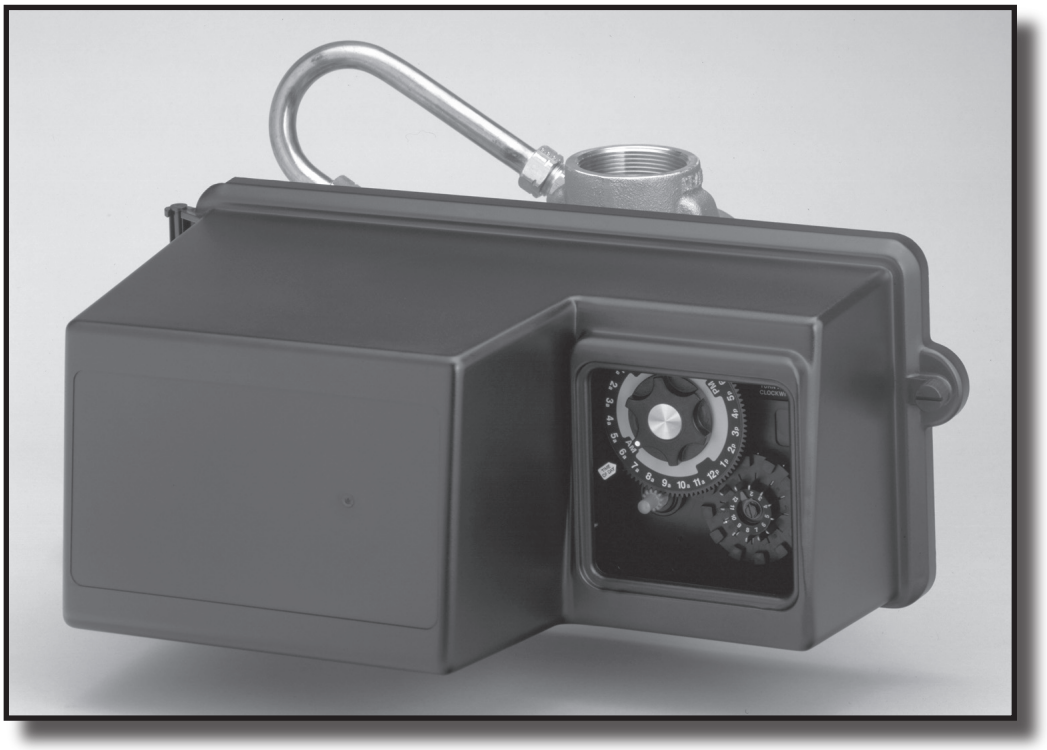
Model 3150 Downflow

Service Manual



IMPORTANT: Fill in Pertinent Information on Page 3 for Future Reference

Table of Contents

IMPORTANT PLEASE READ:

- The information, specifications and illustrations in this manual are based on the latest information available at the time of printing. The manufacturer reserves the right to make changes at any time without notice.
- This manual is intended as a guide for service of the valve only. System installation requires information from a number of suppliers not known at the time of manufacture. This product should be installed by a plumbing professional.
- This unit is designed to be installed on potable water systems only.
- This product must be installed in compliance with all state and municipal plumbing and electrical codes. Permits may be required at the time of installation.
- If daytime operating pressure exceeds 80 psi, nighttime pressures may exceed pressure limits. A pressure reducing valve must be installed.
- Do not install the unit where temperatures may drop below 32°F (0°C) or above 125°F (52°C).
- Do not place the unit in direct sunlight. Black units will absorb radiant heat increasing internal temperatures.
- Do not strike the valve or any of the components.
- Warranty of this product extends to manufacturing defects of the vessel and controller, not the membrane. Misapplication of this product may result in failure to properly condition water, or damage to product.
- A prefilter should be used on installations in which free solids are present.
- In some applications local municipalities treat water with Chloramines. High Chloramine levels may damage valve components.
- Correct and constant voltage must be supplied to the control valve to maintain proper function.

Job Specification Sheet

Job No. _____

Model No. _____

Water Test _____

Capacity Per Unit _____

Mineral Tank Size _____ Diameter _____ Height

Brine Tank Size & Salt Setting per Regeneration _____

Control Valve Specifications

1. Type of Timer
   - A. 7 Day or 12 Day
   - B. 1,250 to 21,250 Gallon Meter or
     6,250 to 106,250 Gallon Meter or
     Other _____
   - C. Meter Wiring Package
     1. System #4 - 1 Tank, 1 Meter, Immediate or Delayed Regeneration
     2. System #5 - 2 Tanks, 2 Meters, Interlock
     3. System #6 - 2 Tanks, 1 Meter, Series Regeneration
     4. System #7 - 2 Tanks, 1 Meter, Alternator
2. Timer Program Settings
   - A. Backwash _____ Minutes
   - B. Brine & Slow Rinse _____ Minutes
   - C. Rapid Rinse _____ Minutes
   - D. Brine Tank Refill _____ Minutes
3. Drain Line Flow Control _____ gpm
4. Brine Line Flow Controller _____ gpm
5. Injector Size # _____
6. Service Valve Operation Units (SVO)
   Size of Service Valve _____

General Commercial Pre-Installation Check List

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

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

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

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

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

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

INSTALLATION INSTRUCTIONS

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

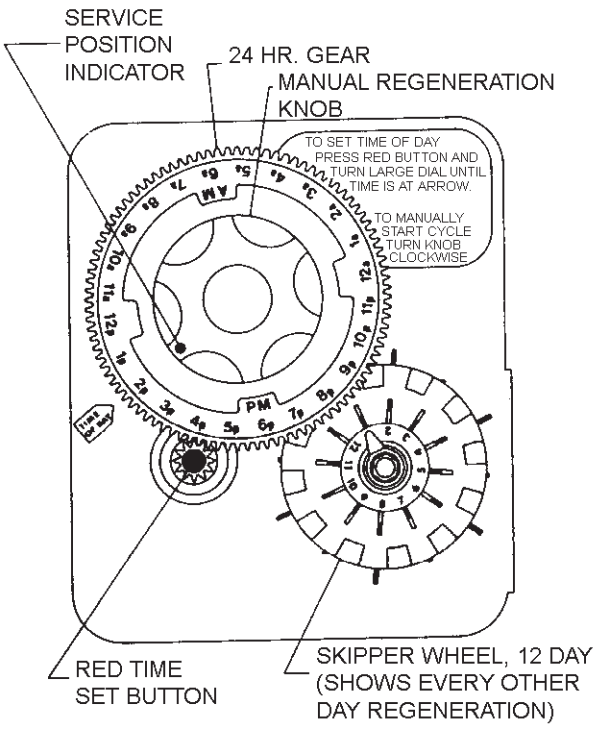
3200 Timer Setting Procedure

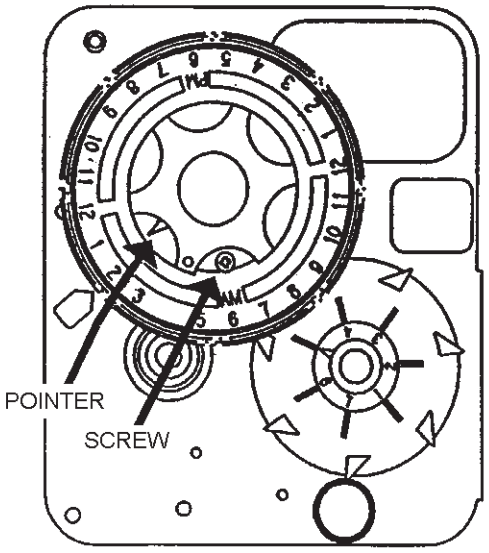
How To Set Days On Which Water Conditioner Is To Regenerate:
Rotate the skipper wheel until the number “1” is at the red pointer. Set the days that regeneration is to occur by sliding tabs on the skipper wheel outward to expose trip fingers. Each tab is one day. Finger at red pointer is tonight. Moving clockwise from the red pointer, extend or retract fingers to obtain the desired regeneration schedule.

How To Set The Time Of Day:
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 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

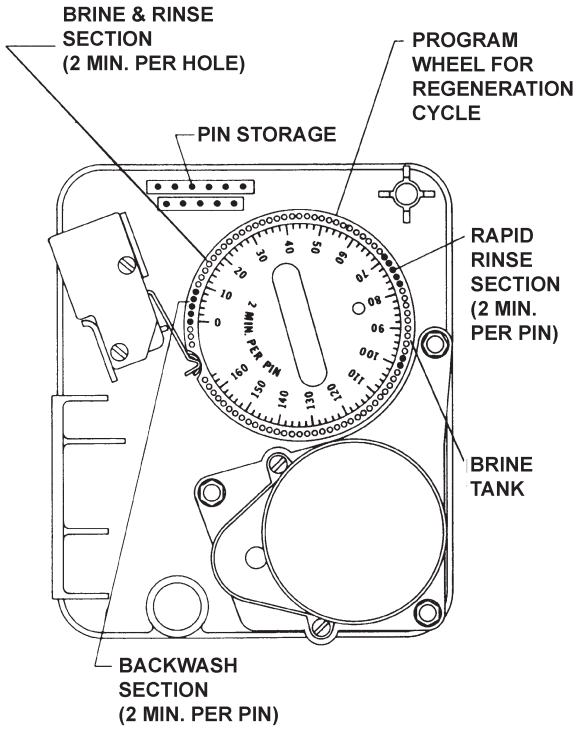
3200 & 3210 Timer Series

Regeneration Cycle Program 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 & 3210 Series Timers (Figure to Right)

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 for the 3200 & 3210 Timers

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.

