

LANCASTER[®]

WATER TREATMENT

INSTALLATION, OPERATING AND SERVICE MANUAL

ELECTRONIC WATER FILTER WITH THE LES CONTROL VALVE

- 7-CTAIR-1
- 7-CTAIR-2
- 7-CTAIR-3



Congratulations on purchasing your new **Lancaster Water Filter**. This unit is designed to give you many years of trouble free service. For servicing and future inspection purposes, please file this booklet with your important documents.

In the event that you need assistance for servicing your water filter, please first contact the professional contractor who installed the system.

OPERATING PARAMETERS

Minimum / Maximum Operating Pressures	20 psi (138 kPa) - 125 psi (862 kPa)
Minimum / Maximum Operating Temperatures	40°F (4°C) - 110°F (38°C)
Supply Voltage/ Frequency	120V AC/ 60 Hz Other Options Available
Power Consumption	9.5 W
Output Voltage	12V AC
Output Current	500 mA

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.

Do not use Vaseline, oils, other hydrocarbon lubrications 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 red or clear lip seals.**

The nuts and caps are designed to be unscrewed or tightened by hand or with the special plastic wrench (P/N V3193). If necessary, pliers can be used to unscrew the nut or cap. Do not use a pipe wrench to tighten or loosen nuts or caps. Do not place screwdriver in slots on caps and/or tap with hammer.

Do not use pipe dope or any other sealant on threads. Teflon tape must be used on the threads of the 1" NPT elbow or the 1/4" NPT connection and on the threads for the drain line connection. Teflon tape is not necessary on the nut connection or caps because of o-ring seals.

After completing any valve maintenance involving the drive assembly and pistons, press and hold **NEXT** and **REGEN** button for three seconds or unplug power source jack from printed circuit board (black wire) and plug back in. This resets the electronics and establishes the service piston position. The display should flash all wording, then flash software version (e.g. 216) and then reset the valve to the service position.

All plumbing should be done in accordance with local plumbing codes. The pipe size of the drain line should be a minimum of 1/2". Backwash flow rates in excess of 7 gpm or length in excess of 20' require 3/4" drain line.

Solder joints near the drain must be done prior to connecting the drain line flow control fitting. Leave at least 6" 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(P/N V3007) to the inlet and outlet (see Page 10), 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.**

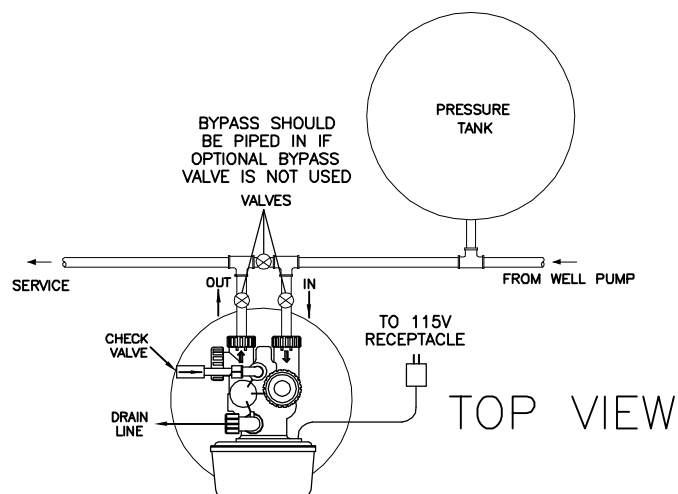
Plug into an electrical outlet. NOTE: All electrical connections must be connected according to local codes. (Be certain the outlet is uninterrupted.) Install grounding strap on metal pipes.

INSTALLATION

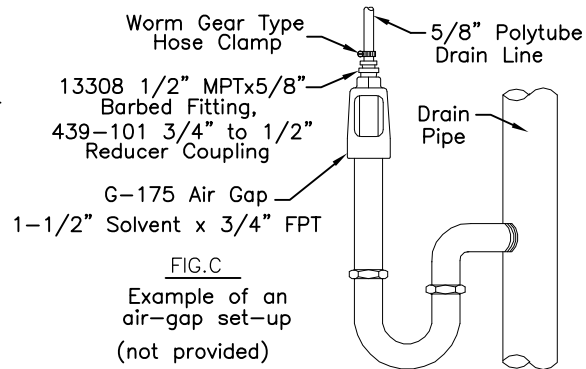
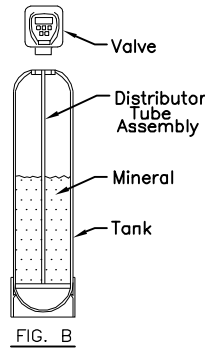
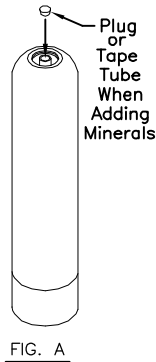
Place filter in desired location close to water supply inlet, after pressure tank, and near a source for waste water, (utility sink, floor drain or sewer line). A 115/120V, 60 Hz uninterrupted outlet is required. Keep far enough away from walls and other obstructions to allow enough room for servicing the unit. A bypass valve (optional accessory) should be installed so that water will be available if it should be necessary to shut off the pressure in order to service the filter.

The mineral tank must be reasonably level and solidly in place. Prior to beginning work to the system, make sure that water pressure is shut off at the incoming water supply and that several water spigots are open to provide sufficient venting for drainage of that system.

Arrows are molded into the control valve to show the direction of the flow.



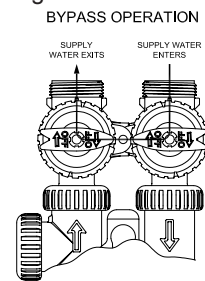
ADD MINERALS: Remove control valve from mineral tank by turning counter-clockwise. Plug open end (top) of distributor tube assembly to prevent gravel & mineral from entering (Fig. A). Add mineral. Tank will be approximately half full. (Fig. B). Remove plug from the top of the distributor tube. Water can be manually added at this time to begin the mineral soaking process. Install control valve making sure the distributor tube is slipped into the center hole on the bottom of the control valve.



