

MODEL 3900

Service Manual



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

MODEL 3900

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

- 1) Type of Timer (see pages 19, 20, & 21)
- A) 7 day or 12 day
 - B) * 3,750 to 63,750 gallon meter or
* 18,750 to 318,750 gallon meter or
* Other _____
 - C) Meter Wiring Package
 - 1) System #4 - 1 tank; 1 meter; immediate or delayed regeneration
 - 2) System #5 - 2 tanks; 2 meters; interlock
 - 3) System #6 - 2 tanks; 1 meter; series regeneration
 - 4) System #7 - 2 tanks; 1 meter; alternator
- 2) Timer Program Settings
- A) Backwash _____ min
 - B) Brine & Slow Rinse _____ min
 - C) Rapid Rinse _____ min
 - D) Brine Tank Refill _____ min
- 3) Drain Line Flow Controller _____ gpm
- 4) Brine Line Flow Controller _____ gpm
- 5) Injector Size # _____
- 6) A) Hard Water By-Pass
B) No Hard Water By-Pass

MODEL 3900

General Commercial Pre-Installation Check List

WATER PRESSURE: A minimum of 25 pounds of water pressure is required for regeneration valve to operate effectively.

ELECTRICAL FACILITIES: A continuous 115 volt, 60 Hertz current supply is required. (Other voltages available.) Make certain the current supply is always hot and cannot be turned off with another switch.

EXISTING PLUMBING: Condition of existing plumbing should be free from lime and iron buildup. Piping that is built up heavily with lime and/or iron should be replaced. If piping is clogged with iron, a separate iron filter unit should be installed ahead of the water softener.

LOCATION OF SOFTENER AND DRAIN: The softener should be located close to a drain.

BY-PASS VALVES: Always provide for the installation of a by-pass valve.

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

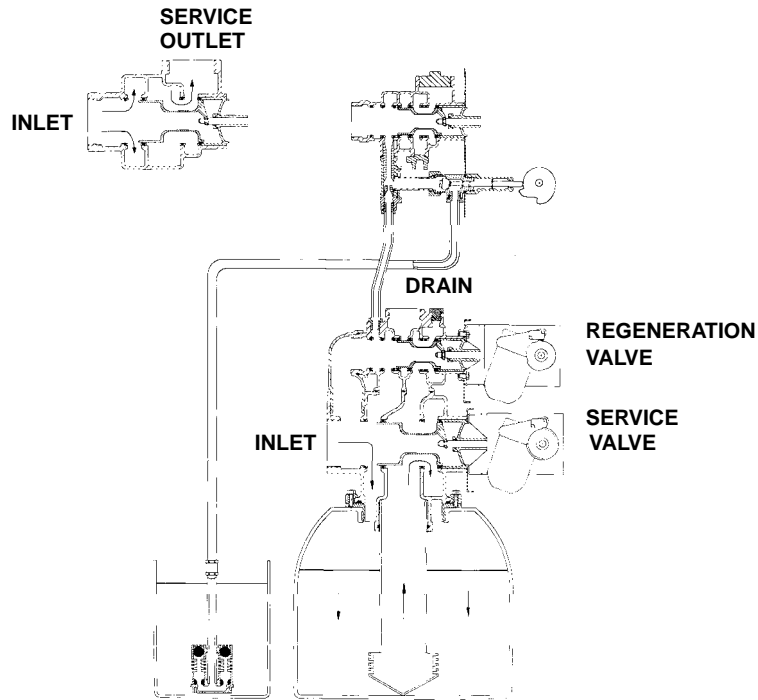
INSTALLATION INSTRUCTIONS

1. Place the softener tank where you want to install the unit making sure the unit is level and on a firm base. (Maximum 7 feet apart for twin units.) To provide for expansion and contraction of plastic resin tanks and rigid plumbing loads, use FLEXIBLE FITTINGS at the valve.
2. All plumbing should be done in accordance with local plumbing codes. The pipe size for the drain line should be the same size as the drain line flow control connection. Water meters are to be installed on soft water outlets. Twin units with (1) one meter shall be installed on common soft water outlet of units.
3. Make sure that the floor is clean beneath the salt storage tank and that it is level.
4. Place approximately 1" of water above the grid plate (if used) in your salt tank. Salt may be placed in the unit at this time.
5. Place in by-pass position. Turn on the main water supply. Open a cold soft water tap nearby and let run a few minutes or until the system is free from foreign material (usually solder) that may have resulted from the installation.
6. Place the by-pass in service position.
7. Manually index the softener control into "service" position and let water flow into the mineral tank. When water flow stops, close inlet valve, place control in "backwash" position to relieve head of air, then gradually open inlet valve to purge remaining air in tank. Return control to "service" position.
8. Electrical: All electrical connections must be connected according to codes. Use electrical conduit if applicable. Plug into power supply.

MODEL 3900

Water Conditioner Flow Diagrams

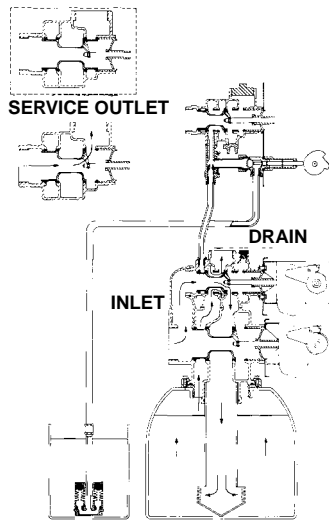
1 SERVICE POSITION



Hard water enters at valve inlet and flows down thru mineral to the bottom distributor. Conditioned water flows up thru the distributor tube, around the piston and out the outlet.

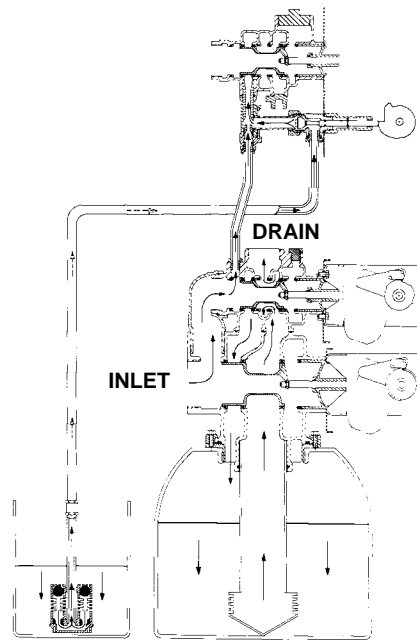
2 BACKWASH POSITION

NO HARD WATER BY-PASS



Hard water enters at valve inlet — flows thru service adapter piston for by-pass, and up thru coupling to regeneration valve inlet. Flow continues thru the regeneration valve piston — down the distributor tube — thru the bottom distributor and up thru the mineral — around the piston and out the drain. If optional no hard water by-pass piston is used, water flow to service outlet is prevented by an extension on the service outlet until the end of the rapid rinse cycle or brine tank refill cycle, depending on options chosen.

3 BRINE POSITION

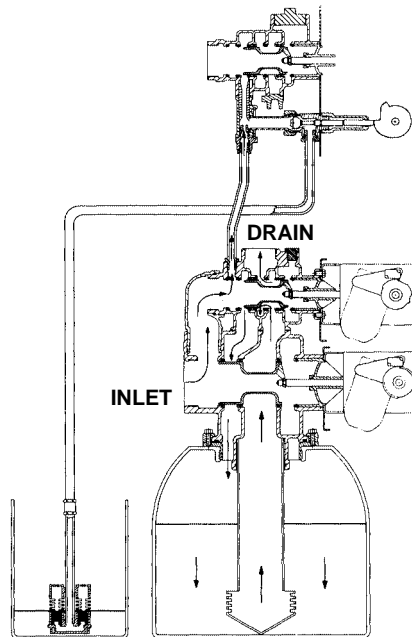


Hard water enters at valve inlet — flows thru injector nozzle and throat to draw brine from the brine tank. Brine flows down thru the mineral — into the bottom distributor — up the distributor tube — around the piston and out the drain.

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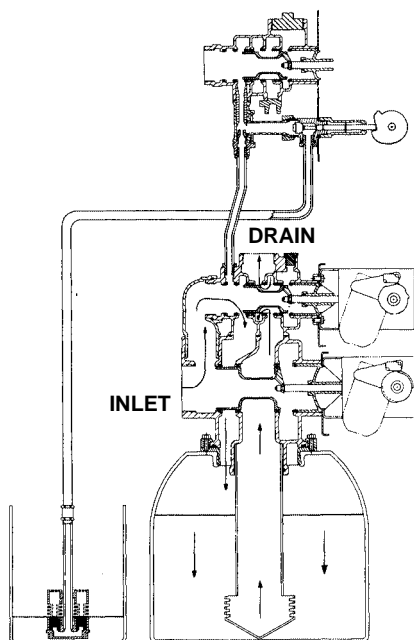
Water Conditioner Flow Diagrams (Cont'd.)

4 SLOW RINSE POSITION



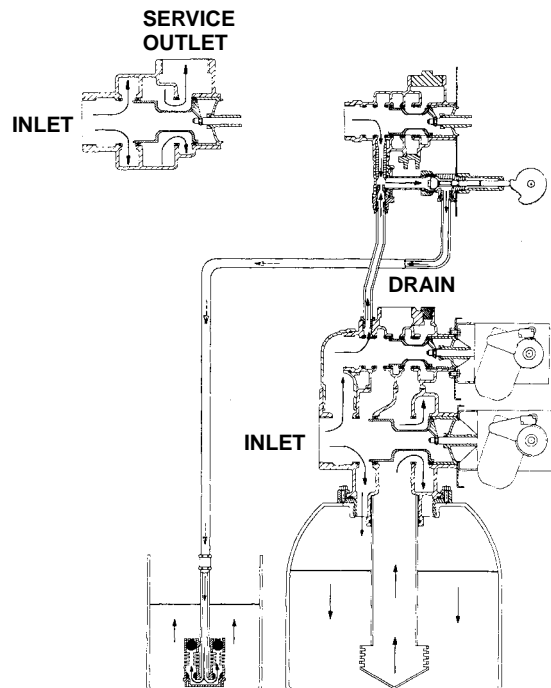
Hard water enters at valve inlet — flows thru injector nozzle and throat — down thru the mineral — into the bottom distributor — up the distributor tube — around the piston and out the drain..

5 RAPID RINSE POSITION



Hard water enters at valve inlet — flows thru the regeneration valve directly down thru the mineral — into the bottom distributor — up the distributor tube — around the piston and out the drain.

6 BRINE TANK REFILL POSITION

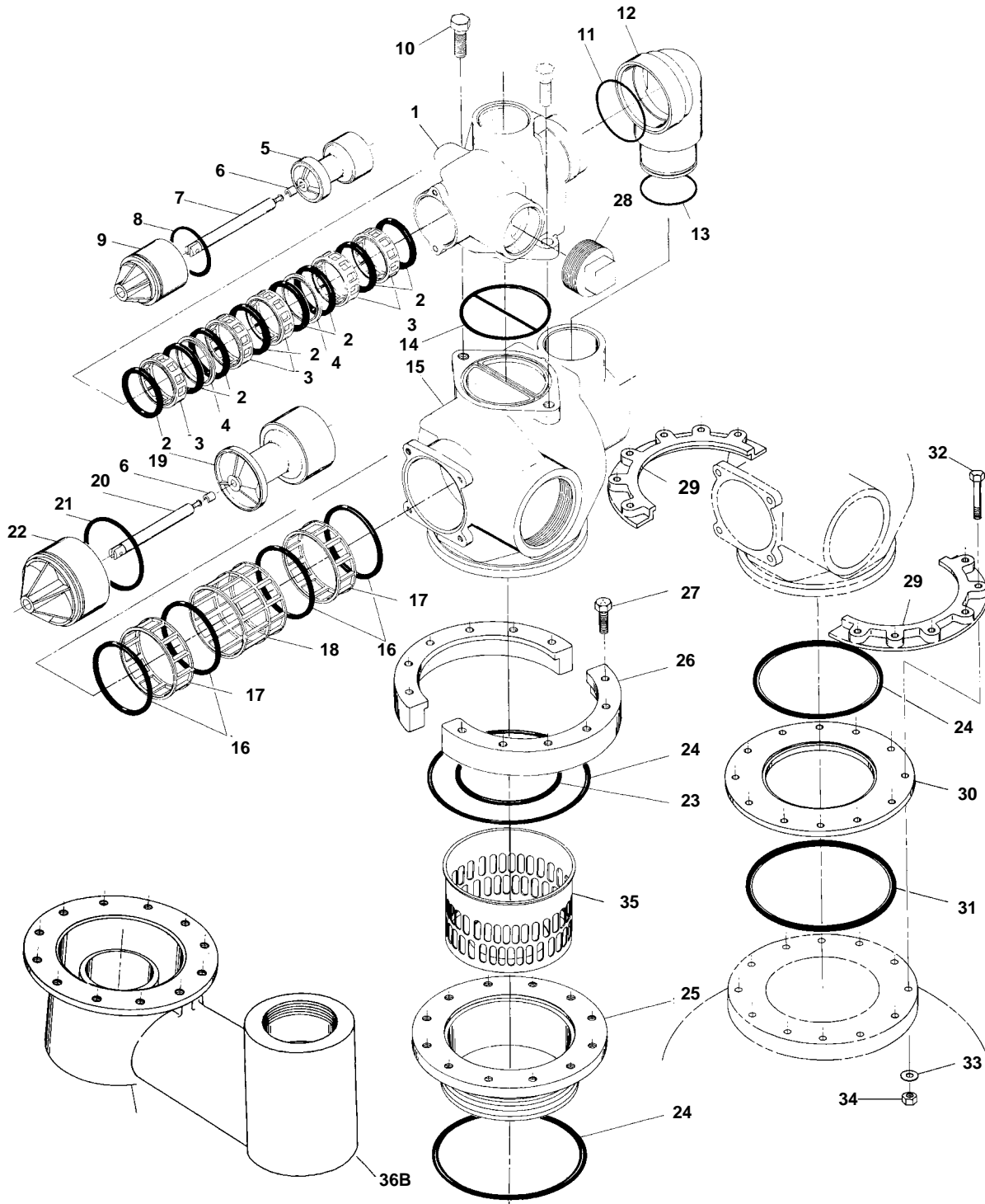


Hard water enters at valve inlet — flows thru nozzle and thru throat to brine valve to refill the brine tank. Inlet flow also continues down thru mineral to the bottom distributor. Conditioned water flows up thru the distributor tube, around the piston and out the outlet. Note: An option is available to keep service valve in by-pass position until the end of brine tank refill cycle.

