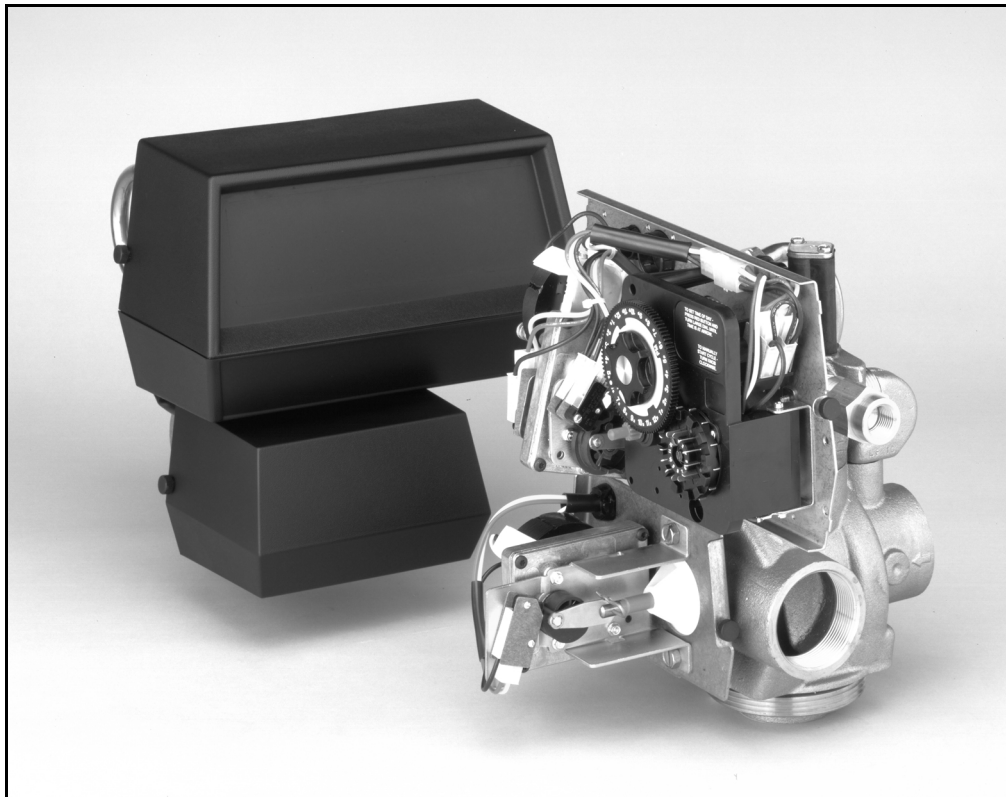


MODEL 2900

Upflow Brining

Service Manual



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

MODEL 2900 Upflow

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 _____

* 2900 CONTROL VALVE SPECIFICATIONS

1) Type of Timer (see pages 22-24)

- A) 7 day or 12 day
- B) *1,250 to 21,250 gallon= meter or
* 6,250 to 106,250 gallon meter
- * 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 (see pages 24)

- 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 2900 Upflow

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 110 volt, 60 Hertz current supply is required. 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.

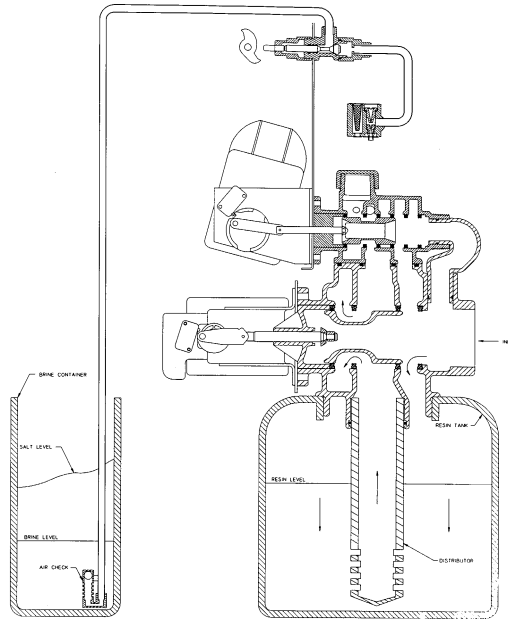
CAUTION: Water pressure is not to exceed 120 p.s.i., water temperature is not to exceed 100° F, and the unit cannot be subjected to freezing conditions.

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 4 feet apart for twin units.)
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 female 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. Solder joints near the drain must be done prior to connecting the Drain Line Flow Control fitting. Leave at least 6" between the DLFC and solder joints when soldering when the pipes are connected on the DLFC. Failure to do this could cause interior damage to the DLFC.
4. Teflon tape is the only sealant to be used on the drain fitting. The drain from twin units may be run through a common line.
5. Make sure that the floor is clean beneath the salt storage tank and that it is level.
6. 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.
7. On units with a by-pass, 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.
8. Place the by-pass in service position.
9. Manually index the softener control into "service" position and let water flow into the mineral tank. When water flow stops, open a cold water tap nearby and let run until air pressure is relieved.
10. Electrical: All electrical connections must be connected according to codes. Use electrical conduit if applicable. Remote meter systems and Twin meter system wiring diagrams are on pages 31-34.
11. Plug into power supply.

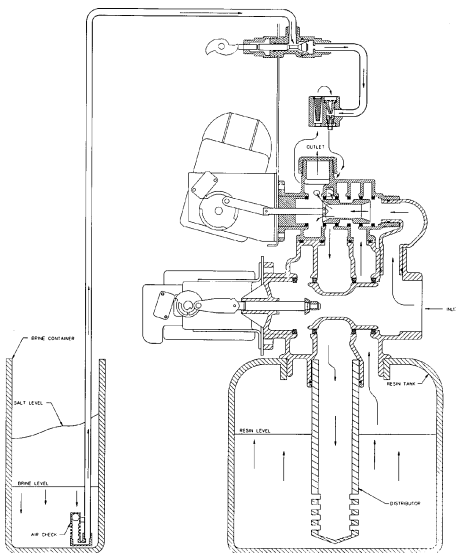
MODEL 2900 Upflow

1 SERVICE POSITION



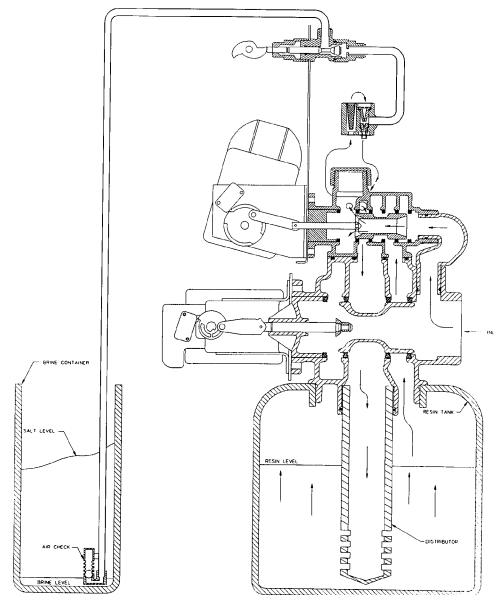
Hard water enters unit at valve inlet and flows down thru the mineral in the mineral tank. Conditioned water enters center tube thru the bottom distributor — then flows up thru the center tube — around the piston and out the top outlet of the valve.

2 BRINE POSITION



Hard water enters unit at valve inlet — flows up into injector housing and down thru nozzle and orifice to draw brine from the brine tank — brine flows down the center tube thru bottom of tank, up thru mineral to top of tank, around piston and out thru the drain line.

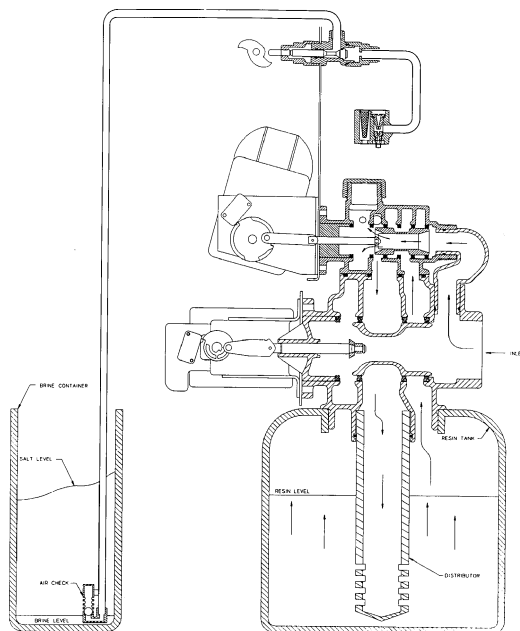
3 SLOW RINSE POSITION



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

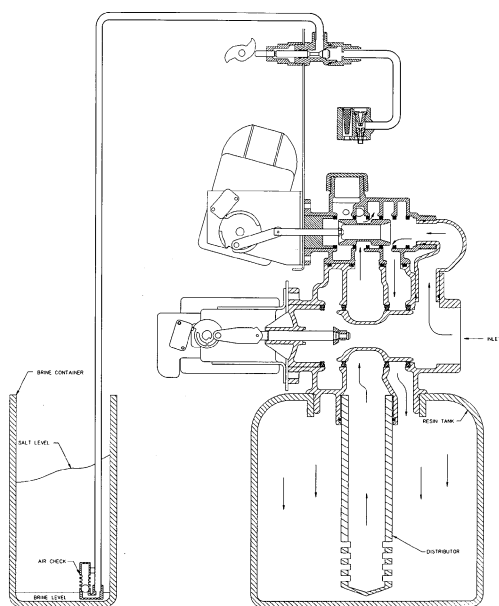
MODEL 2900 Upflow

4 BACK WASH POSITION



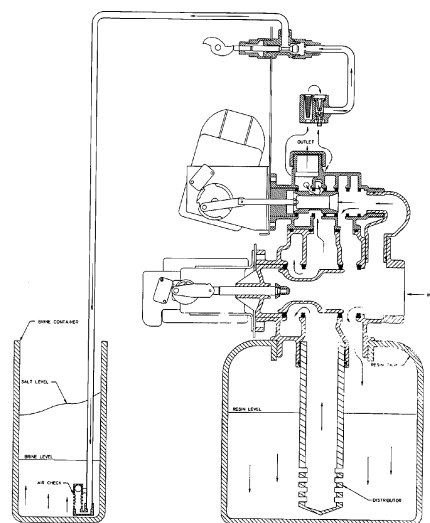
Hard water enters unit at valve inlet — flows thru service adapter for by pass, and up thru coupling to regenerating valve inlet. It then flows thru the regenerating valve piston — down the center tube — thru the bottom distributor and up thru the mineral — around the piston and out the drain line. If optional no hard water by pass piston is used water flow to outlet is prevented by an extended section of the service piston which closes the outlet port from by pass water until the end of rapid rinse.

5 RAPID RINSE



Hard water flows thru the regenerating valve directly down thru the mineral into the bottom distributor and up thru the center tube — around the piston and out the drain line.

6 BRINE TANK FILL POSITION

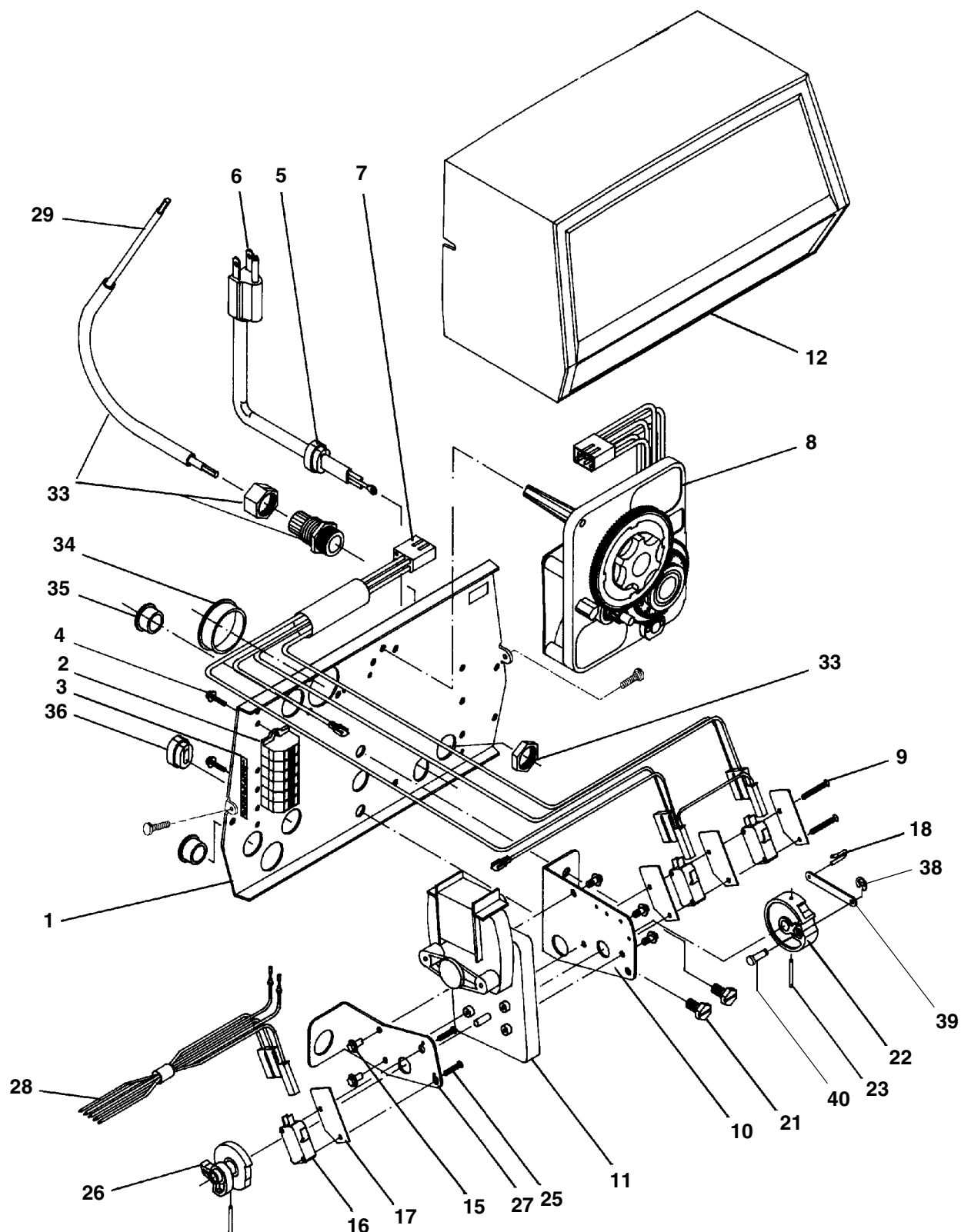


Hard water flows thru the service valve and down thru the mineral. Conditioned water enters the bottom distributor flows up the center tube around the piston to the outlet. Hard water flows to the regenerating valve thru the injector housing and brine valve to fill the brine tank.

