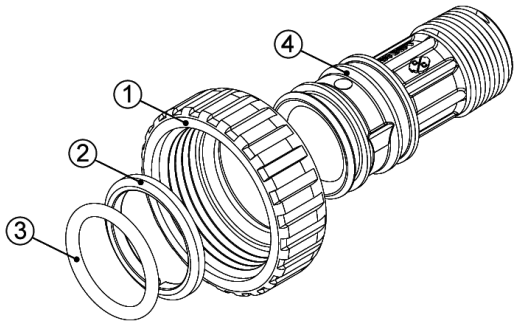
* Do not install in California.



Installation Fitting Assemblies

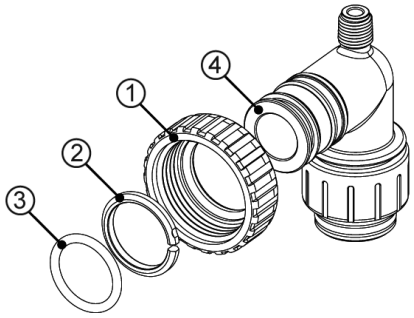
Part No: LC-V3007-14
Description: WS1 Fitting 3/4 Inch
Plastic Male BSPT Assembly

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3594	WS1 Fitting 3/4 inch Plastic Male BSPT	2



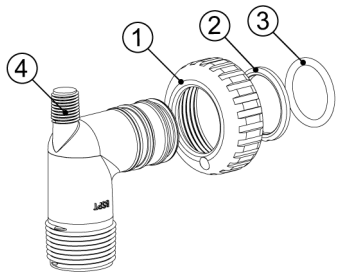
Part No: LC-V3007-15
Description: WS1 Fitting 3/4 Inch
John Guest Quick Connect 90° Assembly

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3790	WS1 Elbow 3/4 inch Quick Connect with Stem	2



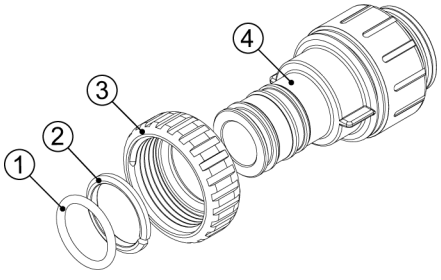
Part No: LC-V3007-16
Description: WS1 Fitting 1 Inch
Plastic Male BSPT Elbow Assembly

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3316	WS1 Fitting 1 inch Plastic Male BSPT Elbow	2



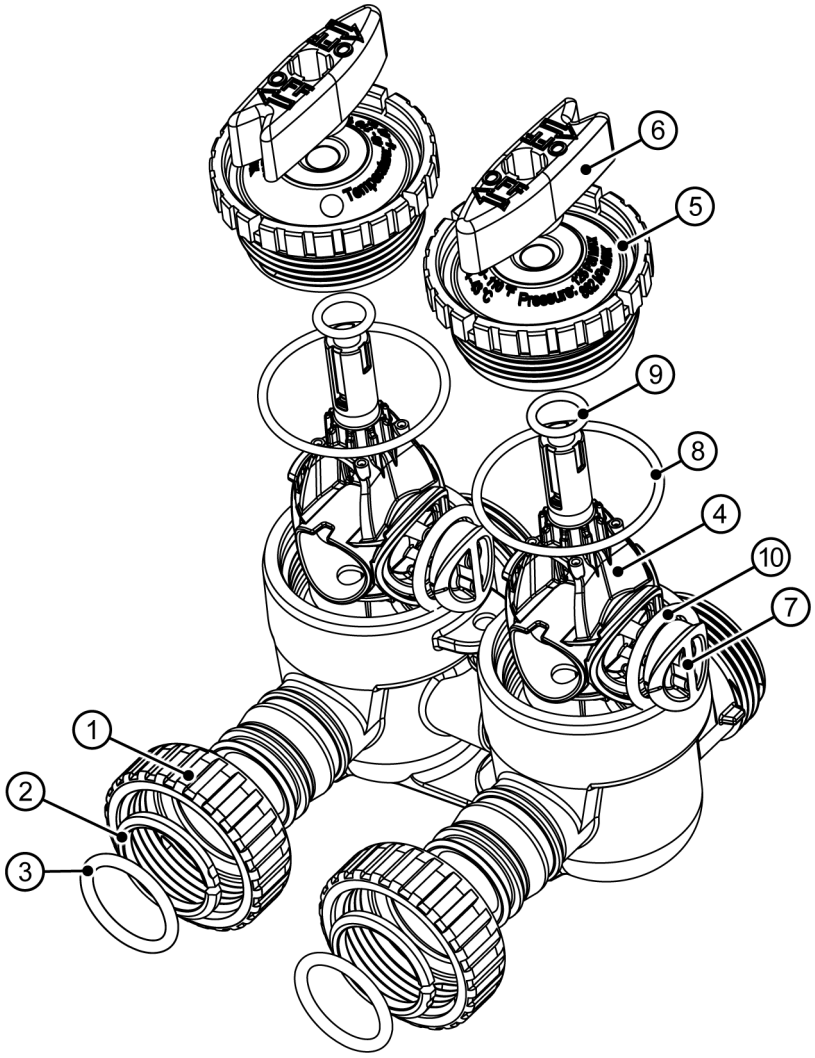
Part No. LC-V3007-17
Description: WS1 Fitting 1 Inch
John Guest Quick Connect Assembly

Drawing No.	Part No.	Description	Qty.
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3352	WS1 Fitting 1 inch Quick Connect	2



