



# Pentair Water

## Fleck 2900s

### Service Manual

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#### JOB SPECIFICATION SHEET

Job Number: \_\_\_\_\_  
 Model Number: \_\_\_\_\_  
 Water Hardness: \_\_\_\_\_ ppm or gpg  
 Capacity Per Unit: \_\_\_\_\_  
 Mineral Tank Size: \_\_\_\_\_ Diameter: \_\_\_\_\_ Height: \_\_\_\_\_  
 Salt Setting per Regeneration: \_\_\_\_\_

##### 1. Type of Timer:

- A. 7 Day or 12 Day
- B. Meter Initiated

##### 2. Downflow:                      Upflow                      Upflow Variable

##### 3. Meter Size:

- A. 3/4" Std Range (125 - 2,100 gallon setting)
- B. 3/4" Ext Range (625 - 10,625 gallon setting)
- C. 1" Std Range (310 - 5,270 gallon setting)
- D. 1" Ext Range (1,150 - 26,350 gallon setting)
- E. 1-1/2" Std Range (625 - 10,625 gallon setting)
- F. 1-1/2" Ext Range (3,125 - 53,125 gallon setting)
- G. 2" Std Range (1,250 - 21,250 gallon setting)
- H. 2" Ext Range (6,250 - 106,250 gallon setting)
- I. 3" Std Range (3,750 - 63,750 gallon setting)
- J. 3" Ext Range (18,750 - 318,750 gallon setting)
- K. Electronic \_\_\_\_\_ Pulse Count \_\_\_\_\_ Meter Size \_\_\_\_\_

##### 4. System Type:

- A. System #4: 1 Tank, 1 Meter, Immediate, or Delayed Regeneration
- B. System #4: Time Clock
- C. System #4: Twin Tank
- D. System #5: 2-5 Tanks, Interlock Mechanical  
2-4 Tanks, Interlock Electronic  
Meter per unit for Mechanical and Electronic
- E. System #6: 2-5 Tanks, 1 Meter, Series Regeneration, Mechanical  
2-4 Tanks, 1 Meter, Series Regeneration, Electronic
- F. System #7: 2-5 Tanks, 1 Meter, Alternating Regeneration,  
Mechanical  
2 Tanks only, 1 Meter, Alternating Regeneration,  
Electronic
- G. System #9: Electronic Only, 2-4 Tanks, Meter per Valve, Alternating
- H. System #14: Electronic Only, 2-4 Tanks, Meter per Valve. Brings units on and offline based on flow.

##### 5. Timer Program Settings:

- A. Backwash: \_\_\_\_\_ Minutes
- B. Brine and Slow Rinse: \_\_\_\_\_ Minutes
- C. Rapid Rinse: \_\_\_\_\_ Minutes
- D. Brine Tank Refill: \_\_\_\_\_ Minutes
- E. Pause Time: \_\_\_\_\_ Minutes
- F. Second Backwash: \_\_\_\_\_ Minutes

##### 6. Drain Line Flow Control: \_\_\_\_\_ gpm

##### 7. Brine Line Flow Controller: \_\_\_\_\_ gpm

##### 8. Injector Size#: \_\_\_\_\_

##### 9. Piston Type:

- A. Hard Water Bypass
- B. No Hard Water Bypass

# INSTALLATION

## Water Pressure

A minimum of 20 pounds (1.4 bar) of water pressure is required for regeneration valve to operate effectively.

## Electrical Facilities

An uninterrupted alternating current (A/C) supply is required. Note: Other voltages are available. Please make sure your voltage supply is compatible with your unit before installation.

## 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 to prevent air breaks and back flow.

## BY-PASS VALVES

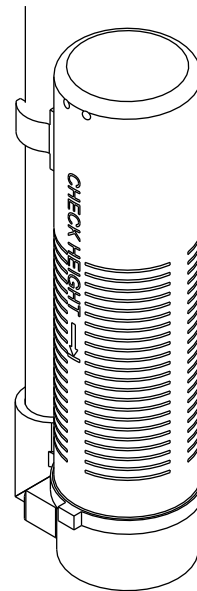
Always provide for the installation of a by-pass valve if unit is not equipped with one.

**CAUTION** Water pressure is not to exceed 125 psi (8.6 bar), water temperature is not to exceed 110°F (43°C), 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.
2. During cold weather, the installer should warm the valve to room temperature before operating.
3. All plumbing should be done in accordance with local plumbing codes. The pipe size for residential drain line should be a minimum of 1/2" (13 mm). Backwash flow rates in excess of 7 gpm (26.5 Lpm) or length in excess of 20' (6 m) require 3/4" (19 mm) drain line. Commercial drain lines should be the same size as the drain line flow control.
4. Refer to the dimensional drawing for cutting height of the distributor tube. If there is no dimensional drawing, cut the distributor tube flush with the top of the tank.
5. Lubricate the distributor O-ring seal and tank O-ring seal. Place the main control valve on tank. Note: Only use silicone lubricant.
6. Solder joints near the drain must be done prior to connecting the Drain Line Flow Control fitting (DLFC). Leave at least 6" (15 cm) between the DLFC and solder joints when soldering pipes that are connected on the DLFC. Failure to do this could cause interior damage to the DLFC.
7. Teflon tape is the only sealant to be used on the drain fitting. The drain from twin tank units may be run through a common line.
8. Make sure that the floor is clean beneath the salt storage tank and that it is level.
9. Place approximately 1" (25 mm) of water above the grid plate. If a grid is not utilized, fill to the top of the air check (Figure 1) in the salt tank. Do not add salt to the brine tank at this time.
10. 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. Once clean, close the water tap.

11. Slowly place the by-pass in service position and let water flow into the mineral tank. When water flow stops, slowly open a cold water tap nearby and let run until the air is purged from the unit.
12. Plug unit into an electrical outlet. Note: All electrical connections must be connected according to local codes. Be certain the outlet is uninterrupted.



60002 Rev E

Figure 1 Residential Air Check Valve

## START-UP INSTRUCTIONS

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

1. Turn the manual regeneration knob slowly in a clockwise direction until the program micro switch lifts on top of the first set of pins. Allow the drive motor to move the piston to the first regeneration step and stop. Each time the program switch position changes, the valve will advance to the next regeneration step. Always allow the motor to stop before moving to the next set of pins or spaces.
- NOTE: For electronic valves, please refer to the manual regeneration part of the timer operation section. If the valve came with a separate electronic timer service manual, refer to the timer operation section of the electronic timer service manual.**
2. Position the valve to backwash. Ensure the drain line flow remains steady for 10 minutes or until the water runs clear (see above).
  3. Position the valve to the brine / slow rinse position. Ensure the unit is drawing water from the brine tank (this step may need to be repeated).
  4. Position the valve to the rapid rinse position. Check the drain line flow, and run for 5 minutes or until the water runs clear.
  5. Position the valve to the start of the brine tank fill cycle. Ensure water goes into the brine tank at the desired rate. The brine valve drive cam will hold the valve in this position to fill the brine tank for the first regeneration.
  6. Replace control box cover.
  7. Put salt in the brine tank.

**NOTE: Do not use granulated or rock salt.**

## 3200 TIMER SETTING PROCEDURE

### How To Set Days On Which Water Conditioner Is To Regenerate (Figure 2)

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

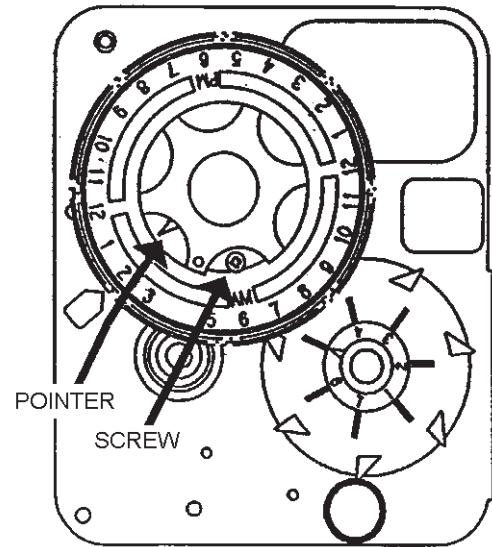
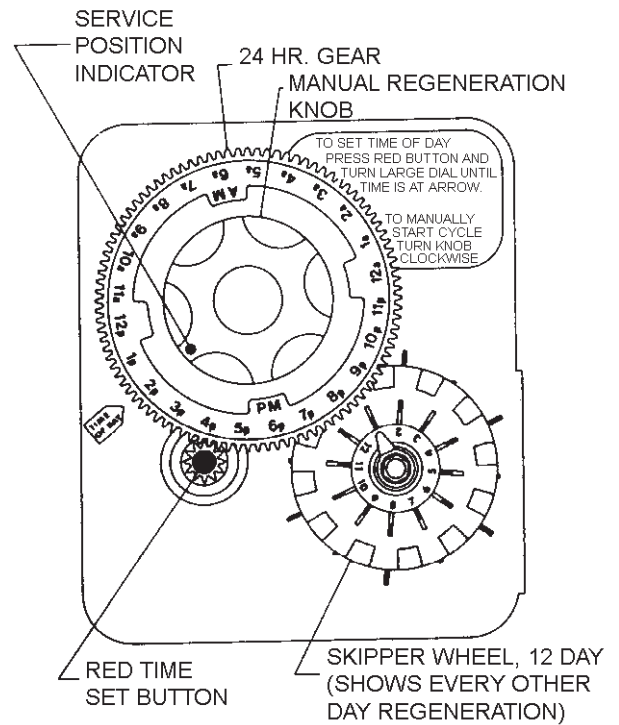
1. Press and hold the red button in to disengage the drive gear.
2. Turn the large gear until the actual time of day is at the time of day pointer.
3. Release the red button to again engage the drive gear.

### How To Manually Regenerate Your Water Conditioner At Any Time

1. Turn the manual regeneration knob clockwise.
2. This slight movement of the manual regeneration knob engages the program wheel and starts the regeneration program.
3. The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.
4. 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.
5. 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

61502-3200 Rev A

Figure 2

# 3210 & 3220 TIMER SETTING PROCEDURE

## 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 (Figure 3).

**NOTE: Drawing shows 8,750 gallon setting. The capacity (gallons) arrow (15) shows zero gallons remaining. The unit will regenerate tonight at the set regeneration time.**

## How To Set The Time Of Day

1. Press and hold the red button in to disengage the drive gear.
2. Turn the large gear until the actual time of day is opposite the time of day pointer.
3. Release the red button to again engage the drive gear.

## How To Manually Regenerate Your Water Conditioner At Any Time

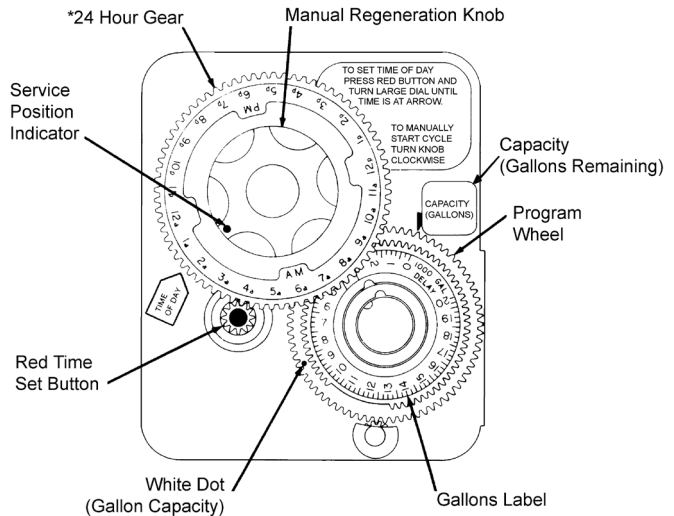
1. Turn the manual regeneration knob clockwise.
2. This slight movement of the manual regeneration knob engages the program wheel and starts the regeneration program.
3. The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.
4. 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.
5. 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. The timer will regenerate as soon as the capacity gallons reaches zero.

**NOTE: The program wheel to the left may be different than the program wheel on the product.**

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



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

61502-3200 Rev A

Figure 3

# 3200, 3210, 3220, 3230 REGENERATION CYCLE SETTING PROCEDURE

## 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 Series Timers (Figure 4)

1. To expose cycle program wheel, grasp timer in upper left-hand corner and pull, releasing snap retainer and swinging timer to the right.
2. 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.
3. Return timer to closed position engaging snap retainer in back plate. Make certain all electrical wires locate above snap retainer post.

## Timer Setting Procedure

### 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

1. 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).
2. 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

1. 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).
2. 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

1. 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).
2. To change the length of refill time, move the two pins at the end of the second group of holes as required.
3. The regeneration cycle is complete when the outer microswitch is tripped by the two pin set at end of the brine tank refill section.
4. The program wheel, however, will continue to rotate until the inner micro switch drops into the notch on the program wheel.

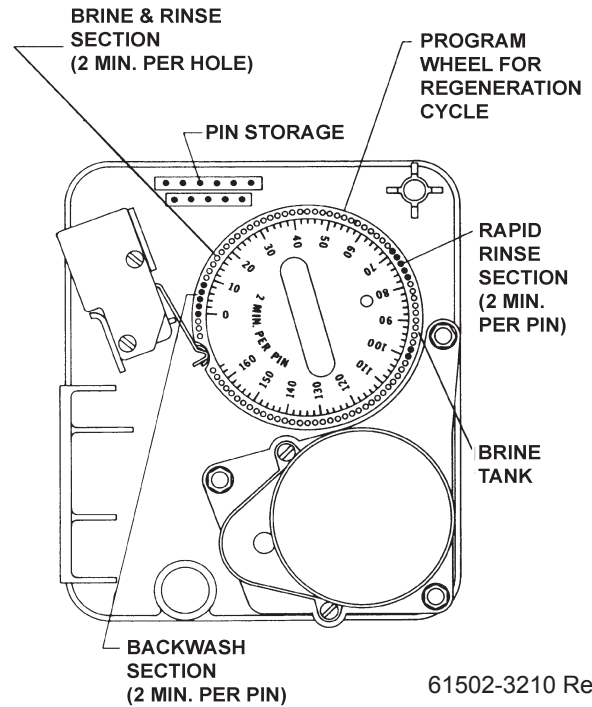
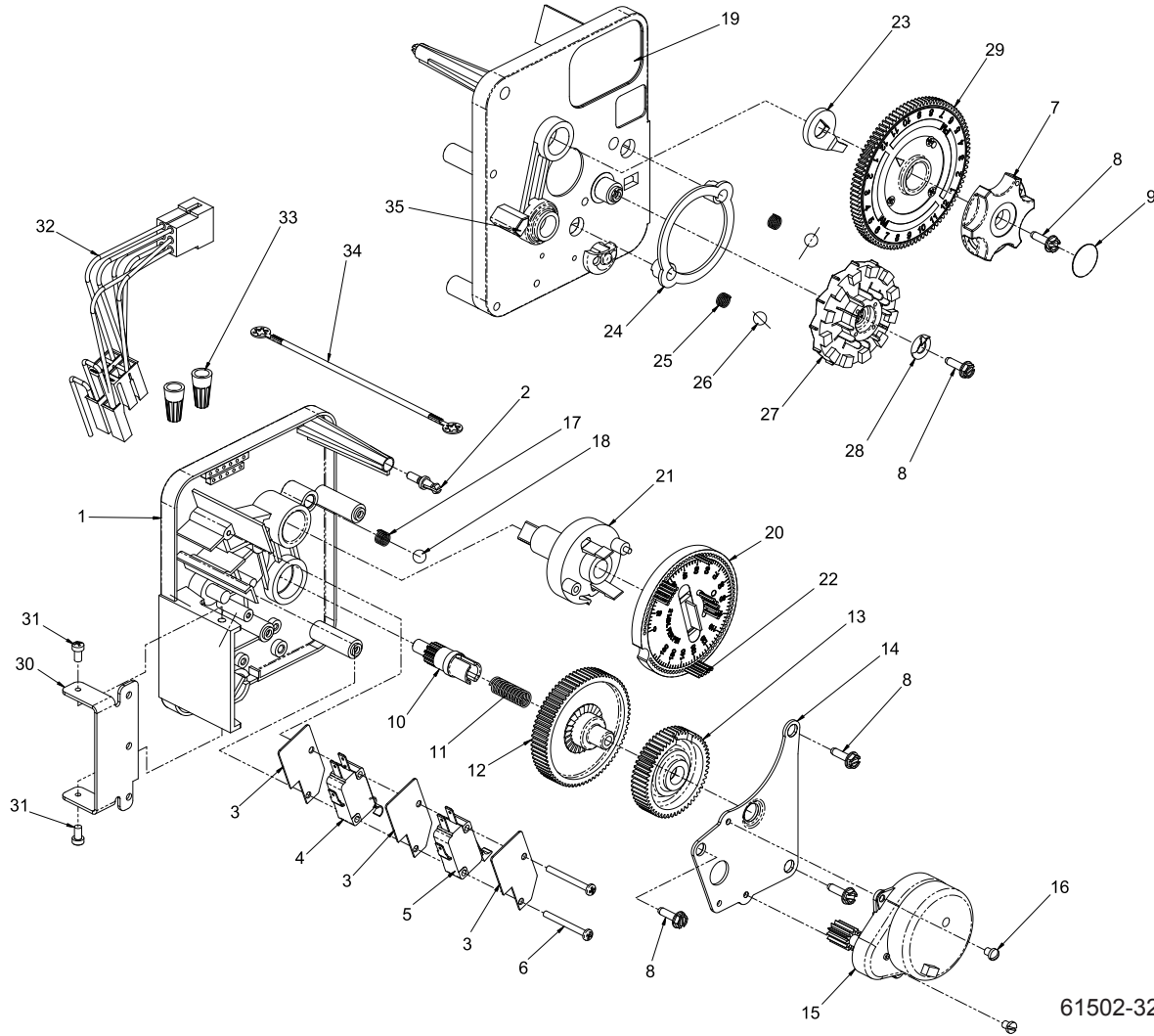


Figure 4

# 3200 TIME CLOCK TIMER ASSEMBLY

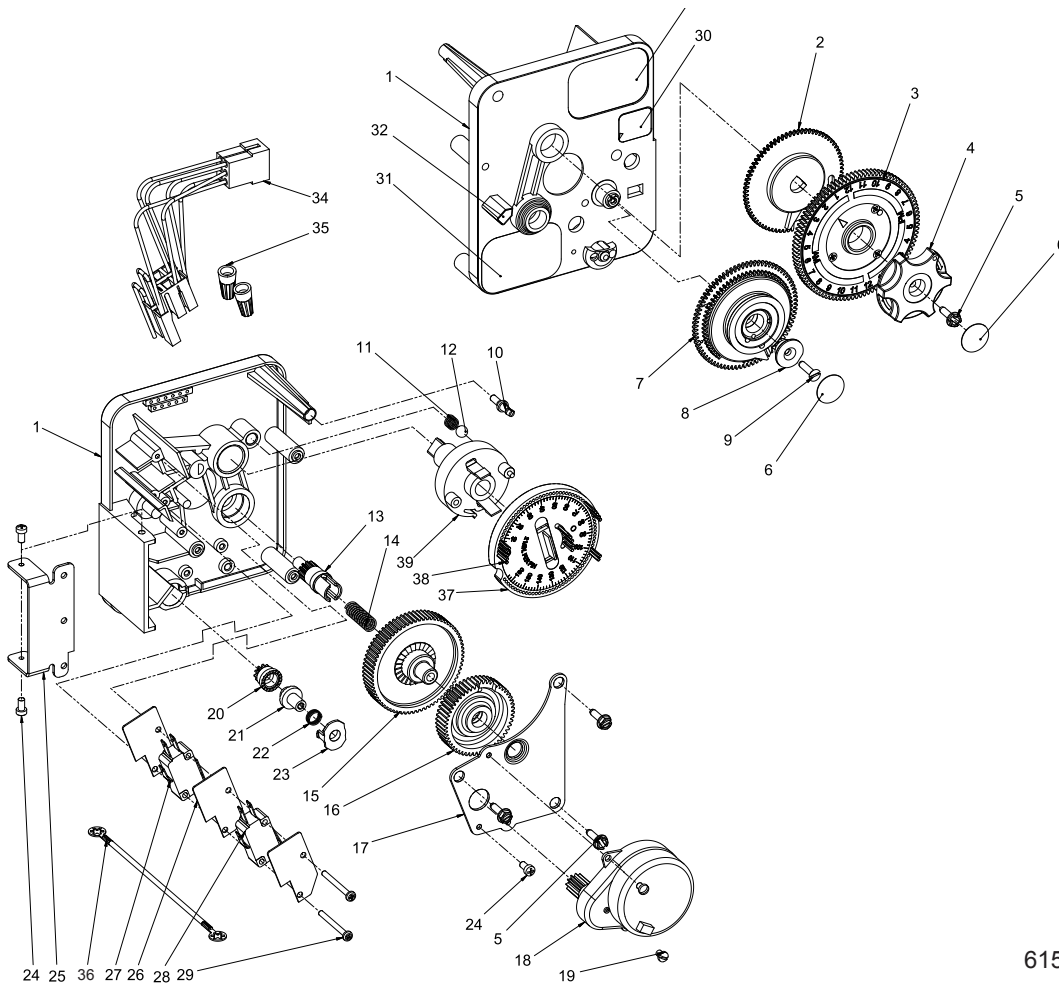


61502-3200 Rev A

Item No.	QTY	Part No.	Description
1.....	1	13870	Housing, Timer, 3200
2.....	1	14265	Clip, Spring
3.....	3	14087	Insulator
4.....	1	10896	Switch, Micro
5.....	1	15320	Switch, Micro, Timer
6.....	2	11413	Screw, Pan Hd Mach, 4-40 x 1-1/8
7.....	1	13886	Knob, 3200
8.....	5	13296	Screw, Hex Wsh, 6-20 x 1/2
9.....	1	11999	Label, Button
10.....	1	13018	Pinion, Idler
11.....	1	13312	Spring, Idler Shaft
12.....	1	13017	Gear, Idler
13.....	1	13164	Gear, Drive
14.....	1	13887	Plate, Motor Mounting
15.....	1	18743-1	Motor, 120V, 60Hz, 1/30 RPM
	1	18752-1	Motor, 100V, 50Hz, 1/30 RPM
	1	18824-1	Motor, 23V, 50Hz, 1/30 RPM
	1	18826-1	Motor, 24V, 50Hz, 1/30 RPM
	1	19659-1	Motor, 24V, 60Hz, 1/30 RPM
	1	19660-1	Motor, 230V, 60Hz, 1/30 RPM
16.....	2	13278	Screw, Slt'd Fillister Hd 6-32 x .156