MODEL 3900

Control Valve

(see opposite page for parts list)



MODEL 3900

Control Valve

Parts List

Item No.	Quantity	Part No.	Description
1.	1	15114	Valve Body
2.	8	11720	Seal
	8	11720-02	Seal, Silicone
3.	5	10369	Spacer - Port
4.	2	10368	Spacer
		10368-01	Spacer, Hot Water
5.	1	16130	Piston
6.	2	14818	Clip - Piston Rod
7.	1	15125	Piston Rod
8.	1	14922	O-Ring -035
9.	1	16398-01	End Plug Assembly
10.	2	40118	Screw - Hex Hd.
11.	1	16078	O-Ring - 149
12.	1	16074	Coupling
13.	1	16077	O-Ring - 140
14.	1	15112	Seal
15.	1	16067-02	3" Adapter Body
16.	4	16068	Seal
	4	16068-02	Seal, Silicone
17.	2	16069	Spacer - Narrow
	2	16069-01	Spacer - Narrow, Hot Water
18.	1	16070	Spacer - Wide
	1	16070-01	Spacer - Wide, Hot Water
19.	1	16071	Piston
	1	16082	Piston - No Hard Water By-Pass
20.	1	16072	Piston Rod
21.	1	16076	O-Ring - 042
22.	1	16399-01	End Plug Assy - White
	1	16399-11	End Plug Assy - Black, NHWB-P
	1	19901	End Plug Assy - Brass, Hot Water
23.	1	16800	O-Ring - 238
24.	2	16345	O-Ring - 362
25.	1	16255	Tank Adapter - 6" -8
	1	16256	Welded Flange
26.	2	16257	Flange Segment
27.	12	11238	Screw - Hex Hd.
28.	1	16088	Pipe Plug - 2" NPT
35.	1	16258	Flow Disperser

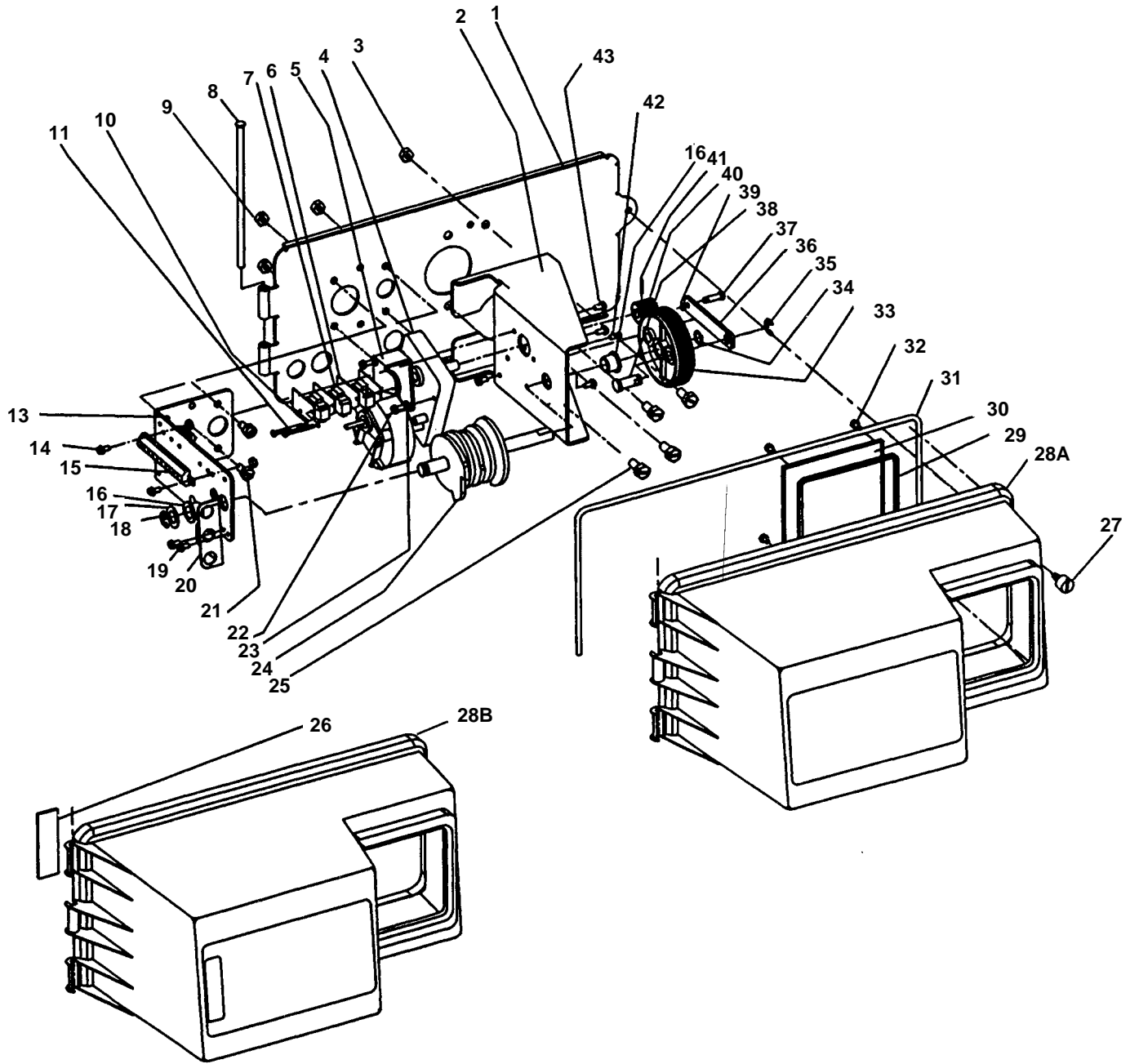
Options

29.	2	16482	Flange Segment
30.	1	16483	Flange Ring
31.	1	16484	O-Ring -442
32.	12	16517	Screw, Park Tank
	12	19592	Screw, Structural Tank
33.	12	18619	Washer
34.	12	16346	Nut
35.	1	19608-20	Disperser (Upper)
36B	1	18584	Adapter, Side Mount

MODEL 3900

Control Drive Assembly

(see opposite page for parts list)



MODEL 3900

Control Drive Assembly

Parts List

Item No.	Quantity	Part No.	Description
1.	1	19304-00	.Back Plate -01, -02
2.	1	15120-01	.Bracket - Motor Mounting
3.	2	16346	.Nut - 5/16 - 18
4.	1	16044	.Drive Motor - 115 V. 60 Hz.
		16500	.Drive Motor - 220 V. 50 Hz.
		16501	.Drive Motor - 24 V. 60 Hz.
5.	1	17797	.Bracket - Switch Mounting
6.	4	10302	.Insulator - Switch
7.	3	10218	.Switch
8.	1	17845-03	.Pin, Hinge
9.	4	11235	.Nut, 1/4 - 20
10.	2	13365	.Lockwasher
11.	2	12624	.Screw - Pan Hd.
13.	1	16053	.Bracket - Brine Side
14.	2	40133	.Screw - Round Hd.
15.	1	15226-*	.Terminal Block
16.	2	16052	.Bushing
17.	1	16059	.Washer
18.	1	16051	.Retaining Ring - Bowed "E"
•19	2	10300	.Screw - Hex - Hex Hd Thread Cutting
•20	1	19317	.Light Bracket
21.	4	10231	.Screw - Hex Hd.
22.	2	17567	.Screw - Hex Hd.
23.	2	12288	.Washer, Lock, #8 Internal
24.	1	16494-05	.Cam Assembly - Service After RR
	1	16494-03	.Cam Assembly - Service After Brine Refill
25.	4	11224	.Screw - Hex Hd.
•26	1	19319	.Lamp Window
27.	1	18744	.Screw
28A	1	19277-020	.Cover, Black
•28B	1	19277-021	.Cover, Lamp Window
29.	1	18615-02	.Seal, Window
30.	1	18745	.Window
31.	1	18716-03	.Seal, Cover
32.	4	19203	.Screw
33.	1	16046	.Drive Gear
34.	1	16050	.Retaining Ring
35.	1	11774	.Retaining Ring "E"
36.	1	16047	.Drive Link
37.	1	11709	.Pin - Drive Link
38.	1	16048	.Bearing - Drive Link
39.	1	11898	.Clip
40.	1	16045	.Drive Pinion
41.	1	11381	.Roll Pin
42.	1	11080	.Screw - Flat Hd.
43.	3	10872	.Screw - Hex Hd.
44.	1		.Timer - (not shown) [3000, 3200, 3210, 3200E, 3200ET]
45.	1	40084-07	.Power Cord, 120V, 7 Ft. (not shown)
	1	40084-12	.Power Cord, 120V, 12 Ft. (not shown)
	1	40085-07	.Power Cord, 240V, 7 Ft. (not shown)
46.	1	17967	.Strain Relief (not shown)
47.	1	16430	.Harness (not shown)
48.	1	19691	.Hole Plug - 3/4 Dia. (not shown)
49.	1	19591	.Hole Plug - 7/8 Dia. (not shown)
50.	1	16427-04	.Motor Lead Wire (not shown)
51.	1	16384	.Wire Harness (not shown)
52.	1	14924	.Strain Relief (not shown)
53.	1	15513	.Meter Cable (not shown)
54.	2	15250	.Label - Terminal Strip (not shown)
55.	1	16821	.Cable Guide Assembly (not shown)

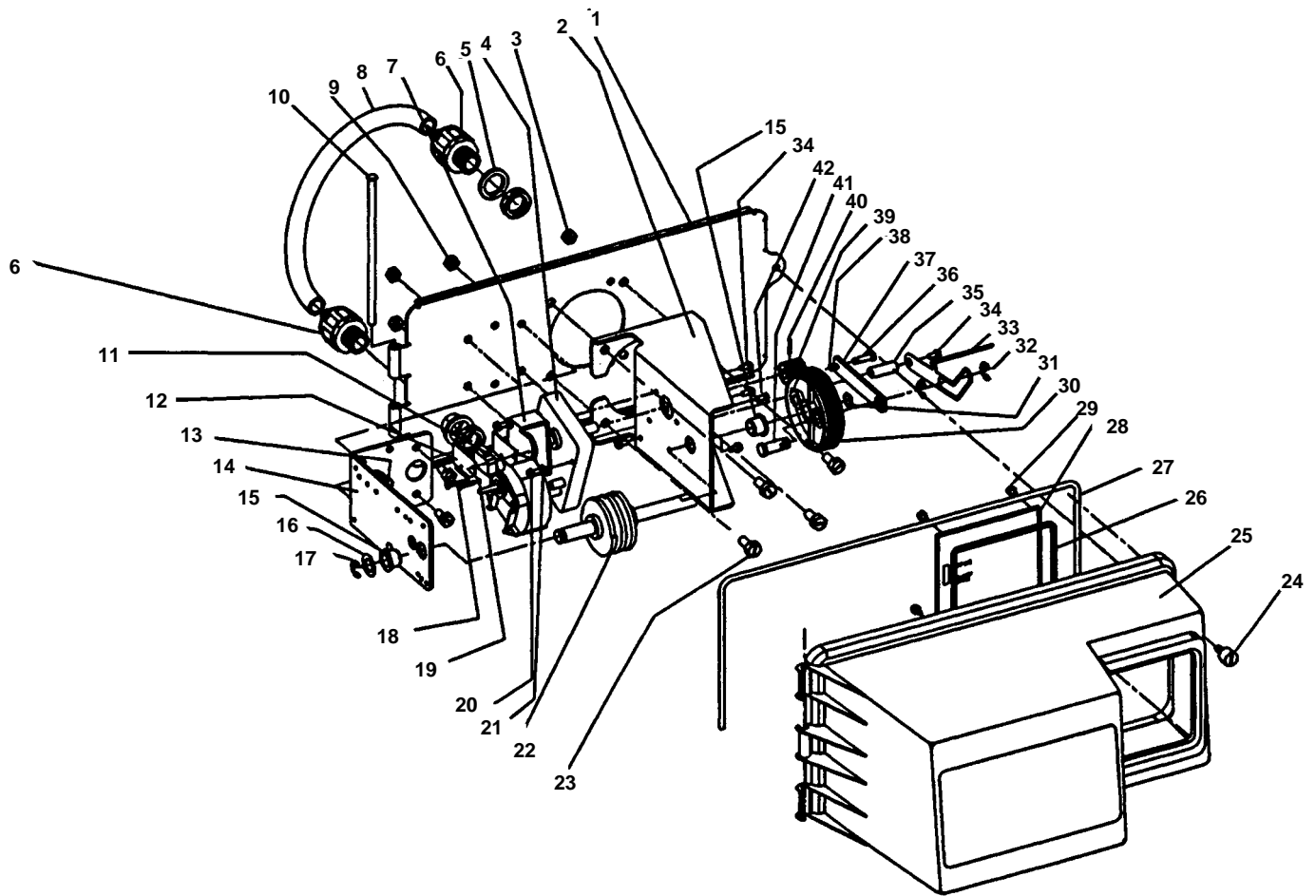
*Specify number of terminals

• Optional Parts for Lamp Package

MODEL 3900

Adapter Control Drive

(see opposite page for parts list)



