

# LANCASTER<sup>®</sup>

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# WATER TREATMENT

## INSTALLATION, OPERATING AND SERVICE MANUAL

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## ELECTRONIC WATER SOFTENER WITH THE WS1 VALVE

- 7-LECR-75
- 7-LECR-100
- 7-LER-75
- 7-LER-100
- 7-LER-150
- 7-LER-200



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Congratulations on purchasing your new **Lancaster Water Softener**. This unit is designed to give you many years of trouble free service. When installed in accordance with the following instructions and if given reasonable care, clear-soft water will be the result. For servicing and future inspection purposes, please file this booklet with your important documents.

## OPERATING PARAMETERS

Minimum / Maximum Operating Pressures	20 psi (138 kPa) - 125 psi (862 kPa)
Minimum / Maximum Operating Temperatures	40°F (4°C) - 110°F (43°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. 220.1) 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 7), 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 softener 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 softener far enough away from walls and other obstructions to allow enough room for servicing the unit. All sillcocks and similar fixtures that will use untreated water must have their pipes connected to the hard water side of the softener. 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 softener.

The cabinet tank or 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.

**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 page 3)**.

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.

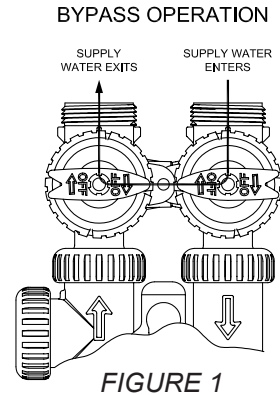
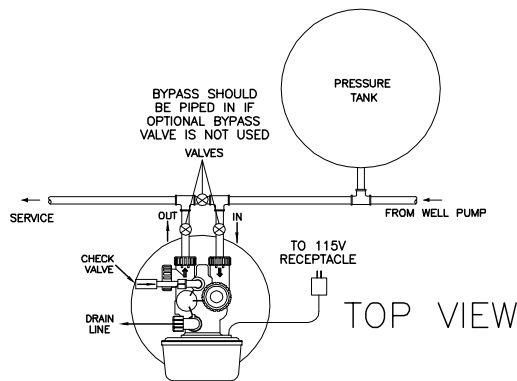


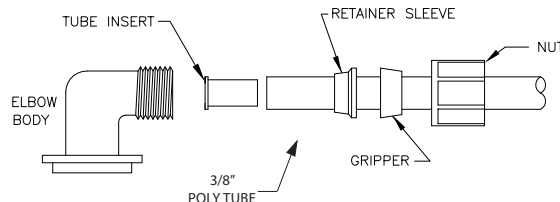
FIGURE 1

**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, 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 sewer should become plugged 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 drain line.

**BRINE LINE CONNECTIONS:** 3/8" poly tube is shipped within the instruction/warranty card packet affixed to the control valve. The poly tube inserts are shipped on the brine line elbow's locking clip. Remove the locking clip by pulling straight out. Remove the white poly tube insert from the locking clip, and replace the locking clip on the brine line elbow of the control valve.

Press the poly tube insert into the provided 3/8" poly tube. Press the poly tube and insert into the nut until it is fully seated into the fitting. Do not use pipe dope or any other sealant on threads. Teflon tape is not needed on the threads. Tighten nut securely to create a pressure tight connection. Pliers or crescent wrench may be used. 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 to function properly. If the nut is completely removed from the body, slip the nut, plastic gripper and retainer sleeve on to the tube then tighten on to the fitting.



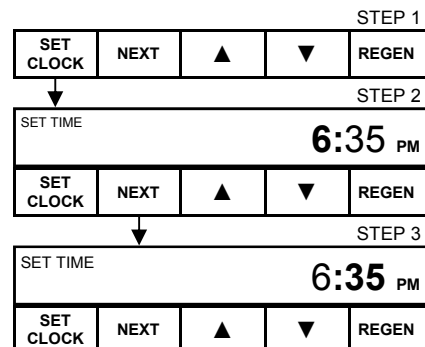
Install poly tube insert into the end of the 3/8" poly tube and repeat instructions above to install into the brine tank's brine line fitting.

**BRINE TANK OVERFLOW PRECAUTION:** Attach a 1/2" poly tube (not provided) to the barbed fitting on the outside of the tank. This poly tube should be piped to drain to allow brine to discharge to drain in the event of an overflow condition.

