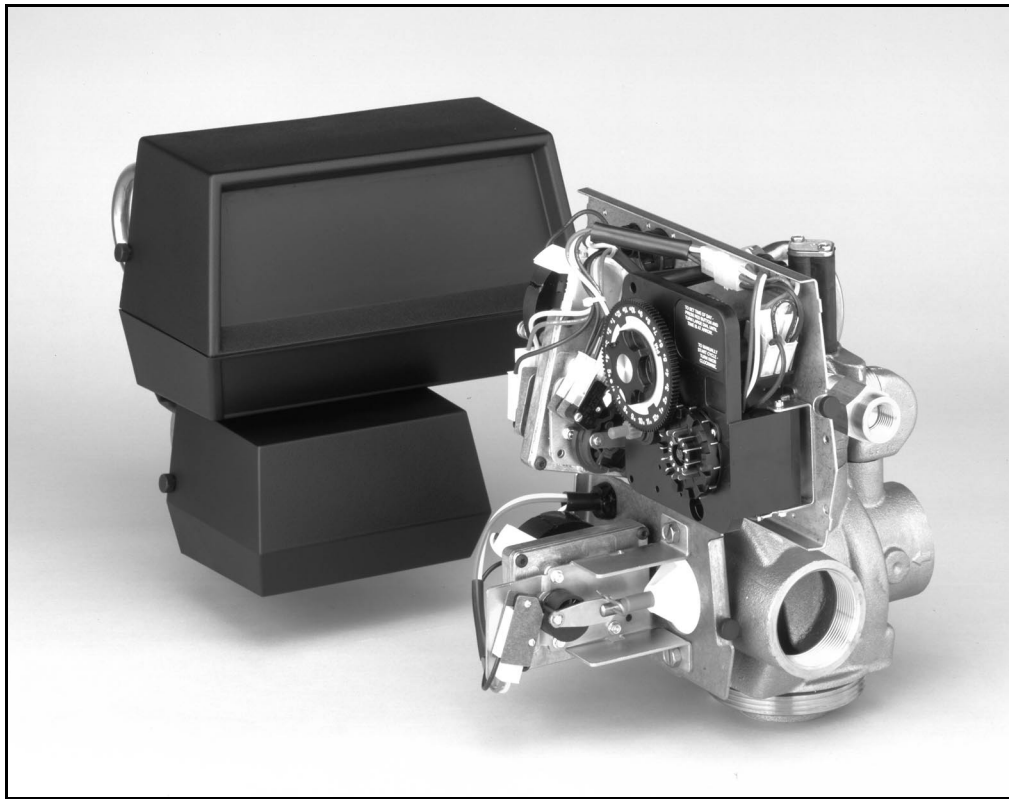


# MODEL 2900 Downflow

## *Service Manual*



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

# MODEL 2900

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## *Job Specification Sheet*

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- 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 18-21)

- 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 18 and 19)

- 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 - \_\_\_\_\_

- 5) Injector Size # \_\_\_\_\_

- 6) A) Hard Water By-Pass

- B) No Hard Water By-Pass

# MODEL 2900

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## *General Commercial Pre-Installation Check List*

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**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.

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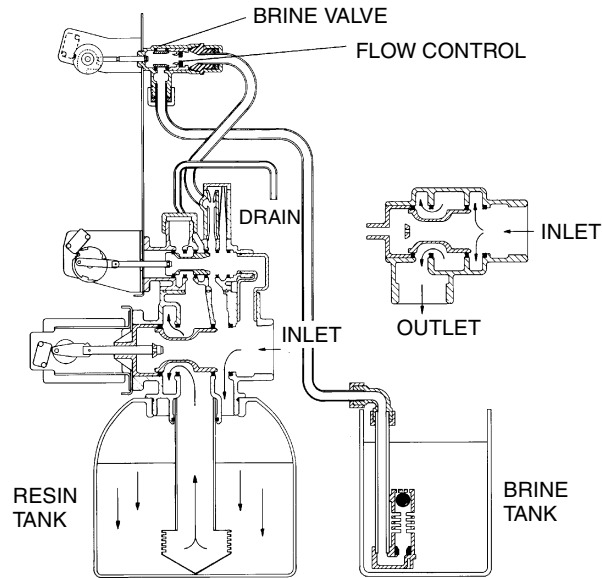
## *Installation Instructions*

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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 26-29.
11. Plug into power supply.

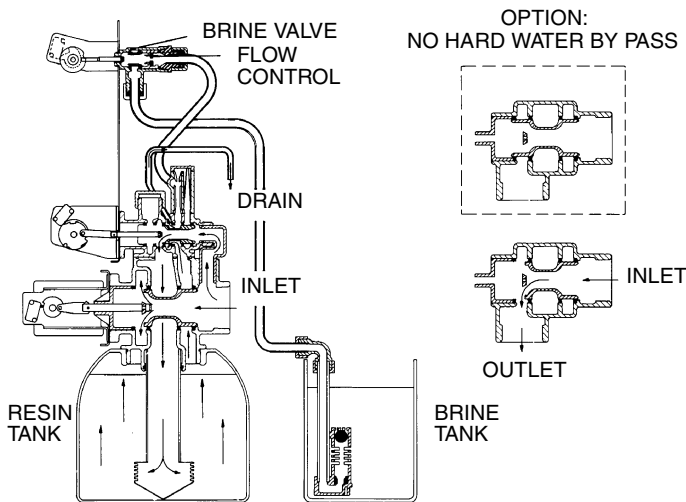
# MODEL 2900

## 1 SERVICE POSITION



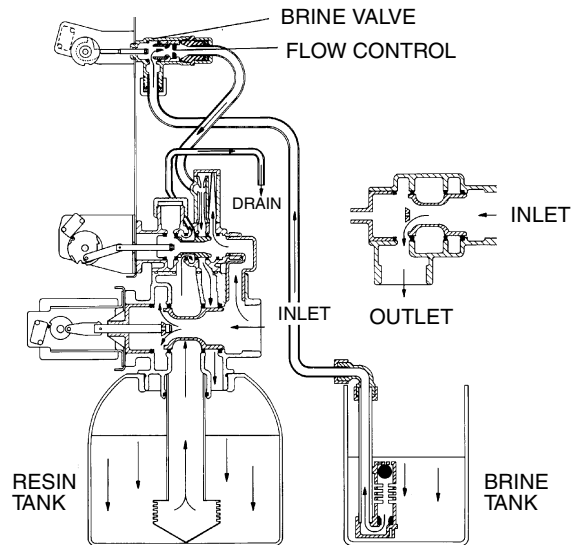
Hard water enters unit at valve inlet and flows down thru the mineral in the mineral tank. Conditioned water enters center tube thru the bottom distributor — then flows up thru the center tube — around the piston and out the side outlet of the valve.

## 2 BACKWASH POSITION



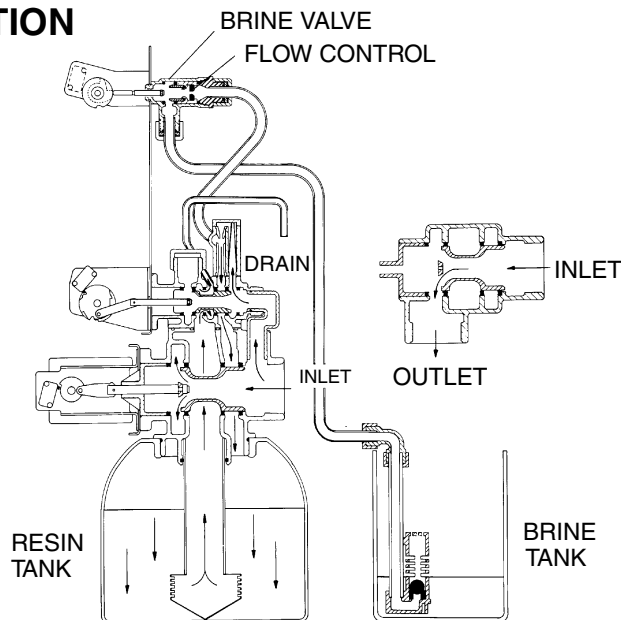
Hard water enters unit at valve inlet — flows thru service adapter for by pass, and up thru coupling to regenerating valve inlet. It then flows thru the regenerating valve piston — down the center tube — thru the bottom distributor and up thru the mineral — around the piston and out the drain line. If 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.

## 3 BRINE POSITION



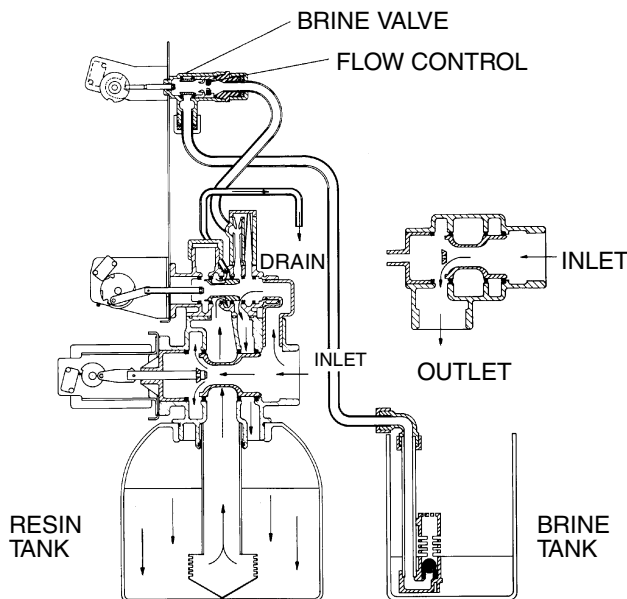
Hard water enters unit at valve inlet — flows up into injector housing and down thru nozzle and orifice to draw brine from the brine tank — brine flows down thru mineral and enters the center tube thru bottom distributor — flows up thru center tube — around the piston and out thru the drain line.

## 4 SLOW RINSE POSITION



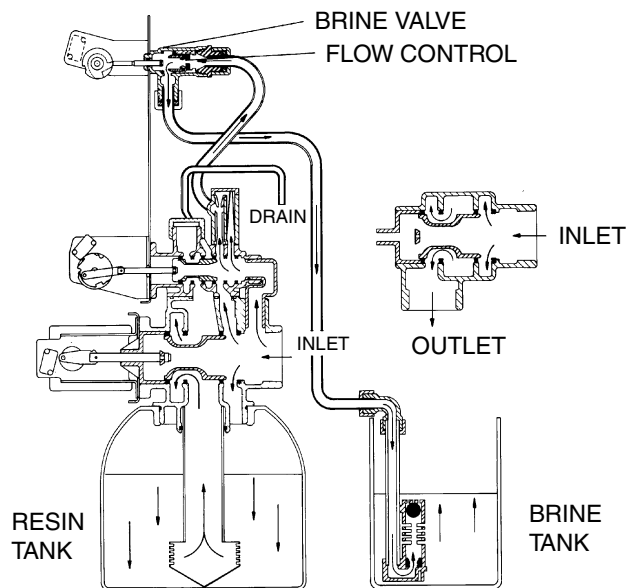
Hard water enters unit at valve inlet — flows up into injector housing and down thru nozzle and orifice — around the piston — down thru mineral — enters center tube thru bottom distributor — flows up thru center tube — around piston and out thru the drain line.