Item No.	QTY	Part No.	Description
17.....	1	15424	Spring, Detent, Timer
18.....	1	15066	Ball, 1/4", Delrin
19.....	1	15465	Label, Caution
20.....	1	19210	Program Wheel Assy
21.....	1	13911	Gear, Main Drive, Timer
22.....	17	41754	Pin, Spring, 1/16 x 5/8 SS, Timer
23.....	1	13011	Arm, Cycle Actuator
24.....	1	13864	Ring, Skipper Wheel
25.....	2	13311	Spring, Detent, Timer
26.....	2	13300	Ball, 1/4", SS
27.....	1	14381	Skipper Wheel Assy, 12 Day
	1	14860	Skipper Wheel Assy, 7 Day
28.....	1	13014	Pointer, Regeneration
29.....	1	40096-24	Dial, 12 AM Regen Assy, Black
	1	40096-02	Dial, 2 AM Regen Assy, Black
30.....	1	13881	Bracket, Hinger Timer
31.....	2	11384	Screw, Phil, 6-32 x 1/4 Zinc
32.....	1	13902	Harness, 3200
33.....	2	40422	Nut, Wire, Tan
34.....	1	15354-01	Wire, Ground, 4"
35.....	1	14007	Label, Time of Day

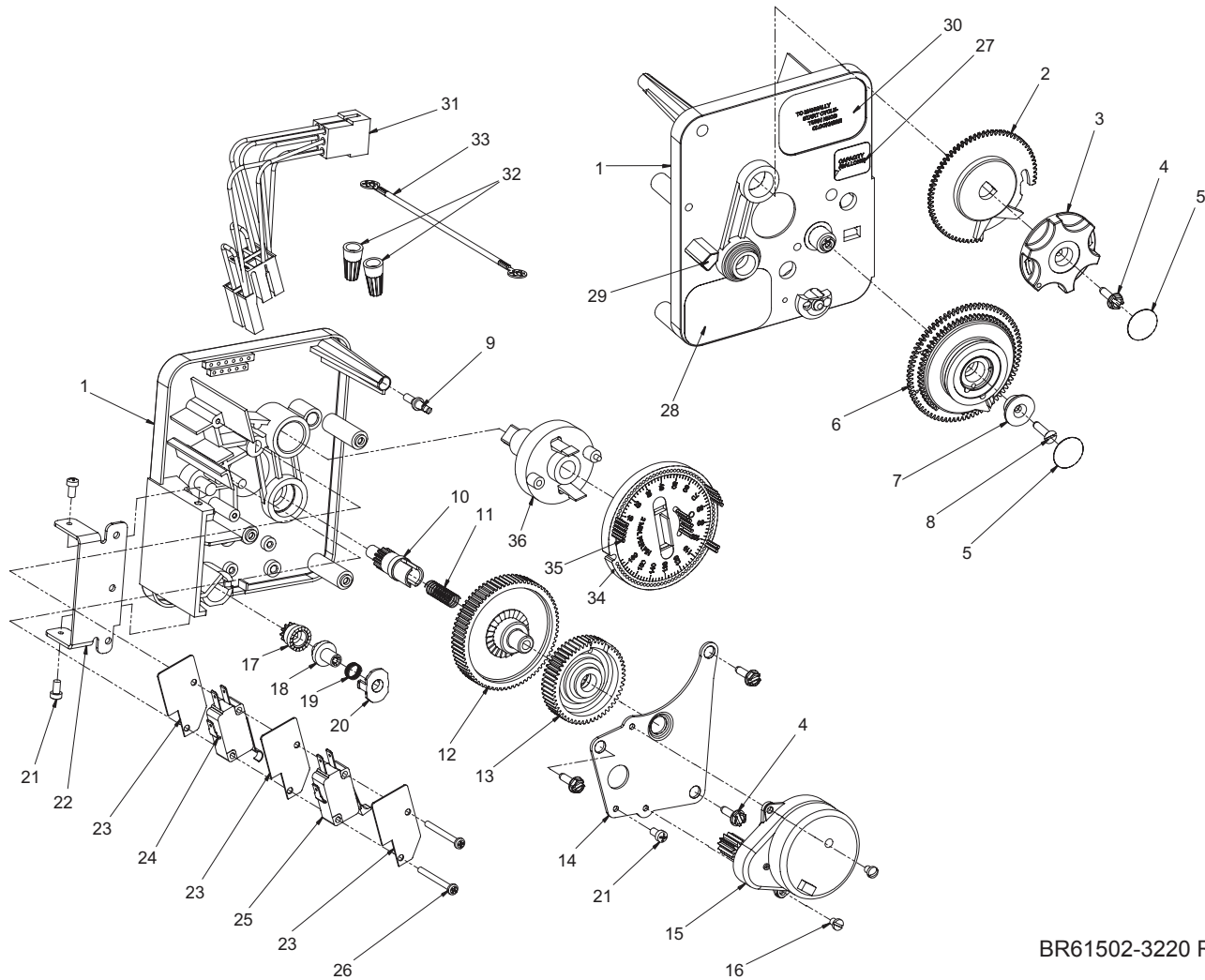
# 3210 METER DELAYED TIMER ASSEMBLY



61502-3210 Rev A

Item No.	QTY	Part No.	Description	Item No.	QTY	Part No.	Description
1	1	13870	Housing, Timer, 3200	1	1	19660-1	Motor, 230V, 60Hz, 1/30 RPM
2	1	13802	Gear, Cycle Actuator	19	1	13278	Screw, Fillister Hd, 6-32 x .156
3	1	40096-02	Dial 2 AM Regen Assy, Black	20	1	13830	Pinion, Program Wheel Drive
4	1	13886	Knob, 3200	21	1	13831	Clutch, Drive Pinion
5	4	13296	Screw, Hex Wsh, 6-20 x 1/2	22	1	14276	Spring, Meter, Clutch
6	2	11999	Label, Button	23	1	14253	Retainer, Clutch Spring
7	1	60405-50	Program Wheel, w/2" Std Label, w/People Label Set @ 21	24	3	11384	Screw, Phil, 6-32 x 1/4
8	1	13806	Retainer, Program Wheel	25	1	13881	Bracket, Hinge Timer
9	1	13748	Screw, Flat Head St, 6-20 x 1/2	26	3	14087	Insulator
10	1	14265	Clip, Spring	27	1	10896	Switch, Micro
11	1	15424	Spring, Detent, Timer	28	1	15320	Switch, Micro, Timer
12	1	15066	Ball, 1/4" Delrin	29	2	11413	Screw, Pan Hd Mach, 4-40 x 1/8
13	1	13018	Pinion, Idler	30	1	14198	Label, Indicator
14	1	13312	Spring, Idler Shaft	31	1	15465	Label, Caution
15	1	13017	Gear, Idler	32	1	14007	Label, Time of Day
16	1	13164	Gear, Drive	33	1	14045	Label, Instruction
17	1	13887	Plate, Motor Mounting	34	1	13902	Harness, 3200
18	1	18743-1	Motor, 120V, 60Hz 1/30 RPM	35	2	40422	Nut, Wire, Tan
1	1	18752-1	Motor, 100V, 50Hz, 1/30 RPM	36	1	15354-01	Wire, Ground, 4"
1	1	18824-1	Motor, 23V, 50Hz, 1/30 RPM	37	1	19210	Program Wheel Assy
1	1	18826-1	Motor, 24V, 50Hz, 1/30 RPM	38	17	41754	Pin, Spring, 1/16 x 5/8 SS, Timer
1	1	19659-1	Motor, 24V, 60Hz, 1/30 RPM	39	1	13911	Gear, Main Drive, Timer

# 3220 METER IMMEDIATE TIMER ASSEMBLY

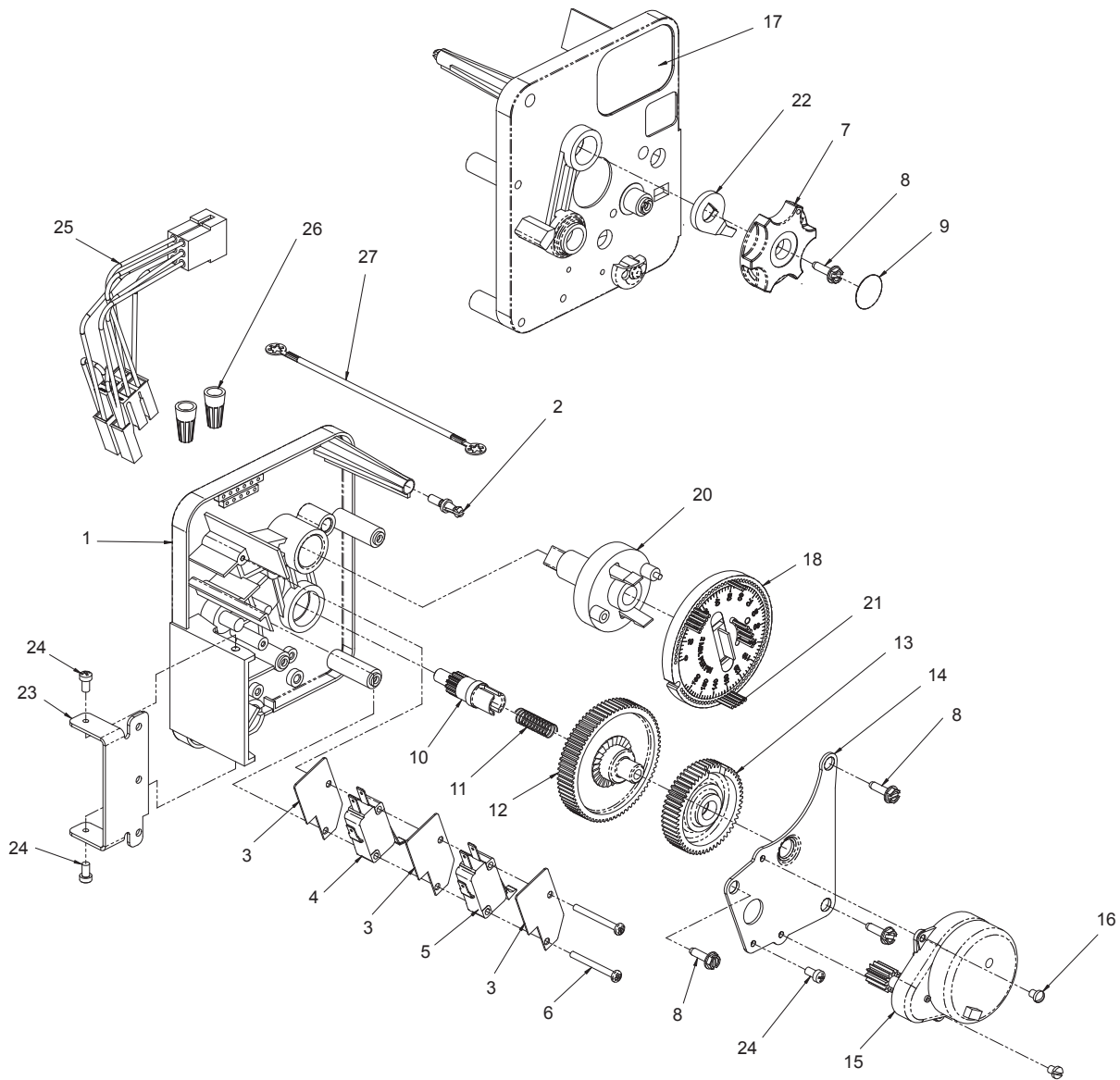


BR61502-3220 Rev B

Item No.	QTY	Part No.	Description	Item No.	QTY	Part No.	Description
1	1	13870	Housing, Timer	17	1	14502	Pinion, Program Wheel
2	1	15431	Gear, Cycle Actuator Sys #5	18	1	14501	Clutch, Drive Pinion
3	1	13886	Knob, 3200	19	1	14276	Meter Clutch Spring
4	4	13296	Screw, Hex Wsh, 6-20 x 1/2	20	1	14253	Retainer, Clutch Spring
5	2	11999	Label, Button	21	3	11384	Screw, Phil, 6-32 x 1/4 Zinc
6	1	60405-50	Program Wheel, w/2" Std Label	22	1	13881	Bracket, Hinge Timer
7	1	13806	Retainer, Program Wheel	23	3	14087	Insulator
8	1	13748	Screw, Flt Hd St, 6-20 x 1/2	24	1	15314-00	Micro Switch
9	1	14265	Spring Clip	25	1	15320	Switch, Micro, Timer
10	1	13018	Pinion, Idler	26	2	11413	Screw, Pan Hd Mach, 4-40 x 1-1/8
11	1	18563	Idler Shaft Spring				
12	1	13017	Gear, Idler	27	1	14198	Label, Indicator
13	1	13164	Drive Gear	28	1	15465	Label, Caution
14	1	13887	Plate, Motor Mounting	29	1	14007	Label, Time of Day
15	1	18743-1	Motor, 120V, 60 Hz 1/30 RPM	30	1	15148	Label, Instruction
	1	18752-1	Motor, 100V, 50Hz, 1/30 RPM	31	1	40617	Harness, 3220
	1	18824-1	Motor, 23V, 50Hz, 1/30 RPM	32	2	40422	Nut, Wire, Tan
	1	18826-1	Motor, 24V, 50Hz, 1/30 RPM	33	1	15354-01	Wire, Ground, 4"
	1	19659-1	Motor, 24V, 60Hz, 1/30 RPM	34	1	19210-05	Program Wheel Assy, 9000/3230
	1	19660-1	Motor, 230V, 60Hz, 1/30 RPM	35	17	41754	Pin, Spring, 1/16 x 5/8 SS, Timer
16	2	13278	Screw, Std Fillister Hd	36	1	15055	Gear, Main Drive



# 3230 REMOTE START TIMER ASSEMBLY

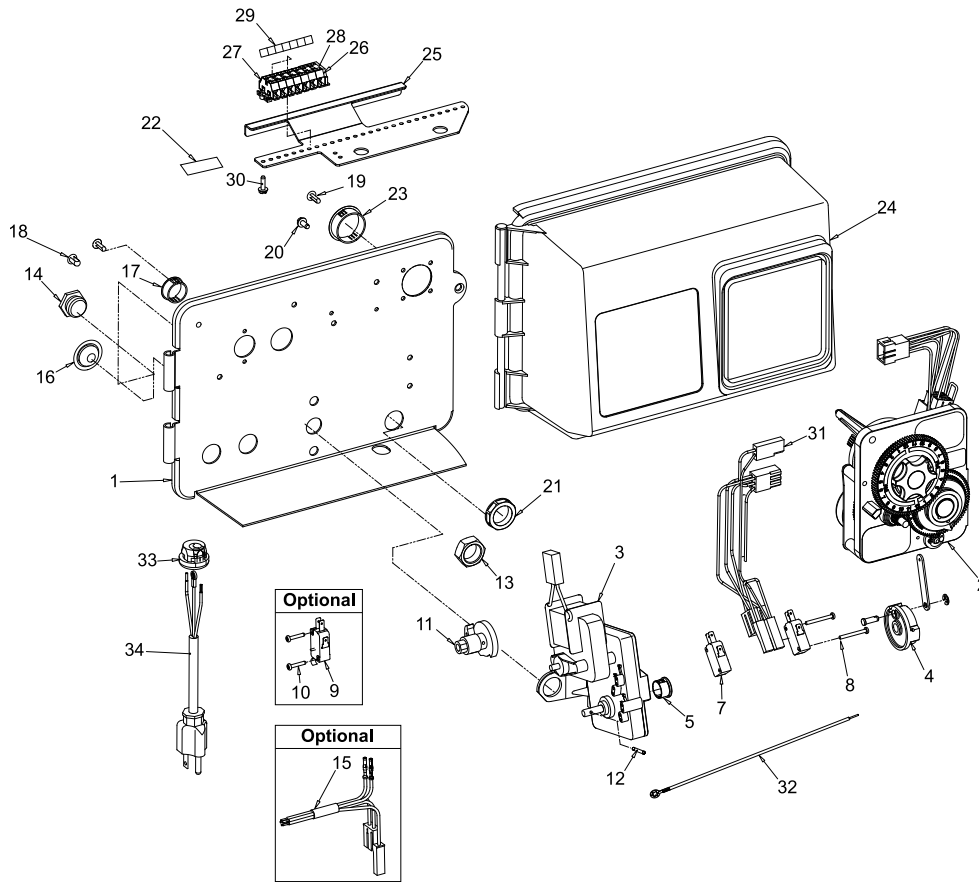


61502-3230R REV A

Item No.	QTY	Part No.	Description
1.....	1	13870	Housing, Timer
2.....	1	14265	Spring Clip
3.....	3	14087	Insulator
4.....	1	15314	Micro Switch
5.....	1	15320	Switch, Micro, Timer
6.....	2	11413	Screw, Pan Hd Mach, 4-40 x 1-1/8
7.....	1	13886	Knob, 3200
8.....	4	13296	Screw, Hex Wsh, 6-20 x 1/2
9.....	1	11999	Label, Button
10.....	1	13018	Pinion, Idler
11.....	1	18563	Idler Shaft Spring
12.....	1	13017	Gear, Idler
13.....	1	15055	Drive Gear
14.....	1	13887	Plate, Motor Mounting
15.....	1	18743-1	Motor, 120V, 60 Hz, 1/30 RPM
1.....	1	18752-1	Motor, 100V, 50Hz, 1/30 RPM

Item No.	QTY	Part No.	Description
1.....	1	18824-1	Motor, 23V, 50Hz, 1/30 RPM
1.....	1	18826-1	Motor, 24V, 50Hz, 1/30 RPM
1.....	1	19659-1	Motor, 24V, 60Hz, 1/30 RPM
1.....	1	19660-1	Motor, 230V, 60Hz, 1/30 RPM
16.....	2	13278	Screw, Slt'd Fillister Hd
17.....	1	15313	Label, Caution
18.....	1	19210-05	Program Wheel Assembly, 3200
20.....	1	15055	Main Drive Gear
21.....	17	41754	Pin, Spring, 1/16 x 5/8 Stainless Steel, Timer
22.....	1	13011	Cycle Actuator Arm
23.....	1	13881	Bracket, Hinge Timer
24.....	3	11384	Screw, Phil, 6-32 x 1/4 Zinc
25.....	1	16336	Harness, 3230R
26.....	2	40422	Nut, Wire, Tan
27.....	1	15354-01	Wire, Ground, 4"

# UPPER ENVIRONMENTAL POWERHEAD ASSEMBLY



61501-2900 Rev G

Item No.	QTY	Part No.	Description
1	1	18697-15	Backplate, Hinged
2	1		3200 Clock Timer Assembly
	1		3200 Meter Timer Assembly
3	1	41543	Motor, Drive, 115V, 50/60 Hz
	1	42579	Motor, Drive, 24VAC/DC, 50/60 Hz
	1	41545	Motor, Drive, 230V, 50/60 Hz
4	1	60160-15	Drive Cam Assembly, STF, Blue, 2900
	1	60160-30*	Drive Cam Assembly, Upflow
	1	60160-31*	Drive Cam Assembly, Upflow, Variable
5	1	17904	Bushing, Heyco 1/2, Heyco #2073
7	2	10218	Switch, Micro
8	2	14923	Screw, Pan Hd Mach, 4-40 X 1 MS Steel Zinc
9	1	10896	Switch, Micro
10	2	11805	Screw, Rd Hd, 4-40 X 5/8 TYPE 1 Steel Zinc
11	1	12472	Cam Assy, Tri-Stack, After RR
	1	12777	Cam, Shut-Off Valve
	1	15770	Cam Assy, Special Tri-Stack, After Brine Fill
	1	15805	Cam, SVO
	1	19887*	Cam, Brine, 2750 U/F, Std
12	2	10338	Pin, Roll 3/32 x 7/8
13	1	10269	Nut, Jam, 3/4-16
14	1	10712	Fitting, Brine Valve
15	1	14822	Harness, 2900
16	2	19691	Plug, .750 Dia Recessed, Black
17	1	15806	Plug, Hole, Heyco #2693
18	1	19801	Plug, .190 Dia, White Heyco 0307
19	7	19800	Plug, .140 Dia, White Heyco 0304