OPTIONAL BYPASS VALVE: The bypass valve easily connects to the control valve body using nuts that only require hand tightening. Install with red knobs in the upward position. Press end of bypass valve with o-rings into valve. Hand tighten nuts. Place into **BYPASS OPERATION (figure 1).**

Avoid getting primer and solvent cement on any part of the o-rings or split rings, bypass valve or control valve. Do not use pipe dope or any other sealant on threads. Teflon tape is not necessary on the caps because of o-ring seals. Do not use Vaseline or other unacceptable lubricants on o-rings. A silicone lubricant may be used on black o-rings.

DRAIN LINE: The 3/4" drain line elbow accommodates 5/8" poly tube or 3/4" NPT drain line connections. The nut and poly tube insert for the 3/4" drain line elbow is designed for use with flexible poly tube only. The drain line elbow can be rotated so the outlet can be oriented toward the nearest drain. Filters with backwash rates in excess of 10 GPM will have a 1" straight line fitting.

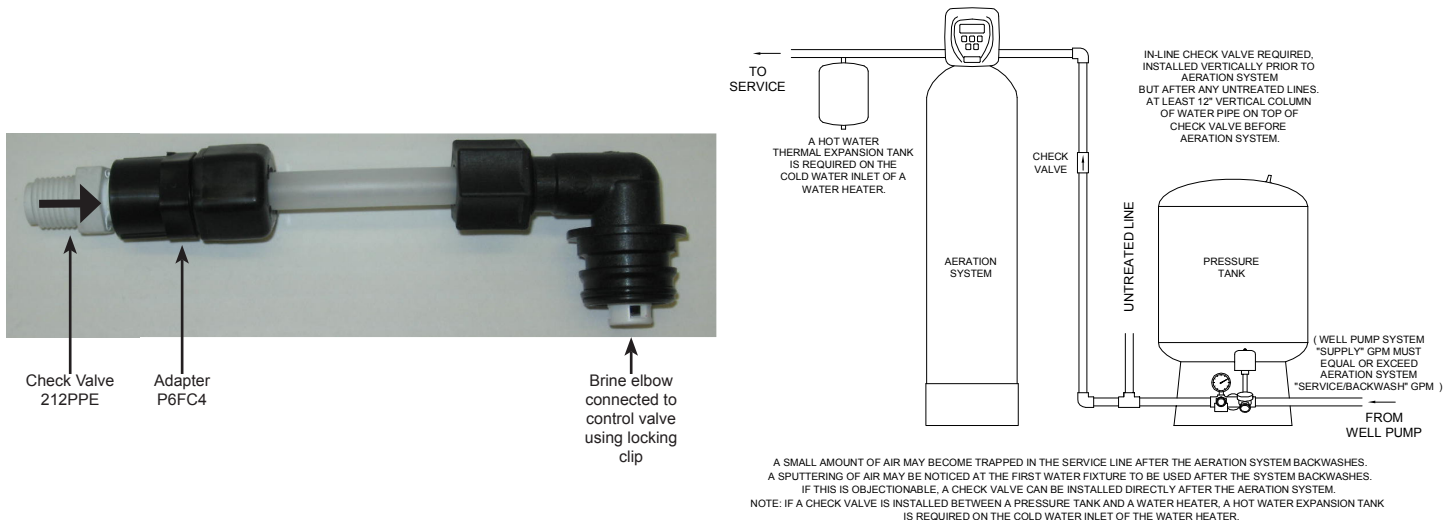


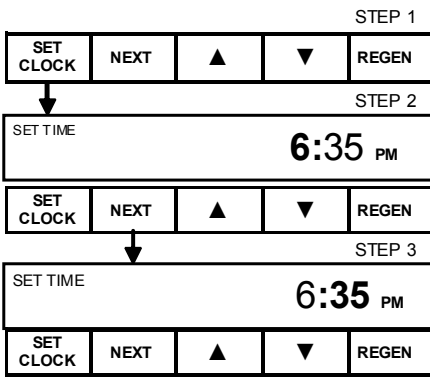
TO INSTALL 5/8" POLY TUBE DRAIN LINE: The poly tube insert is shipped attached to the drain line elbow's locking clip. Press the insert into the drain line (5/8" poly tube not included). Loosen nut of the drain line elbow. Press 5/8" poly tube with insert into the drain line elbow until it seats on the back of the fitting. Tighten nut.

It is simplest to run the drain line into a sump pump pit or washing machine drain if possible. If this is not practical, a fitting with a trap must be installed in a sewer line. Place the trap as close to the vent as possible to prevent siphoning of the trap when large amounts of waste water go through the sewer line. DO NOT pipe the drain line solidly into the waste line (figure C), as this is prohibited by most plumbing codes. The drain line should enter the trap from above so the water will not back up in the drain line if the sewer should become clogged up and the trap overflow. The trap should have a short pipe extending from it to prevent splashing when water runs into the trap from the drain line.

Special precautions must be made when connecting the drain line. Hard piping is recommended. During backwash, air and water escape quickly, causing a flexible drain line to whip and thrash. Attach the drain line securely to an air gap device on the waste water line.

PROGRAMMING THE CONTROL VALVE: Note: A quick-reference card is stored inside the front cover of the control valve. To access this card, slightly pull tabs on side of cover outward and pull cover forward. Plug the electrical cord into a 115 Volt receptacle. DO NOT plug into an outlet controlled by a wall switch or pull chain that could inadvertently be turned off. Wait a couple of seconds for control valve to "home" itself. Panel should display "TIME" and the time of day will be flashing.