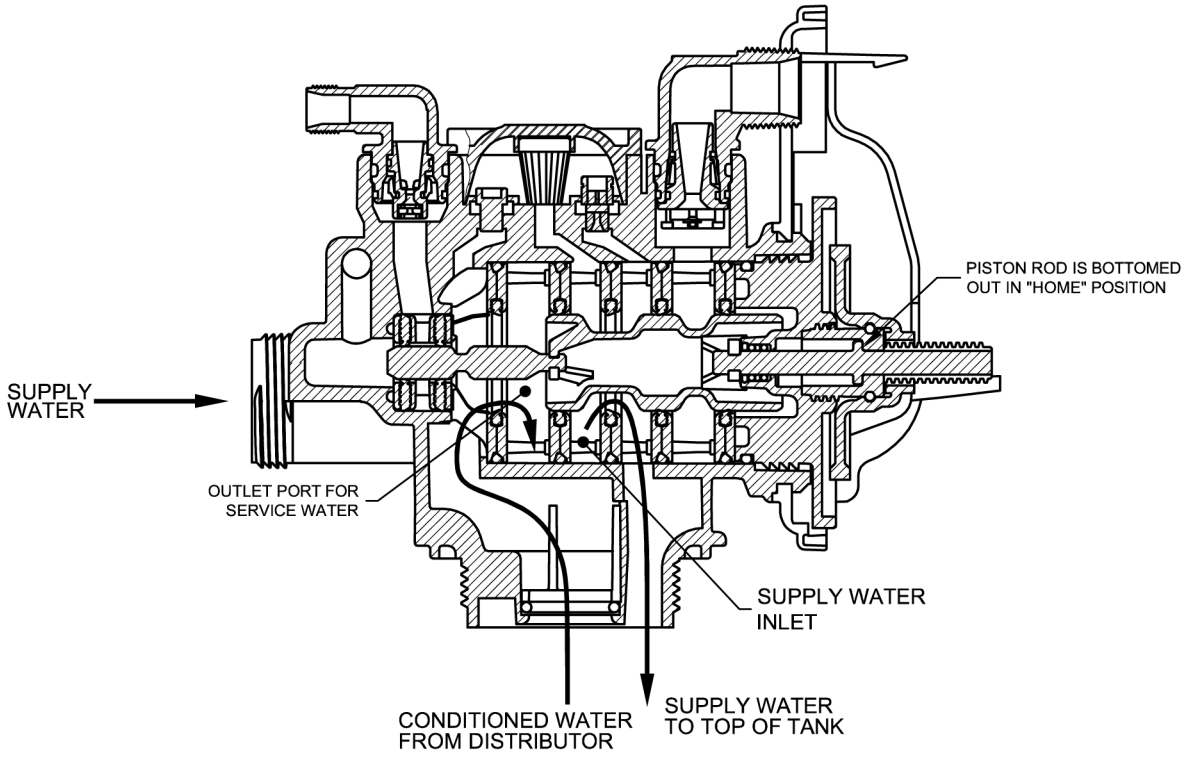
Bypass Valve

Drawing No.	Part No.	Description	Quantity
1	LC-V3151	WS1 Nut 1 inch Quick Connect	2
2	LC-V3150	WS1 Split Ring	2
3	LC-V3105	O-ring 215	2
4	LC-V3145	WS1 Bypass 1 inch Rotor	2
5	LC-V3146	WS1 Bypass Cap	2
6	LC-V3147	WS1 Bypass Handle	2
7	LC-V3148	WS1 Bypass Rotor Seal Retainer	2
8	LC-V3152	O-ring 135	2
9	LC-V3155	O-ring 112	2
10	LC-V3156	O-ring 214	2
Not Shown	LC-V3191-01	WS1 Bypass Vertical Adapter Assembly	
	LC-V3151	WS1 Nut 1 inch Quick Connect	2
	LC-V3150	WS1 Split Ring	2
	LC-V3105	O-ring 215	2
	LC-V3191	WS1 Bypass Vertical Adapter	2