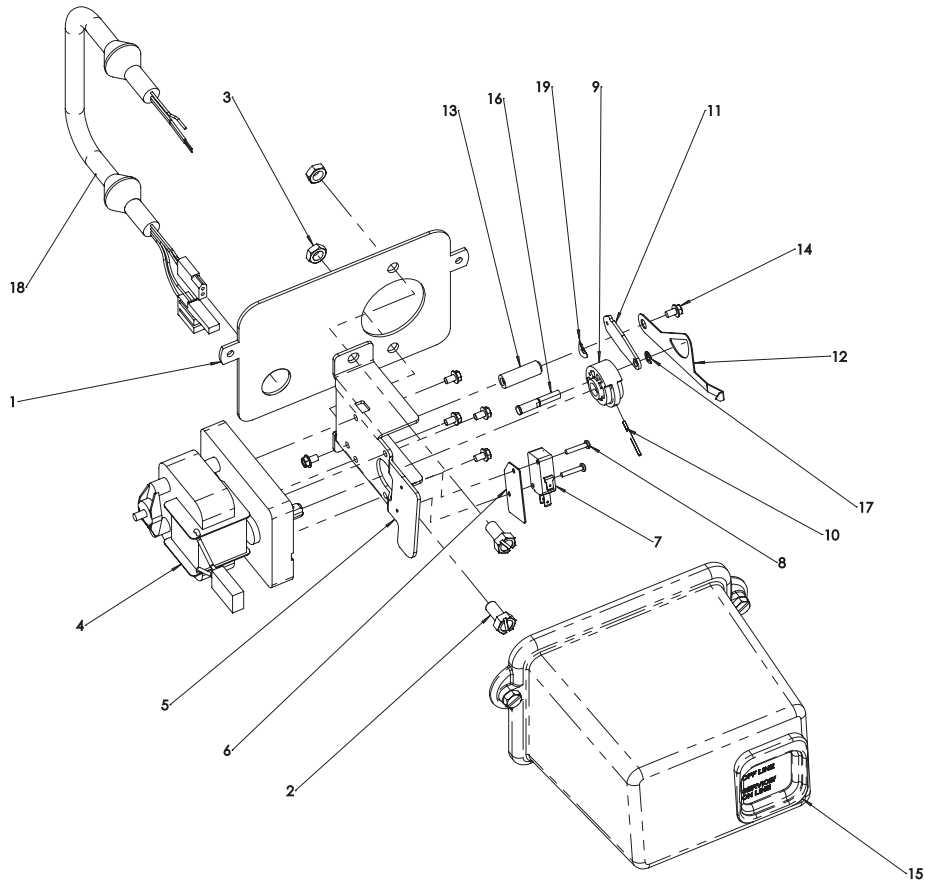
Item No.	QTY	Part No.	Description
20	4	10300	Screw, Slot Hex Wsh, 8-18 X 3/8 Type "B" RC 44-47
21	1	18691-02	Nut, Conduit Fitting 1/2"
22	1	40038-03	Label, Voltage, 120V, 3200ET
23	1	17421	Plug, 1.20 Hole Heyco #2733
24	1	60219-02	Cover Assembly, Environmental, Black w/Clear Window
25	1	19772	Bracket, Terminal Block
26	1	40174	Terminal Block, Green/Yellow Commercial, 809-260/141
27	6	41084	Terminal Block, Segment, Gray
28	1	41085	Endplate, Terminal Block, Gray
29	2	15250	Label, Terminal Strip
30	2	13296	Screw, Hex Wsh, 6-20 6-20 x 1/2 Type 25 Steel Zinc
31	1	40400	Harness, Drive, Designer/ Environmental
32	1	40175-01	Wire, Ground, Commercial Valves
33	1	13547	Strain Relief, Flat Cord Heyco #30-1
	1	13547-01	Strain Relief, Euro Round Cord
	1	13547-02	Strain Relief, U.S. Round
34	1	11545	Powercord, 4' European, Black
	1	19303	Powercord, 8', Australian
	1	40084-12	Powercord, 12' US, Round, 120V, Sys 5,6,7&2900/3150/3900
	1	40085-12	Powercord, 12' US, Round, 240V

**Not Shown:**

1	1	15216	Meter Cable Assembly, 15.25"
1	1	15879	Cable Guide Assembly, 2900

\*Upflow Only

# LOWER ENVIRONMENTAL POWERHEAD ASSEMBLY

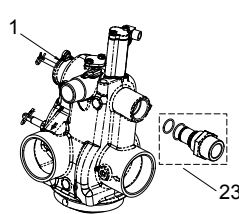
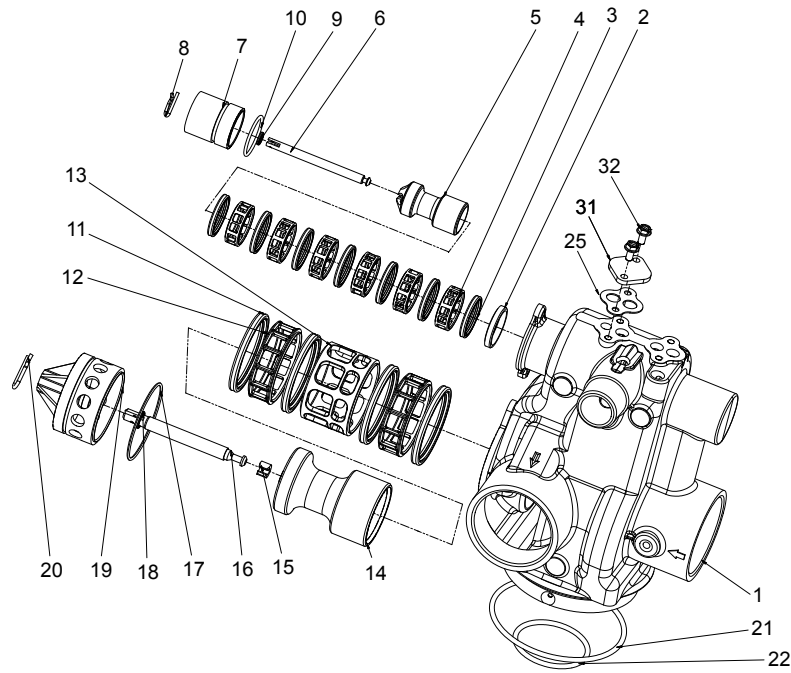


61501-2900 Rev G

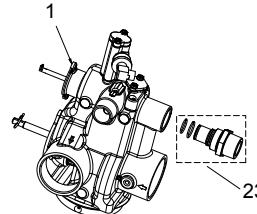
Item No.	QTY	Part No.	Description
1.....	1	BR18709.....	Backplate, Lower
2.....	2	BR11224.....	Screw, Slotted Hex Head
3.....	2	BR16346.....	Nut, Hex, Jam, 5/16-18, 18-8-SS
4.....	1	BR40387.....	Motor, Drive, 115V, 60 Hz, SP FAM
5.....	1	BR14769.....	Bracket, Motor, 2900
6.....	1	BR10302.....	Insulator, Limit Switch
7.....	1	BR10218.....	Switch, Micro
8.....	2	BR19849.....	Screw, Pan HD, 4-40 x 5/8
9.....	1	BR14775.....	Cam, Main Drive, 2900 Lower
10.....	1	BR41022.....	Pin, Roll 2900 Lower
11.....	1	BR14759.....	Link, Piston Rod
12.....	1	BR18725.....	Indicator, Service/Standby

Item No.	QTY	Part No.	Description
13.....	1	BR18726.....	Spacer, Indicator
14.....	6	BR10872.....	Screw, Hex WSH, 8-32 x 5/16
15.....	1	BR60217-02.....	Cover Assy, 2900, Lower, Black
16.....	1	BR42979.....	Bearing, Connecting Rod
17.....	1	BR42980.....	Ring, Retaining
18.....	1	BR42446.....	Harness, Lower Drive SYS4, ENV
19.....	1	BR18727.....	Washer, Curved Spring, /265 ID
<b>Not Shown:</b>			
1	1	BR14044.....	Tie, Cable, HeyCo VNT # 4-18
1	1	BR43062.....	Grease, Lubriplate, 630-2

# CONTROL VALVE ASSEMBLY



Downflow



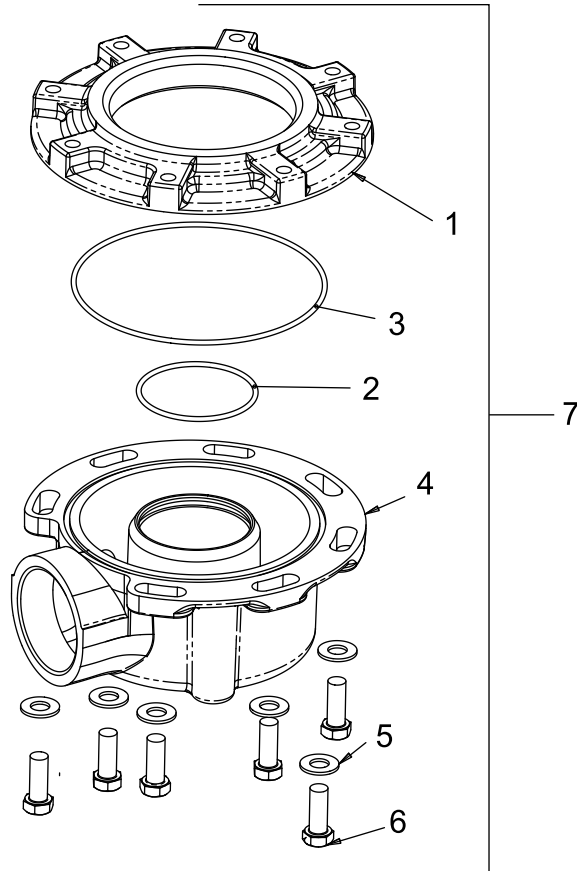
Upflow

61500-2900 Rev F

Item No.	QTY	Part No.	Description	Item No.	QTY	Part No.	Description
1.....	1	41428-01.....	Valve Body, 2900s, Machd, NPT U.S. Tap	14.....	1	14757.....	Piston, HWBP
		41428-09.....	Valve Body, 2900s, Machined, w/ Soft Water Adapter			14752.....	Piston, 2900, NHWBP
2.....	1	10757.....	Spacer, End	15.....	1	14818.....	Ring, Piston Rod, Snap
		10757B.....	Spacer, End, Brass, HW	16.....	1	14758.....	Rod, Piston, 2900
3.....	7	10545.....	Seal, Piston	17.....	1	14922.....	O-ring, -.035, Piston
		10545-01.....	Seal, Piston, Viton	18.....	1	14926.....	Quad Ring, -.012
		10545-02.....	Seal, Piston, Silicone	19.....	1	14754-00.....	End Plug Assy, 2900
4.....	6	11451.....	Spacer, 12 Hole			14754-01.....	Plug, End, White, Machined
		16589.....	Spacer, Hot Water			14754-10.....	End Plug Assembly, 2900/2930, NHWBP
5.....	1	14451.....	Piston, 2750			19276-01.....	End Plug Assembly, 2900s, Brass, HW
		19454*.....	Piston, 2750, Upflow			41427-01.....	Plug, End, 2900s, Lower, White
6.....	1	41424.....	Rod, Piston, 2900s, Upper			41427-11.....	Plug, End, 2900s, Lower, Black
7.....	1	41131.....	Plug, End	20.....	1	14813.....	Pin, Spring, Connecting Rod
	1	10212.....	Plug, End, 1500/2750, Brass	21.....	1	13575.....	O-ring, -.240
8.....	1	10909.....	Pin, Link			15210.....	O-ring, -.343, Park Tank
9.....	1	10209.....	Quad Ring, -.010	22.....	1	13577.....	O-ring, -.226
10.....	1	40078.....	O-ring, 28mm X 2mm	23.....	1	61525.....	Softwater Adapter Kit, 2900s
		10234-01.....	O-ring, -.024, Hot Water	25.....	2	19925.....	Gasket, Injector Body, 1700
11.....	4	11720.....	Seal, Piston, 2900/3150	31.....	1	11893.....	Cap, Injector, Stainless Steel
		10545-02.....	Seal, Piston, Silicone	32.....	2	15137.....	Screw, Hex Wsh Mach, 10 - 24 x 3/8
12.....	2	10369.....	Spacer, 2", 2900/3150				
		14241-01.....	Spacer, Hot Water				
13.....	1	14753.....	Spacer, 2900				
		16589.....	Spacer, Hot Water				

\*Upflow Only

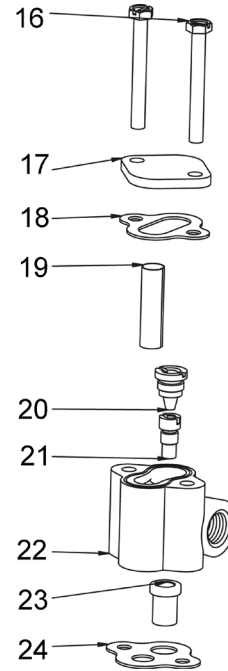
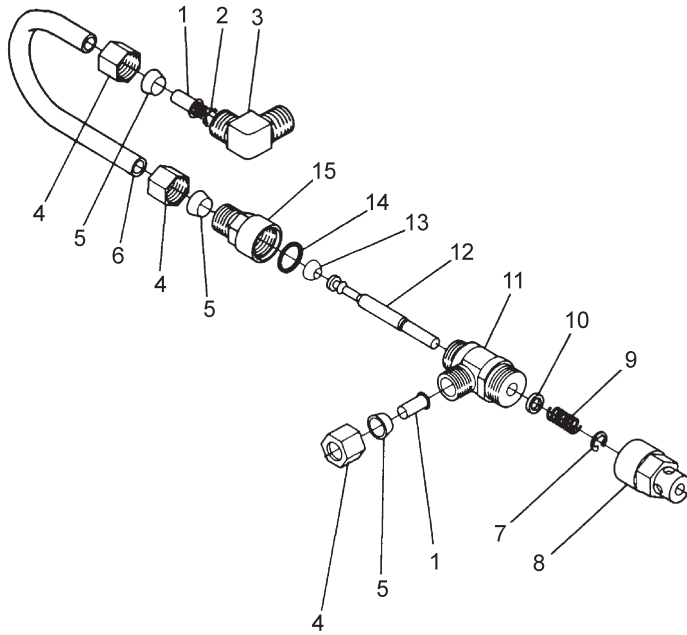
# CONTROL VALVE SIDE MOUNT ADAPTER



61415 Rev B

Item No.	QTY	Part No.	Description
1.....	1	40316.....	Adapter, Sidemount
2.....	1	40372.....	O-ring - 142
3.....	1	40368.....	O-ring - 160, Sidemount, Flange
4.....	1	40310.....	Base, 2850/2900/3930, Rotating
5.....	7	40375.....	Washer, Flat, 3/8, Type A, N-SERS
6.....	7	19768.....	Screw, Hex Hd, 3/8 - 16 x 1, Cap 18-8
7.....	1	61415.....	Adapter Assy, Sidemount 2850/2900/2930
		..... 61415NP.....	Adapter Assy, Sidemount, NP 2850/2900/2930
		..... 61415-20.....	Adapter Assy, Sidemount, BSP/ MTC 2850/2900/2930
		..... 61415-20NP.....	Adapter Assy, Sidemount, BSP/ NP 2850/2900/2930

# 1600 SERIES BRINE SYSTEM



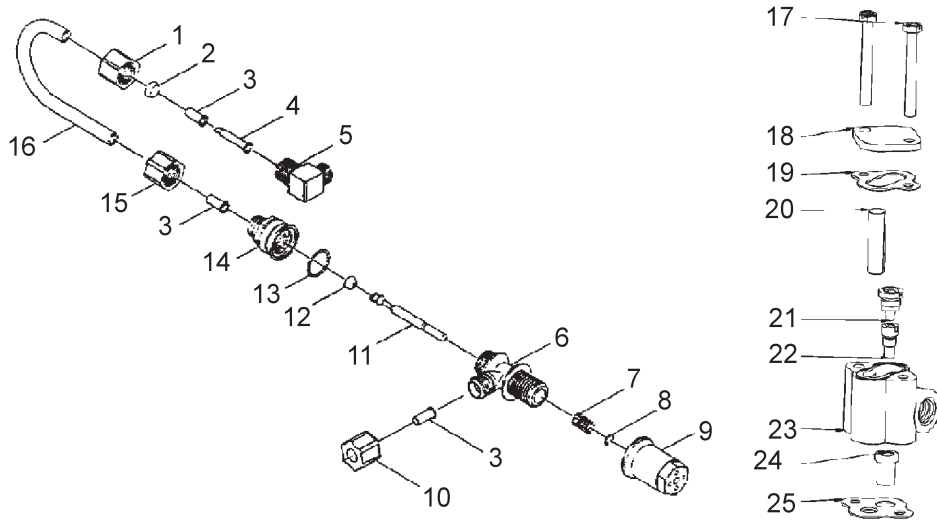
60029 Rev C

Item No.	QTY	Part No.	Description
1	2	10332	Fitting, Insert, 3/8
2	1	12767	Screen, Brine
3	1	10328	Fitting, Elbow, 90 Deg. 1/4 PT x 3/8Tube
4	3	10329	Fitting, Tube, 3/8 Nut, Brass
5	3	10330	Fitting, Sleeve, 3/8 Celcon
6	1	16508	Tube, Brine, 1600, PVC
	1	16508-01	Tube, Brine Valve, 2850/2900s
	1	12774	Tube, Brine Valve, 1500
	1	40027	Tube, Brine Valve, 2510
	1	15221	Tube, Brine Valve, 2750/2900
	1	42184	Tube, Brine Valve, 2850s
	1	41683*	Tube, Brine Valve, UF, 1600/1650
7	1	10250	Ring, Retaining
8	1	11749	Guide, Brine Valve Stem
9	1	10249	Spring, Brine Valve
10	1	12550	Quad Ring, -009
11	1	12748	Brine Valve Body Assy, 1600 w/ Quad Ring

Item No.	QTY	Part No.	Description
12	1	12552-02	Brine Valve Stem, 1600, with seat
13	1	12626	Seat, Brine Valve
14	1	11982	O-ring, -016
15	1	60020-25	BLFC, .25 GPM, 1600
	1	60020-50	BLFC, .50 GPM, 1600
	1	60020-100	BLFC, 1.0 GPM, 1600
16	2	10692	Screw, Slot Hex Hd, 10 - 24X 18-8 Stainless Steel
17	1	11893	Cap, Injector, SS
18	1	10229	Gasket, Injector Cap, 1600
19	1	10227	Screen, Injector
20	1	10913-xx	Nozzle, Injector, -xx is for injector size
21	1	10914-xx	Throat, Injector, -xx is for injector size
22	1	17776	Body, Injector, 1600
	1	17776-02*	Body, Injector, 1600 Upflow
23	1	16221	Disperser, Air
24	1	14805	Gasket, Injector Body, 1600/1700

\*Upflow Only

# 1650 BRINE SYSTEM ASSEMBLY



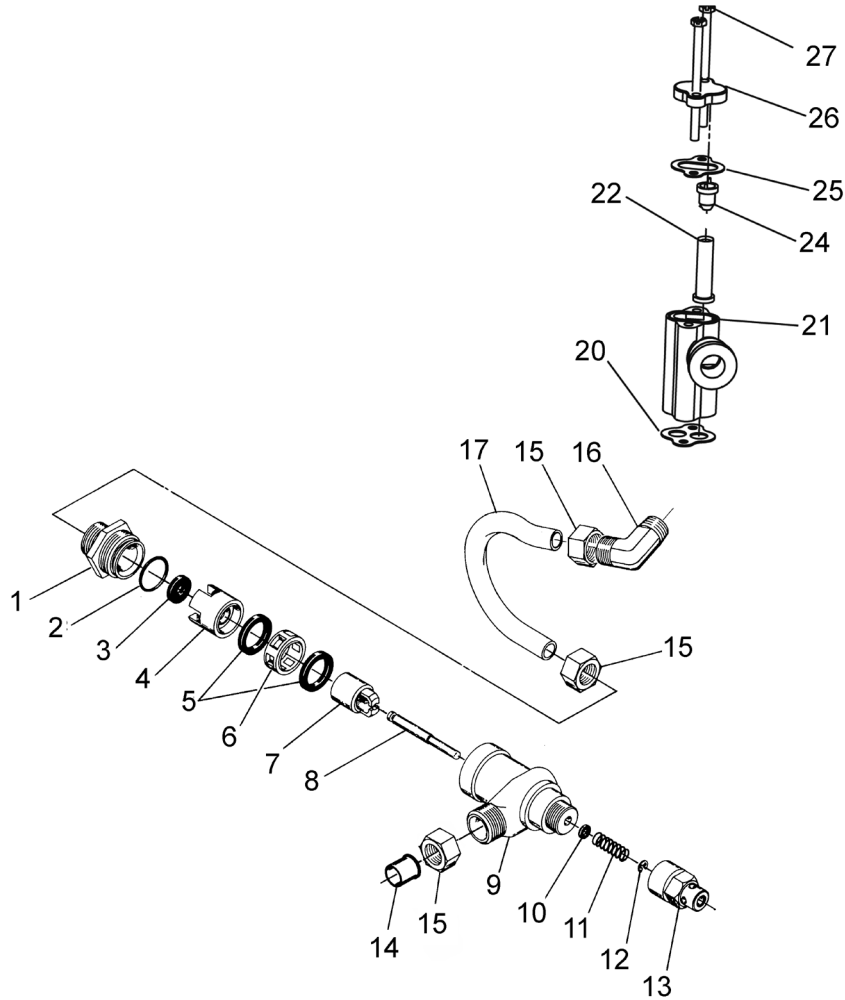
60011 Rev D

Item No.	QTY	Part No.	Description
1.....	1	10329.....	Fitting, Tube, 3/8 Nut, Brass
2.....	1	10330.....	Fitting, Sleeve, 3/8 Celcon
3.....	3	10332.....	Fitting, Insert, 3/8
4.....	1	12767.....	Screen, Brine
5.....	1	10328.....	Fitting, Elbow, 90 Deg 1/4 NPT x 3/8T
6.....	1	17884.....	Brine Valve Body Assembly, 1650
7.....	1	10249.....	Spring, Brine Valve
8.....	1	10250.....	Ring, Retaining
9.....	1	17906.....	Guide, Brine Valve Stem
10.....	1	19625.....	Nut Assy, 3/8", Plastic
11.....	1	12552-02.....	Brine Valve Stem, 1600, with Seat
12.....	1	12626.....	Seat, Brine Valve
13.....	1	16924.....	O-ring, -018
14.....	1	60020-25.....	BLFC, 1650, .25 GPM, Plastic
	1	60020-50.....	BLFC, 1650, .50 GPM, Plastic
	1	60020-100.....	BLFC, 1650, 1.0 GPM, Plastic
15.....	1	19625.....	Nut Assembly, 3/8", Plastic