SET TIME OF DAY

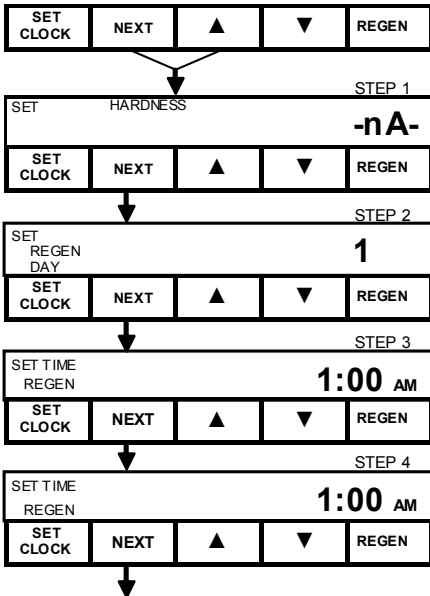
STEP 1: Press **SET CLOCK**.

STEP 2: Set current hour of the day by pressing ▲ or ▼ buttons. AM/ PM toggles after 12.

STEP 3: Press **NEXT**. Set current minutes by pressing ▲ or ▼ buttons.

STEP 4: Press **NEXT** to exit **SET CLOCK**.

ADDITIONAL PROGRAMMING INFORMATION AVAILABLE FORM LANCASTER WATER TREATMENT UPON REQUEST.



SET DAYS BETWEEN BACKWASHING & BACKWASH TIME

STEP 1: Press **NEXT** and ▲ simultaneously for 3 seconds.

STEP 2: Press **NEXT**. Regen day: This sets the maximum number of days between backwashing. This must be set at 1 to eliminate gasses daily, and to replenish compressed air pocket.

STEP 3: Press **NEXT**. Backwashing time (hour): Set the hour of the day for backwash to occur by using ▲ or ▼ buttons. AM/ PM toggles after 12. The default time is 1:00 am. We recommend 1:00 am for filters and 2:00 am for softeners to prevent both from backwashing at the same time.

STEP 4: Press **NEXT**. Backwash time (minutes): Set the minutes of the day for backwash by using ▲ or ▼ buttons. Press **NEXT** to exit Displays/ Settings. Current time of day will be displayed

PLACING UNIT INTO SERVICE: Make sure inlet and outlet valves are to their closed positions. If using optional bypass, place in bypass position. Turn on main water supply. Open a cold water faucet. This will clear the lines of any debris (solder, pipe dope, etc.) that may be in the line. Let water run at tap for a couple of minutes, or until clear. Turn off faucet.

Press and hold the **REGEN** button for approximately 5 seconds until the motor starts.

Display will read **Rinse** and numbers will start counting down. Momentarily press **REGEN**. Display will read **BACKWASH**.

If using optional bypass **VERY SLOWLY** turn bypass valve to **DIAGNOSTIC** position (figure 2) or slowly open inlet valve to allow water to slowly enter the filter.

Allow water to run to drain for a few minutes to remove "fines".

When water is flowing steadily to drain without the presence of air, momentarily press **REGEN**. Display will read **dn Brine**

Open the outlet valve of the filter, or if using optional bypass place to **NORMAL OPERATION MODE** (figure 3).

Allow control to finish the **dn Brine** cycle. It will then advance to the **Service** position.

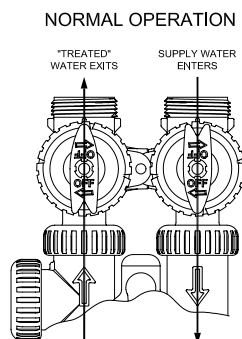


FIGURE 2

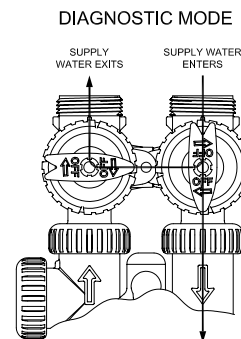
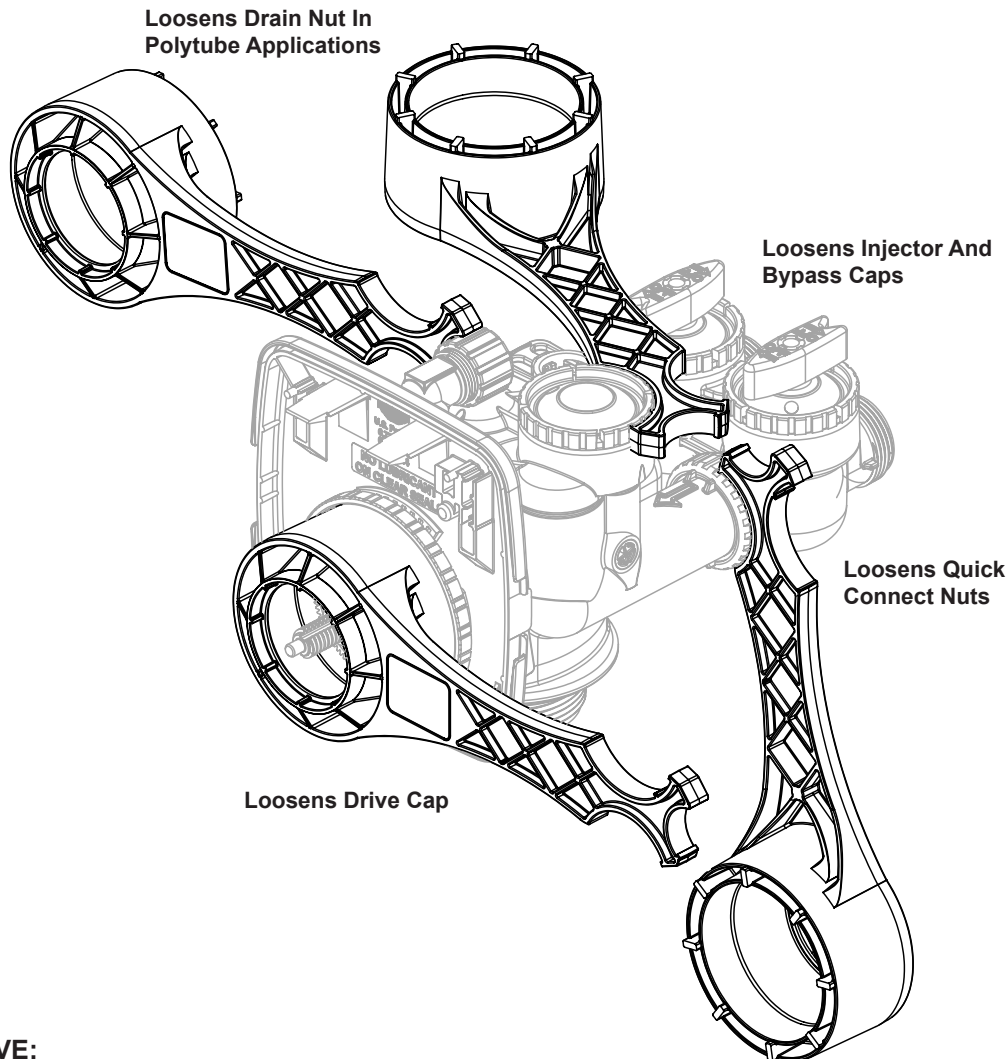


