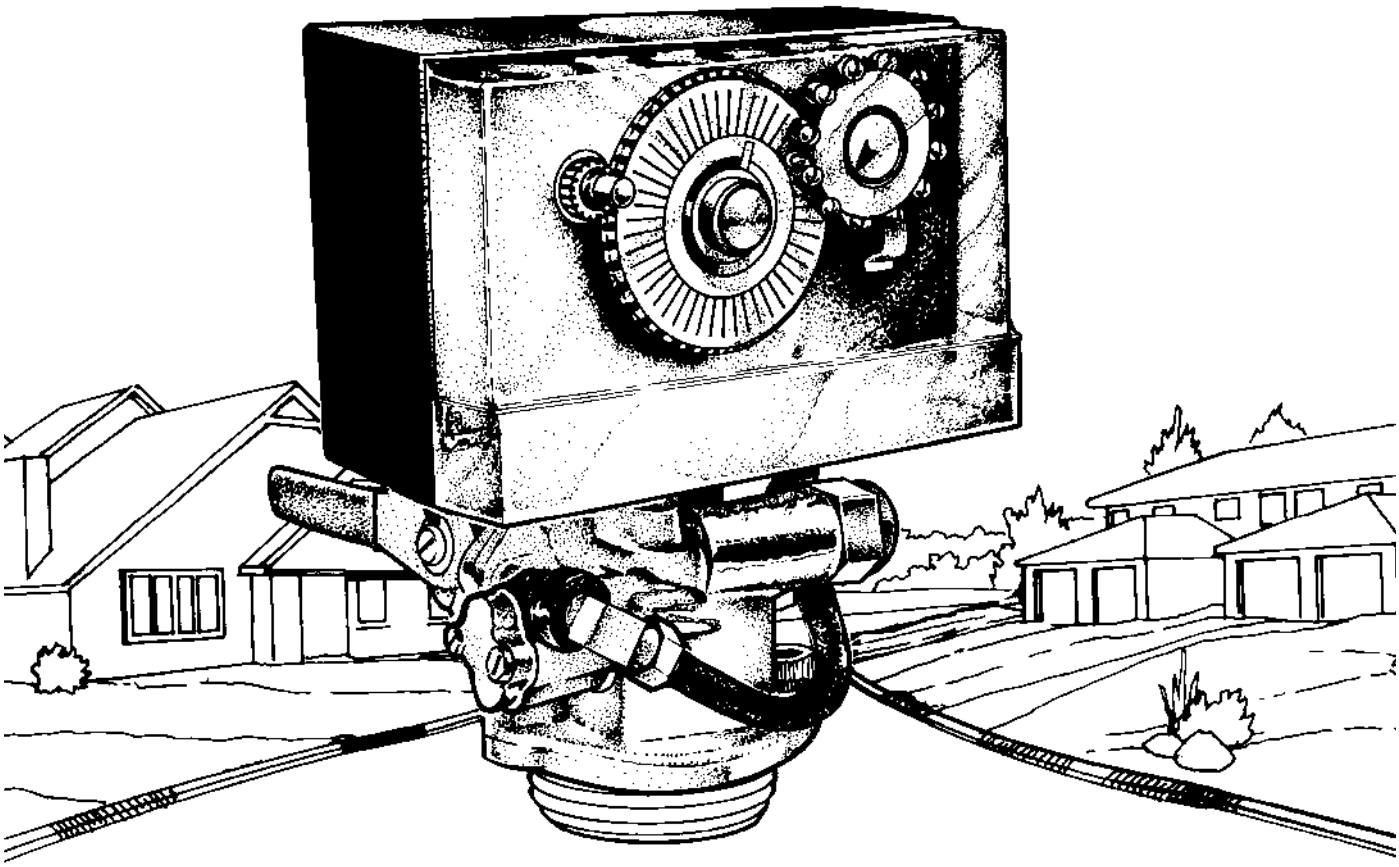
MODEL 3600

Service Manual



IMPORTANT: Fill in pertinent information on page 2 for future reference.

MODEL 3600

Job Specification Sheet

- JOB NO. _____
- *MODEL NO. _____
- WATER TEST _____
- CAPACITY PER UNIT _____MAX. _____PER REGENERATION
- MINERAL TANK SIZE DIA._____HEIGHT_____
- BRINE TANK SIZE & SALT SETTING PER REGENERATION:
- _____

CONTROL VALVE SPECIFICATIONS

Type of Timer

A) 7 Day

B) 12 Day

Drain Line Flow Control_____ gpm

Brine Refill Rate_____ gpm

Injector Size_____

CONTROL INFORMATION

Tank Size Dia.	Injector	Slow Rinse Rate (gpm)	B.L.F.C.[1]	D.L.F.C.[2]
6″ 7″	# 0 Red # 0 Red	.26 gpm .26 gpm	.25 gpm .25 gpm	1.2 gpm 1.2 gpm
8″ 9″ 10″	# 1 White # 1 White # 1 White	.33 gpm .33 gpm .33 gpm	.25 gpm .25 gpm .25 gpm	1.5 gpm 2.0 gpm 2.4 gpm
12″ 13″	# 2 Blue # 2 Blue	.64 gpm .64 gpm	.5 gpm .5 gpm	3.5 gpm 4.0 gpm

[1]B.L.F.C. (Brine Line Flow Control). Refill Rate for Filling Brine Tank.

[2]D.L.F.C. (Drain Line Flow Control). Backwash and Rapid Rinse Flow Rates.

CAUTION: Water pressure is not to exceed 120 p.s.i., water temperature is not to exceed 110° F, (180° F Hot Water Valve) and the unit cannot be subjected to freezing conditions.

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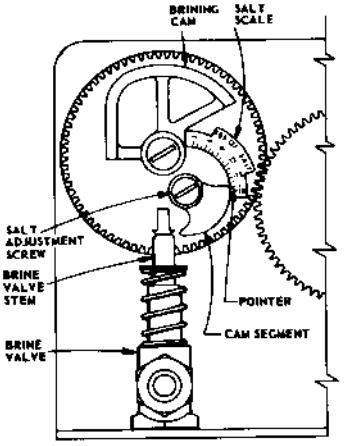
MODEL 3600

Installation and Start-Up Procedure for the Water Softener Control

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

1. 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 backwash position and allow water to flow at the drain for 3 or 4 minutes.
3. Make sure that the salt dosage is set as recommended by the manufacturer. If necessary, set salt in accordance with the setting instruction sheet. Manually index the control to the brine fill position and allow the brine tank to fill to the top of the air check.
4. Manually index the control to the brine draw position and allow the control to draw water from the brine tank until it stops.
5. 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.
6. Manually advance the control to the beginning of the brine fill position; and allow the control to return to the service position automatically.
7. Fill the brine tank with salt.
8. Replace back cover on the control.
9. Make sure that any by-pass valving is left in the normal service position.