Item No.	QTY	Part No.	Description
16.....	1	16508-01.....	Tube, Brine Valve, 2850/2900
	1	40027.....	Tube, Brine Valve, 2510
	1	42184.....	Tube, Brine Valve, 2850s
	1	12774.....	Tube, Brine Valve, 1500
	1	15221.....	Tube, Brine Valve, 2750
	1	41683*.....	Tube, Brine Valve, UF, 1600/1650
17.....	2	10692.....	Screw, Slot Hex Hd, 10 - 24X 18-8 Stainless Steel
18.....	1	11893.....	Cap, Injector, Stainless Steel
19.....	1	10229.....	Gasket, Injector Cap, 1600
20.....	1	10227.....	Screen, Injector
21.....	1	10913-xx.....	Nozzle, Injector, -xx means injector size
22.....	1	10914-xx.....	Throat, Injector, -xx means injector size
23.....	1	17776.....	Body, Injector, 1600
	1	17776-02*.....	Body, Injector, 1600 Upflow
24.....	1	16221.....	Disperser, Air
25.....	1	14805.....	Gasket, Injector Body, 1600/1700

\*Upflow Only

# 1700 BRINE SYSTEM ASSEMBLY



60034 Rev D

Item No.	QTY	Part No.	Description
1.....	1	14792.....	Plug, End, Brine Valve
2.....	1	13201.....	Quad Ring, -020
3.....	1	12085.....	Washer, Flow, 1.2 GPM
	1	12086.....	Washer, Flow, 1.5 GPM
	1	12087.....	Washer, Flow, 2.0 GPM
	1	12088.....	Washer, Flow, 2.4 GPM
	1	12089.....	Washer, Flow, 3.0 GPM
	1	12090.....	Washer, Flow, 3.5 GPM
	1	12091.....	Washer, Flow, 4.0 GPM
	1	12092.....	Washer, Flow, 5.0 GPM
4.....	1	14785.....	Retainer, Flow Control
5.....	3	14811.....	O-ring, -210, 560CD, Brine
6.....	1	14798.....	Spacer, 1700, Brine
7.....	1	14795.....	Piston, Brine Valve
8.....	1	14797.....	Brine Valve Stem
9.....	1	14790.....	Brine Valve Body
10.....	1	12550.....	Quad Ring, -009
11.....	1	15310.....	Spring, Brine Valve
12.....	1	10250.....	Retaining Ring
13.....	1	15517.....	Guide, Stem
14.....	1	15415.....	Fitting, Insert, 1/2", Tube
15.....	3	15414.....	Nut, 2900, w/Sleeve
16.....	1	15413.....	Fitting, Elbow, Male, 1/2T x 3/8

Item No.	QTY	Part No.	Description
			NPT
17.....	1	15416.....	Tube, Brine, 2900/2750
	1	16460.....	Tube, Brine, 2850/2900s
	1	41447*.....	Tube, Brine, 2900s, U/F
	1	42183.....	Tube, Brine, 1700, 2850s
20.....	1	14805.....	Gasket, Injector Body 1600/1700
21.....	1	17777.....	Body, Injector, 1700
	1	17777-02*.....	Body, Injector, 1700 U/F
22.....	1	14802-xxc.....	Throat, Injector, -xxc is for Injector Size
24.....		14801-xxc.....	Nozzle, Injection, -xxc is for Injector Size
25.....	1	10229.....	Gasket, Injector Cap, 1600
26.....	1	11893.....	Cap, Injector, Stainless Steel
	1	10228.....	Cap, Injector
27.....	2	14804.....	Screw, Hex Hd Mach, 10 - 24 x 2-3/4" 18-8 Stainless Steel

**Not Shown:**

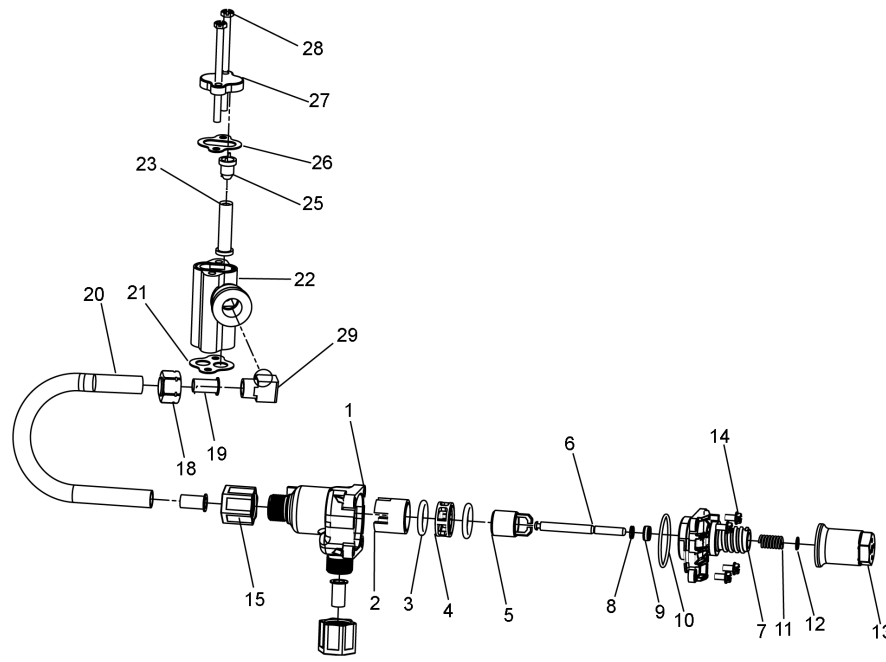
1.....	16974.....	Fitting, Plastic, Female, 3/4 x 3/4 Slip
1.....	17996.....	Dispenser, Air, Injector

\*Upflow Only

**NOTE: Item number 26 (11893) is used on injector sizes 2 through 5C. Part number 10228 is used on injector sizes 6C.**



# 1710 BRINE SYSTEM ASSEMBLY



60604 Rev F

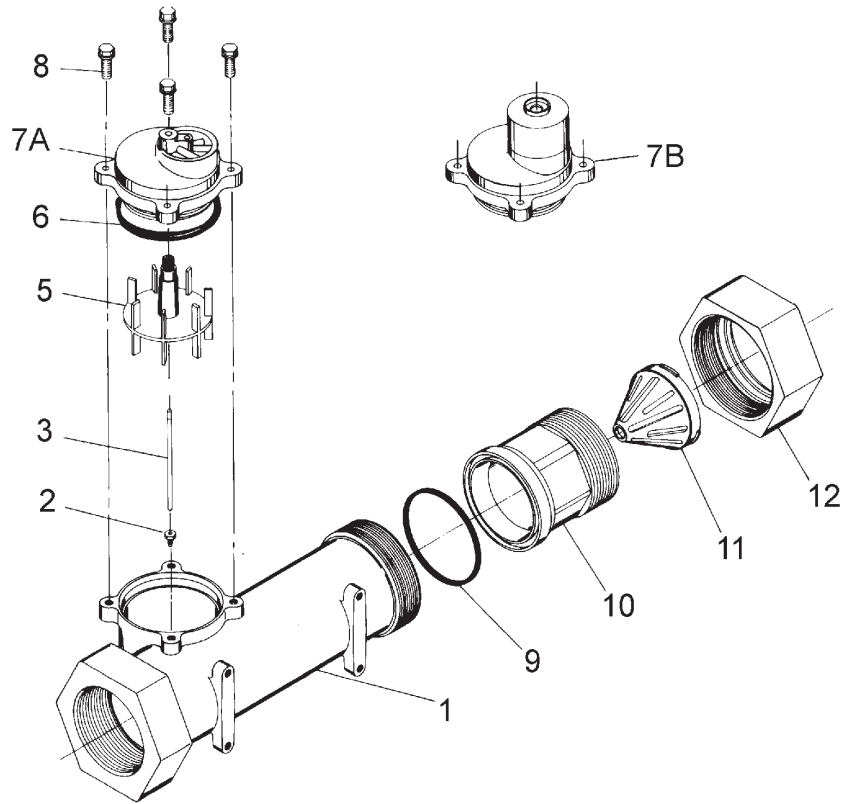
Item No.	QTY	Part No.	Description
1.....	1	41202.....	Brine Valve, 1700, Plastic, Top
2.....	1	14785-01.....	Retainer, Flow Control
3.....	1	14811.....	O-Ring, -210, 560CD, Brine
4.....	1	14798.....	Spacer, 1700, Brine
5.....	1	14795.....	Piston, Brine Valve
6.....	1	41203.....	Stem, Brine, 1710, Plastic, 2900
7.....	1	41201.....	Brine Valve, 1700, Plastic, Bottom
8.....	5	17908.....	Sleeve, Brine Valve Stem
9.....	1	12550.....	Quad Ring, -009
10.....	3	41547.....	O-Ring, 2mmx35mm
11.....	2	15310.....	Spring, Brine Valve
12.....	2	10250.....	Ring, Retaining
13.....	1	17906.....	Guide, Brine Valve Stem
14.....	2	14202-01.....	Screw, Hex Wsh Mach, 8-32 X 5/16 18-8 Stainless Steel
15.....	2	41056.....	Nut Assembly, 1/2" Plastic
18.....	1	15414.....	Nut, 2900, w/Sleeve
19.....	1	15415.....	Fitting, Insert, 1/2", Tube

Item No.	QTY	Part No.	Description
20.....	1	16460.....	Tube, Brine, 2850, 2900s
	1	42183.....	Tube, Brine, 2850s
	1	15416.....	Tube, Brine, 2900/2750
	1	41447.....	Tube, Brine, 2900s U/F
21.....	1	19925.....	Gasket, Injector Body, 1700
22.....	1	17777.....	Body, Injector, 1700
23.....	1	14802-xxc.....	Throat, Injector, -xxc is Injector Size
25.....	1	14801-xxc.....	Nozzle, Injector, -xxc is Injector Size
26.....	1	10229.....	Gasket, Injector Cap, 1600
27.....	1	10228.....	Cap, Injector
28.....	2	14804.....	Screw, Hex Head Mach, 10 - 24 x 2-3/4 18-8 Stainless Steel
29.....	1	15413.....	Fitting, Elbow, Male, 1/2T X 3/8NPT

**Not Shown**

1	17996.....	Dispenser, Air, Injector
1	41493-00.....	Label, Blank, BLFC, 1710

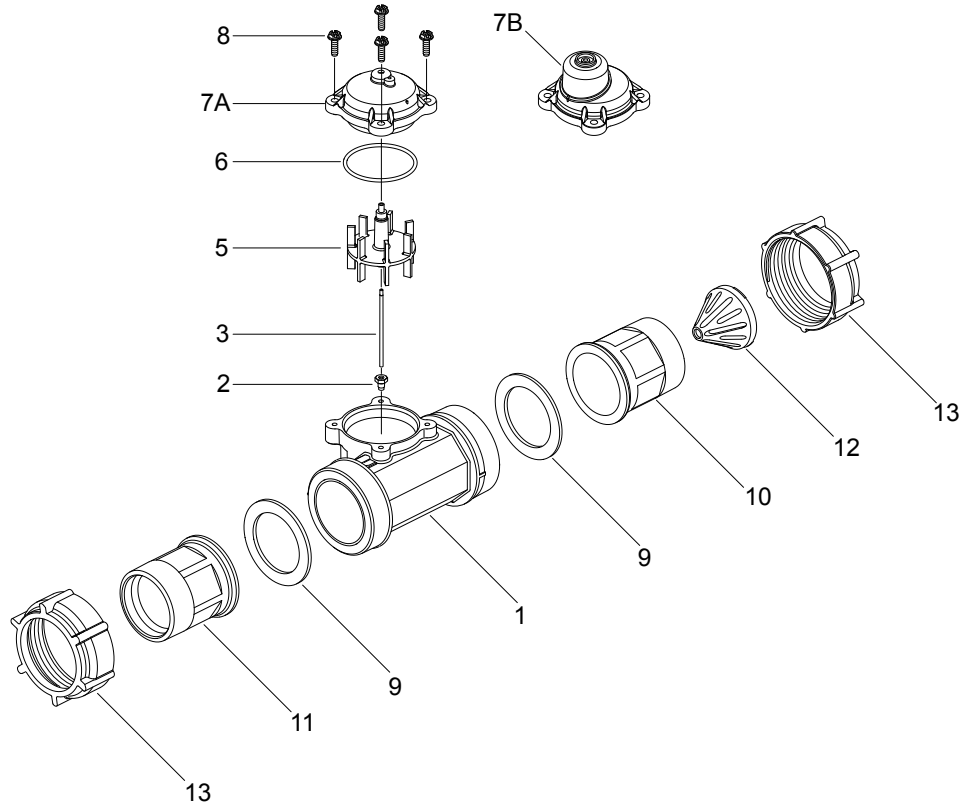
## 2" BRASS METER ASSEMBLY



60393 Rev E

Item No.	QTY	Part No.	Description
1.....	1	14456.....	Body, Meter, 2"
2.....	1	15532.....	Seat, Impeller Shaft, Hex
3.....	1	15432.....	Shaft
5.....	1	15374.....	Impeller Assy, 2" Meter
6.....	1	13847.....	O-ring, -137, Std/560CD, Meter
7A.....	1	14038.....	Meter Cap Assembly, Std, Plastic
7B.....	1	15150.....	Meter Cap Assembly, 3/4" to 2", Ext Plastic, Pdl
8.....	4	12112.....	Screw, Hex Hd Mach, 10-24 x 1/2 18-8 Stainless Steel
9.....	1	14679.....	O-ring, -227, Meter
10.....	1	14568.....	Fitting, Nipple, 2"
11.....	1	14680.....	Flow Straightener
12.....	1	14569.....	Nut, 2900 Meter

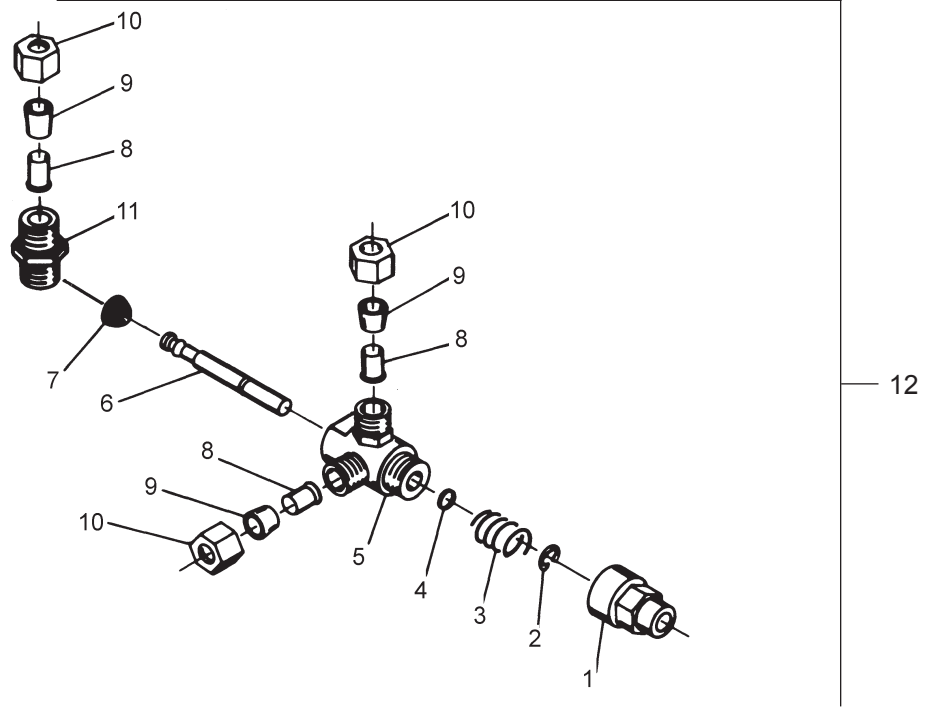
## 2" PLASTIC METER ASSEMBLY



60621 Rev D

Item No.	QTY	Part No.	Description
1.....	1	17689	Body, Meter, 2" Plastic w/Impeller Shaft Seat
2.....	1	15532	Seat, Impeller Shaft, Hex
3.....	1	15432	Shaft, Impeller, Stainless Steel
5.....	1	15374	Impeller Assy, 2" Meter
6.....	1	13847	O-ring, -137, Std/560CD, Meter
7A.....	1	14038	Meter Cap Assembly
7B.....	1	15150	Meter Cap Assembly, Ext
8.....	4	12473	Screw, Hex Wsh, 10-24 x 5/8 18-8 Stainless Steel
9.....	2	40666	Seal, Face, 2", Plastic Meter
10A.....	1	17987-001	Fitting, Nipple, 2", Plastic, NPT, Machined, Flow Straightener
10B.....	1	17987-101	Fitting, Nipple, 2", Plastic, BSP, Machined, Flow Straightener
11A.....	1	17987-000	Fitting, Nipple, 2", Plastic, NPT
11B.....	1	17987-100	Fitting, Nipple, 2", Plastic, BSP
12.....	1	14680	Flow Straightener
13.....	2	17988	Nut, 2" Meter

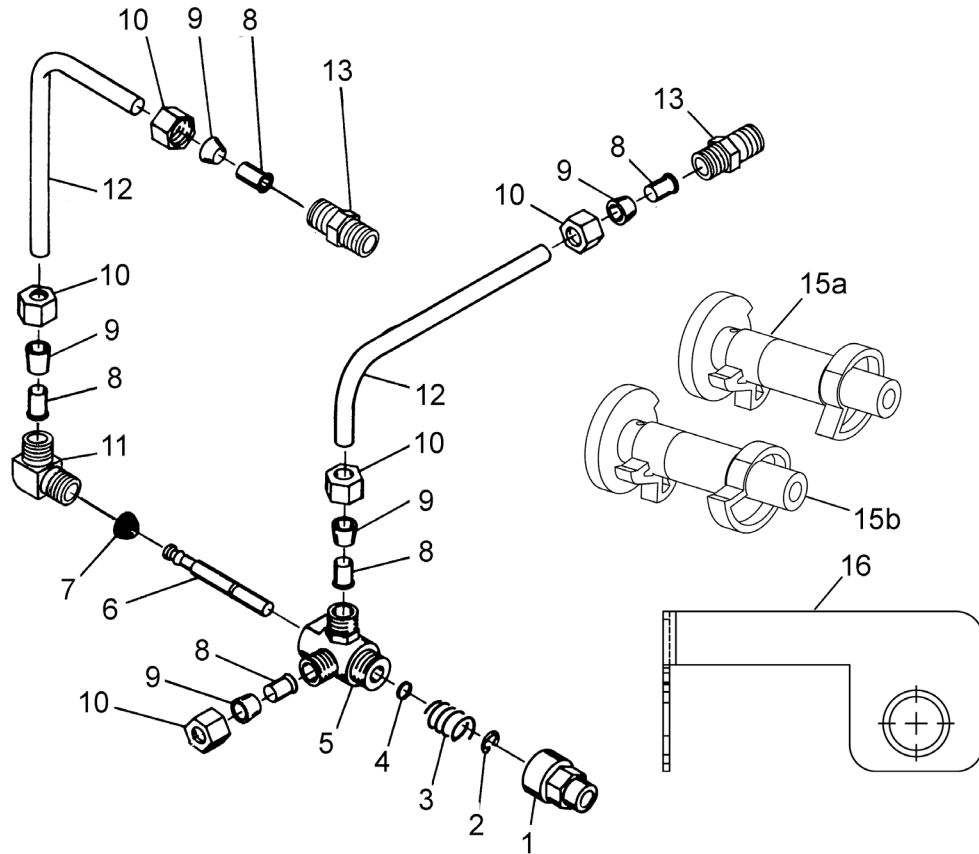
# 1600 SERVICE VALVE OPERATOR ASSEMBLY (OLD STYLE)



60150 Rev A

Item No.	QTY	Part No.	Description
1.....	1 .....	11749 .....	Guide, Brine Valve Stem
2.....	1 .....	10250.....	Ring, Retaining
3.....	1 .....	10249.....	Spring, Brine Valve
4.....	1 .....	12550.....	Quad Ring, -009
5.....	1 .....	10785.....	SVO Body Assy Brass Valves
6.....	1 .....	12552-02.....	Brine Valve Stem, 1600, w/Seat
7.....	1 .....	12626.....	Seat, Brine Valve
8.....	3 .....	10332.....	Fitting, Insert, 3/8
9.....	3 .....	10330.....	Fitting, Sleeve, 3/8 Celcon
10.....	3 .....	10329.....	Fitting, Tube, 3/8 Nut, Brass
11.....	1 .....	10331.....	Fitting, Compression, 1/4" x 3/8"
12.....	1 .....	60150.....	Service Valve Operator, Assy, 1600, Old Style, Complete