## 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

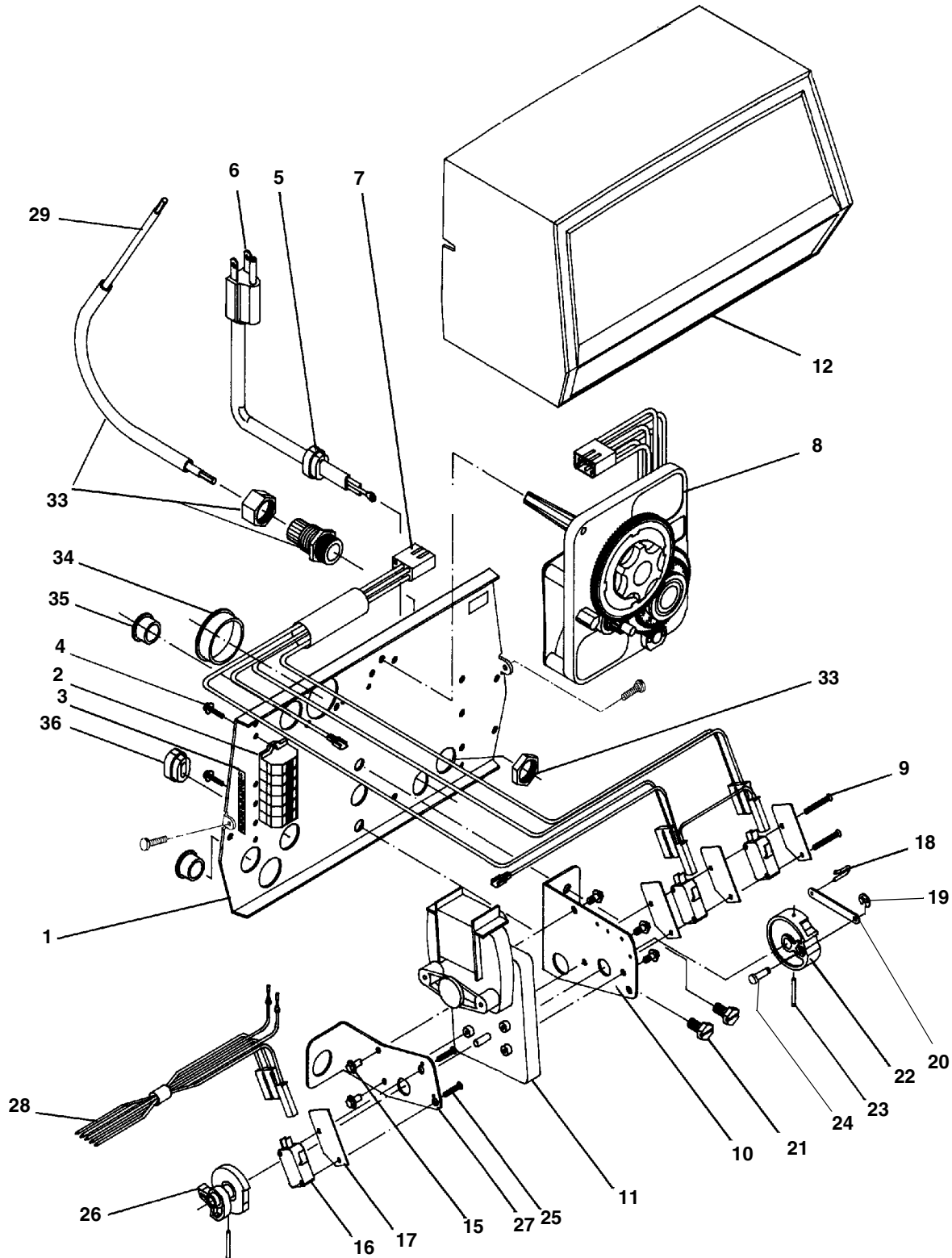


Hard water flows thru the service valve and down thru the mineral. Conditioned water enters the bottom distributor flows up the center tube around the piston to the outlet. Hard water flows to the regenerating valve thru the injector housing and brine valve to fill the brine tank.

# MODEL 2900

## Control Drive Assembly

(See opposite page for parts list)



# MODEL 2900

## Control Drive Assembly

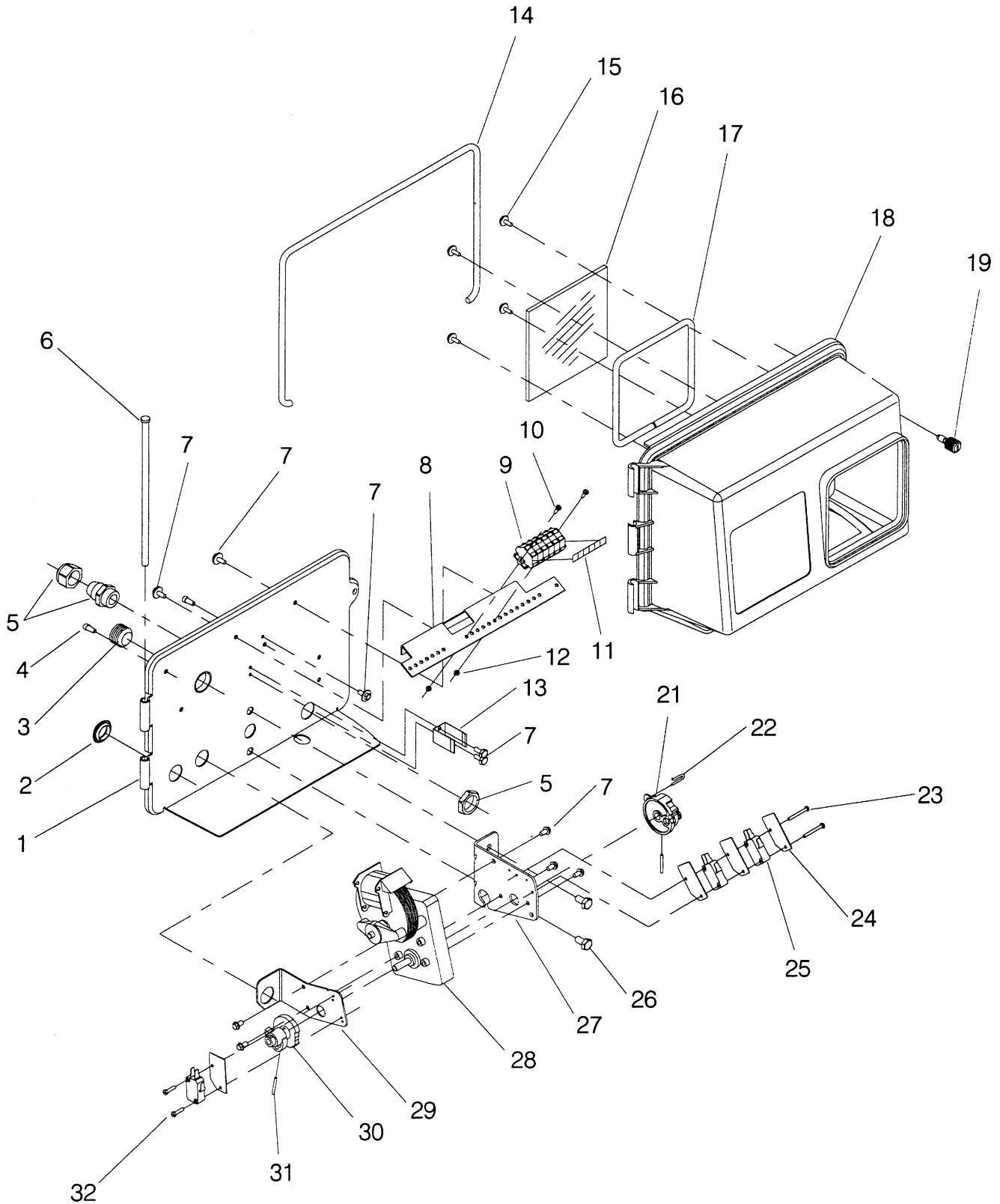
### Parts List

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 3000, 3200, or 3210 Series
9	2	14923	Micro Switch Screw - #4-40 x 1"
10	1	10774	Motor Bracket
11	1	10769	Motor 120V., 60Hz.
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
20	1	10621	Connecting Rod
21	2	10231	Drive Mount Screw
22	1	60160-10	Drive Cam - Separate Time Fill
23	2	10338	Drive Roll Pin
24	1	13366	Drive Bearing
25	2	11805	Micro Switch Screw
26	1	12777	Brine Valve Cam
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

# MODEL 2900

## Service Assemblies

(See opposite page for parts list)





# MODEL 2900

## Service Assemblies

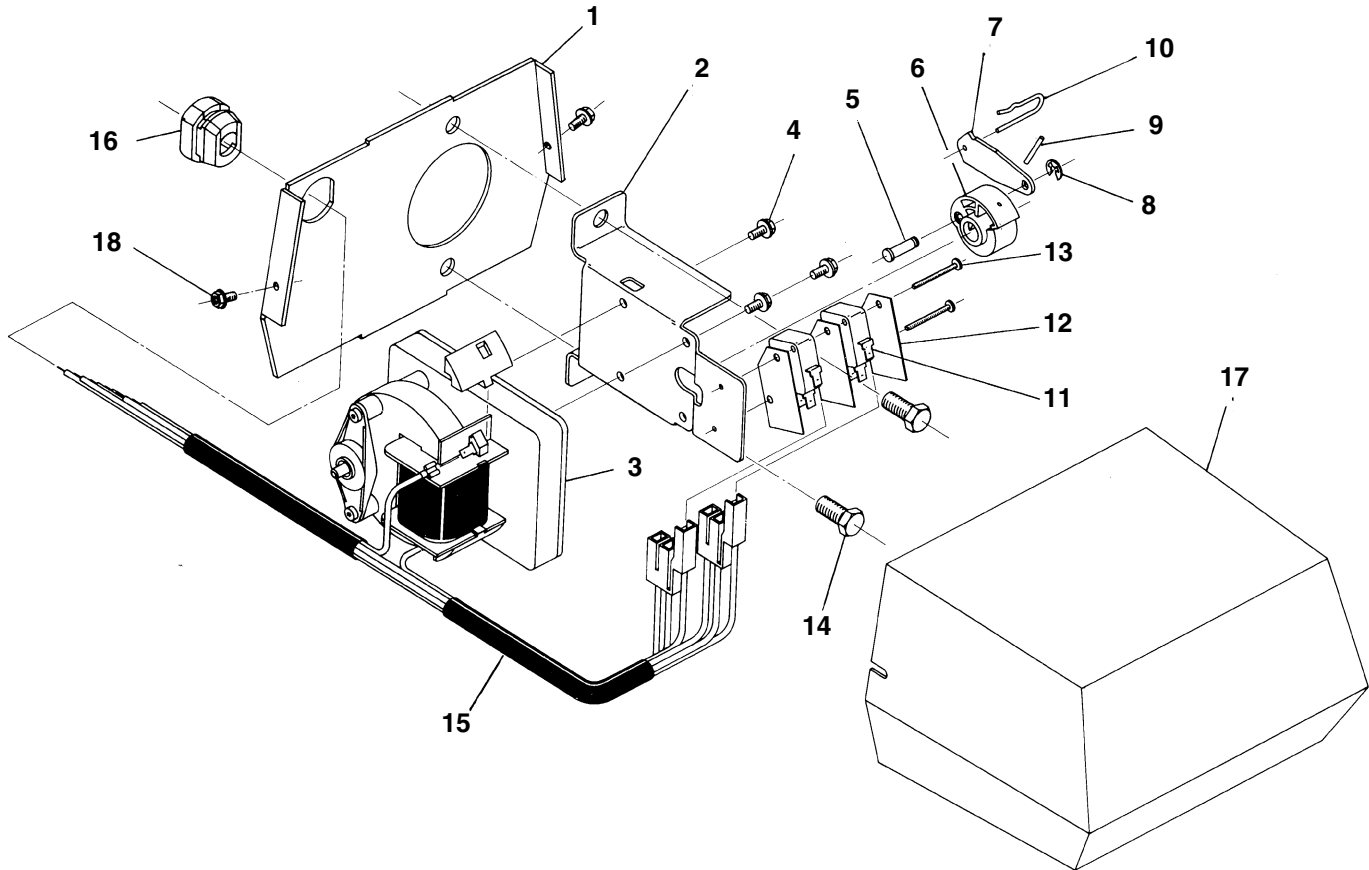
### Parts List

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	18744	Screw, Cover
20	5	10872	Screw, Motor
21	1	60150-10	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 (Systems 5, 6 & 7)

# MODEL 2900

## Adapter Control Drive

(See opposite page for parts list)



# MODEL 2900

## 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.,60Hz.
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	11381	Pin Drive Cam Mtg.
10	1	14813	Spring Clip
11	1	10218	Micro Switch - System 4
	2	10218	Micro Switch - Systems 5, 6, 7
12	2	10302	Insulator - System 4
	3	11805	Insulator - Systems 5, 6, 7
13	2	19849	Screw - Micro Switch - System 4
	2	14923	Screw - Micro Switch - Systems 5, 6, 7
14	2	11224	Screw - Drive Mounting
15	1	15926	Wire Harness #4
	1	14827	Wire Harness #5 & #6
	1	15938	Wire Harness #7 - Lead Valve
	1	15936	Wire Harness #7 - Lag Valve
16	1	14924	Strain Relief
17	1	14800	Cover
18	2	15236	Screw Assy. - Cover