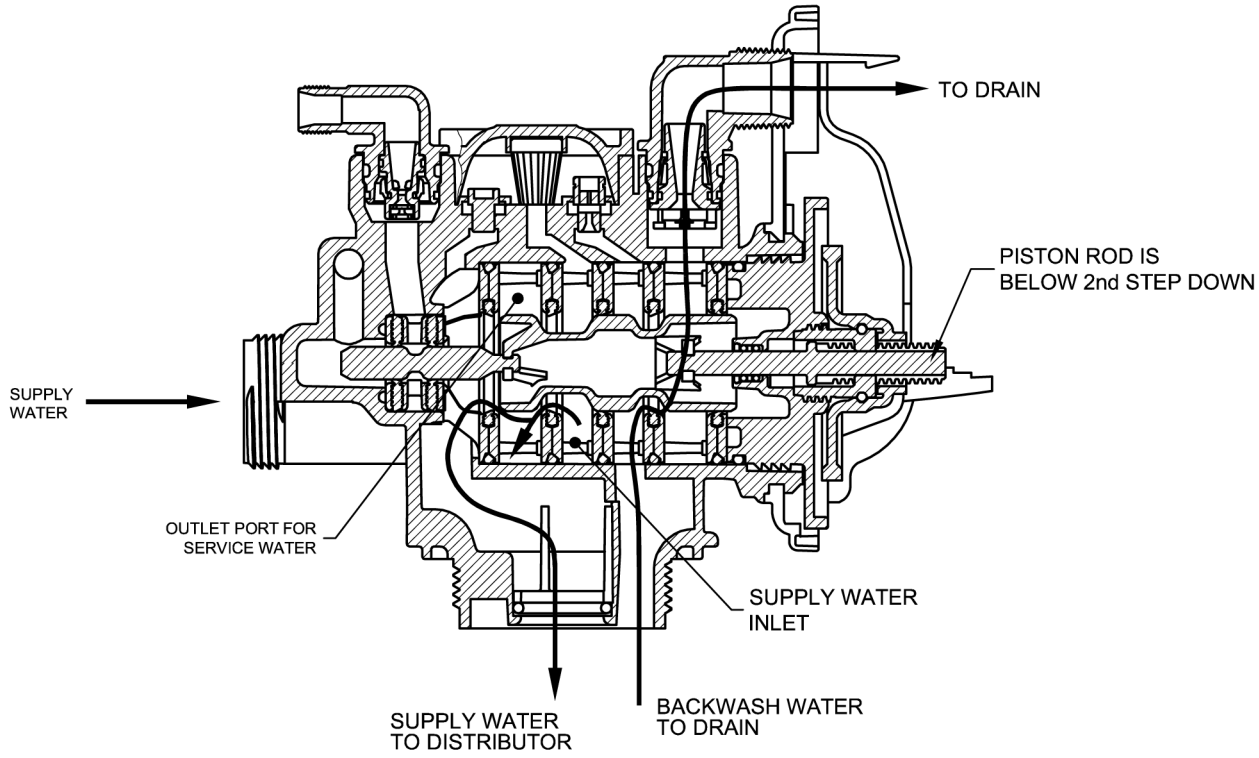


Flow Diagrams – Service and Backwash

Flow Diagram – Service

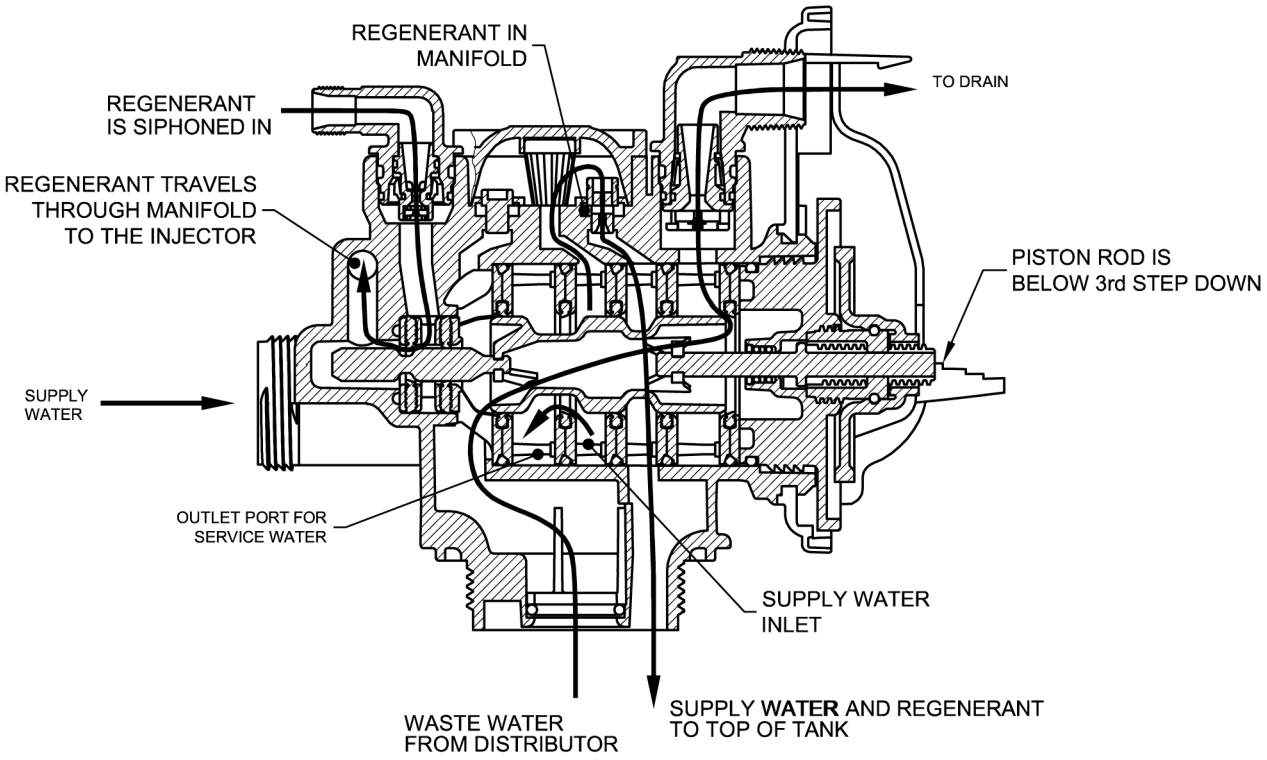


Flow Diagram – Backwash

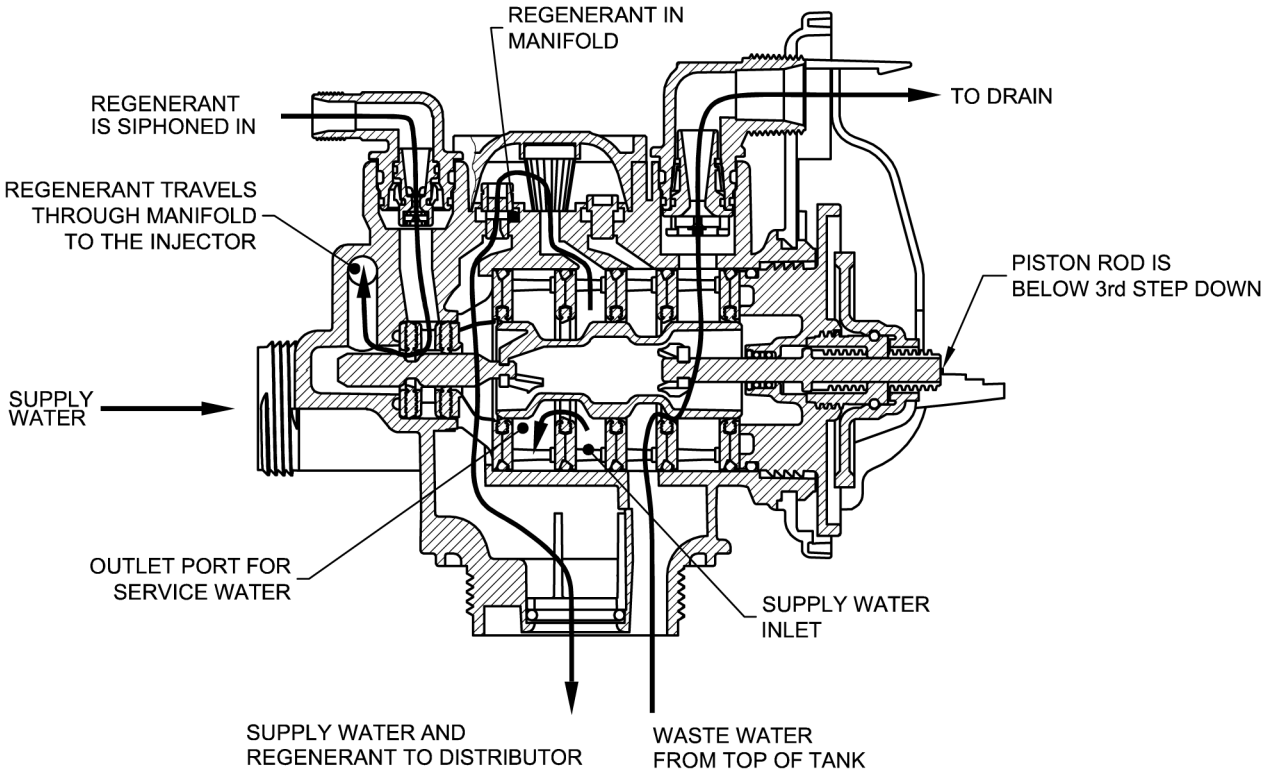


Flow Diagrams – Downflow and Upflow

Flow Diagram – Downflow Brine