MODEL 2900 Upflow

Control Drive Assembly

(See opposite page for parts list)



MODEL 2900 Upflow

Control Drive Assembly

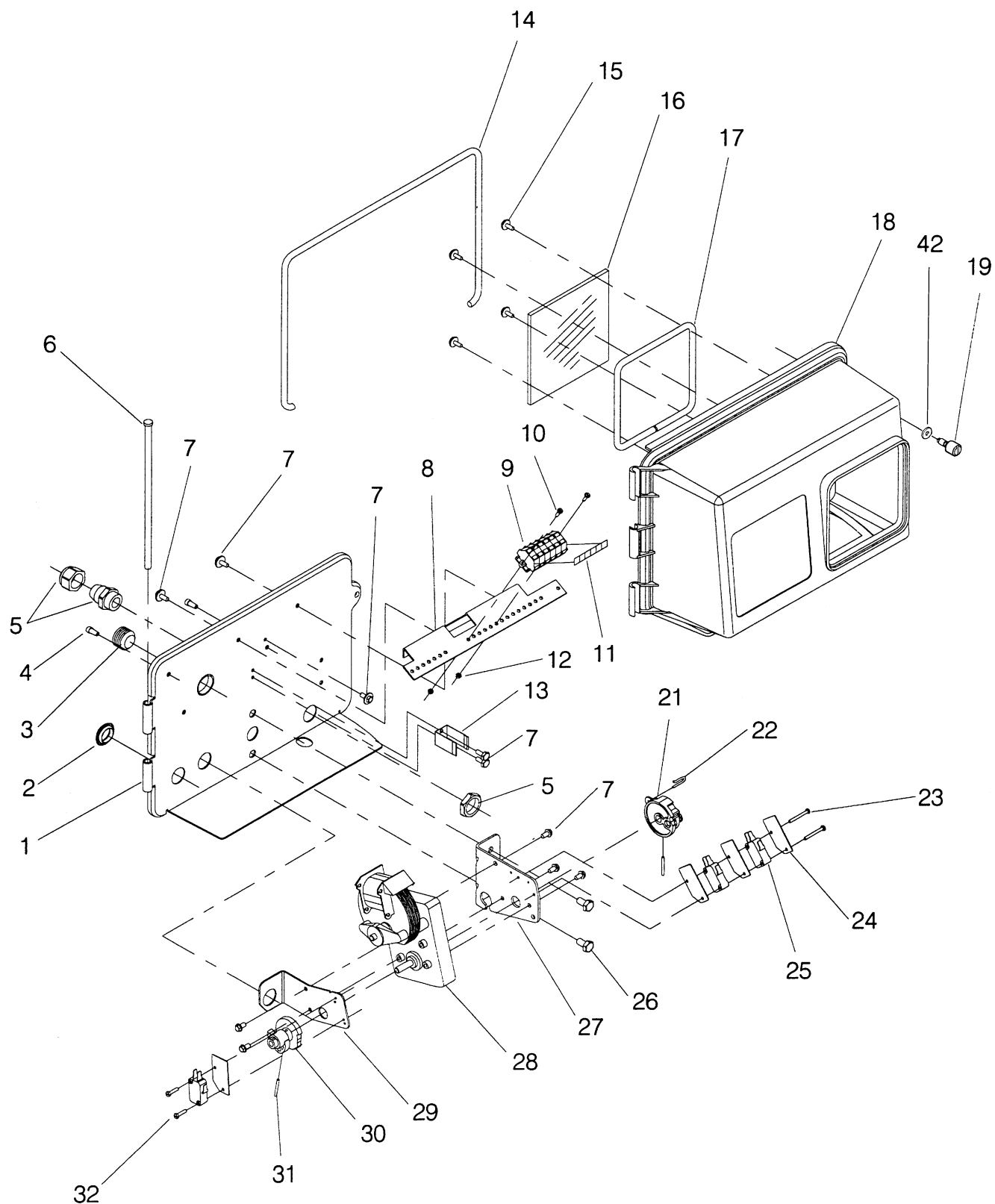
Parts List

Item No.	Quantity	Part No.	Description
1.....	1	40264	Back Plate w/ Thumb Screws
2.....	1	15226-6.....	Terminal Block
3.....	2	15250	Label - Terminal Block
4.....	2	13296	Screws - Terminal Block - #6-20 x 1/2"
5.....	1	13547-01.....	Strain Relief
6.....	1	40084-12.....	Power Cord, 120V, 12 Ft.
7.....	1	11667	Wire Harness
8.....	1		Timer Assembly -Specify 3200, or 3210 Series
9.....	2	14923	Micro Switch Screw - #4-40 x 1"
10.....	1	10774	Motor Bracket
11.....	1	10769	Motor 120V., 60 Hz.
12.....	1	19291-020.....	Designer Cover, 1 Piece
15.....	5	10872	Motor Mount Screw - #8-32 x 5/16"
16.....	3	10218	Micro Switch
17.....	3	10302	Insulator
18.....	1	10909	Connecting Rod Clip
19.....	2	10250	Retaining Ring
21.....	2	10231	Drive Mount Screw
22.....	1	19888	Drive Cam - Std., Upflow
		19750	Drive Cam, Variable Brining (Not Shown)
23.....	2	10338	Drive Roll Pin
25.....	2	11805	Micro Switch Screw
26.....	1	19887	Brine Cam, Std., Upflow
		19749	Brine Cam, Variable Brining (Not Shown)
27.....	1	11826	Motor Bracket - Brine Side
28.....	1	14822	Motor Lead Wires - Pigtail
29.....	1	15216	Meter Cable
33.....	1	15879	Cable Guide, Assembly
34.....	1	17421	Plug, Heyco
35.....	2	13741	Plug, Heyco
36.....	1	14924	Strain Relief, Harness
37.....	2	10300	Screw, Timer Mounting - Not Shown
38.....	1	10250	Retaining Ring
39.....	1	10621	Links, Connecting
40.....	1	13366	Drive, Bearing

MODEL 2900 Upflow (Environmental)

Environmental Control Drive Assembly

(See opposite page for parts list)



MODEL 2900 Upflow (Environmental)

Environmental Control Drive Assembly

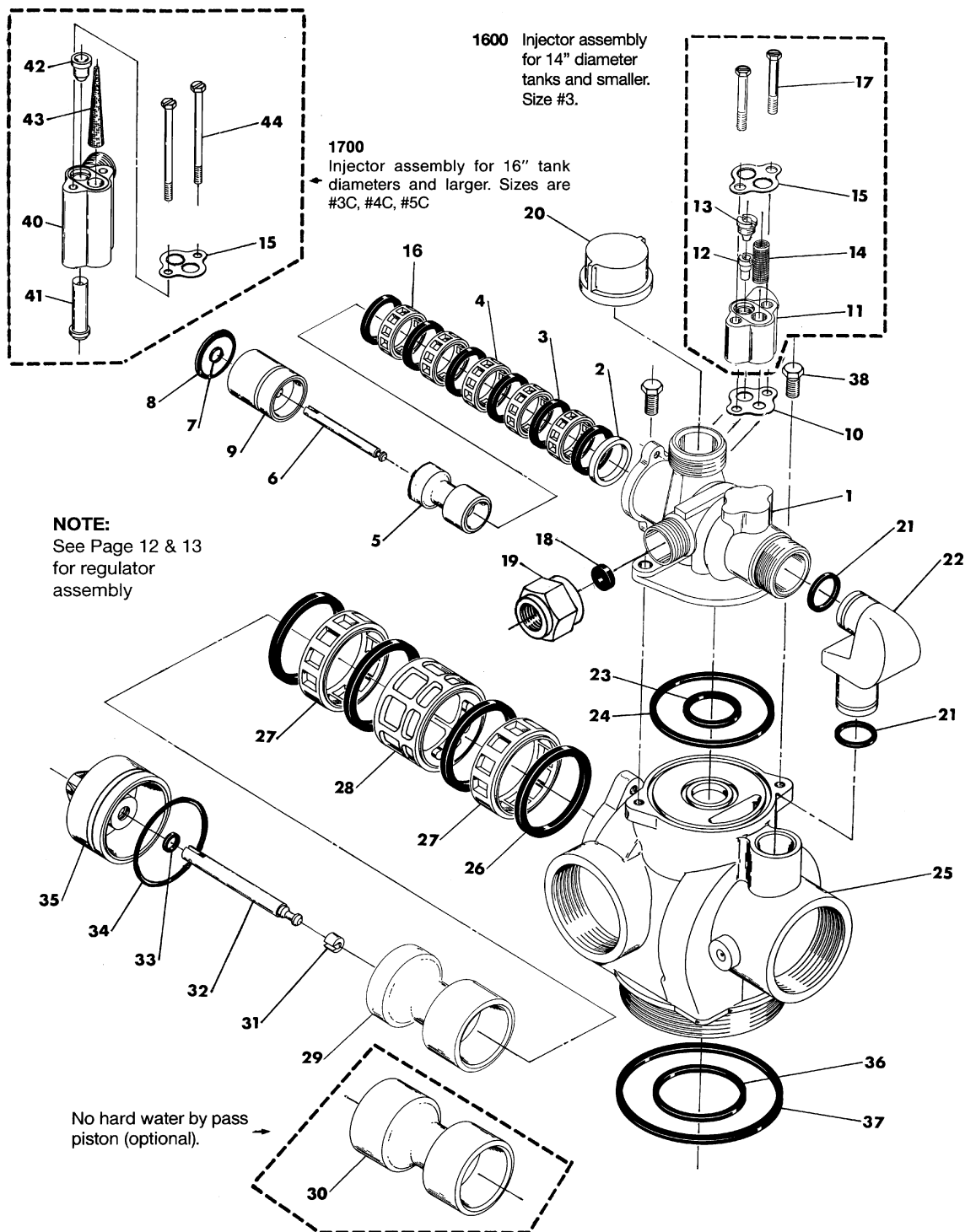
Parts List

Item No.	Quantity	Part No.	Description
1	1	18697-01	Back Plate
	1	18697-13	Back Plate (19 pin connector)
	1	18697-14	Back Plate (9 pin connector)
2	1	18748	Plug, .750 Hole
3	1	18720	Pipe Plug, 1/2-14 NPT
4	3	18747	Plug, .190 Hole
5	1	17967	Fitting, Liquid Tight
6	1	17845-02	Pin, Hinge
7	5	10300	Screw
8	1	18750	Bracket, Terminal
9	1	15226-X	Terminal Strip (X denote number of terminals)
10	2	10299	Screw, Terminal Strip
11	2	15250	Label, Terminal Strip
12	2	12732	Nut, Terminal Strip
13	1	17831-01	Holder, Battery, 9V
14	1	18716-01	Seal, Cover
15	4	19203	Screw, Window
16	1	18745	Window
17	1	18615-02	Seal, Window
18	1	18670-02	Cover, Hinged, Black
	1	18670-07	Cover, Hinged, Blue
19	1	19813	Screw, Cover
20	5	10872	Screw, Motor
21	1	60160-10	Cam, Drive STF
22	1	10909	Pin, Cam
23	2	14923	Screw, Switch
24	4	10302	Insulator
25	3	10218	Micro Switch
26	2	10231	Screw, Motor Bracket
27	1	10774	Bracket, Motor
28	1	10769	Motor, 110V 60 Hz
	1	12292	Motor, 230V 50/60 Hz
	1	13383	Motor, 24V 50 Hz
	1	15073	Motor, 24V 60 Hz
29	1	11826	Bracket, Motor
30	1	12777	Cam, Brine Valve
31	2	10338	Pin, Roll
32	2	11805	Screw, Switch
33	1	11667	Wire Harness, Drive Motor (Systems 4, 5 & 6)
34	1	14822	Wire Harness, Upper Drive (Systems 4, 5 & 6)
35	1	15926	Wire Harness, Lower Drive (System 4)
36	1	14827	Wire Harness, Lower Drive (Systems 5 & 6)
37	1	16564	Wire Harness, Upper Drive (System 7)
38	1	15938	Wire Harness, Lower, Lead Valve (System 7)
39	1	15936	Wire Harness, Lower, Lag Valve (System 7)
40	1	19009	Cable, Interlock, 9 Pin Connector (Systems 5, 6 & 7)
41	1	19010	Receptacle, Interlock, 9 Pin Connector (Sys 5, 6 & 7)
42	1	19856	Washer

MODEL 2900 Upflow

Control Valve

(See opposite page for parts list)



MODEL 2900 Upflow

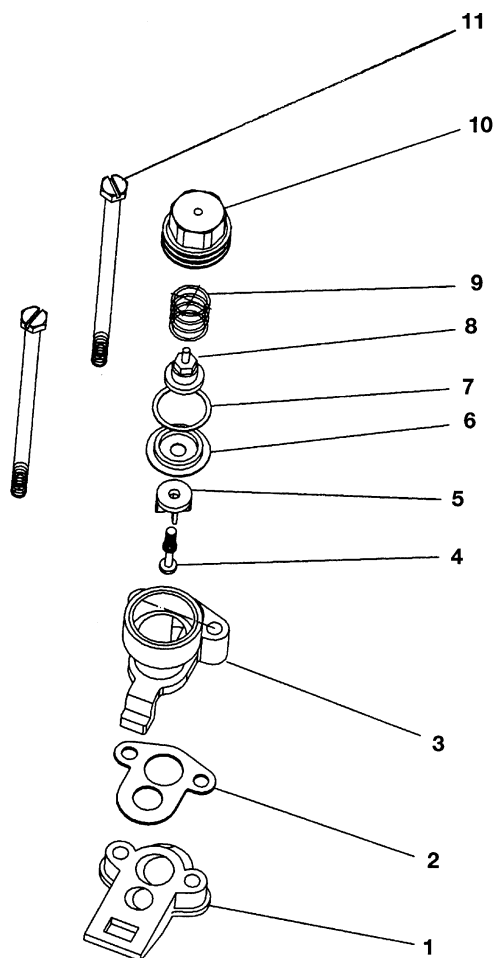
Control Valve

Parts List

Item No.	Quantity	Part No.	Description
1	1	19401	Valve Body
2	1	10757	End Spacer
3	6	10545	Seal
4	4	11451	Spacer
5	1	19454	Piston
6	1	14452	Piston Rod
7	1	10209	Quad Ring - Piston Rod
8	1	40078	O-Ring - End Plug
9	1	10598-03	End Plug Assembly
10	1	14805	Injector Body Gasket
11	1	17776-02	Injector Body
12	1	10914	Injector Throat
13	1	10913	Injector Nozzle #3, Yellow
14	1	19479	Injector Screen
15	1	19925	Injector Gasket, Regulator
16	1	19457	Spacer, Upflow, Red
17	2	19740	Screw - Injectory Body
18	1		Washer - Flow Control - Specify Size
19	1	15177	Flow Control Housing
20	1	12248	1", NPT Pipe Cap
21	2	14812	O-Ring Coupling
22	1	14751	Coupling
23	1	11710	O-Ring - Regeneration Port
24	1	11208	O-Ring - Regeneration Port
25	1	14750-01	2" Adapter Valve
26	4	11720	Seal
	4	11720-02	Seal, Silicone
27	2	10369	Spacer
28	1	14753	Spacer
29	1	14757	Piston
30	1	14752	Piston - No Hard Water By Pass
31	1	14818	Piston Rod Clip
32	1	14758	Piston Rod
33	1	14926	Quad-Ring - Piston Rod
34	1	14922	O-Ring - End Plug
35	1	14754-00	End Plug Assembly (White)
		14754-10	End Plug Assembly - No Hard Water
		19276	End Plug Assembly - Hot Water
36	1	13577	O-Ring - Distributor
37	1	13575	O-Ring - Top of Tank
	1	15210	O-Ring - Top of "Park" Tank
38	2	11224	Screw - Valve Mounting
39			Not Assigned
40	1	17777-02	Injector Body
41	1	*14802	Injector Throat
42	1	*14801	Injector Nozzle
43	1	19478	Injector Screen
44	2	19718	Screw-Injector Body
45	1	16221	Air Disperser - 1600 Injector (not show)
46	1	19608-15	Upper Disperser (not shown)
	*Injector Throat	*Injector Nozzle	Size Color
	14802-03	14801-03	#3C Yellow
	14802-04	14801-04	#4C Green
	14802-05	14801-05	#5C White
	14802-06	14801-06	#6C Red

MODEL 2900 Upflow

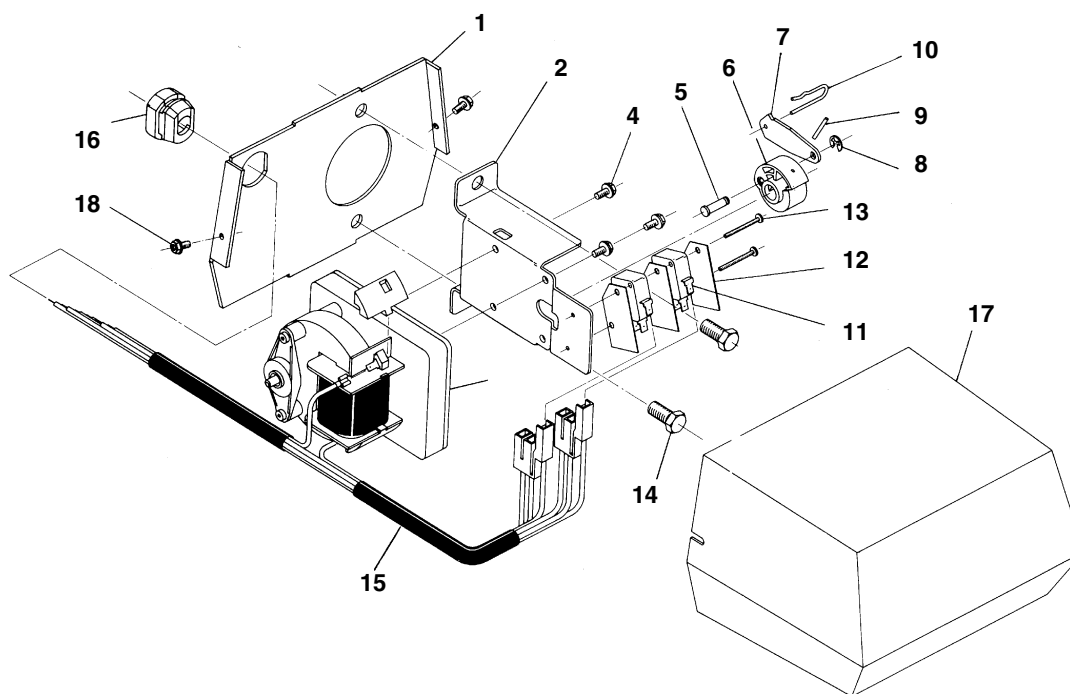
Regulation Assembly 1600/1700



Item No.	Quantity	Part No.	Description
1	1	19482	Adapter, Regulator, 1600
		19482-01	Adapter, Regulator, 1700
2	1	19452	Gasket, Regulator, 1600
		19925	Gasket, Regulator, 1700
3	1	19464	Body, Regulator, 1600
		19464-01	Body, Regulator, 1700
4	1	19462	Stem, Regulator, 1600
		19924	Stem, Regulator, 1700
5	1	19463	Seat, Regulator
6	1	18568	Diaphragm, Regulator
7	1	14848	Washer, Regulator
8	1	18571	Retainer, Regulator
9	1	18837	Spring, Regulator, 1600
		19917	Spring, Regulator, 1700
10	1	18570	Cap, Regulator
11	2	19718	Screw, Injector Body