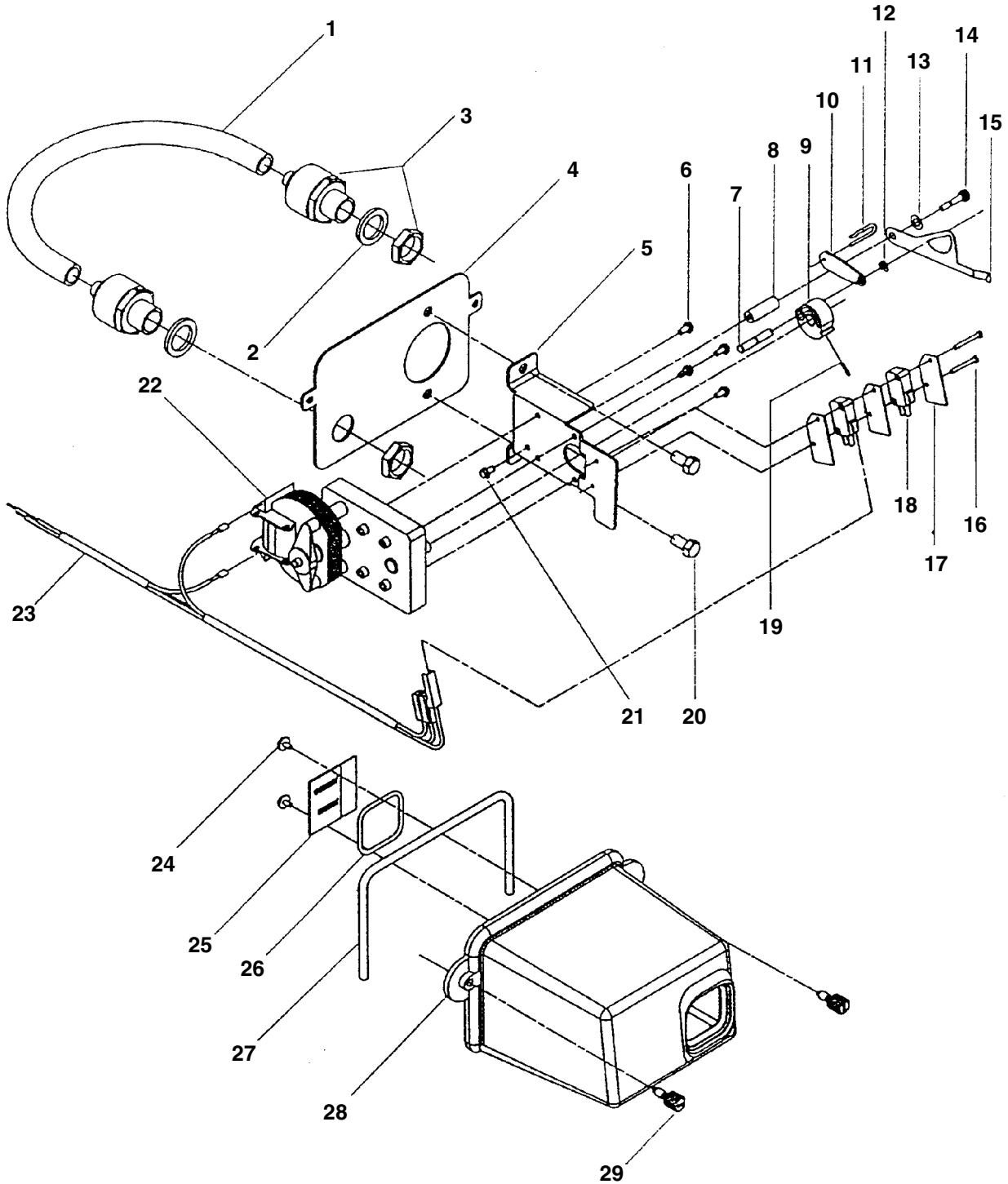
NOTE: For System 7 Lead Only, Add

1	10218	Micro Switch (Not Shown)
2	10302	Insulator (Not Shown)
2	11805	Mtg. Screw (Not Shown)
1	1S713	Mtg. Plate (Not Shown)
1	16103	Insulator (Not Shown)

# MODEL 2900

## Lower Environmental Control Drive

(See opposite page for parts list)



# MODEL 2900

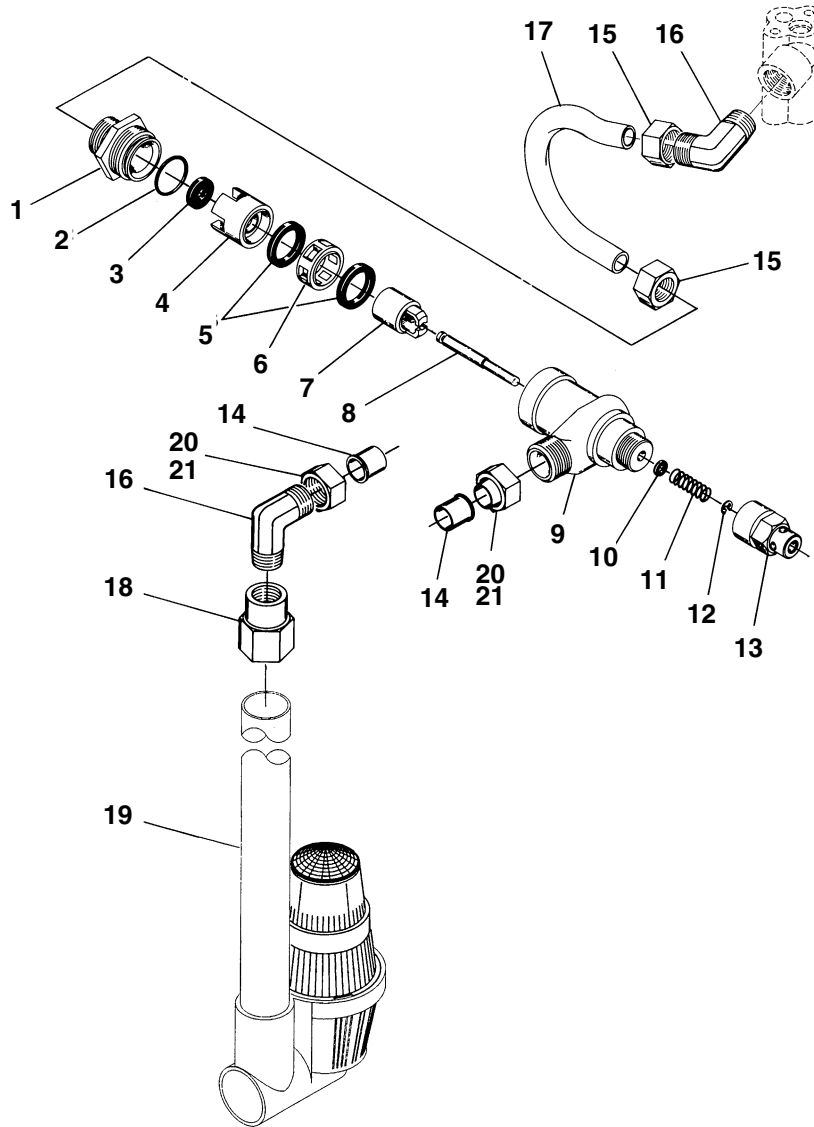
## Lower Environmental Control Drive

### 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

# MODEL 2900

## 1700 Brine System



# MODEL 2900

## 1700 Brine System

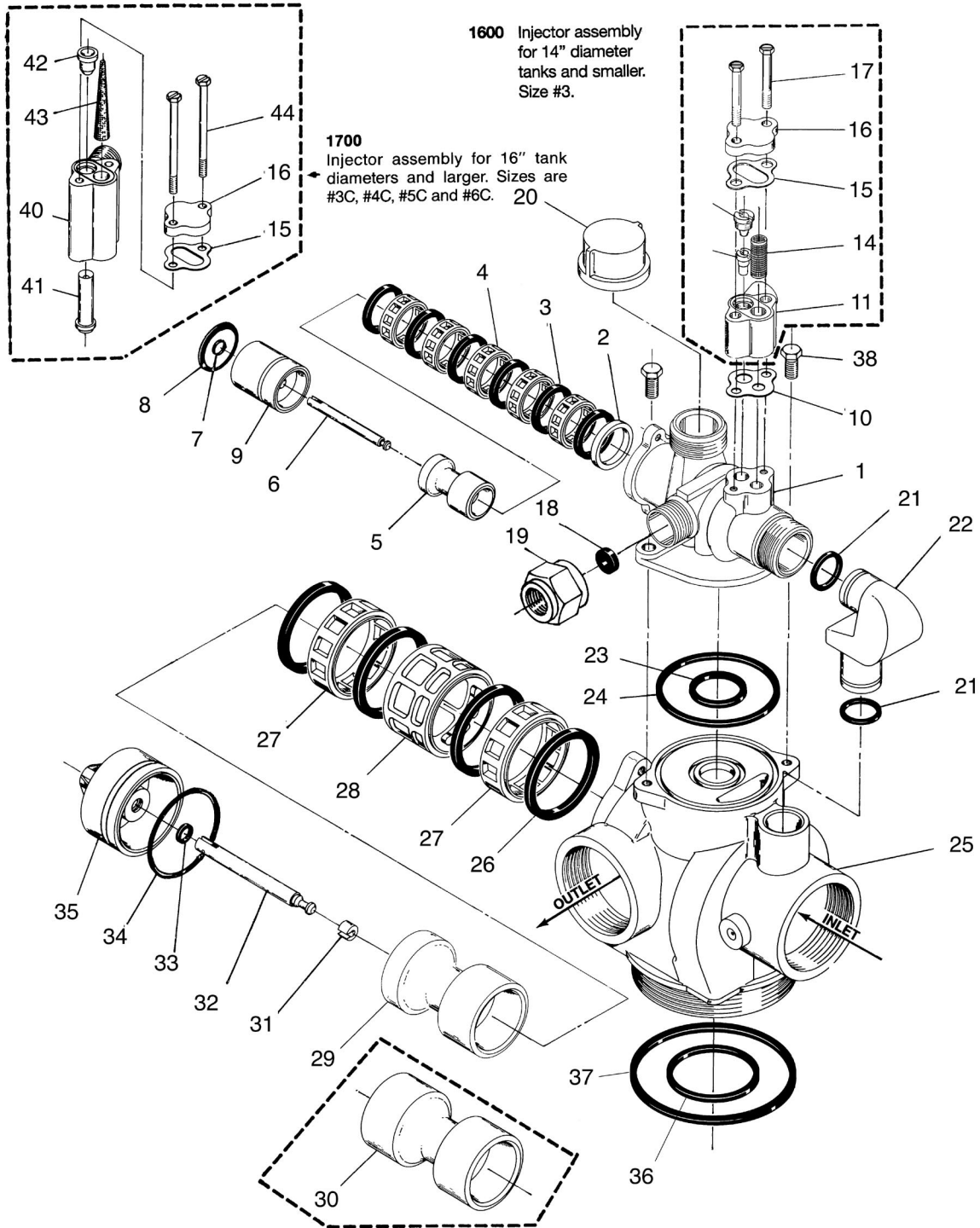
### Parts List

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 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 .....	15416 .....	Brine Tube
18.....	1 .....	16977 .....	Bushing Reducer - 3/4" x 3/8"
19.....	1 .....	60009 .....	#900 Air Check Assembly
		60009-01.....	#900 Air Check Assembly, Hot Water
20.....	2 .....	16123 .....	Tube Nut 1/2"
21.....	2 .....	16124 .....	Ferrule 1/2"
22.....	1 .....	16974 .....	Fitting, Brass, Female 3/4" x 3/4" Slip - Not Shown

# MODEL 2900

## Control Valve

(See opposite page for parts list)





# MODEL 2900

## Control Valve

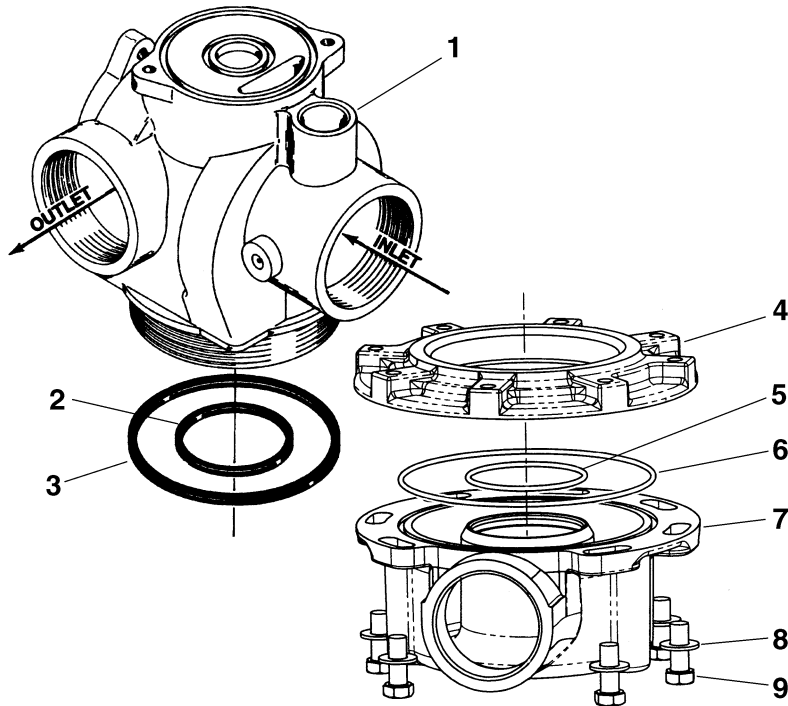
### Parts List

Item No.	Quantity	Part No.	Description
1	1	14749	Valve Body
2	1	10757	End Spacer
		10757B	End Spacer, Hot Water
3	6	10545	Seal
4	5	11451	Spacer
		16589	Spacer, Hot Water
5	1	14451	Piston
6	1	14452	Piston Rod
7	1	10209	Quad Ring - Piston Rod
8	1	40078	O-Ring - End Plug
9	1	10598	End Plug Assembly
		10598-01	End Plug Assembly, Hot Water
10	1	14805	Injector Body Gasket
11	1	17776	Injector Body
12	1	10914-3	Injector Throat #3, Yellow
		10226-03	Injector Throat #3, Hot Water
13	1	10913-3	Injector Nozzle #3, Yellow
		10225-03	Injector Nozzle #3, Hot Water
14	1	10227	Injector Screen
15	1	10229	Injector Cover Gasket
16	1	11893	Injector Cover
17	2	10692	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	Silicone
27	2	10369	Spacer
		16141	Spacer, Hot Water
28	1	14753	Spacer
		16142	Spacer, Hot Water
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 By Pass (Black)
		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	Injector Body
41	1	*14802	Injector Throat
42	1	*14801	Injector Nozzle
43	1	14803	Injector Screen
44	2	14804	Screw - Injectory Body
45	1	16221	Air Disperser - 1600 Injector (not shown)
46	1	19608-15	Disperser, Upper (not shown)
		*Injector Throat	*Injector Nozzle
		14802-03	14801-03
		14802-04	14801-04
		14802-05	14801-05
		14802-06	14801-06
			Size
			Color
			#3C
			Yellow
			#4C
			Green
			#5C
			White
			#6C
			Red

