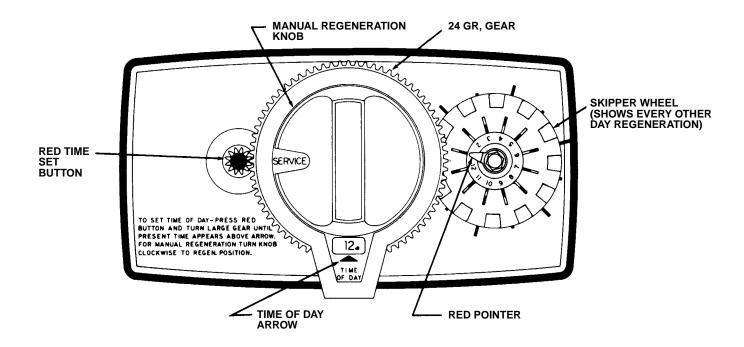


Job Specification Sheet

JOB NO			
MODEL NO			
WATER TEST			
CAPACITY PER U	INIT	MAX	PER REGENERATION
MINERAL TANK S	SIZE DIA	HEIGHT	
ONTROL VALVE S	PECIFICATIONS	5	
Type of Tim	er		
A) "L"	B) 7 Day	C) 12 Day	
Day/Ti	me of Regenerat	ion	
Drain I	Line Flow Control		
Brine I	Refill Rate		
Inicata	ır Siza		

Installation and Start-up Procedure

The water softener should be installed with the inlet, outlet and drain connections made in accordance with manufacturer's recommendations and to meet applicable plumbing codes.

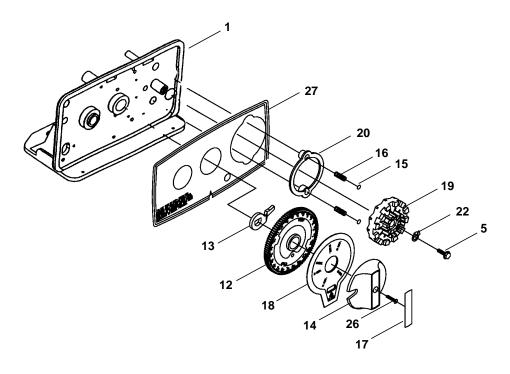


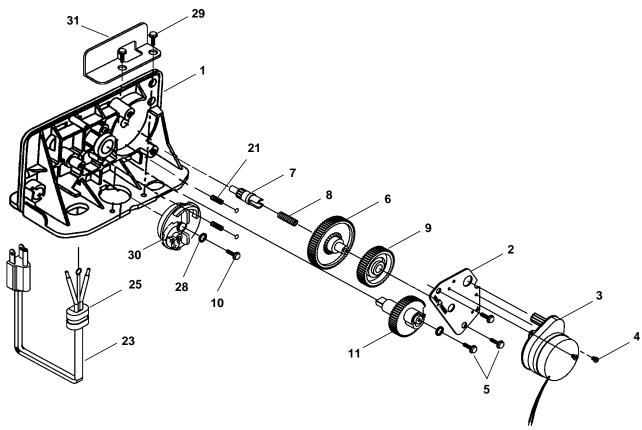
- Manually index the softener control into the service position and let water flow into the resin tank. When the water flow stops, open a softened water tap until all air is released from the lines, then close the tap.
 - Note: the various regeneration positions may be dialed manually by turning the knob on the front of the control until the indicator shows that the softener is in the desired position.
- 2. Manually index the control to the back-wash position and allow water to flow at the drain for 3 or 4 minutes.
- 3. Remove back cover plate.
- 4. Make sure that the salt dosage is set as recommended by the manufacturer. Manually index the control to the brine fill position and allow the brine tank to fill to the top of the air check.
- 5. Manually index the control to the brine draw position and allow the control to draw water from the brine tank until it stops.

- 6. Plug in the electrical cord and look in the sight hole in the back of the motor to see that it is running. Set the days that regeneration is to occur by sliding tabs on skipper wheel outward to expose trip fingers. Each tab is one day. Finger at red pointer is tonight. Moving clockwise from red pointer, extend or retract fingers to obtain the desired regeneration schedule.
- 7. Manually advance the control to the beginning of the brine fill position; and allow the control to return to the service position automatically.
- 8. Fill the brine tank with salt.
- 9. Replace back cover on the control.
- 10. Make sure that any by-pass valving is left in the normal service position.