FIGURE 3

OPTIONAL MAINTENANCE WRENCH

V3193

Although no tools are necessary to assemble the valve, the optional maintenance wrench (shown in various positions on the valve) may be purchased to aid in assembly or disassembly.



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 rotor, make sure the system is depressurized. Turn the red arrow shaped handles toward the center of the bypass valve and back to the arrow direction several times to ensure rotor is turning freely.

The nuts and caps are designed to be unscrewed or tighten by hand. If necessary a pliers can be used to unscrew the nut or cap. **DO NOT** use a pipe wrench to tighten or loosen nuts or caps. **DO NOT** place screwdriver in slots on caps and/or tap with a hammer. To access the rotor, unscrew the cap and lift the cap, rotor and handle out as one unit. Twisting the unit as you pull it out will help to remove it more easily. There are three o-rings: one under the rotor cap, one on the rotor stem and the rotor seal. Replace worn o-rings. Clean rotor. Reinstall rotor.

When reinstalling the red arrow handles be sure that:

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

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

After completing any valve maintenance, press and hold **NEXT** and **REGEN** buttons for 5 seconds or unplug power source jack (black wire) from the circuit board and plug back in. This resets the electronics and establishes the home position for softening. Reset the time of day.

SERVICE INSTRUCTIONS

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 plug from the PC board. The motor plug connects to the two-pin jack on the left-hand side of the PC board. The power source plug connects to the four-pin jack.

The 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 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 one plastic pin that fits into the hole in the lower edge of the PC board. Once the PC board is tilted about 45° from the drive bracket it can be lifted off the pin. To reinstall the PC board, position the lower edge of the PC board so that the hole in the PC board lines up with the plastic pin. Push the top of the PC board towards the valve. Align the upper hole on the left hand side of the PC board with the pin and push in until the PC board snaps under the middle latch, weave the power wire into the holders and reconnect the motor and power plugs.

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

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

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

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

The drive gear cover only fits on one way, with the large clip oriented 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 a ¼ turn in either direction before gently pulling on the wire connectors to remove the motor. Pulling directly on the wire without rotating the motor may break the wires off the motor.

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

Replace the valve cover. After completing any valve maintenance, press and hold **NEXT** and **REGEN** buttons for 5 seconds or unplug power source jack (black wire) from the circuit board and plug back in. This resets the electronics and establishes the home position for softening. Reset the time of day.

DRIVE CAP ASSEMBLY AND MAIN PISTON:

The drive assembly must be removed to access the drive cap assembly. The drive cap assembly must be removed to access the piston. The drive cap assembly is threaded into the control valve body and seals the o-ring. To remove the drive cap assembly use the optional maintenance wrench or insert a ¼" to ½" flat bladed screwdriver into one of the slots around the top 2" of the drive cap assembly so it engages the notches molded into the drive back plate around the top 2" of the piston cavity (see figure 4). The notches are visible through the holes. Lever the screwdriver so the drive cap assembly turns counter clockwise. Once loosened unscrew the drive cap assembly by hand and pull straight out.

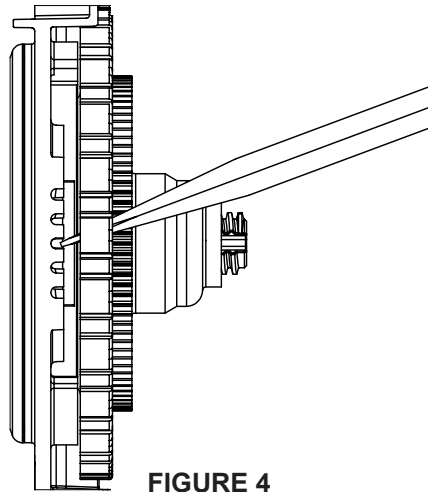


FIGURE 4

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. 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 diluted sodium bisulfite or vinegar or replace the main piston.

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

Reattach the drive assembly to the control valve and connect all plugs. After completing any valve maintenance, press and hold **NEXT** and **REGEN** buttons for 5 seconds or unplug power source jack (black wire) from the circuit board and plug back in. This resets the electronics and establishes the home position for softening. Reset the time of day.