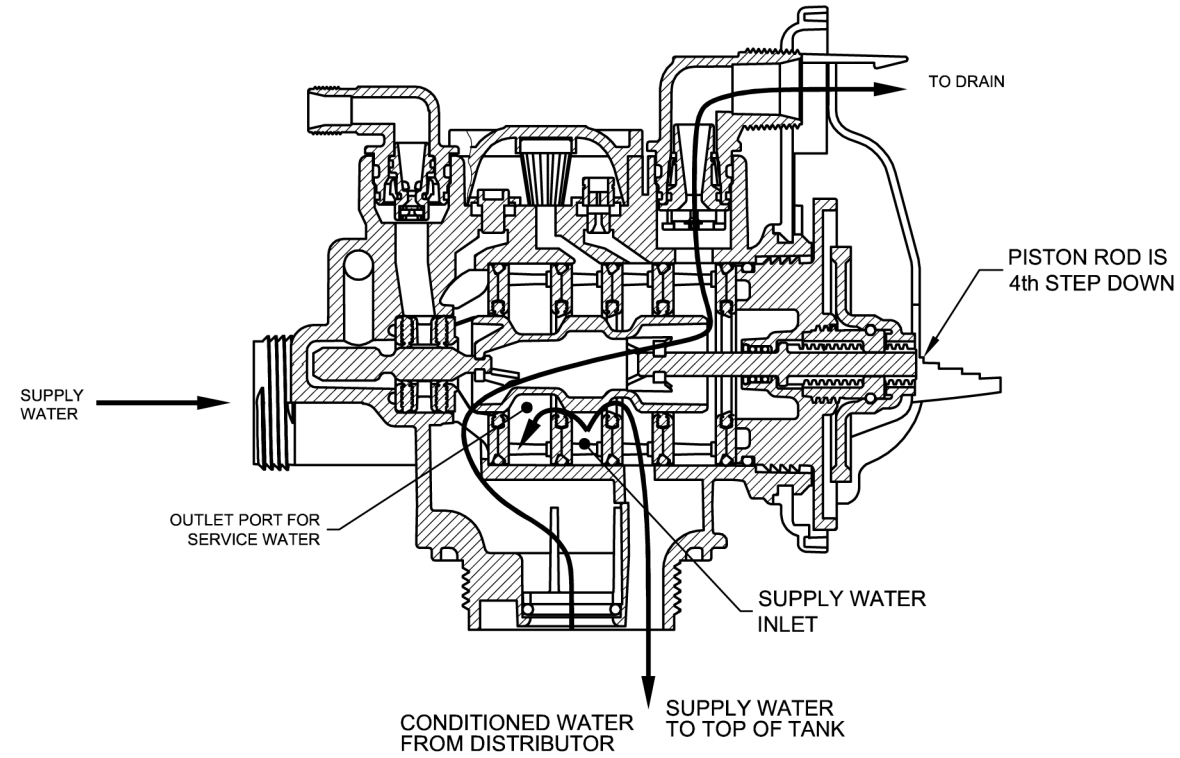


Flow Diagram – Upflow Brine

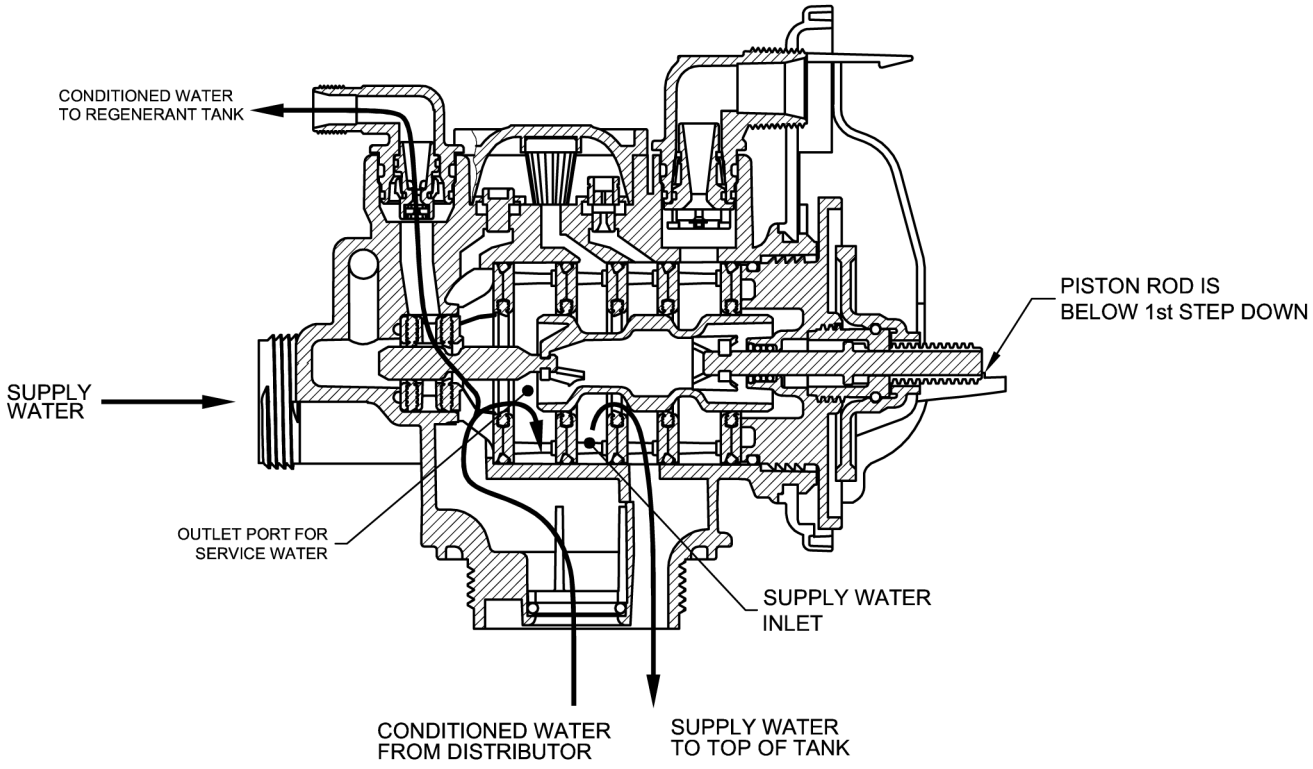


Flow Diagrams – Rinse and Fill

Flow Diagram – Rinse

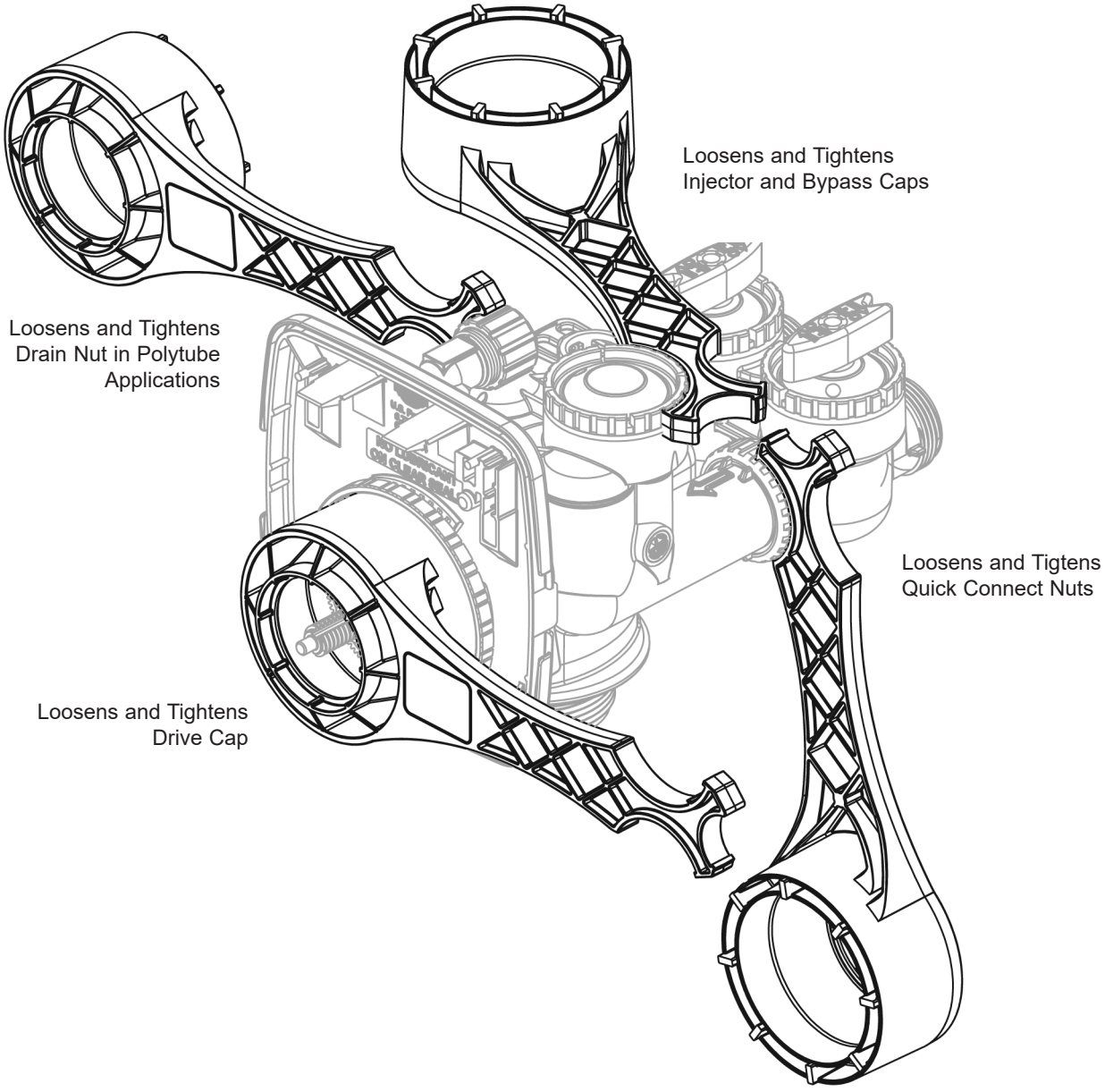


Flow Diagram – Fill



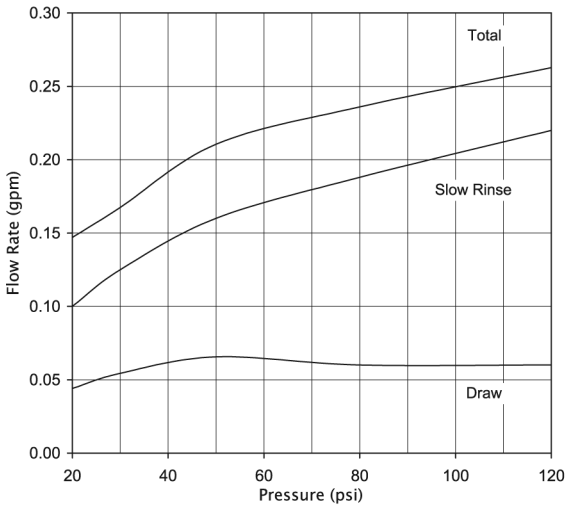
WS1 Service Spanner Wrench
(Part No. LC-V3193-02)

Although no tools are necessary to assemble or disassemble the valve, the WS1 Service Spanner Wrench (shown in various positions on the valve) may be purchased to aid in assembly or disassembly.