Control Valve Drive Assembly

(See opposite page for parts list)





Control Valve Drive Assembly

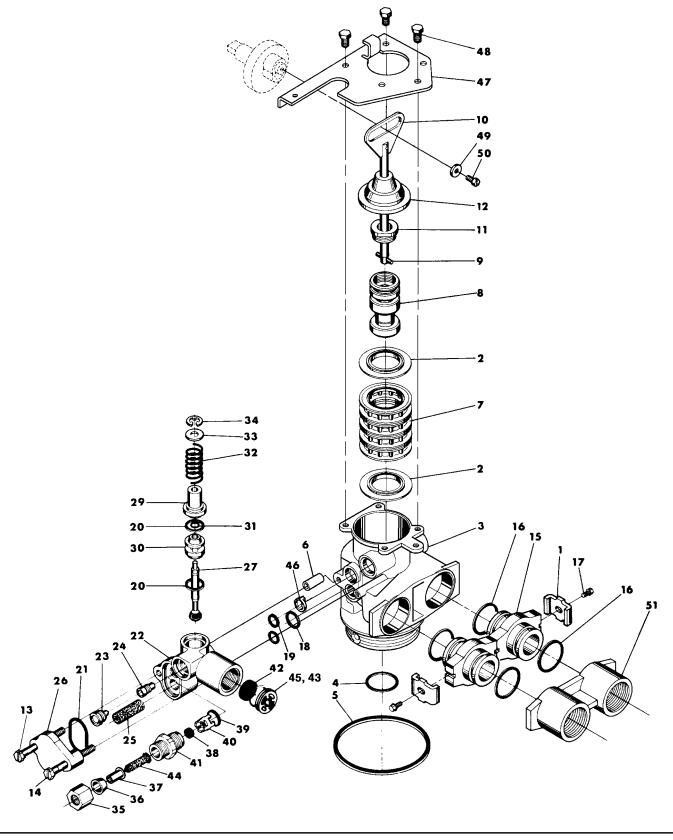
Parts List

1 1 15494-01 "L" Housing - w/Pin 2 1 13175 Motor Mounting Plate 3 1 18743 Motor - 120V., 60 Hz. 1 19659 Motor - 24V., 60 Hz. 4 3 11384 Screw - Motor Mtg. & Ground Wire 5 3 13296 Screw - Component Mounting 6 1 13017 Idler Gear 7 1 13018 Idler Pinion 8 1 13312 Spring - Idler 9 1 13164 Drive Gear 10 1 40214 Screw - Brine Cam 11 1 13170 Main Gear & Shaft 12 1 19205-01 24 Hour Gear Assembly, Silver 13 1 13011 Cycle Actuator Gear 14 1 14177 Knob - Manual Regeneration 15 4 13300 Ball - 1/4 Toia. 16 2 13311 Spring - Detent - Skipper Wheel 17 1 <th>Item No.</th> <th>Quantity</th> <th>Part No.</th> <th>Description</th>	Item No.	Quantity	Part No.	Description
3. 1 18743 Motor - 120V., 60 Hz. 1 19659 Motor - 24V., 60 Hz. 4. 3 11384 Screw - Motor Mtg. & Ground Wire 5. 3 13296 Screw - Component Mounting 6. 1 13017 Idler Gear 7. 1 13018 Idler Pinion 8. 1 13312 Spring - Idler 9. 1 13164 Drive Gear 10 1 40214 Screw - Brine Cam 11 1 13170 Main Gear & Shaft 12 1 19205-01 24 Hour Gear Assembly, Silver 13 1 13011 Cycle Actuator Gear 14 1 14177 Knob - Manual Regeneration 15 4 13300 Ball - 1/4" Dia. 16 2 13311 Spring - Detent - Skipper Wheel 17 1 14207 Knob Label - Silver 18 1 14176 Valve Position Dial - Standard 19				•
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1 60514-02 Brine Cam Assembly, Minutes	30			•
*31 1 40327 Support Bracket				
	*31	1	. 40327	Support Bracket

^{*} Hot Water Only

Control Drive Assembly for Clock

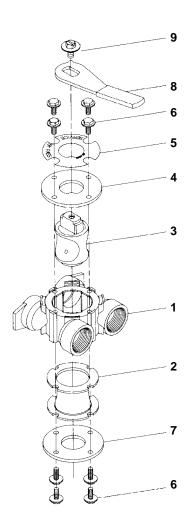
(See opposite page for parts list)