SPACER STACK ASSEMBLY:

To access the spacer stack assembly remove the drive assembly, drive cap assembly and piston. The spacer stack assembly can be removed easily without tools by using your thumb and forefinger. Inspect the black o-rings and red or clear lip seals for wear or damage. Replace the entire stack if necessary. The spacer stack assembly has been 100% tested at the factory to insure proper orientation of one way seals. Do not disassemble stack. The spacer stack assembly may be chemically cleaned (dilute sodium bisulfite or vinegar) or wipe with a soft cloth.

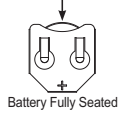
The spacer stack assembly can be pushed into the control valve body bore by hand. Since the spacer stack assembly can be compressed it is easier to use a blunt object (5/8" to 1 1/8" in diameter) to push the center of the assembly into the control valve body. The assembly is properly seated when at least four threads are exposed (approximately 5/8") Do not force the spacer stack assembly in. The control valve body bore interior can be lubricated with silicone to allow for easy insertion of the entire stack. Do not use silicone or any other type of lubricant on the red or clear lips seals or the piston. Reattach the drive cap assembly and piston(s) and the drive assembly.

After completing any valve maintenance, press and hold **NEXT** and **REGEN** buttons for 5 seconds or unplug power source jack (black wire) from the circuit board and plug back in. This resets the electronics and establishes the home position for softening. Reset the time of day.

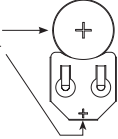
INJECTOR CAP, SCREEN AND INJECTOR PLUGS:

Unscrew the injector cap and lift off. Loosen cap with optional maintenance wrench or pliers if necessary. A screen is attached to the injector cap. Remove the screen and clean if fouled. The plugs can be pried out with a small screwdriver. The plug can be wiped clean. If the plug leaks replace the entire plug.

When replacing the battery, align
 itives and push down to fully seat.



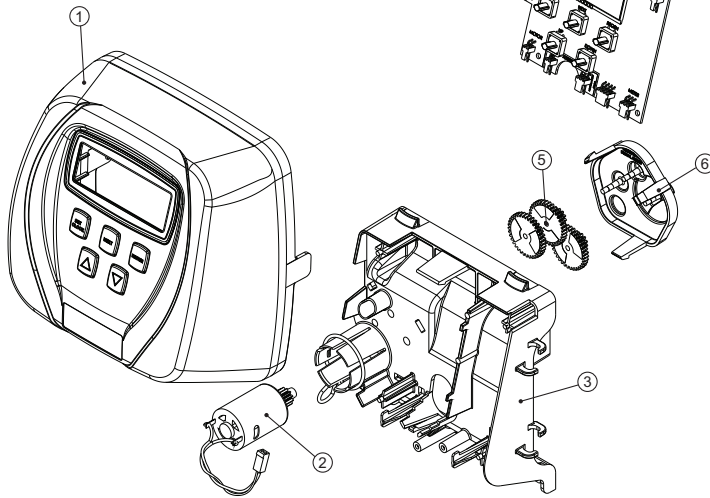
Correct
 Battery
 Orientation



Battery replacement is
 3 volt lithium coin cell
 type 2032.

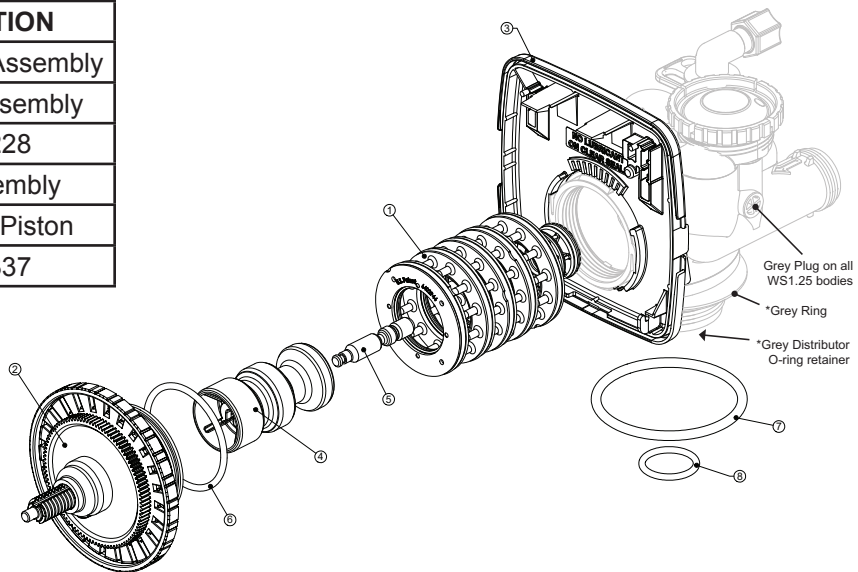
FRONT COVER AND DRIVE ASSEMBLY

ITEM #	QTY	PART NO.	DESCRIPTION
1	1	V3175CC	Front Cover Assembly
2	1	C3107	Motor
3	1	V3106	Drive Bracket/Spring Clip
4	1	V3108CC	PC Board
5	3	V3110	Drive Gear Cover
6	1	V32109	Drive Assembly
2-6	*	V3002CC	Drive Assembly (parts 2-6)
NOT SHOWN	1	V3186	Transformer 110V-12V