Fig. 1



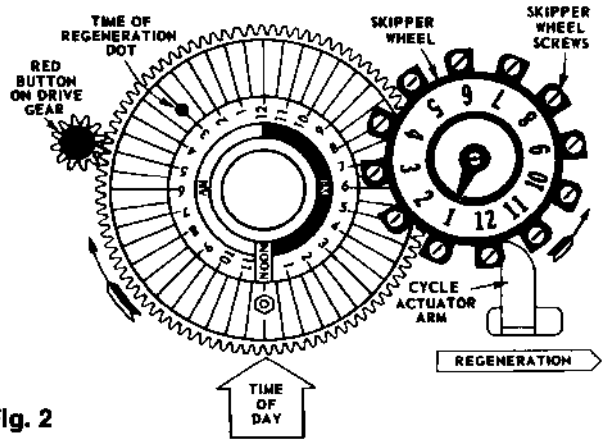


Fig. 2

SALT USAGE ADJUSTMENT Fig. 1

Since the salt scale dial conveniently reads in pounds of salt used per regeneration cycle, just loosen the salt adjustment screw, rotate the cam segment until its pointer is at the desired usage... then tighten adjustment screw.

SETTING THE TIME AND FREQUENCY OF REGENERATION Fig. 2

Simple with "UP FRONT" Controls.

Frequency or Regeneration: every day, every 12th day or anything in between.

a. Turn the skipper wheel counter-clockwise until No. 1 is at the red arrow.
b. Set screws on the skipper wheel all the way *in* on days regeneration is desired and screwed *out* so they do not contact the cycle actuator arm on days when regeneration is not required.

Time of Regeneration: Your Choice.

Turn the dial with time-of-day numerals in either direction until the time you have chosen for regeneration is in line with the dot on the large gear.

Time of Day:

a. Press and hold in the red button to disengage the drive gear.
b. Turn the large gear until the actual time of day is at the time-of-day arrow.
c. Release the red button to re-engage the drive gear. Now the time of day on "clock" has been set

HOW TO TRIGGER AN EXTRA REGENERATION

You can start a regeneration cycle manually at any time, by pushing the cycle actuation arm to the right momentarily. The Model 3600 will then automatically go through a *full* regeneration cycle.

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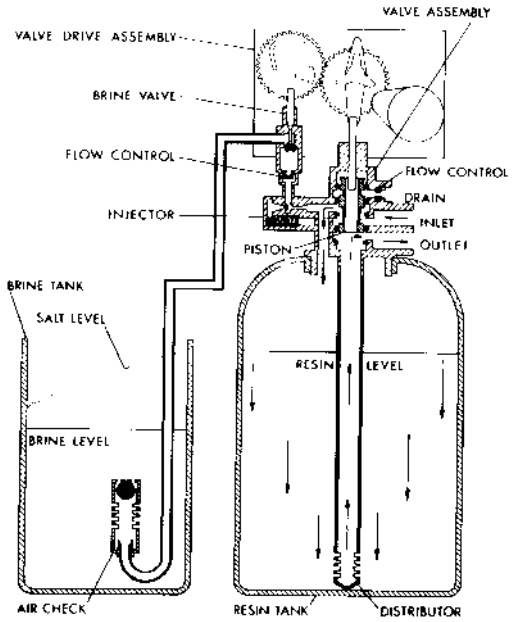
MODEL 3600

Water Conditioner Flow Diagrams

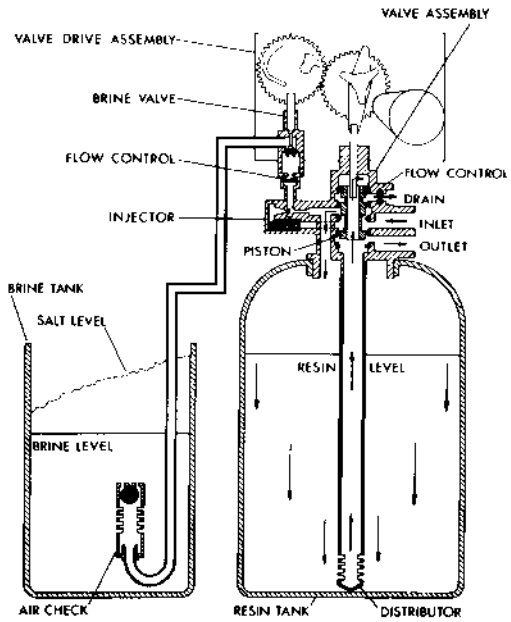
1 SERVICE POSITION



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.

2 PRELIMINARY RINSE POSITION

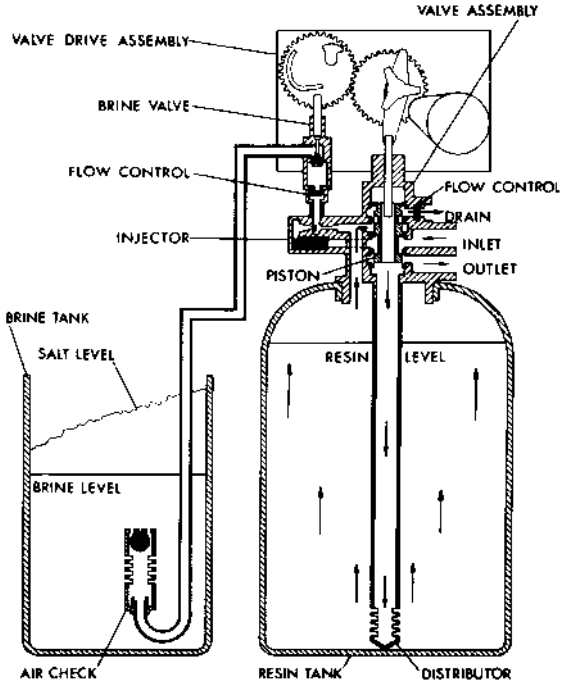
5 Minutes



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.

3 BACKWASH POSITION

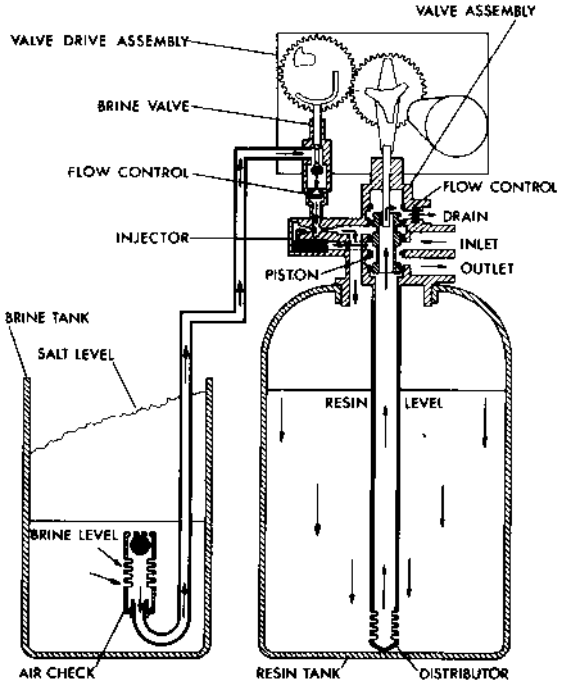
10 Minutes



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.