MODEL 3900

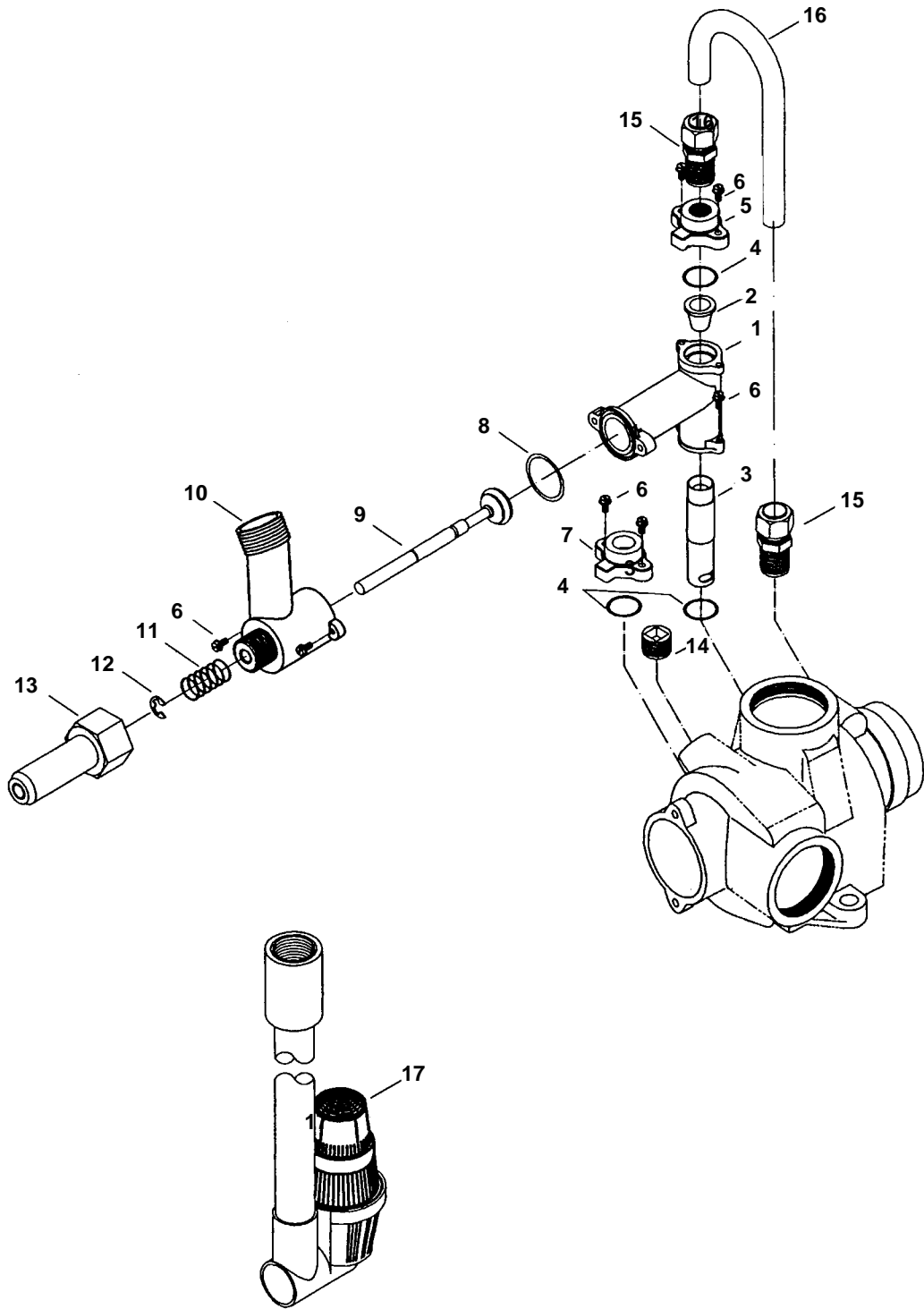
Adapter Control Drive

Parts List

Item No.	Quantity	Part No.	Description
1	1	19305	Back Plate
2	1	16086	Bracket - Motor Mounting
3	2	16346	Nut
4	1	16044	Drive Motor - 115 V. 60 Hz.
		16500	Drive Motor - 220 V. 50 Hz.
		16501	Drive Motor - 24 V. 60 Hz.
5	2	18692	Washer, Sealing
6	2	18691	Connector, Conduit
7	1	17797	Bracket - Switch Mounting
8	1	18693	Conduit, Interdrive
9	4	11235	Nut, 1/4-20
10	1	17845-03	Pin, Hinge
11	1	10218	Switch
12	2	10302	Insulator - Switch
13	4	10231	Screw - Hex Hd.
14	1	16053	Bracket - Brine Side
15	2	16052	Bushing
16	1	16059	Washer
17	1	16051	Retaining Ring - Bowed "E"
18	2	11805	Screw - Pan Hd.
19	2	13365	Lockwasher
20	2	17567	Screw - Hex Hd.
21	2	12288	Washer, Lock, Internal #8
22	1	16495	Cam Assembly
23	4	11224	Screw - Hex Hd.
24	1	18744	Screw, Cover
25	1	19277-020	Cover, Black
26	1	18615-02	Seal, Window
27	1	18716-03	Seal, Cover
28	1	19316	Window, Indicator
29	4	19203	Screw, Window
30	1	16046	Drive Gear
31	1	16050	Retaining Ring
32	2	11774	Retaining Ring - "E"
33	1	19315	Indicator
34	4	10872	Screw - Hex Hd.
35	1	18726	Space, Indicator
36	1	11709	Pin - Drive Link
37	1	16047	Drive Link
38	1	11898	Clip
39	1	16045	Drive Pinion
40	1	11381	Roll Pin
41	1	16048-01	Bearing - Drive Link
42	2	11080	Screw - Flat Hd.
43	1	19015	Wire Harness (not shown)

MODEL 3900

1800 Brine System



MODEL 3900

Brine System

Parts List

Item No.	Quantity	Part No.	Description
1	1	16340	Injector Body
2	1	15128*	Injector Nozzle
3	1	15127*	Injector Throat
4	3	15246	O-Ring - 116
5	1	16341-01	Injector Cover
6	8	12473	Screw - Hex Hd.
	8	19677	Screw - Hex Hd. (Metric)
7	1	16341-02	Cover
8	1	18879	O-Ring - 021
9	1	16497-01	Brine Stem Assembly
10	1	18713	Brine Valve Body
11	1	11772	Spring
12	1	11774	Retaining Ring
13	1	16498-01	Stem Guide Assembly
14	1	16387	Pipe Plug - 1/2 NPT
15	2	18702	Tube Fitting - Straight
16	1	18703	Brine Tube
17	1	60009	#900 Commercial Air Check
	1	60009-01	#900 Commercial Air Check Hot Water
18	1		Flow Control - Specify Flow Rate - Not Shown

* Specific Size

Option Without Brine Valve

1	16605	Retainer Plate
1	16620	Fitting - Brine Tank
1	18879	O-Ring, 021

Delete: Items 9 thru 16

Injector Throat

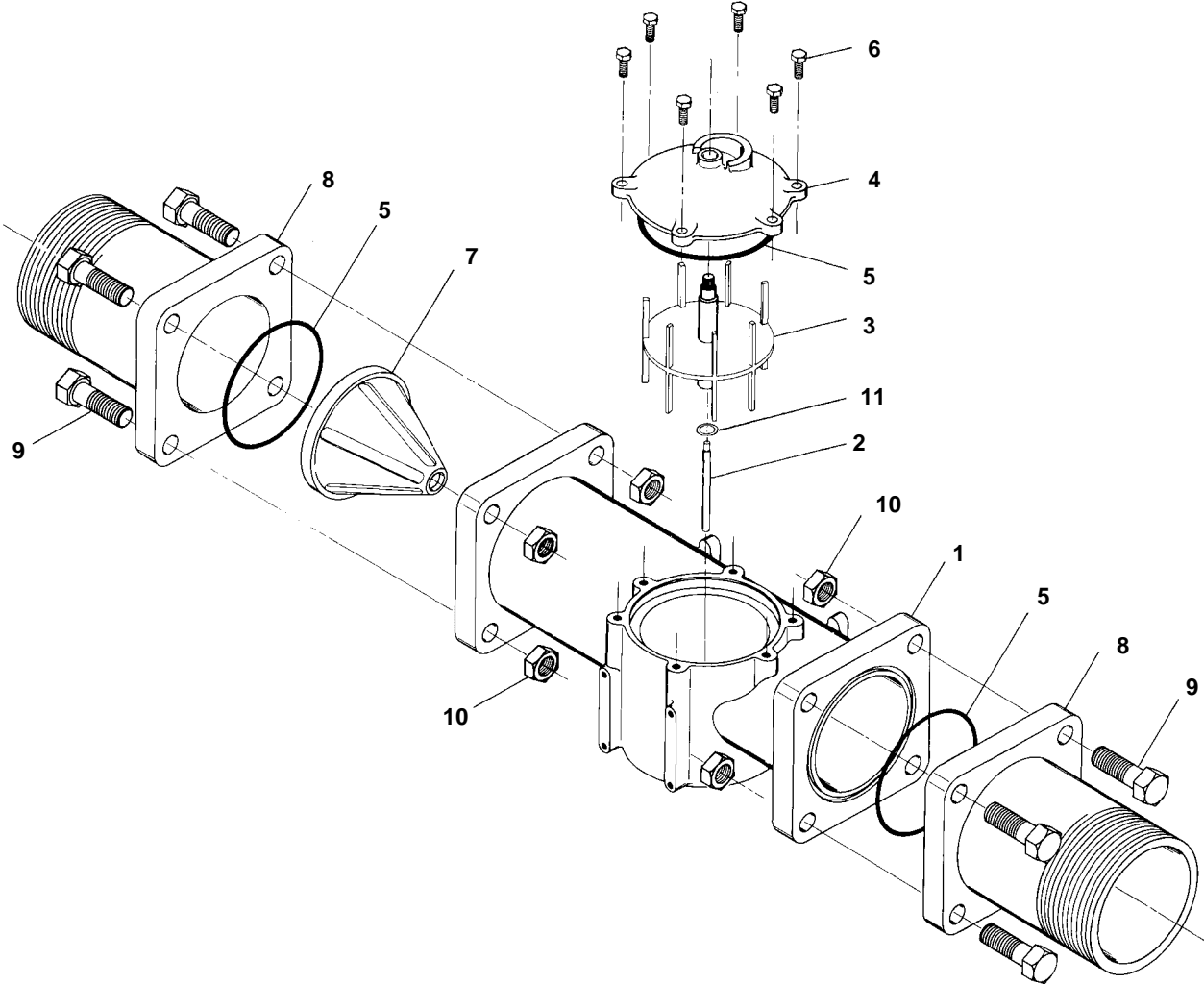
15127-04	#4	Green
15127-05	#5	Red
15127-06	#6	White
15127-07	#7	Blue
15127-08	#8	Yellow
15127-09	#9	Violet
15127-10	#10	Black

Injector Nozzle

	Size	Color
15128-04	#4	Green
15128-05	#5	Red
15128-06	#6	White
15128-07	#7	Blue
15128-08	#8	Yellow
15128-09	#9	Violet
15128-10	#10	Black

MODEL 3900

3" Meter Assembly



MODEL 3900

3" Meter Assembly

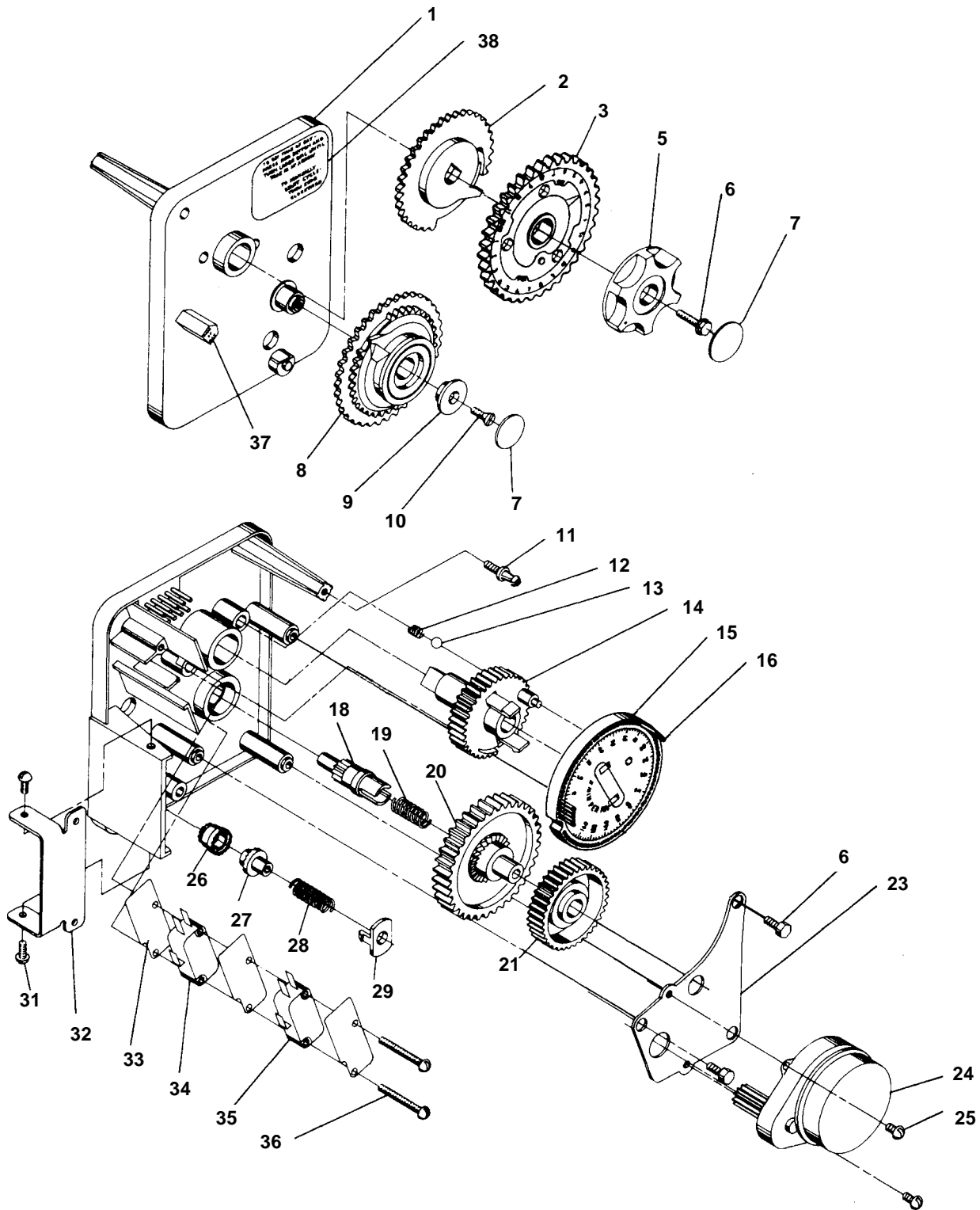
Parts List

Item No.	Quantity	Part No.	Description
1.....	1	16254	Meter Body
2.....	1	16279	Impeller Shaft
3.....	1	16575	Impeller Assembly
4.....	1	16400	Meter Cover Assembly - Std.
	1	16401	Meter Cover Assembly - Ext. Range
5.....	3	15707	O-Ring - 236
6.....	6	12112	Screw - Hex Hd.
	6	15886	Screw - Hex Hd. (Metric)
7.....	1	16280	Flow Straightener
8.....	2	16328	Connecting Flange
9.....	8	40118	Screw - Hex Hd.
	8	17122	Screw - Hex Hd. (Metric)
10	8	16386	Nut - 1/2-13
11	1	16574	Stainless Steel Washer