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

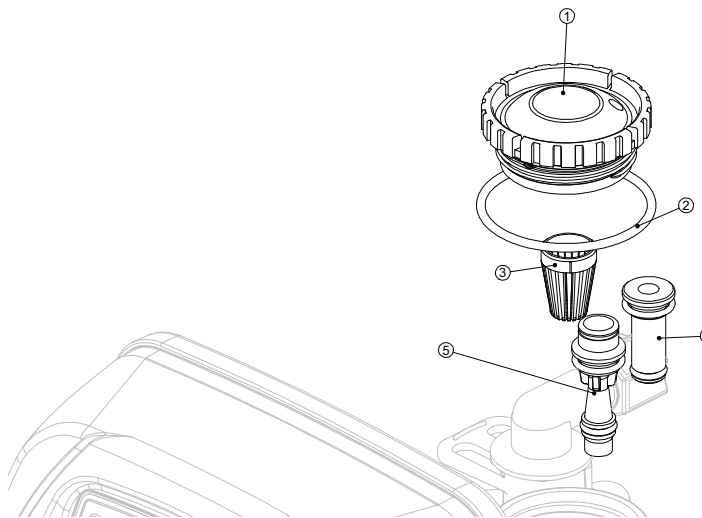
ITEM #	QTY	PART NO.	DESCRIPTION
1	1	V3005	Spacer Stack Assembly
2	1	V3004	Drive Cap Assembly
3	1	V3135	O-Ring 228
4	1	V3011	Piston Assembly
5	1	V3174	Regenerant Piston
6	1	V3180	O-Ring 337

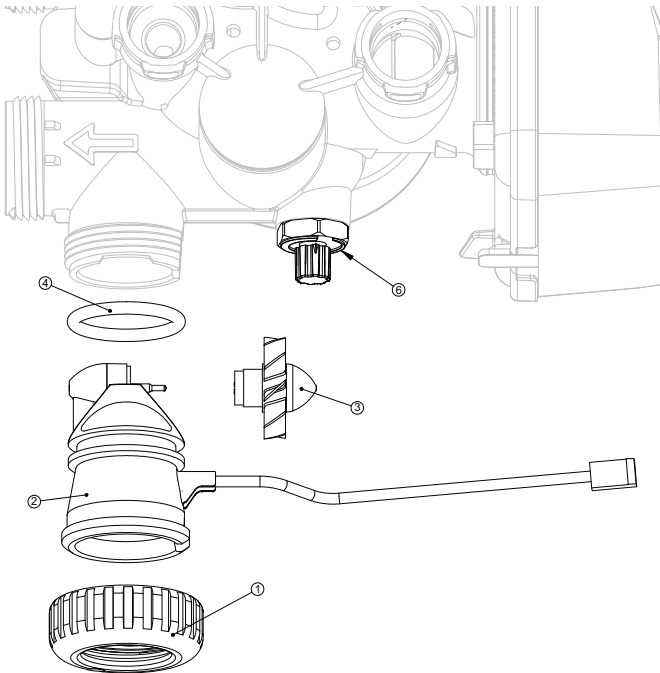


INJECTOR, INJECTOR CAP, SCREEN AND O-RING

ITEM #	QTY	PART NO.	DESCRIPTION
1	1	V3176	Injector Cap
2	1	V3152	O-Ring 135
3	1	V3177	Injector Screen
4	1	V3010-1Z	Plug
5	2	V3010-1C, 1F, 1H	Injector
NOT SHOWN	*	V3170	O-Ring 011
NOT SHOWN	*	V3171	O-Ring 013

* Injector plug and injector contains one 011 and one 013 O-ring



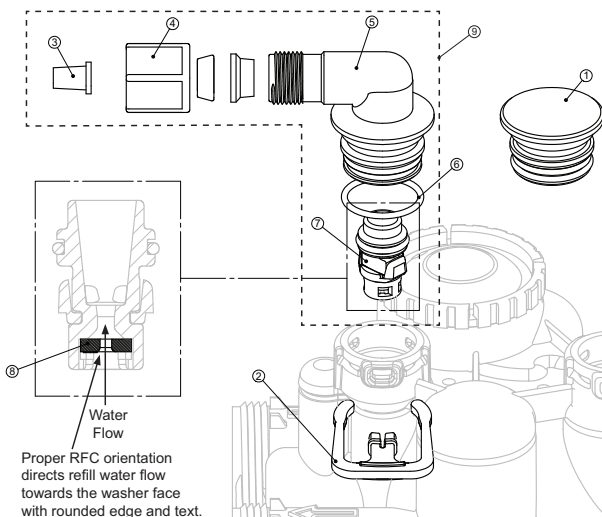
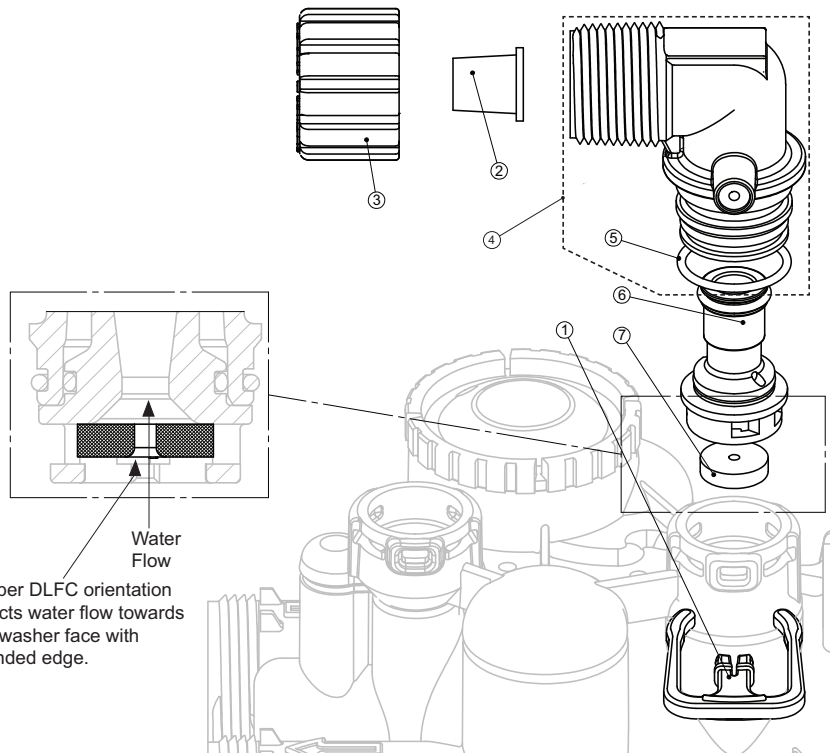