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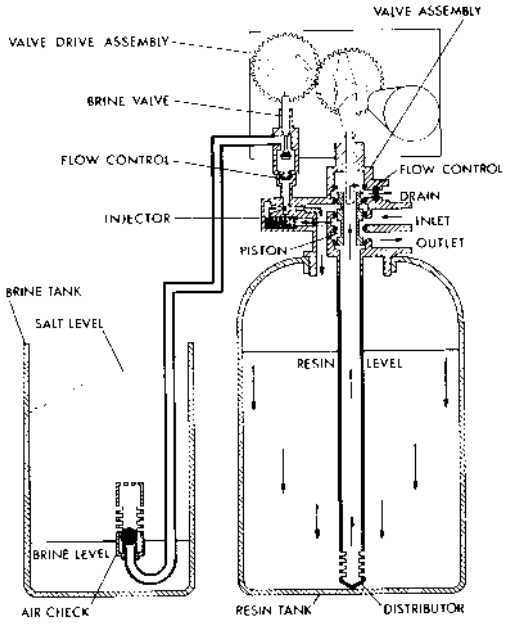
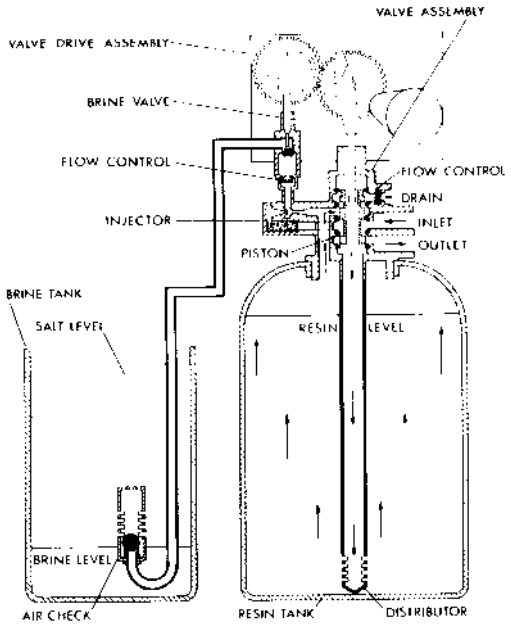
Water Conditioner Flow Diagrams (Cont'd.)

5 SLOW RINSE POSITION
Last Portion of 50 Minute Fixed Cycle



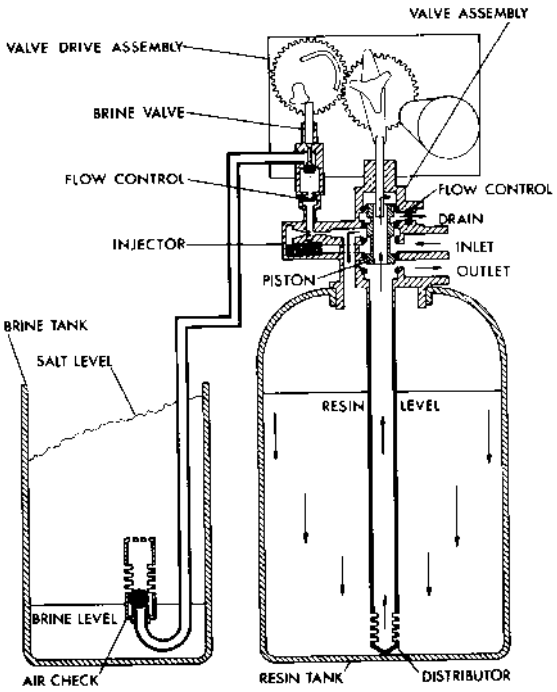
After all the brine has been drawn from the brine tank, hard water continues to enter thru the valve inlet - flows around the lower piston groove - thru the nozzle and orifice - down thru the resin and into the distributor - up thru the center tube - thru the center hole in the piston and out the drain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

6 RAPID RINSE POSITION
10 Minutes



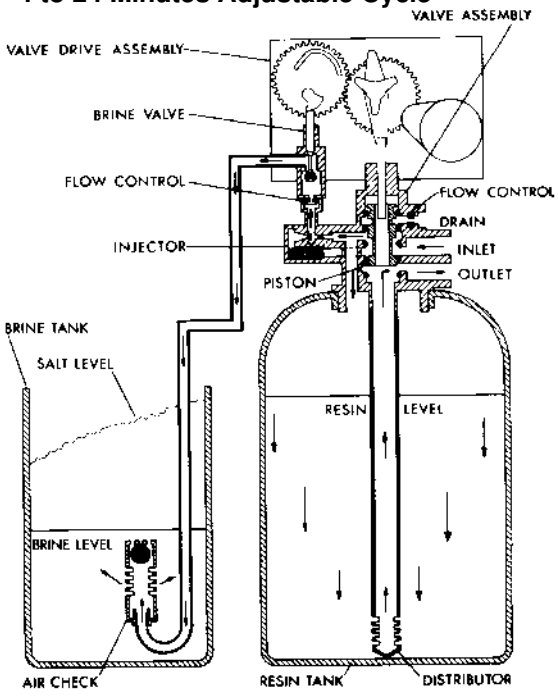
Hard water enters the unit at the valve inlet - flows around the lower piston groove and lower piston land - down thru the center tube and out the distributor - up thru the resin - thru the top of tank passage - around the upper piston groove and out the drain line.

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.

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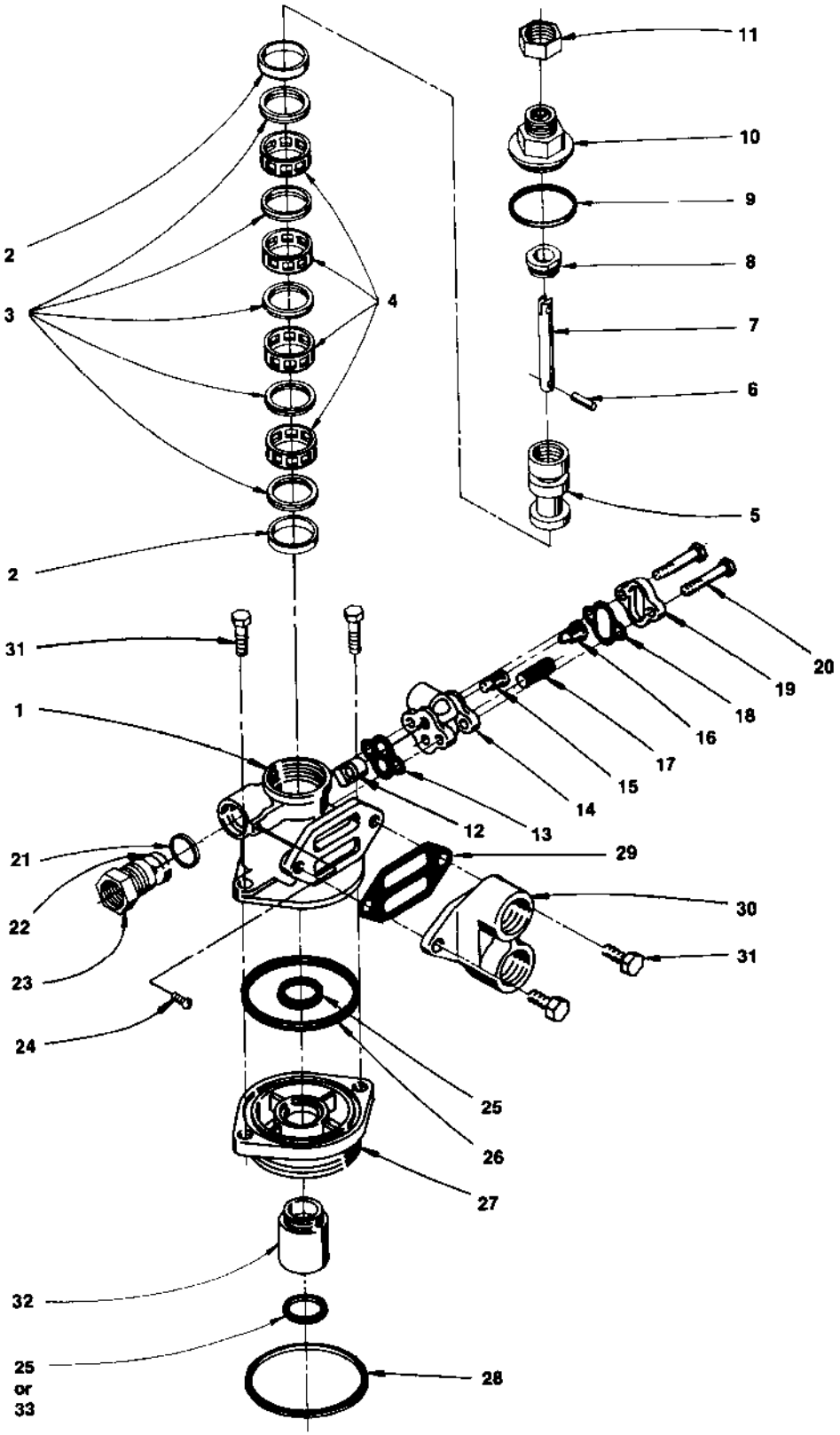
MODEL 3600