# MODEL 2900

## Control Valve

### Side Mount Adapter

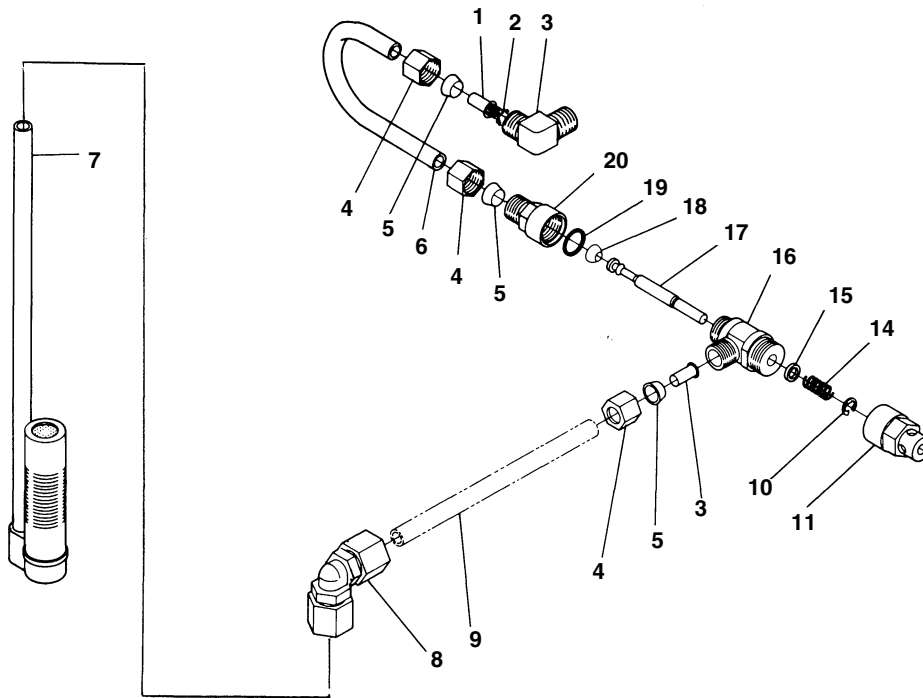


Item No.	Quantity	Part No.	Description
1	1	14750-01	2" Adaptor Valve
*2	1	13577	O-Ring - Distributor
3	1	13575	O-Ring - Top of Tank
	1	15210	O-Ring - Top of "Park" Tank
4	1	40316	Adaptor, Side Mount
5	1	40372	O-Ring - 142
6	1	40368	O-Ring - 160
7	1	40310	Base, Rotating
8	7	40375	Washer
9	7	19768	Screw

\*Do not use this O-Ring if control is side mounted.

# MODEL 2900

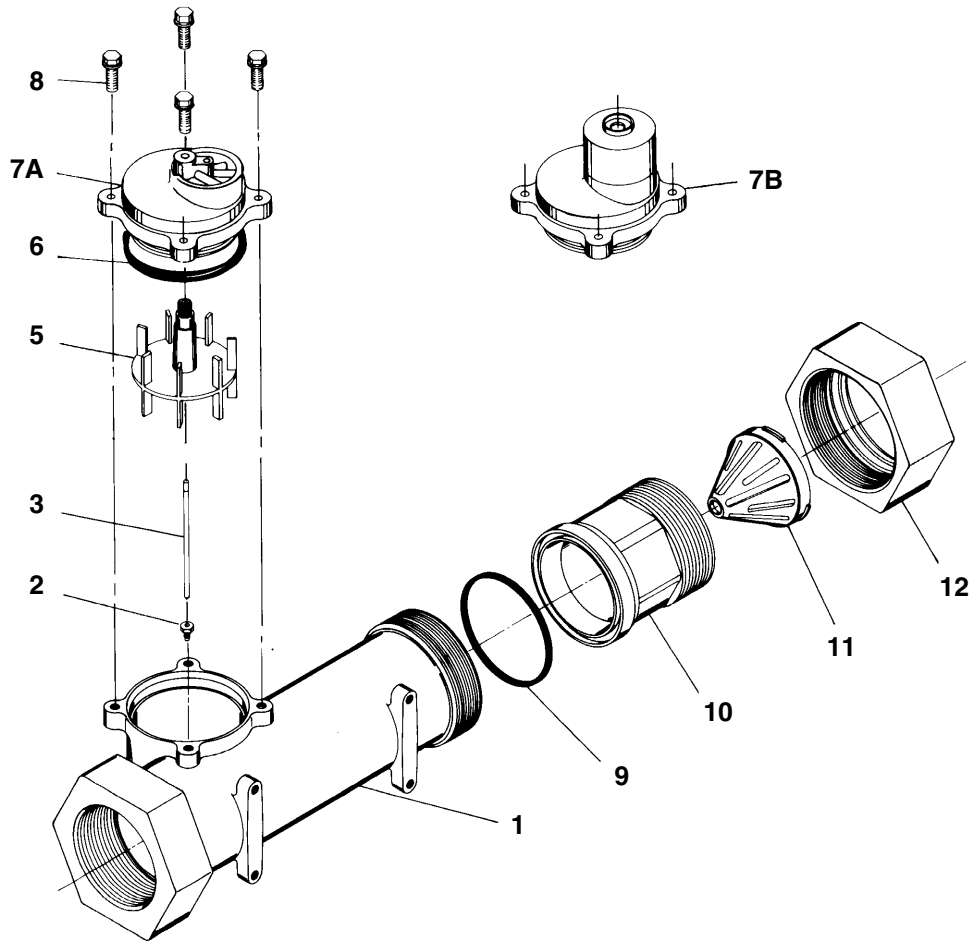
## 1600 Series Brine System



Item No.	Quantity	Part No.	Description
1	1	10328	90° Elbow - ¼ 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	15221	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.25GPM
		60020-50	BLFC .50 GPM
		60020-100	BLFC 1.0 GPM

# MODEL 2900

## 2" Meter Assembly



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

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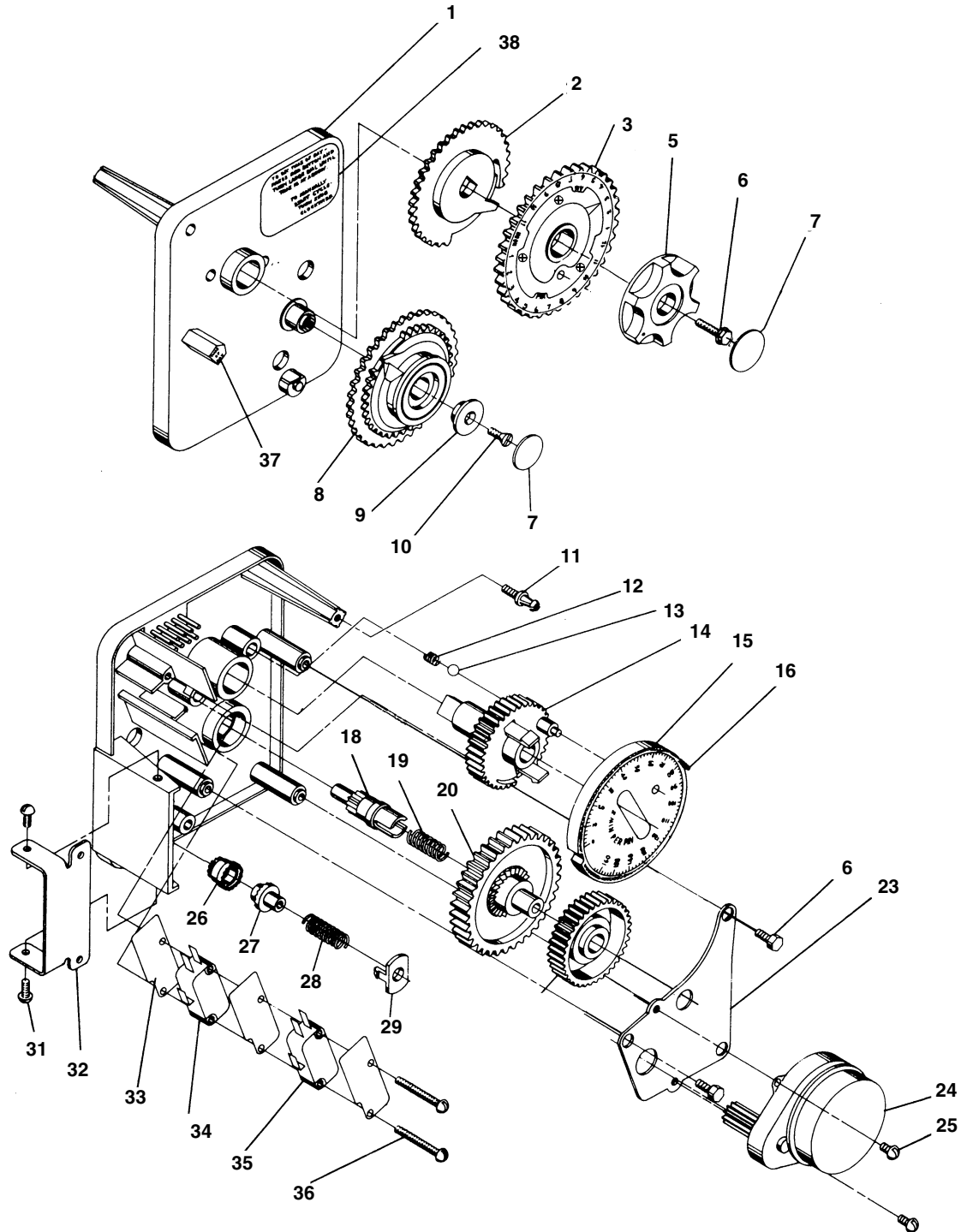
*Notes:*

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# 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	40096-24	24 Hour Gear Assembly, 12 Midnight
		40096-02	24 Hour Gear Assembly, 2 A.M.
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
42	1	15465	Caution Label - Not Shown
43	1	14198	Capacity Label - Not Shown

# 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.

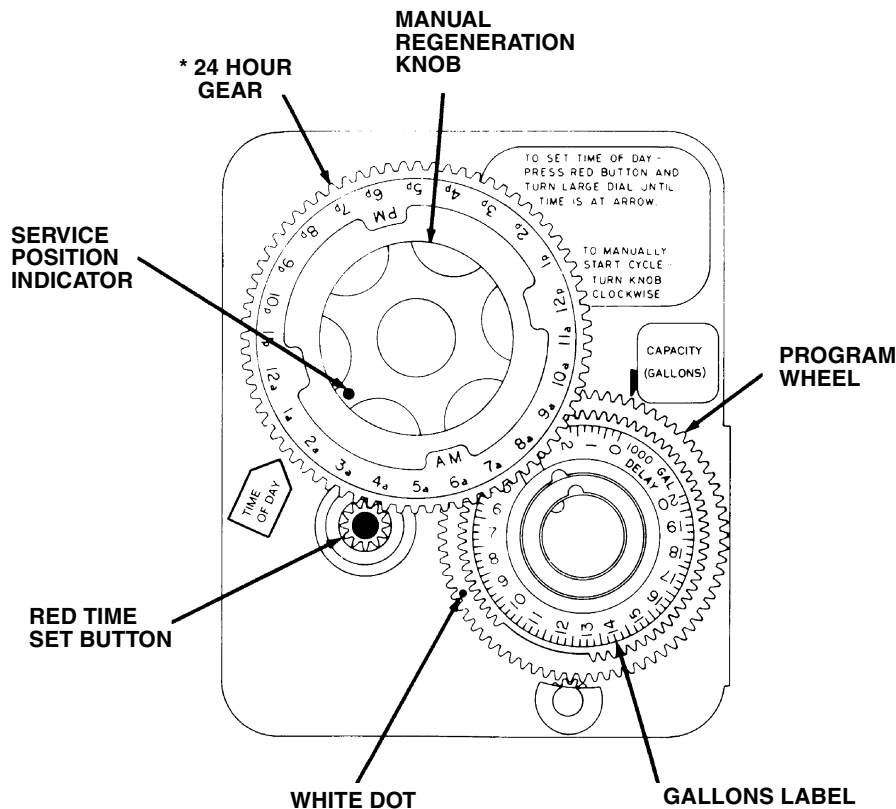
The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.