METER PLUG

ITEM #	QTY	PART NO.	DESCRIPTION
1	1	V3151	Nut 1" QC
2	1	V3003-01	Meter Plug Assembly
3	1	V3105	O-Ring 215

DRAIN LINE - 3/4"

ITEM #	QTY	PART NO.	DESCRIPTION
1	1	H4615	Elbow Locking Clip
2	1	V3194	Polytube Insert 5/8
3	1	V3192	Nut for 3/4 Drain Elbow
4	1	V3158	3/4 Drain Elbow
5	1	V3163	O-Ring 019
6	1	V3159	DLFC Retainer
7	1	V3162-053	DLFC 5.3 GPM
7	1	V3162-100	DLFC 10.0 GPM



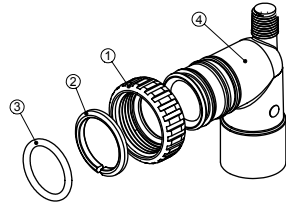
AIR REFILL

ITEM #	QTY	PART NO.	DESCRIPTION
1	1	H4615	Elbow Locking Clip
2	1	V3195-01	Plug
3	1	H4612	Nut 3/8"
4	1	H4613	Elbow Cap 3/8"
5	1	V3163	O-Ring 019
6	1	V3165	RFC Retainer Assy
7	1	V3182	RFC
8	1	10-6-4	Plastic Fitting
9	1	5492K11	Spring Loaded Poppet Check Valve
10	1	H1023	Tubing

* Not Shown

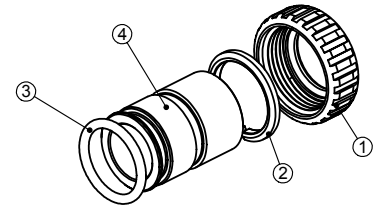
PARTS

V3007 1" PVC Male NPT Elbow Assembly Standard



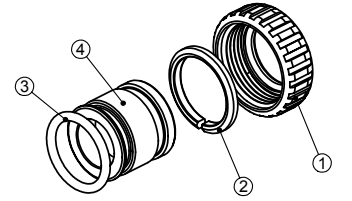
Item No.	Quantity	Part No.	Description
1	2	V3151	Nut 1" Quick Connect
2	2	V3150	Split Ring
3	2	V3105	O-Ring 215
4	2	V3149	1" PVC Male NPT Elbow

V3007-02 1" Brass Sweat Assembly Optional

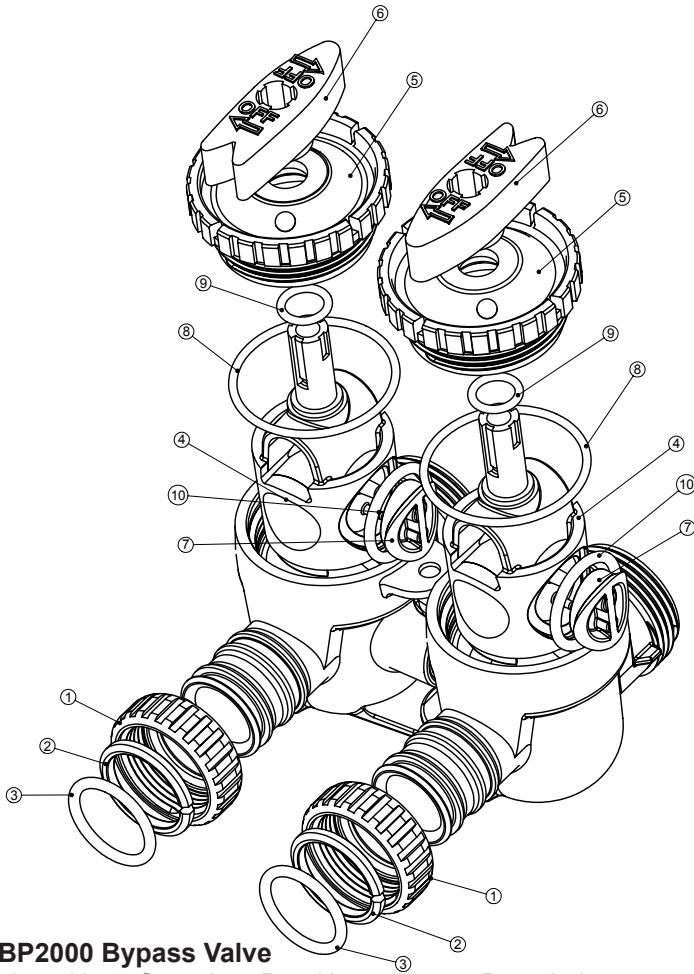


Item No.	Quantity	Part No.	Description
1	2	V3151	Nut 1" Quick Connect
2	2	V3150	Split Ring
3	2	V3105	O-Ring 215
4	2	V3188	Fitting - 1" Brass Sweat

V3007-03 3/4" Brass Sweat Assembly Optional



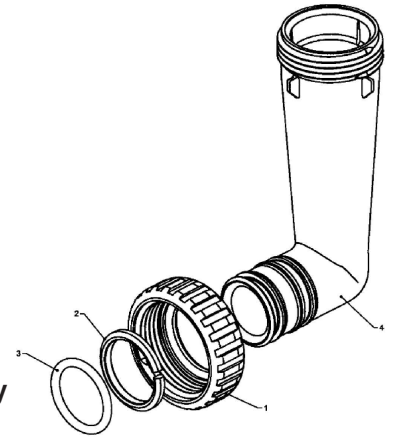
Item No.	Quantity	Part No.	Description
1	2	V3151	Nut 1" Quick Connect
2	2	V3150	Split Ring
3	2	V3105	O-Ring 215
4	2	V3188	Fitting - 3/4" Brass Sweat