Control Valve Assembly

(See opposite page for parts list)



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Item No.	Quantity	Part No.	Description
1	1	11971	Control Valve Body
	1	11971NP	Control Valve Body - Nickel Plated
2	2	10757	End Spacer
	2	10757B	End Spacer Brass (Hot Water)
3	5	10545	Piston Seal
4	4	11451	Spacer
	4	16589	Spacer (Hot Water)
5	1	12600	Piston - Standard
	1	12968	Piston - Filter/Feeder
	1	13260	Piston - Low Water
	1	17210	Piston - Hot Water
6	1	10696	Piston Pin
7	1	11943	Piston Rod
8	1	12953	Piston Rod Retainer
	1	15110	Piston Rod Retainer - Hot Water
9	1	11184	O-Ring #123
10	1	60707	End Plug Assembly
11	1	10269	Jam Nut 3/4 - 16
12	1	12360	Injector Air Disperser
13	1	11475	Injector Body Gasket
14	1	17776	Injector Body - Plastic
	1	11483	Injector Body - Brass
	1	11483NP	Injector Body Nickel Plated
15	1	10914-X	Injector Throat
	1	10225-XX	Injector Throat - Hot Water
16	1	10913-X	Injector Nozzle
	1	10226-XX	Injector Nozzle - Hot Water
17	1	10227	Injector Screen
18	1	10229	Injector Cover Gasket
19	1	11893	Injector Cover - Plastic Body
	1	10228	Injector Cover - Brass Body
20	2	10692	Injector Body Screw #10 24 x 1-9/16
21	1	11183	O-Ring #017
22	1		Flow Control Button - Specify Flow Rate (See pg. 15)
23	1	11385-01	Flow Control Housing - Plastic
	1	11385-03	Flow Control Housing - Brass
24	1	11180	Flow Control Retainer Screw
25	2	10244	Inside Tube O-Ring #211
26	1	11208	O-Ring #232
27	1	12341	Valve Body Adapter (2-1/8 - 8 Thread)
	1	12341 NP	Valve Body Adapter Nickel Plated (2-1/2 - 8 Thread)
28	1	10381	Tank O-Ring #231
	1	10381-01	Tank O-Ring (Galvanized Tank)
	1	12570	Tank O-Ring (Park Tank)
29	1	18296	Seal, By-pass
30	1	11985	3/4 NPT Yoke
	1	11985NP	3/4 NPT Yoke Nickel Plated
	1	11985-40	1″ Sweat Yoke
	1	11985-40NP	1″ Sweat Yoke Nickel Plated
31	4	11224	Hex Cap Screw 5/16″ x 5/8″
32	1	11966	Distributor Tube Pilot 13/16″
	1	14364	Distributor Tube Pilot 1″
	1	14673	Distributor Tube Pilot 13/16″ Brass - Hot Water
	1	16435	Distributor Tube Pilot 1″ Brass - Hot Water
33	1	13304	O-Ring 1″ Distributor Pilot Only
	1	11995	Pin (Not Shown)

Specify Size

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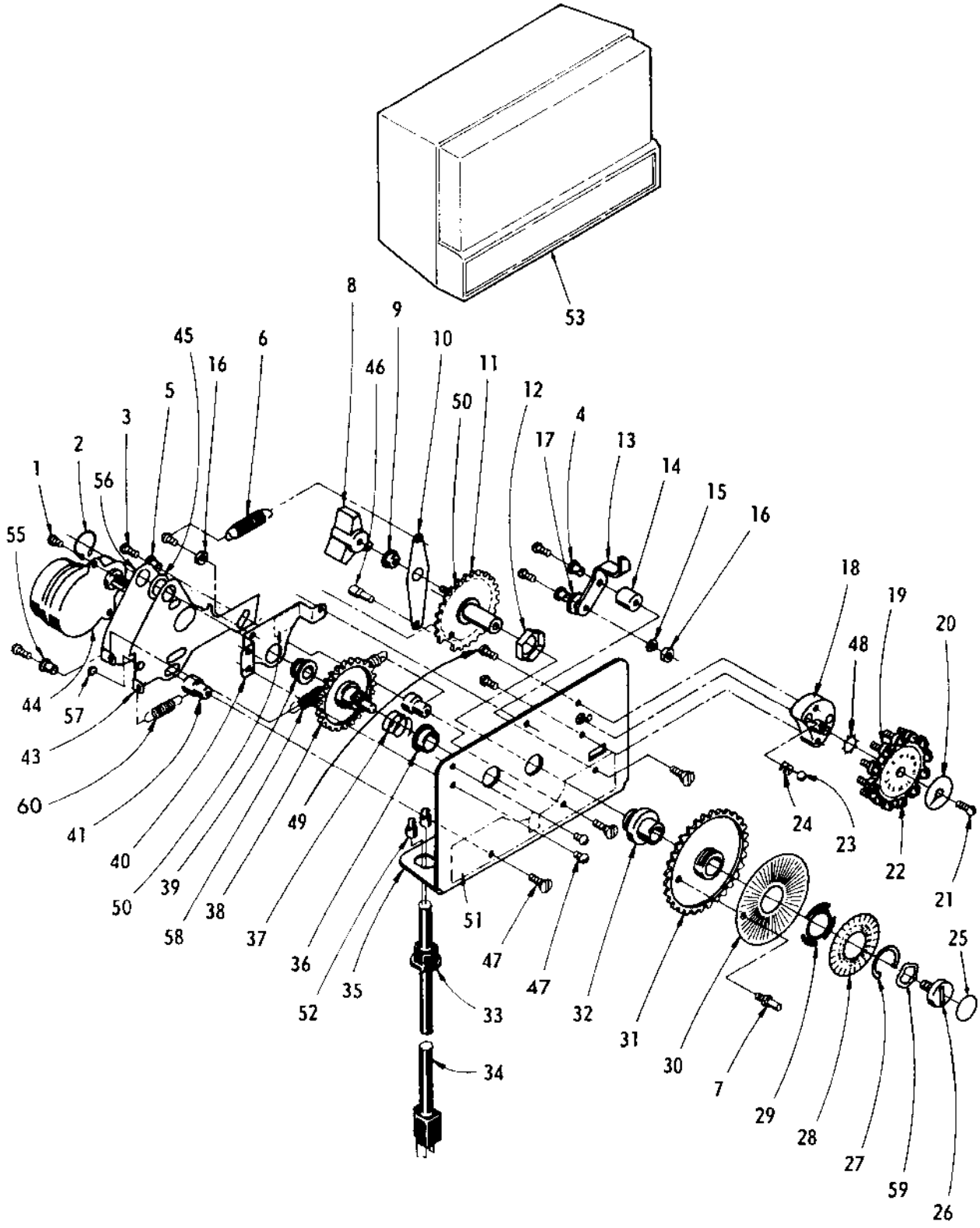
MODEL 3600