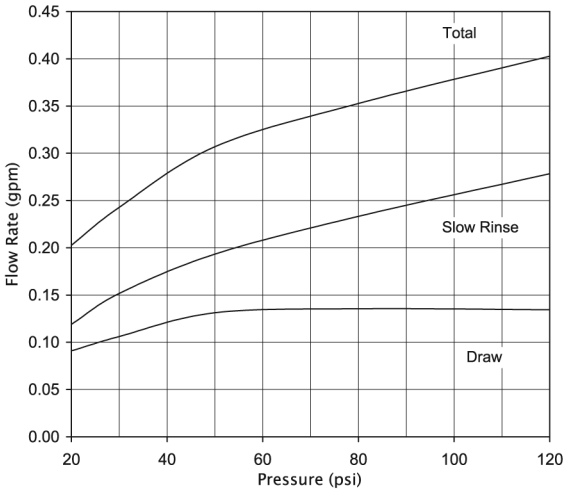


Injector Graphs US Units: Injector Draw, Slow Rinse, and Total Flow Rates

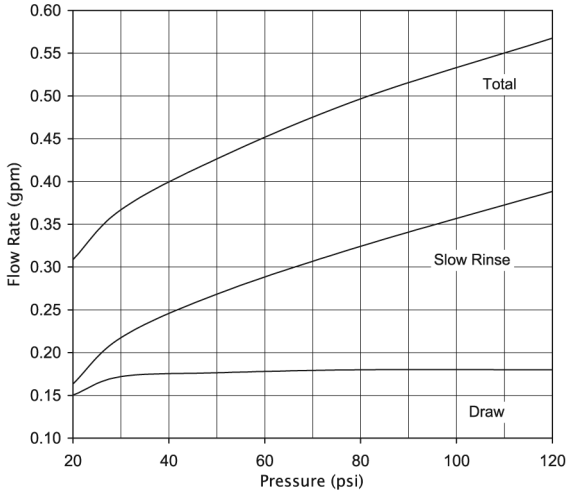
Black, Part No. LC-V3010-1A
US Units



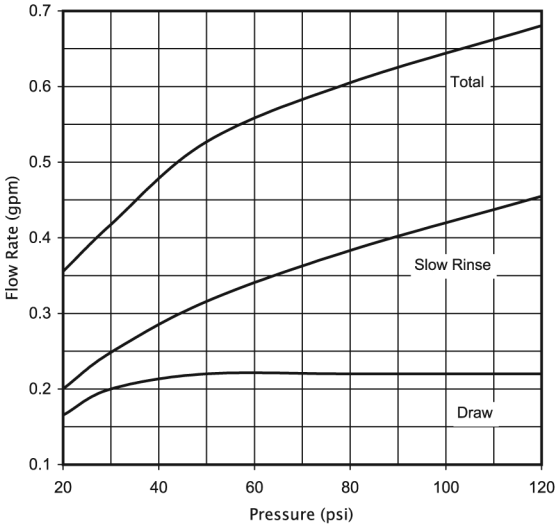
Brown, Part No. LC-V3010-1B
US Units



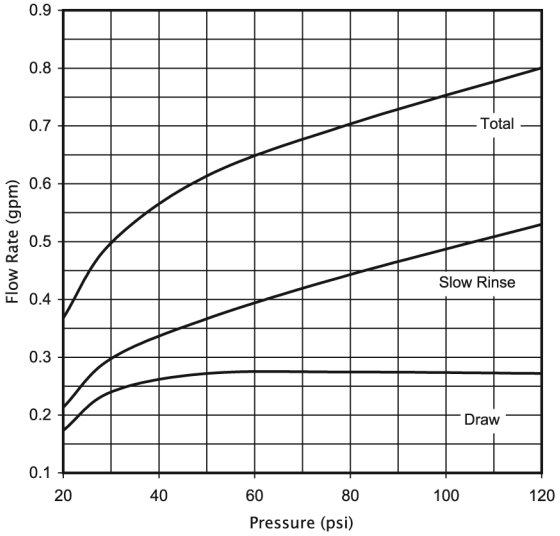
Violet, Part No. LC-V3010-1C
US Units



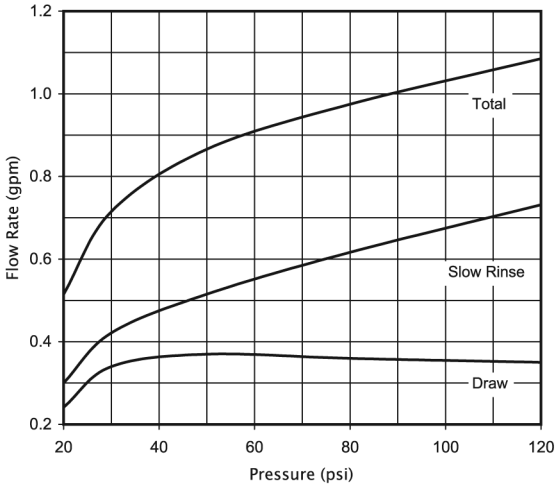
Red, Part No. LC-V3010-1D
US Units



White, Part No. LC-V3010-1E
US Units

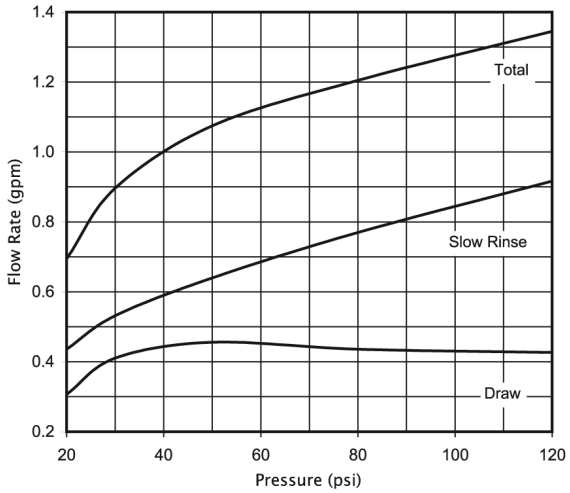


Blue, Part No. LC-V3010-1F
US Units

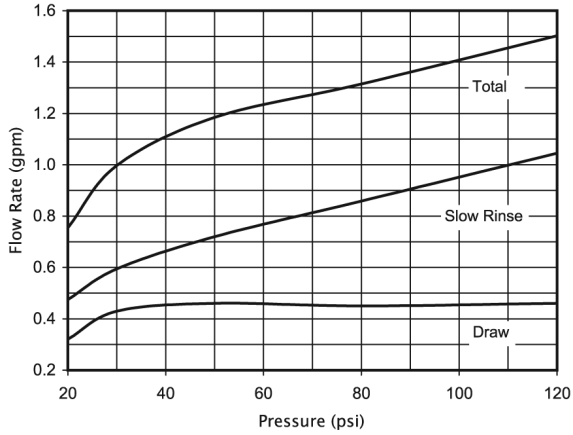


Injector Graphs US Units: Injector Draw, Slow Rinse, and Total Flow Rates

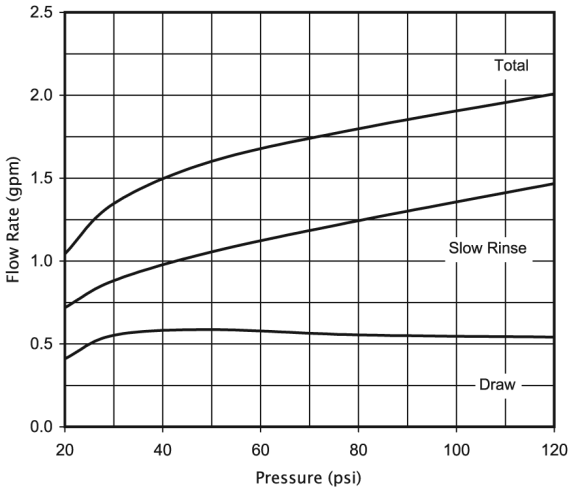
Yellow, Part No. LC-V3010-1G
US Units



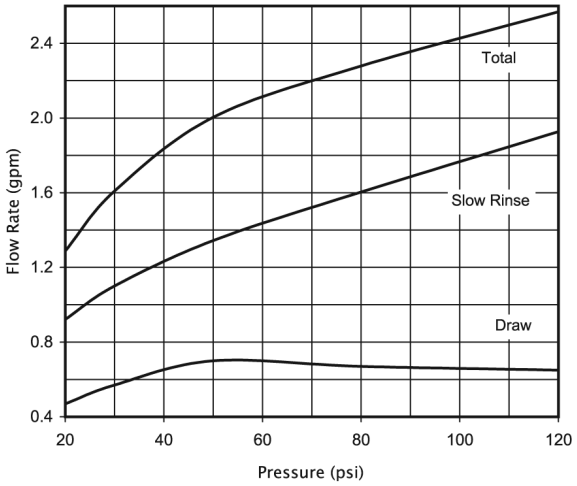
Green, Part No. LC-V3010-1H
US Units



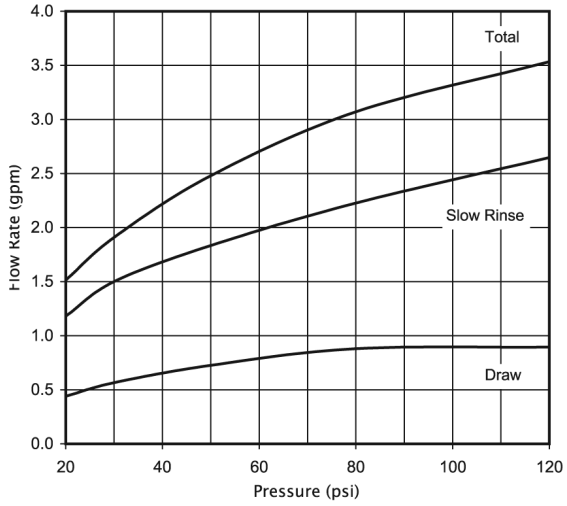
Orange, Part No. LC-V3010-1I
US Units



Light Blue, Part No. LC-V3010-1J
US Units

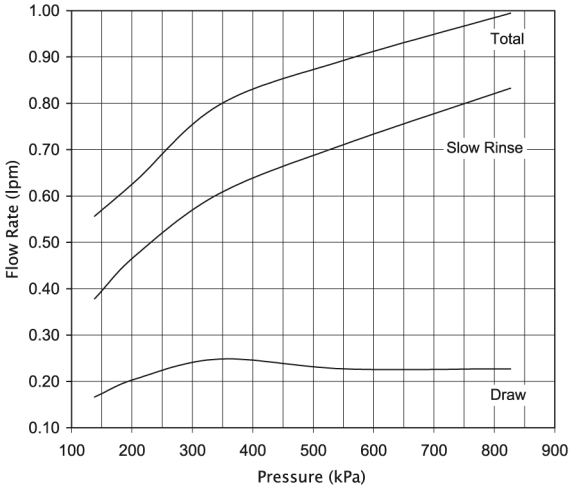


Light Green, Part No. LC-V3010-1K
US Units

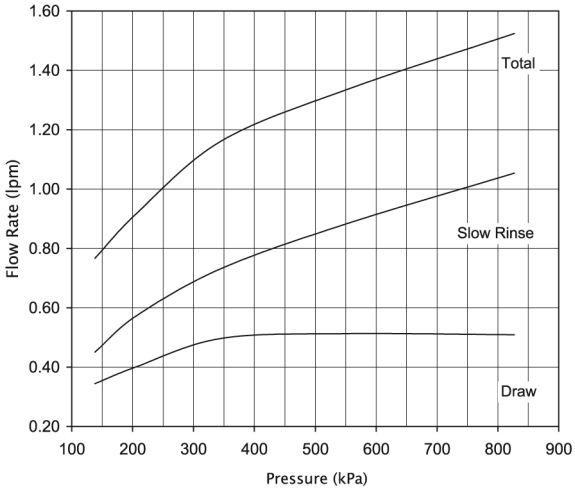


Injector Graphs Metric Units: Injector Draw, Slow Rinse, and Total Flow Rates

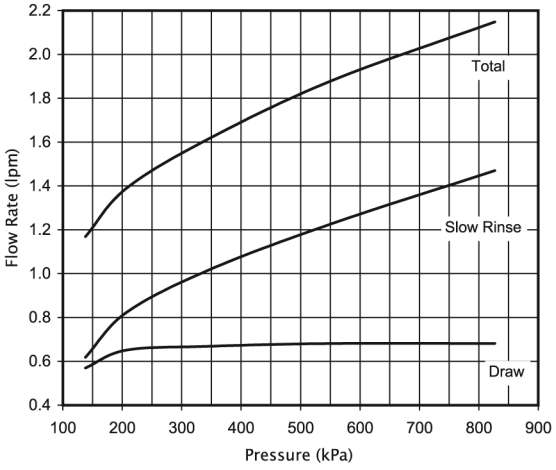
Black, Part No. LC-V3010-1A
Metric Units