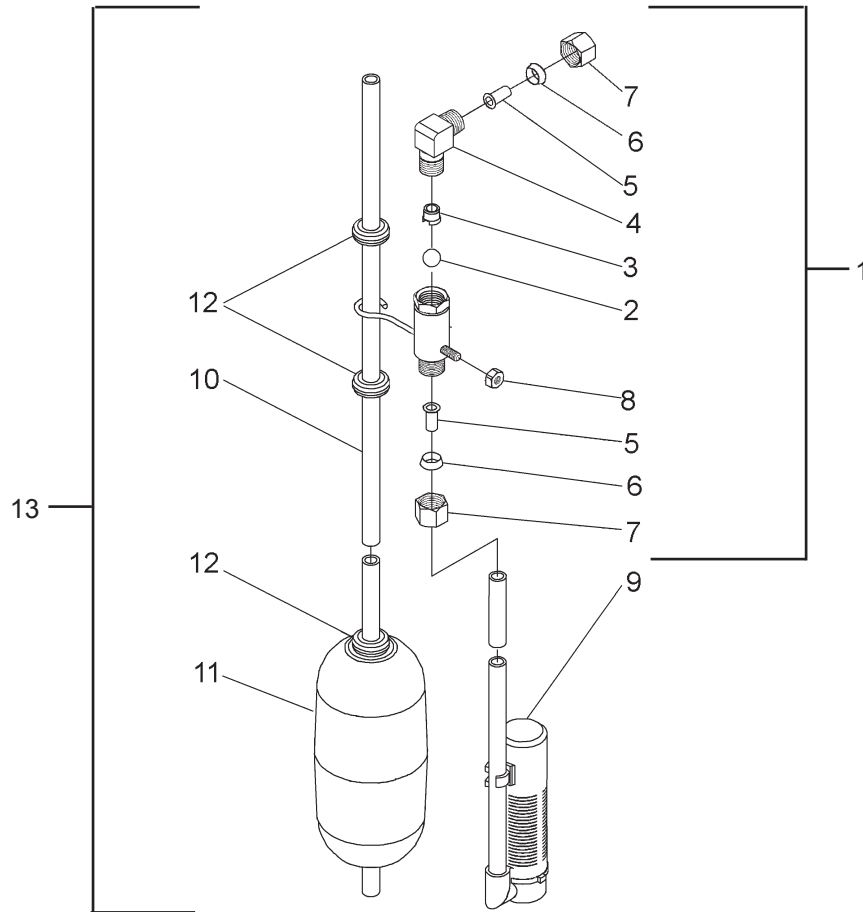
# 1600 SERVICE VALVE OPERATOR (NEW STYLE)



60150 Rev A

Item No.	QTY	Part No.	Description
1	1	11749	Guide, Brine Valve Stem
2	1	10250	Ring, Retaining
3	1	10249	Spring, Brine Valve
4	1	12550	Quad Ring, -009
5	2	10785	SVO Body Assy Brass Valves
6	1	12552	Brine Valve Stem, 1600
7	1	12626	Seat, Brine Valve
8	5	10332	Fitting, Insert, 3/8
9	5	10330	Fitting, Sleeve, 3/8" Celcon
10	5	10329	Fitting, Tube, 3/8 Nut, Brass
11	1	10328	Fitting, Elbow, 90 Deg 1/4 NPT x 3/8 Tube
12	2	12897	Tube, Fitting, 3/8 x 9 3/4
13	1	16730	Fitting, Male, 1/4 x 1
14	2	15415	Fitting, Insert, 1/2" Tube
15a	1	12472	Cam Assembly, Tri-Stack, After RR
15b	1	15770	Cam Assembly, Special Tri-Stack After Brine Fill
16	1	12114	Bracket, Motor Outboard, Coated
17	1	60150-01	Service Valve Operator Assembly, 1600, New Style, Item No's 1-11

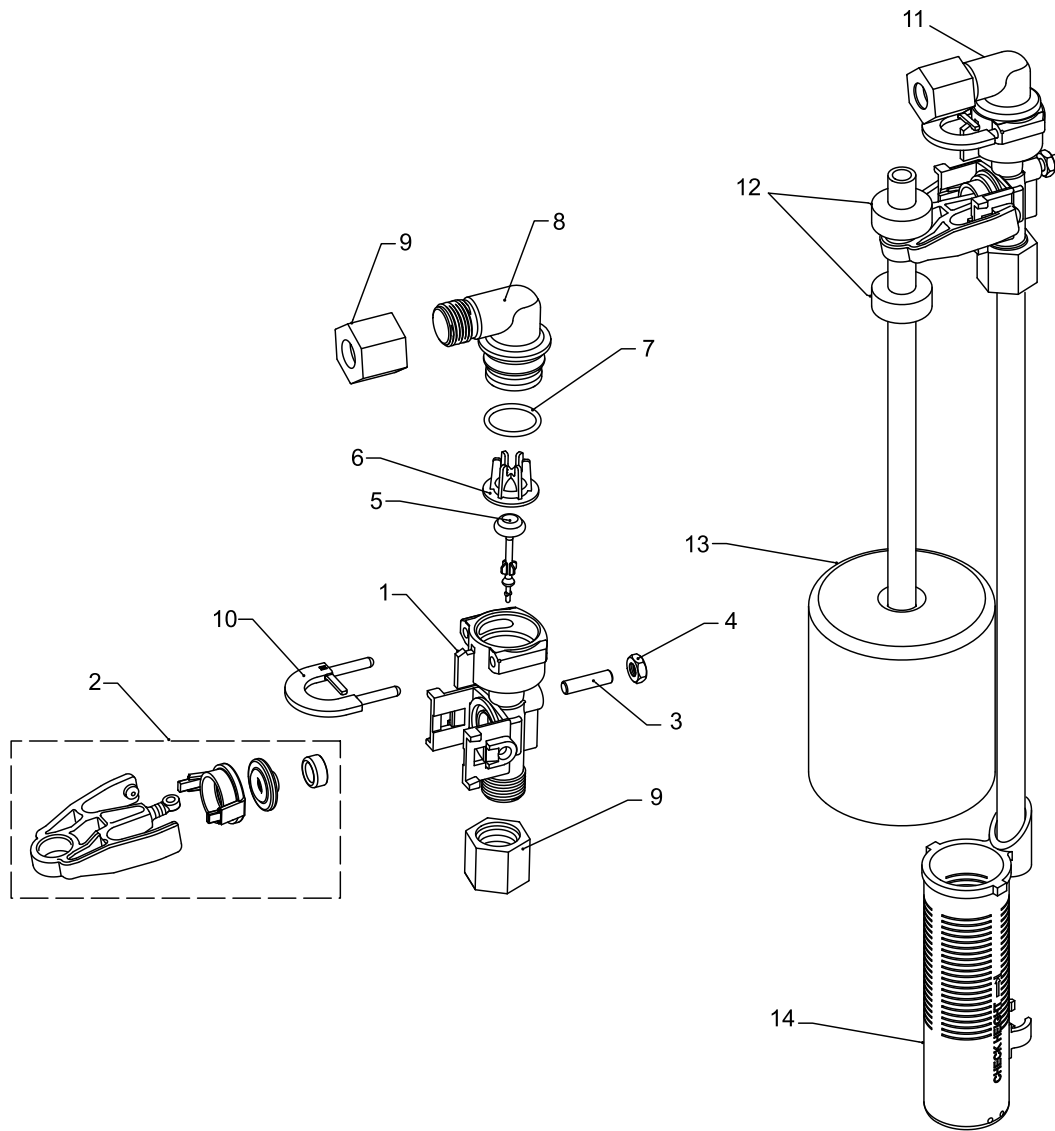
# SAFETY BRINE VALVE 2300



60027 Rev A

Item No.	QTY	Part No.	Description
1.....	1	60027-FF	Safety Brine Valve Body, 2300, Fitting Facing Arm
1A.....	1	60027-FFS	Safety Brine Valve Body, 2300, Fitting Facing Stud
2.....	1	10138	Ball, 3/8", Brass
3.....	1	11566	Ball Stop, Slow Fill
4.....	1	10328	Fitting, Elbow, 90 Deg. 1/4 NPT x 3/8 Tube
5.....	1	10332	Fitting, Insert, 3/8
6.....	1	10330	Fitting, Sleeve, 3/8 Celcon
7.....	1	10329	Fitting, Tube, 3/8 Nut, Brass
8.....	1	10186	Nut, Hex, 10-32
9.....	1	60002-34	Air Check, #500, 34" Long
		60003-34	Air Check, #500, HW, 34" Tube
10.....	1	10149	Rod, Float
11.....	1	10700	Float Assembly, White
12.....	3	10150	Grommet, .30 Dia
13.....	1	60028-30	Float Assembly, White
13A.....	1	60028-30SAN	Float Assembly, San, Hot Water

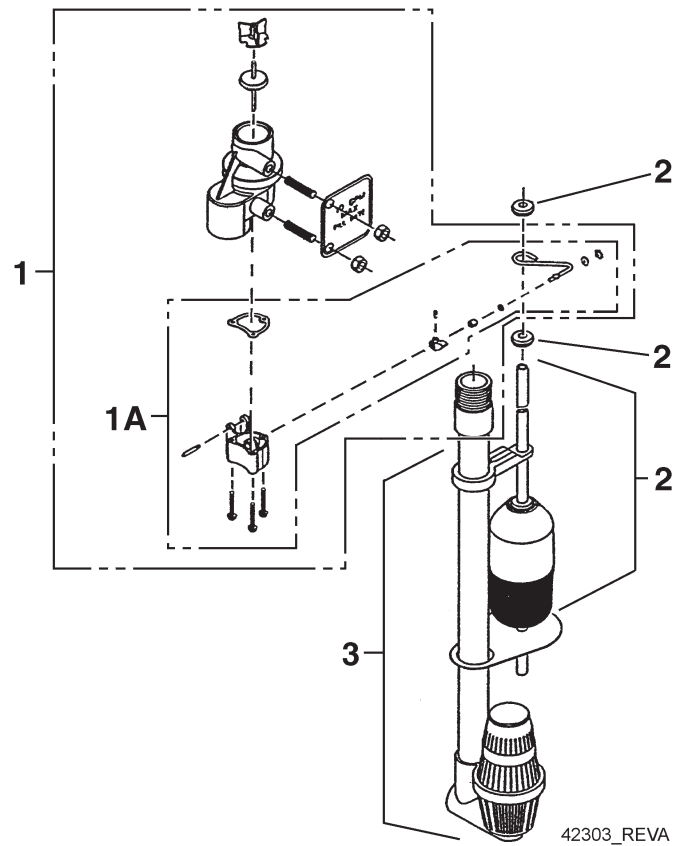
# 2310 SAFETY BRINE VALVE



42112\_REVA

Item No.	QTY	Part No.	Description
1.....	1	19645.....	Body, Safety Brine Valve, 2310
2.....	1	19803.....	Safety Brine Valve Assy
3.....	1	19804.....	Screw, Sckt Hd, Set, 10-24 x .75
4.....	1	19805.....	Nut, Hex, 10-24, Nylon Black
5.....	1	19652-01.....	Poppet Assy, SBV w/O-ring
6.....	1	19649.....	Flow Dispenser
7.....	1	11183.....	O-ring, -.017
8.....	1	19647.....	Elbow, Safety Brine Valve
9.....	2	19625.....	Nut Assy, 3/8" Plastic
10.....	1	18312.....	Retainer, Drain
11.....	1	60014.....	Safety Brine Valve Assy, 2310
12.....	2	10150.....	Grommet, .30 Dia
13.....	1	60068-30.....	Float Assy, 2310, w/30" Rod
14.....	1	60002-34.....	Air Check, #500, 34" Long

# 2350 SAFETY BRINE VALVE



Item No.	QTY	Part No.	Description
1.....	1 .....	60038.....	Safety Brine Valve, 2350
1A.....	1 .....	61024.....	Actuator Assy, 2350 Brine
2.....	1 .....	60028-30.....	Float Assy, 2350, 30" Wht
.....	1 .....	60026-30SAN .....	Float Assy, 2350, 30" Hot Water
3.....	1 .....	60009-00.....	Air Check, #900, Commercial Less Fittings
.....	1 .....	60009-01.....	Air Check, #900, Commercial, Hot Water Less Fittings

**Not Shown**

.....	1 .....	18603.....	Fitting Assy, 900 Air Check 2350
.....	1 .....	18602.....	Fitting Assy, 900 Air Check



## GENERAL SERVICE HINTS FOR METER CONTROL

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**Problem: Softener delivers hard water**

**Reason:** Reserve capacity has been exceeded.

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

**Reason:** 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.

**Reason:** Meter is not measuring flow.

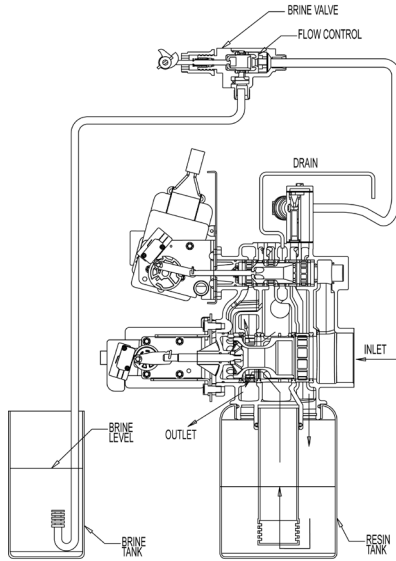
**Correction:** Check meter with meter checker.

## TROUBLESHOOTING

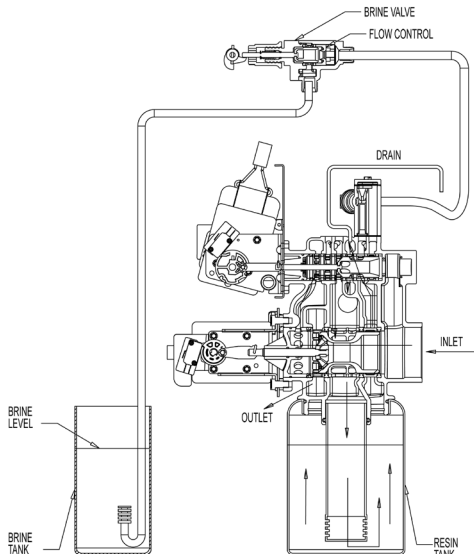
Problem	Cause	Correction
Water conditioner fails to regenerate.	Electrical service to unit has been interrupted	Assure permanent electrical service (check fuse, plug, pull chain, or switch)
	Timer is defective.	Replace timer.
	Power failure.	Reset time of day.
Hard water.	By-pass valve is open.	Close by-pass valve.
	No salt is in brine tank.	Add salt to brine tank and maintain salt level above water level.
	Injector screen plugged.	Clean injector screen.
	Insufficient water flowing into brine tank.	Check brine tank fill time and clean brine line flow control if plugged.
	Hot water tank hardness.	Repeated flushings of the hot water tank is required.
	Leak at distributor tube.	Make sure distributor tube is not cracked. Check O-ring and tube pilot.
	Internal valve leak.	Replace seals and spacers and/or piston.
Unit used too much salt.	Improper salt setting.	Check salt usage and salt setting.
	Excessive water in brine tank.	See "Excessive water in brine tank".
Loss of water pressure.	Iron buildup in line to water conditioner.	Clean line to water conditioner.
	Iron buildup in water conditioner.	Clean control and add mineral cleaner to mineral bed. Increase frequency of regeneration.
	Inlet of control plugged due to foreign material broken loose from pipes by recent work done on plumbing system.	Remove piston and clean control.
Loss of mineral through drain line.	Air in water system.	Assure that well system has proper air eliminator control. Check for dry well condition.
	Improperly sized drain line flow control.	Check for proper drain rate.
Iron in conditioned water.	Fouled mineral bed.	Check backwash, brine draw, and brine tank fill. Increase frequency of regeneration. Increase backwash time.
Excessive water in brine tank.	Plugged drain line flow control.	Clean flow control.
	Plugged injector system.	Clean injector and screen.
	Timer not cycling.	Replace timer.
	Foreign material in brine valve.	Replace brine valve seat and clean valve.
	Foreign material in brine line flow control.	Clean brine line flow control.
Softener fails to draw brine.	Drain line flow control is plugged.	Clean drain line flow control.
	Injector is plugged.	Clean injector
	Injector screen plugged.	Clean screen.
	Line pressure is too low.	Increase line pressure to 20 psi
	Internal control leak	Change seals, spacers, and piston assembly.
	Service adapter did not cycle.	Check drive motor and switches.
Control cycles continuously.	Misadjusted, broken, or shorted switch.	Determine if switch or timer is faulty and replace it, or replace complete power head.
Drain flows continuously.	Valve is not programming correctly.	Check timer program and positioning of control. Replace power head assembly if not positioning properly.
	Foreign material in control.	Remove power head assembly and inspect bore. Remove foreign material and check control in various regeneration positions.
	Internal control leak.	Replace seals and piston assembly.