Control Valve Drive Assembly

(See opposite page for parts list)



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Item No.	Quantity	Part No.	Description
1	3	11384	Self Tapping Screw
2	1	11593	Retaining Ring
3	4	12362	Round Head Machine Screw
4	2	11630	Swivel Bearing
5	1	11974	Swivel Bearing
6	1	11925	Drive Link Spring
7	1	12110	24 Hour Gear Stud
8	1	11645	Knob
9	1	11937	Drive Link Swivel Bearing
10	1	11932	Valve Drive Link
11	1	11933	Drive Shaft Assembly
12	1	11332	Jam Nut
13	1	11931	Cycle Actuator Arm
14	1	11941	Cycle Actuator Support
15	1	10337	Lock Washer
16	1	11085	Hex. Nut
17	1	12239	Actuator Roller
18	1	12051	Skipper Wheel Support
19	1	10864-01	Skipper Wheel - 12 Day
	1	12052-01	Skipper Wheel - 7 Day
20	1	11466	Day of Regeneration Dial
21	1	12531	Round Head Machine Screw
22	12	11358	Fillister Head Machine Screw
23	2	11360	3/16″ Dia. Ball
24	2	11363	Skipper Wheel Detent Spring
25	1	11999	Button Decal
26	1	11996	Drive Shaft Button
27	1	11292	Retaining Ring
28	1	13225	Time of Day Washer
29	1	11303	Spring Washer
30	1	11975	24 Hour Gear Dial
31	1	11489	24 Hour Gear
32	1	11491	Main Bearing
33	1	13547	Strain Relief
34	1	11842	Power Cord
35	1	11944	Drive Mounting Panel
36	1	10885	Bearing - Idler Shaft - Front
37	1	11375	Idler Shaft Spring
38	1	11588	Idler Shaft
39	1	11584	Pivot Bushing
40	1	11930	Pivot Plate
41	2	11940	Motor Plate Stand-Off
42			Not Assigned
43	1	12325	Motor Mounting Plate
44	1	11590	Motor (110 V.)
	1	11788	Motor (220 V.)
45	1	11997	Motor Plate Spacer
46	1	11995	Connecting Rod Pin
47	5	11969	Flat Head Machine Screw
48	1	13365	Lock Washer
49	2	12038	Round Head Machine Screw
50	1	12111	Position Indicator Label
51	1	12893	Front Label
52	2	12681	Closed End Connector
53	1	60233	Cover, (Specify Color)
54			Not Assigned
55	1	12328	Swivel Bearing
56	1	12324	Motor Clutch Plate
57	1	12332	Spacer Button
58	1	12333	Clutch Plate Spring
59	1	12116	Wave Washer
60	1	13235	Motor Mounting Plt. Spring
		10857	Rivet, Idler Shaft, Red, (Not Shown)

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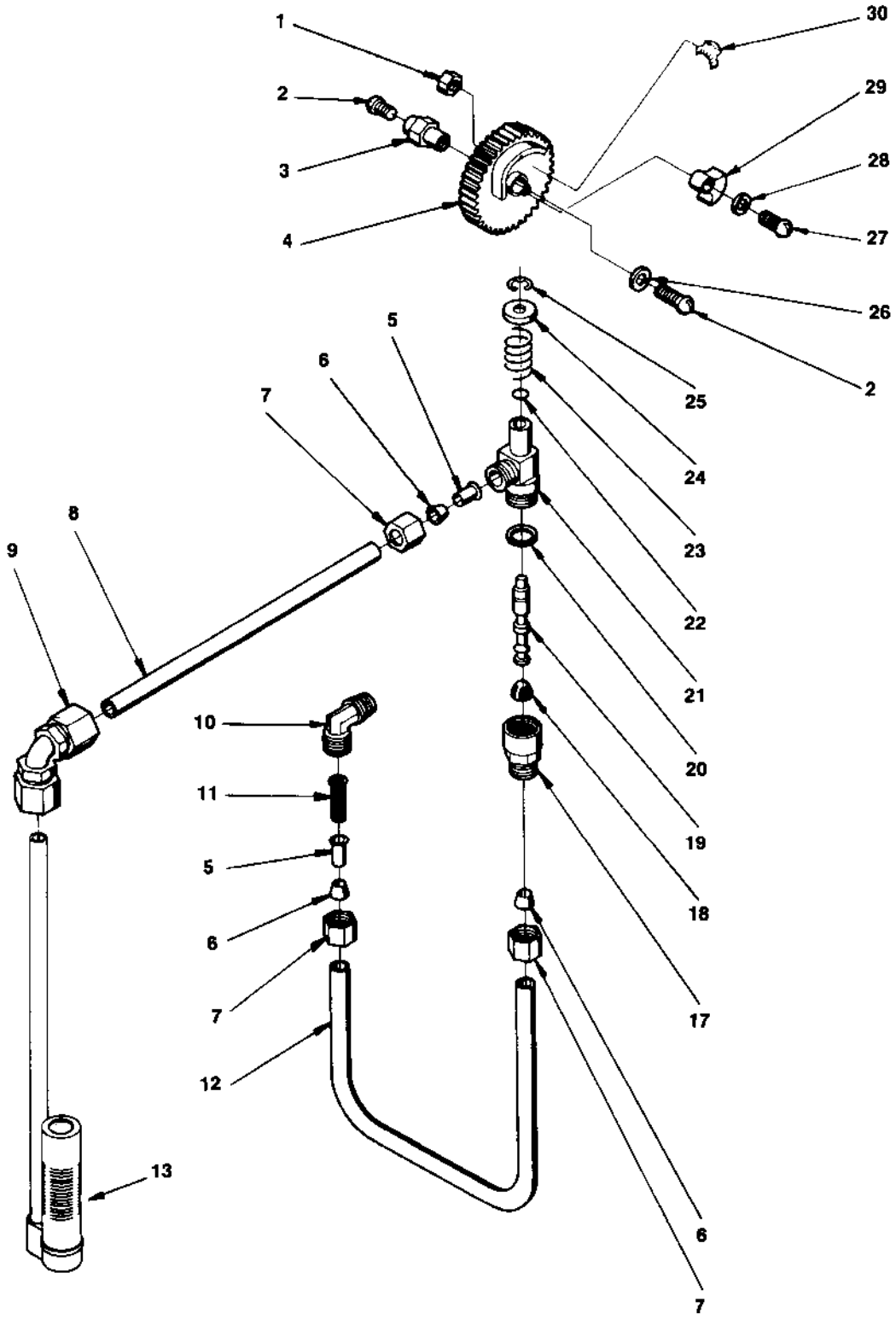
MODEL 3600