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.

Commercial Demand Regeneration Control Timer Settings

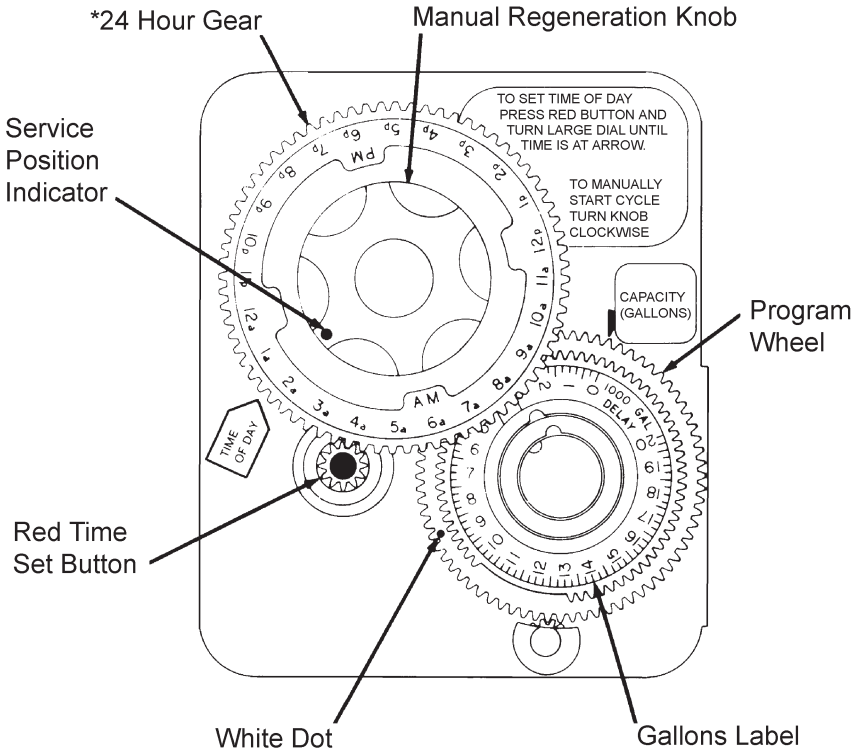
Typical Programming Procedure
Calculate the gallon capacity of the system, subtract the necessary reserve requirement and set the gallons available opposite the small white dot on the program wheel gear.

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:
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.

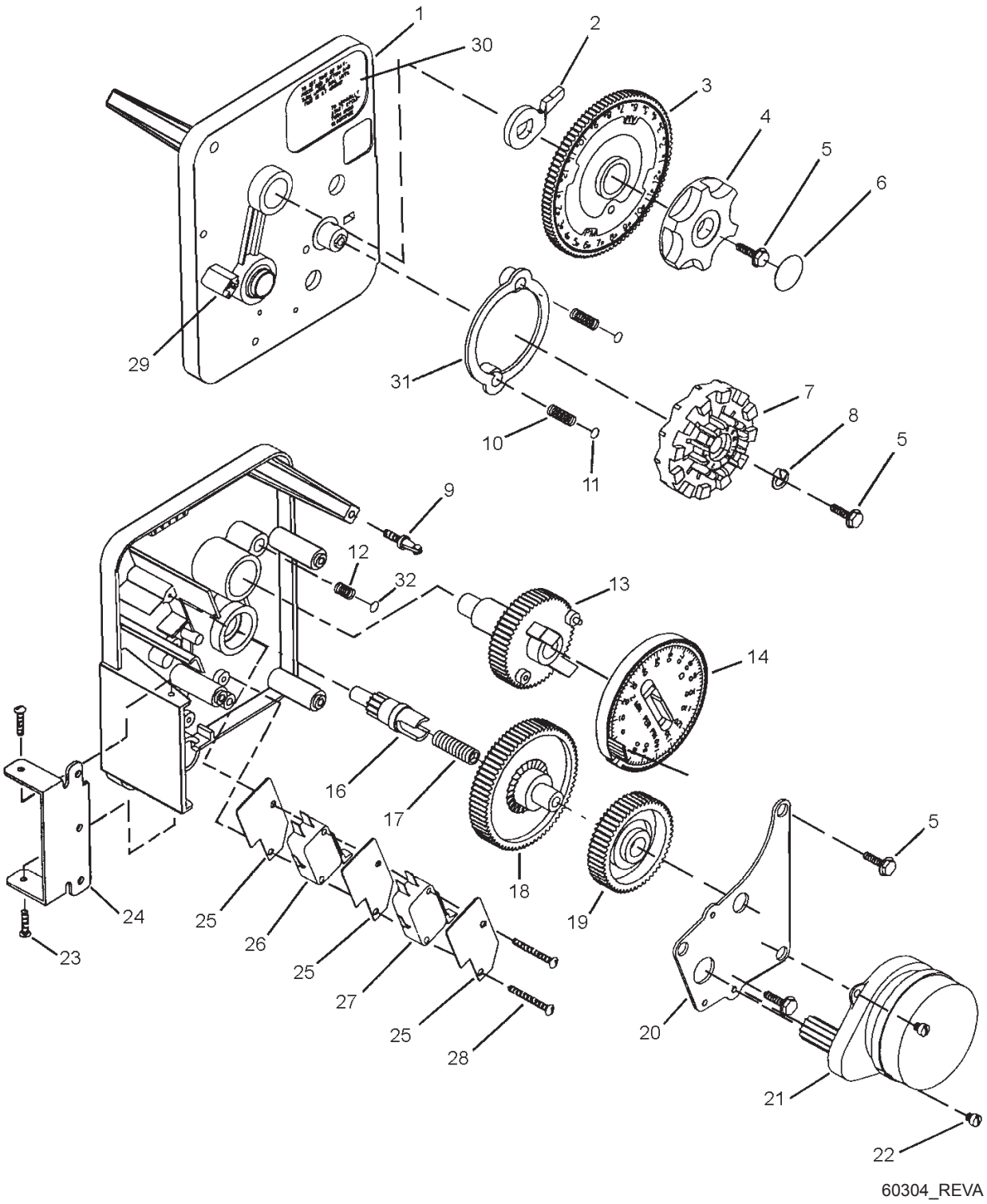
Immediate Regeneration Timers:
These timers do not have a 24 hour gear. Setting the gallons on the program wheel and manual regeneration procedure are the same as previous instructions.



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.