MODEL 2900 Upflow

Adapter Control Drive



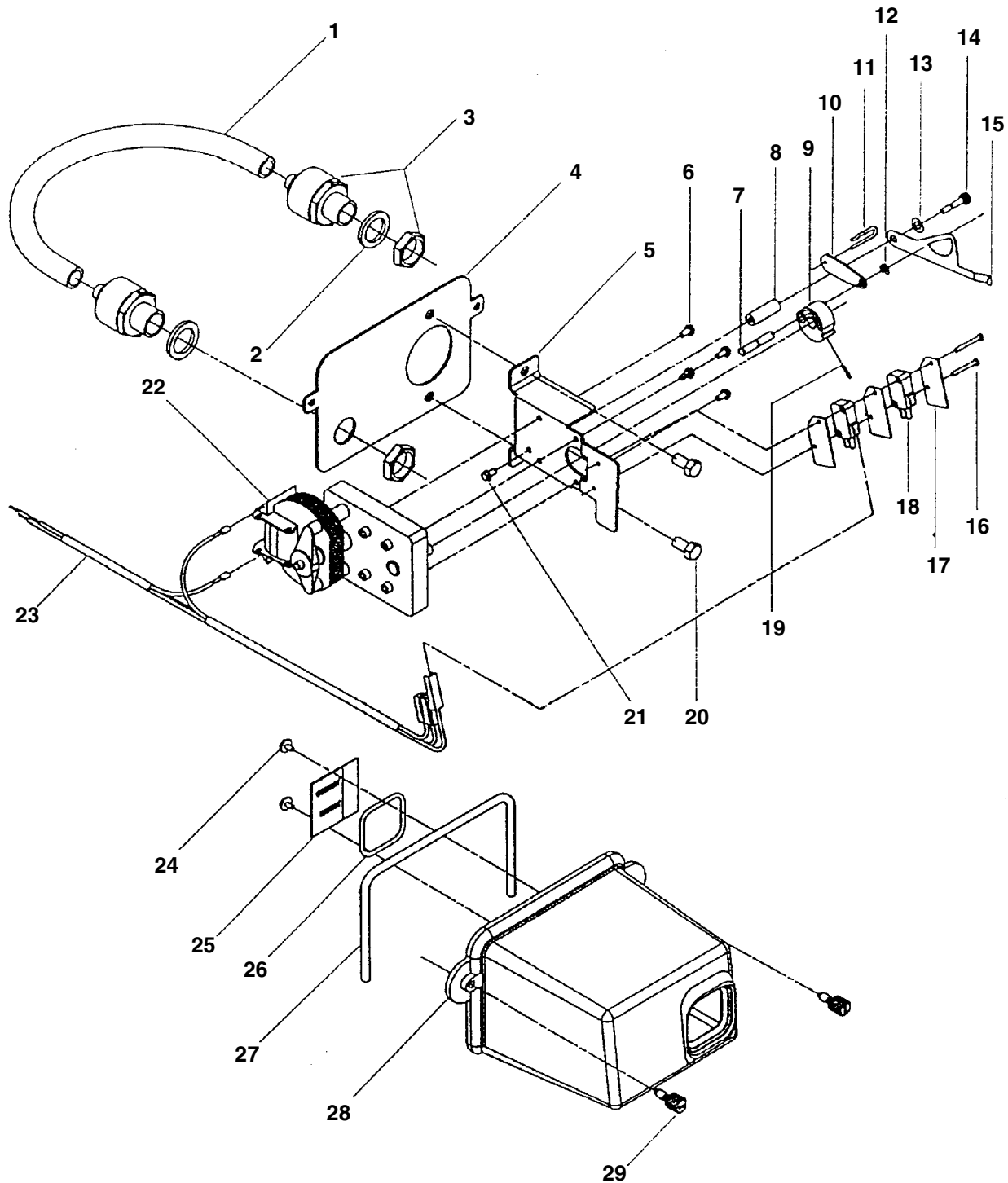
PARTS LIST

Item No.	Quantity	Part No.	Description
1.....	1	14770.....	Back Plate
2.....	1	14769.....	Motor Bracket
3.....	1	14772.....	Motor-110V., 60 Hz
4.....	4	10872.....	Screw - Motor Mtg.
5.....	1	14784.....	Connecting Rod Bearing
6.....	1	14775.....	Drive Cam
7.....	1	14759.....	Piston Drive Link
8.....	1	10250.....	Retaining Ring
9.....	1	15493.....	Pin Drive Cam Mtg.
10.....	1	14813.....	Spring Clip
11.....	1	10218.....	Micro Switch - System 4
12.....	2	10302.....	Insulator - System 4
13.....	2	19849.....	Screw - Micro Switch - System 4
14.....	2	11224.....	Screw - Drive Mounting
15.....	1	15926.....	Wire Harness #4
16.....	1	14924.....	Strain Relief
17.....	1	14800.....	Cover
18.....	2	15236.....	Screw Assy-Cover

MODEL 2900

Lower Environmental Control Drive

(See opposite page for parts list)



MODEL 2900

Lower Environmental Control Drive

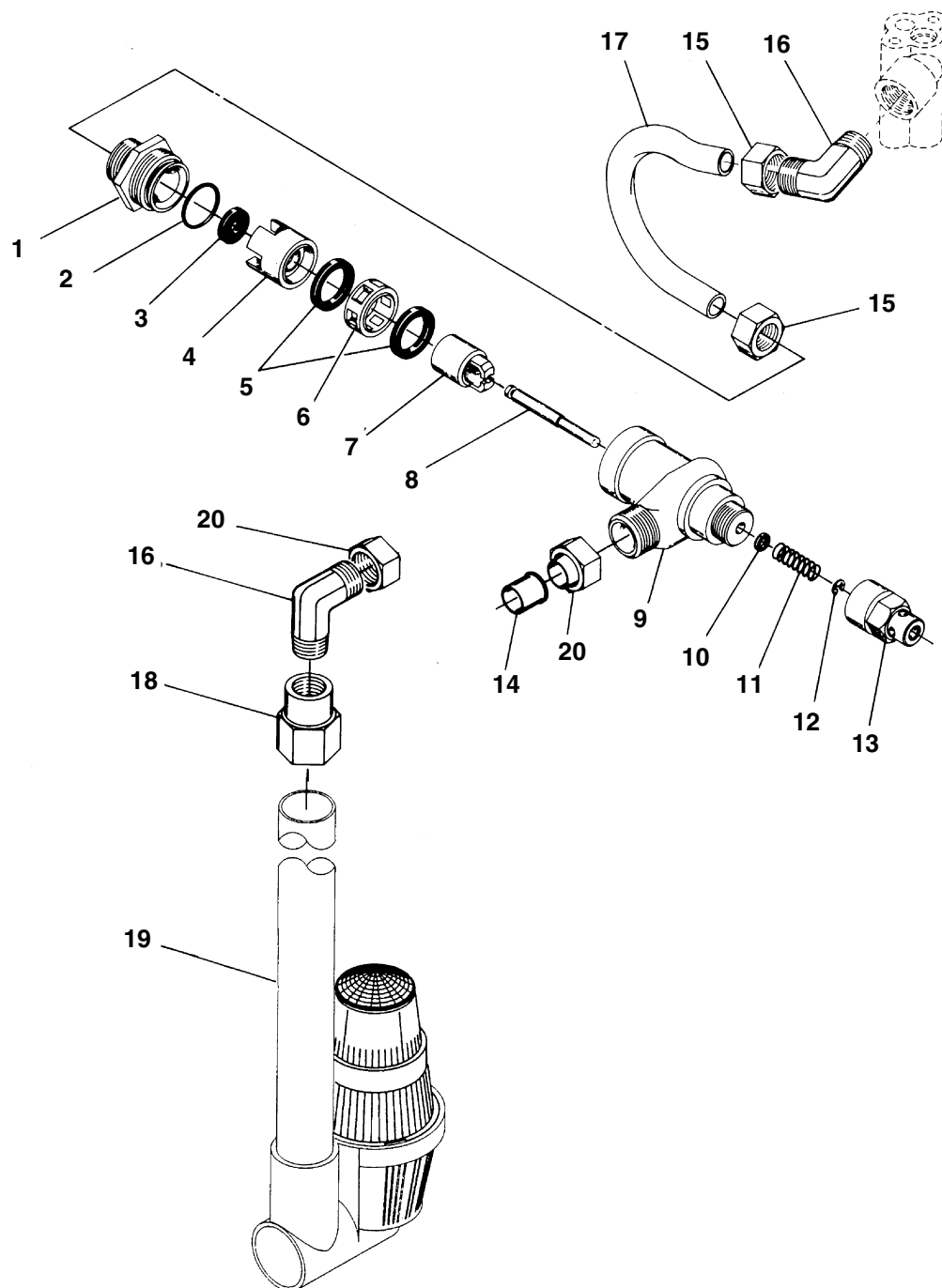
Parts List

Item No.	Quantity	Part No.	Description
1.....	1	18693	Conduit, Interdrive
2.....	2	18692	Washer, Sealing
3.....	2	18691	Connector, Conduit
4.....	1	18709	Back Plate, Lower
5.....	1	14769	Bracket, Motor
6.....	4	10872	Screw, Motor
7.....	1	18746	Bearing, Connecting Rod
8.....	1	18726	Spacer, Indicator
9.....	1	14775	Cam, Drive
10	1	14759	Link, Piston Rod
11	1	14813	Pin, Spring
12	1	10250	Retaining Ring
13	1	18727	Washer, Curved Spring
14	1	15742	Screw, Indicator
15	1	18725	Indicator, Off Line / Service / On Line
16	2	11805	Screw, Switch, System 4
	2	14923	Screw, Switch, Systems 5, 6 & 7
17	2	10302	Insulator Switch, System 4
	3	14923	Screw, Switch, Systems 5, 6 & 7
18	1	10218	Micro Switch, System 4
	2	10218	Micro Switch, Systems 5, 6 & 7
19	1	11381	Pin, Cam
20	2	11224	Screw, Motor Bracket
21	1	10872	Screw, Spacer
22	1	14772	Motor, 110V 50/60 Hz
	1	15305	Motor, 220V 50/60 Hz
	1	15651	Motor, 24V 50 Hz
	1	15653	Motor, 24V 60 Hz
23	1	19015	Wire Harness, System 4
	1	19016	Wire Harness, Systems 5 & 6
	1	19017	Wire Harness, System 7, Lead Valve
	1	19018	Wire Harness, System 7, Lag Valve
24	2	14430	Screw, Window
25	1	18724	Window
26	1	18615-03	Seal, Window
27	1	18716-02	Seal, Cover
28	1	18708-02	Cover, Lower, Black
	1	18708-07	Cover, Lower, Blue
29	2	18744	Screw, Cover
NOTE: For System 7 Lead Only, Add			
	1	10218	Micro Switch (Not Shown)
	2	10302	Insulator (Not Shown)
	2	11805	Mtg. Screw (Not Shown)
	1	15713	Mtg. Plate (Not Shown)
	1	16103	Insulator (Not Shown)

MODEL 2900 Upflow

1700 Brine System

(See opposite page for parts list)



MODEL 2900 Upflow

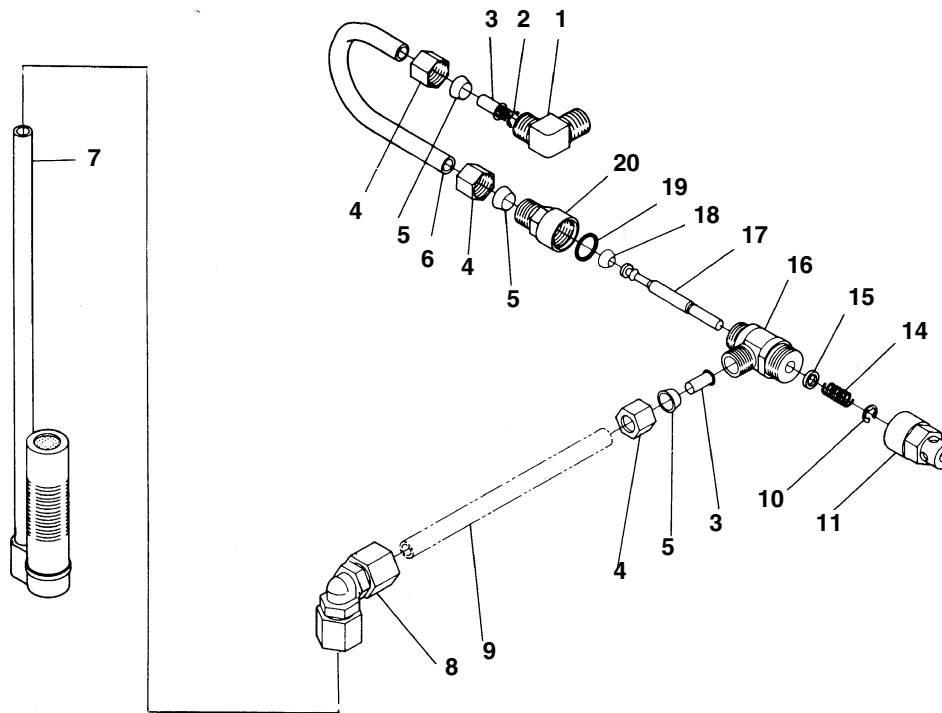
1700 Brine System

Parts List

Item No.	Quantity	Part No.	Description
1.....	1	14792	End Plug
2.....	1	13201	O-Ring - End Plug
3.....	1	12085	Flow Washer 1.2 GPM
		12086	Flow Washer 1.5 GPM
		12087	Flow Washer 2.0 GPM
		12088	Flow Washer 2.4 GPM
		12089	Flow Washer 3.0 GPM
		12090	Flow Washer 3.5 GPM
		12091	Flow Washer 4.0 GPM
		12092	Flow Washer 5.0 GPM
4.....	1	14785	Flow Control Retainer
5.....	2	14811	Piston Seals
6.....	1	14798	Spacer
7.....	1	14795	Brine Valve Piston
8.....	1	14797	Brine Valve Stem
9.....	1	14790	Brine Valve Body
10	1	12550	Quad Ring - Brine Spring Stem
11	1	15310	Spring - Brine Valve
12	1	10250	Retaining Ring
13	1	15517	Stem Guide
14	2	15415	Insert
15	2	15414	Nut Ferrule 1/2"
16	2	15413	Elbow
17	1	19682	Brine Tube
18	1	16977	Reducer Coupling, NPT 1/2 to 3/8
19	1	60009	#900 Air Check Assembly
		60009-01	#900 Air Check Assembly, Hot Water
20	2	15414	Tube Nut 1/2" Sleeve Assembly