Brine Valve Assembly

(See opposite page for parts list)



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MODEL 3600

Brine Valve Assembly

Parts List

Item No.	Quantity	Part No.	Description
1	1	11081	Hex Nut
2	2	11983	Pan Head Machine Screw
3	1	11957	Brine Valve Cam Stand Off
4	1	11963	Brine Valve Cam
5	2	10332	Insert Sleeve (3/8″ Tube)
6	3	10330	Delrin Sleeve (3/8″ Tube)
7	3	10329	Fitting Nut (3/8″ Tube)
8	1	Not Supplied	Brine Line Tube (3/8″ O.D. Flexible Tube-Length To Suite.)
9	1	12794	90° Elbow - 3/8″ Tube to 3/8″ Tube
10	1	10328	90° Elbow - 1/4″ Pipe Thd. to 1/4″ Tube
11	1	12767	Brine Line Screen
12	1	12778	Brine Valve Tube (Polyethylene) 3/8″
13	1	60002	#500 Air Check
14			Not Assigned
15			Not Assigned
16			Not Assigned
17	1	60020-25	Flow Control Fitting - .25 GPM
	1	60020-50	Flow Control Fitting - .50 GPM
	1	12775	Flow Control Fitting - Blank
18	1	12626	Shut Off Valve Seat
19	1	12551	Brine Valve Stem
20	1	11982	O-Ring #016
21	1	11992	Brine Valve Body
22	1	12550	Quad Ring #009
23	1	11973	Brine Valve Spring
24	1	12035	Plain Washer #10
25	1	11981	Retaining Ring
26	1	12037	Plain Washer #10 Stainless Steel
27	1	11980	Pan Head Machine Screw 8-32 x 5/8″
28	1	12036	Plain Washer #8
29	1	11967	Cam Segment
30	1	11988	Brine Valve Label, 3-18 LB
		12129	Brine Valve Label, 6-36 LB
		12632	Brine Valve Label, Minutes

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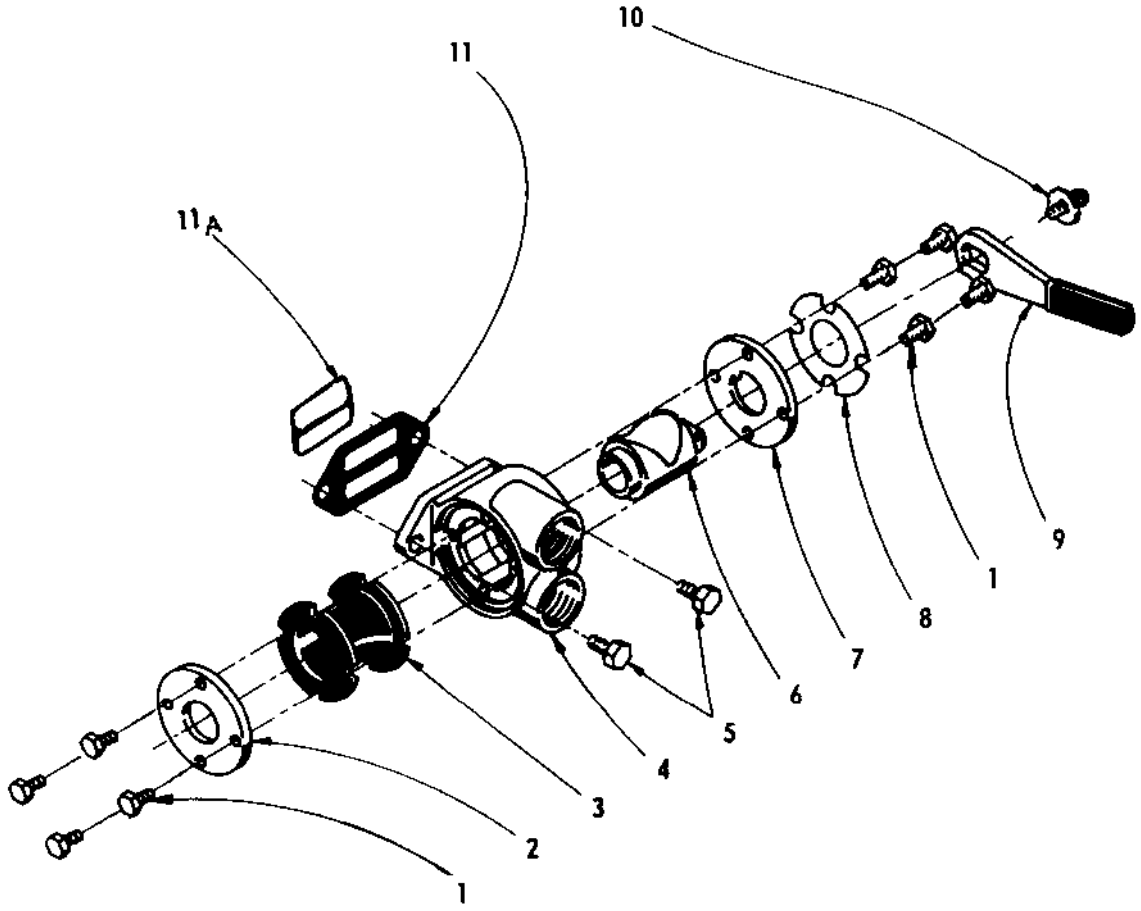
MODEL 3600

By-pass Valve Assembly

(See opposite page for parts list)



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MODEL 3600

By-pass Valve Assembly

Parts List

Item No.	Quantity	Part No.	Description
1	8	15727	Hex Head Machine Screw 10 - 24-1/2″
2	1	11986	Side Cover - By-Pass
3	1	11726	Seal - By-Pass
4	1	11678	Valve Body - By-Pass 3/4″ NPT
	1	11678NP	Valve Body - By-Pass 3/4″ NPT Nickel Plated
5	2	11224	Hex Head Cap Screw 5/16″ x 5/8″
6	1	11972	Plug - By-Pass
7	1	11978	Side Cover - By-Pass
8	1	11987	Valve Label - By-Pass
9	1	11979	Valve Lever - By-Pass
10	1	11989	Round Head Machine Screw 1/4″ - 14 x 1/2
11	1	18296	Seal By-Pass (Not Shown)
11A	1	11684	Gasket