MODEL 3210 ECONOMINDER™

Timer Assembly

(see opposite page for parts list)



MODEL 3900

Timer Assembly

Parts List

Item No.	Quantity	Part No.	Description
1	1	13870-01	Timer Housing Assembly
2	1	13802	Cycle Actuator Gear
3	1	40096-27	24 Hour Gear Assy, 12 Midnight
		40096-02	24 Hour Gear Assy, 2 AM
5	1	13886-01	Knob
6	4	13296	Screw - Timer Knob & Motor Plate Mtg.
7	2	11999	Button Decal
8	1	60405-80	Program Wheel Assembly - 0-63, 750
9	1	13806	Program Wheel Retainer
10	1	13748	Screw - Program Wheel Mtg.
11	1	14265	Spring Clip
12	1	15424	Spring - Detent
13	1	15066	Ball - 1/4" Dia.
14	1	13911	Main Drive Gear
15	1	19210	Program Wheel
16	21	15493	Roll Pin
18	1	13018	Idler Shaft
19	1	13312	Spring - Idler
20	1	13017	Idler Gear
21	1	13164	Drive Gear
23	1	13887	Motor Mounting Plate
24	1	18743	Motor - 110V., 60 Hz.
		19659	Motor - 24V., 60 Hz.
25	2	13278	Screw - Motor Mounting
26	1	13830	Drive Pinion - Program Wheel
27	1	13831	Clutch - Drive Pinion
28	1	14276	Spring
29	1	14253	Spring Retainer
30			Not Assigned
31	3	11384	Screw - Timer Hinge & Ground Wire
32	1	13881	Hinge Bracket
33	3	14087	Insulator
34	1	10896	Switch
35	1	15320	Switch
36	2	11413	Screw - Switch Mounting
37	1	14007	Decal - Time of Day
38	1	14045	Decal - Instructions
39	1	13902	Harness - Not Shown
40	2	12681	Wire Connector - Not Shown
41	1	15354-01	Ground Wire - Not Shown

MODEL 3200 TIMER

Timer Setting Procedure

How To Set Days On Which Water Conditioner Is To Regenerate:

Rotate the skipper wheel until the number "1" is at the red pointer. Set the days that regeneration is to occur by sliding tabs on the skipper wheel outward to expose trip fingers. Each tab is one day. Finger at red pointer is tonight. Moving clockwise from the red pointer, extend or retract fingers to obtain the desired regeneration schedule.

How To Set The Time Of Day:

Press and hold the red button in to disengage the drive gear.

Turn the large gear until the actual time of day is at the time of day pointer.

Release the red button to again engage the drive gear.

How To Manually Regenerate Your Water Conditioner At Any Time:

Turn the manual regeneration knob clockwise.

This slight movement of the manual regeneration knob engages the program wheel and starts the regeneration program.

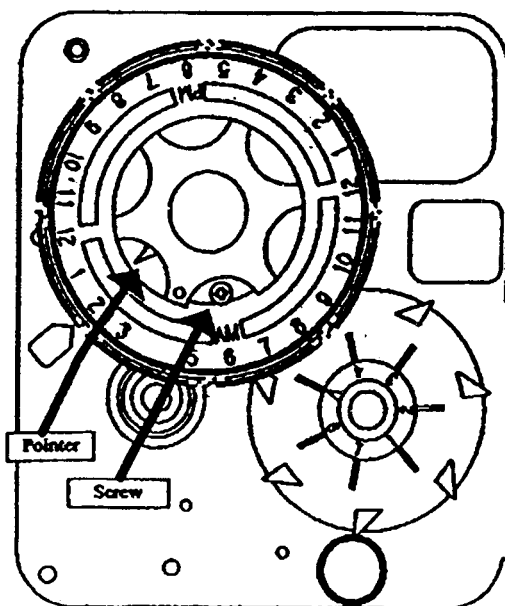
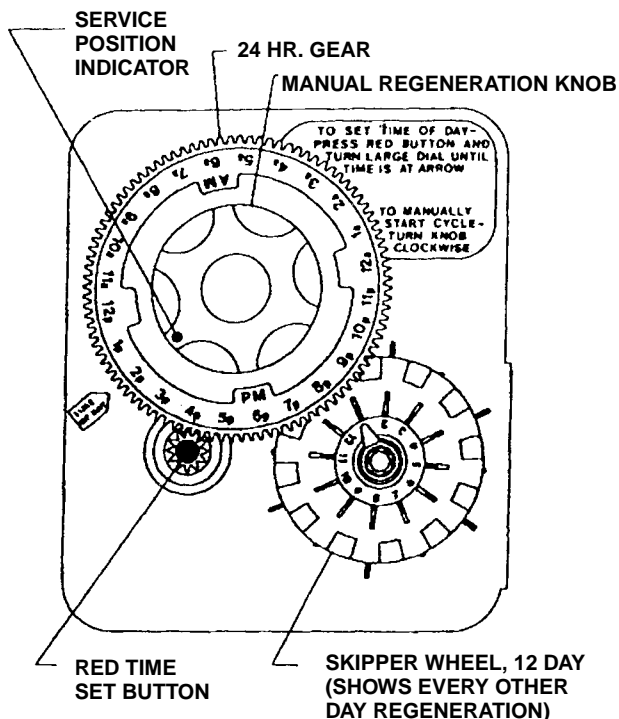
The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.

Even though it takes three hours for this center knob to complete one revolution, the regeneration cycle of your unit might be set only one half of this time.

In any event, conditioned water may be drawn after rinse water stops flowing from the water conditioner drain line.

How to Adjust Regeneration Time:

1. Disconnect the power source.
2. Locate the three screws behind the manual regeneration knob by pushing the red button in and rotating the 24 hour dial until each screw appears in the cut out portion of the manual regeneration knob.
3. Loosen each screw slightly to release the pressure on the time plate from the 24 hour gear.
4. Locate the regeneration time pointer on the inside of the 24 hour dial in the cut out.
5. Turn the time plate so the desired regeneration time aligns next to the raised arrow.
6. Push the red button in and rotate the 24 hour dial. Tighten each of the three screws.
7. Push the red button and locate the pointer one more time to ensure the desired regeneration time is correct.
8. Reset the time of day and restore power to the unit



3200 ADJUSTABLE REGENERATION TIMER

IMPORTANT!

SALT LEVEL MUST ALWAYS BE ABOVE WATER LEVEL IN BRINE TANK.

MODEL 3200 & 3210 TIMER SERIES

Regeneration Cycle Program Setting Procedure

How To Set Regeneration Cycle Program:

The regeneration cycle program on your water conditioner has been factory preset, however, portions of the cycle or program may be lengthened or shortened in time to suit local conditions.

3200 & 3210 Series Timers (Figure to Right)

To expose cycle program wheel, grasp timer in upper left-hand corner and pull, releasing snap retainer and swinging timer to the right

To change the regeneration cycle program, the program wheel must be removed. Grasp program wheel and squeeze protruding lugs toward center, lift program wheel off timer. (Switch arms may require movement to facilitate removal.)

Return timer to closed position engaging snap retainer in back plate. Make certain all electrical wires locate above snap retainer post

Timer Setting Procedure for 3200 & 3210 Timer

How To Change The Length Of The Backwash Time:

The program wheel as shown in the drawing is in the service position. As you look at the numbered side of the program wheel, the group of pins starting at zero determines the length of time your unit will backwash.

FOR EXAMPLE: If there are six pins in this section, the time of backwash will be 12 min. (2 min. per pin). To change the length of backwash time, add or remove pins as required. The number of pins times two equal the backwash time in minutes.

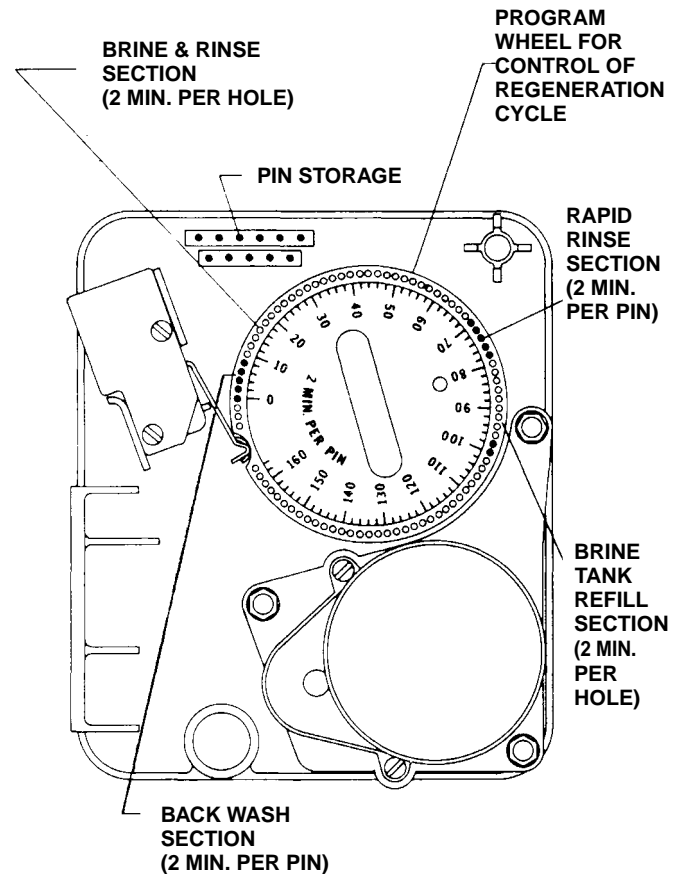
How To Change The Length Of Brine And Rinse Time:

The group of holes between the last pin in the backwash section and the second group of pins determines the length of time that your unit will brine and rinse (2 min. per hole).

To change the length of brine and rinse time, move the rapid rinse group of pins to give more or fewer holes in the brine and rinse section. Number of holes times two equals brine and rinse time in minutes.

How To Change The Length Of Rapid Rinse:

The second group of pins on the program wheel determines the length of time that your water conditioner will rapid rinse (2 min. per pin).



To change the length of rapid rinse time, add or remove pins at the higher numbered end of this section as required. The number of pins times two equals the rapid rinse time in minutes.

How To Change The Length Of Brine Tank Refill Time:

The second group of holes in the program wheel determines the length of time that your water conditioner will refill the brine tank (2 min. per hole).

To change the length of refill time, move the two pins at the end of the second group of holes as required.

The regeneration cycle is complete when the outer microswitch is tripped by the two pin set at end of the brine tank refill section. The program wheel, however, will continue to rotate until the inner microswitch drops into the notch on the program wheel.

MODEL 3210 ECONOMINDER™

Commercial Demand Regeneration Control Timer Settings

Typical Programming Procedure

Calculate the gallon capacity of the system, subtract the necessary reserve requirement and set the gallons required by lifting the gallon dial and rotating it so that the number of gallons required is aligned with the white dot on program wheel gear. Release and check for firm engagement with gear. Note, drawing shows 8,750 gallon setting. The capacity (gallons) arrow denotes remaining gallons exclusive of fixed reserve.

Note:

To set meter capacity at initial start-up, either:

1. Rotate manual regeneration knob one full revolution.
— or —
2. Rotate program wheel manually clockwise or counter clockwise and align white dot with capacity arrow.

This procedure must be followed any time the program wheel setting is changed.

How To Set The Time Of Day:

Press and hold the red button in to disengage the 24 hour gear.

Turn the 24 hour gear until the actual time of day is at the time of day pointer.

Release the red button to again engage the 24 hour gear.

How To Manually Regenerate Your Water Conditioner At Any Time:

Turn the manual regeneration knob clockwise one "click"

This slight movement of the manual regeneration knob engages the program wheel and starts the regeneration program.

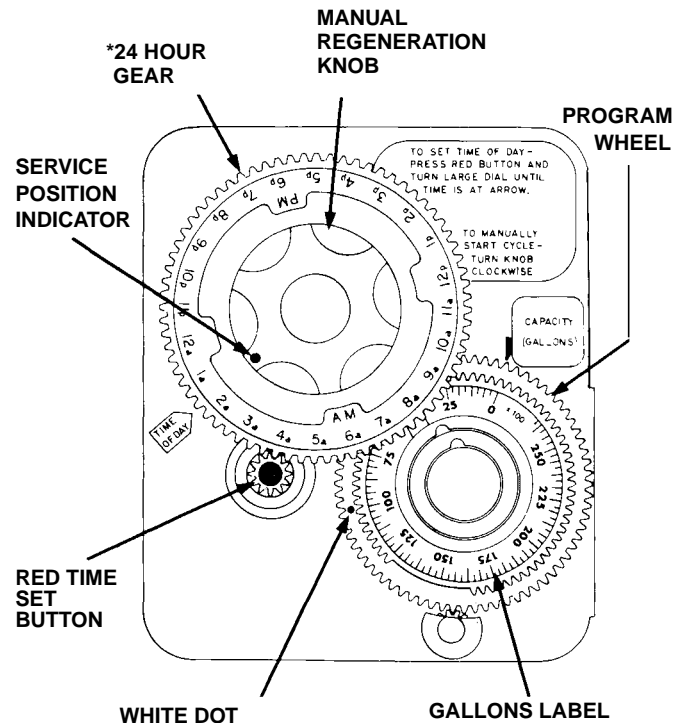
The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.