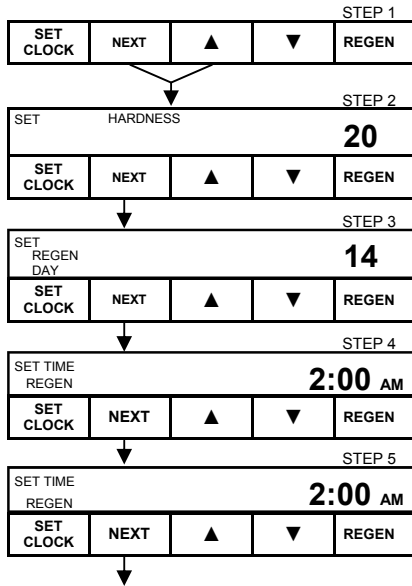
**PROGRAMMING THE CONTROL VALVE:** Note: A quick-reference card is stored inside the front cover of the control valve. To access this card, slightly pull tabs on side of cover outward and pull cover forward. Plug the electrical cord into a 115 Volt receptacle. DO NOT plug into an outlet controlled by 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 FROM  
LANCASTER WATER TREATMENT UPON REQUEST.**



**SET HARDNESS, DAYS OVERRIDE & REGENERATION TIME**

- STEP 1:** Press **NEXT** and **▲** simultaneously for 3 seconds.
- STEP 2: Hardness:** Set the amount of hardness in grains of hardness as calcium carbonate per gallon using the **▲** or **▼** buttons. The default is 20. The available range is 1 to 150 in 1 grain increments.
- STEP 3:** Press **NEXT**. Regen day: This sets the maximum number of days between regenerations. This days override feature can be shut off by pressing the **▼** button until "OFF" appears. Set the maximum number of days between by pressing **▲** or **▼**. Range is 1– 28 days. If the OFF position is selected, the softener will regenerate based solely on the gallons capacity.
- STEP 4:** Press **NEXT**. Regeneration time (hour): Set the hour of the day for regeneration to occur by using **▲** or **▼** buttons. AM/ PM toggles after 12. The default time is 2:00 am.
- STEP 5:** Press **NEXT**. Regeneration time (minutes): Set the minutes of the day for regeneration 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. Manually add 1½ gallons of water to the brine tank.

- Press and hold the **REGEN** button for approximately 5 seconds until the motor starts.
- Wait until display reads **BACKWASH** and numbers start counting down.
- Momentarily press **REGEN** again. Wait until display reads **BRINE** and numbers start counting down.
- Momentarily press **REGEN** again. Valve is now in the second **BACKWASH** position.

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

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

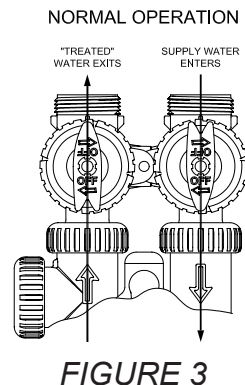
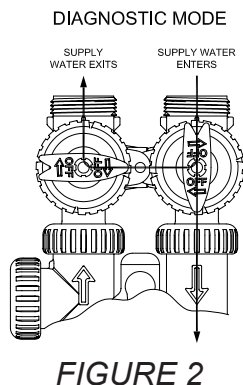
Open the outlet valve of the softener, or if using optional bypass place to **NORMAL OPERATION MODE** (**figure 3**).

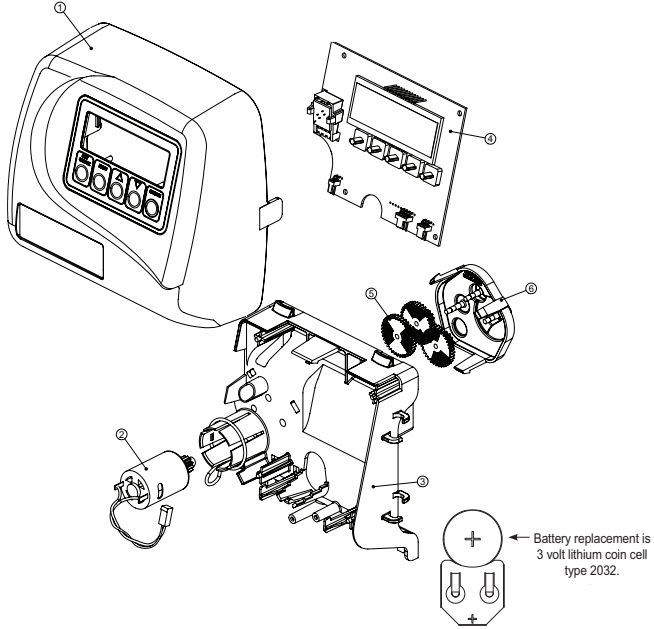
Allow control to finish the **RINSE** cycle. It will then advance to the **FILL** position. The brine tank will now automatically fill with the proper volume of water for the first regeneration.