3200 Timer Assembly

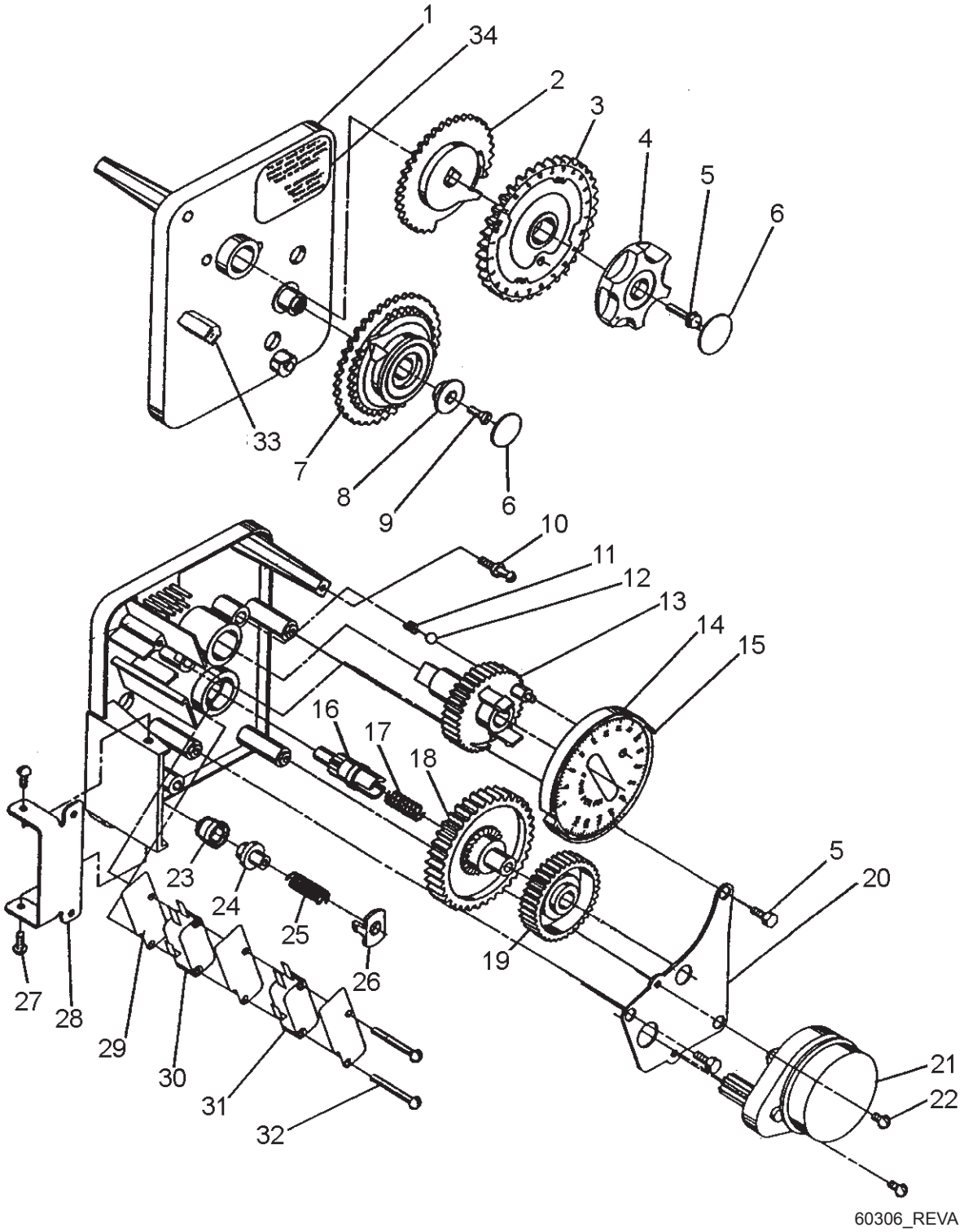


For Service Assembly Numbers, See the Back of this Manual

1	1	13870	Housing, Timer, 3200
2	1	13011	Arm, Cycle Actuator
3	1	40096-24	Dial 12AM Regen Assy, Black
		40096-02	Dial 2AM Regen Assy, Black
4	1	13886	Knob, 3200
5	5	13296	Screw, Hex Wsh, 6-20 x 1/2
6	1	11999	Label, Button
7	1	14381	Skipper Wheel Assy, 12 Day
		14860	Skipper Wheel Assy, 7 Day
8	1	13014	Pointer, Regeneration
9	1	14265	Clip, Spring
10	2	13311	Spring, Detent, Timer
11	2	13300	Ball, 1/4” SS
12	1	15424	Spring, Detent, Timer
13	1	13911	Gear, Main Drive, Timer
14	1	19210	Program Wheel Assy, 3200
15	17	41754	Pin, Spring, 1/16 x 5/8 SS, Timer
16	1	13018	Pinion, Idler
17	1	13312	Spring, Idler Shaft
18	1	13017	Gear, Idler
19	1	13164	Gear, Drive
20	1	13887	Plate, Motor Mounting
21	1	18743-1	Motor, 120V, 60Hz 1/30 RPM, 5600
		19659-1	Motor, 24V, 60 Hz 1/30 RPM
22	2	13278	Screw, Phil Hd Mach, 6-32 x 1/8
23	3	11384	Screw, Phil, 6-32 x 1/4 Zinc
24	1	13881	Bracket, Hinge Timer
25	3	14087	Insulator
26	1	10896	Switch, Micro
27	1	15320	Switch, Micro, Timer
28	2	11413	Screw, Pan Hd Mach, 4-40 x 1 1/8
29	1	14007	Label, Time of Day
30	1	14045	Label, Instruction
31	1	13864	Ring, Skipper Wheel
32	1	15066	Ball, 1/4” Delrin
Not Shown	1	13902	Harness, 3200
Not Shown	2	40422	Nut, Wire, Tan
Not Shown	1	15354-01	Wire, Ground 4”

For Service Assembly Numbers, See the Back of this Manual

3210 Timer Assembly



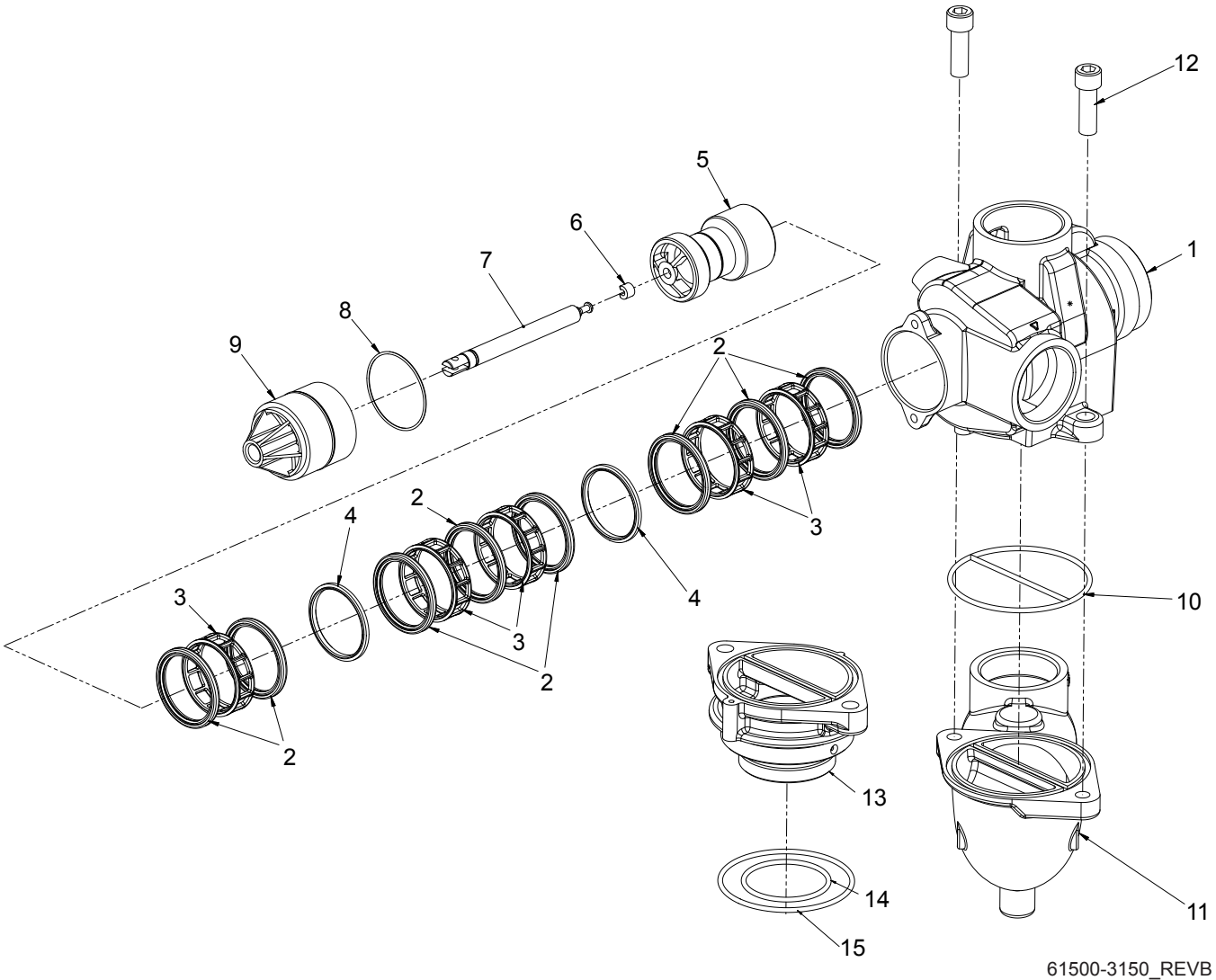
For Service Assembly Numbers, See the Back of this Manual

3210 Timer Assembly Parts List

Item No.	Quantity	Part No.	Description
1	1	13870	Housing, Timer, 3200
2	1	13802	Gear, Cycle Actuator
3	1	40096-24	Dial 12AM Regen Assy, Black
		40096-02	Dial 2 AM Regen Assy, Black
5	1	13886	Knob, 3200
6	4	13296	Screw, Hex Wsh, 6-20 x 1/2
7	2	11999	Label, Button
8	1	60405-50	Program Wheel Assy, w/2” Std Label Set @ 21
9	1	13806	Retainer, Program Wheel
10	1	13748	Screw, Flt Hd St, 6-20 x 1/2
11	1	14265	Clip, Spring
12	1	15424	Spring, Detent, Timer
13	1	15066	Ball, 1/4” Delrin
14	1	13911	Gear, Main Drive, Timer
15	1	19210	Program Wheel Assy
16	17	41754	Pin, Spring, 1/16 x 5/8 SS, Timer
18	1	13018	Pinion, Idler
19	1	13312	Spring, Idler Shaft
20	1	13017	Gear, Idler
21	1	13164	Gear, Drive
23	1	13887	Plate, Motor Mounting
24	1	18743-1	Motor, 120V, 60 Hz 1/30 RPM, 5600
		19659-1	Motor, 24V, 60 Hz 1/30 RPM
25	2	13278	Screw, Phil Hd Mach, 6-32 x 1/8
26	1	13830	Pinion, Program Wheel Drive
27	1	13831	Clutch, Drive Pinion
28	1	14276	Spring, Meter Clutch
29	1	14253	Retainer, Clutch Spring
31	3	11384	Screw, Phil, 6-32 x 1/4
32	1	13881	Bracket, Hinge Timer
33	3	14087	Insulator
34	1	10896	Switch, Micro
35	1	15320	Switch, Micro, Timer
36	2	11413	Screw, Pan Hd Mach, 4-40 x 1 1/8
37	1	14007	Label, Time of Day
38	1	14045	Label, Instruction
Not Shown	1	13902	Harness, 3200
Not Shown	2	40422	Nut, Wire, Tan
Not Shown	1	15354-01	Wire, Ground, 4”
Not Shown	1	15465	Caution Label
Not Shown	1	14198	Capacity Label