Even though it takes three hours for this center knob to complete one revolution, the regeneration cycle of your unit might be set for only one half of this time.

In any event, conditioned water may be drawn after rinse water stops flowing from the water conditioner drain line.

Immediate Regeneration Timers:

These timers do not have a 24 hour gear. Setting the gallons on the program wheel and manual regeneration procedure are the same as previous instructions.



* Immediate regeneration timers do not have 24 hour gear. No time of day can be set.

MODEL 3900

Service Instructions

PROBLEM	CAUSE	CORRECTION
1. Softener fails to regenerate.	A. Electrical service to unit has been interrupted. B. Timer is defective. C. Power Failure.	A. Assure permanent electrical service (check fuse, plug, pull chain or switch). B. Replace timer. C. Reset Time of Day.
2. Hard water.	A. By-pass valve is open. B. No salt in brine tank. C. Insufficient water flowing into brine tank. D. Hot water tank hardness. E. Leak at distributor tube. F. Internal valve leak.	A. Close by-pass valve. B. Add Salt to brine tank and maintain salt level above water level. C. Check brine tank fill time and clean brine line flow control if plugged. D. Repeated flushing of the hot water tank is required. E. Make sure distributor tube is not cracked. Check O-ring and tube pilot. F. Replace seals and spacers and/or piston.
3. Unit used too much salt.	A. Improper salt setting. B. Excessive water in brine tank.	A. Check salt usage and salt setting. B. See Problem No. 7.
4. Loss of water pressure.	A. Iron buildup in line to water conditioner. B. Iron buildup in water conditioner. C. Inlet of control plugged due to foreign material broken loose from pipe by recent work done on plumbing system.	A. Clean line to water conditioner. B. Clean control and add mineral cleaner to mineral bed. Increase frequency of regeneration. C. Remove pistons and clean control.
5. Loss of mineral through drain line.	A. Air in water system. B. Improperly Sized Drain Line Flow Control.	A. Assure that well system has proper air eliminator control. Check for dry well condition. B. Check For proper Drain Rate.
6. Iron in conditioned water.	A. Fouled mineral bed.	A. Check backwash, brine draw and brine tank fill. Increase frequency of regeneration. Increase Backwash Time.
7. Excessive water in brine tank	A. Plugged drain line flow control. B. Plugged injector system. C. Timer not cycling.	A. Check flow control. B. Clean injector and screen. C. Replace timer.

MODEL 3900

Service Instructions

PROBLEM	CAUSE	CORRECTION
8. Softener fails to draw brine.	D. Foreign material in brine valve.	D. Replace brine valve seat and clean valve.
	E. Foreign material in brine line flow control.	E. Clean brine line flow control.
	A. Drain line flow control is plugged.	A. Clean drain line flow control.
	B. Injector is plugged.	B. Clean injector.
	C. Line Pressure Is Too Low.	C. Increase Line Pressure To 20 P.S.I. Minimum.
9. Control cycles continuously.	D. Internal Control Leak.	D. Change Seals, Spacers and piston Assembly.
	E. Service Adapter Did Not Cycle.	E. Check Drive Motor And Switches
10. Drain flows continuously.	A. Missadjusted, Broken or shorted Switch.	A. Determine if switch or timer is faulty and replace it, or replace complete power head.
	A. Valve is not programming correctly.	A. Check timer program and positioning of control. Replace power head assembly if not positioning properly.
	B. Foreign material in control.	B. Remove power head assembly and inspect bore, remove foreign material and check control in various regeneration positions.
	C. Internal control leak.	C. Replace seals and piston assembly.

General Service Hints For Meter Control

Problem: Softener Delivers Hard Water.

Cause could be that. . .Reserve Capacity Has Been Exceeded.

Correction: Check salt dosage requirements and reset program wheel to provide additional reserve.

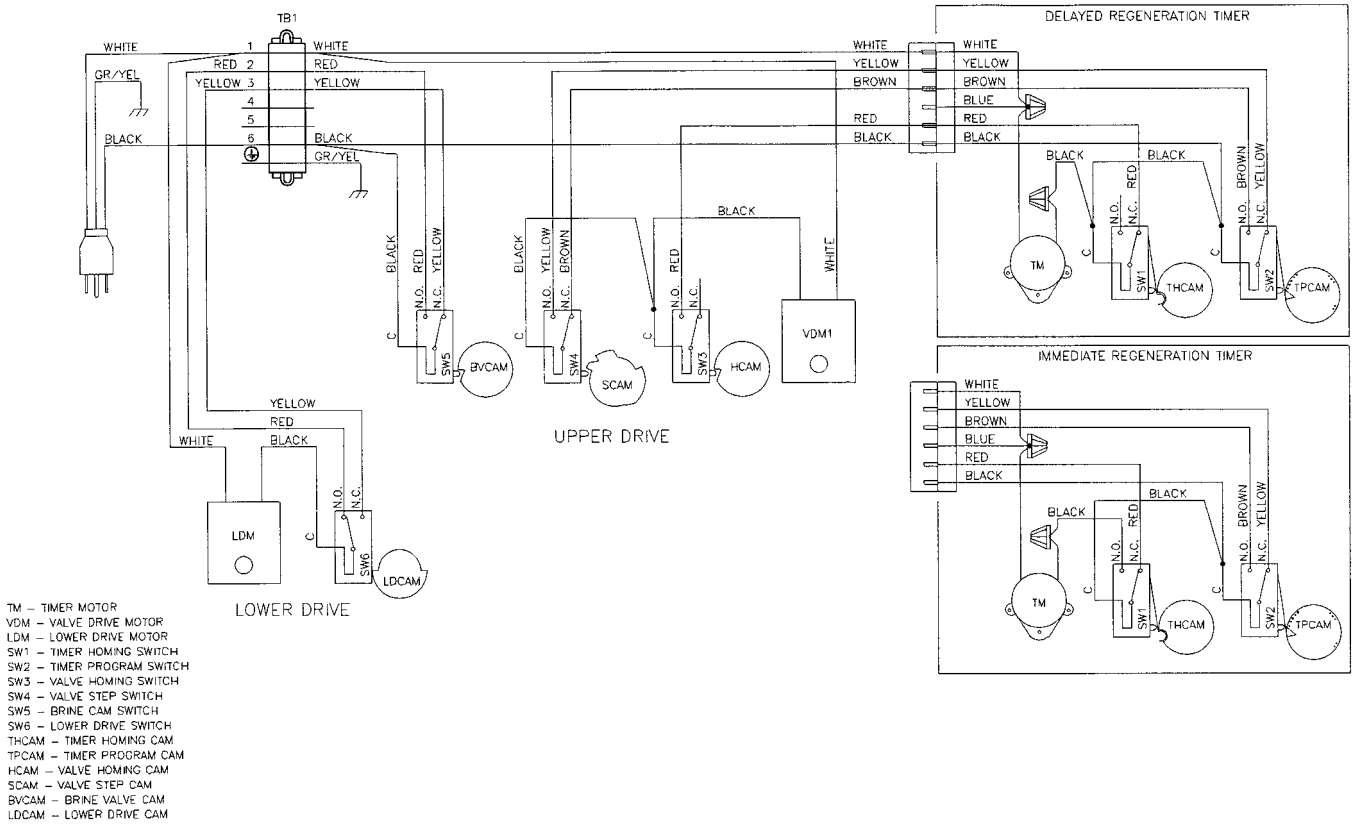
Cause could be that. . .Program Wheel Is Not Rotating With Meter Output.

Correction: Pull cable out of meter cover and rotate manually. Program wheel must move without binding and clutch must give positive "clicks" when program wheel strikes regeneration stop. If it does not, replace timer. Cause could be that. . .Meter Is Not Measuring Flow.

Correction: Check meter with meter checker.

3900 SYSTEM #4

Valve Wiring

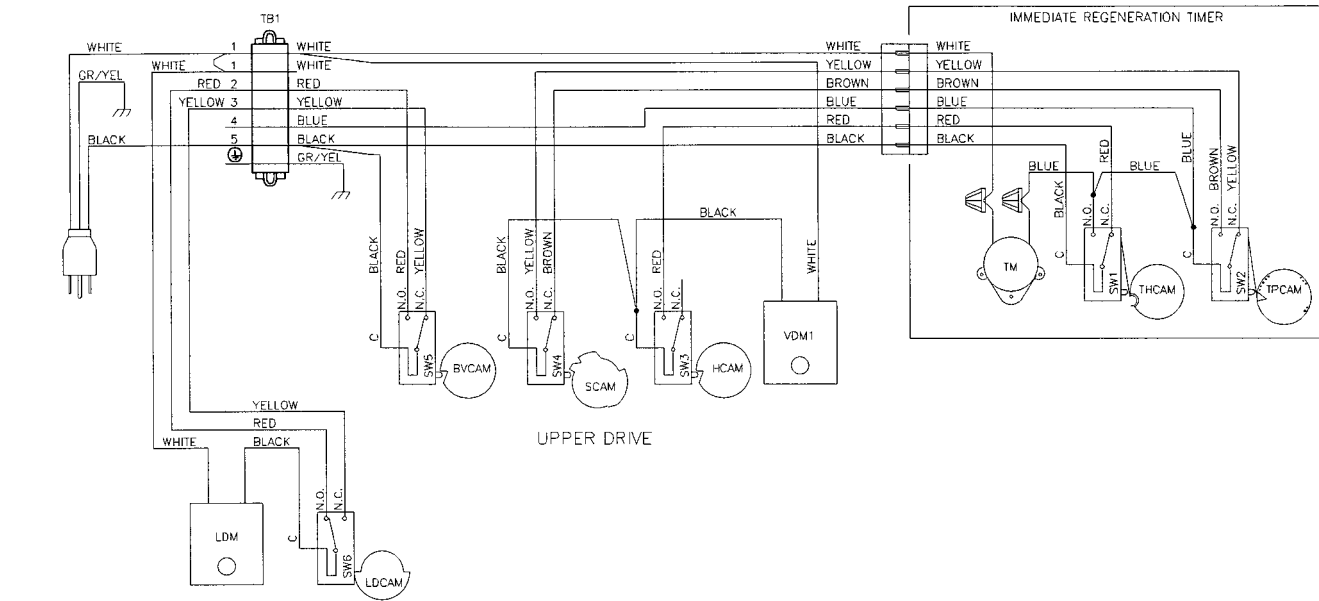


- TM - TIMER MOTOR
- VDM - VALVE DRIVE MOTOR
- LDM - LOWER DRIVE MOTOR
- SW1 - TIMER PROGRAM SWITCH
- SW2 - TIMER PROGRAM SWITCH
- SW3 - VALVE HOMING SWITCH
- SW4 - VALVE STEP SWITCH
- SW5 - BRINE CAM SWITCH
- SW6 - LOWER DRIVE SWITCH
- THCAM - TIMER HOMING CAM
- TPCAM - TIMER PROGRAM CAM
- HCAM - VALVE HOMING CAM
- SCAM - VALVE STEP CAM
- BVCAM - BRINE VALVE CAM
- LDCAM - LOWER DRIVE CAM

NOTE:
SINGLE TANK TIMELOCK, METER DELAYED, OR METER IMMEDIATE REGENERATION

3900 System #4 With Remote Meter

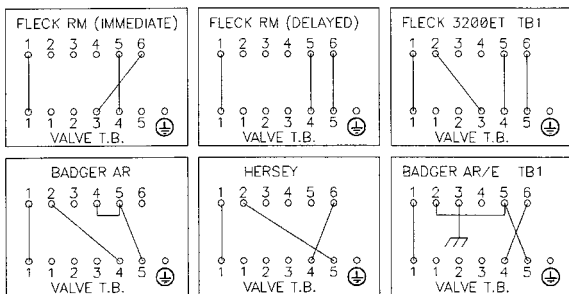
Valve Wiring



- TM - TIMER MOTOR
- VDM - VALVE DRIVE MOTOR
- LDM - LOWER DRIVE MOTOR
- SW1 - TIMER HOMING SWITCH
- SW2 - TIMER PROGRAM SWITCH
- SW3 - VALVE HOMING SWITCH
- SW4 - VALVE STEP SWITCH
- SW5 - BRINE VALVE CAM SWITCH
- SW6 - LOWER DRIVE SWITCH
- THCAM - TIMER HOMING CAM
- TPCAM - TIMER PROGRAM CAM
- HCAM - VALVE HOMING CAM
- SCAM - VALVE STEP CAM
- BVCAM - BRINE VALVE CAM
- LDCAM - LOWER DRIVE CAM