MODEL 2900 Upflow

1600 Series Brine System



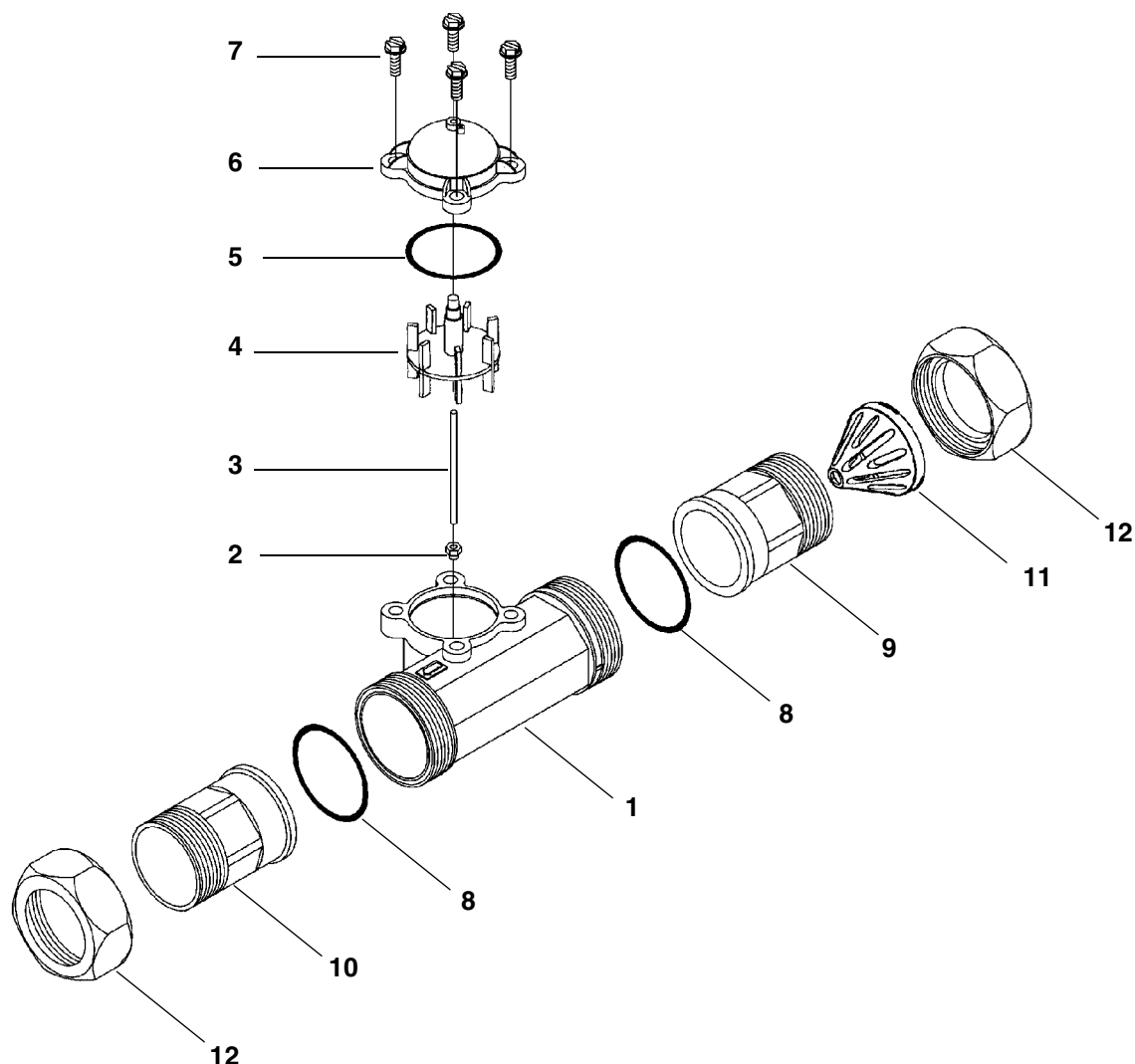
PART LIST

Item No.	Quantity	Part No.	Description
1	1	10328	90° Elbow - 1/4 Pipe Thd. to 3/8 Tube
2	1	12767	Brine Line Screen
3	2	10332	Insert Sleeve (3/8 Tube)
4	3	10329	Fitting Nut (3/8 Tube)
5	3	10330	Derlin Sleeve (3/8 Tube)
6	1	14703-02	Brine Valve Tube
7	1	60002	#500 Air Check Assembly
		60003	#500 Air Check Assembly, Hot Water
8	1	12794	90° Elbow - 3/8 Tube to 3/8 Tube
9	1	Not Supplied	Brine Line Tube (3/8 Flexible Tube)
10	1	10250	Retaining Ring
11	1	11749	Stem Guide
12			Not Assigned
13			Not Assigned
14	1	10249	Brine Valve Spring
15	1	12550	Quad Ring
16	1	12748	Brine Valve Body
17	1	12552	Brine Valve Stem
18	1	12626	Brine Valve Seat
19	1	11982	O-Ring
20	1	60020-25	BLFC .25 GPM
		60020-50	BLFC .50 GPM
		60020-100	BLFC 1.0 GPM

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MODEL 2900 Upflow

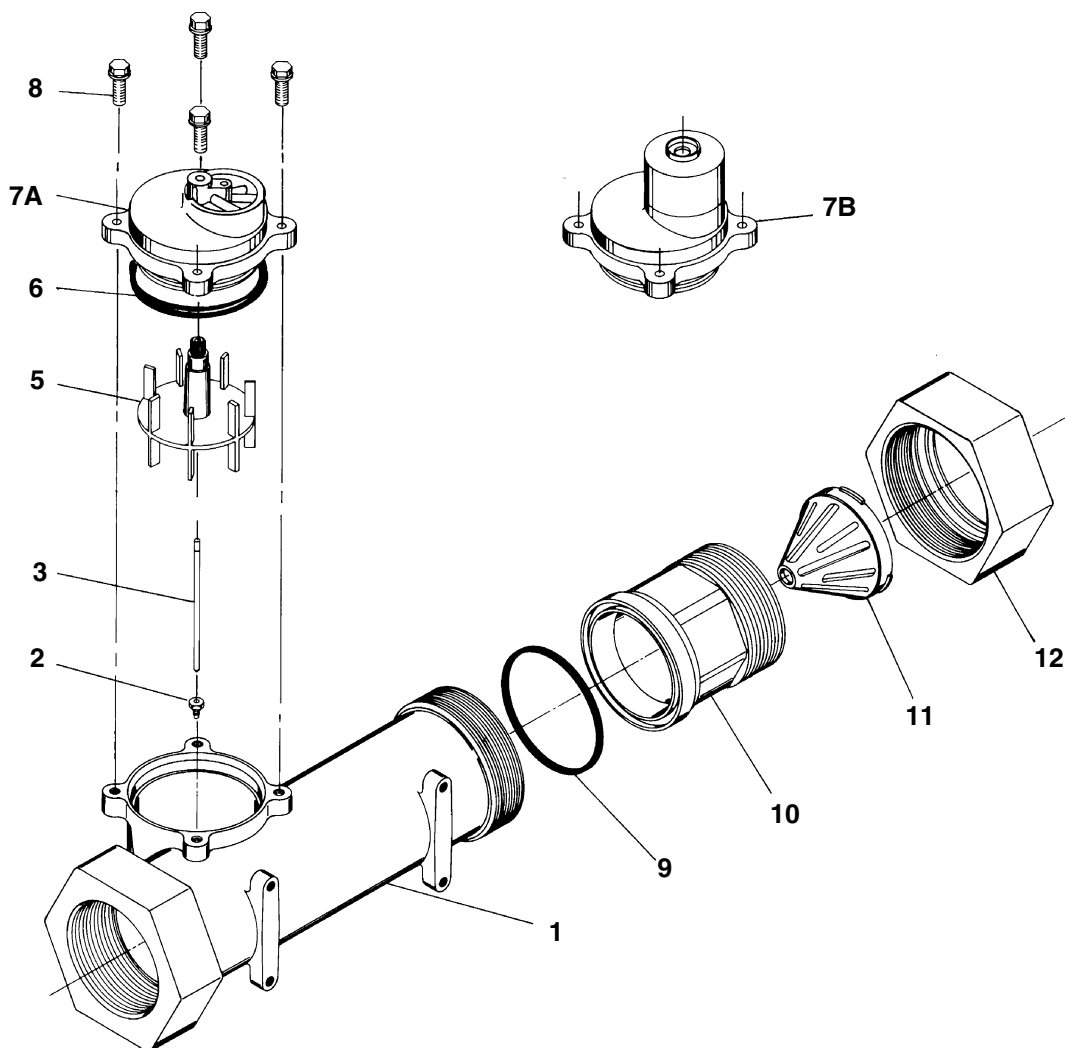
2" Plastic Meter Assembly



Item No.	Quantity	Part No.	Description
1	1	17689	Body, Meter, 2" Plastic
2	1	15532	Shaft, Impeller Seat
3	1	15432	Shaft, Impeller
4	1	15374	Impeller Assembly, 2" Meter
5	1	13847	O-Ring, -137, Meter
6	1	14038	Meter Cap Assembly (Standard Range)
	1	15150	Meter Cap Assembly (Extended Range)
7	4	12473	Screw, Hex Washer, 10-24 x 5/8
8	2	19485	O-Ring, -141, Meter
9A.	1	17987-001	Fitting, Nipple, 2", Plastic, NPT, Machined
9B.	1	17987-101	Fitting, Nipple, 2", Plastic, BSP, Machined
10A.	1	17987-000	Fitting, Nipple, 2", Plastic, NPT
10B.	1	17987-100	Fitting, Nipple, 2", Plastic, BSP
11	1	14680	Flow Straightener
12	2	17988	Nut, 2" Meter

MODEL 2900 Upflow

2" Meter Assembly



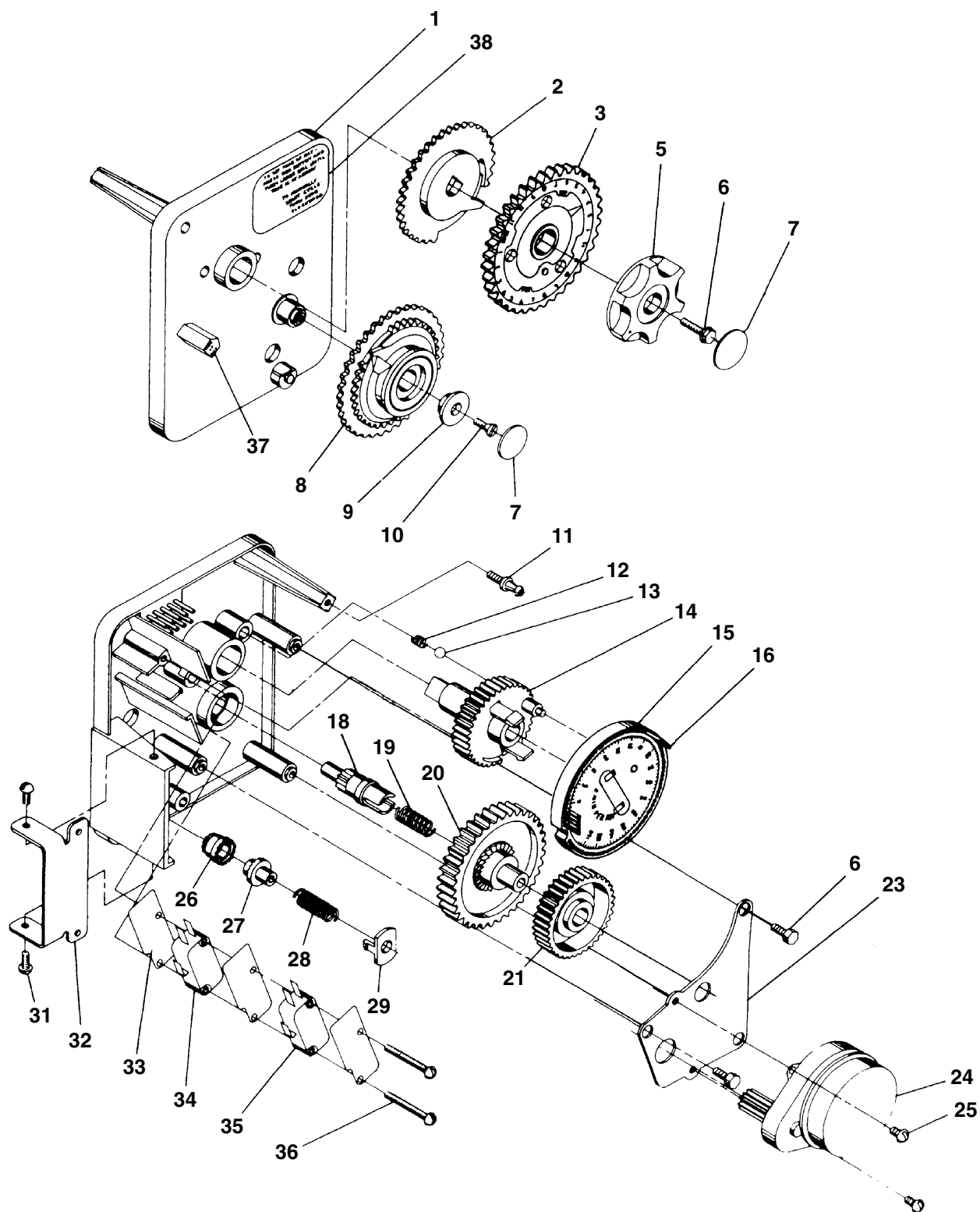
PARTS LIST

Item No.	Quantity	Part No.	Description
1.....	1	14456	Meter Body
2.....	1	15532	Impeller Shaft Retainer
3.....	1	15432	Impeller Shaft
4.....			Not Assigned
5.....	1	15374	Impeller
6.....	1	13847	O-Ring - Meter Cover
7A.....	1	15218	Meter Cover Assembly (Standard)
7B.....	1	15237	Meter Cover Assembly (Extended Range)
8.....	4	12112	Screw - Meter Cover
9.....	1	14679	O-Ring - Quick Connect
10.....	1	14568	Nipple - Quick Connect
11.....	1	14680	Flow Straightener
12.....	1	14569	Nut - Quick Connect

MODEL 2900 ECONOMINDER®

Timer Assembly

(See opposite page for parts list)



MODEL 2900 ECONOMINDER®

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 Assembly, 12 Midnight
		40096-02.....	24 Hour Gear Assembly, 2 AM
5.....	1	13886-01.....	Knob
6.....	4	13296	Screw - Timer Knob & Motor Plate Mtg.
7.....	2	11999	Button Decal
8.....	1	60405-50.....	Program Wheel Assembly, 0-21,000
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 in. dia.
14.....	1	13911	Main Drive Gear
15.....	1	19210	Program Wheel Assembly
16.....	21	15493	Roll Pin
17.....			Not Assigned
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
Not Shown....	1	15465	Caution Label
Not Show.....	1	14198	Capacity Label

MODEL 2900 ECONOMINDER®

2" 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 available opposite the small white dot on the program wheel gear. Note, drawing shows 8,750 gallon setting. The capacity (gallons) arrow denotes remaining gallons exclusive of fixed reserve.

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 opposite 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.

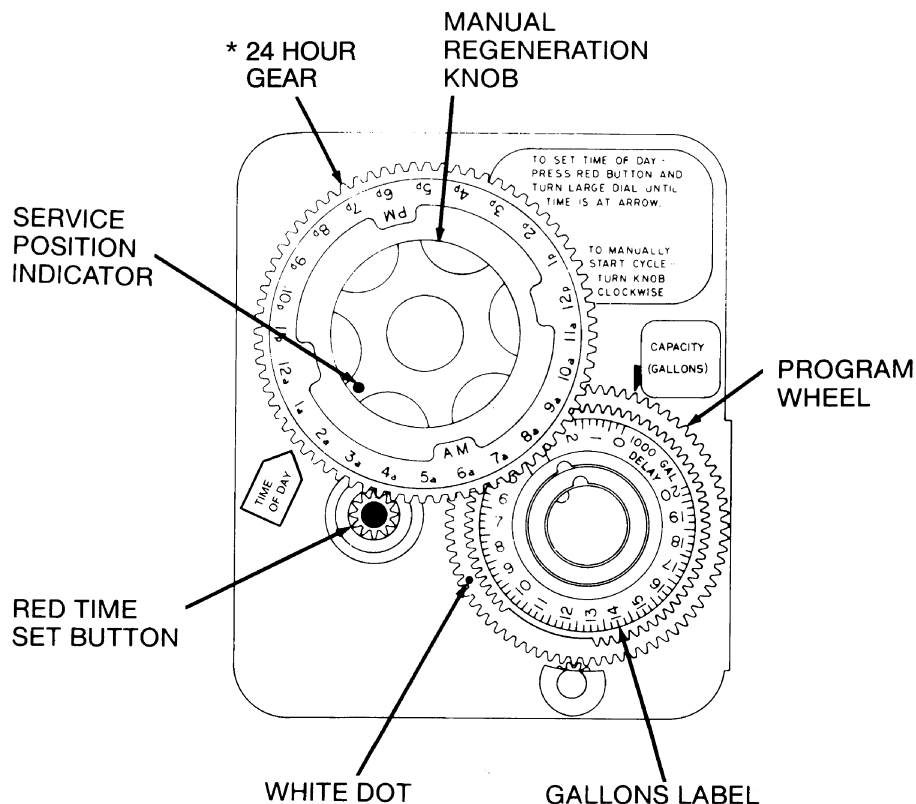
The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.