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Common Service Assemblies

60031 Brine Valve Assembly
See Illustration Page 10

2 . . . . . 10329 . . . . . Fitting Nut
2 . . . . . 10330 . . . . . Delrin Sleeve
2 . . . . . 10332 . . . . . Insert Sleeve
1 . . . . . 11973 . . . . . Brine Valve Spring
1 . . . . . 11981-01 . . . . . Retaining Ring
1 . . . . . 11982 . . . . . O-Ring
1 . . . . . 11992 . . . . . Brine Valve Body
1 . . . . . 16098 . . . . . Plain Washer
1 . . . . . 12551-02 . . . . . Brine Valve Stem w/ Seat
1 . . . . . 12778 . . . . . Brine Valve Tube 3/8″

60042 By Pass Assembly - 3/4″ NPT

60042 NP By Pass Assembly - 3/4″ NPT Nickel

60046 By Pass Assembly - 3/4″ Sweat

60046 By Pass Assembly - 3/4″ Sweat Nickel
Includes All Items on Page 15

60123 Seal Kit
See Illustration Page 6

5 . . . . . 10545 . . . . . Piston Seal
2 . . . . . 10757 . . . . . End Spacer
4 . . . . . 11451 . . . . . Spacer

60071-12 24 Hour Gear Assembly - 12 Day
See Illustration Page 8

1 . . . . . 19207-03 . . . . . 24 Hour Gear Assembly - 12 Day
1 . . . . . 11491 . . . . . Main Bearing

60321 3600 Powerhead - 12 Day
Includes all parts on Page 8 except cover

60082 Injector Assembly Complete - Plastic

60083 Injector Assembly Complete - Brass
See Illustration Page 6

1 . . . . . 10227 . . . . . Injector Screen
1 . . . . . 11893 . . . . . Injector Cover - Plastic Body
10228 . . . . . Injector Cover - Brass Body
1 . . . . . 10229 . . . . . Injector Cover Gasket
1 . . . . . 17776 . . . . . Injector Body (Plastic)
11483 . . . . . Injector Body (Brass)
1 . . . . . 10328 . . . . . Elbow 1/4″ Pipe x 3/8″ Tube
2 . . . . . 10692 . . . . . Injector Body Screw
1 . . . . . 10913 . . . . . Injector Nozzle
1 . . . . . 10914 . . . . . Injector Throat
1 . . . . . 11475 . . . . . Injector Body Gasket
1 . . . . . 12360 . . . . . Air Disperser

60096-00 Piston Assembly - Standard

60096-10 Piston Assembly - Filter/Feeder

60096-20 Piston Assembly - Low Water
See Illustration Page 6

1 . . . . . 10696 . . . . . Piston Pin
1 . . . . . 60707 . . . . . End Plug Assembly
1 . . . . . 11943 . . . . . Piston Rod
1 . . . . . 12600 . . . . . Piston - Standard
12968 . . . . . Piston - Filter/Feeder
13260 . . . . . Piston - Low Water

60144 Skipper Wheel Assembly - 12 Day

60145 Skipper Wheel Assembly - 7 Day
See Illustration Page 10

1 . . . . . 19211-12 . . . . . Skipper Wheel - 12 Day
19211-07 . . . . . Skipper Wheel - 7 Day

60704 * Drain Line Flow Control Assembly - Brass

60705 * Drain Line Flow Control Assembly - Plastic
See Illustration Page 6

*Specify Flow Rate

1 . . . . . 11183 . . . . . O-Ring
1 . . . . . 11385-01 . . . . . D.L.F.C. Housing Plastic
11385-03 . . . . . D.L.F.C. Housing Brass
1 . . . . Flow Control Button

60513 Brine Valve Cam Assembly

1 . . . . . 11963 . . . . . Brine Cam
1 . . . . . 11967 . . . . . Cam Segment
1 . . . . . 11980 . . . . . Pan Head Machine Screw
1 . . . . . 12036 . . . . . Plain Washer
1 . . . . . 11988 . . . . . Brine Valve Cam Label 3-18 lb.
12129 . . . . . Brine Valve Cam Label 6-36 lb.

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Hot Water Conversion Parts

1	60097	Piston Assembly
1	60124	Seal Kit
1	10225	Injector Nozzle - Stainless Steel — Specify Size
1	10226	Injector Throat - Stainless Steel — Specify Size
1	11483	Injector Body - Brass
1	11475-02	Injector Body Gasket - Hot Water
1	10229-02	Injector Cover Gasket - Hot Water
1	12778-01	Poly Tubing - Hot Water
1	60704	Brass D.L.F.C. - Specify Flow Rate
1	14673	Distributor Pilot (For 3600 QC only) 13/16″
1	16435	Distributor Pilot 1″
1	60003	#500 Air Check Hot Water
1	11684-01	Gasket Hot Water (Bypass/Yoke)
1	14105	Bypass Seal 3/4″ Hot Water
	14106	Bypass Seal 1″ Hot Water

Backwash Filter Conversion Parts

1	60096-10	Filter Piston Assembly
1	11893	Flat Injector Cap
2	15137	Injector Screws
1	11475	Injector Cover Gasket

Items Not Needed for Backwash Filter

1	10229	Injector Cover Gasket
2	10692	Injector Body Screw
1	10228	Injector Cover
1	10227	Injector Screen
1	10913	Injector Nozzle
1	10914	Injector Throat
1	10283	Injector Body Plastic
1	12360	Injector Air Disperser
1	60096-00	Standard Piston Assy.

All Items on Page 13
(Brine Valve Assembly)

*Flow Control Buttons

12085 - 1.2GPM	12090 - 3.5 GPM
12086 - 1.5GPM	12091 - 4.0 GPM
12087 - 2.0 GPM	12092 - 5.0 GPM
12088 - 2.4 GPM	
12089 - 3.0 GPM	

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A. TO REPLACE TIME BRINE VALVE

1. Unplug electrical cord from outlet.
2. a. If the conditioner installation has a “three-valve” by-pass system, first open the valve in the bypass line, then close the valve at the conditioner inlet and the valve at conditioner outlet
   b. If the conditioner has an integral by-pass valve, put it in the by-pass position.
   c. If there is only a shut-oft valve near conditioner inlet, close it.
3. Remove control cover.
4. Relieve water pressure in conditioner by putting in backwash position momentarily. Return valve to service position.
5. Disconnect brine tube at inlet and outlet of brine valve.
6. To remove brine valve, unscrew fitting on bottom of mounting plate while holding valve body on top of mounting plate to keep from turning. The valve will now come free from the mounting plate.
7. To install new valve, put O-ring onto valve body from bottom after it has been inserted through mounting plate. Make sure O-ring seats properly as bottom fitting is tightened.
8. Reconnect brine tubing.
9. Return by-pass or inlet valving to normal service position. Water pressure should now be applied to conditioner, and any by-pass line shut off.
10. Plug electrical cord back in.
11. Reset time of day, and cycle control valve manually to assure proper function. Make sure control valve is in service position.
12. Make sure there is enough brine in brine tank Start regeneration cycle manually if water is hard.
13. Replace control cover.