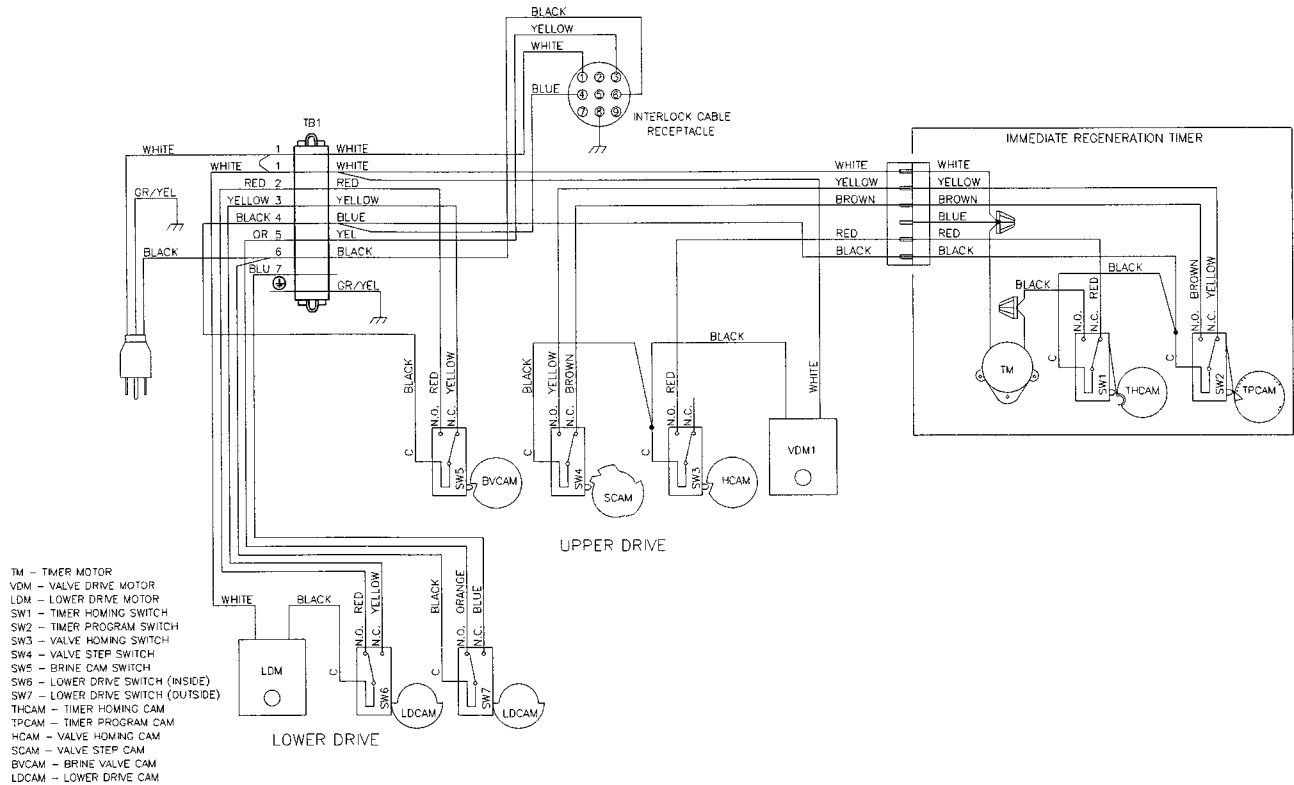
NOTE:
SINGLE TANK REMOTE METER DELAYED, OR IMMEDIATE REGENERATION

REMOTE METER WIRING

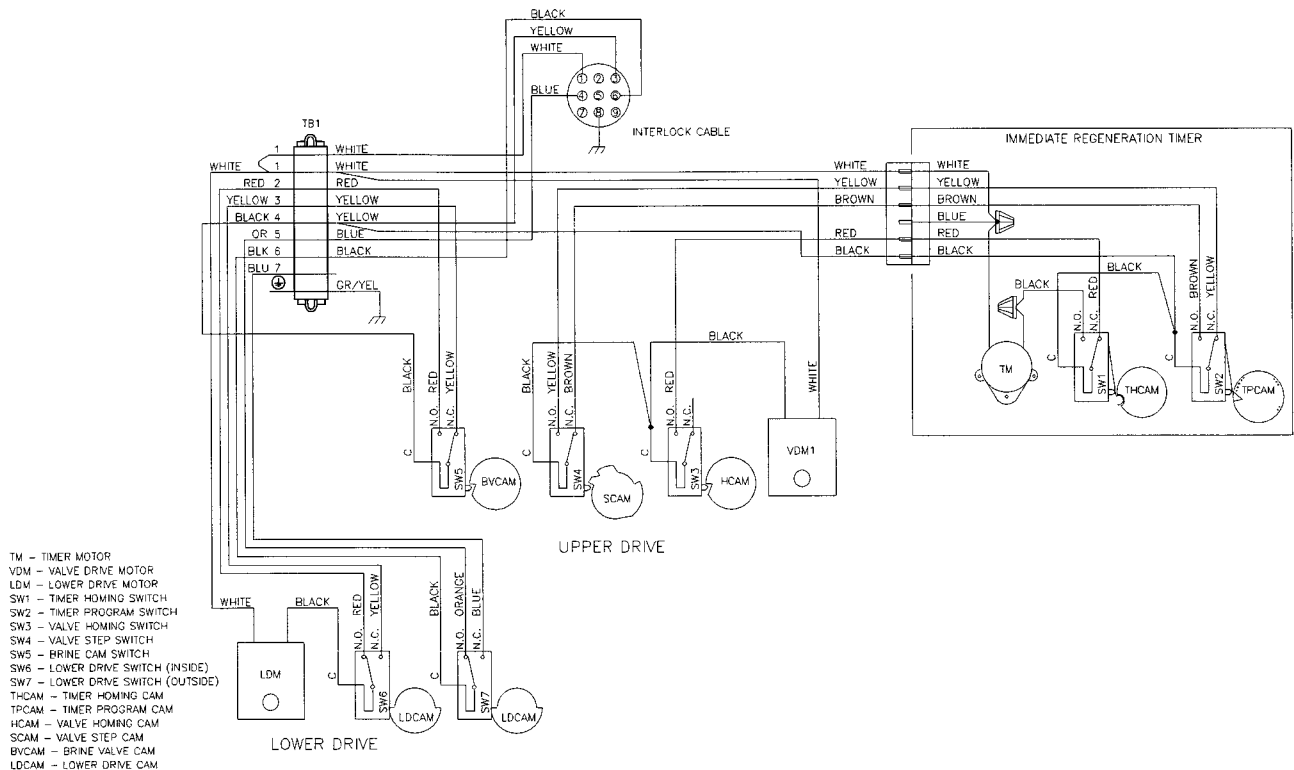


3900 SYSTEM #5

Valve Wiring

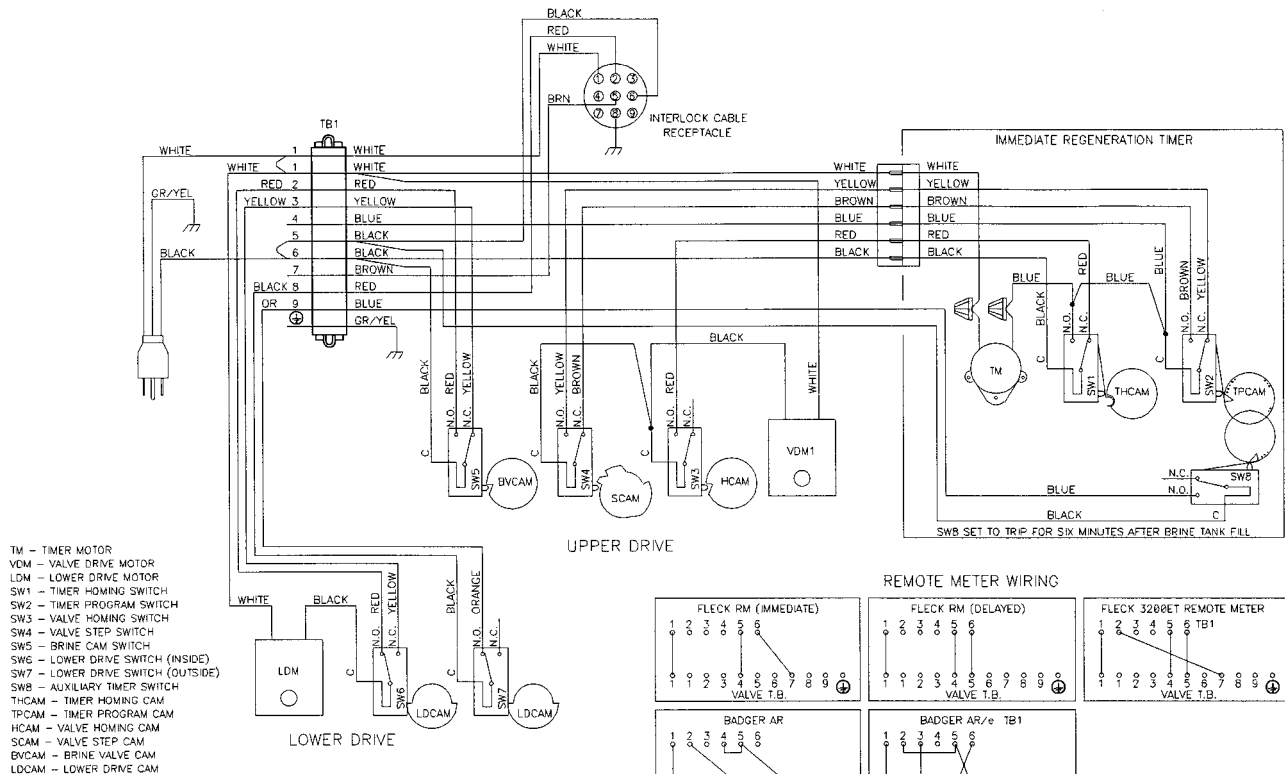


NOTE:
TWO TANK INTERLOCKED, INDIVIDUAL METER, IMMEDIATE REGENERATION.
ONLY ONE TANK IN REGENERATION THE OTHER IN SERVICE.



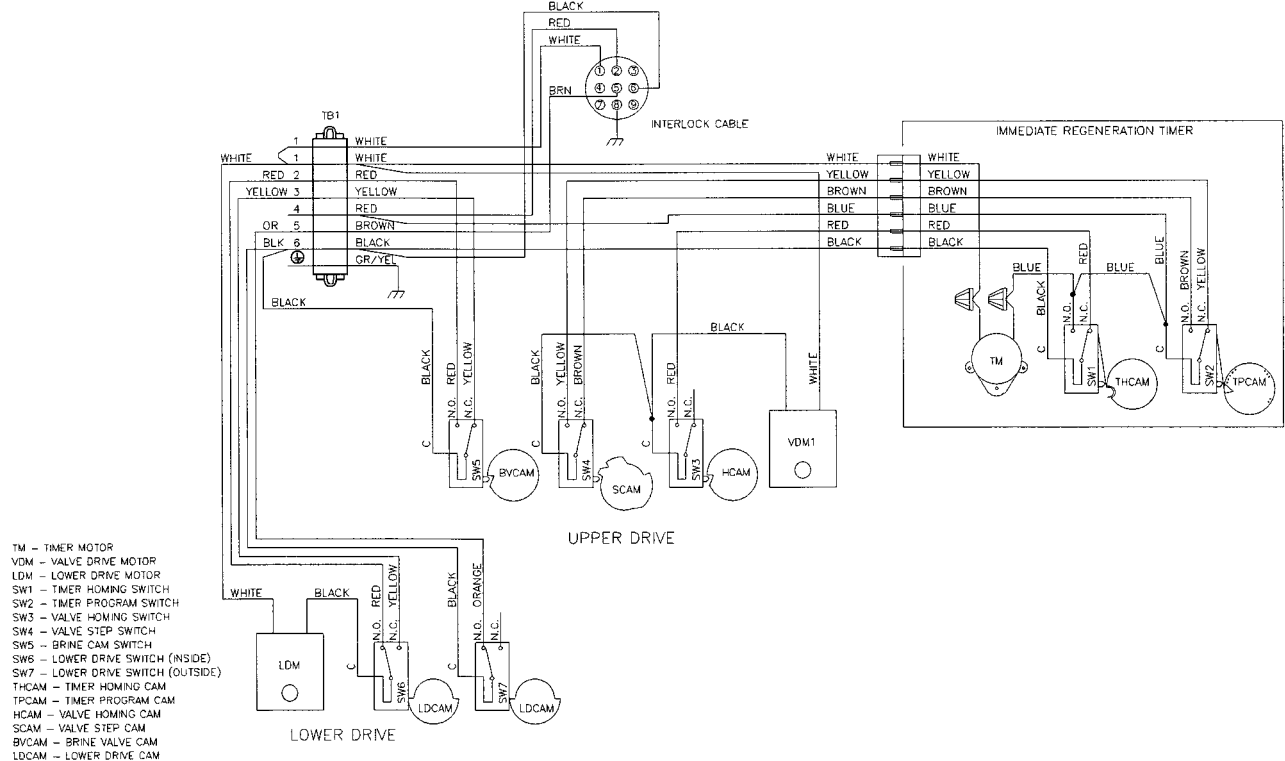
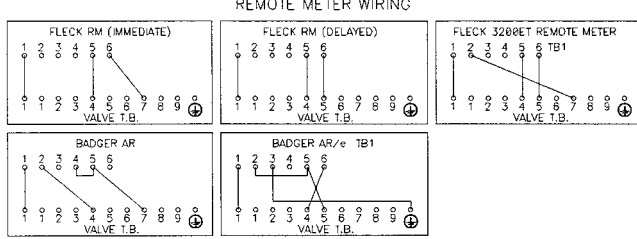
3900 SYSTEM #6

Valve Wiring



- TM - TIMER MOTOR
- VDM - VALVE DRIVE MOTOR
- LDM - LOWER DRIVE MOTOR
- SW1 - TIMER HOMING SWITCH
- SW2 - TIMER PROGRAM SWITCH
- SW3 - VALVE HOMING SWITCH
- SW4 - VALVE STEP SWITCH
- SW5 - BRINE CAM SWITCH
- SW6 - LOWER DRIVE SWITCH (INSIDE)
- SW7 - LOWER DRIVE SWITCH (OUTSIDE)
- SW8 - AUXILIARY TIMER SWITCH
- THCAM - TIMER HOMING CAM
- TPCAM - TIMER PROGRAM CAM
- HCAM - VALVE HOMING CAM
- SCAM - VALVE STEP CAM
- BVCAM - BRINE VALVE CAM
- LDCAM - LOWER DRIVE CAM