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



NOTE:

To set meter capacity rotate manual knob one - 360° revolution to set gallonage.

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

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.

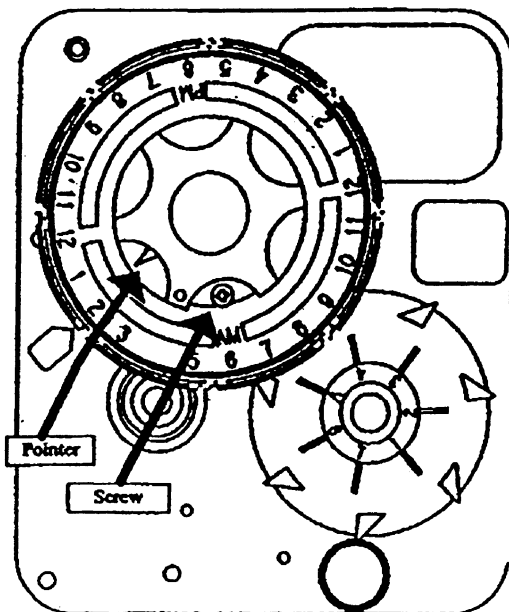
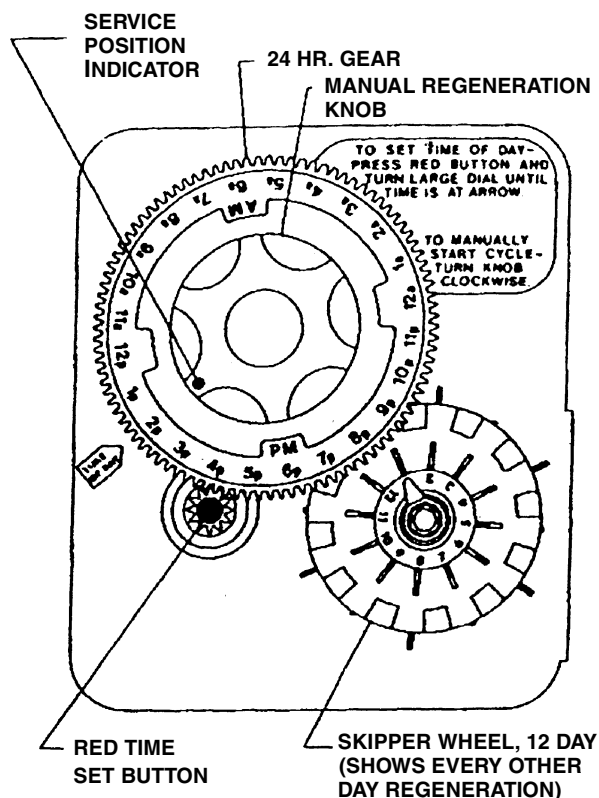
The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.

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

Regenerating Cycle Program Setting Procedure

Standard Upflow

How To Set The 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 equals 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.)

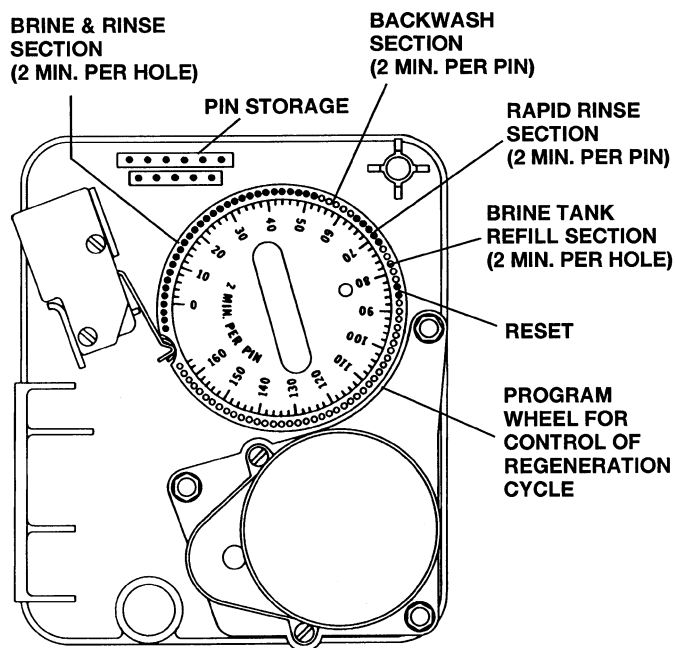
To change the length of rapid rinse time, add or remove pins at the higher numbered end of this section as required. The number of pins times two equals the rapid rinse time in minutes.

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 micro-switch drops into the notch on the program wheel.



MODEL 2900 Upflow

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. Injector Screen Plugged. D. Insufficient Water Flowing Into Brine Tank E. Hot Water Tank Hardness. F. Leak At Distributor Tube. G. Internal Valve Leak. H. Service Adapter Did Not Return To Service.	A. Close By-Pass Valve. B. Add Salt To Brine Tank and Maintain Salt Level Above Water Level. C. Clean Injector Screen. D. Check Brine Tank Fill Time And Clean Brine Line Flow Control If Plugged. E. Repeated Flushings Of The Hot Water Tank is Required. F. Make Sure Distributor Tube Is Not Cracked. Check O-Ring And Tube Pilot G. Replace Seals and Spacers And/Or Piston. H. Check Drive Motor And Switch.
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 Pipes By Recent Work Done On Plumbing System.	A. Clean Line To Water Conditioner. B. Clean Control and Add Mineral Cleaner to Mineral Bed. Increased Frequency of Regeneration. C. Remove Piston 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.

MODEL 2900 Upflow

Service Instructions (Cont'd.)

PROBLEM	CAUSE	CORRECTION
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. D. Foreign Material In Brine Valve. E. Foreign Material In Brine Line Flow Control.	A. Clean Flow Control. B. Clean Injector and Screen. C. Replace Timer. D. Replace Brine Valve Seat And Clean Valve. E. Clean Brine Line Flow Control.
8. Softener Fails To Draw Brine.	A. Drain Line Flow Control Is Plugged. B. Injector Is Plugged. C. Injector Screen Plugged. D. Line Pressure Is Too Low. E. Internal Control Leak F. Service Adapter Did Not Cycle.	A. Clean Drain Line Flow Control. B. Clean Injector. C. Clean Screen. D. Increase Line Pressure To 20 P.S.I. E. Change Seals, Spacers and Piston Assembly. F. Check Drive Motor And Switches.
9. Control Cycles Continuously.	A. Misadjusted, Broken or Shorted Switch.	A. Determine If Switch or Timer Is Faulty and Replace It or Replace Complete Power Head.
10. Drain Flows Continuously.	A. Valve Is Not Programming Correctly. B. Foreign Material In Control. C. Internal Control Leak	A. Check Timer Program and Positioning of Control. Replace Power Head Assembly If Not Positioning Properly. B. Remove Power Head Assembly And Inspect Bore. Remove Foreign Material and Check Control In Various Regeneration Positions. 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.

MODEL 2900 Upflow

**Typical Timer Settings at Various Salting Levels*

Salting @ 6# Per Ft³

Tank Dia. Volume of Resin	B/W Rate-GPM	B/W Time-Min.	Inj. Size	Brine and Slow Rinse Time-Minutes @ 6# Per Ft³			Fast Rinse Time (min.)	Brine Refill Rate GPM	Brine Tank Refill Time-Minutes @ 6# Per Ft³
				35 PSI	60 PSI	90 PSI			
14" 3 Ft³	5.0	10	3	38	30	26	10	1.0	6 min. 18 lb.
16" 4 Ft³	7.0	10	3C	36	30	26	10	1.2	8 min. 24 lb.
21" 7 Ft³	10.0	10	4C	40	32	30	10	2.4	8 min. 42 lb.
22" 7 Ft³	12.0	10	4C	40	32	30	10	2.0	8 min. 42 lb.
24" 10 Ft³	15.0	10	4C	58	48	42	10	2.0	10 min. 60 lb.
30" 15 Ft³	25.0	10	5C	64	52	48	10	4.0	8 min. 96 lb.

Salting @ 10# Per Ft³

Tank Dia. Volume of Resin	B/W Rate-GPM	B/W Time-Min.	Inj. Size	Brine and Slow Rinse Time-Minutes @ 10# Per Ft³			Fast Rinse Time (min.)	Brine Refill Rate GPM	Brine Tank Refill Time-Minutes @ 10# Per Ft³
				35 PSI	60 PSI	90 PSI			
14" 3 Ft³	5.0	10	3	58	50	42	10	1.0	10 min. 30 lb.
16" 4 Ft³	7.0	10	3C	60	48	44	10	1.2	12 min. 42 lb.
21" 7 Ft³	10.0	10	4C	66	54	50	10	2.0	12 min. 72 lb.
22" 7 Ft³	12.0	10	4C	66	54	50	10	2.0	12 min. 72 lb.
24" 10 Ft³	15.0	10	4C	96	78	70	10	2.0	16 min. 96 lb.
30" 15 Ft³	25.0	10	5C	106	86	78	10	4.0	12 min. 144 lb.

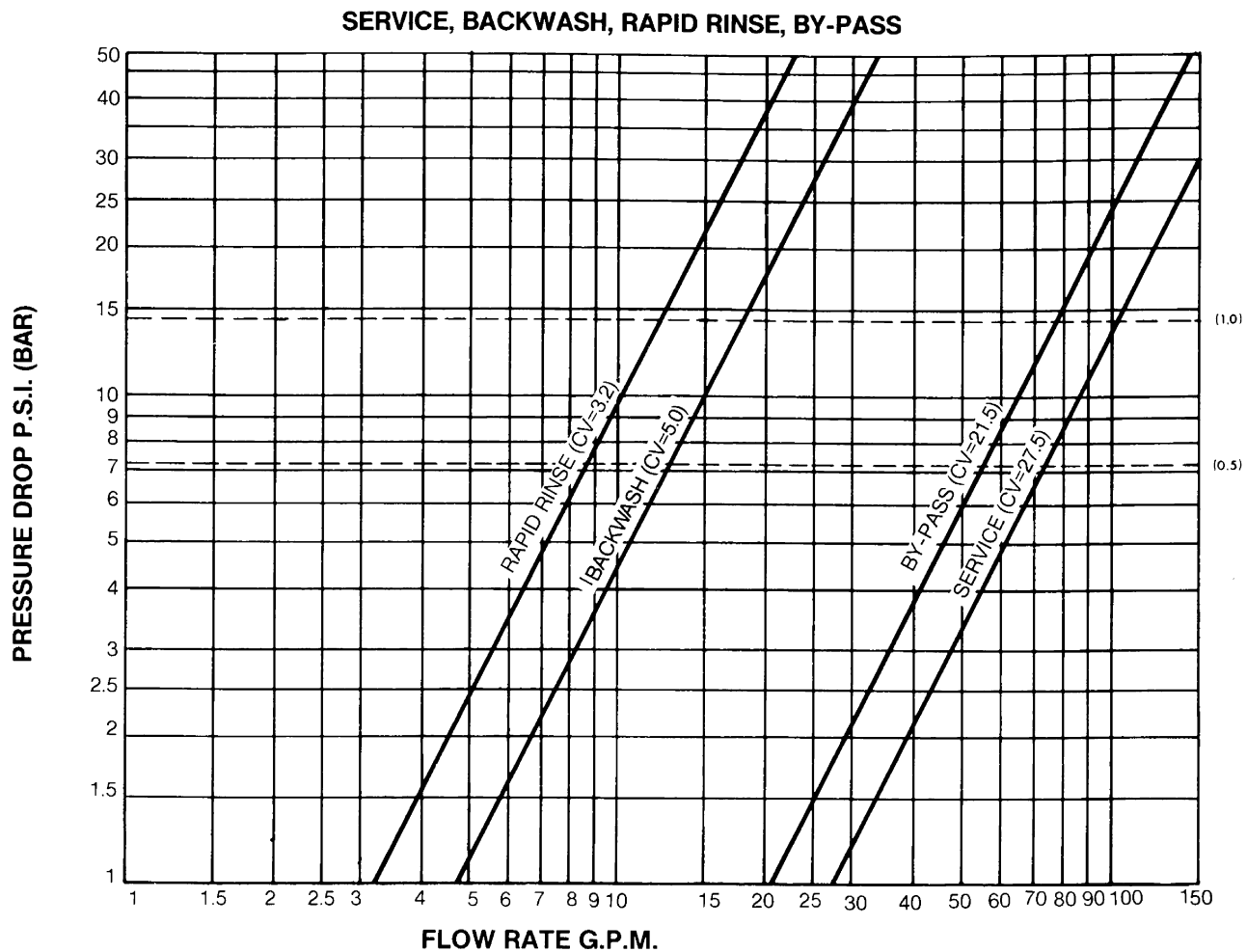
Salting @ 15# Per Ft³

Tank Dia. Volume of Resin	B/W Rate-GPM	B/W Time-Min.	Inj. Size	Brine and Slow Rinse Time-Minutes @ 15# Per Ft³			Fast Rinse Time (min.)	Brine Refill Rate GPM	Brine Tank Refill Time-Minutes @ 15# Per Ft³
				35 PSI	60 PSI	90 PSI			
14" 3 Ft³	5.0	10	3	62	52	46	10	1.0	16 min. 48 lb.
16" 4 Ft³	7.0	10	3C	86	70	62	10	1.2	18 min. 64 lb.
21" 7 Ft³	10.0	10	4C	90	78	70	10	2.0	18 min. 108 lb.
22" 7 Ft³	12.0	10	4C	90	78	70	10	2.0	18 min. 108 lb.
24" 10 Ft³	15.0	10	5C	96	82	70	10	5.0	10 min. 150 lb.
30" 15 Ft³	25.0	10	6C	116	100	88	10	5.0	16 min. 240 lb.

*Due to varying water conditions, tank sizes and water pressures, the above settings should only be used as a guideline.

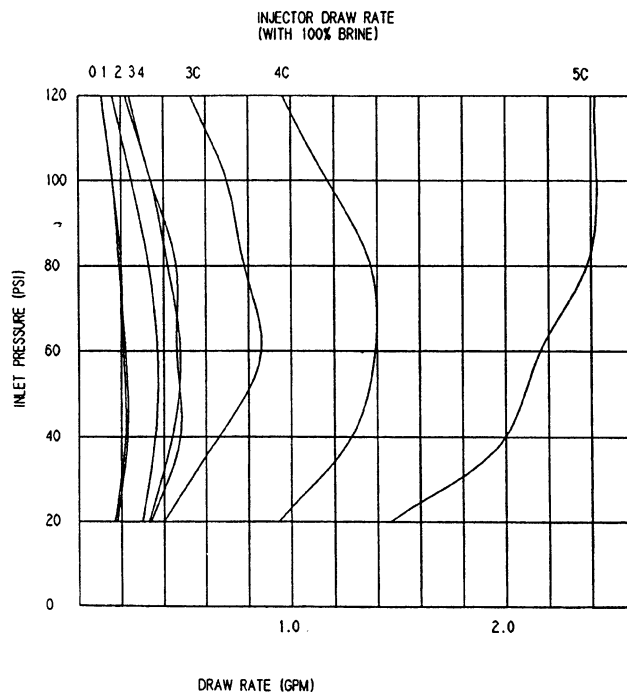
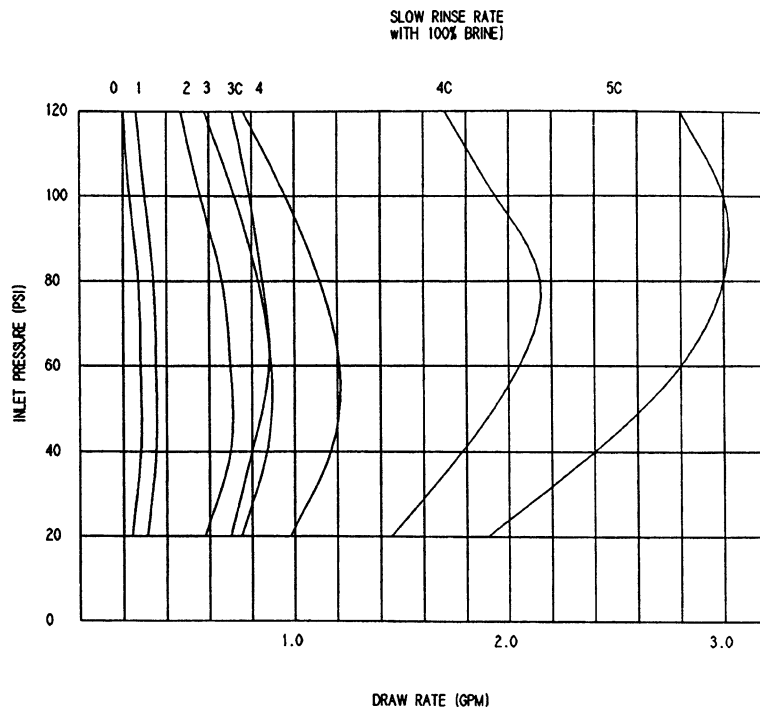
MODEL 2900 Upflow