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.

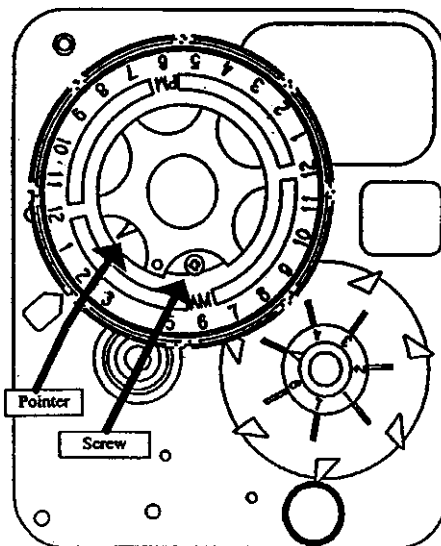
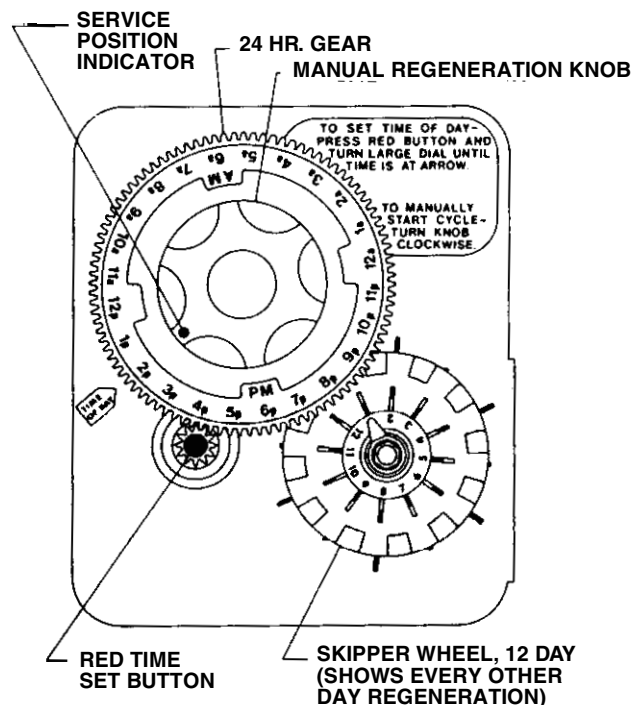
The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.

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

# MODEL 3200 & 3210 TIMER SERIES

## Regeneration Cycle Program Setting Procedure

*(Brine Tank Refill Separate From Rapid Rinse)*

### 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.

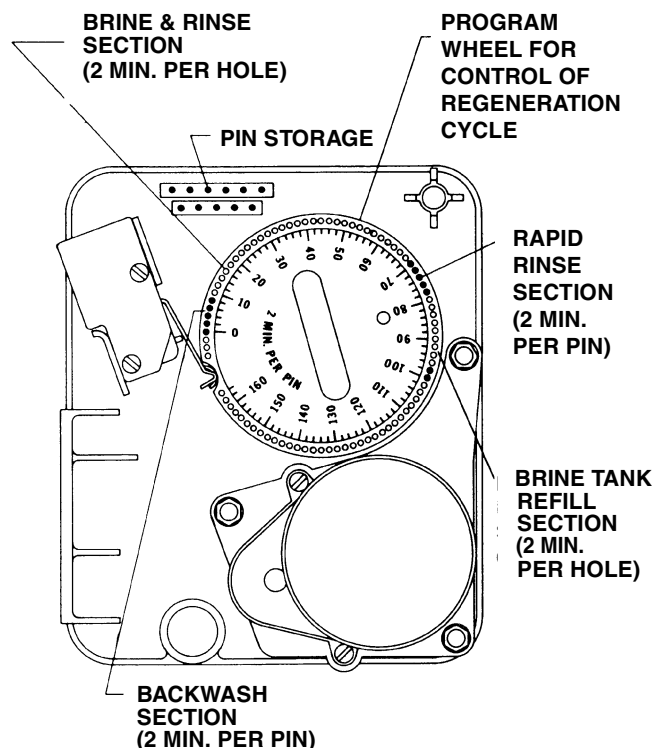
#### How To Change The Length Of Brine And Rinse Time:

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.)



### See Page 27 For Typical Timer Settings

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

## 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.
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.

# MODEL 2900

## Service Instructions (Cont'd.)

PROBLEM	CAUSE	CORRECTION
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

## *\*Typical Timer Settings At Various Salting Levels*

### Salting @ 6# Per Ft<sup>3</sup>

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

### Salting @ 10# Per Ft<sup>3</sup>

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

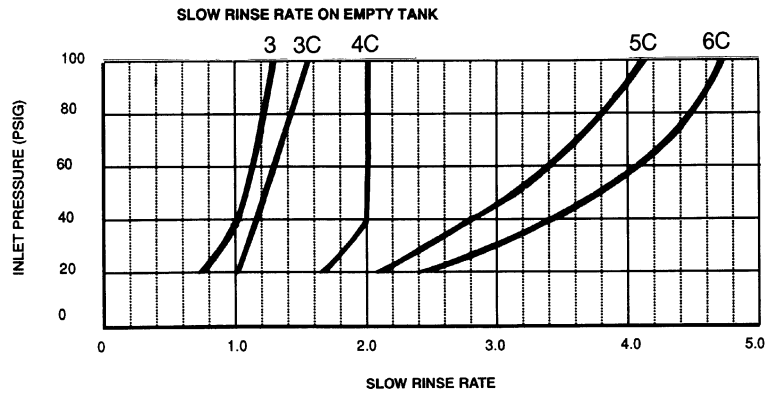
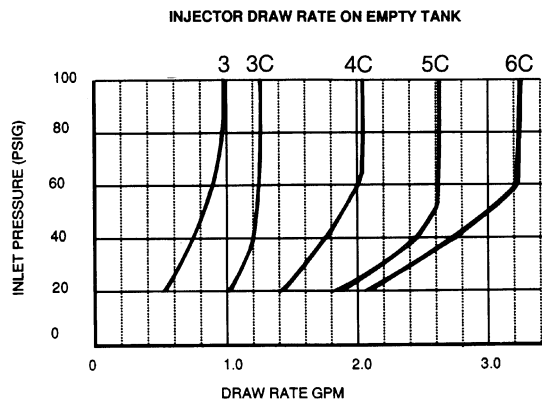
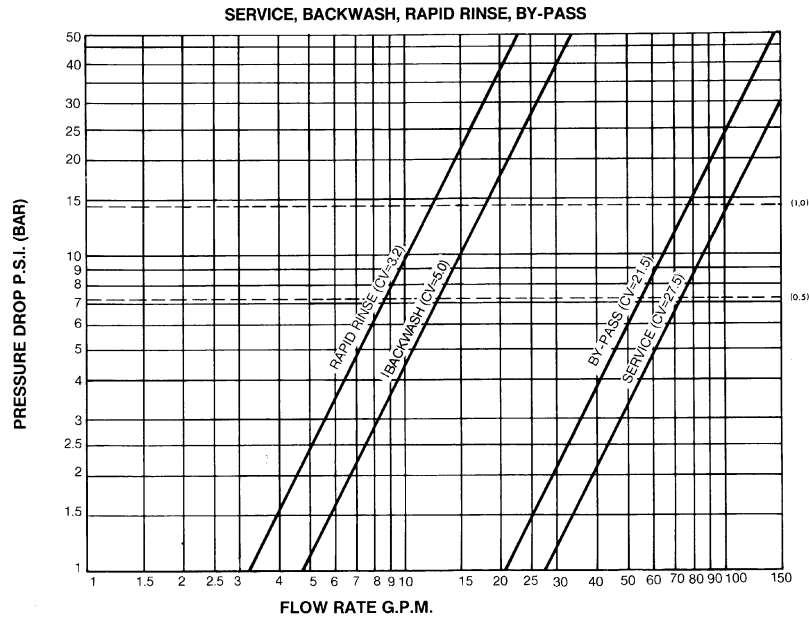
### Salting @ 15# Per Ft<sup>3</sup>