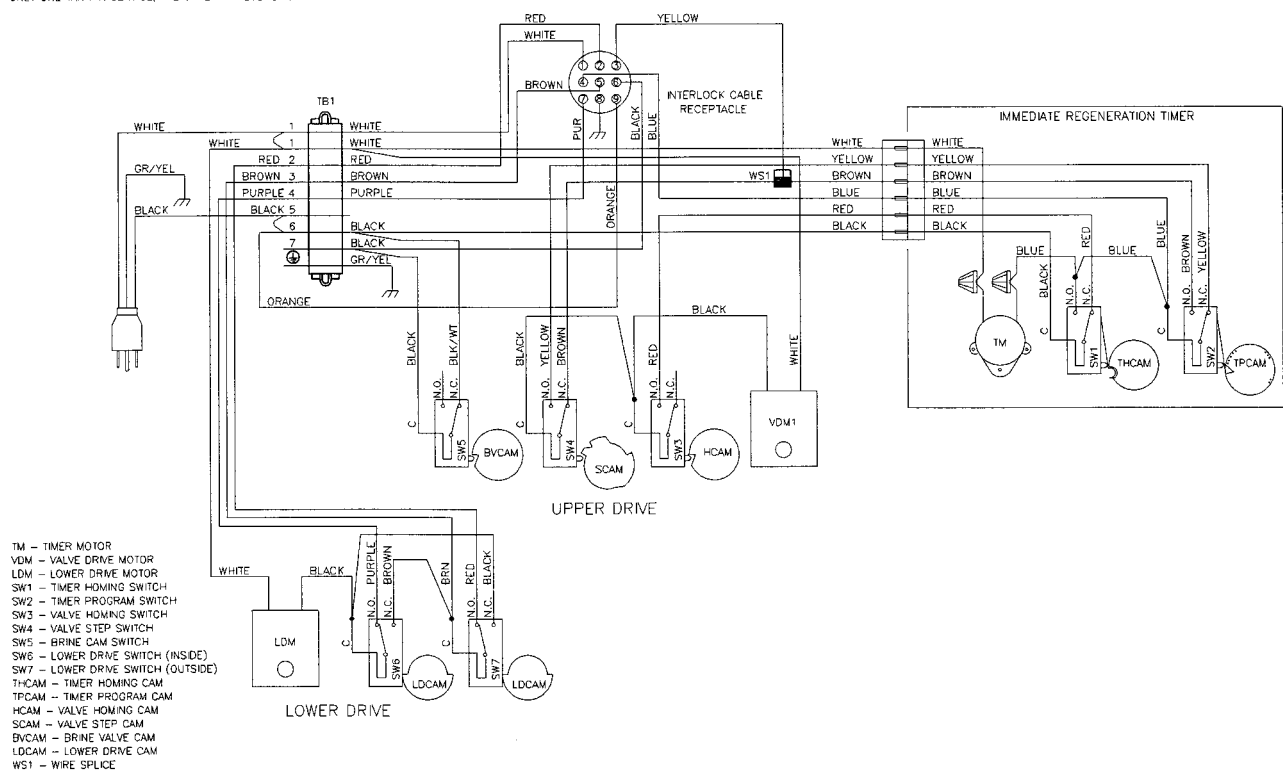
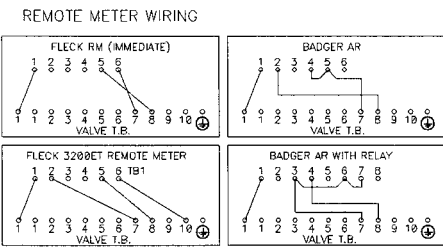
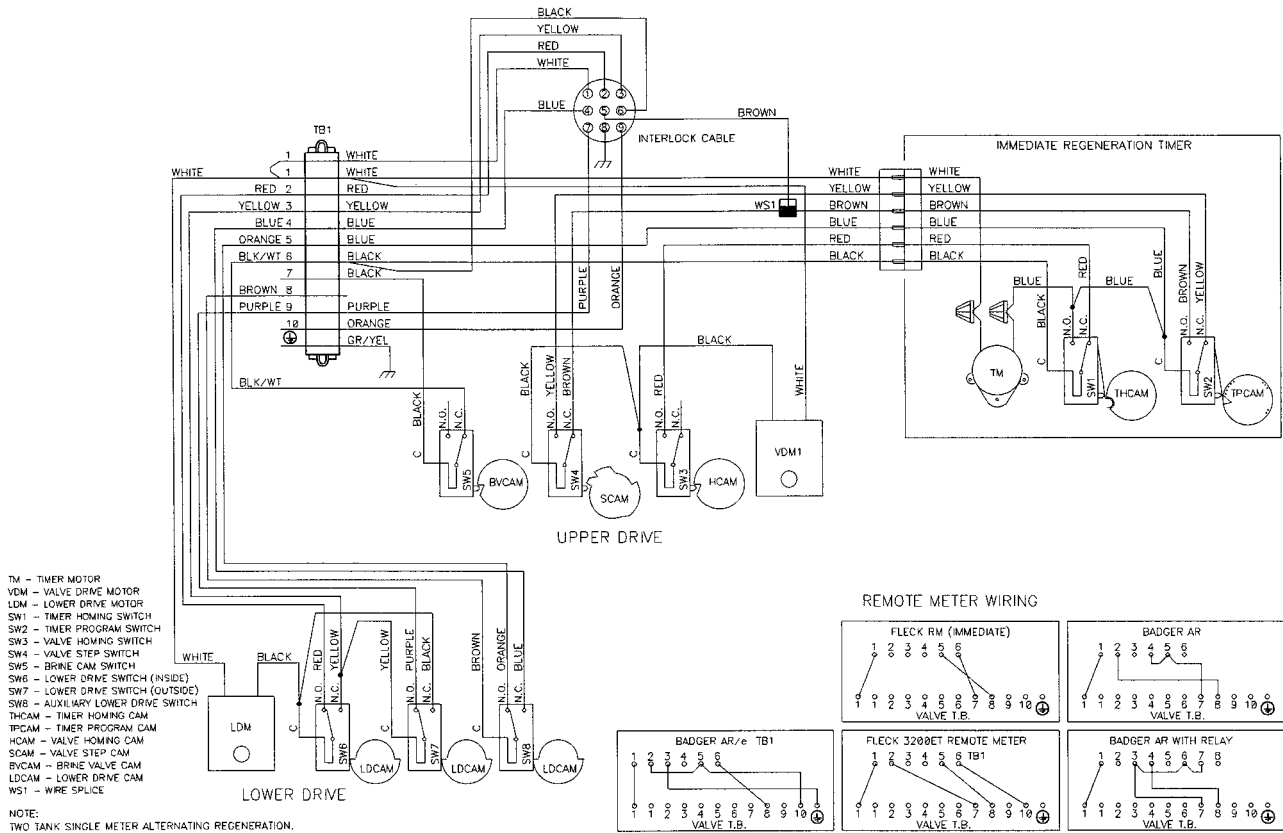
NOTE:
TWO TANK INTERLOCKED, SINGLE REMOTE METER, SERIES REGENERATION.
ONLY ONE TANK IN REGENERATION THE OTHER IN SERVICE.
LEAD VALVE REGENERATES FIRST, FOLLOWED IMMEDIATELY BY LAG VALVE.



- TM - TIMER MOTOR
- VDM - VALVE DRIVE MOTOR
- LDM - LOWER DRIVE MOTOR
- SW1 - TIMER HOMING SWITCH
- SW2 - TIMER PROGRAM SWITCH
- SW3 - VALVE HOMING SWITCH
- SW4 - VALVE STEP SWITCH
- SW5 - BRINE CAM SWITCH
- SW6 - LOWER DRIVE SWITCH (INSIDE)
- SW7 - LOWER DRIVE SWITCH (OUTSIDE)
- SW8 - AUXILIARY TIMER SWITCH
- THCAM - TIMER HOMING CAM
- TPCAM - TIMER PROGRAM CAM
- HCAM - VALVE HOMING CAM
- SCAM - VALVE STEP CAM
- BVCAM - BRINE VALVE CAM
- LDCAM - LOWER DRIVE CAM