Flow Data & Injector Draw Rates



MODEL 2900 Upflow

Injector Draw Rate & Slow Rinse Rate

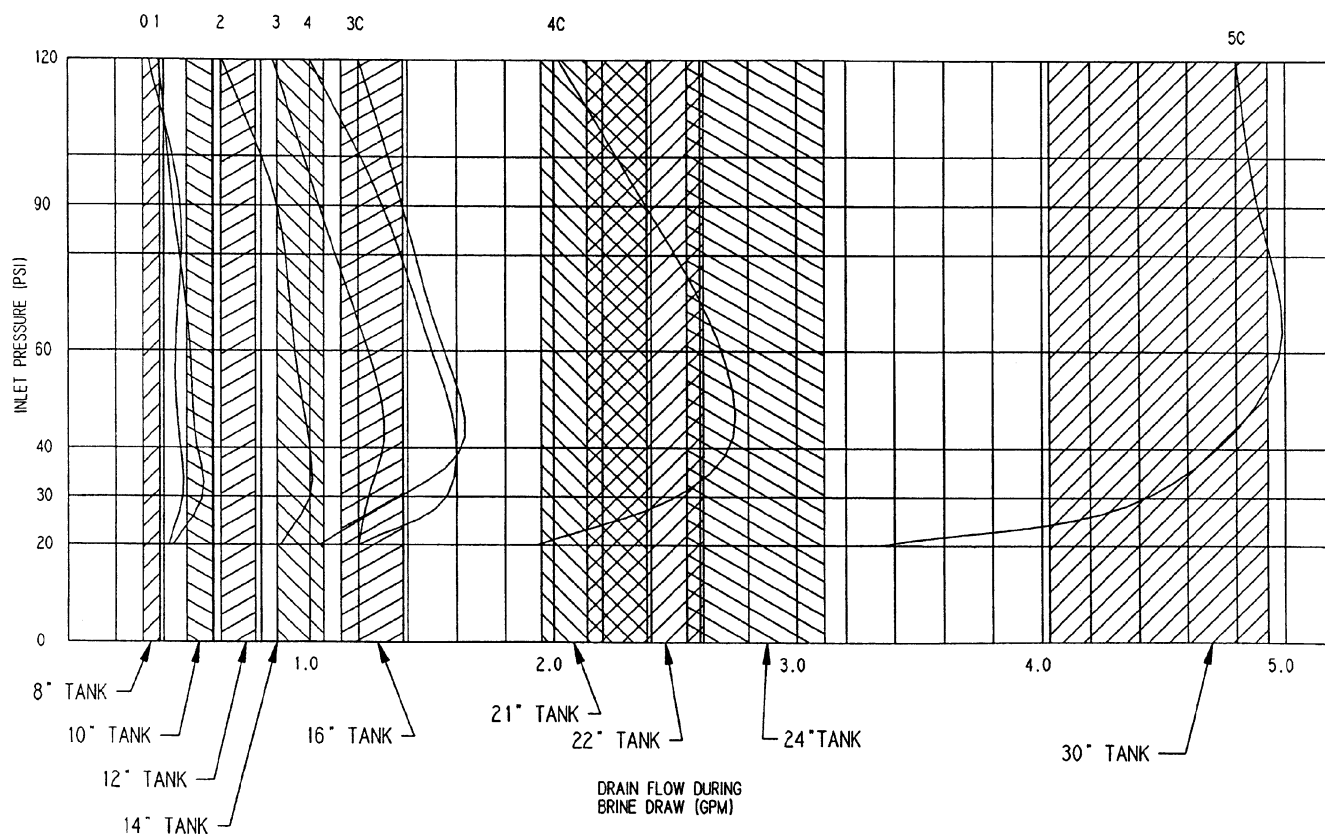


INJECTORS 0, 1, 2, 3, 4 - TESTED W/ 1/2 CUBE RESIN
INJECTORS 3C, 4C, 5C - TESTED W/ 1 CUBE RESIN

MODEL 2900 Upflow

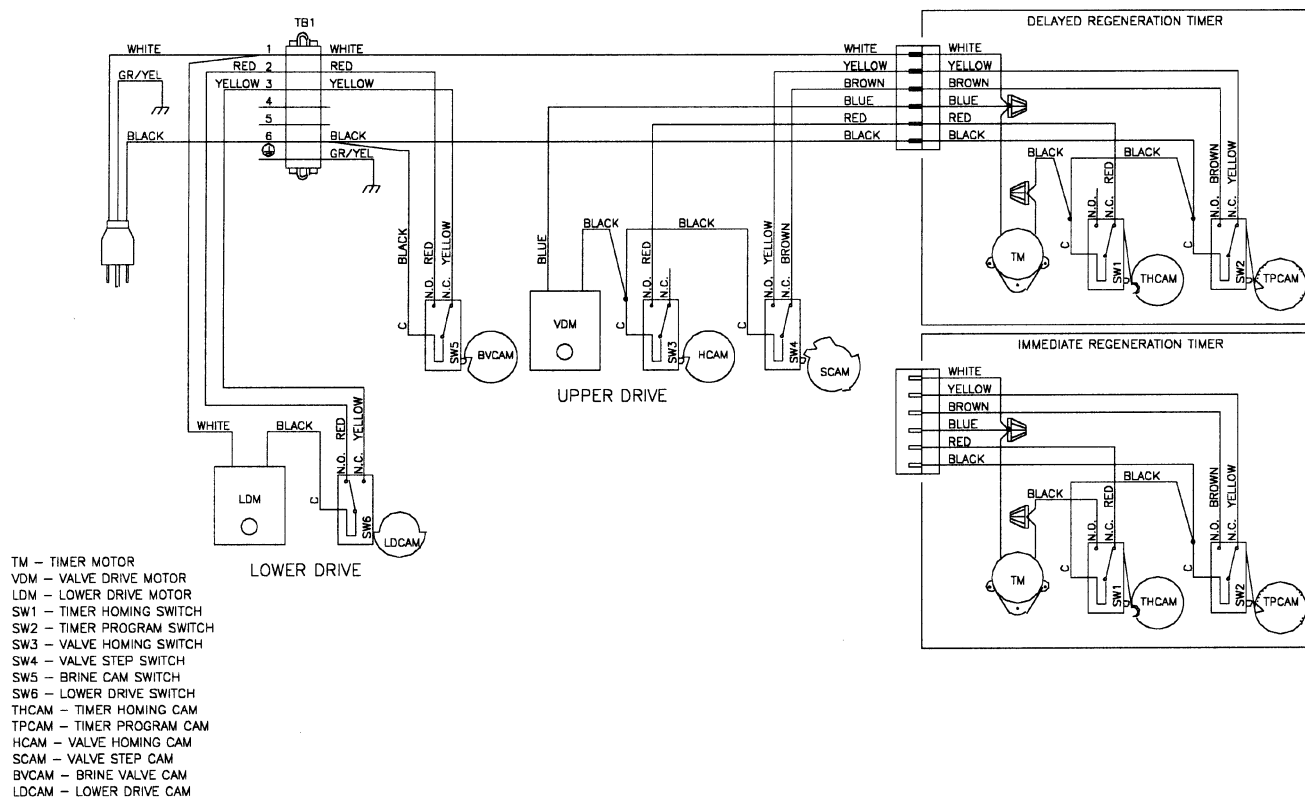
Tank with Pressure Regulator

2900 on Tank w/Resin and 100% Brine
with Pressure Regulator

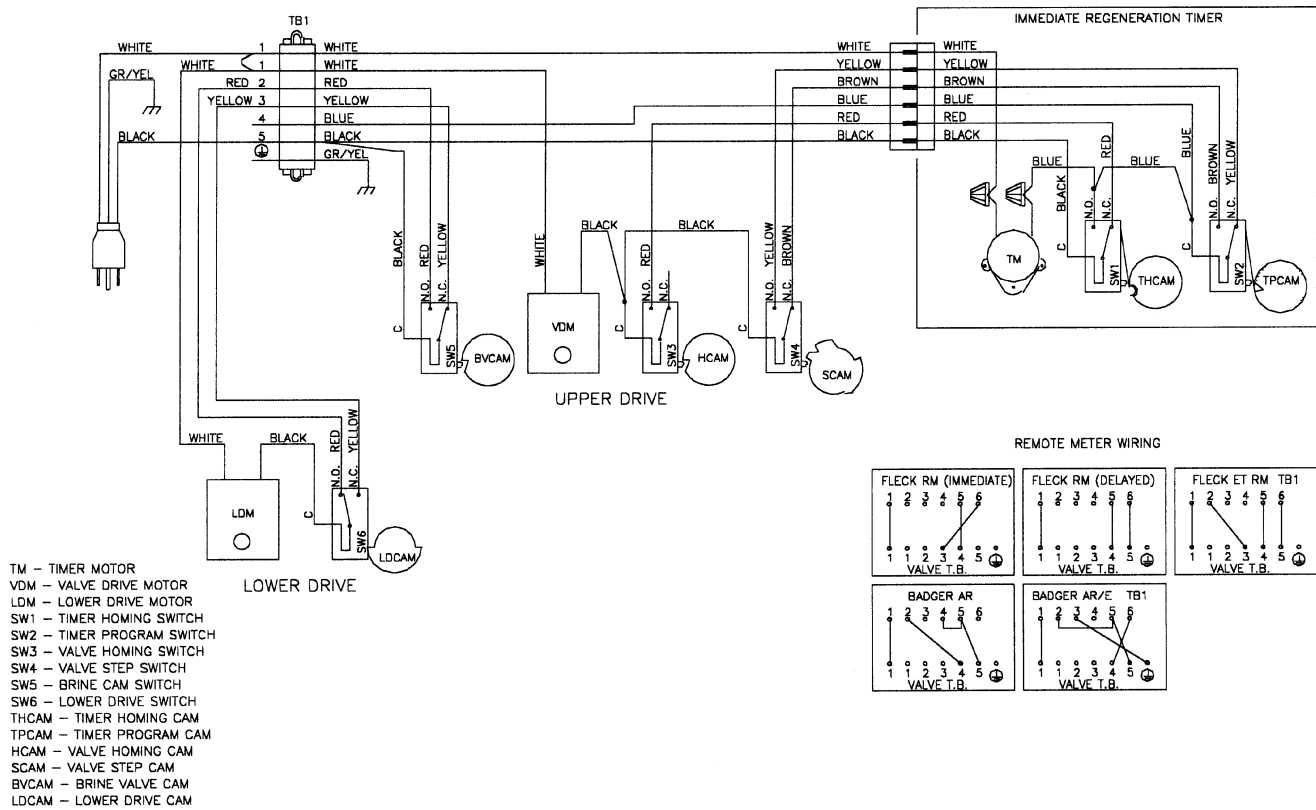


SYSTEM #4-SINGLE VALVE REGENERATION

Immediate and Delayed Valve Wiring



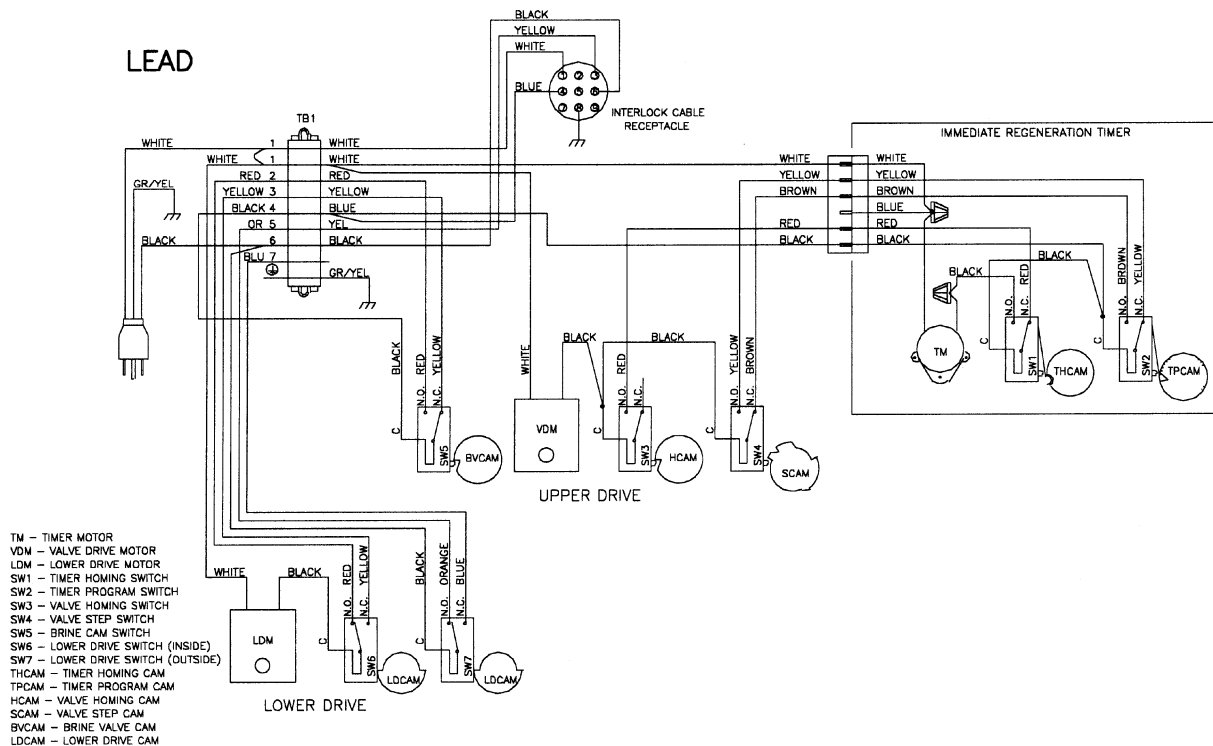
SYSTEM #4-WITH REMOTE SIGNAL START



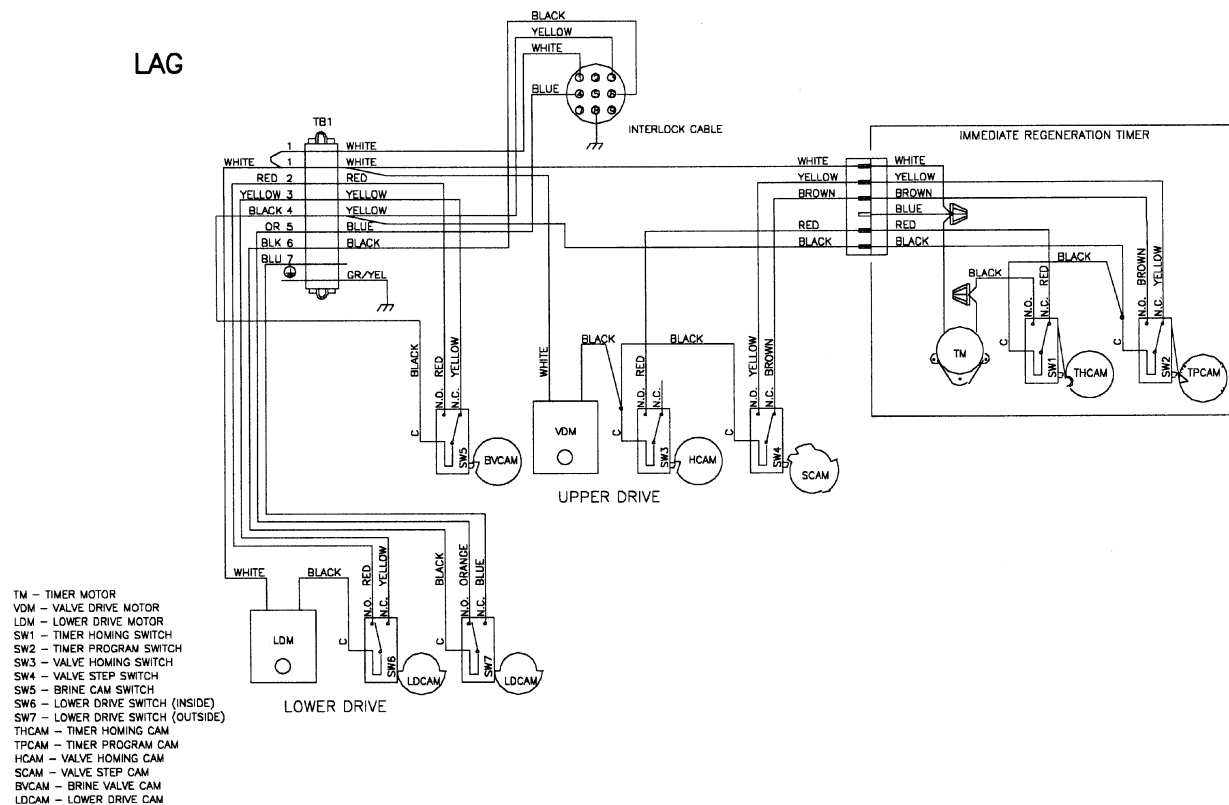
NOTE:
SINGLE TANK REMOTE METER DELAYED, OR IMMEDIATE REGENERATION.