B. TO REPLACE TIMER

1. Unplug electrical cord from outlet
2. a If the conditioner installation has a three-valve by-pass system, first open the valve in the bypass line, then close the valve at the conditioner inlet and the valve at conditioner outlet.
   b. If the conditioner has an integral by-pass valve, put it in the by-pass position.
   c. If there is only a shut-off valve near conditioner inlet, close it.
3. Remove control cover.
4. Relieve water pressure in conditioner by putting in backwash position momentarily. Return valve to service position.
5. Remove time brine valve in accordance with section A. “To Remove Time Brine Valve”, Steps 5 and 6.
6. Pull out drive link pin with pliers. Remove large nut that holds mounting plate onto valve. The entire timer assembly on the mounting plate will now lift straight up.
7. Put new timer onto threaded stud at top of valve, and fasten with the large nut Press drive link pin back in place. If necessary to realign link pin, link and piston rod, rotate knob at back of timer.
8. Replace brine valve in accordance with section A, steps 7 and 8.
9. Return by-pass or inlet valving to normal service position. Water pressure should now be applied to conditioner, and any by-pass line shut off.
10. Plug electrical cord back in.
    a Reset time of day, days of regeneration and time of regeneration.
    b. Reset salt usage. Cycle control valve manually to assure proper function.
    c. Make sure control valve is left in the service position.
11. Make sure there is enough brine in brine tank. Start regeneration cycle manually if water is hard.
12. Replace control cover.

C. TO REPLACE PISTON ASSEMBLY

1. Unplug electrical cord from outlet
2. a. If the conditioner installation has a “three-valve” by-pass system, first open the valve in the bypass line, then close the valve at the conditioner inlet and the valve at conditioner outlet.
   b. If the conditioner has an integral by-pass valve, put it in the bypass position.
   c. If there is only a shut-off valve near conditioner inlet, close it.
3. Remove control cover.
4. Relieve water pressure in conditioner by putting in backwash position momentarily. Return valve to service position.
5. Disconnect brine line at injector housing.
6. Pull out drive link pin with pliers. Remove large nut that holds mounting plate onto valve. The entire timer assembly on the mounting plate will now lift straight up with the brine valve on it
7. Unscrew valve end plug with wrench. When end plug is loose, pull upward on end of piston rod grasping carefully with pliers until assembly is out of valve.
8. Inspect the inside of the valve to make sure that all spacers and seals are in place, and that there is no

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foreign matter that would interfere with valve operation.

9. Take new piston assembly as furnished and push piston into valve by means of the end plug. Tighten end plug with a wrench.
10. Put timer back onto threaded stud on top of valve and tighten mounting panel nut. Reinsert the drive link pin. If necessary to realign link pin, link and piston rod, rotate knob at back of timer.
11. Reconnect brine line to injector housing.
12. Return by-pass or inlet valving to normal service position. Water pressure should now be applied to conditioner, and any by-pass line shut off.
13. Plug electrical cord back in.
14. Reset time of day, and cycle control valve manually to assure proper function. Make sure control valve is in service position.
15. Replace control cover.
16. Make sure there is enough brine in brine tank. Start regeneration cycle manually if water is hard.
17. Replace control cover.

D. TO REPLACE SEALS AND SPACERS

1. Unplug electrical cord from outlet
2. a. If the conditioner installation has a three valve by-pass system, first open the valve in the bypass line, then close the valve at the conditioner inlet and the valve at conditioner outlet
   b. If the conditioner has an integral by-pass valve put it in the by-pass position.
   c. If there is only a shut-off valve near conditioner inlet - close it
3. Remove control cover.
4. Relieve water pressure in conditioner by putting in backwash position momentarily. Return valve to service position.
5. Remove brine valve, timer, and piston assembly by following steps 5 through 7 of Section C, "To Replace Piston Assembly."
6. Remove the end spacer with your fingers.
7. Remove the first seal using the wire hook with the finger loop.
8. The spacer tool (Use only for removing the spacers) has three retractable pins, retained by a rubber ring, at one end. They are retracted or pushed out by pulling or pushing the center button on the opposite end.
9. Insert the pin end of the spacer tool into the valve body with the pins retracted (button pulled back). Push the tool tight against the spacer and push the button in. When the button is pushed in, the pins are pushed out to engage the holes in the spacer. Remove the tool from valve body. The spacer will be on the end. Pull the center button back, the pins will be retracted and the spacer can be removed from the spacer tool.
10. Alternately remove the remaining seals and spacers in accordance with steps No. 7 and 9.
11. The last end spacer does not have any holes for the pins of the spacer tool to engage. Use the wire hook with finger loop to remove.
12. To replace seals, spacers and end rings use special tool with the brass sleeve on one end. This is a **double**-purpose tool. The male end acts as a pilot to hold the spacers as they are pushed into the valve body and the brass female end is used to insert the seals into the valve body.
13. To restuff a valve first take the end ring then, with your thumb press the button on the brass sleeve end. Inner portion of tool is now exposed. Place the end ring on this pilot with the lip on the end ring facing the tool and push the tool into the valve body bore until it bottoms. While tool is in the valve body take a seal and press it into the inside diameter of the exposed brass female end.
14. Remove the tool, turn it end for end and insert it into the valve body bore. While holding the large dia. of the tool, slide it all the way into the valve body bore until it bottoms, then push the center button to push the seal out of the tool and leave it in place in the valve body.
15. Remove the tool from the valve body and push the center on the brass female end to expose the pilot on the opposite end. Place a spacer on this end and insert the spacer and tool into the valve. While the tool is still in the valve, press another seal into the inside diameter of the exposed brass sleeve end.
16. Alternately repeat steps No. 14 and 15 until all seals and spacers have been pushed into the valve.
17. Replace top end spacer by hand, with lip on spacer down.
18. Replace brine valve, timer and piston in accordance with steps 8 through 11 of Section C.
19. Return by-pass or inlet valving to normal service position. Water pressure should now be applied to conditioner, and any by-pass line shut off.
20. Plug electrical cord back in.
21. Reset time of day, and cycle control valve manually to assure proper function. Make sure control valve is left in service position.
22. Make sure there is enough brine in brine tank. Start regeneration cycle manually if water is hard.
23. Replace control cover.

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E. TO REPLACE INJECTORS AND SCREEN

1. Unplug electrical cord from outlet
2. a If the conditioner installation has a "three-valve" by-pass system, first open the valve in the by-pass line, then close the valve at the conditioner inlet and the valve at conditioner outlet
   b. If the conditioner has an integral by-pass valve, put it in the by-pass position.
   c. If there is only a shut-off valve near conditioner inlet, close it
3. Remove control cover.
4. Relieve water pressure in conditioner by putting in backwash position momentarily. Return valve to service position.
5. Disconnect brine line from injector housing.
6. Remove two injector housing mounting screws. The cap, housing and two gaskets will come apart.
7. Remove screen from injector housing. Unscrew injector nozzle and throat from housing.
8. Screw in new injector nozzle and throat until they are tight. Place a new screen in injector housing.
9. Insert screws through injector cap, top gasket, injector housing, and bottom gasket in that order. Place this assembly against valve and tighten screws.
10. Reconnect brine line.
11. Return by-pass or inlet valving to normal service position. Water pressure should now be applied to conditioner, and any by-pass line shut off.
12. Plug electrical cord back in.
13. Reset time of day, and cycle control valve manually to assure proper function. Make sure control valve is in service position.
14. Make sure there is enough brine in brine tank. Start regeneration cycle manually if water is hard.
15. Replace control cover.

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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.	A. 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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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.	E. 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.	A. 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.

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Notes

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