Allow the control to automatically advance to the **SOFTENING** position.

Load the brine tank with salt. Solar Salt is recommended.

**SANITIZING:** Use 2 oz. of 5¼% household chlorine bleach for each cubic foot of resin. Pour bleach directly into the brine well of the softener. Press and hold the REGEN button for 5 – 6 seconds until the motor starts running. Allow system to complete the regeneration automatically. Check for other local and state codes which may also specify sanitation methods.



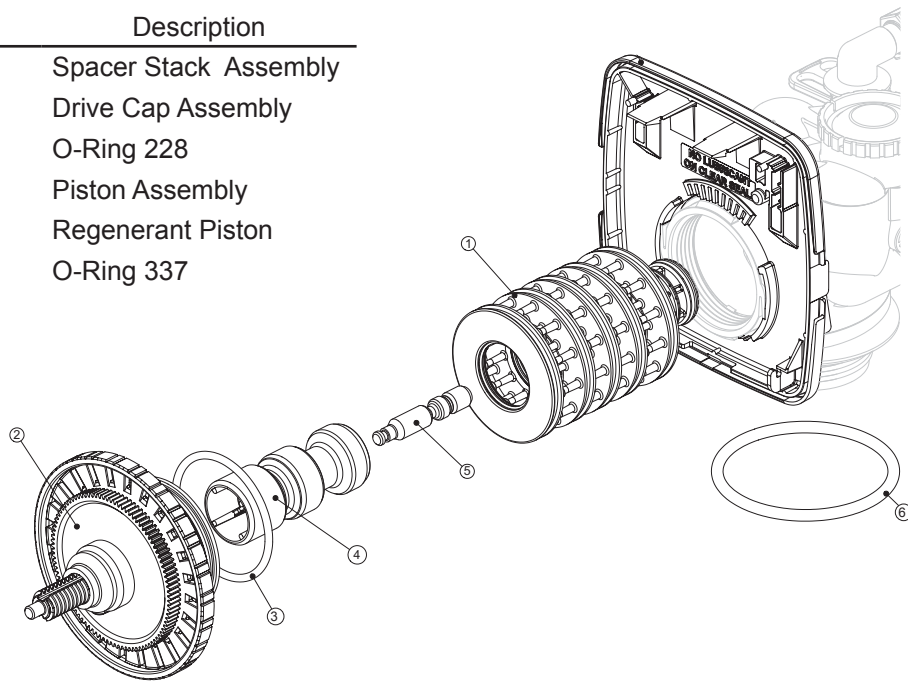


**FRONT COVER AND DRIVE ASSEMBLY**

Item No.	Quantity	Part No.	Description
1	1	V3175-01	Front Cover Assembly
2	1	V3107	Motor
3	1	V3106	Drive Bracket & Spring Clip
4	1	V3108	PC Board
5	3	V3110	Drive Gear 12 x 36
6	1	V3109	Drive Gear Cover
2 thru 6		V3002CC	Drive Assembly - (parts 2-6)
Not Shown	1	V3186	Transformer 110V-12V