For Service Assembly Numbers, See the Back of this Manual

Control Valve Assembly



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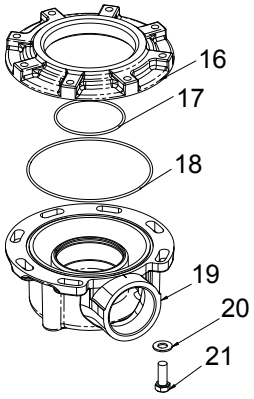


61414_REVA

For Service Assembly Numbers, See the Back of this Manual

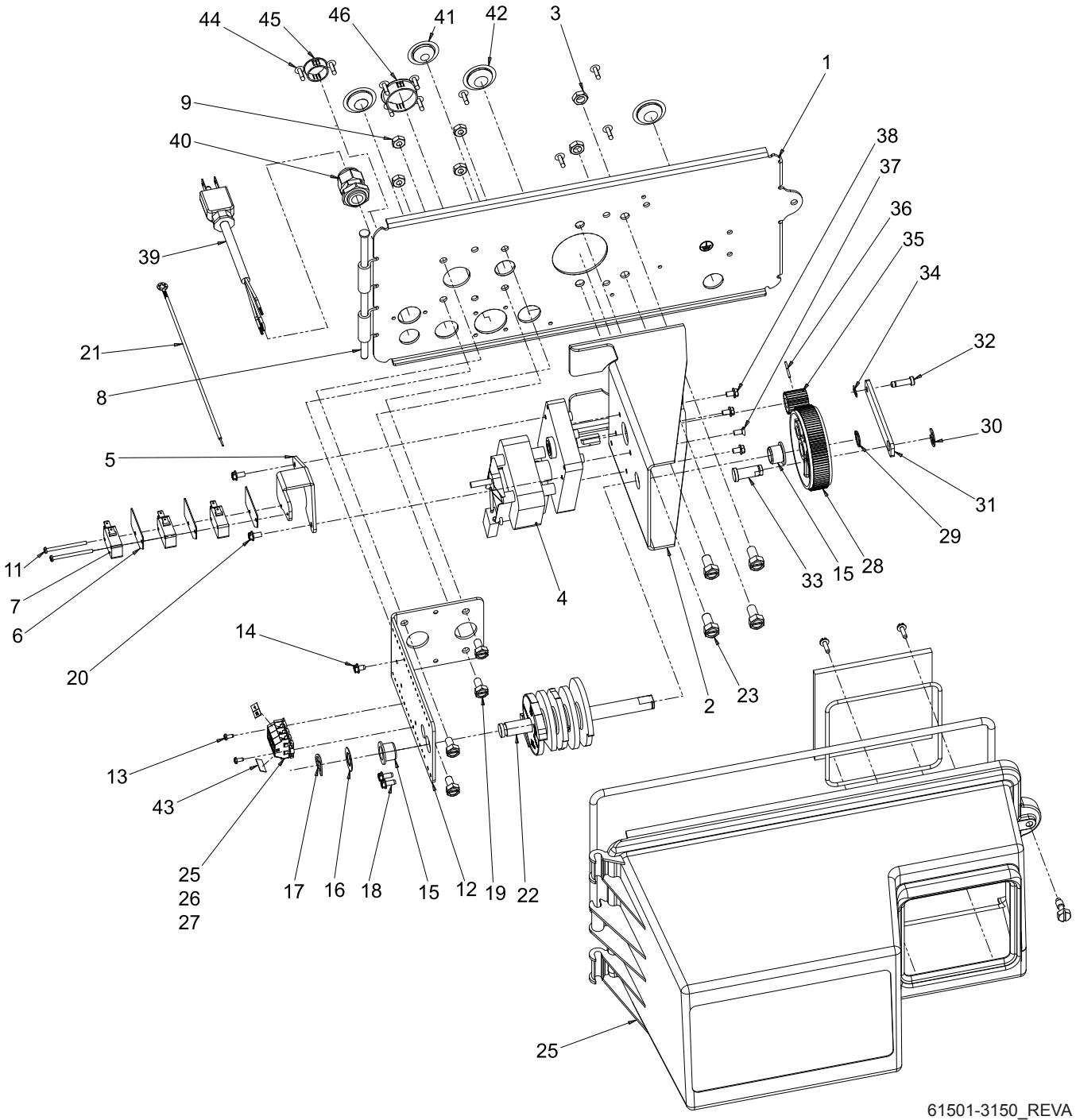
Item No.	Quantity	Part No.	Description
1	1	15114	Valve Body, 3150
2	8	11720	Seal, Piston, 2900/3150
3	5	10369	Spacer, 2”, 2900/3150
		16141	Spacer, Port Ring, HW, 180°
4	2	10368	Spacer, Narrow, 3150/3900
		10368-01	Spacer, Quad Ring, Brass, HW, 180°
5	1	16130	Piston, High Backwash
		19611-01	Piston Assy, 3150, NHWBP, O-ring
6	1	14818	Ring, Piston Rod, Snap
7	1	15125	Rod, Piston, 3150
		19708	Rod, Piston, 3150 NHWBP
8	1	14922	O-ring, -035, Piston
9	1	16398-01	End Plug Assy, 3150, White
		16398-11	End Plug Assy, 3150, Black
10	1	15112	Seal, 3150 Adapter Base
11	1	17407	Adapter, 3150, Sidemount
12	2	40118	Screw, Sckt Hd, 1/2 - 13 Unc
Options			
▲13	1	15117-01	Adapter, 3150, Machined
*▲14	1	15247	O-ring, -229
▲15	1	13575	O-ring, -240
		15210	O-ring, -343, Park Tank
*▲16	1	19608-20	Disperser, Commercial, 2”, 3150
Options			
16	1	40316	Adapter, Sidemount
17	1	16804-01	O-ring, -150
18	1	40368	O-ring, -160, Sidemount, Flange
19	1	40365	Base, 3130/3150, Rotating
20	7	40375	Washer, Flat, 3/8, Type A
21	7	19768	Screw, Hex Hd, 3/8 - 16 x 1, Cap 18-8

* Not used with a fixed sidemount.

▲ Not used with a rotating sidemount.