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

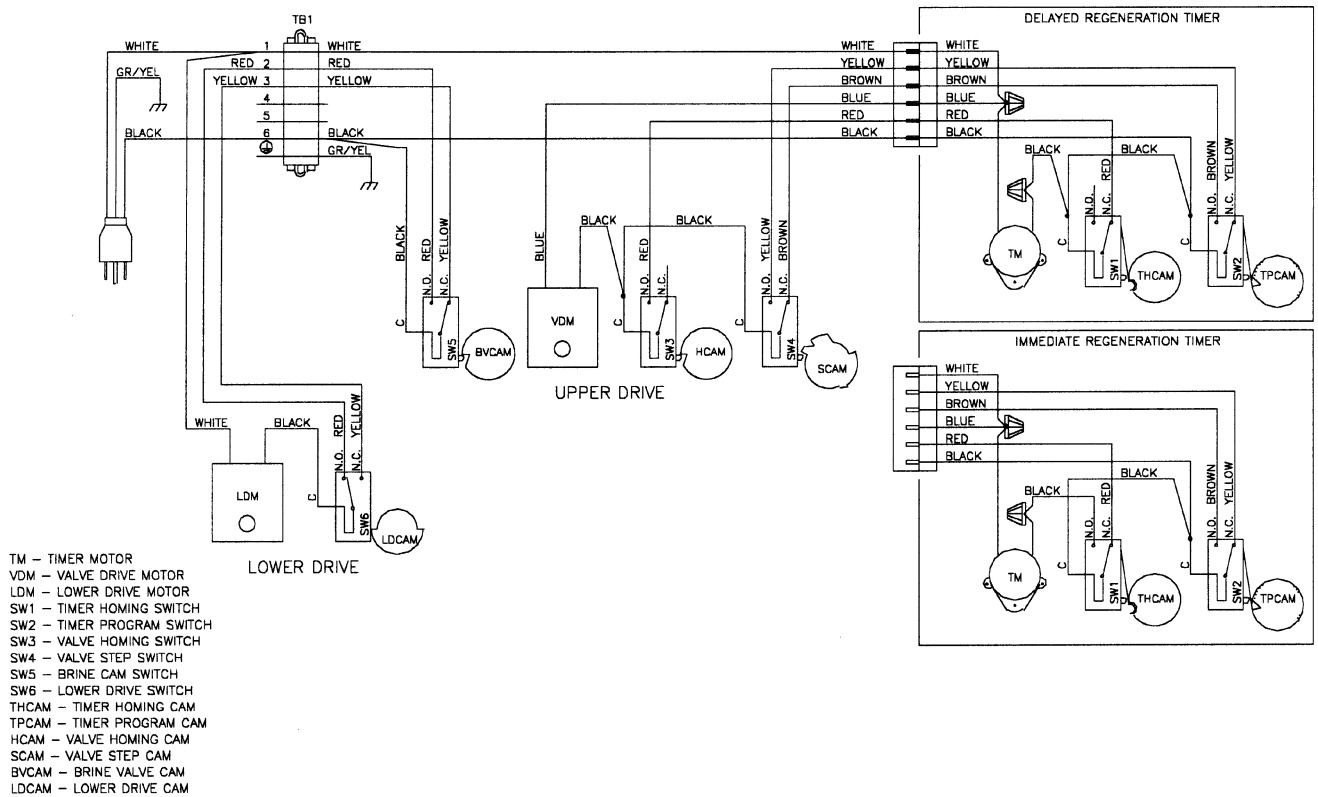
# MODEL 2900

## Flow Data & Injector Draw Rates



# SYSTEM #4-SINGLE VALVE REGENERATION

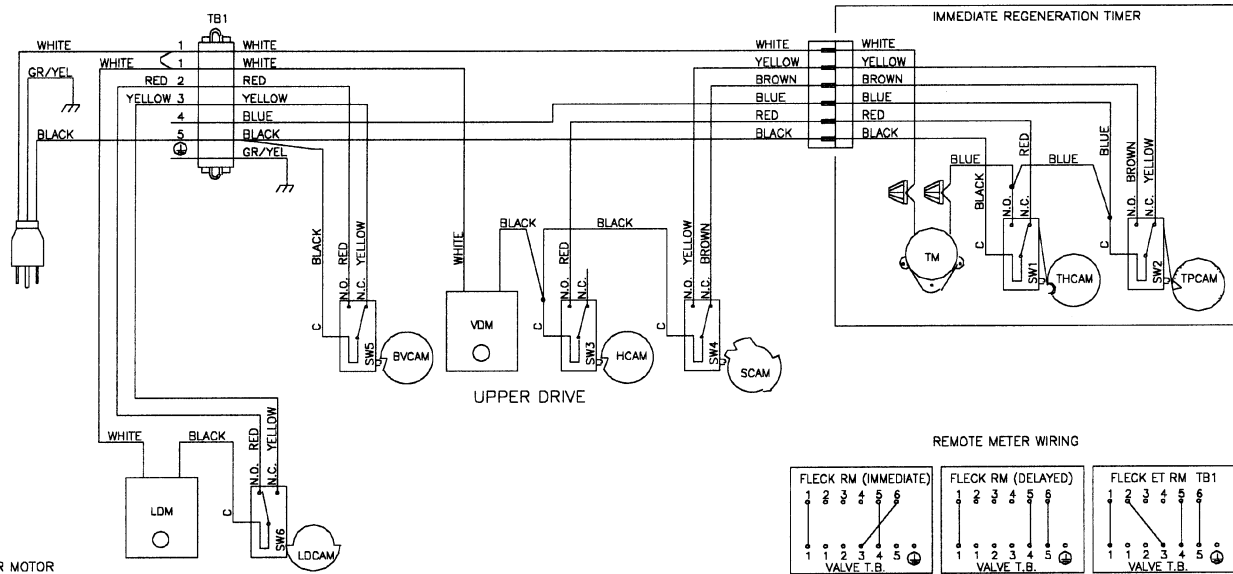
## Immediate and Delayed Valve Wiring



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

# SYSTEM #4-WITH REMOTE SIGNAL START

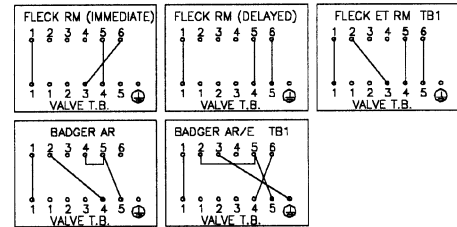
## Valve Wiring



- 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
- 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.

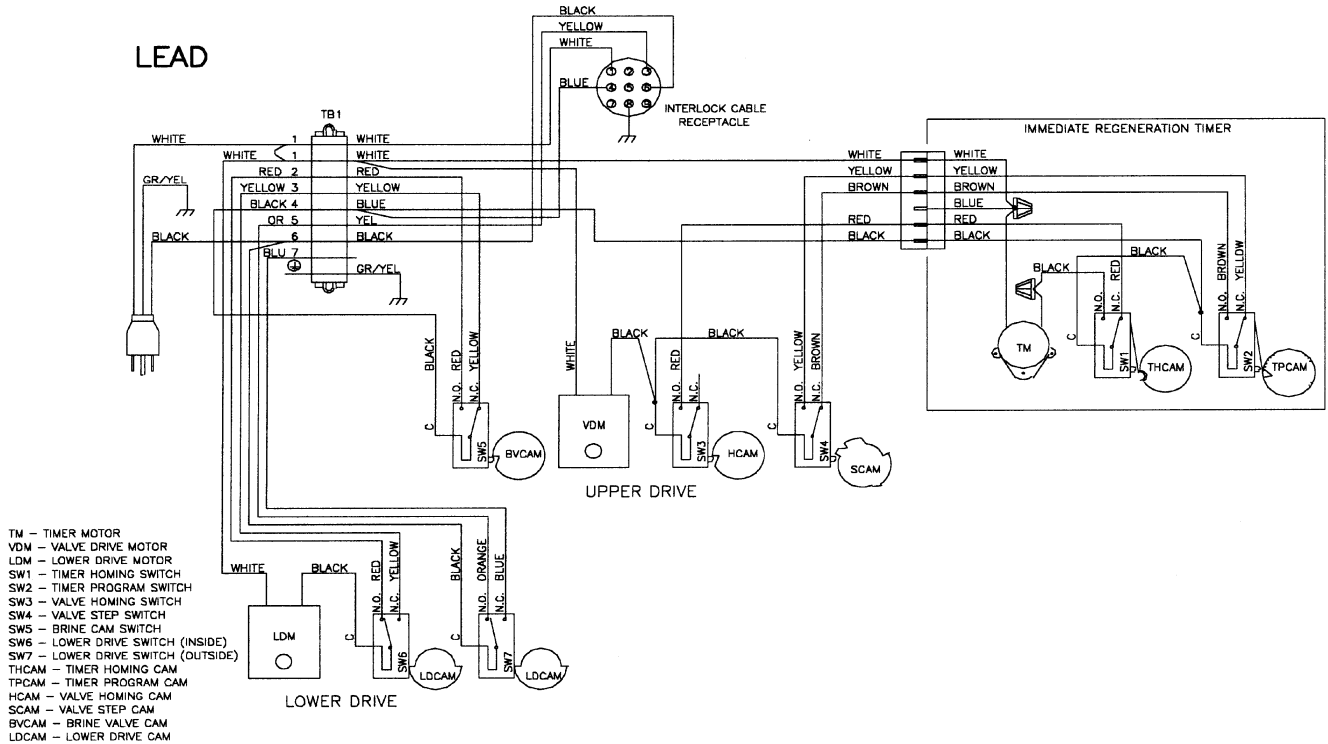
### REMOTE METER WIRING



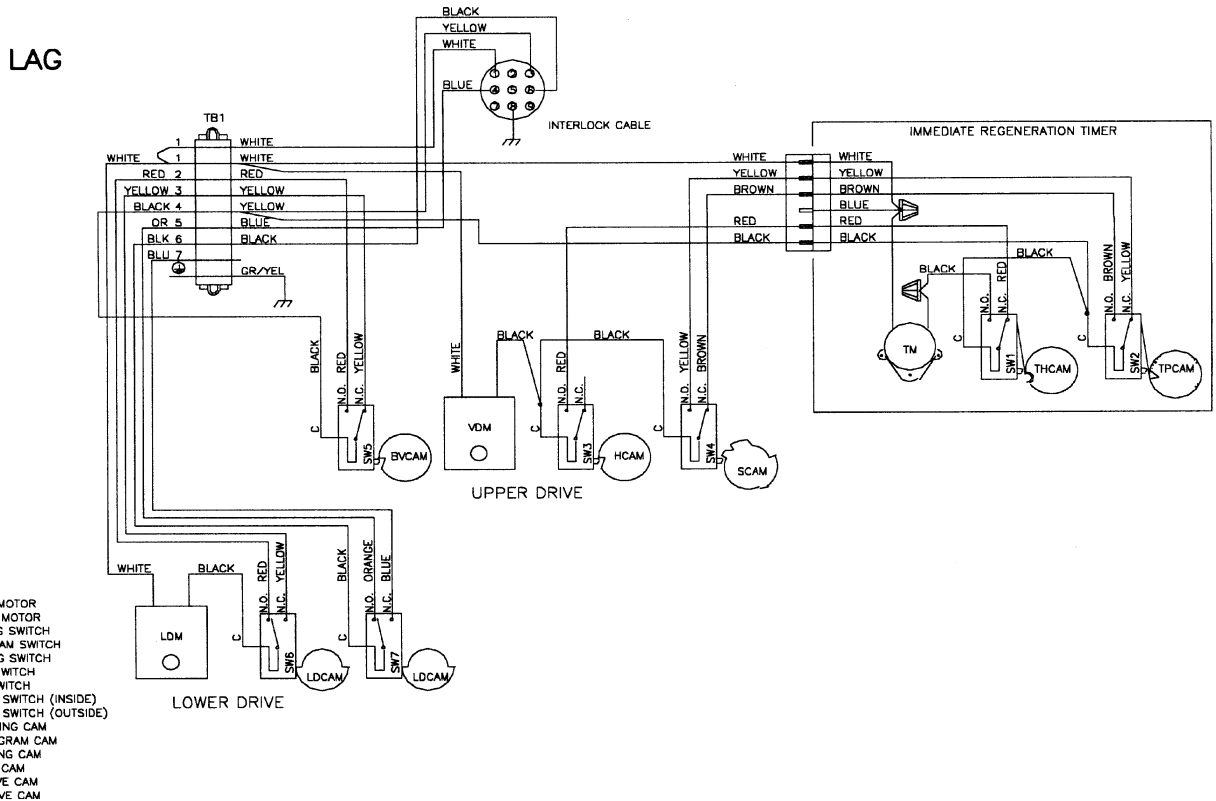


# SYSTEM #5-INTERLOCKED REGENERATION

## Valve Wiring

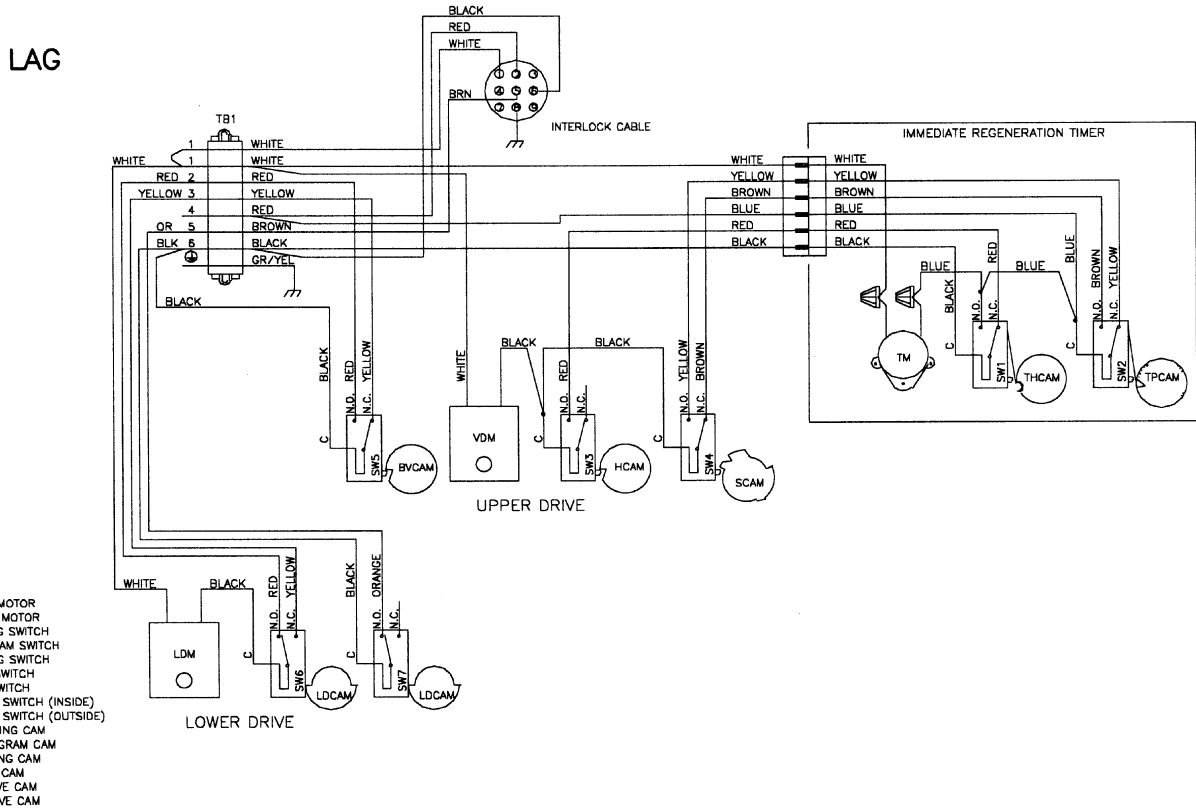
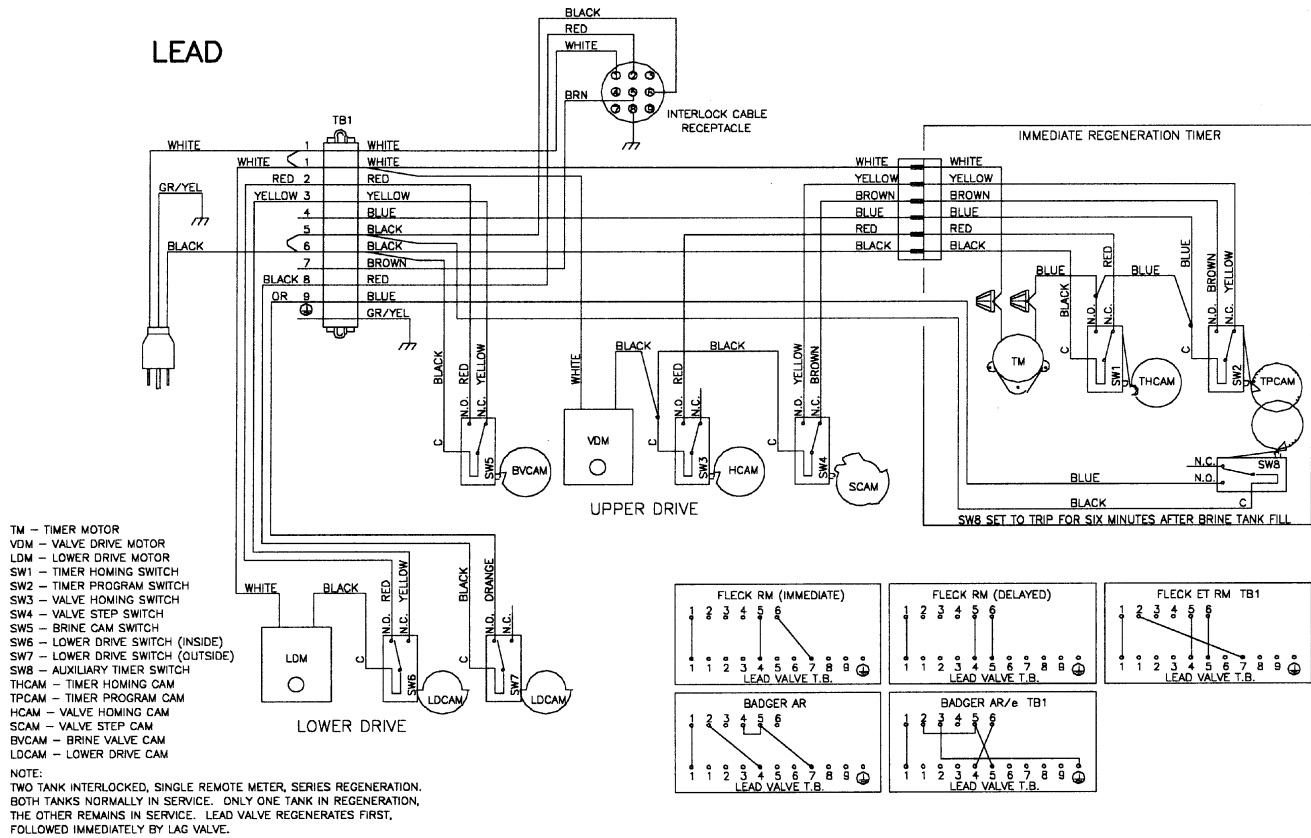