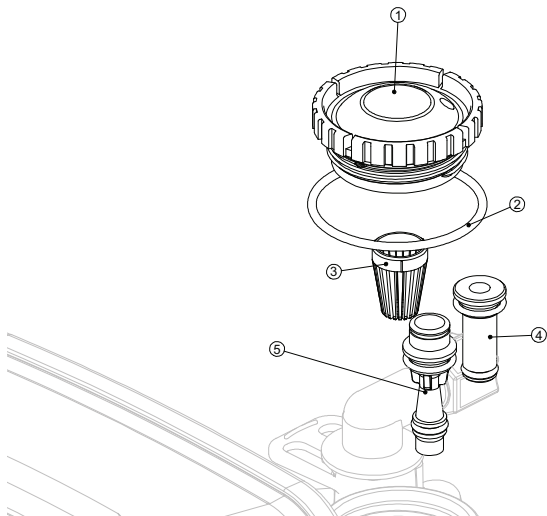
**DRIVE CAP ASSEMBLY, DOWNFLOW PISTON, REGENERANT PISTON AND SPACER STACK ASSEMBLY**

Item No.	Quantity	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**

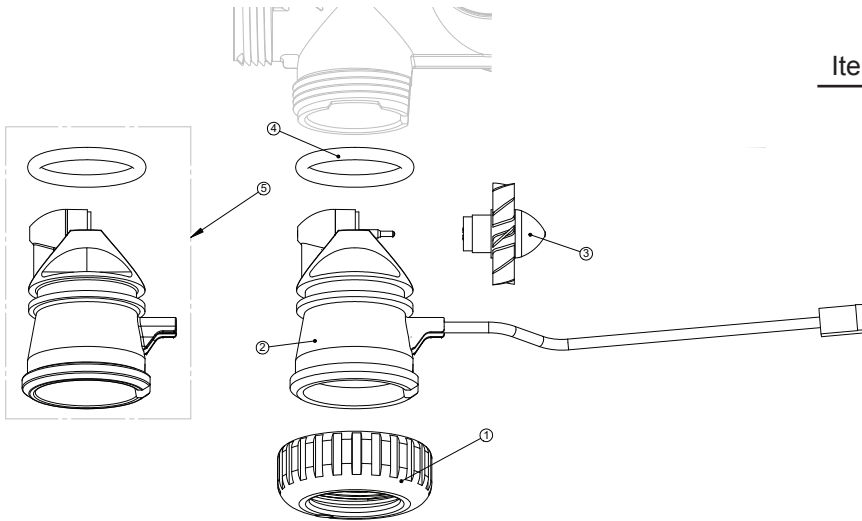
Item No.	Quantity	Part No.	Description
1	1	V3176	Injector Cap
2	1	V3152	O-Ring 135
3	1	V3177	Injector Screen
4	1	V3010-1Z	Injector Assy Z Plug
5	1	V3010-1C	Injector Assy C Violet
5	1	V3010-1E	Injector Assy E White
5	1	V3010-1F	Injector Assy F Blue
5	1	V3010-1G	Injector Assy G Yellow
Not Shown	*	V3170	O-Ring 011
Not Shown	*	V3171	O-Ring 013



\* Injector plug and injector each contain one 011 and one 013 O-Ring



## WATER METER AND METER PLUG

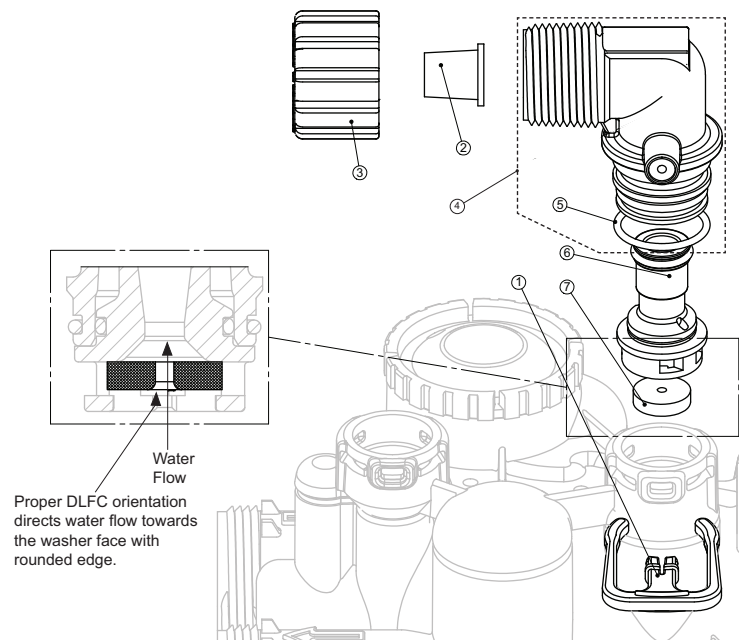


Item No.	Quantity	Part No.	Description
1	1	V3151	Nut 1" QC
2	1	V3003*	Meter Assy
3	1	V3118-01	Turbine Assy
4	1	V3105	O-Ring 215
5	1	V3003-01	Meter Plug Assy