For Service Assembly Numbers, See the Back of this Manual

Control Drive Assembly



For Service Assembly Numbers, See the Back of this Manual

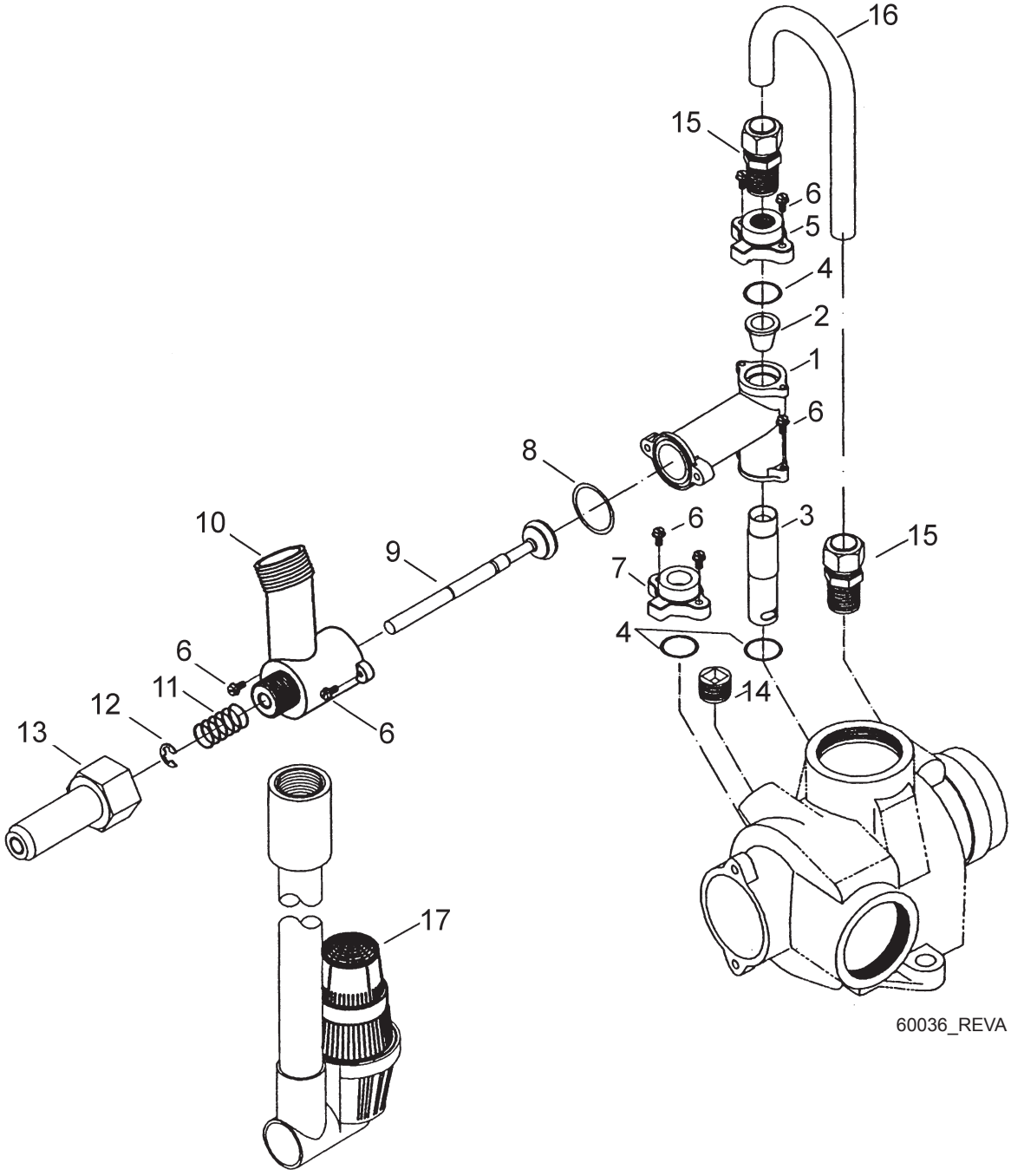
Control Drive Assembly Parts List

Item No.	Quantity	Part No.	Description
1	1	19304-04	Backplate, 3150/3900, Upper
2	1	15120-01	Bracket, Motor Mtg, 3150/3900 Environmental
3	2	16346	Nut, Hex, Jam, 5/16 - 18
4	1	40392	Motor, Drive, 115V, 50/60 Hz, Sp
		40390	Motor, Drive, 220V, 50 Hz, Sp, Fam 3
		40391	Motor, Drive, 24V, 50/60 Hz, Sp Fam 3
5	1	17797	Bracket, Switch Mounting, 3150/3900
6	4	10302	Insulator, Limit Switch
7	3	10218	Switch, Micro
8	1	17845-03	Pin, Hinge, 3150/3900, Env
9	4	11235	Nut, Hex, 1/4 -20, Mach Screw, Zinc
10	2	13365	Washer, Lock, #4, External
11	2	40080	Screw, Rd Hd, 4-40 x 1 1/2”
12	1	16053	Bracket, Brine Side
13	2	40133	Screw, Pan Hd, 4-40 x 1/4
14	1	15226-6	Terminal Block
15	2	16052	Bushing, 3150/3900
16	1	16059	Washer, SS, .88, 3150/3900
17	1	16051	Ring, Retaining, Bowed
18	2	10300	Screw, Slot Hex Wsh, 18-8 x 3/8
19	4	10231	Screw, Slot Hex, 1/4 - 20 x 1/2
20	2	14202-01	Screw, Hex Wsh Hd, 8 x 5/16
21	1	10475-01	Wire, Ground
22	1	16494-03	Cam Assy, 3150/3900 Signal After Brine Fill
		16494-05	Cam Assy, 3150/3900 Upper Signal After Rapid Rinse
23	4	11224	Screw, Hex Hd, 5/16 - 18 x 5/8
24	1	60240-02	Cover Assy, 3150/3900 Env, Black
25	2	41084	Terminal Block, Segment, Gray
26	1	41085	Endplate, Terminal Bloack, Gray
27	1	40174	Terminal Block, Green/Yellow
28	1	16046	Gear, Drive
29	1	16050	Ring, Retaining
30	1	11774	Ring, Retaining
31	1	16047	Link, Drive
32	1	11709	Pin, Drive Link
33	1	16048	Bearing, Drive Link
34	1	11898	Clip, 3150/3900
35	1	16045	Pinion, Drive
36	1	11381	Pin, Roll, 2900/3900
37	1	11080	Screw, Flt Hd Mach, 8-32 x 3/8
38	3	10872	Screw, Hex Wsh, 8-32 x 17/64
39	1	40084-12	Power Cord, 12’ US, Round, 120V
40	1	17967	Fitting Assy, Liquid Tight, Blk
41	1	19691	Plug, .750 Dia, Recessed, Black
42	3	19591	Plug, .8750 Hole, Recessed, Black
43	2	15250	Label, Terminal Strip
44	10	19800	Plug, .140 Dia, White
45	1	15806	Plug, Hole, Heyco #2693
46	1	17421	Plug, 1.20 Hole
Not Shown	1	17470	Cable Guide Assy, 2850/3150
Not Shown	1	19856	Ring, Retaining
Not Shown	1		Timer
Not Shown	1	40396	Harness, Drive, Environmental
Not Shown	1	16427-04	Wire, Lead, 12”, White
Not Shown	1	40396	Harness, Drive, Environmental
Not Shown	1	14924	Strain Relief Heyco #1247
Not Shown	1	15513	Meter Cable, 17.5”

* Specify number of terminals

For Service Assembly Numbers, See the Back of this Manual

1800 Series Brine System Assembly



For Service Assembly Numbers, See the Back of this Manual

1800 Series Brine System Assembly Parts List

Item No.	Quantity	Part No.	Description
1	1	16340	Body, Injector, 1800 D/F
2	1	15128-xx	Injector Nozzle
3	1	15127-xx	Injector Throat
4	3	15246	O-ring, -116
5	1	16341-01	Cap, Injector, 1800
6	8	12473	Screw, Hex Wsh, 10-24 x 5/8
7	1	16341-02	Plug, Injector, 1800
8	1	13303-01	O-ring, -021, 560CD
9	1	16497-01	Stem Assy, 1800, Brine Valve
10	1	18713	Brine Valve Body, 1800
11	1	11772	Spring, 3150 Brine Valve
12	1	11774	Ring, Retaining
13	1	16498-01	Stem Guide Assy, Brine
14	1	16387	Plug, Pipe, 1/2” NPT
15	2	18702	Fitting, Tube, 1/2 NPT 5/8
16	1	18703	Tube, Brine, 5/8 OD Annealed
17	1	60009-00	Air Check, #900, Commercial Less Fittings
		60009-01	Air Check, #900, Commercial, HW Less Fittings
Not Shown	1		Flow Control (Specify Flow Rate)