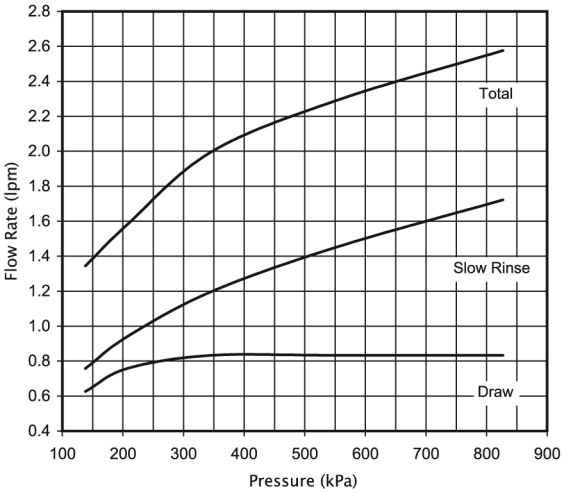
Brown, Part No. LC-V3010-1B
Metric Units



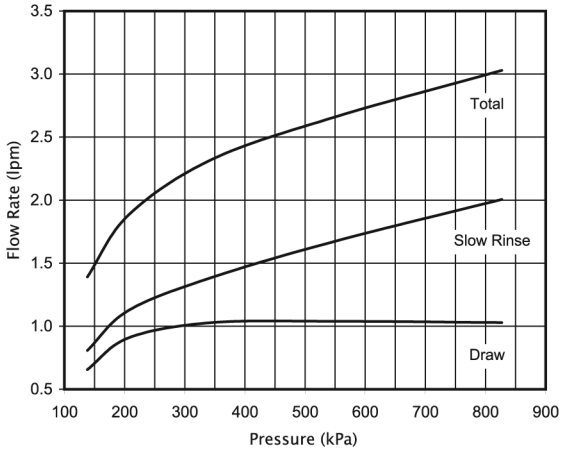
Violet, Part No. LC-V3010-1C
Metric Units



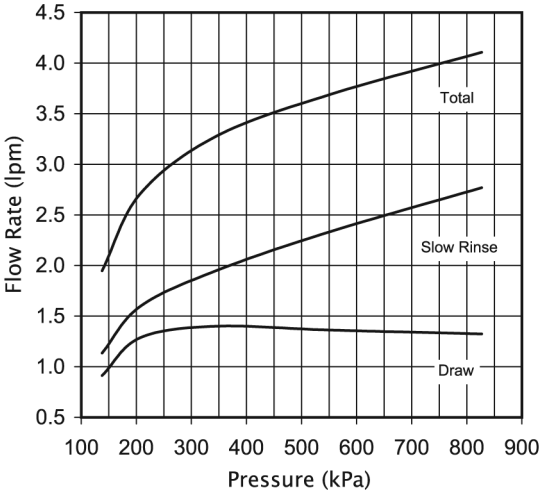
Red, Part No. LC-V3010-1D
Metric Units



White, Part No. LC-V3010-1E
Metric Units

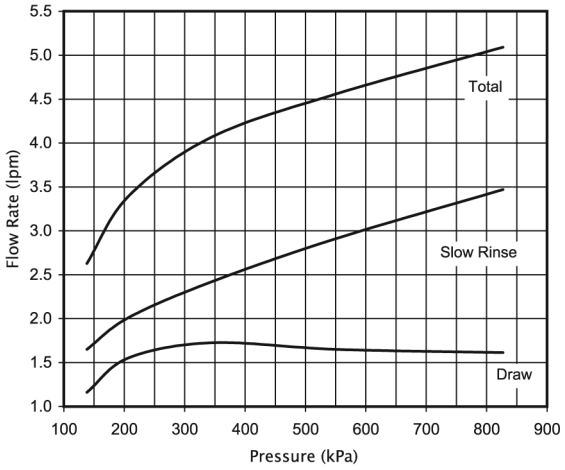


Blue, Part No. LC-V3010-1F
Metric Units

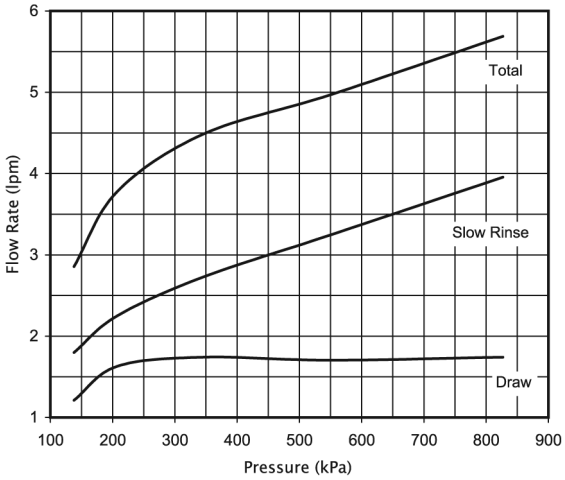


Injector Graphs Metric Units: Injector Draw, Slow Rinse, and Total Flow Rates

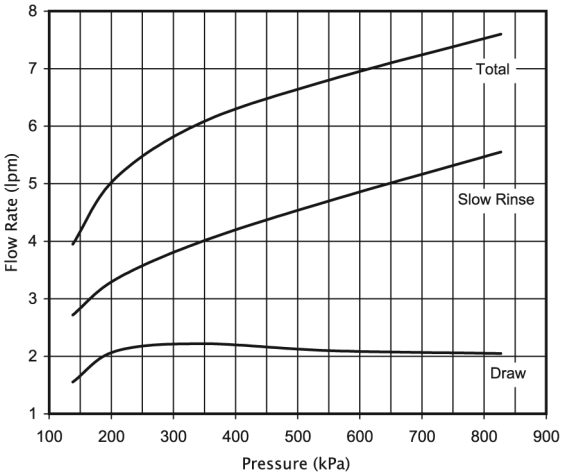
Yellow, Part No. LC-V3010-1G Metric Units



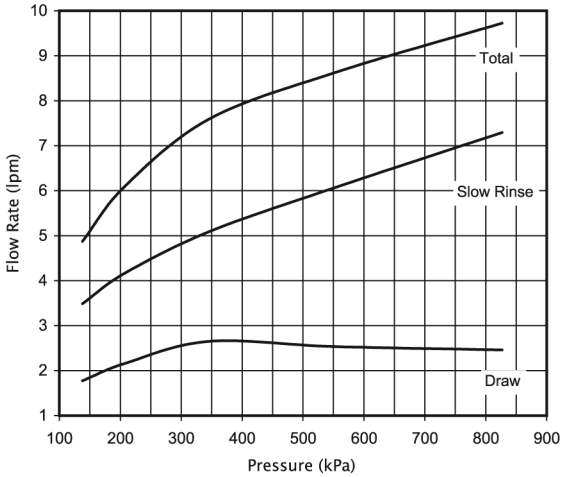
Green, Part No. LC-V3010-1H Metric Units