NOTE:  
TWO TANK INTERLOCKED, INDIVIDUAL METER, IMMEDIATE REGENERATION.  
BOTH TANKS NORMALLY IN SERVICE. ONLY ONE TANK IN REGENERATION,  
THE OTHER REMAINS IN SERVICE.



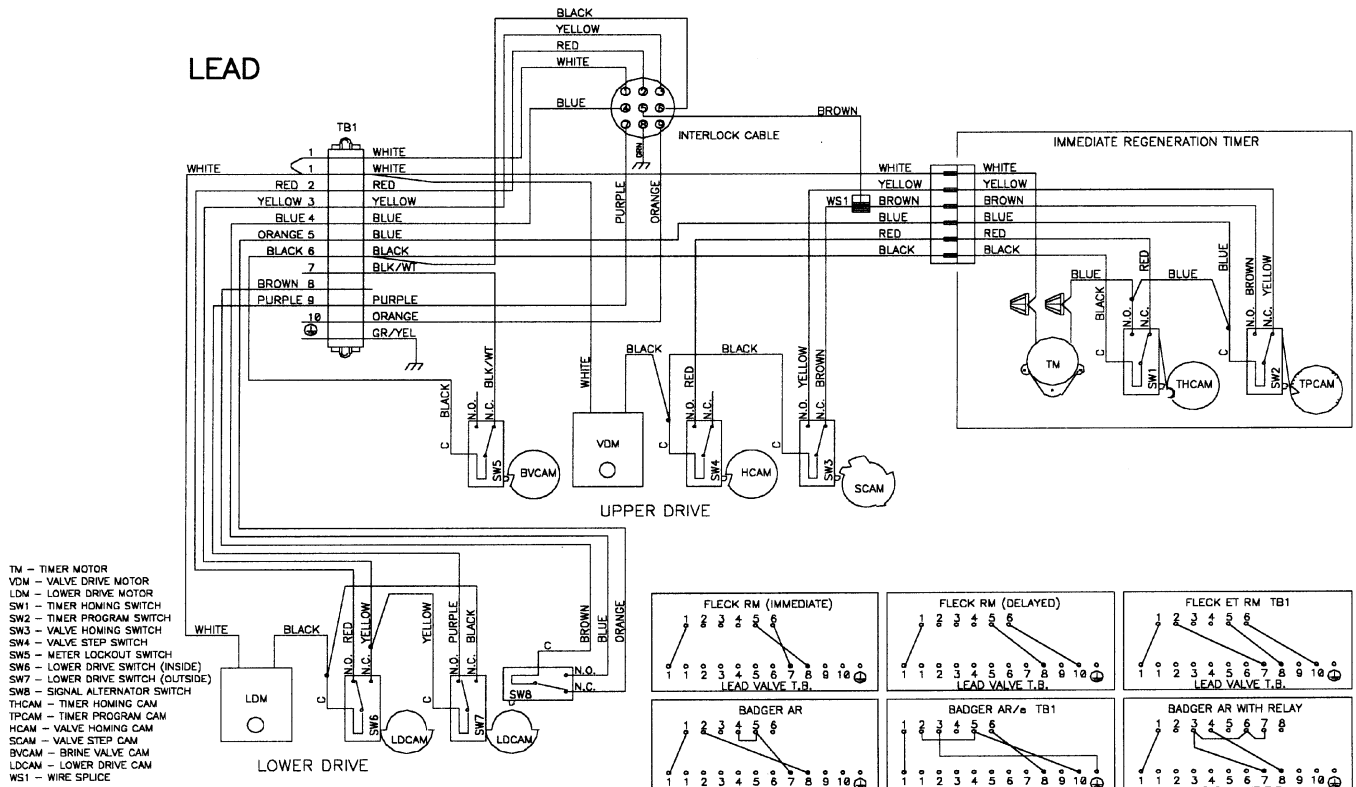
# SYSTEM #6-SERIES REGENERATION

## Valve Wiring

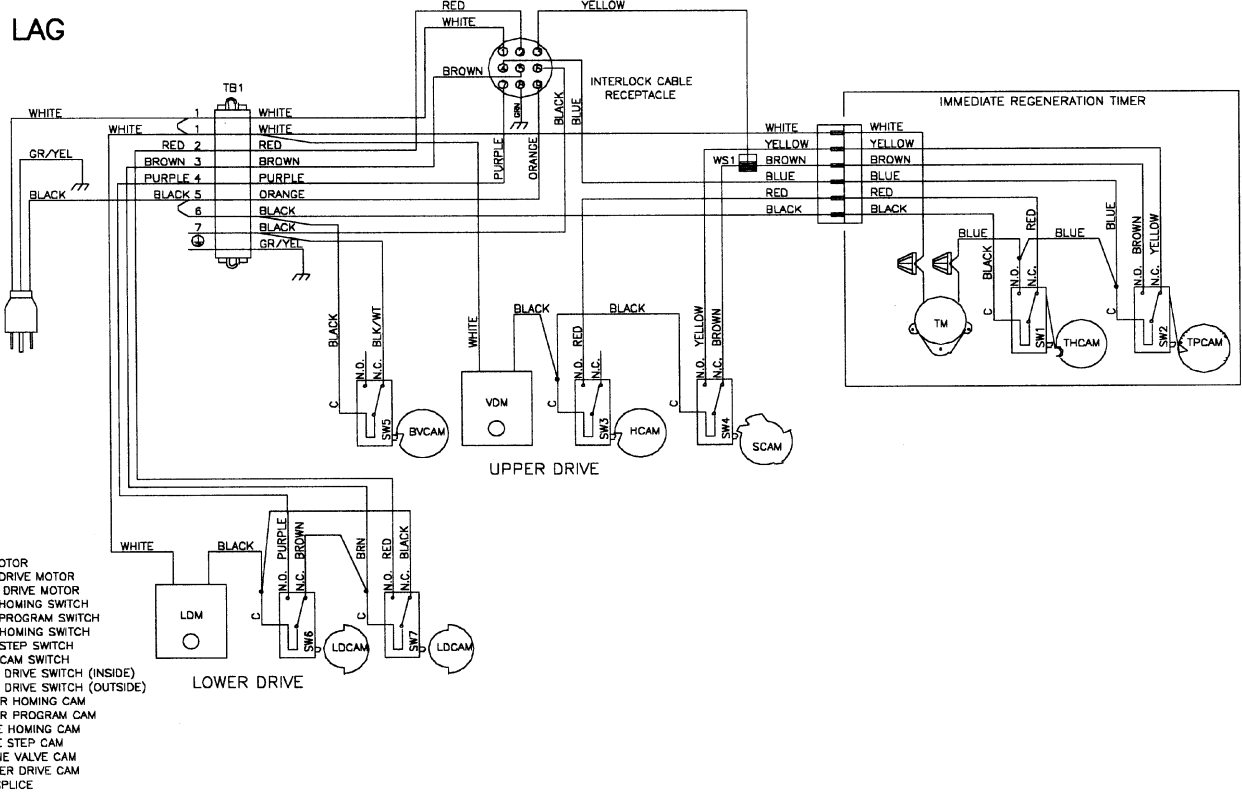


# SYSTEM #7-ALTERNATING REGENERATION

## Valve Wiring

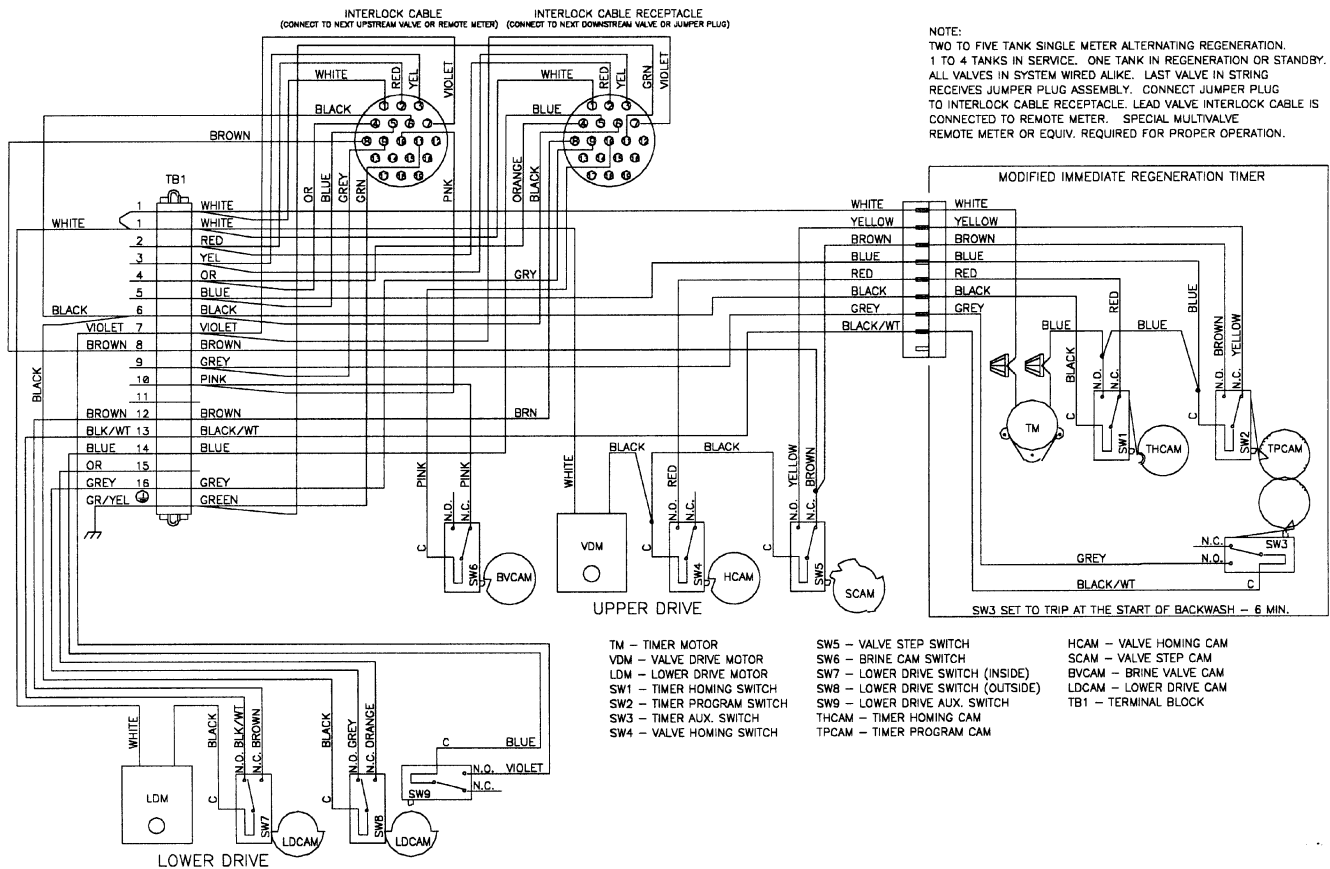


NOTE:  
 TWO TANK SINGLE REMOTE METER ALTERNATING REGENERATION.  
 ONLY ONE TANK IN SERVICE, THE OTHER IN REGENERATION OR STANDBY.