# WATER CONDITIONER FLOW DIAGRAMS - DOWNFLOW

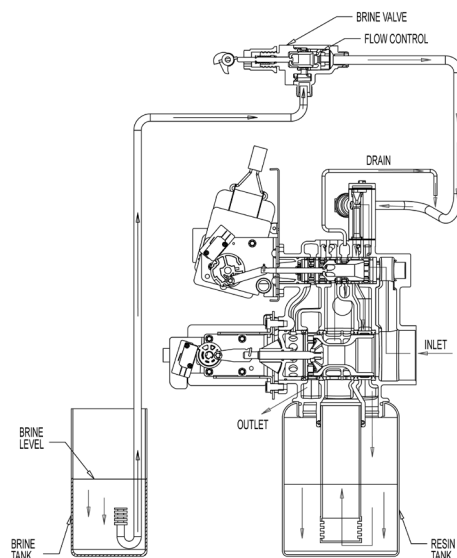
**1 Service Position**



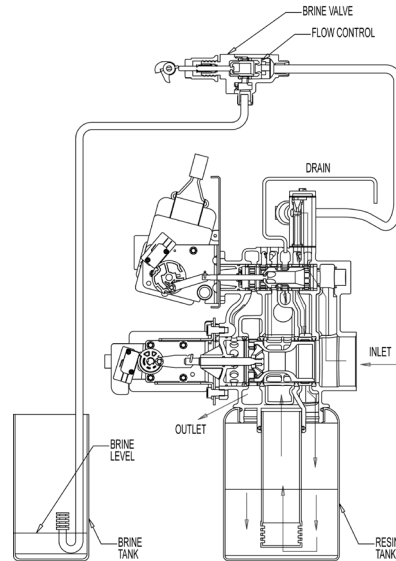
**2 Backwash Position**



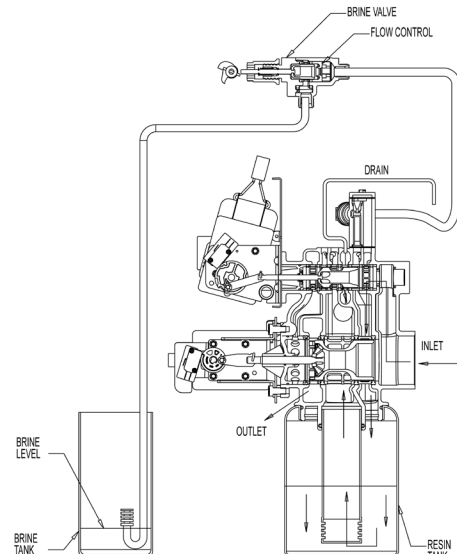
**3 Brine Position**



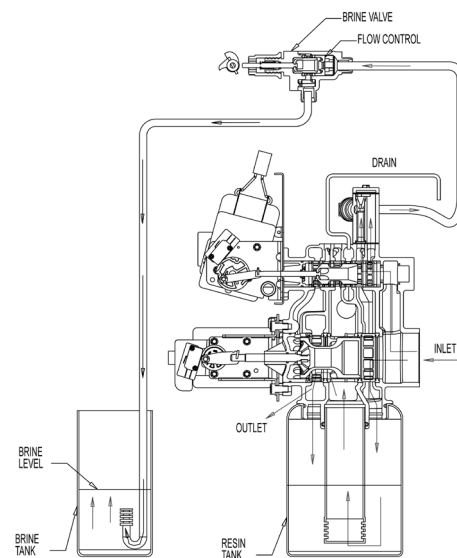
**4 Slow Rinse Position**



**5 Rapid Rinse**

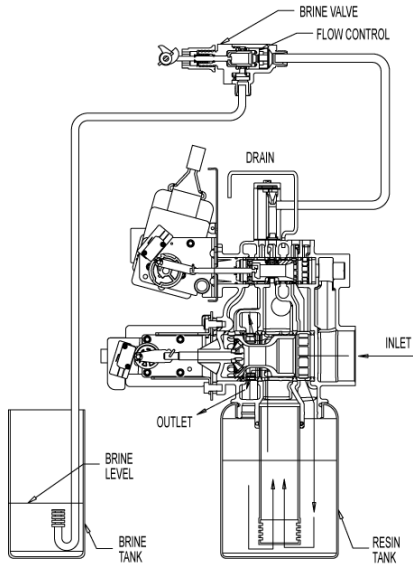


**6 Brine Tank Refill Position**

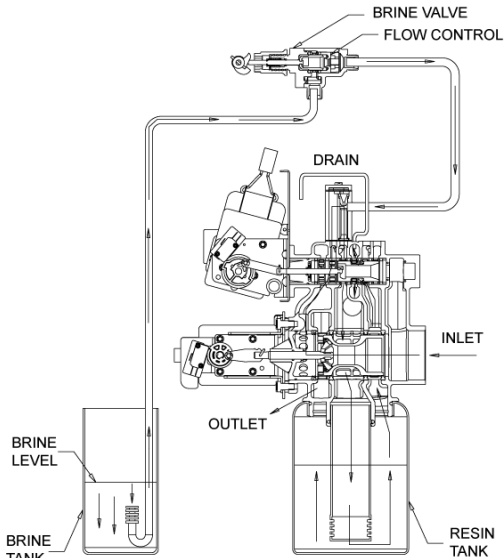


# WATER CONDITIONER FLOW DIAGRAMS - UPFLOW

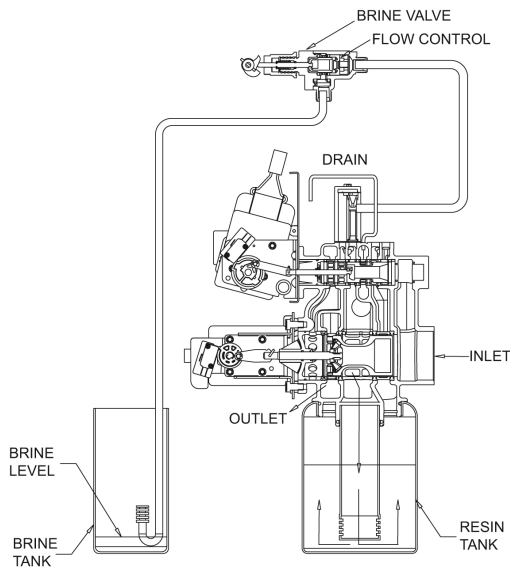
**1 Service Position**



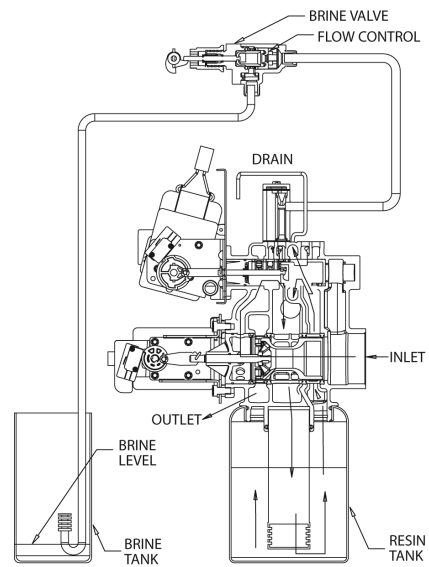
**2 Brine Position**



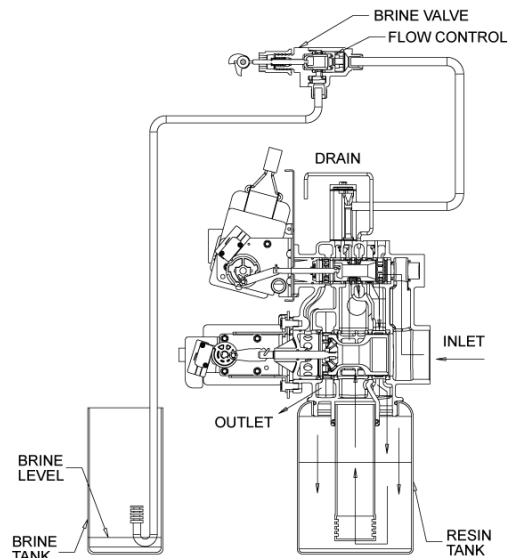
**3 Slow Rinse Position**



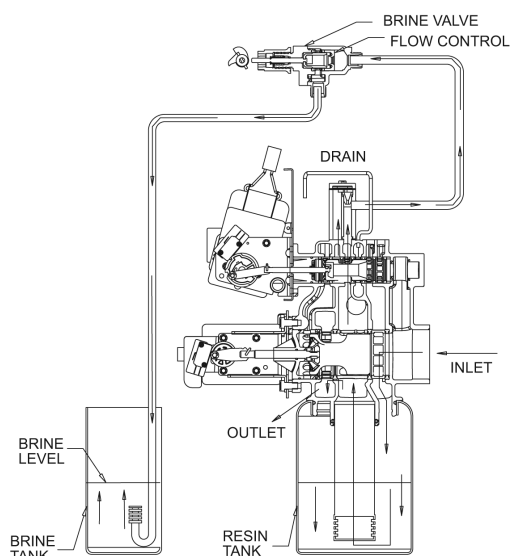
**4 Back Wash Position**



**5 Rapid Rinse Position**

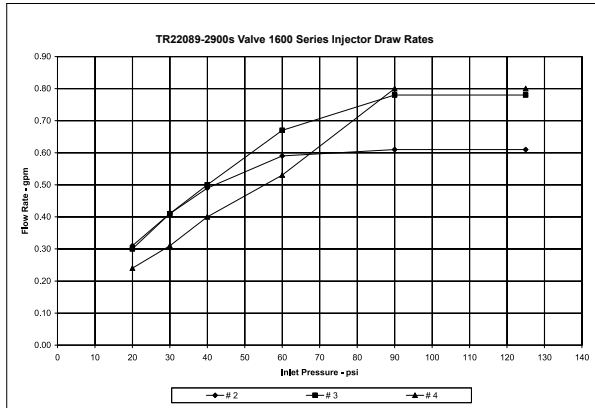


**6 Brine Tank Fill Position**



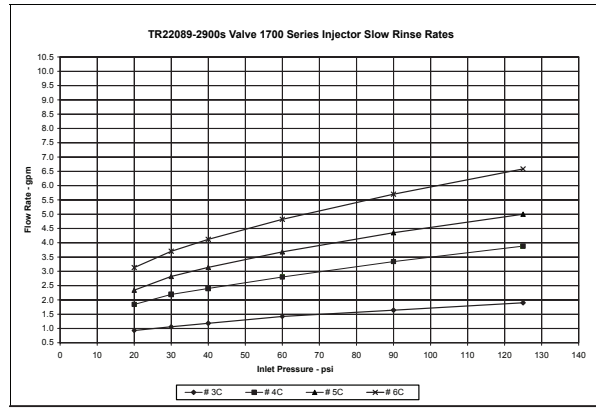
61500-2900 UPFLW Rev F

# FLOW DATA & INJECTOR DRAW RATES - DOWNFLOW



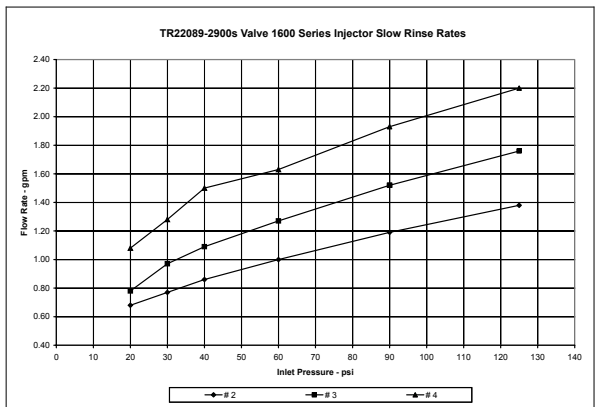
1600 series injectors	Draw Rate - gpm		
pressure	# 2	# 3	# 4
20	0.31	0.30	0.24
30	0.41	0.41	0.31
40	0.49	0.50	0.40
60	0.59	0.67	0.53
90	0.61	0.78	0.80
125	0.61	0.78	0.80

all injectors used the steel cap and an air disperser



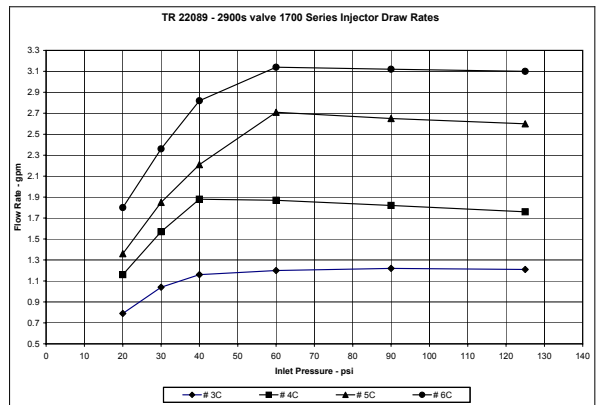
1700 series injectors	Slow Rinse - gpm			
pressure	# 3C	# 4C	# 5C	# 6C
20	0.93	1.84	2.34	3.13
30	1.06	2.19	2.82	3.70
40	1.18	2.40	3.14	4.12
60	1.42	2.80	3.68	4.82
90	1.64	3.34	4.35	5.70
125	1.90	3.88	5.00	6.58

# 3C - steel cap, no o-ring, air disperser  
# 4C & 5C - steel cap, o-ring, air disperser  
# 6C & 7C - brass cap, o-ring, no air disperser



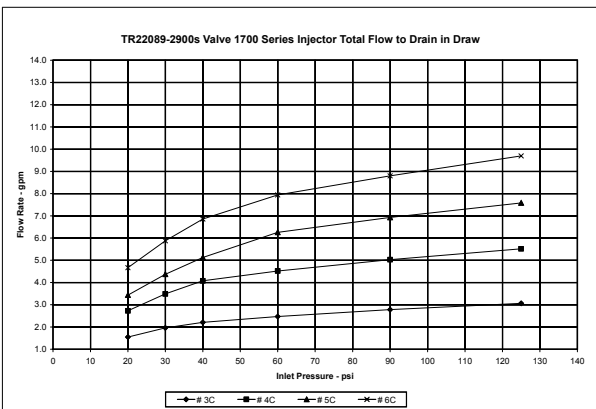
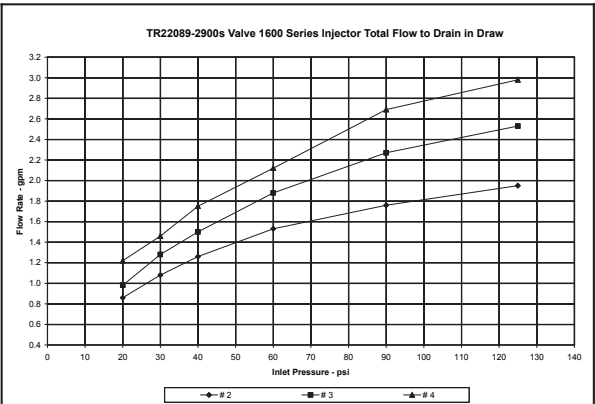
1600 series injectors	Slow Rinse Rates - gpm		
pressure	# 2	# 3	# 4
20	0.68	0.78	1.08
30	0.77	0.97	1.28
40	0.86	1.09	1.50
60	1.00	1.27	1.63
90	1.19	1.52	1.93
125	1.38	1.76	2.20

all injectors used the steel cap and an air disperser

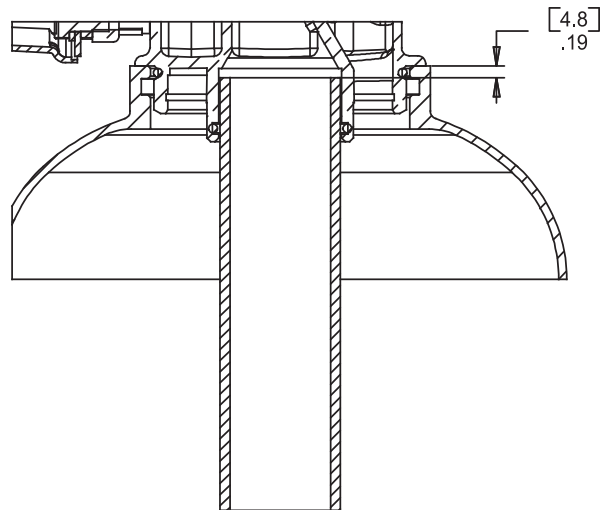
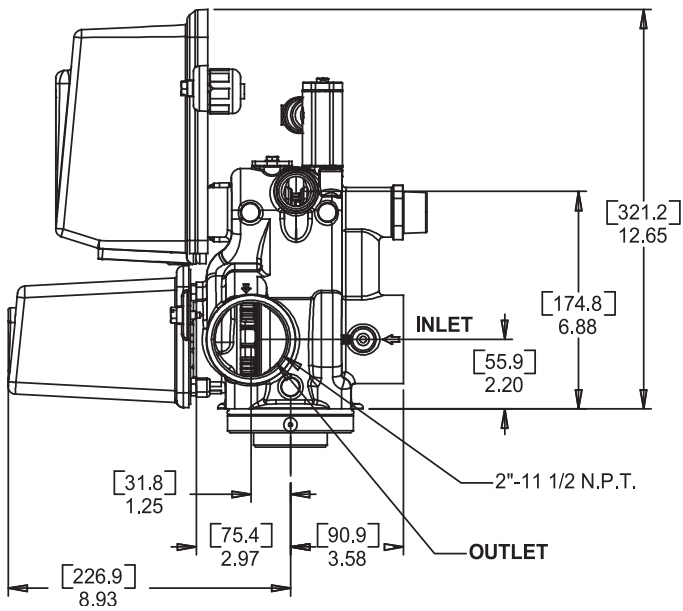
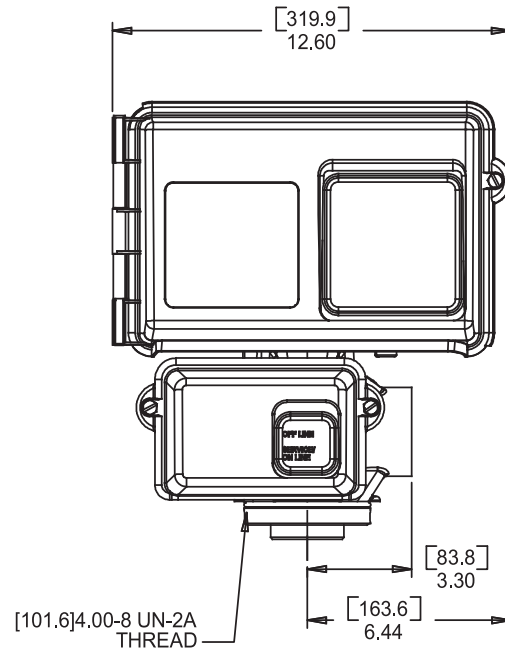
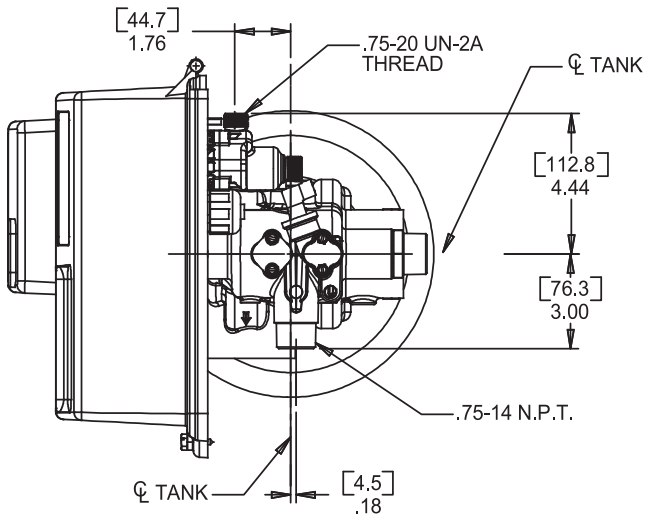


1700 series injectors	Draw Rate - gpm			
pressure	# 3C	# 4C	# 5C	# 6C
20	0.79	1.16	1.36	1.80
30	1.04	1.57	1.85	2.36
40	1.16	1.88	2.21	2.82
60	1.20	1.87	2.71	3.14
90	1.22	1.82	2.65	3.12
125	1.21	1.76	2.60	3.10

# 3C - steel cap, no o-ring, air disperser  
# 4C & 5C - steel cap, o-ring, air disperser  
# 6C - brass cap, o-ring, no air disperser



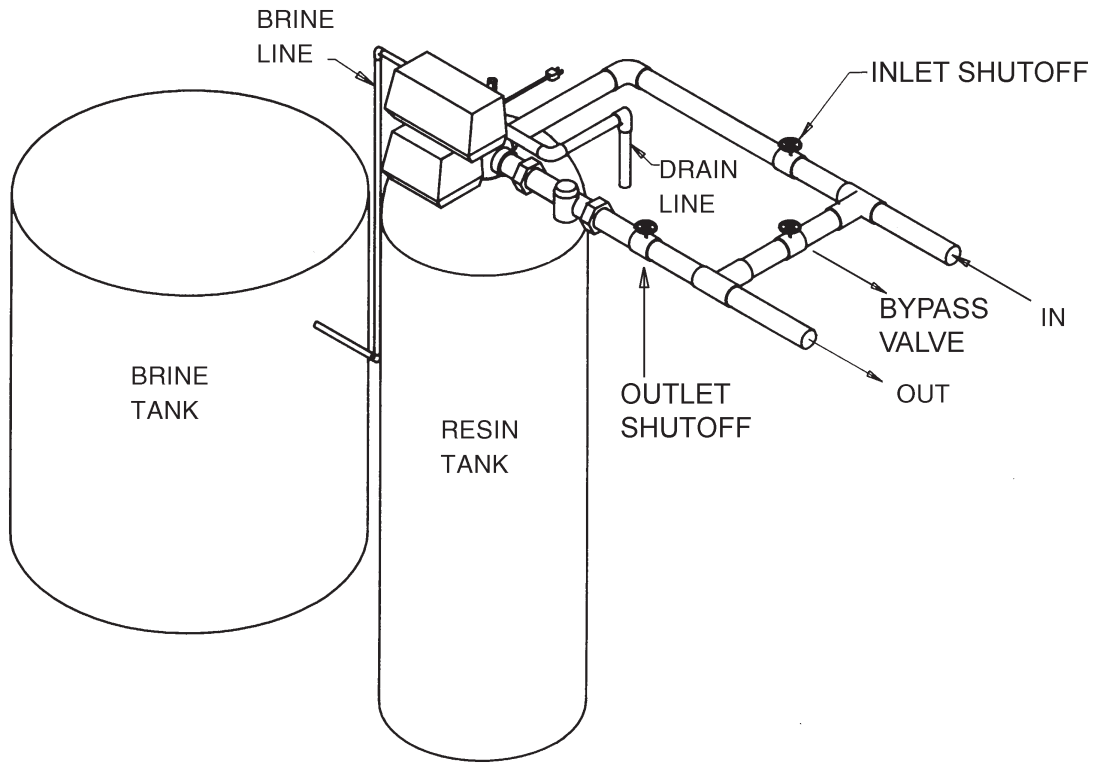
# ENVIRONMENTAL BACKPLATE DIMENSIONS



61500-2900LNE Rev B

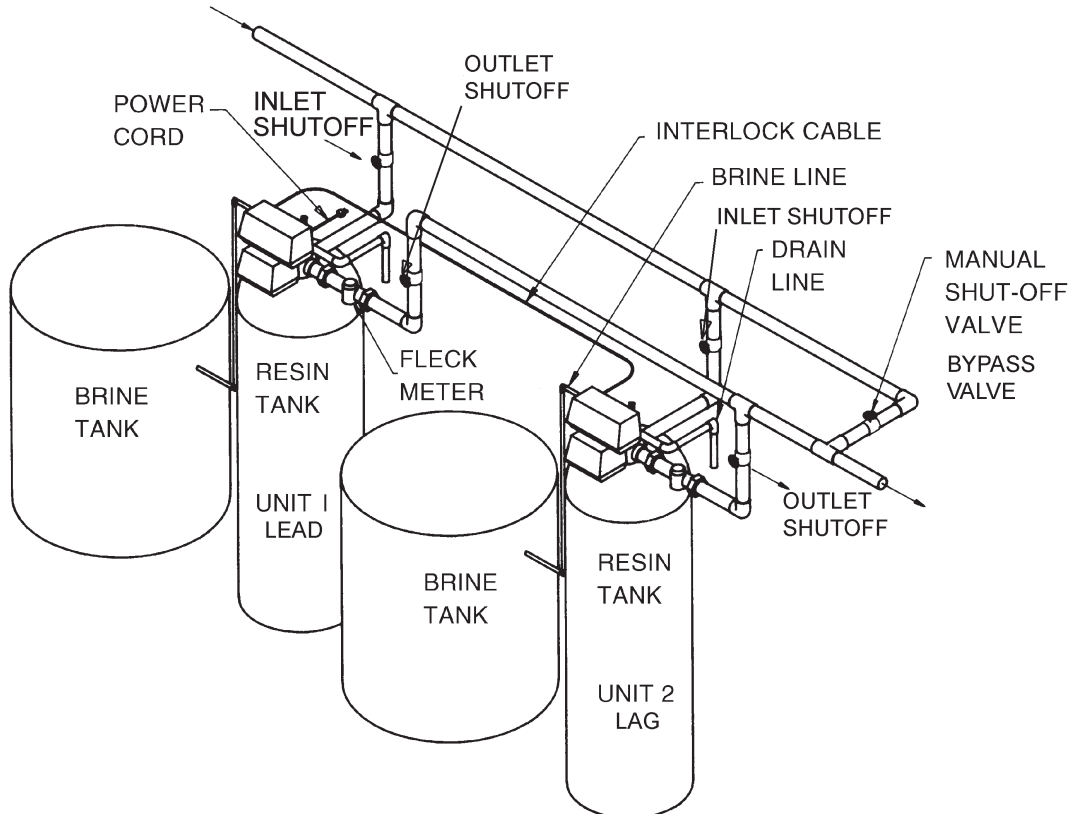
## SYSTEM #4

### Typical Single Tank Installation with Optional Meter



## SYSTEM #5 INTERLOCK

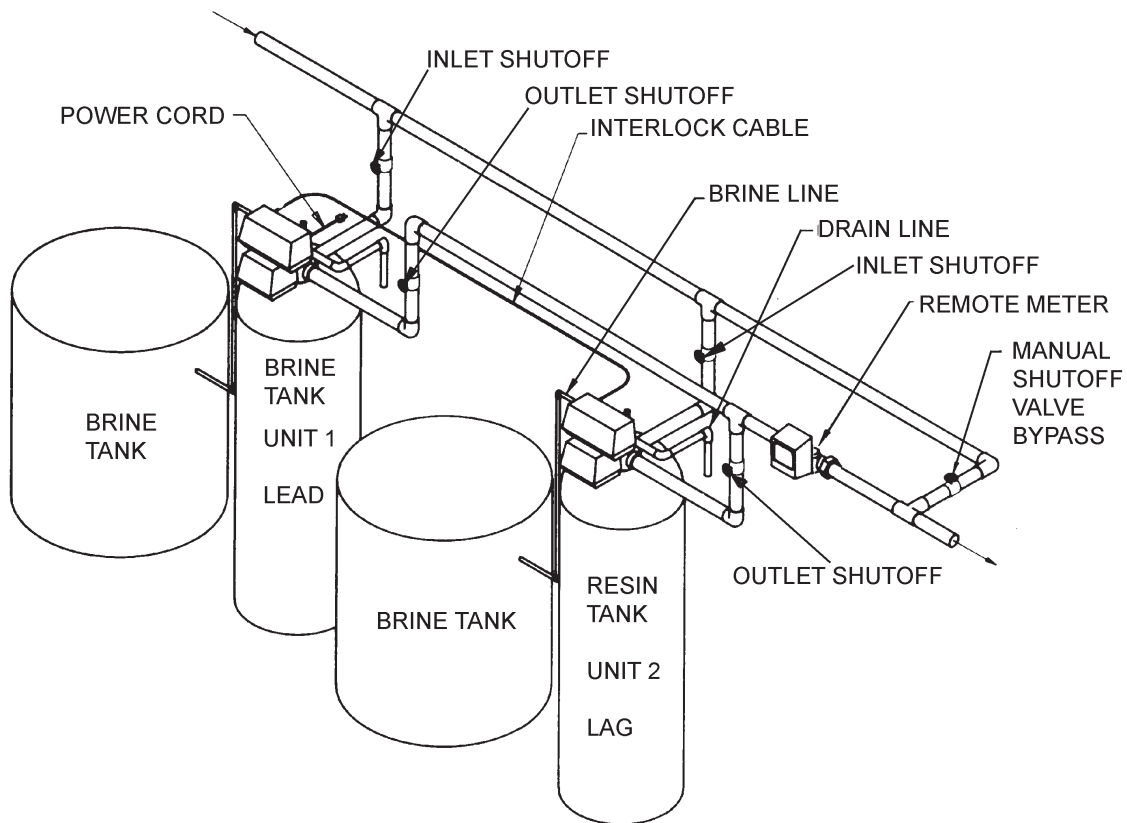
### Typical Twin Tank Installation with Optional Meter Interlock and No Hard Water Bypass