Option Without Brine Valve

1 ..... 16605 ..... Retainer Plate

1 ..... 19860 ..... Fitting, Brine Valve, 1800

Delete: Items 9 through 16

Injector Throat

15127-04 ..... #4 ..... Green

15127-05 ..... #5 ..... Red

15127-06 ..... #6 ..... White

15127-07 ..... #7 ..... Blue

15127-08 ..... #8 ..... Yellow

15127-09 ..... #9 ..... Violet

15127-10 ..... #10 ..... Black

Injector Nozzle

15128-04 ..... #4 ..... Green

15128-05 ..... #5 ..... Red

15128-06 ..... #6 ..... White

15128-07 ..... #7 ..... Blue

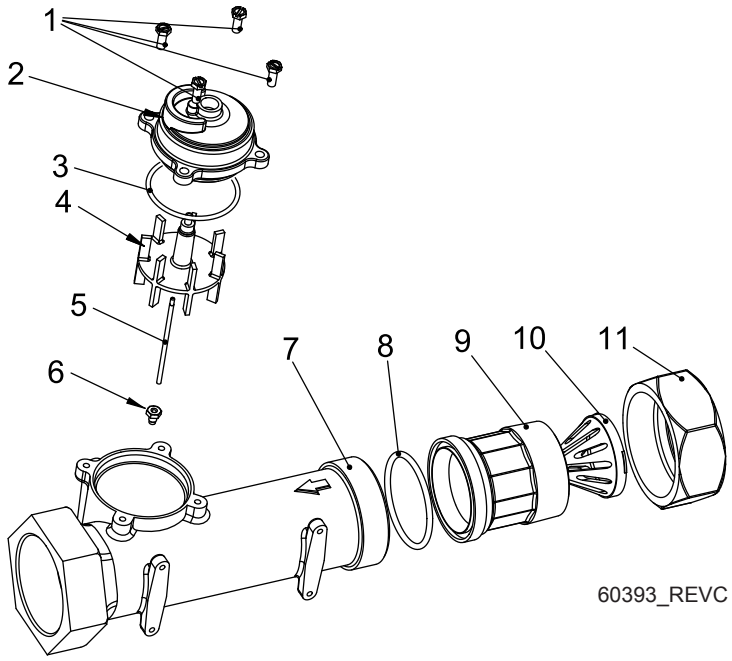
15128-08 ..... #8 ..... Yellow

15128-09 ..... #9 ..... Violet

15128-10 ..... #10 ..... Black

For Service Assembly Numbers, See the Back of this Manual

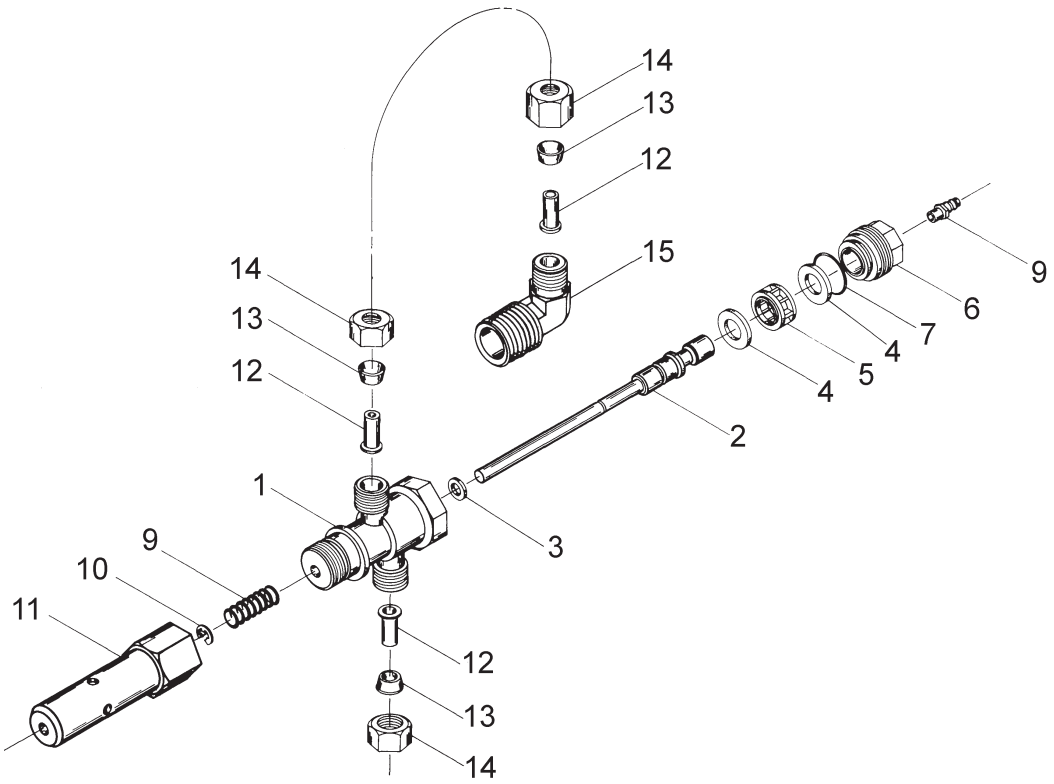
2” Brass Meter Assembly & Parts List



Item No.	Quantity	Part No.	Description
1	1	12112	Screw, Hex Hd Mach, 10-24 x 1/2
		15886	Screw, Hex Hd, M5 x 12
		21716	Screw, M5 x 16
		12473	Screw, Hex Wsh, 10-24 x 5/8
2	1	15803	Cap, Meter, Brass
		15803NP	Cap, Meter, NP
		13822	Cap, Meter, 5600
3	1	13847	O-ring, -137, Std/560CD, Meter
4	1	15374-01	Impeller, 2” Meter
		15374-11	Impeller, 2” Meter, HW
5	1	15432	Shaft, Impeller, SS
6	1	15532	Seat, Impeller Shaft, Hex
7	1	14456	Body, Meter, 2”
		14456-20	Body, Meter, 2”, BSP, Metric
		14456-20NP	Body, Meter, 2”, BSP, Mtrc, NP
		60627NP	Meter Assy, 2”, NP
8	1	14679	O-ring, -227, Meter
9	1	14568	Fitting, Nipple, 2”
		14568-10	Fitting, Nipple, 2”, BSP, Brass
		14568-10NP	Fitting, Nipple, 2”, BSP, Brass, NP
10	1	14680	Flow Straightener
11	1	14569	Nut, 2900 Meter
		14569NP	Nut, 2900 Meter, NP

For Service Assembly Numbers, See the Back of this Manual

Service Valve Operator Assembly & Parts List



Item No.	Quantity	Part No.	Description
1	1	15074	Body, SVO
2	1	16065	Piston & Stem, SVO
3	1	10141	O-ring, -010
4	2	14835	Seal, 3150
5	1	14834	Spacer, Softwater Fill
6	1	16509	Plug, End, SVO
7	1	12977	O-ring, -015
8	1	15965	Fitting, Bias
9	1	10249	Spring, Brine Valve
10	1	10250	Ring, Retaining
11	1	16498-02	Stem Guide Assy, SVO
12	3	10332	Fitting, Insert, 3/8
13	3	10330	Fitting, Sleeve, 3/8 Celcon
14	3	10329	Fitting, Tube, 3/8 Nut, Brass
15	1	16503	Fitting, Elbow, 90 Deg.
Not Shown	1	16511	Tube, 3150, PVC, SVO

For Service Assembly Numbers, See the Back of this Manual

Troubleshooting

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

Problem	Cause	Correction
7. Excessive water in brine tank.	A. Plugged drain line flow control.	A. Clean flow control.
	B. Plugged injector system.	B. Clean injector and screen.
	C. Timer not cycling.	C. Replace timer.
	D. Foreign material in brine valve.	D. Replace brine valve seat and clean valve.
	E. Foreign material in brine line flow control.	E. Clean brine line flow control.
8. Softener fails to draw brine.	A. Drain line flow control is plugged.	A. Clean drain line flow control.
	B. Injector is plugged.	B. Clean injector
	C. Injector screen plugged.	C. Clean screen.
	D. Line pressure is too low.	D. Increase line pressure to 20 P.S.I.
	E. Internal control leak	E. Change seals, spacers, and piston assembly.
	F. Service adapter did not cycle.	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.	A. Check timer program and positioning of control. Replace power head assembly if not positioning properly.
	B. Foreign material in control.	B. Remove power head assembly and inspect bore. Remove foreign material and check control in various regeneration positions.
	C. Internal control leak.	C. Replace seals and piston assembly.

General Service Hints For Meter Control

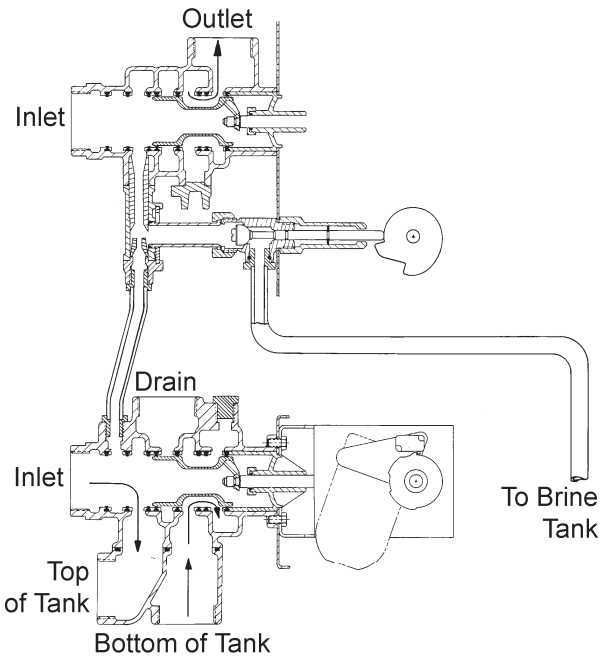
Problem: Softener delivers hard water

Reason: Reserve capacity has been exceeded.
Correction: Check salt dosage requirements and reset program wheel to provide additional reserve.

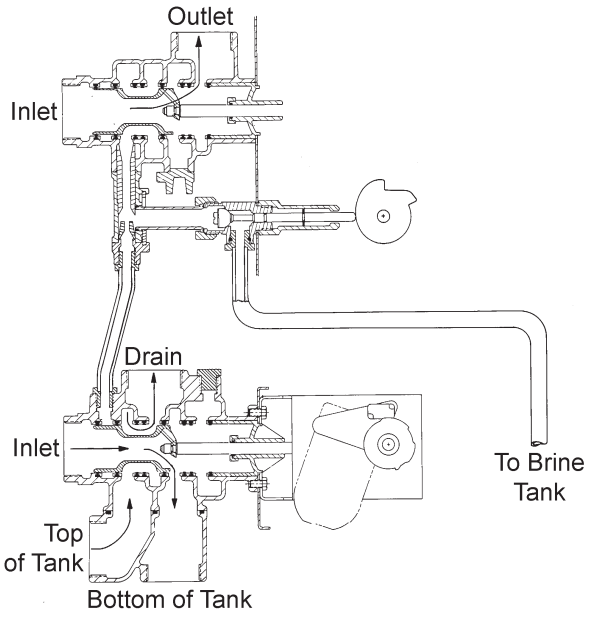
Reason: Program wheel is not rotating with meter output.
Correction: Pull cable out of meter cover and rotate manually. Program wheel must move without binding and clutch must give positive clicks when program wheel strikes regeneration stop. If it does not, replace timer.

Reason: Meter is not measuring flow.
Correction: Check meter with meter checker.