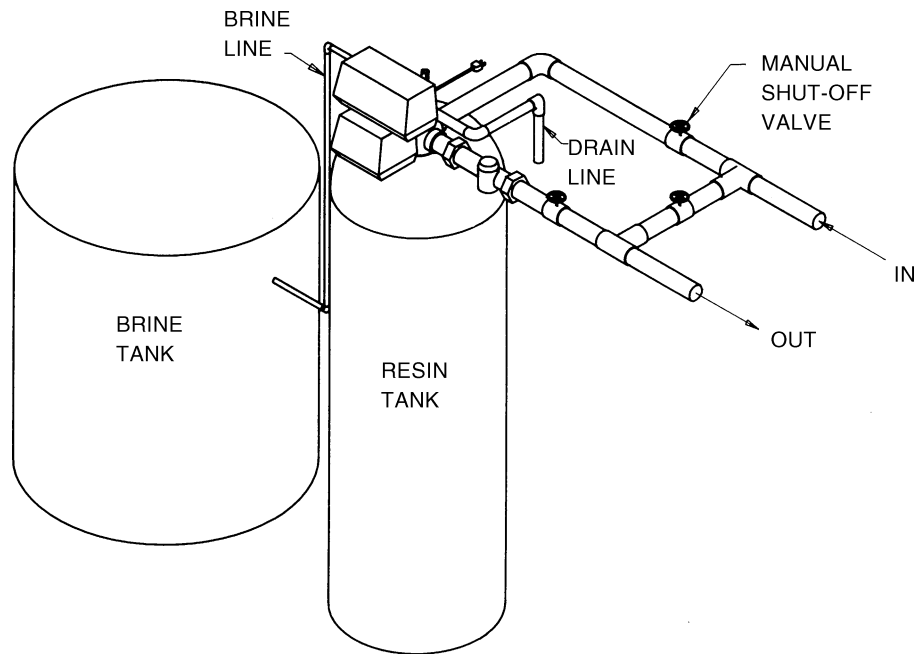
# SYSTEM #7-ALTERNATING REGENERATION

## Multi-Valve System Valve Wiring

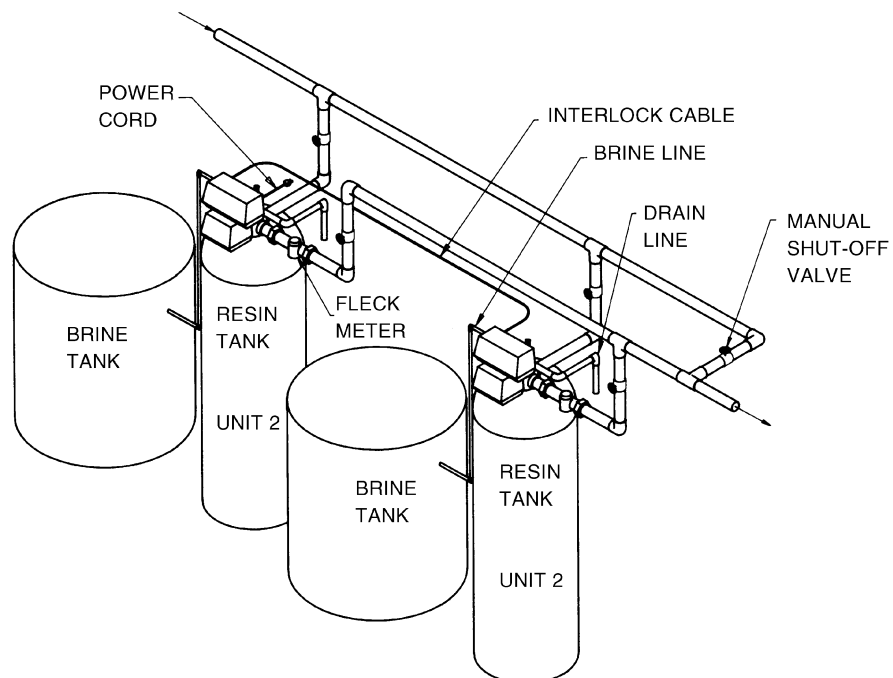


# MODEL 2900

## System #4 - Typical Single Tank Installation With Optional Meter



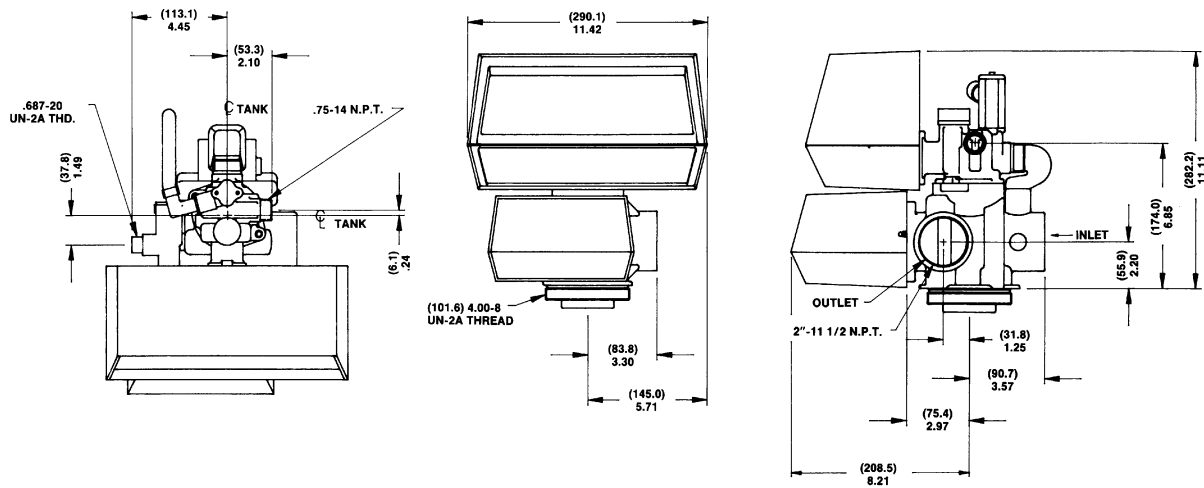
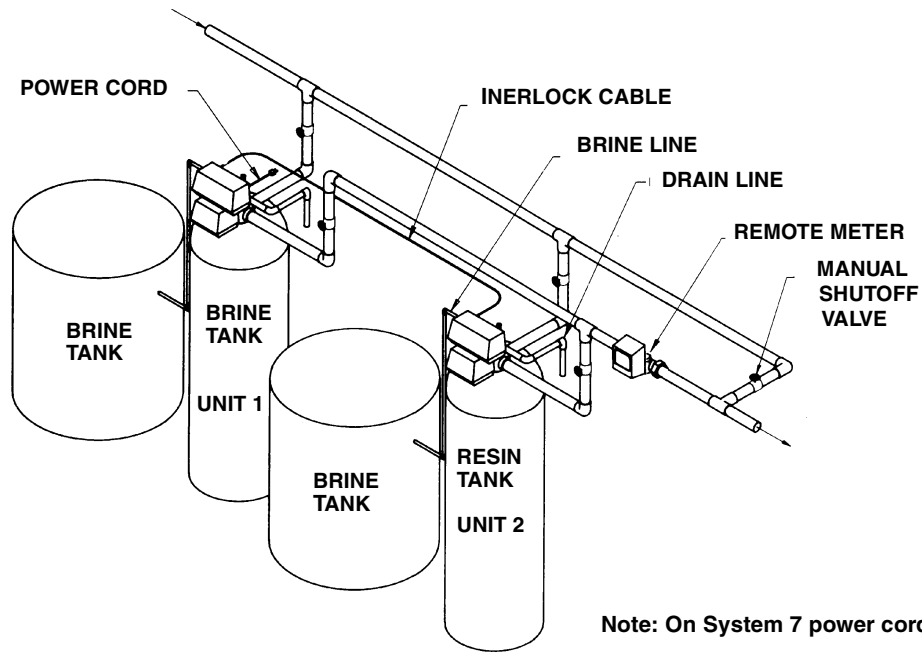
## System #5 - Interlock - Typical Twin Tank Installation With Optional Meter Interlock And No Hard Water Bypass



# MODEL 2900

## System #6 – Twin Series Regeneration

## System #7 – Twin Alternator Installation



# MODEL 2900

## 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

### 60034 1700 Brine Valve

For Illustration, See Page 14

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	16123	Nut/2"
1	16124	Ferrule 1/2"

### 60080 1600 Injector Assembly

For Illustration, See Page 8

1	10227	Injector Screen
1	11893	Injector Cap
1	10229	Injector Cover Gasket
1	10328	90° Elbow 1/4" NPT x 3/8 Tube
2	10692	Screw
1	10913	Injector Nozzle
1	10914	Injector Throat
1	11475	Injector Body Gasket
1	17776	Injector Body

### 60381 1700 Injector Assembly

For Illustration, See Page 8

1	11893	Injector Cap
1	10229	Injector Cover Gasket
1	17777	Injector Body
1	14801	Injector Nozzle
1	14802	Injector Throat
1	14803	Injector Screen
2	14804	Screw
1	14805	Injector Body Gasket

### 60090-HF 2900 Piston Assembly, Upper

For Illustration, See Page 8

1	10209	Quad Ring, -010
1	10234	O-Ring, -024
1	10598	End Plug Assembly
1	10909	Pin, Link
1	14451	Piston, 2750
1	14452	Piston Rod, 2500

### 60103 2900 Piston Assembly, Hard Water By-Pass

For Illustration, See Page 8

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

### 60103-01 2900 Piston Assembly, Hard Water By-Pass Hot Water

1	14757	Piston, Hard Water By-Pass
1	14758	Piston Rod, 2900
1	14818	Ring, Piston Rod Snap
1	14922	O-Ring, -035
1	14926-01	Quad Ring, -012
1	19276	End Plug Assembly, 2900, Hot Water

### 60104 2900 Piston Assembly, No Hard Water By-Pass

For Illustration, See Page 8

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

### 60104-01 2900 Piston Assembly, No Hard Water By-Pass, Hot Water

1	14752	Piston, No Hard Water By-Pass
1	14758	Piston Rod, 2900
1	14818	Ring, Piston Rod Snap
1	14922	O-Ring, -035
1	14926-01	Quad Ring, -012
1	19276	End Plug Assembly, 2900, Hot Water

### 60121 2900 Upper Seal and Spacer Kit

For Illustration, See Page 8

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

# MODEL 2000

## Service Assemblies (Cont'd.)

### 60128 2900 Lower Seal & Spacer Kit

For Illustration, See Page 8

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

### 60050-21 Drive Motor Assembly, 11 5V, STF

For Illustration, See Page 6

- 2..... 10218 ..... MicroSwitch
- 2..... 10220 ..... Screw #4 x 1 1/13
- 2..... 10302 ..... Insulator
- 2..... 10338 ..... Roll Pin 3/22 x 7/8
- 2..... 10339 ..... HexNut#4
- 2..... 10340 ..... LockWasher#4
- 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..... 11752 ..... Motor Lead Wire
- 1..... 11826 ..... Motor Bracket BN Side
- 1..... 12576 ..... Drive Cam - STF
- 1..... 12777 ..... Brine Valve Cam
- 1..... 13366 ..... Drive Bearing
- 1..... 10250 ..... Retaining Ring
- 1..... 10621 ..... Connecting Link

### 60055-51 2900 Lower Drive Assembly, 11 5V

For Illustration, See page 10

- 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
- 2..... 14203 ..... Screw, Rd Hd 4-40 x 9/16
- 1..... 14759 ..... Link, Piston Rod
- 1..... 14769 ..... Bracket, Motor
- 1..... 14772 ..... Motor, 110V/60 Hz
- 1..... 14775 ..... Cam, Drive
- 1..... 14784 ..... Bearing, Connecting Rod
- 1..... 15926 ..... Wire Harness, System 4
- 1..... 16103 ..... Insulator, Micro Switch

### 60393 2" Meter Assembly - Std. Range

For Parts Breakdown See Page 13

### 60394 2" Meter Assembly - Ext. Range Drain Line Flow Controls

- 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

### Side Mount Adapter

- 61415 ..... NPT/US
- 61415NP ..... NPT/US/NICKEL
- 61415-20 ..... BSP/METRIC
- 61415-20NP ..... BSP/METRIC/NICKEL