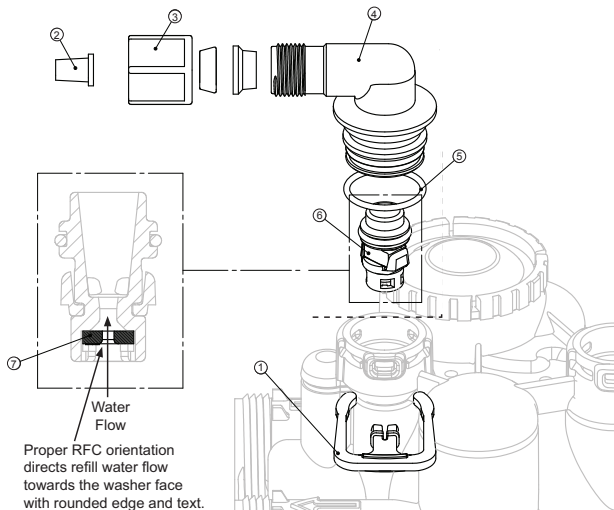
\*Part No. V3003 includes Items 2, 3 and 4

### DRAIN LINE - 3/4"

Item No.	Quantity	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	V3162-010	DLFC 1.0
7	1	V3162-017	DLFC 1.7
7	1	V3162-027	DLFC 2.7
7	1	V3162-032	DLFC 3.2
7	1	V3162-042	DLFC 4.2



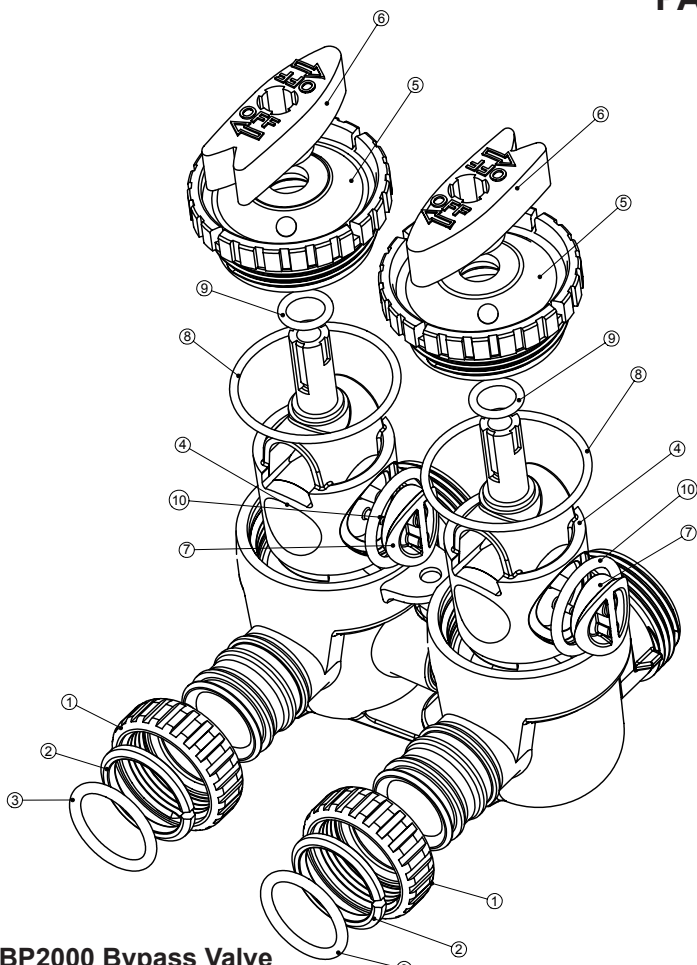
### BRINE REFILL



Item No.	Quantity	Part No.	Description
1	1	H4615	Elbow Locking Clip
2	1	H4614	Polytube Insert 3/8"
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