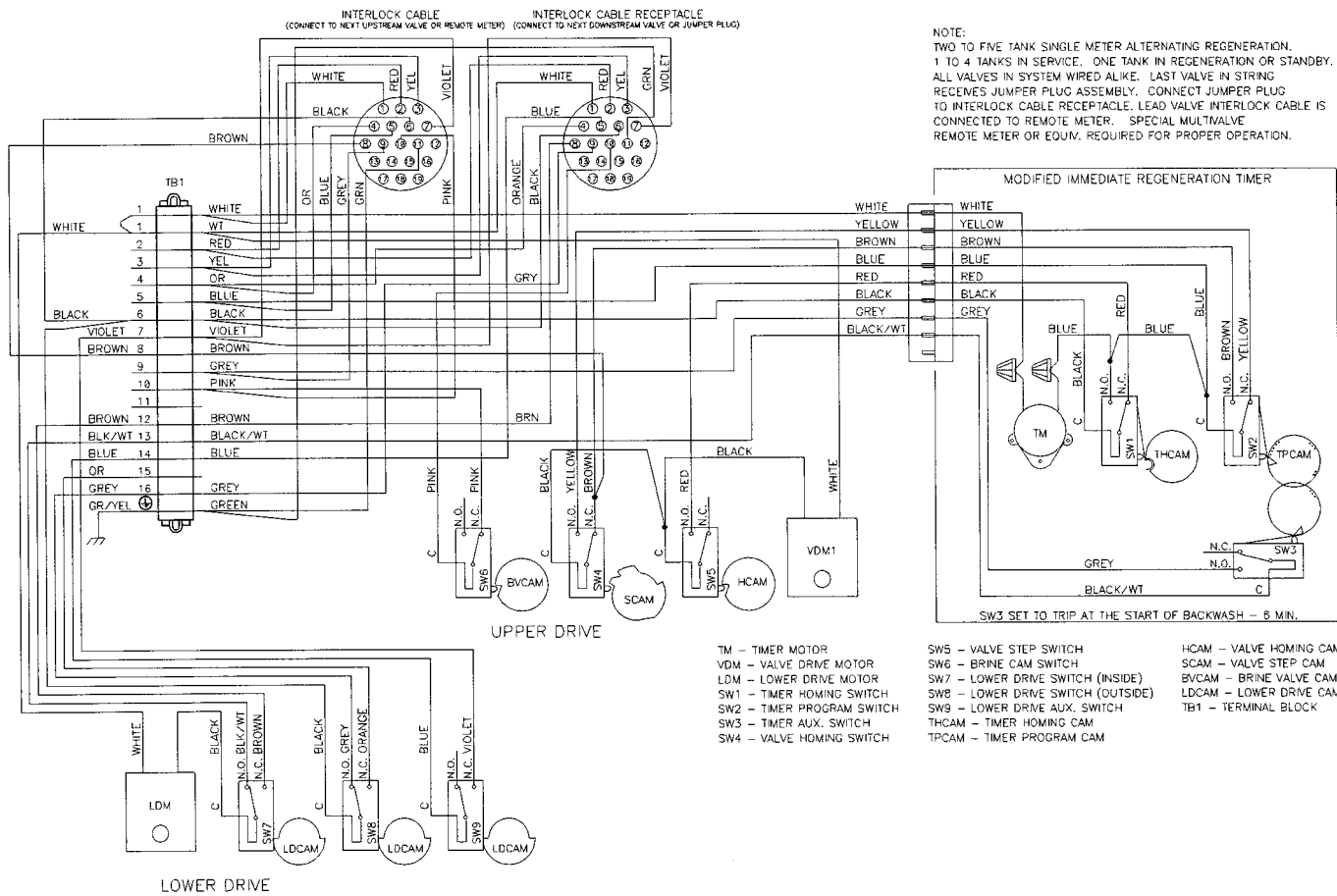
3900 SYSTEM #7

Valve Wiring



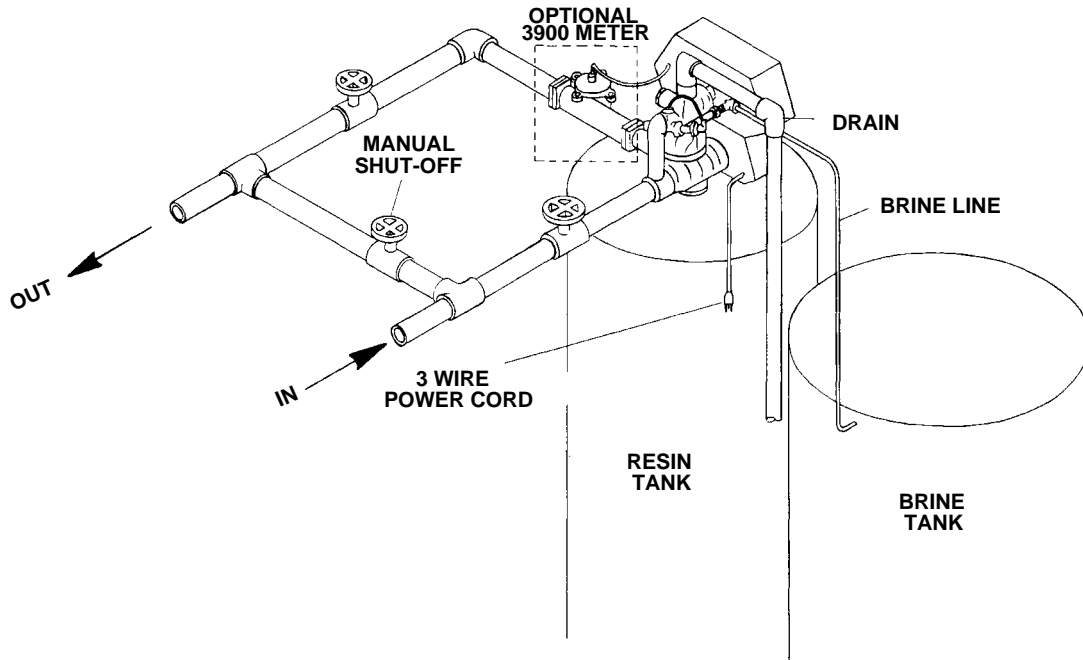
3900 MULTIVALVE SYSTEM #7

Valve Wiring

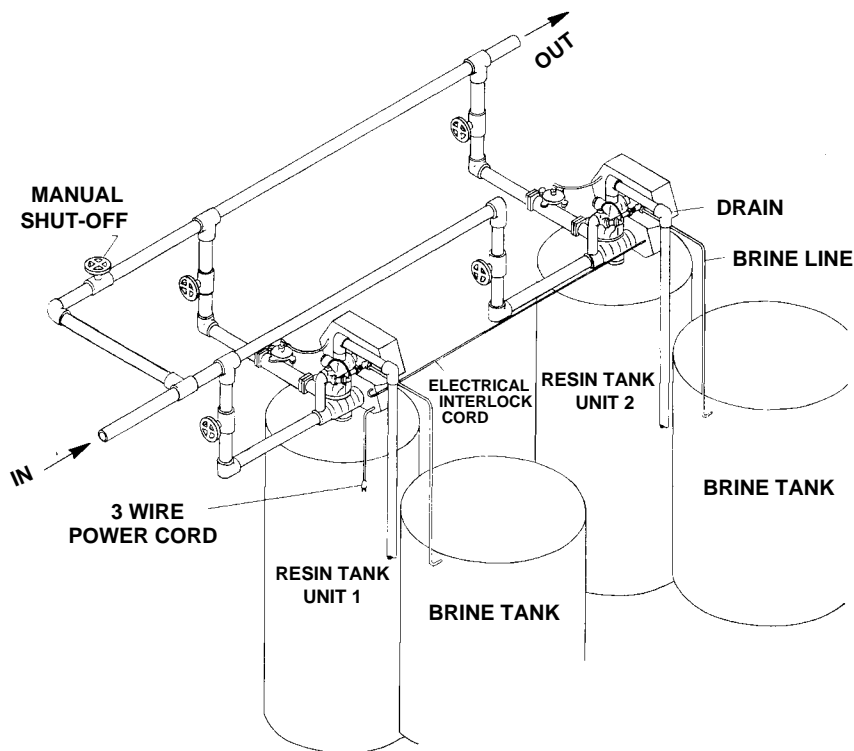


MODEL 3900

System #4 - Typical Single Tank Installation with Optional Meter



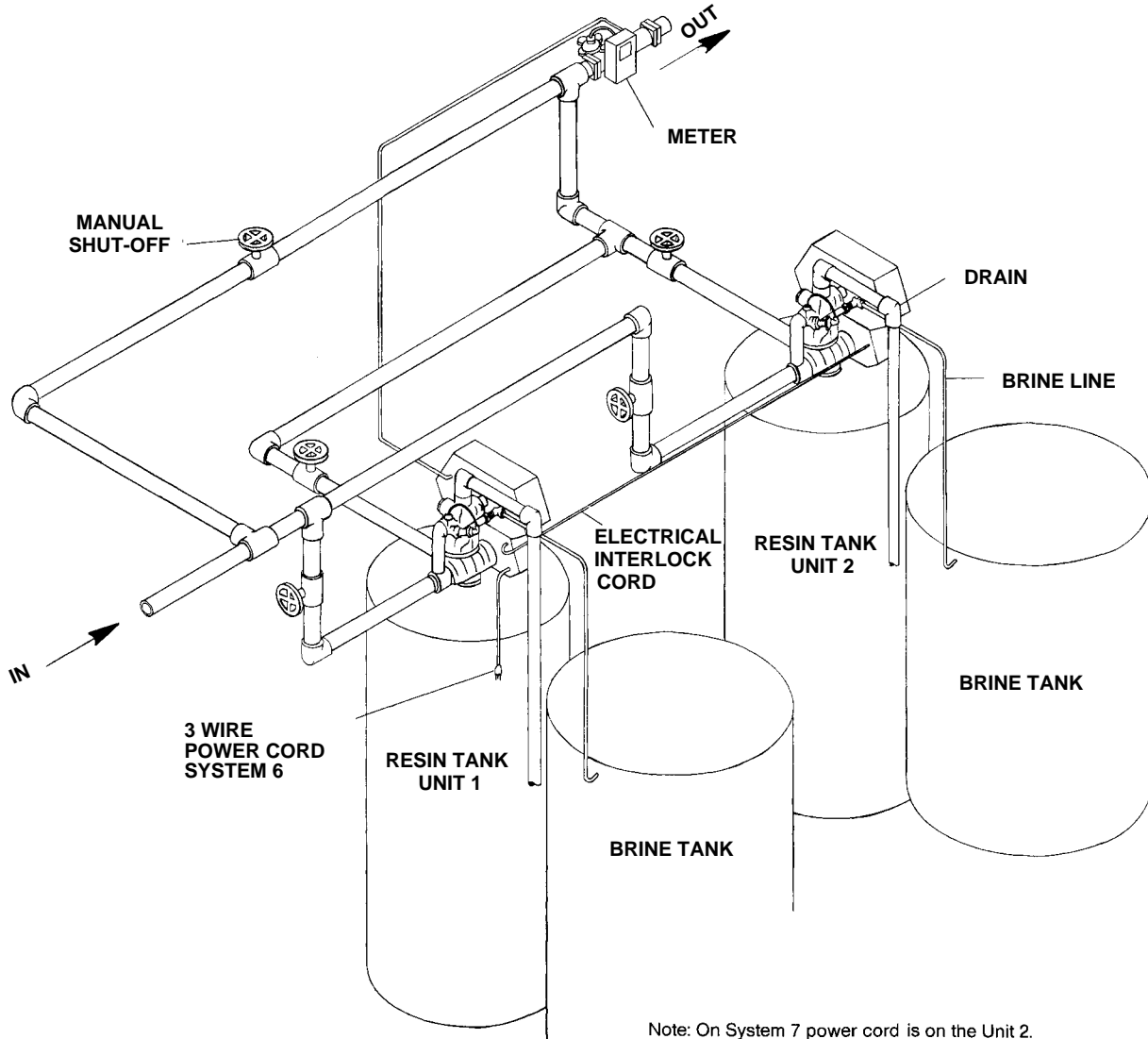
System #5 Interlock - Typical Twin Tank Installation with Optional Meter Interlock and No Hard Water Bypass



MODEL 3900

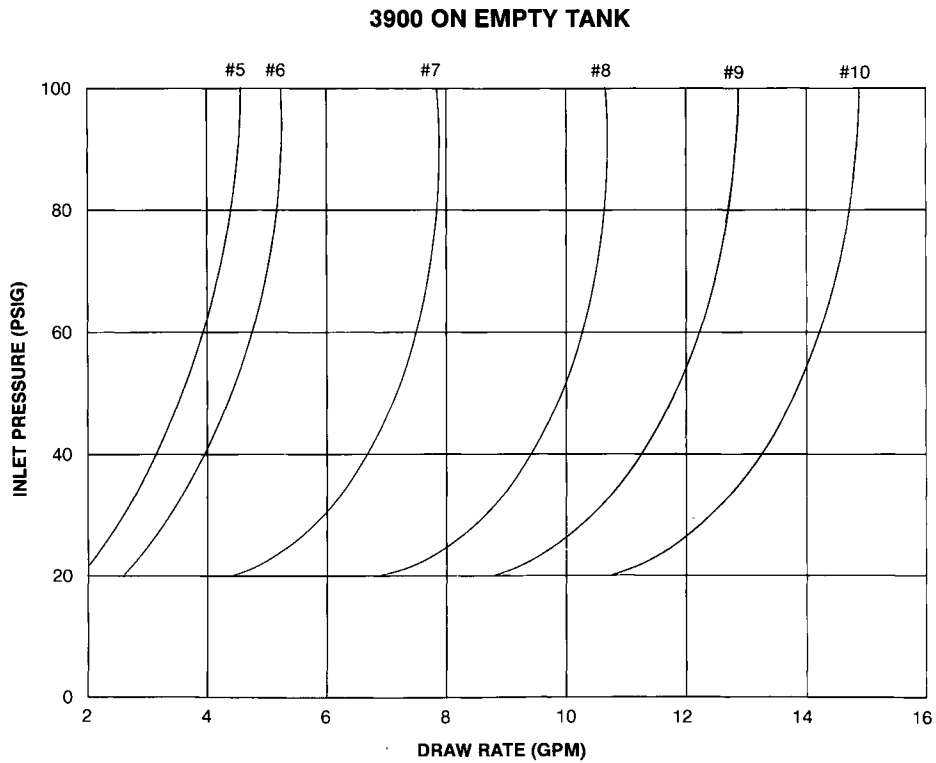
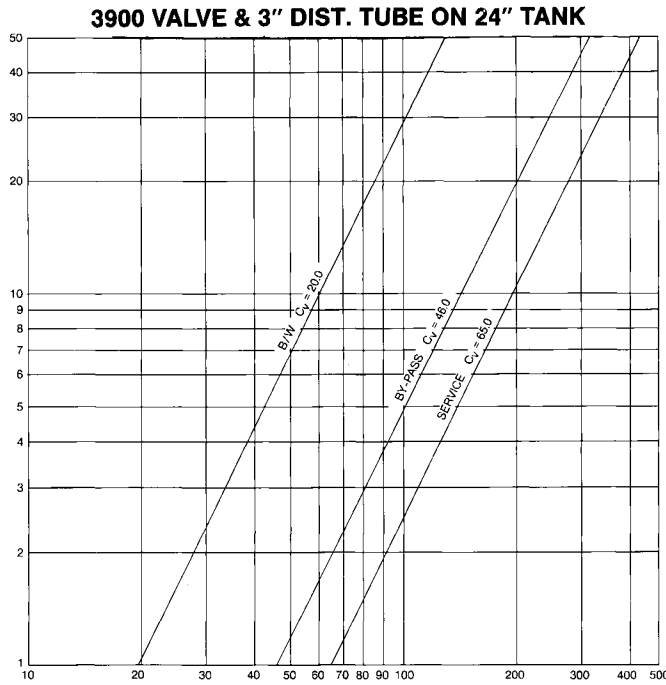
System #6 - Twin Series Regeneration

System #7 - Twin Alternator Installation



MODEL 3900

Flow Data & Injector Draw Rates



MODEL 3900

*Typical Timer Settings

Tank Dia. Volume of Resin	B/W Rate-GPM	B/W Time Min.	1800 Inj. Size	Brine and Slow Rinse Time-Minutes									Fast Rinse Time	Brine Refill Rate GPM	Brine Tank Refill Time-Minutes		
				@ 6# Per Ft ³			@ 10# Per Ft ³			@ 15# Per Ft ³					@ 6# Per Ft ³	@ 10# Per Ft ³	@ 15# Per Ft ³
				35 PSI	60 PSI	90 PSI	35 PSI	60 PSI	90 PSI	35 PSI	60 PSI	90 PSI					
24" 10 Ft ³	15	10	4	42	30	26	68	50	46	102	76	64	10	2	6	16	26
30" 15 Ft ³	25	10	5	36	26	24	62	42	40	96	68	64	10	5	6	10	16
36" 20 Ft ³	35	10	6	34	28	28	58	48	48	84	68	68	10	5	8	14	20
42" 30 Ft ³	50	10	7	36	26	26	58	44	44	92	70	70	10	10	6	10	16
48" 42 Ft ³	70	10	8	34	34	34	56	56	56	76	76	76	10	15	6	10	14
54" 55 Ft ³	80	10	9	40	34	34	60	50	50	90	76	76	10	15	8	12	18
60" 70 Ft ³	100	10	10	46	36	34	68	54	52	102	80	78	10	20	8	12	18

WITH MODEL 2350 SAFETY BRINE VALVE

48" 42 Ft ³	70	10	8	34	34	34	56	56	56	76	76	76	10	10	9	16	22
54" 55 Ft ³	80	10	9	40	34	34	60	50	50	90	76	76	10	10	12	18	28
60" 70 Ft ³	100	10	10	46	36	34	68	54	52	102	80	78	10	10	16	24	36

MODEL 3900

Service Assemblies

60036-02 1800 Brine Valve See Illustration Page 12	60131 3900 Upper Seal Kit See Illustration Page 6
1 11772 Spring	2 10368 Spacer
1 11774 Retaining Ring	5 10369 Spacer - Port
1 18713 Brine Valve Body	8 11720 Seal
1 16497-01 Brine Stem Assembly	
1 16498-01 Stem Guide Assembly	60132 3900 Lower Seal Kit See Illustration Page 6
	4 16068 Seal
60277 1800 Injector Assembly See Illustration Page 12	2 16069 Spacer - Narrow
4 12473 Screw - Hex Hd.	1 16070 Spacer - Wide
1 15127 Injector Throat	
1 15128 Injector Nozzle	60132-01 3900 Lower Seal Kit, Hot Water
2 15246 O-Ring -116	4 16068 Seal
1 16340 Injector Body	2 16069-01 Spacer, Narrow, Hot Water
1 16341-01 Injector Cover	1 16070-01 Spacer, Wide, Hot Water
60106-00 3900 Upper Piston Assembly See Illustration Page 6	60057-01 3900 Upper Drive Motor Assembly - 115 V. See Illustration Page 8
1 14818 Clip Piston Rod	4 10302 Insulator - Switch
1 14922 O-Ring - 035	3 10872 Screw - Hex Hd.
1 15125 Piston Rod	1 11080 Screw - Flat Hd.
1 16130 Piston	3 10218 Switch
1 16398-0 End Plug Assembly	2 10300 Screw - Hex Hd.
	1 15120 Bracket - Motor Mounting
60107-00 3900 Lower Piston - Hard Water By-Pass See Illustration Page 6	1 16044 Drive Motor - 115 V.
1 14818 Clip Piston Rod	1 16052 Bushing
1 16071 Piston	1 17797 Bracket - Switch Mounting
1 16072 Piston Rod	2 12624 Screw - Pan Hd.
1 16076 O-Ring - 042	
1 16399-01 End Plug Assembly - White	60058-01 3900 Lower Drive Motor Assembly - 115 V. System #4 See Illustration Page 10
	2 10302 Insulator - Switch
60107-10 3900 Lower Piston - No Hard Water By-Pass See Illustration Page 6	3 10872 Screw - Hex Hd.
1 14818 Clip Piston Rod	1 11080 Screw - Flat Hd.
1 16082 Piston - No Hard Water By-Pass	1 10218 Switch
1 16072 Piston Rod	2 10300 Screw - Hex Hd.
1 16076 O-Ring - 042	2 11805 Screw - Pan Hd.
1 16399-11 End Plug Assembly - Black	1 16044 Drive Motor - 115 V.
	1 17797 Bracket - Switch Mounting
	1 16086 Bracket - Motor Mounting