Page 6

1.	Item No. Quantity	Part No.	Description
2. 5 13242 Seal 3. 1 40319 Valve Body 4. 1 13304 O.Ring - Distributor Tube - 1" 5. 1 10381-01 O.Ring - Tipo of Tank - Hot Water 1 10381 O.Ring - Top of Tank - Hot Water 6. 1 13361 Stand-Off 7. 4 14241-01 Spacer - Hot Water 8. 1 12424 Spacer - Cold Water 8. 1 13247 Piston - Standard 9. 1 10696 Piston Pin 10. 1 13001 Piston Rod Assembly 11. 1 12953 Piston Retainer 12. 1 61411 End Plug Assembly, Brass - Hot Water 13. 1 13387 Screw - Injector Mounting 14. 1 13315 Screw - Injector Mounting 15. 2 19228 Adapter Coupling 16. 4 13305 O.Ring - Adapter Coupling 17. 2-4 13314 Screw - Adapter Coupling 18. 1 12638 O.Ring - Drain - Hot Water 1 12638 O.Ring - Drain - Cold Water 1 12638 O.Ring - Drain - Cold Water 1 12638 O.Ring - Brain Spacer - Hot Water 2 13301-01 O.Ring - Brain Spacer - Hot Water 2 13302-01 O.Ring - Brain Spacer - Hot Water 2 13302-01 O.Ring - Brain Spacer - Hot Water 2 13302-01 O.Ring - Brain Spacer - Hot Water 1 13303 O.Ring - Brain Spacer - Hot Water 2 13302-01 O.Ring - Brain Spacer - Hot Water 1 13303 O.Ring - Brain Spacer - Hot Water 1 13303 O.Ring - Brain Spacer - Hot Water 1 13303 O.Ring - Brain Spacer - Hot Water 1 13303 O.Ring - Brain Spacer - Hot Water 1 13303 O.Ring - Brain Spacer - Hot Water 1 13303 O.Ring - Brain Spacer - Hot Water 1 13303 O.Ring - Brain Spacer - Hot Water 1 13303 O.Ring - Injector Cover - Cold Water 1 13303 O.Ring - Injector Cover - Hot Water 1 13303 O.Ring - Injector Cover - Hot Water 1 13172-03 Braine Spacer - Hot Water 1 10914-xx Injector Mozzle - Hot Water 1 13172-03 Braine Wate Stem Assembly - Hot Water 1 13172-03 Braine Wate Stem Assembly - Hot Water 1 13172-03 Braine Valve Stem Assembly - Hot Water 1 13172-03 Braine Valve Stem Assembly - Hot Water 1 13172-03 Braine Valve Stem Assembly - Cold Water 1 13172-03 Braine Valve Stem Assembly - Cold Water 1 13172-03 Braine Valve Stem Assembly - Cold Water 1 13165 Braine Valve Stem Assembly - Cold Water 1 13172-03 Braine Valve Stem Assembly - Cold Water 1 13173 Spring - Spring		13255	
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11	10 1	13001	Piston Rod Assembly
1	11 1	12953	Piston Retainer
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48. 3 .12112 .121			
49			
51 1	49 1	13363	. Washer
	50 1	13296	Screw
1 Yoke, Brass, 3/4" NPT			
	1	13708	Yoke, Brass, 3/4" NPT

By-Pass Valve Assembly



Item No.	Quantity	Part No.	Description
1	1	17290	By-Pass Valve Body, 3/4"
	1	17290NP	By-Pass Valve Body, 3/4" Nickel Plate
	1	13399	By-Pass Valve Body, 1"
	1	13399NP	By-Pass Valve Body, 1", Nickel Plate
2	1	11726	Seal, By-Pass
	1	14105	Seal, 3/4" By-Pass, Hot Water
3	1	11972	Plug, By-Pass
4	1	11978	Side Cover
5	1	13604-01	Label
6	8	15727	Screw
7	1	11986	Side Cover
8	1	11979	Lever, By-Pass
9	1	11989	Screw, Hex Head, 1/4-14