## SYSTEM #6 & #7

### Twin Series Regeneration Installation with a Remote Meter

#### Twin Alternator Installation



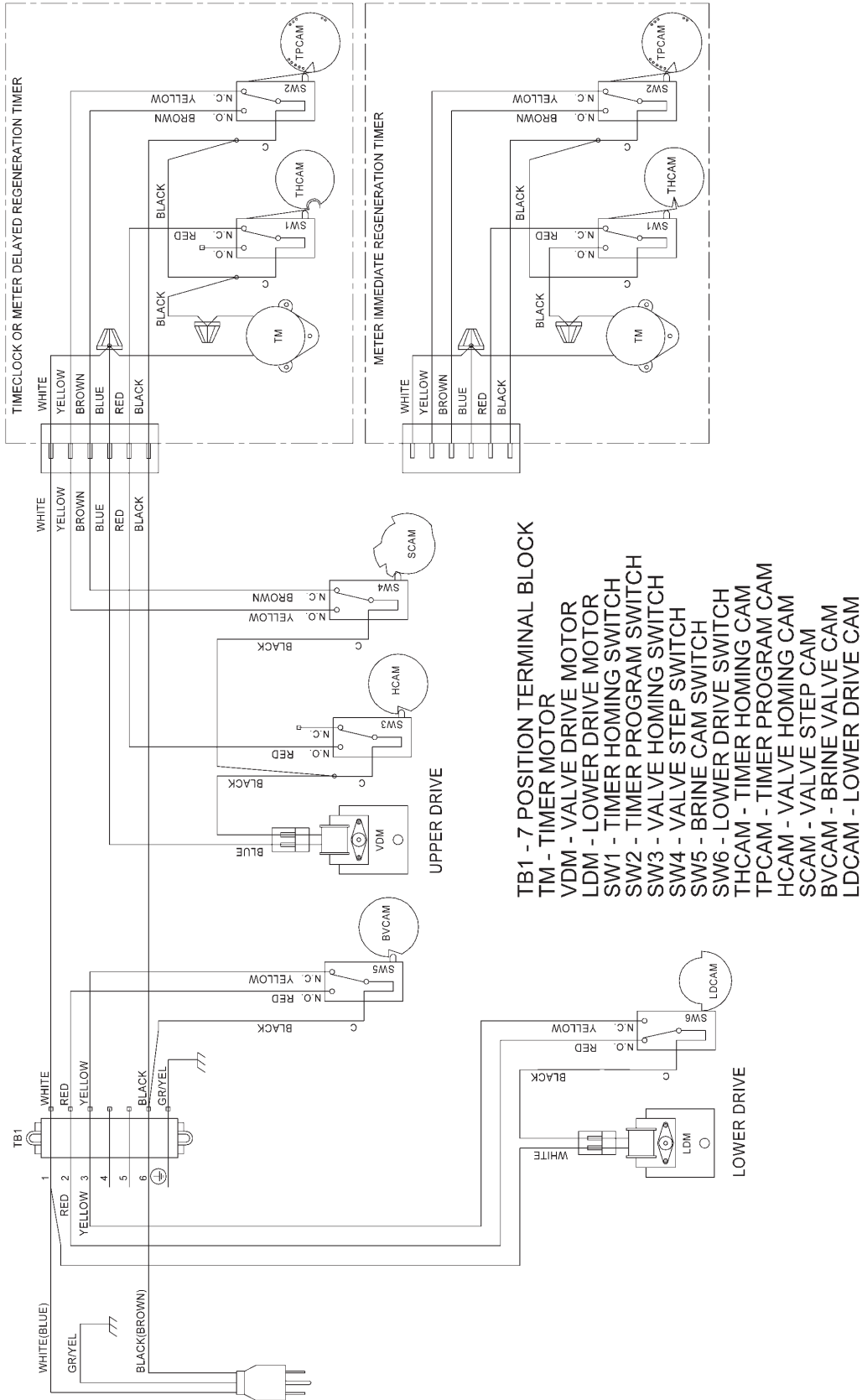
**NOTE:** On System 7, the power cord is on Unit 2.

**NOTE:** System 7 can run with either one or two brine tanks. Two brine tanks should be used if regeneration is less than 4 hours.



# SYSTEM #4 WIRING

## Single Valve Regeneration Immediate and Delayed Valve Wiring

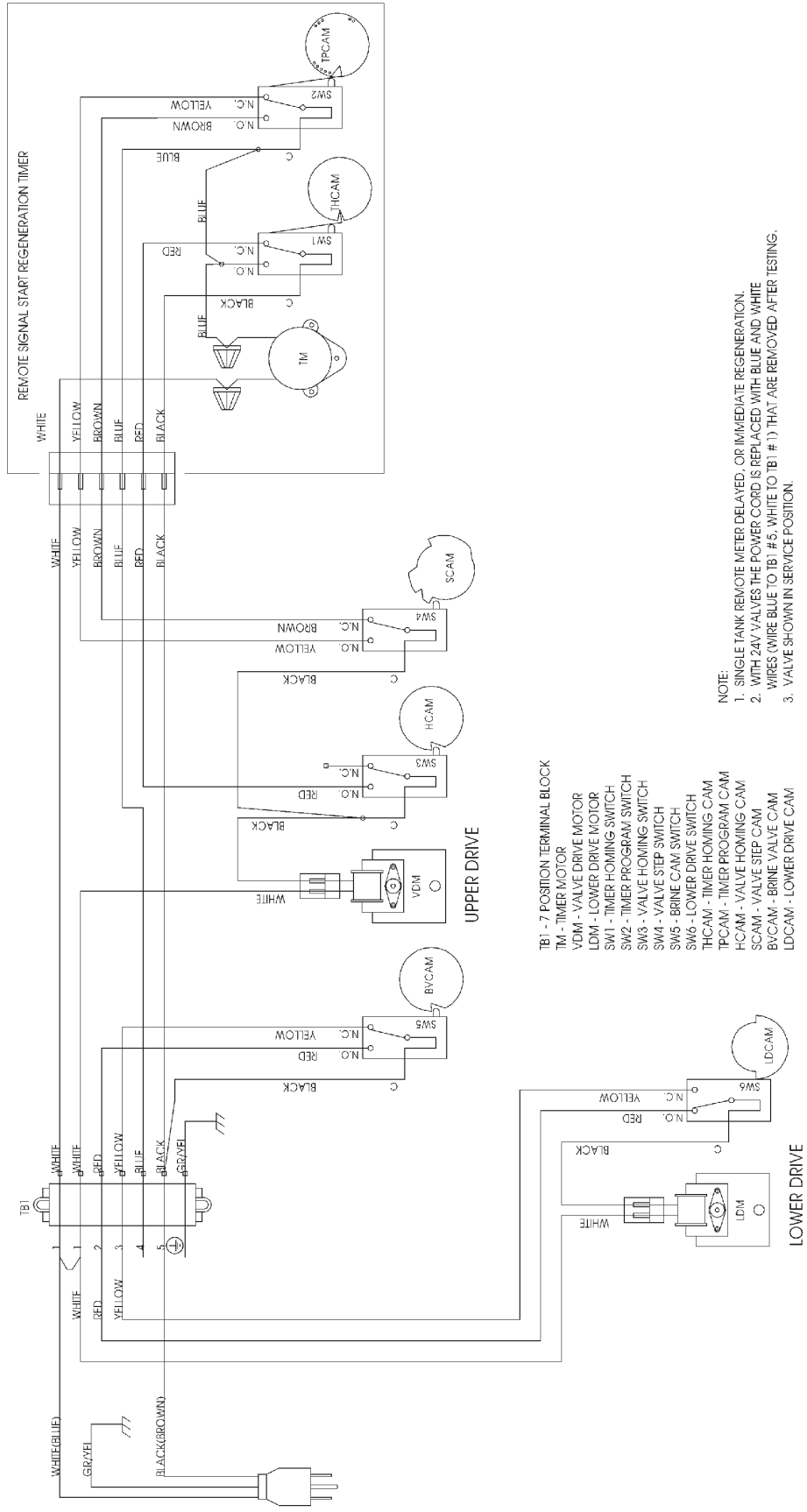
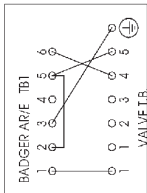
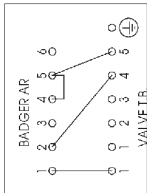
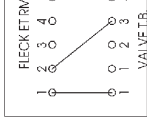
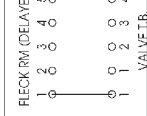
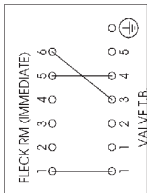


NOTE:  
 1. SINGLE TANK TIMELOCK, METER DELAYED, OR METER IMMEDIATE REGENERATION.  
 2. VALVE SHOWN IN SERVICE.

# SYSTEM #4 WIRING *continued*

## With Remote Starter Valve Wiring

### REMOTE METER WIRING

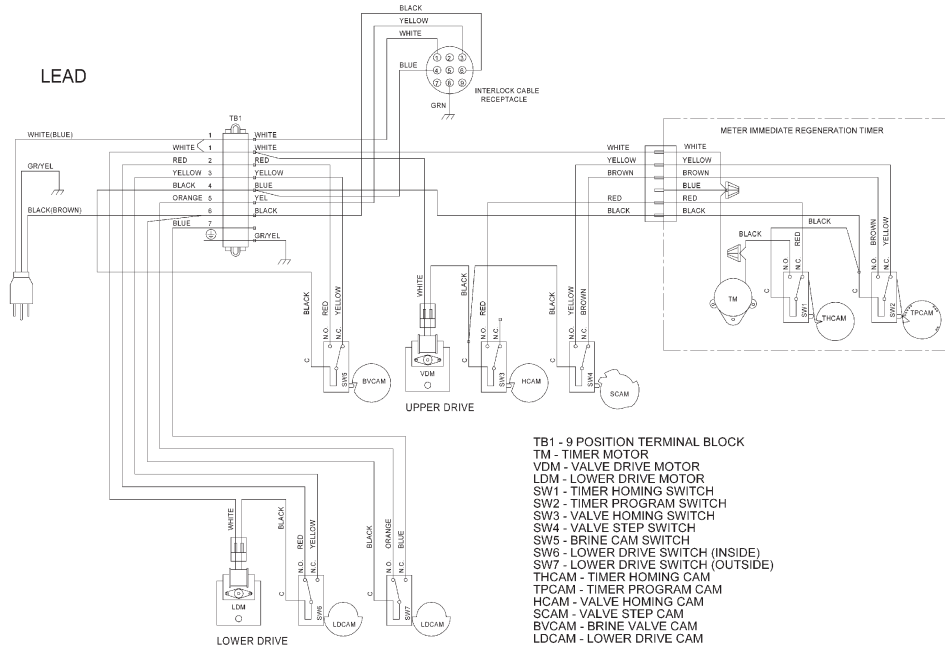


- TB1 - 7 POSITION TERMINAL BLOCK  
 TM - TIMER MOTOR  
 VDM - VALVE DRIVE MOTOR  
 LDM - LOWER DRIVE MOTOR  
 SW1 - TIMER HOMING SWITCH  
 SW2 - TIMER PROGRAM SWITCH  
 SW3 - VALVE HOMING SWITCH  
 SW4 - VALVE STEP SWITCH  
 SW5 - BRINE CAM SWITCH  
 SW6 - LOWER DRIVE SWITCH  
 TPCAM - TIMER HOMING CAM  
 HCAM - VALVE HOMING CAM  
 SCAM - VALVE STEP CAM  
 BVCAM - BRINE VALVE CAM  
 LDCAM - LOWER DRIVE CAM

NOTE:  
 1. SINGLE TANK REMOTE METER DELAYED, OR IMMEDIATE REGENERATION.  
 2. WITH 24V VALVES THE POWER CORD IS REPLACED WITH BLUE AND WHITE WIRES (WIRE BLUE TO TB1 #5, WHITE TO TB1 #1) THAT ARE REMOVED AFTER TESTING.  
 3. VALVE SHOWN IN SERVICE POSITION.

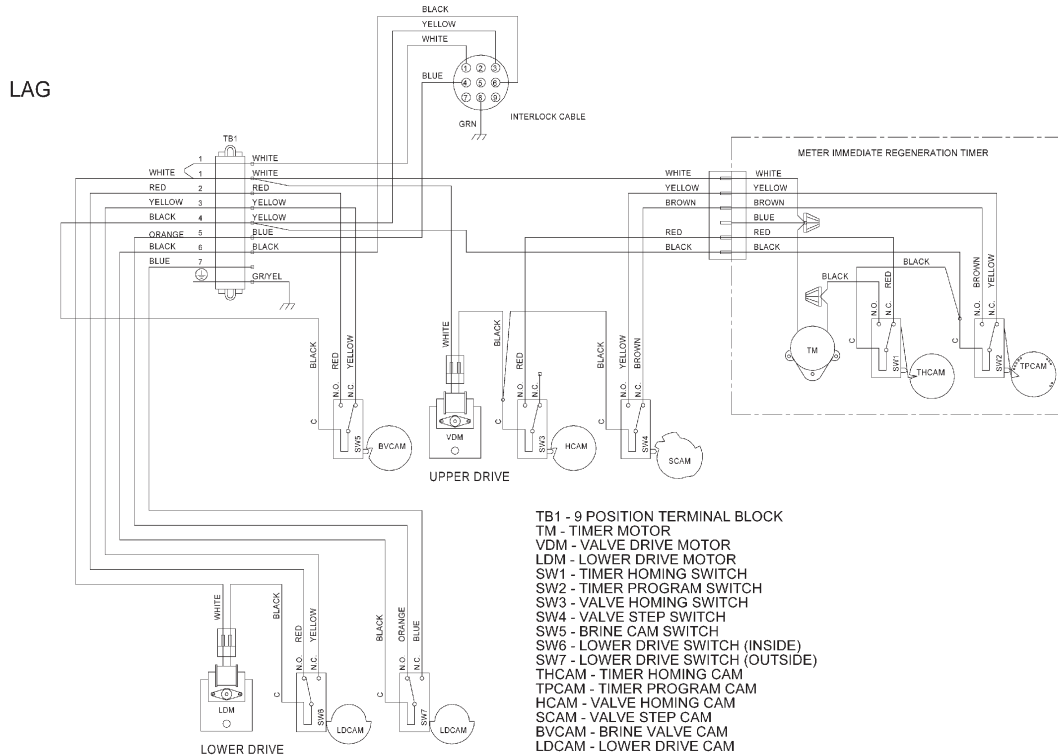
# SYSTEM #5 WIRING

## Interlocked Regeneration Valve Wiring



**NOTE:**  
 1. TWO TANK INTERLOCKED, INDIVIDUAL METER, IMMEDIATE REGENERATION.  
 2. BOTH TANKS NORMALLY IN SERVICE. ONLY ONE TANK IN REGENERATION, THE OTHER REMAINS IN SERVICE.  
 3. VALVE SHOWN IN SERVICE.

18685-01 Rev D

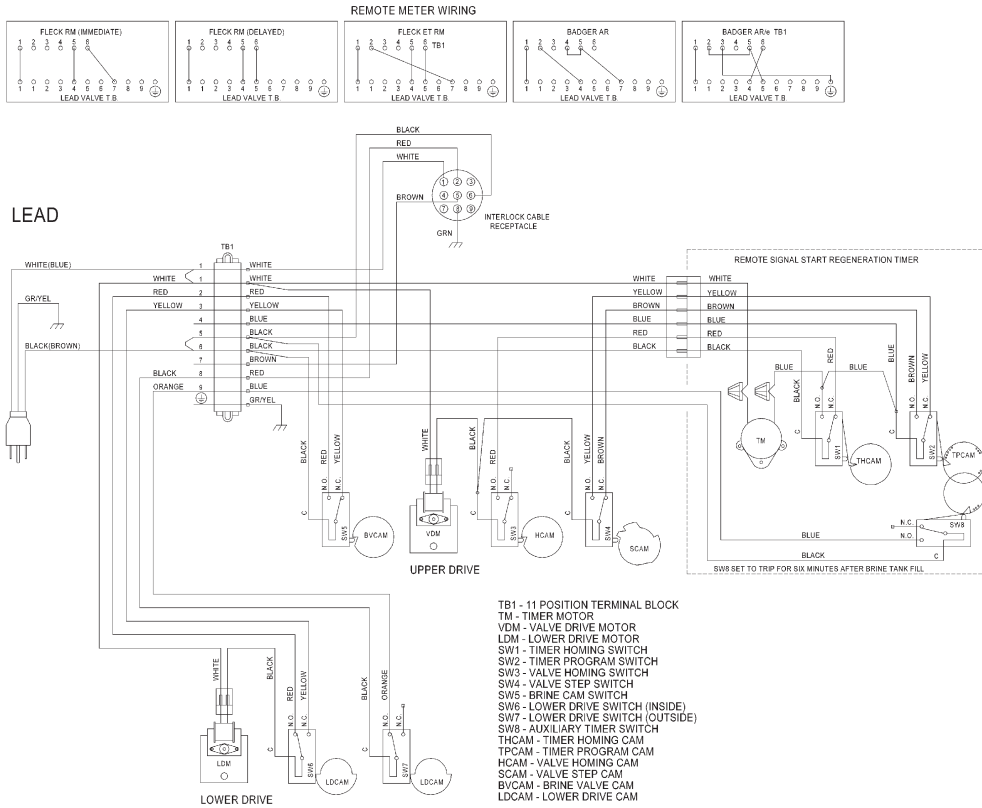


**NOTE:**  
 1. TWO TANK INTERLOCKED, INDIVIDUAL METER, IMMEDIATE REGENERATION.  
 2. BOTH TANKS NORMALLY IN SERVICE. ONLY ONE TANK IN REGENERATION, THE OTHER REMAINS IN SERVICE.  
 3. VALVE SHOWN IN SERVICE.

18685-02 Rev D

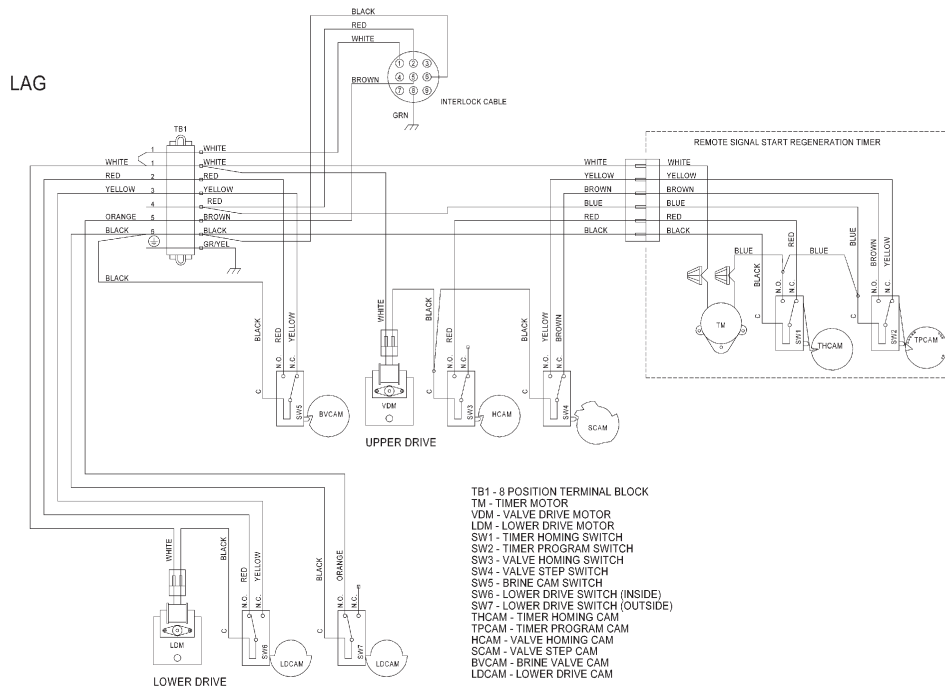
# SYSTEM #6 WIRING

## Series Regeneration Valve Wiring



- NOTE:**
1. TWO TANK INTERLOCKED, SINGLE REMOTE METER, SERIES REGENERATION.
  2. BOTH TANKS NORMALLY IN SERVICE.
  3. ONLY ONE TANK IN REGENERATION, THE OTHER REMAINS IN SERVICE.
  4. LEAD VALVE REGENERATES FIRST, FOLLOWED IMMEDIATELY BY LAG VALVE.
  5. VALVE SHOWN IN SERVICE POSITION.