\*Part No. V3165 Includes Items 6 and 7

# PARTS



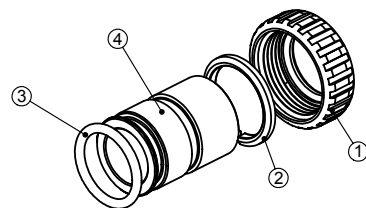
## BP2000 Bypass Valve

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

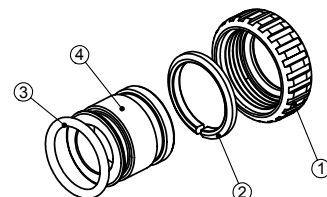
Item No.	Quantity	Part No.	Description
1	2	V3151	Nut 1" Quick Connect
2	2	V3150	Split Ring
3	2	V3105	O-Ring 215
4	2	V3191	Vertical Adapter

## V3007-02 1" Brass Sweat Assembly Optional



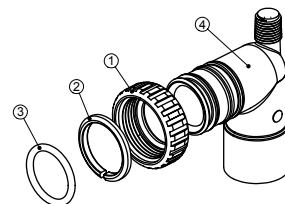
Item No.	Quantity	Part No.	Description
1	2	V3151	Nut 1" Quick Connect
2	2	V3150	Split Ring
3	2	V3105	O-Ring 215
4	2	V3188	Fitting - 1" Brass Sweat

## V3007-03 3/4" Brass Sweat Assembly Optional

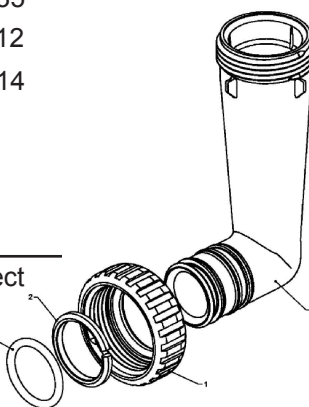


Item No.	Quantity	Part No.	Description
1	2	V3151	Nut 1" Quick Connect
2	2	V3150	Split Ring
3	2	V3105	O-Ring 215
4	2	V3188	Fitting - 3/4" Brass Sweat

## 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



## 4740 Brine Valve Assembly

Item No.	Quantity	Part No.	Description
1	1	H4600	3/8" Safety Brine Valve
2	2	10151	Pin
3	1	H4640-32	Float Assembly
4	1	H4500-30.50	Air Check Assembly