Service Assembly

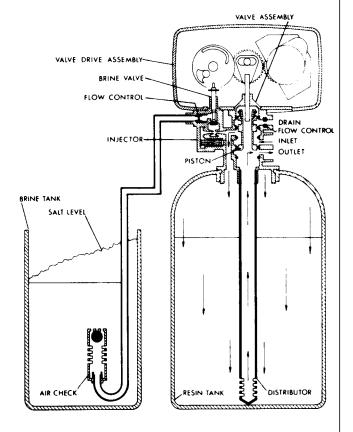
60102-00	Piston Assy., Cold Water - Softener
60102-20	Piston Assy., Cold Water - Low Water
60102-031	Piston Assy Hot Water - Softener
60125	Seal Kit - Cold Water
60125-05	Seal Kit - Hot Water
60084-XXXX	Injector - Cold Water
See Parts List,	
Page 7	Injector - Hot Water
60032	Brine Valve - Cold Water
60032-001	Brine Valve - Hot Water
60514	Brine Cam, 3-18
60514-01	Brine Cam, 6-36
60514-02	Brine Cam, Minutes
60510	Coupling with Clip and Screws
60040	Bypass, Brass 3/4" NPT - Cold Water
60729-01	Bypass, Brass 3/4" NPT - Hot Water
60041	Bypass, Brass 1" NPT - Hot Water
60729-02	Bypass, Brass 1" NPT - Hot Water
14860	Skipper Wheel - 7 Day
14381	Skipper Wheel - 12 Day

Flow Control Washers

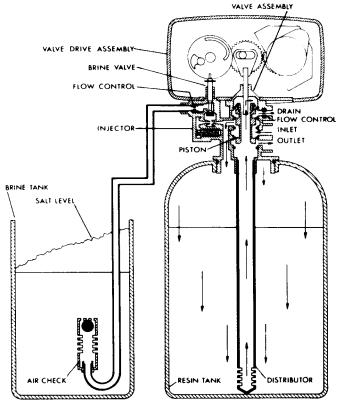
191530.6 gpm
191520.8 gpm
191511.0 gpm
120851.2 gpm
191501.3 gpm
120861.5 gpm
191491.7 gpm
120872.0 gpm
120882.4 gpm
120893.0 gpm
120903.5 gpm
120914.0 gpm
191474.5 gpm
120925.0 gpm
178146.0 gpm
124087.0 gpm

Water Conditioner Flow Diagrams

1 SERVICE POSITION



2 PRELIMINARY RINSE POSITION 5 Minutes

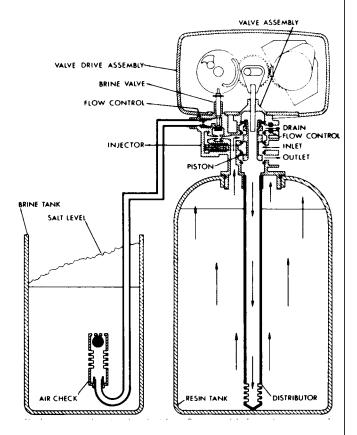


Hard water enters the unit at the valve inlet - flows around the lower piston groove - thru the passage to the top of tank - down thru the resin and enters the distributor as conditioned water. The conditioned water flows up thru the center tube to the valve outlet.

Hard water enters the unit at the valve inlet - flows around the lower piston groove - down thru the top of tank passage - downward thru the resin - up the distributor tube - thru the center hole in the piston - over the top edge of the piston and out the drain line.

Water Conditioner Flow Diagrams (Cont'd.)

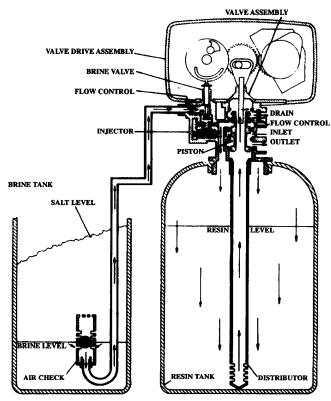
3 BACKWASH POSITION 10 Minutes



Hard water enters the unit at the valve inlet - flows around the lower piston groove and lower piston land -down thru the center tube and out the distributor - up thru the resin - thru the top of tank passage - around the upper piston groove and out the drain line.