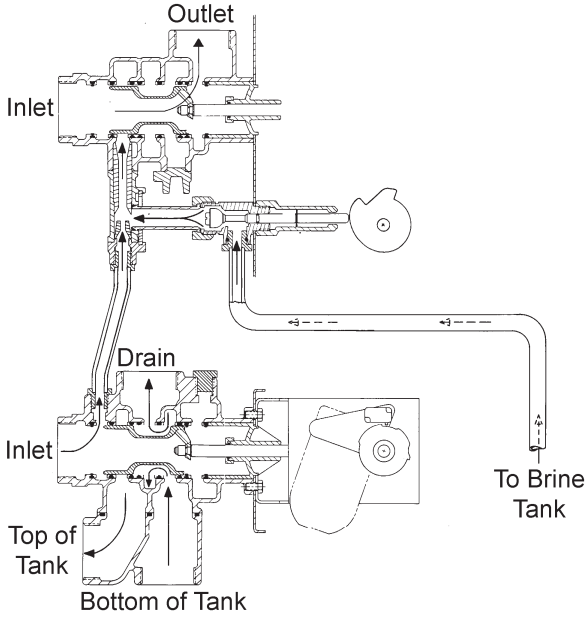
1 Service Position



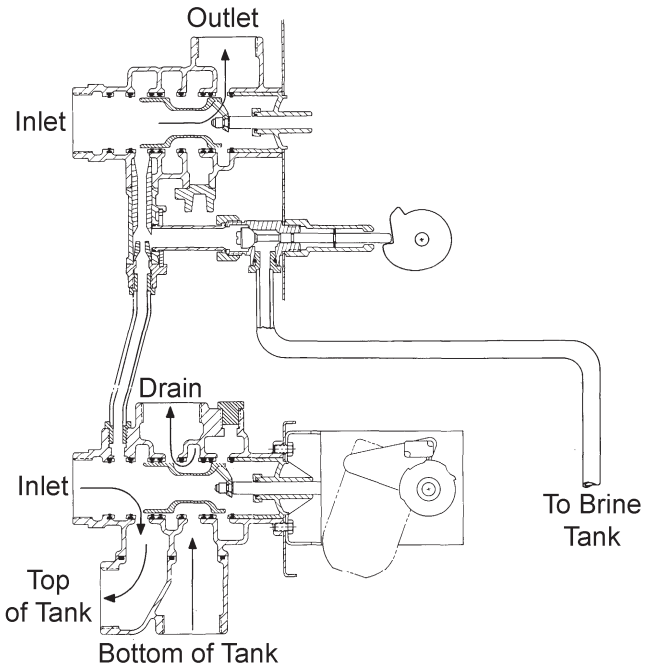
2 Backwash Position



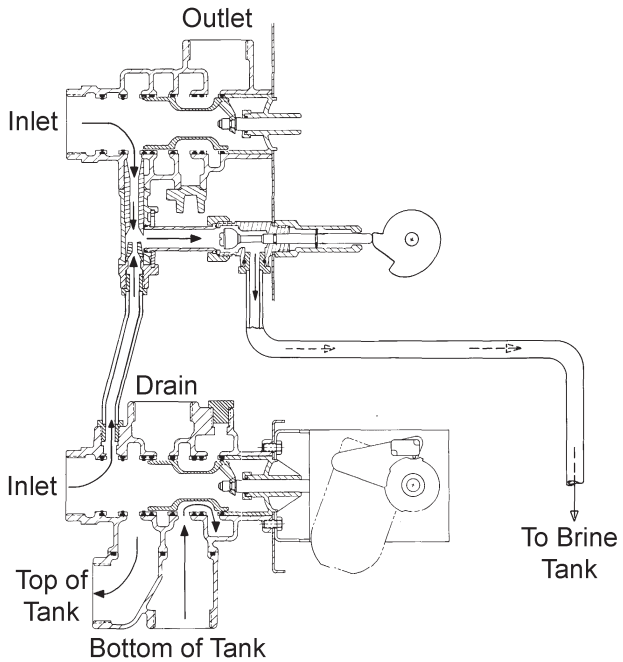
3 Brine and Slow Rinse Position



4 Rapid Rinse Position

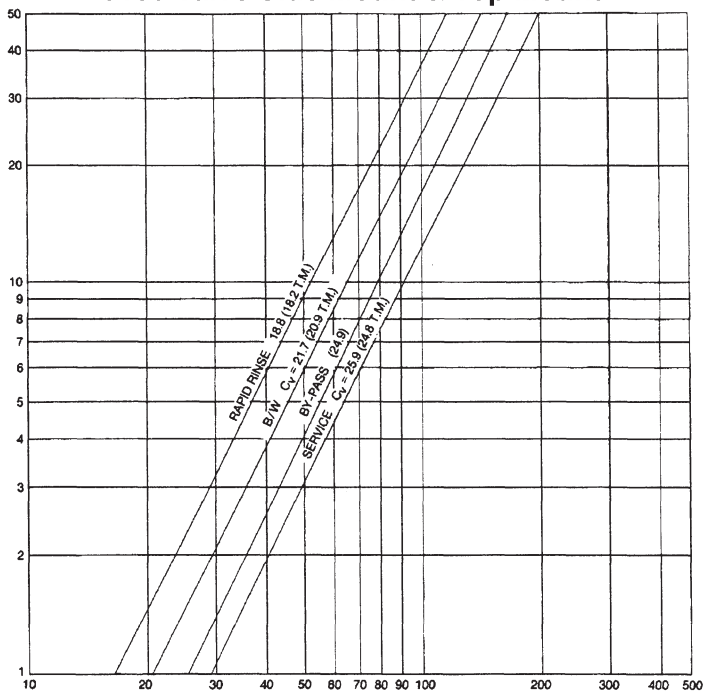


5 Brine Tank Refill Position

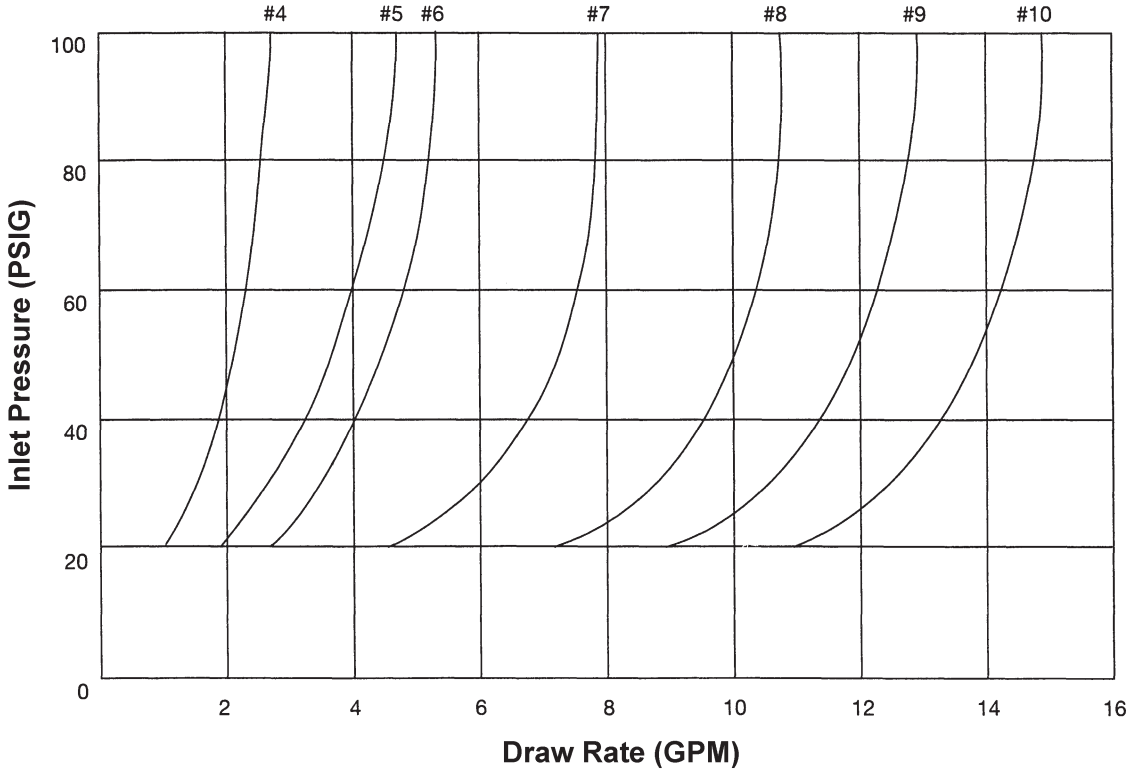


Flow Data & Injector Draw Rates

3150 Valve Side Mount & Top Mount



3150 on Empty Tank

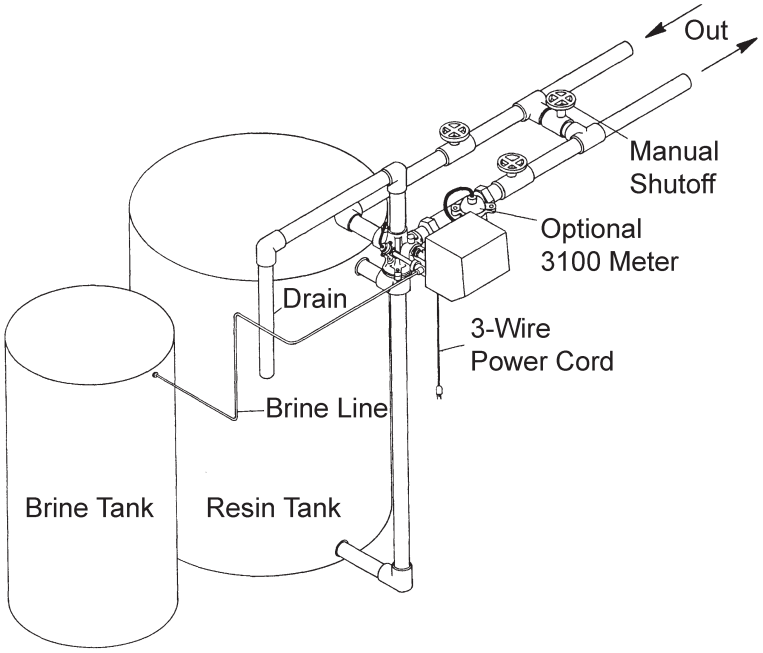


Tank Dia. / Volume of Resin	B/W Rate-GPM	B/W Time Min.	1800 Inj. Size	Brine and Slow Rinse Time-Minutes									Fast Rinse Time	Brine Refill Rate GPM	Brine Tank Refill Time-Minutes		
				@ 6# Per Ft³			@ 10# Per Ft³			@ 15# Per Ft³					@ 6# Per Ft³	@ 10# Per Ft³	@ 15# Per Ft³
				35 PSI	60 PSI	90 PSI	35 PSI	60 PSI	90 PSI	35 PSI	60 PSI	90 PSI					
24" / 10 Ft³	15	10	4	42	30	26	68	50	46	102	76	64	10	2	6	16	26