SYSTEM #5-INTERLOCKED REGENERATION

Valve Wiring

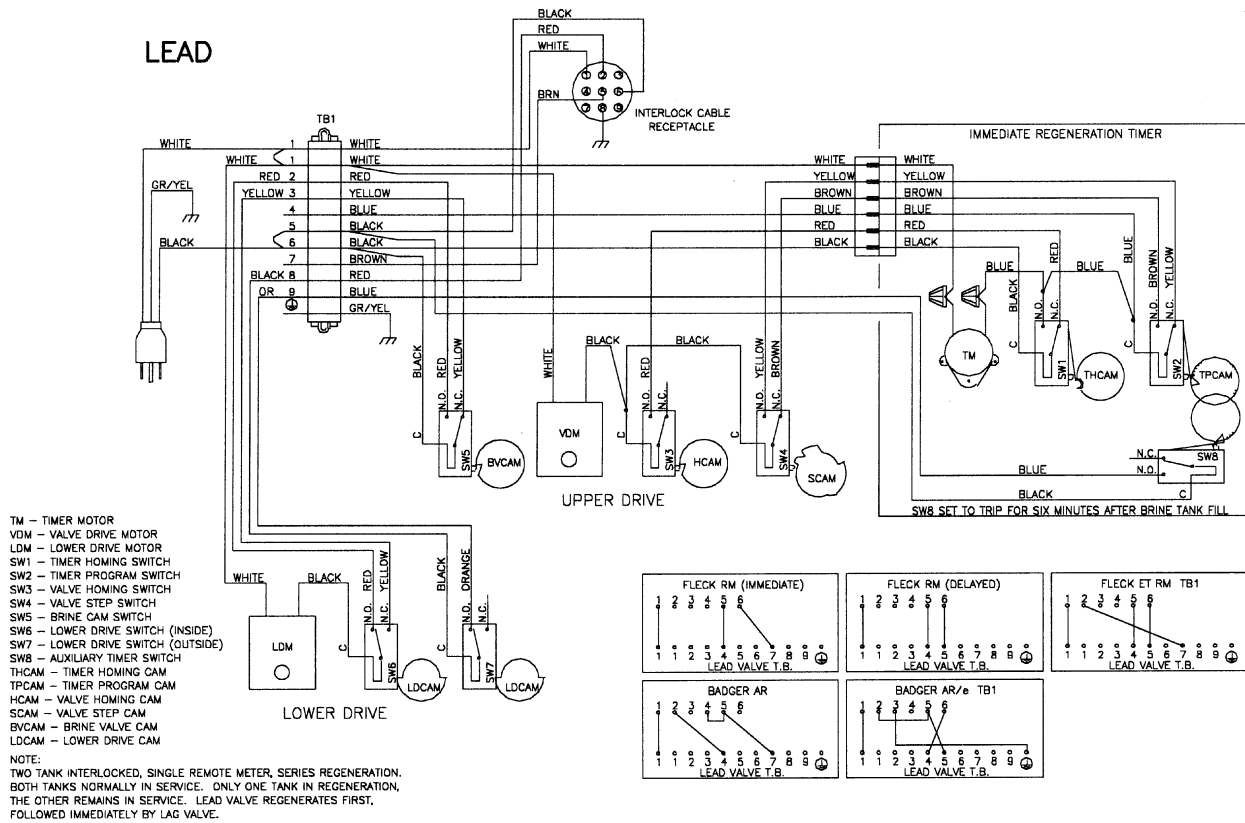


NOTE:
TWO TANK INTERLOCKED, INDIVIDUAL METER, IMMEDIATE REGENERATION.
BOTH TANKS NORMALLY IN SERVICE. ONLY ONE TANK IN REGENERATION,
THE OTHER REMAINS IN SERVICE.

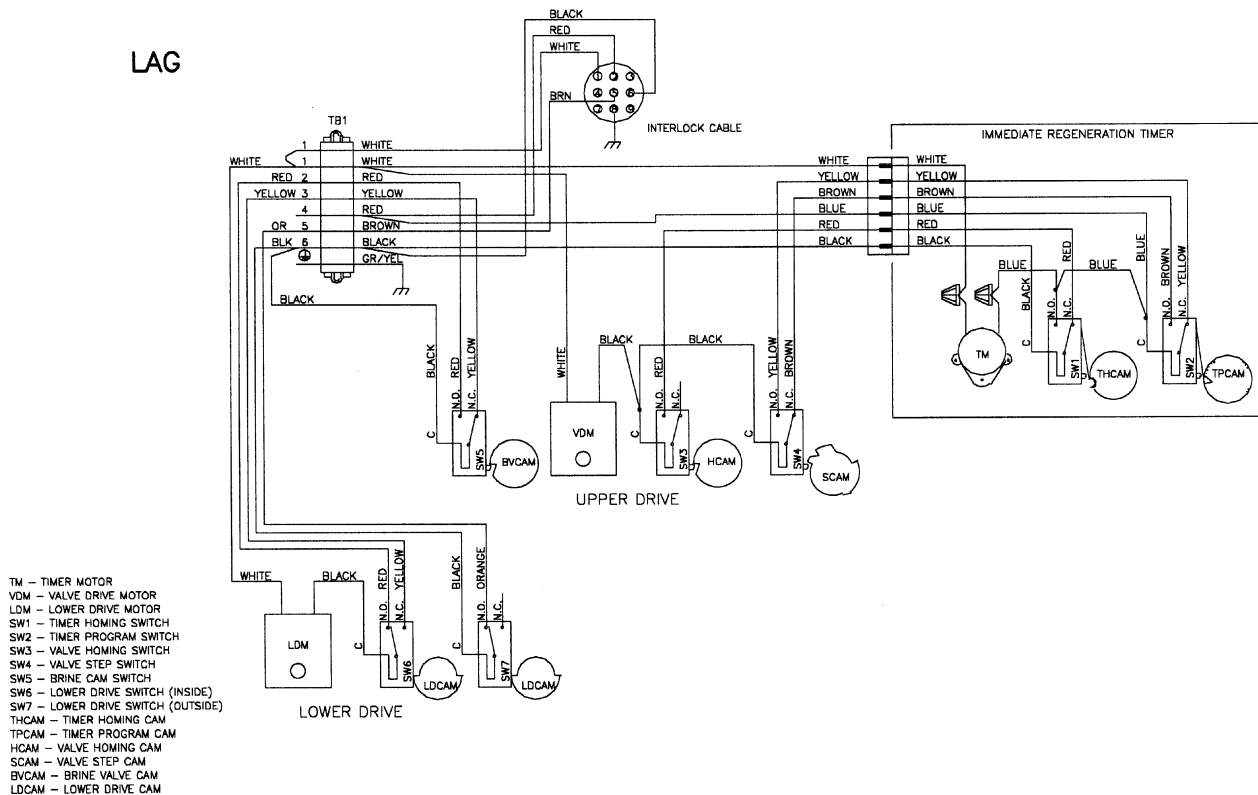


SYSTEM #6-SERIES REGENERATION

Valve Wiring

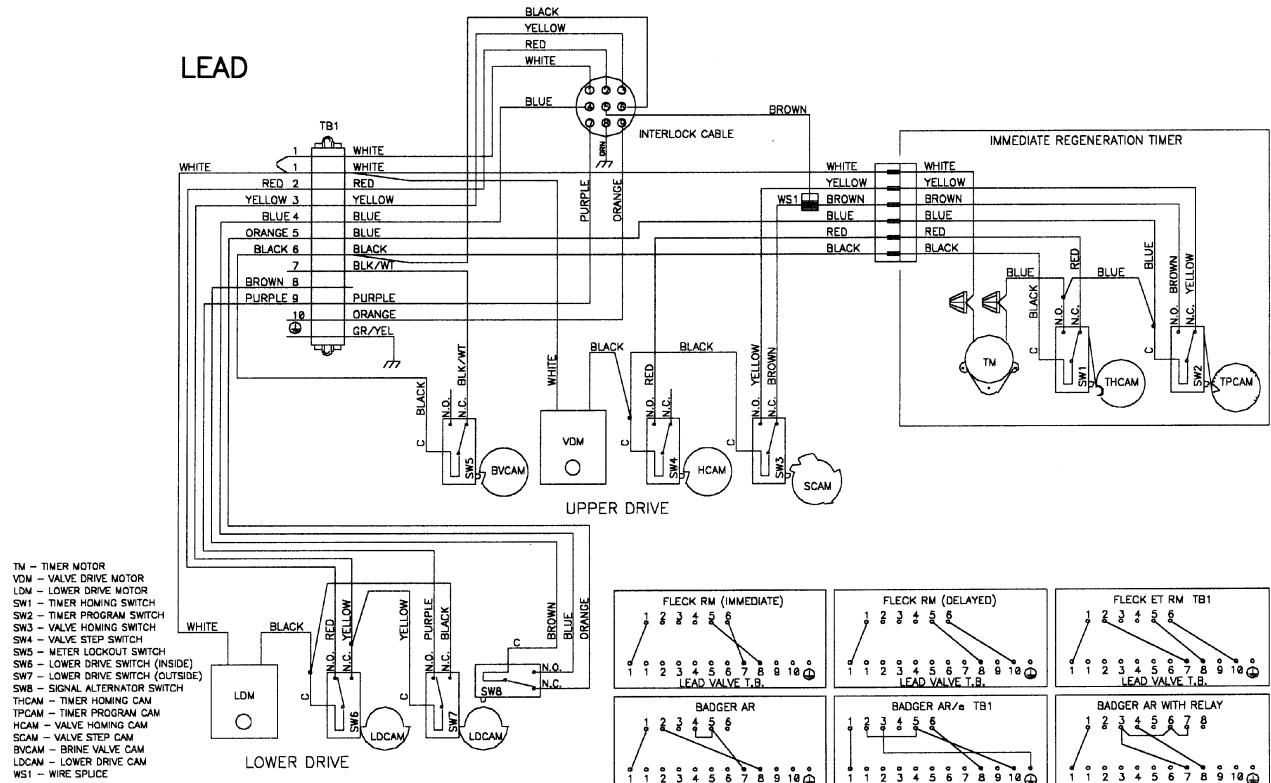


LAG

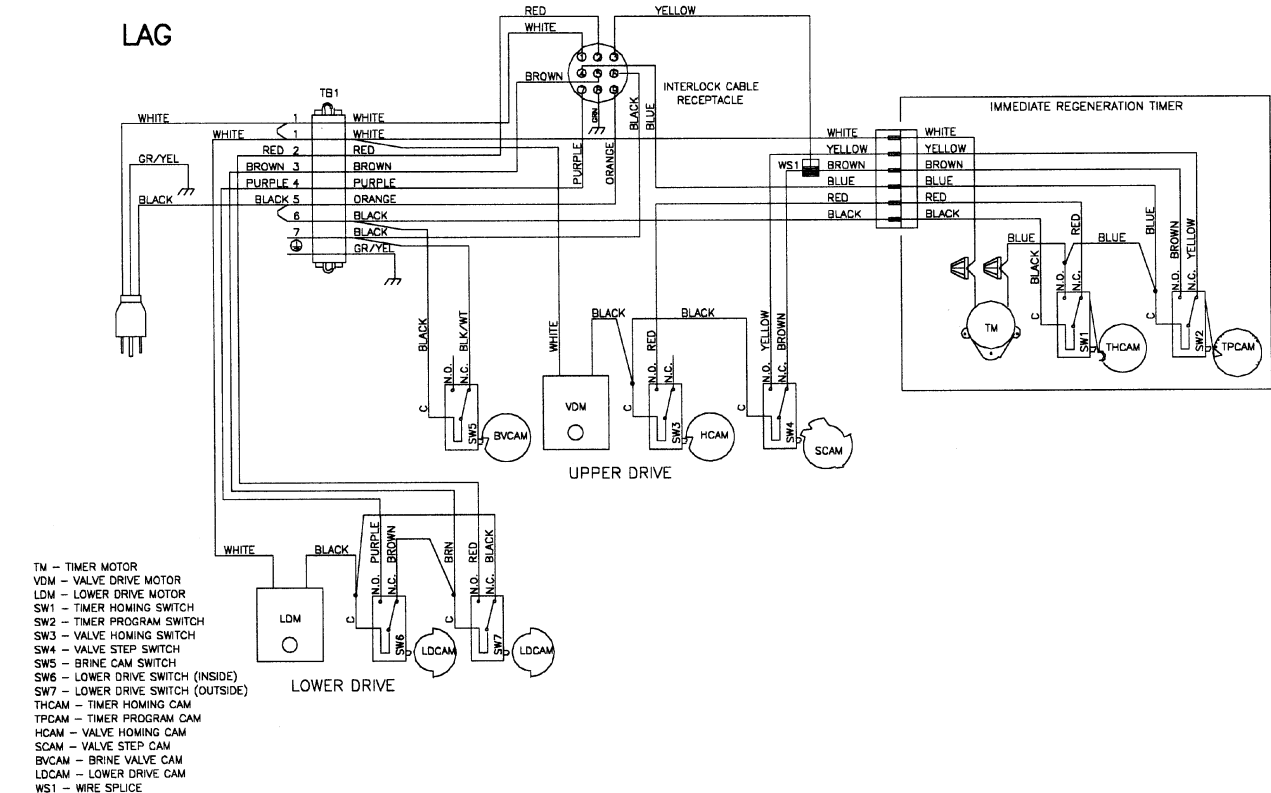


SYSTEM #7-ALTERNATING REGENERATION

Valve Wiring

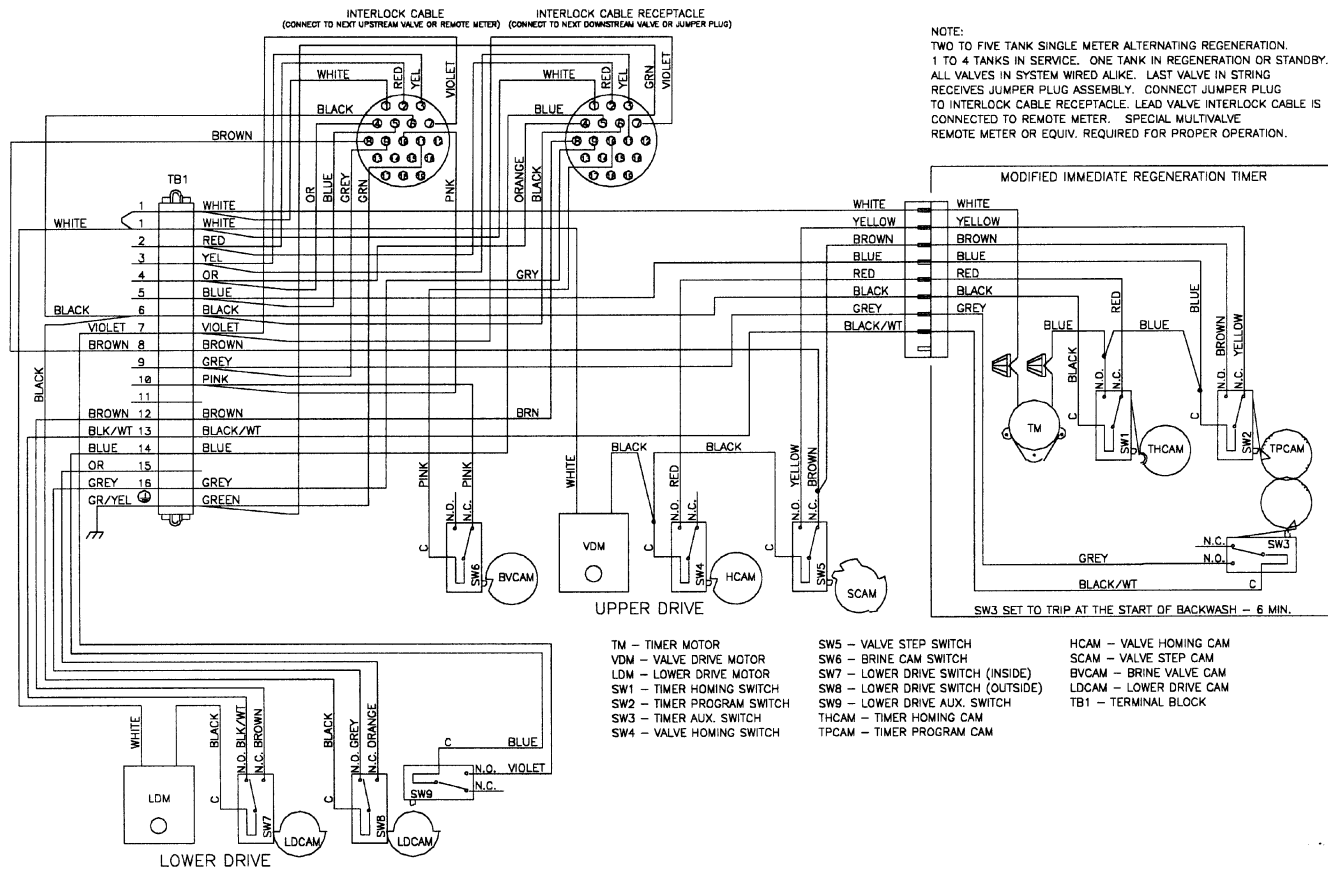


NOTE:
TWO TANK SINGLE REMOTE METER ALTERNATING REGENERATION.
ONLY ONE TANK IN SERVICE, THE OTHER IN REGENERATION OR STANDBY.