4 BRINE POSITION

First Portion of 50 Minute Fixed Cycle

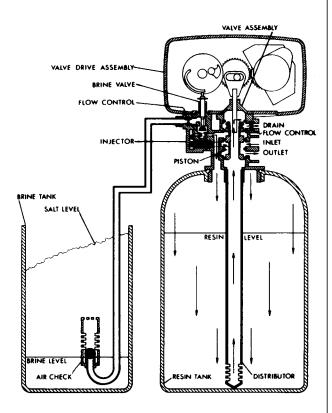


Hard water enters the unit at the valve inlet - flows around the lower piston groove - thru the injector nozzle and orifice to draw brine from the brine tank. The brine flows down thru the resin - into the distributor - up thru the center tube - thru the center hole in the piston and out the drain line.

Water Conditioner Flow Diagrams (Cont'd.)

5 SLOW RINSE POSITION

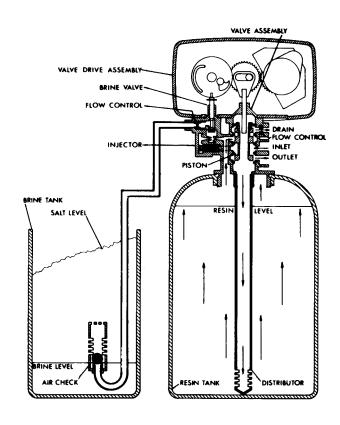
Last Portion of 50 Minute Fixed Cycle



After all the brine has been drawn from the brine tank, hard water continues to enter thru the valve inlet - flows around the lower piston groove - thru the nozzle and orifice - down thru the resin and into the distributor - up thru the center tube - thru the center hole in the piston and out the drain line.

6 SECOND BACKWASH POSITION

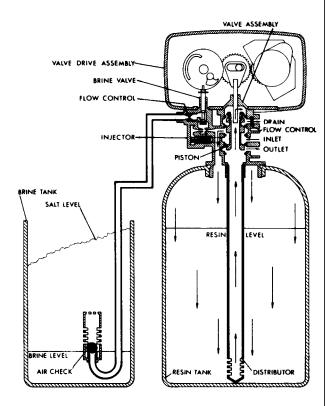
10 Minutes



Hard water enters the unit at the valve inlet - flows around the lower piston groove and lower piston land - down thru the center tube and out the distributor - up thru the resin - thru the top of tank passage - around the upper piston groove and out the drain line.

Water Conditioner Flow Diagrams (Cont'd.)

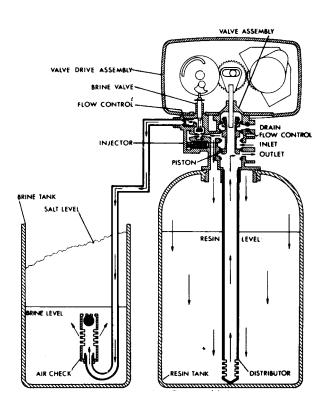
7 SETTLING RINSE POSITION 5 Minutes



Hard water enters the unit at the valve inlet - flows around the lower piston groove - down thru the top of tank passage - downward thru the resin - up the distributor tube - thru the center hole in the piston -over the top edge of the piston and out the drain line.

8 BRINE TANK FILL POSITION

4 to 24 Minutes Adjustable Cycle



Hard water enters the unit at the valve inlet - flows around the lower piston groove - thru the injector throat - thru the brine valve and flow control to fill the brine tank. Hard water also flows around the lower piston groove - thru the passage to the top of tank - down thru the resin and enters the distributor as conditioned water. The conditioned water flows up thru the center tube to the valve outlet.

Service Instructions

PROBLEM		CAUSE	CORRECTION		
1.	Softener fails to regenerate.	A. Electrical service to unit has been interrupted.	A. Assure permanent electrical service (check fuse, plug, pull chain or switch).		
		B. Timer is defective.	B. Replace timer.		
		C. Power failure.	C. Reset time of day.		
2.	Softener delivers hard water.	A. By-pass valve is open.	A. Close by-pass valve.		
		B. No salt in brine tank.	B. Add salt to brine tank and maintain salt level above water level.		
		C. Injectors or screen plugged.	C. Replace injectors and screen.		
		D. Insufficient water flowing into brine tank.	D. Check brine tank fill time and clean brine line flow control if plugged.		
		E. Hot water tank hardness.	E. Repeated flushings of the hot water tank is required.		
		F. Leak at distributor tube.	F. Make sure distributor tube is not cracked. Check O-ring and tube pilot.		
		G. Internal valve leak.	G. Replace seals and spacers and/or piston.		
3.	Unit uses too much salt.	A. Improper salt setting.	A. Check salt usage and salt setting.		
		B. Excess water in brine tank.	B. See problem No. 7.		
4.	Loss of water pressure.	Iron buildup in line to water conditioner.	A. Clean line to water conditioner.		
		B. Iron buildup in water conditioner.	B. Clean control and add resin cleaner to resin bed. Increase frequency of regeneration.		
		C. Inlet of control plugged due to foreign material broken loose from pipes by recent work done on plumbing system.	C. Remove piston & clean control.		
5.	Loss of resin through drain line.	A. Air in water system.	A. Assure that well system has proper air eliminator control. Check for dry well condition.		
6.	Iron In Conditioned Water.	A. Fouled resin bed.	A. Check backwash, brine draw and brine tank fill, increase frequency of regeneration. Increase backwash time.		
7a	. Excessive water in brine tank.	A. Plugged drain line flow control.	A. Clean flow control.		