18686-01 Rev E

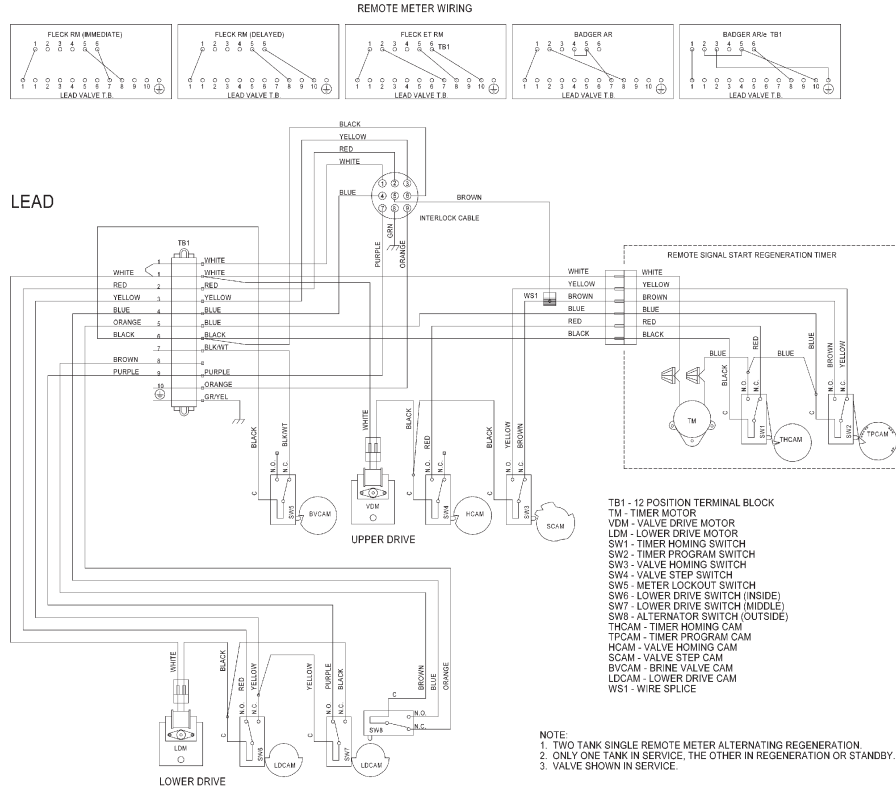


- NOTE:**
1. TWO TANK INTERLOCKED, SINGLE REMOTE METER, SERIES REGENERATION.
  2. BOTH TANKS NORMALLY IN SERVICE.
  3. ONLY ONE TANK IN REGENERATION, THE OTHER REMAINS IN SERVICE.
  4. LEAD VALVE REGENERATES FIRST, FOLLOWED IMMEDIATELY BY LAG VALVE.
  5. VALVE SHOWN IN SERVICE POSITION.

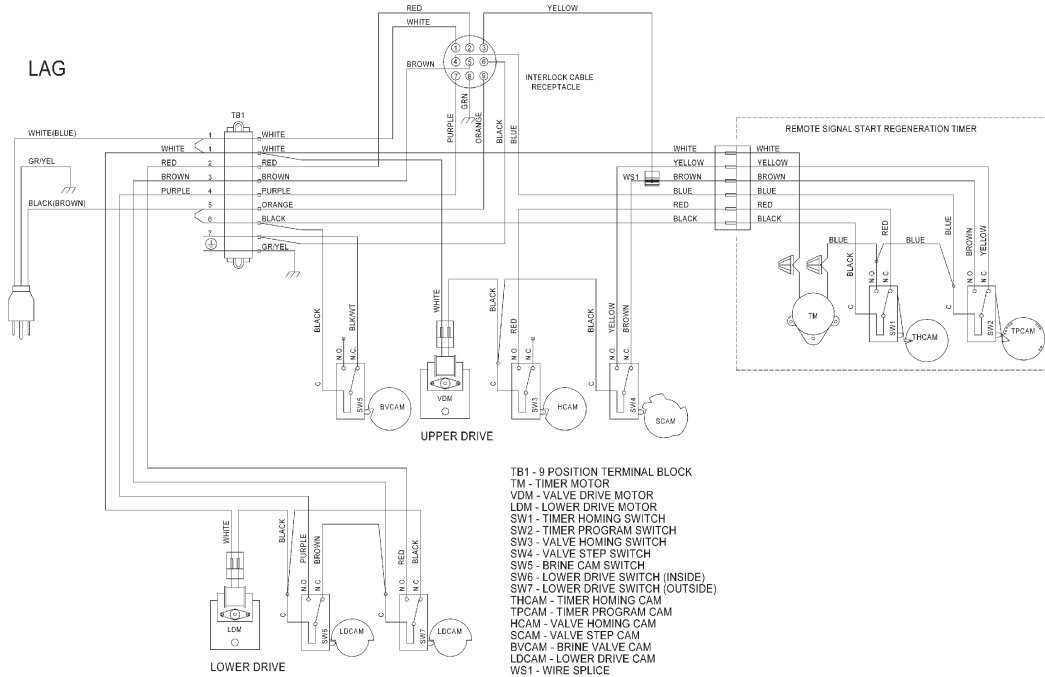
18686-02 Rev E

# SYSTEM #7 WIRING

## Alternating Regeneration Valve Wiring



18687-01 Rev E

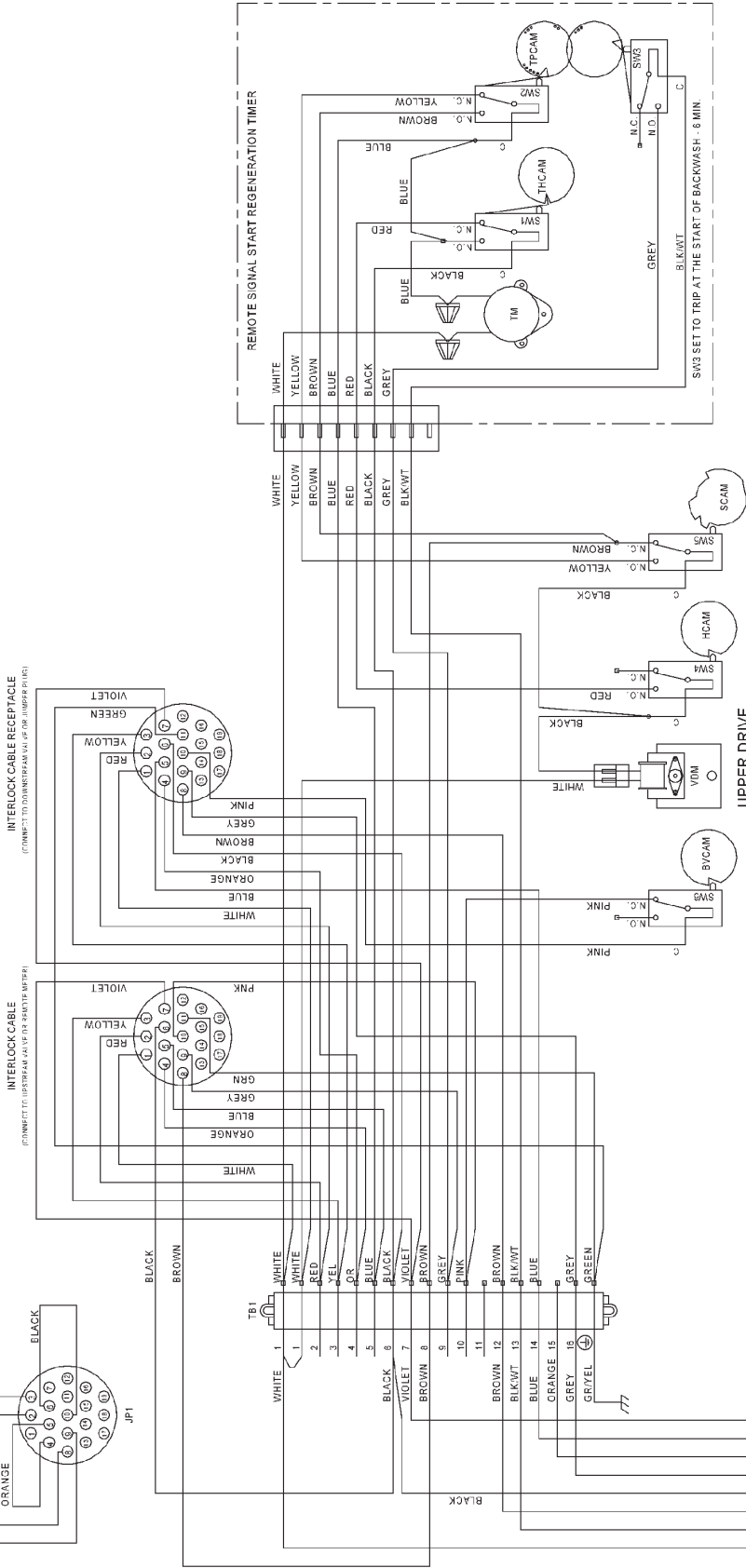
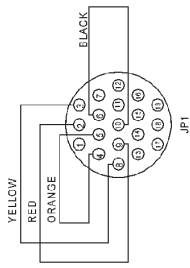


**NOTE:**  
 1. TWO TANK SINGLE REMOTE METER ALTERNATING REGENERATION  
 2. ONLY ONE TANK IN SERVICE, THE OTHER IN REGENERATION OR STANDBY.  
 3. VALVE SHOWN IN STANDBY.

18687-02 Rev E

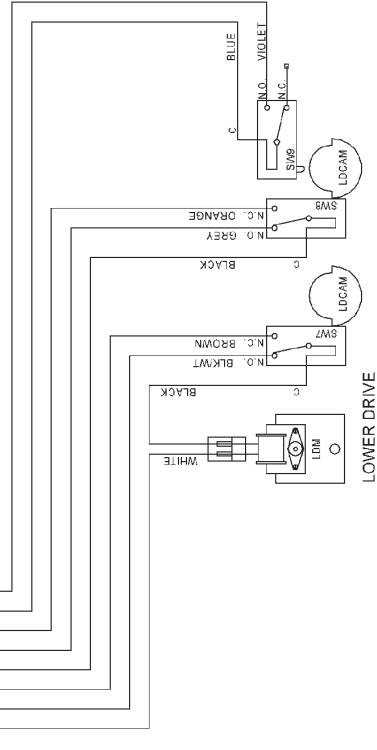
# SYSTEM #7 WIRING *continued*

JUMPER PLUG WIRING  
 JUMPER PLUG PLACED ON LAST VALVE IN SYSTEM



- TB1 - 18 POSITION TERMINAL BLK
- JP1 - JUMPER PLUG ASSEMBLY
- TM - TIMER MOTOR
- VDM - VALVE DRIVE MOTOR
- LDM - LOWER DRIVE MOTOR
- SW1 - VALVE HOMOING SWITCH
- SW2 - TIMER POWER SWITCH
- SW3 - TIMER AUX. SWITCH
- SW4 - VALVE HOMOING SWITCH
- SW5 - VALVE STEP SWITCH
- SW6 - BRINE CAM SWITCH
- SW7 - LOWER DRIVE SWITCH (INSIDE)
- SW8 - LOWER DRIVE SWITCH (OUTSIDE)
- THCAM - TIMER HOMOING CAM
- TPCAM - TIMER PROGRAM CAM
- HCAM - VALVE HOMOING CAM
- SCAM - VALVE STEP CAM
- BVCAM - BRINE VALVE CAM
- LDCAM - LOWER DRIVE CAM

- NOTE
1. TWO TO FOUR TANK, SINGLE METER ALTERNATING REGENERATION.
  2. 1 TO 3 TANKS IN SERVICE
  3. ONE TANK IN REGENERATION OR STANDBY
  4. ALL VALVES IN SYSTEM WIRED ALIKE.
  5. LAST VALVE IN SYSTEM RECEIVES JUMPER PLUG ASSEMBLY.
  6. CONNECT JUMPER PLUG TO INTERLOCK CABLE RECEPTACLE.
  7. SPECIAL INITIAL VALVE REMOTE METER OR EQUIV. REQUIRED FOR PROPER OPERATION.
  8. SPECIAL INITIAL VALVE REMOTE METER CABLE BE CONNECTED TO REMOTE METER.
  9. VALVE SHOWN IN SERVICE POSITION.



UPPER DRIVE

LOWER DRIVE

# 1600/1700 SYSTEM NOZZLE & THROAT CHART

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## 1600 Brine System

### Standard

Size	Color	Nozzle	Throat
#0.....	Red .....	10913-0 .....	10914-0
#1.....	White.....	10913-1 .....	10914-1
#2.....	Blue.....	10913-2 .....	10914-2
#3.....	Yellow.....	10913-3 .....	10914-3
#4.....	Green.....	10913-4 .....	10914-4

### PVC

Size	Color	Nozzle	Throat
#0.....	Gray .....	12973-0 .....	12974-0
#1.....	Gray .....	12973-1 .....	12974-1
#2.....	Gray .....	12973-2 .....	12974-2
#3.....	Gray .....	12973-3 .....	12974-3
#4.....	Gray .....	12973-4 .....	12974-4

### Stainless Steel

Size	Color	Nozzle	Throat
#0.....	Silver.....	10225-0 .....	10226-0
#1.....	Silver.....	10225-1 .....	10226-1
#2.....	Silver.....	10225-2 .....	10226-2
#3.....	Silver.....	10225-3 .....	10226-3
#4.....	Silver.....	10225-4 .....	10226-4

## 1700 Brine System

### Standard

Size	Color	Nozzle	Throat
#3.....	Yellow.....	14801-03C ..	14802-03C
#4.....	Green.....	14801-04C ..	14802-04C
#5.....	White.....	14801-05C ..	14802-05C
#6.....	Red .....	14801-06C ..	14802-06C

## SERVICE ASSEMBLIES

### Adapters:

61525.....	Softwater Adapter Kit, 2900s
61415.....	Adapter Assy, Sidemount 2850/2900/2930
61415NP.....	Adapter Assy, Sidemount, NP 2850/2900/2930
61415-20.....	Adapter Assy, Sidemount, BSP/MTC 2850/2900/2930
61415-20NP.....	Adapter Assy, Sidemount, BSP/NP 2850/2900/2930

### Air Checks:

60002-34.....	Air Check, #500, 34" Long
60003-34.....	Air Check, #500, HW, 34" Tube
60009-01.....	Air Check, #900, Commercial, HW Less Fittings

### Auxiliary Micro Switch:

60320-02.....	Switch Kit, 3200/9000 Timer Auxiliary
60320-11.....	Switch Assy, 2900, Lower Drive (For Adding 2nd Switch)
60320-08.....	Switch Assy, 2900, Lower Drive Aux (For Adding Third Switch)

### Brine Line Flow Controls (BLFC):

60020-25.....	BLFC, .25 GPM, 1600
60020-50.....	BLFC, .50 GPM, 1600
60020-100.....	BLFC, 1.0 GPM, 1600
60011-090.....	Brine Valve, 1650, Short Stem
60010-25.....	BLFC, 1650, .25 GPM, Plastic
60010-50.....	BLFC, 1650, .50 GPM, Plastic
60010-100.....	BLFC, 1650, 1.0 GPM, Plastic

### Brine Valves:

60011.....	Brine Valve, 1650, Less BLFC
60029.....	Brine Valve, 1600, Short Stem Brass, Std O-rings
60029HW.....	Brine Valve, 1600, Short Stem Hot Water
60034-XX.....	Model 1700 brine valve assy (specify flow control 1.0 - 5.0 )
60604-XX.....	Model 1710 brine valve assy (specify flow control 1.0 - 5.0 )

### Covers:

60217-02.....	Environmental Lower Cover, Black
60219-02.....	Environmental, Cover, Black
60232-XX.....	Designer 2 Piece
60232-110.....	Cover, Designer, 1 Piece Black
14800-02.....	Cover, Dust, Lower, 2900, Black

### Drain Line Flow Controls (DLFC):

60366-XX.....	1" FNPT x 3/4" FNPT (specify flow control .6 - 7.0)
60701-XX.....	1" FNPT x 1" FNPT (specify flow control 8.0 - 25.0)
60702-XX.....	1" FNPT x 1" MNPT (specify flow control 8.0 - 25.0)
60708-XX.....	1" FNPT x 3/4" FNPT (specify flow control 8.0 - 25.0)
60721-XX.....	1" FNPT x 1" FNPT (specify flow control .6 - 7.0)

### Cam Assemblies:

60160-00.....	Drive Cam Assy, RR, White
60160-20.....	Drive Cam Assy, Std
60160-22.....	Drive Cam Assy, Link, Environmental 2900 Lower Drive
60160-30*.....	Drive Cam Assy, Upflow
60160-31*.....	Drive Cam Assy, Upflow, Variable

### 24-Hour Gear Assemblies:

19205.....	Gear Assy, 24 Hour, Silver, 5600, 12 A.M.
60519-02.....	Gear Assy, 3200 24 Hour 2 Times/Day, w/Silver Label
60519-03.....	Gear Assy, 3200, 24 Hour 3 Times/Day, w/Silver Label
60519-04.....	Gear Assy, 3200, 24 Hour 4 Times/Day, w/Silver Label
60519-06.....	Gear Assy, 3200, 24 Hour (12:00) 6 Times/Day, w/Silver Label

### Injector Assemblies (Complete):

60480-XX.....	1600/1650 - 3/8" brine (specify size of injector)
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### Meters:

60393.....	Meter Assy, 2900, 2" Std
60394.....	Meter Assy, 2900, 2" Ext
60616.....	Meter Assy, Elec 2"
60620.....	Meter Assy, 2" Plastic, Std
60621.....	Meter Assy, 2" Plastic, Ext
60625.....	Meter Assy, 2" Plastic Electronic
61439.....	Meter Sleeve w/O-ring, Machd

### Piston Assemblies:

60103.....	Piston Assy, 2900/2930, HWBP Lower
60103-01.....	Piston Assy, 2900/2930, HWBP, HW, Lower
60104.....	Piston Assy, 2900/2930, NHWP Lwr, 2900s, Soft Wtr Rgn
60104-01.....	Piston Assy, 2900/2930, NHWP, HW Lwr, 2900s Soft Wtr Rgn
61540.....	Piston Assy, 2900s, Downflow Upper
61540-01.....	Piston Assy, 2900s Downflow Upper, HW
61545*.....	Piston Assy, 2900s, Upflow Upper
61545-01*.....	Piston Assy, 2900s, Upflow Upper, HW
61550.....	Piston Assy, 2900s, HWBP Lower
61550-03.....	Piston Assy, 2900s, HWBP Lower, HW
61555.....	Piston Assy, 2900s, NHWP Lower
61555-03.....	Piston Assy, 2900s, NHWP Lower, HW

### Program Wheel Assemblies:

60405-20.....	Program Wheel, w/3/4" Ext Label 1 1/2" Std Set @ 100
60405-50.....	Program Wheel, w/2" Std Label Set @ 21
60405-60.....	Program Wheel, w/2" Ext Label
60405-70.....	Program Wheel, w/1 1/2" Ext Label



## **SERVICE ASSEMBLIES *continued***

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### **Safety Brine Valves:**

60014.....	Safety Brine Valve Assy, 2310
60038.....	Safety Brine Valve , 2350
60027-FFA.....	Safety Brine Valve Body, 2300 Fitting Facing Arm
60027-FFS.....	Safety Brine Valve Body Fitting Facing Stud
60026-30SAN .....	Float Assy, 400A/2350, 30" HW
60028-30 .....	Float Assy, 2300, 30" White
60028-30 .....	Float Assy, 2300, 30", Blue/White
60068-30 .....	Float Assy, 2310, w/30" Rod

### **Sales & Service Aids:**

40738.....	Literature, 2900 Spec Sheet
41689.....	Literature, 2900s S/Manual
40717.....	Literature, Catalog Assy, PWT Residential/Commercial

### **Seal & Spacer Kits:**

61530.....	Seal & Spacer Kit, 2900s Upper
61530-01 .....	Seal & Spacet Kit, 2900s, HW Upper
60128.....	Seal & Spacer Kit, 2900/2930 Lower
60128-01 .....	Seal & Spacer Kit, 2900/2930, HW Lower

### **Service Equipment:**

11098.....	Stuffer Tool Assy, Complete
12682.....	Puller Tool Assy, 2900/3150
12683.....	Stuffer Tool Assy, 2900/3150
13061.....	Puller Assy, Port Ring
16174.....	Silicone, 2 oz. Tube
60460.....	Meter Checker Kit, Std
60461.....	Meter Checker Kit, Ext
16586-8 .....	Silicone, Dow #7 8 Lb

### **Service Valve Operator Assemblies:**

60150.....	SVO Assy, 1600 O/S
60150-01 .....	SVO Assy, 1600 N/S

### **Skipper Wheel Assemblies:**

14860.....	Skipper Wheel Assy, 7 Day
14381.....	Skipper Wheel Assy, 12 Day

\*Upflow Only