BP2000 Bypass Valve

Item No.	Quantity	Part No.	Description
1	2	V3151	Nut 1" Quick Connect
2	2	V3150	Split Ring
3	2	V3105	O-Ring 215
4	2	V3145	Bypass 1" Rotor
5	2	V3146	Bypass Cap
6	2	V3147	Bypass Handle
7	2	V3148	Bypass Rotor Seal Retainer
8	2	V3152	O-Ring 135
9	2	V3155	O-Ring 112
10	2	V3156	O-Ring 214

V3191-01 Vertical Adapter Assembly Optional



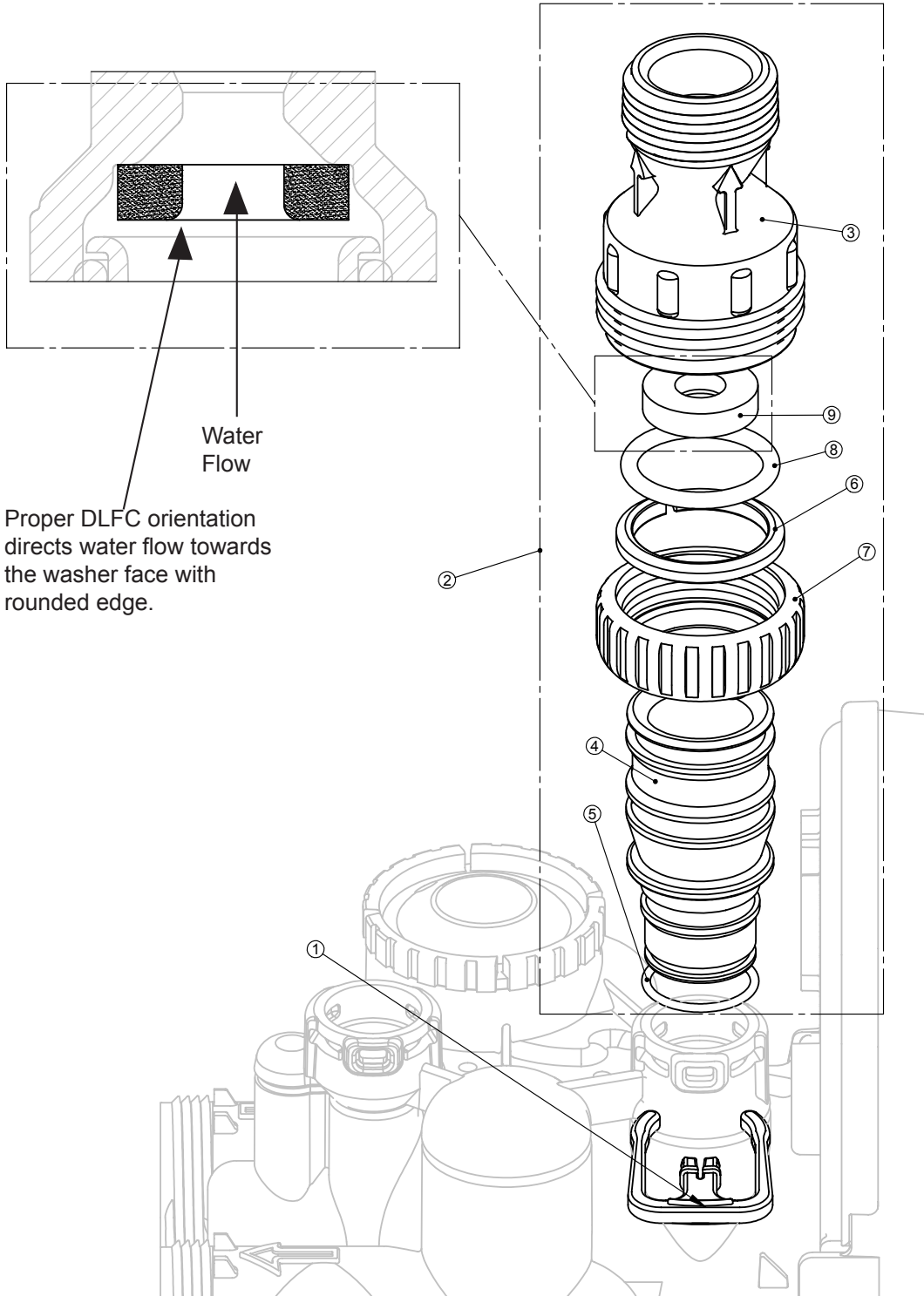
Item No.	Quantity	Part No.	Description
1	2	V3151	Nut 1" Quick Connect
2	2	V3150	Split Ring
3	2	V3105	O-Ring 215
4	2	V3191	Vertical Adapter

ADDITIONAL OPTIONAL FITTINGS

Part Number	Description
V3007-01	3/4" X 1" PVC Solvent Elbow Assembly
V3007-11	1" PEX Brass Assembly
V3007-12	3/4" Shark Bite Assembly
V3007-13	1" Shark Bite Assembly

DRAIN LINE - 1"

Dwg No.	Order No.	Description	Qty
1	H4615	Elbow Locking Clip	1
2	V3008-02	Drain FTG 1" Straight	1
3*	V3166	Drain FTG Body 1"	1
4*	V3167	Drain FTG Adapter 1"	1
5*	V3163	O-ring 019	1
6*	V3150	Split Ring	1
7*	V3151	Nut 1" QC	1
8*	V3105	O-ring 215	1
9	V3190-150	DLFC 15.0 gpm for 1"	1



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1340 MANHEIM PIKE • LANCASTER PA 17601-3196 • TEL: 717-397-3521 • FAX: 717-392-0266
www.lancasterwatertreatment.com • E-mail: info@lancasterpump.com