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Service Instructions (Cont'd.)

PROBLEM	CAUSE	CORRECTION		
7b. Salt water in service line	A. Plugged injector system.	A. Clean injector and replace screen.		
	B. Timer not cycling.	B. Replace timer.		
	C. Foreign material in brine valve.	C. Clean or replace brine valve.		
	D. Foreign material in brine line flow control.	D. Clean brine line flow control.		
8. Softener fails to draw brine.	A. Drain line flow control is plugged.	A. Clean drain line flow control.		
	B. Injector is plugged.	B. Clean or replace injectors.		
	C. Injector screen plugged.	C. Replace screen.		
	D. Line pressure is too low.	D. Increase line pressure. (Line pressure must be at least 20 PSI at all time.)		
	E. Internal control leak.	Change seals and spacers and/or piston assembly.		
9. Control cycles continuous	A. Faulty timer mechanism	A. Replace timer.		
10. Drain flows continuously.	A. Foreign material in control.	Remove piston assembly and inspect bore, remove foreign material & check control in various regeneration positions.		
	B. Internal control leak.	B. Replace seals and/or piston assembly.		
	C. Control valve jammed in brine or backwash position.	C. Replace seals and/or piston assembly.		
	D. Timer motor stopped or jammed	D. Replace timer.		

Service Instructions (Cont'd.)

A. TO REMOVE TIME BRINE VALVE, INJECTORS, AND SCREEN

- 1. Unplug electrical cord from outlet.
- 2. Turn off water supply to conditioner:
 - a. If the conditioner installation has a "three valve" by-pass system, first open the valve in the by pass line, then close the valves at the conditioner inlet and outlet.
 - b. If the conditioner has an integral by-pass valve, put it in the by-pass position.
 - If there is only a shut-off valve near the conditioner inlet, close it.
- Relieve water pressure in the conditioner by putting the control in the backwash position momentarily. Return the control to the service position.
- Disconnect brine tube and drain line connections at the injector body.
- Remove the two injector body mounting screws. The injector and brine module can now be removed from the control valve. Remove and discard valve body Orings

6a. To Replace Brine Valve

- Pull brine valve from injector body, also remove & discard O-ring at bottom of brine valve hole.
- Apply silicone lubricant to new O-ring and reinstall at bottom of brine valve hole.
- Apply silicone lubricant to O- ring on new valve assembly and press into brine valve hole, shoulder on bushing should be flush with injector body.
- 6b. To replace injectors and screen.
 - Remove injector cap and screen, discard O-ring. Unscrew injector nozzle and throat from injector body.
 - 2. Screw in new injector throat and nozzle, be sure they are seated tightly. Install a new screen.
 - 3. Apply silicone lubricant to new O-ring and install around oval extension on injector cap.
- Apply silicone lubricant to three new O-rings and install over three bosses on injector body.
- Insert screws with washers thru injector cap and injector. Place this assembly thru hole in timer housing and into mating holes in the valve body. Tighten screws. (Be sure to reinstall brass spacers with injector on model 4600 valve.)
- 9. Reconnect brine tube and drain line.
- Return by-pass or inlet valving to normal service position. Water pressure should now be applied to the conditioner, and any by-pass line shut off.