## ADDITIONAL OPTIONAL FITTINGS

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

# TROUBLESHOOTING PROCEDURES

PROBLEM	POSSIBLE CAUSE	SOLUTION
1. Timer does not display time of day.	<ul style="list-style-type: none"> <li>a. Transformer unplugged</li> <li>b. No electric power at outlet</li> <li>c. Defective transformer</li> <li>d. Defective PC board</li> </ul>	<ul style="list-style-type: none"> <li>a. Connect power</li> <li>b. Repair outlet or use working outlet</li> <li>c. Replace transformer</li> <li>d. Replace PC board</li> </ul>
2. Timer does not display correct time of day.	<ul style="list-style-type: none"> <li>a. Switched outlet</li> <li>b. Power outage</li> <li>c. Defective PC board</li> </ul>	<ul style="list-style-type: none"> <li>a. Use uninterrupted outlet</li> <li>b. Reset time of day</li> <li>c. Replace PC board</li> </ul>
3. No Softening/filtering display when water is flowing.	<ul style="list-style-type: none"> <li>a. Bypass valve in bypass position.</li> <li>b. Meter connection disconnected.</li> <li>c. Restricted/stalled meter turbine.</li> <li>d. Defective meter.</li> <li>e. Defective PC board.</li> </ul>	<ul style="list-style-type: none"> <li>a. Put bypass valve in service position</li> <li>b. Connect meter to PC board</li> <li>c. Remove meter and check for rotation or foreign material</li> <li>d. Replace meter</li> <li>e. Replace PC board</li> </ul>
4. Control valve regenerates at wrong time of day.	<ul style="list-style-type: none"> <li>a. Power outages</li> <li>b. Time of day not set correctly</li> <li>c. Time of regeneration incorrect</li> <li>d. Control valve set at "on O" (immediate regeneration)</li> <li>e. Control valve set at NORMAL + O</li> </ul>	<ul style="list-style-type: none"> <li>a. Reset control valve to correct time of day</li> <li>b. Reset to correct time of day</li> <li>c. Reset regeneration time</li> <li>d. Check control valve set-up procedure regeneration time option</li> <li>e. Check control valve set-up procedure regeneration time option</li> </ul>
5. ERROR followed by Code number:  <b>Error Code 1001</b> – Unable to recognize start of regeneration.  <b>Error Code 1002</b> – Unexpected stall.  <b>Error Code 1003</b> – Motor ran to long, timed out trying to reach next cycle position.  <b>Error Code 1004</b> – Motor ran to long, timed out trying to reach home position.  If other Error Codes display contact the factory.	<ul style="list-style-type: none"> <li>a. Control valve has just been serviced</li> <li>b. Foreign matter is lodged in control valve</li> <li>c. High drive forces on piston</li> <li>d. Control valve piston not in home position</li> <li>e. Motor not inserted fully to engage pinion, motor wires broken or disconnected, motor failure</li> <li>f. Drive gear label dirty or damaged, missing or broken gear</li> <li>g. Drive bracket incorrectly aligned to back plate</li> <li>h. PC board is damaged or defective</li> <li>i. PC board incorrectly aligned to drive bracket</li> </ul>	<ul style="list-style-type: none"> <li>a. Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve.</li> <li>b. Check piston and spacer stack assembly for foreign matter.</li> <li>c. Replace piston (s) and spacer stack assembly.</li> <li>d. Press NEXT and REGEN for 3 seconds or unplug power source jack (black wire) and plug back in to reset control valve.</li> <li>e. Check motor and wiring. Replace motor if necessary.</li> <li>f. Replace or clean drive gear.</li> <li>g. Reset drive bracket properly.</li> <li>h. Replace PC board.</li> <li>i. Ensure PC board is correctly snapped onto drive bracket.</li> </ul>
6. Control valve stalled in regeneration.	<ul style="list-style-type: none"> <li>a. Motor not operating</li> <li>b. No electric power at outlet</li> <li>c. Defective transformer</li> <li>d. Defective PC board</li> <li>e. Broken drive gear or drive cap assembly</li> <li>f. Broken piston retainer</li> <li>g. Broken main or regenerant piston</li> </ul>	<ul style="list-style-type: none"> <li>a. Replace motor</li> <li>b. Repair outlet or use working outlet</li> <li>c. Replace transformer</li> <li>d. Replace PC board</li> <li>e. Replace drive gear or drive cap assembly</li> <li>f. Replace drive cap assembly</li> <li>g. Replace main or regenerant piston</li> </ul>
7. Control valve does not regenerate automatically when REGEN button is depressed and held.	<ul style="list-style-type: none"> <li>a. Transformer unplugged</li> <li>b. No electric power at outlet</li> <li>c. Broken drive gear or drive cap assembly</li> <li>d. Defective PC board</li> </ul>	<ul style="list-style-type: none"> <li>a. Connect transformer</li> <li>b. Repair outlet or use working outlet</li> <li>c. Replace drive gear or drive cap assembly</li> <li>d. Replace PC board</li> </ul>
8. Control valve does not regenerate automatically but does when REGEN button is depressed.	<ul style="list-style-type: none"> <li>a. Bypass valve in bypass position</li> <li>b. Meter connection disconnected</li> <li>c. Restricted/stalled meter turbine</li> <li>d. Defective meter</li> <li>e. Defective PC board</li> <li>f. Set-up error</li> </ul>	<ul style="list-style-type: none"> <li>a. Put control valve in service piston</li> <li>b. Connect meter to PC board</li> <li>c. Remove meter and check for rotation or foreign matter</li> <li>d. Replace meter</li> <li>e. Replace PC board</li> <li>f. Check control valve set-up procedure</li> </ul>
9. Time of day flashes on and off.	<ul style="list-style-type: none"> <li>a. Power has been out more than two hours, the transformer was unplugged and then plugged back into the wall outlet, the transformer plug was unplugged and then plugged back into the board or the NEXT and REGEN buttons were pressed to reset the valve.</li> </ul>	<ul style="list-style-type: none"> <li>a. Reset the time of day</li> </ul>



A DIVISION OF C-B TOOL CO.