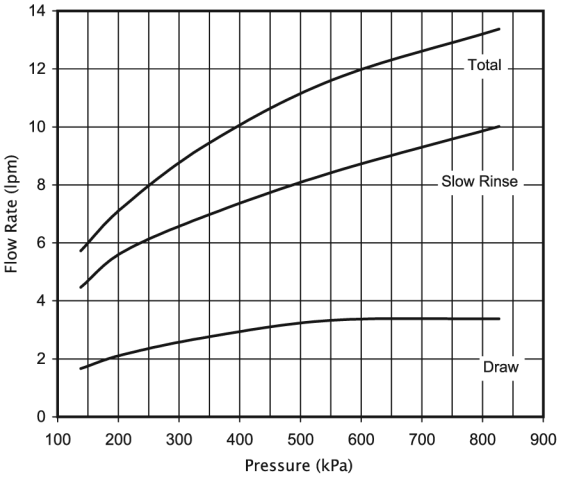
Orange, Part No. LC-V3010-1I Metric Units



Light Blue, Part No. LC-V3010-1J Metric Units

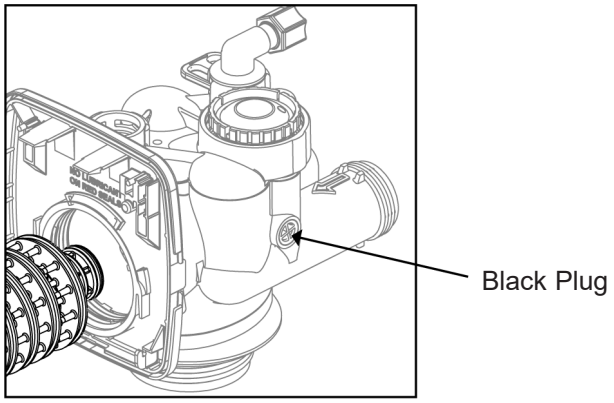


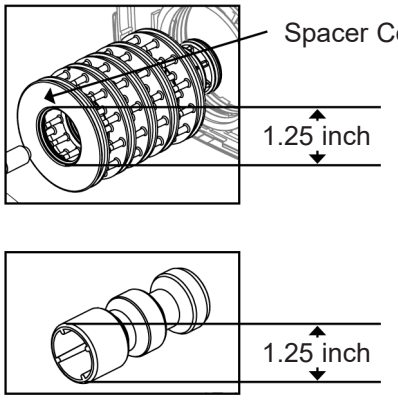
Light Green, Part No. LC-V3010-1K Metric Units



WS1 & WS1.25 Identification

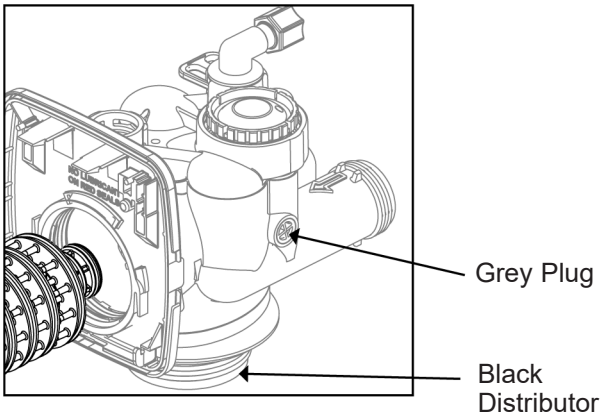
WS1 with 1.050 inch Riser Port Identification

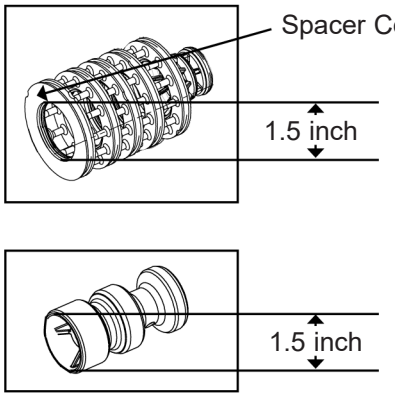




NOTE:
The WS1 downflow piston is a solid amber color.
The WS1 upflow piston is black and amber.

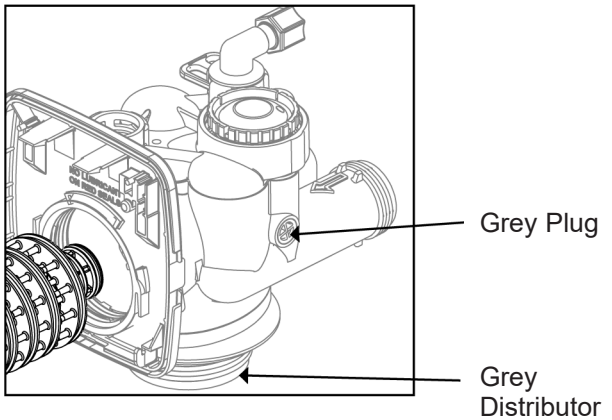
WS1.25 with 1.32 inch Riser Port Identification

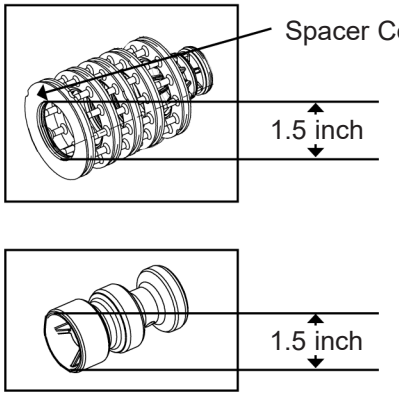




NOTE:
The WS1.25 downflow piston is a solid amber color.
The WS1.25 upflow piston is a solid black color.

WS1.25 with 32mm Riser Port Identification





NOTE:
The WS1.25 downflow piston is a solid amber color.
The WS1.25 upflow piston is a black color

Safe Water Technologies, Inc.

FIVE YEAR SOFTENER AND FILTER CONTROLS LIMITED WARRANTY

Safe Water Technologies, Inc. (SWT) warrants to Dealer that its Softener and Filter Control Valves will be free from defects in material and workmanship under normal use and service for a period of five years from the date of shipment of such Valves from SWT's plant in Elgin, Illinois when installed and operated within recommended parameters. No warranty is made with respect to defects not reported to SWT within the warranty period and/or defects or damages due to neglect, misuse, alterations, accident, misapplication, physical damage, or damage caused by fire, acts of God, freezing, or hot water, or similar causes. For outdoor installations where the Softener and Filter Control Valves are not under cover, the weather cover must be utilized for the warranty to be valid.

SWT's obligation to Dealer under this Limited Warranty shall be limited, at its option, to replacement or repair of any Softener and Filter Control Valve covered by this Limited Warranty. Prior to returning a Control Valve, Dealer must obtain a return goods authorization number from SWT and return the Control Valve freight prepaid. If any Control Valve is covered under this Limited Warranty, SWT shall return the Control Valve repaired, or its replacement, prepaid to the original point of shipment.

SWT GIVES THIS WARRANTY TO DEALER IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND HEREBY EXPRESSLY DISCLAIMS ALL OTHER SUCH WARRANTIES. SWT'S LIABILITY HEREUNDER SHALL NOT EXCEED THE COST OF THE PRODUCT. UNDER NO CIRCUMSTANCES WILL SWT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES OR FOR ANY OTHER LOSS, DAMAGE, OR EXPENSE OF ANY KIND, INCLUDING LOSS OF PROFITS, ARISING IN CONNECTION WITH THE INSTALLATION OR USE OR INABILITY TO USE THE CONTROL VALVES OR ANY WATER TREATMENT SYSTEM THE CONTROL VALVE IS INCORPORATED INTO.

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