- 11. Check for leaks at all seal areas. Check drain seal with the control in the backwash position.
- 12. Plug electrical cord into outlet.
- 13. Set time of day and cycle the control valve manually to assure proper function. Make sure the control valve is returned to the service position.
- 14. Make sure there is enough brine in the brine tank.
- Rotate program wheel counter-clockwise until it stops at regeneration position
- 16. Start regeneration cycle manually if water is hard.

B. TO REPLACE TIMER

- 1. Unplug electrical cord from outlet.
- 2. Turn off water supply to conditioner:
 - a. If the conditioner installation has a "three valve" by-pass system, first open the valve in the by-pass line, then close the valves at the conditioner inlet and outlet.
 - If the conditioner has an integral by-pass valve, put it in the by-pass position.
 - If there is only a shut-off valve near the conditioner inlet, close it.
- Relieve water pressure in the conditioner by putting the control in the backwash position momentarily. Return the control to the service position.
- 4. Remove the control valve back cover.
- Remove screw and washer at drive yoke. Remove timer mounting screws. The entire timer assembly will now lift off easily.
- Put new timer on top of valve. Be sure drive pin on main gear engages slot in drive yoke (rotate control knob if necessary).
- 7. Replace timer mounting screws. Replace screw and washer at drive yoke.
- Return by-pass or inlet valving to normal service position. Water pressure should now be applied to the conditioner, and any by-pass line shut off.
- 9. Plug electrical cord into outlet.
- Set time of day, program wheel, and salt usage. Cycle
 the control valve manually to assure proper function.
 Make sure the control valve is returned to the service
 position.
- Replace the control valve back cover. Be sure grommet at cable hole is in place.
- 12. Make sure there is enough brine in the brine tank.
- Rotate program wheel counter-clockwise until it stops at regeneration position.
- 14. Start regeneration cycle manually if water is hard.

Service Instructions (Cont'd.)

C. TO REPLACE PISTON ASSEMBLY

- 1. Unplug electrical cord from outlet.
- 2. Turn off water supply to conditioner:
 - If the conditioner installation has a "three valve" by-pass system, first open the valve in the by-pass line, then close the valves at the conditioner inlet and outlet.
 - If the conditioner has an integral by-pass valve, put it in the by-pass position.
 - If there is only a shut-off valve near the conditioner inlet, close it.
- Relieve water pressure in the conditioner by putting the control in the backwash position momentarily. Return the control to the service position.
- 4. Remove the control valve back cover.
- Remove screw and washer at drive yoke. Remove timer mounting screws. The entire timer assembly will now lift off easily. Remove end plug retainer plate.
- Pull upward on end of piston yoke until assembly is out of valve.
- Inspect the inside of the valve to make sure that all spacers and seals are in place, and that there is no foreign matter that would interfere with the valve operation.
- Take new piston assembly as furnished and push piston into valve by means of the end plug. Twist yoke carefully in a clockwise direction to properly align it with drive gear. Replace end plug retainer plate.
- Place timer on top of valve. Be sure drive pin on main gear engages slot in drive yoke (rotate control knob if necessary).
- Replace timer mounting screws. Replace screw and washer at drive yoke.
- Return by-pass or inlet valving to normal service position. Water pressure should now be applied to the conditioner, and any by-pass line shut off.
- 12. Plug electrical cord into outlet.
- 13. Set time of day. Cycle the control valve manually to assure proper function. Make sure the control valve is returned to the service position.
- 14. Replace the control valve back cover. Be sure grommet at cable hole is in place.
- 15. Make sure there is enough brine in the brine tank.
- Rotate program wheel counter-clockwise until it stops at regeneration position.
- 17. Start regeneration cycle manually if water is hard.

D. TO REPLACE SEALS AND SPACERS

- 1. Unplug electrical cord from outlet.
- Turn off water supply to conditioner:
 - a. If the conditioner installation has a "three valve" by-pass system, first open the valve in the by-pass line, then close the valves at the conditioner inlet and outlet.
 - b. If the conditioner has an integral by-pass valve, put it in the by-pass position.
 - If there as only a shut-off valve near the conditioner inlet, close it.
- Relieve water pressure in the conditioner by putting the control in the backwash position momentarily. Return the control to the service position.
- 4. Remove the control valve back cover.
- Remove screw and washer at drive yoke. Remove timer mounting screws. The entire timer assembly will now lift off easily. Remove end plug retainer plate.
- Pull upward on end of piston rod yoke until assembly is out of valve. Remove and replace seats and spacers with fingers.

Notes			

Notes			