SYSTEM #7-ALTERNATING REGENERATION

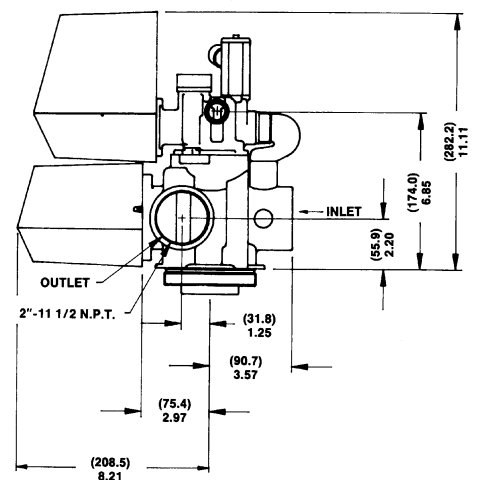
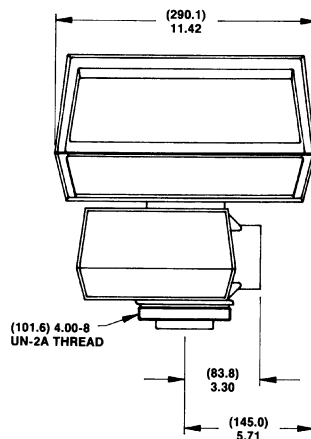
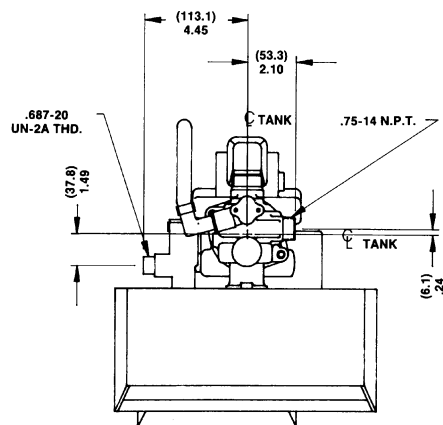
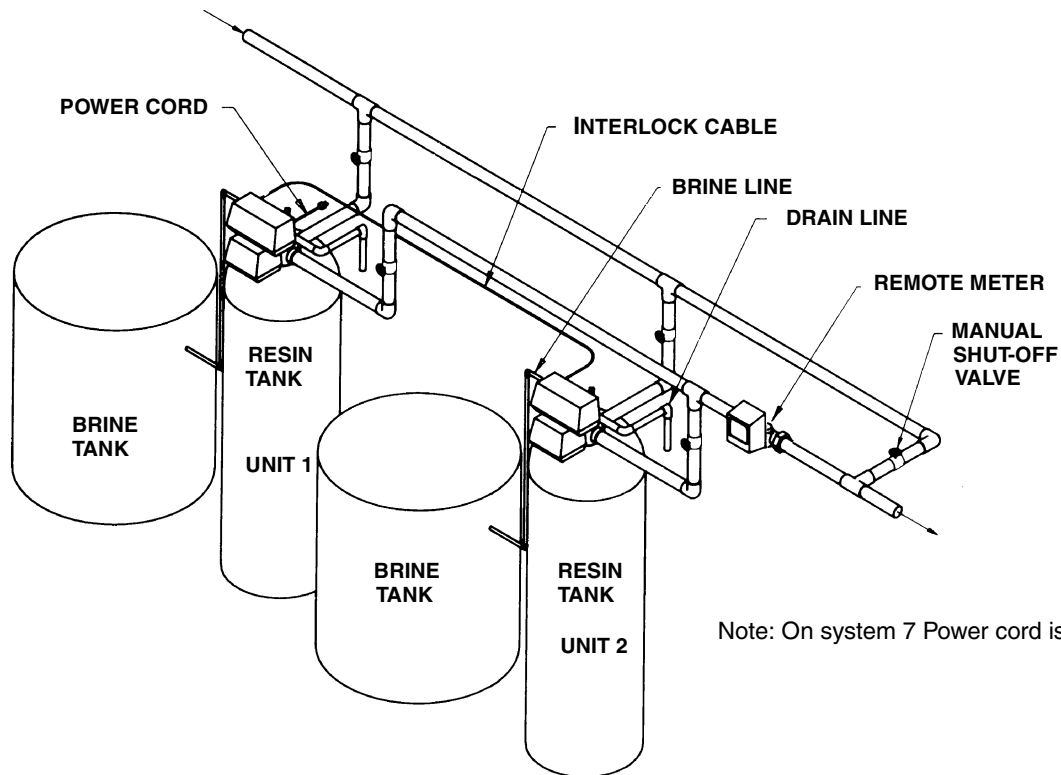
Multi-Valve System Valve Wiring



MODEL 2900 Upflow

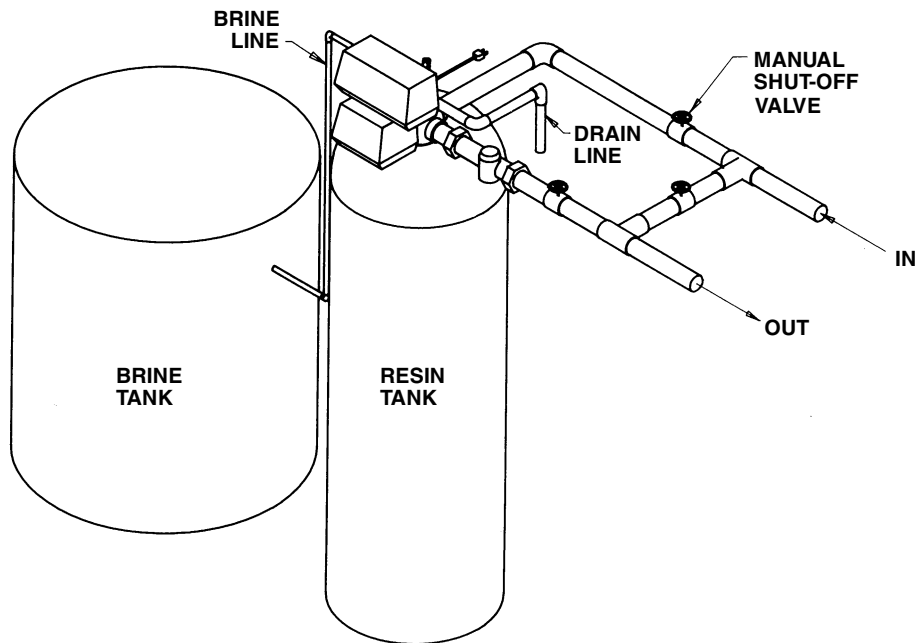
System #6 - Twin Series Regeneration

System #7 - Twin Alternator Installation

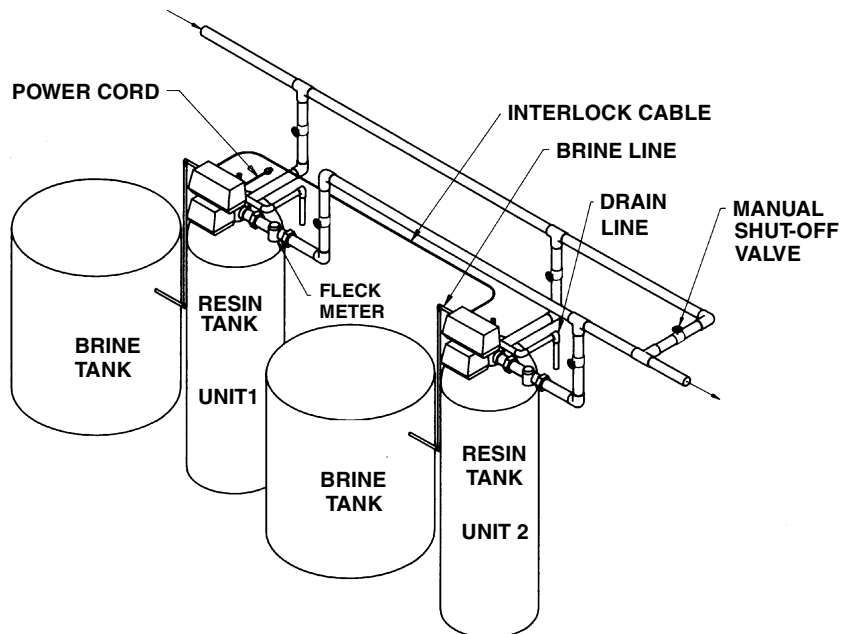


MODEL 2900 Upflow

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 2900 Upflow

Service Assemblies

60029 1600 Brine Valve

For Illustration, See Page 18

- 1 10249 Brine Valve Spring
- 1 10250 Retaining Ring
- 2 10329 3/8" Brass Nut
- 2 10330 3/8" Ferrule
- 2 10332 3/8" Sleeve
- 1 11749 B/V Stem Guide
- 1 11982 O-Ring Brine Valve
- 1 12552 1600 Brine Valve Stem
- 1 12626 Shut-Off Valve Seat
- 1 12748 Brine Valve Body
- 1 12550 Quad Ring
- 1 16039 Spacer, Brine Valve Body

60034-xx 1700 Brine Valve

For Illustration, See Page 16

- 1 10250 Brine Valve Spring
- 1 12550 Quad Ring
- 1 13201 Quad Ring
- 1 14785 Flow Control Retainer
- 1 14790 Brine Valve Body
- 1 14792 Brine Valve End Plug
- 1 14795 Brine Valve Piston
- 1 14797 Brine Valve Stem
- 1 14798 Spacer
- 2 14811 Piston Seal
- 1 15310 Brine Valve Spring
- 1 15517 Stem Guide
- 1 15414 Nut, 1/2" Sleeve Assembly

60180-03 1600 Injector Assembly, Upflow

For Illustration, See Page 10

- 1 10328-01 90° Elbow 1/4", NPT x 3/8"
- 1 10913 Injector Nozzle
- 1 10914 Injector Throat
- 2 14805 Injector Body Gasket
- 1 17776-02 Injector Body
- 1 19479 Injector Screen
- 2 19740 Screw

60372-xx 1700 Injector Assembly, Upflow

For Illustration, See Page 10

- 1 14801-xx Injector Nozzle
- 1 14802-xx Injector Throat
- 1 17777-02 Injector Body
- 1 19478 Injector Screen
- 2 19718 Screw
- 2 19925 Injector Body Gasket

60190 2900 Piston Assembly, Upflow, Upper

For Illustration, See Page 10

- 1 10234-01 O-Ring, -024
- 1 10598-03 End Plug Assembly
- 1 10909 Pin, Link
- 1 14452 Piston Rod, 2500
- 1 19454 Piston, 2750, Upflow

60103 2900 Piston Assembly, Hard Water By-Pass

For Illustration, See Page 10

- 1 14754-00 End Plug Assembly, 2900
- 1 14757 Piston, Hard Water By-Pass
- 1 14758 Piston Rod, 2900
- 1 14818 Ring, Piston Rod Snap
- 1 14922 O-Ring, -035
- 1 14926 Quad Ring, -012

60104 2900 Piston Assembly, No Hard Water By-Pass

For Illustration, See Page 10

- 1 14752 Piston, No Hard Water By-Pass
- 1 14754-10 End Plug Assembly, 2900
No Hard Water By-Pass
- 1 14758 Piston Rod, 2900
- 1 14818 Ring, Piston Rod Snap
- 1 14922 O-Ring, -035
- 1 14926 Quad Ring, -012

60121 2900 Upper Seal and Spacer Kit

For Illustration, See Page 10

- 6 10545 Seal, Piston
- 1 10757 End Spacer, Noryl
- 5 11451 Spacer, 12 Hole

60128 2900 Lower Seal & Spacer Kit

For Illustration, See Page 10

- 2 10369 Spacer
- 4 11720 Seal, Piston 2900/3150
- 1 14753 Spacer

MODEL 2900 Upflow

Service Assemblies (Cont'd.)

60050-21 Drive Motor Assembly, 120V/60, STF For Illustration, See Page 8

2..... 10218 Micro Switch
2..... 14923 Screw #4 x 1-1/13
1..... 10250 Retaining Ring
2..... 10302 Insulator, Limit Switch
2..... 10338 Roll Pin 3/22 x 7/8
1..... 10621 Connecting Link
1..... 10769 Drive Motor 110V/60 Hz
1..... 10774 Motor Bracket - Drive Side
5..... 10872 Screw #8 x 5/16
1..... 11667 Wire Harness
1..... 11826 Motor Bracket B/V Side
1..... 12576 Drive Cam - STF
1..... 12777 Brine Valve Cam
1..... 13366 Drive Bearing
1..... 17904 Busing, 1/2"

60055-51 2900 Lower Drive Assembly, 120V/60 For Illustration, See page 13

1..... 10218 Micro Switch
1..... 10250 Retaining Ring
1..... 10302 Insulator, Limit Switch
4..... 10872 Screw, Hex Washer 8-32 x 5/16
1..... 10876 Wire, Red 12"
1..... 11381 Pin, Roll 1/16 x 5/8 Lg
1..... 14759 Link, Piston Rod
1..... 14769 Bracket, Motor
1..... 14772 Ea Motor, 110V/60 Hz
1..... 14775 Cam, Drive
1..... 14784 Bearing, Connecting Rod
1..... 15926 Wire Harness, System 4
1..... 16103 Insulator, Micro Switch
2..... 19849 Screw, Rd Hd 4-40 x 9/16

60393 2" Meter Assembly (Brass) - Std. Range For Parts Breakdown See Page 19

60394 2" Meter Assembly (Brass) - Ext. Range **Drain Line Flow Controls**

60620 2" Meter Assembly (Plastic) - Std. Range **60021 2" Meter Assembly (Plastic) - Ext. Range**

15474-02 1-1/2" Reducing Sleeve For Brass Meter Only

60052-21 Upper Drive Assembly Sys. 4, 5 & 6 120V/60

60052-217 Upper Drive Assembly Sys. 7 120V/60

60255-51 2900 Lower Drive Assembly Sys. 5 & 6 120V/60

60056-51 2900 Lower Drive Assembly Sys. 7 Lead 120V/60

60056-61 2900 Lower Drive Assembly Sys. 7 Log 120V/60

60365-00 .. Brass DLFC 3/4" NPT, No Button

60365-12 .. Brass DLFC 3/4" NPT, 1.2 GPM

60365-15 .. Brass DLFC 3/4" NPT, 1.5 GPM

60365-20 .. Brass DLFC 3/4" NPT, 2.0 GPM

60365-24 .. Brass DLFC 3/4" NPT, 2.4 GPM

60365-30 .. Brass DLFC 3/4" NPT, 3.0 GPM

60365-35 .. Brass DLFC 3/4" NPT, 3.5 GPM

60365-40 .. Brass DLFC 3/4" NPT, 4.0 GPM

60365-50 .. Brass DLFC 3/4" NPT, 5.0 GPM

60365-70 .. Brass DLFC 3/4" NPT, 7.0 GPM

60701-XX .. DLFC, 1" F x 1" F, Specify Size

60702-XX .. DLFC, 1" M x 1" F, Specify Size

13640 Dole Flow Control, 1" NPT, 30 GPM