30" / 15 Ft³	25	10	5	36	26	24	62	42	40	96	68	64	10	5	6	10	16
36" / 20 Ft³	35	10	6	34	28	28	58	48	48	84	68	68	10	5	8	14	20
42" / 30 Ft³	50	10	7	36	26	26	58	44	44	92	70	70	10	10	6	10	16
48" / 42 Ft³	70	10	8	34	34	34	56	56	56	76	76	76	10	15	6	10	14
54 / 55 Ft³	80	10	9	40	34	34	60	50	50	90	76	76	10	15	8	12	18
60" / 70 Ft³	100	10	10	46	36	34	68	54	52	102	80	78	10	20	8	12	18

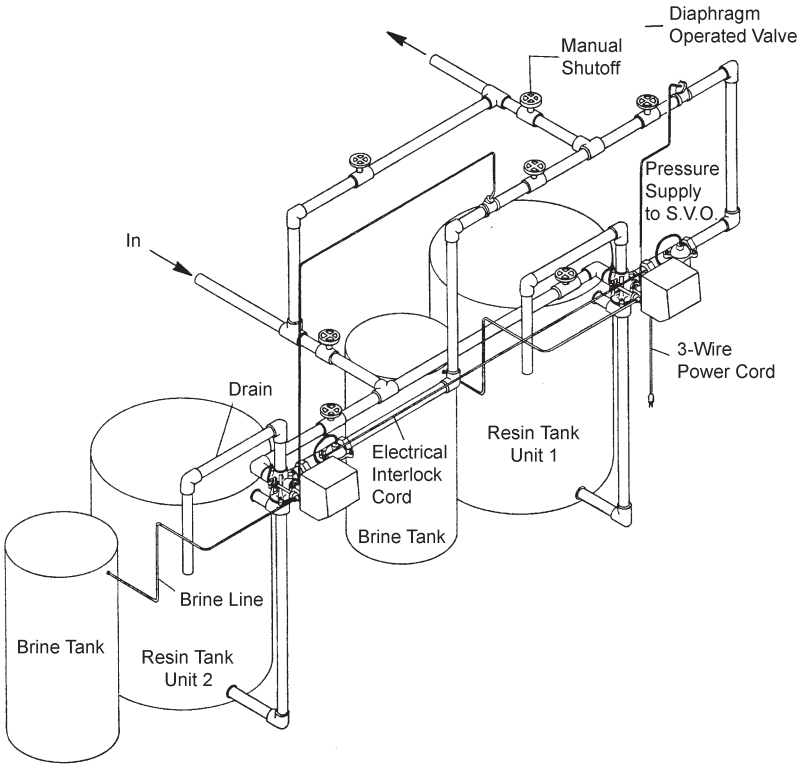
With Model 2350 Safety Brine Valve

48" / 42 Ft³	70	10	8	34	34	34	56	56	56	76	76	76	10	10	9	16	22
54" / 55 Ft³	80	10	9	40	34	34	60	50	50	90	76	76	10	10	12	18	28
60" / 70 Ft³	100	10	10	46	36	34	68	54	52	102	80	78	10	10	16	24	36

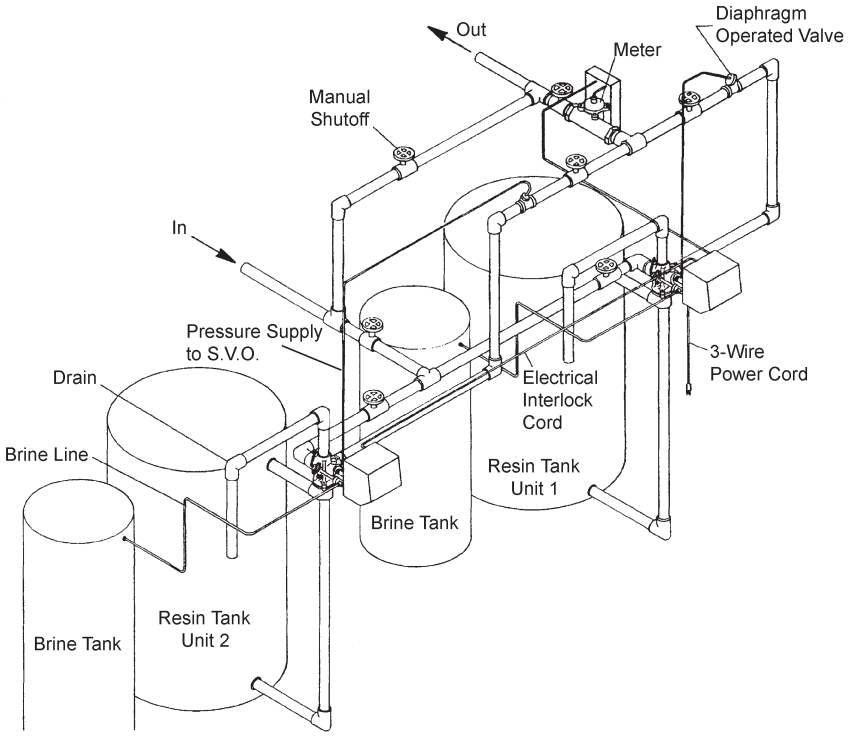
System #4 - Typical Single Tank Installation with Optional Meter



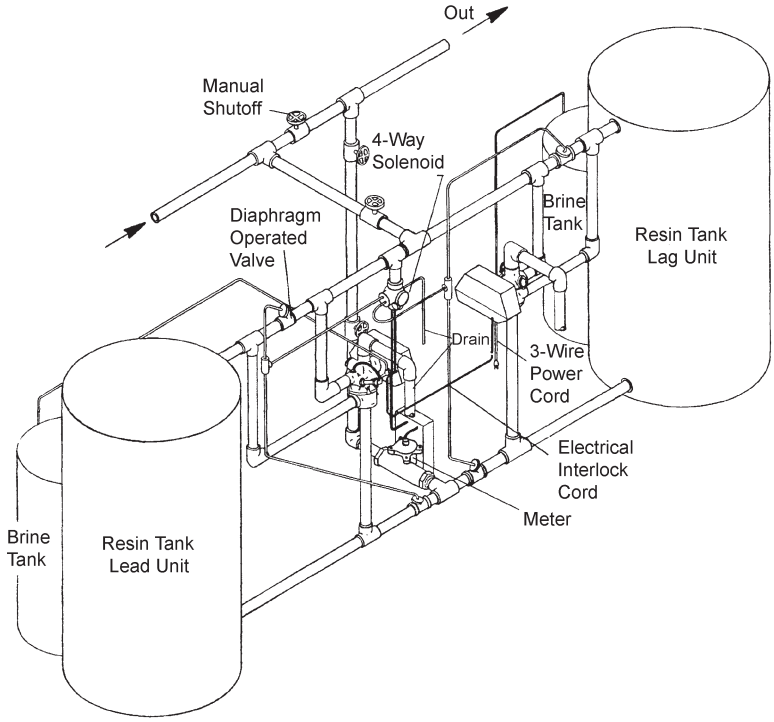
System #5 - Interlock - Typical Twin Tank Installation with Optional Meter Interlock and No Hard Water Bypass



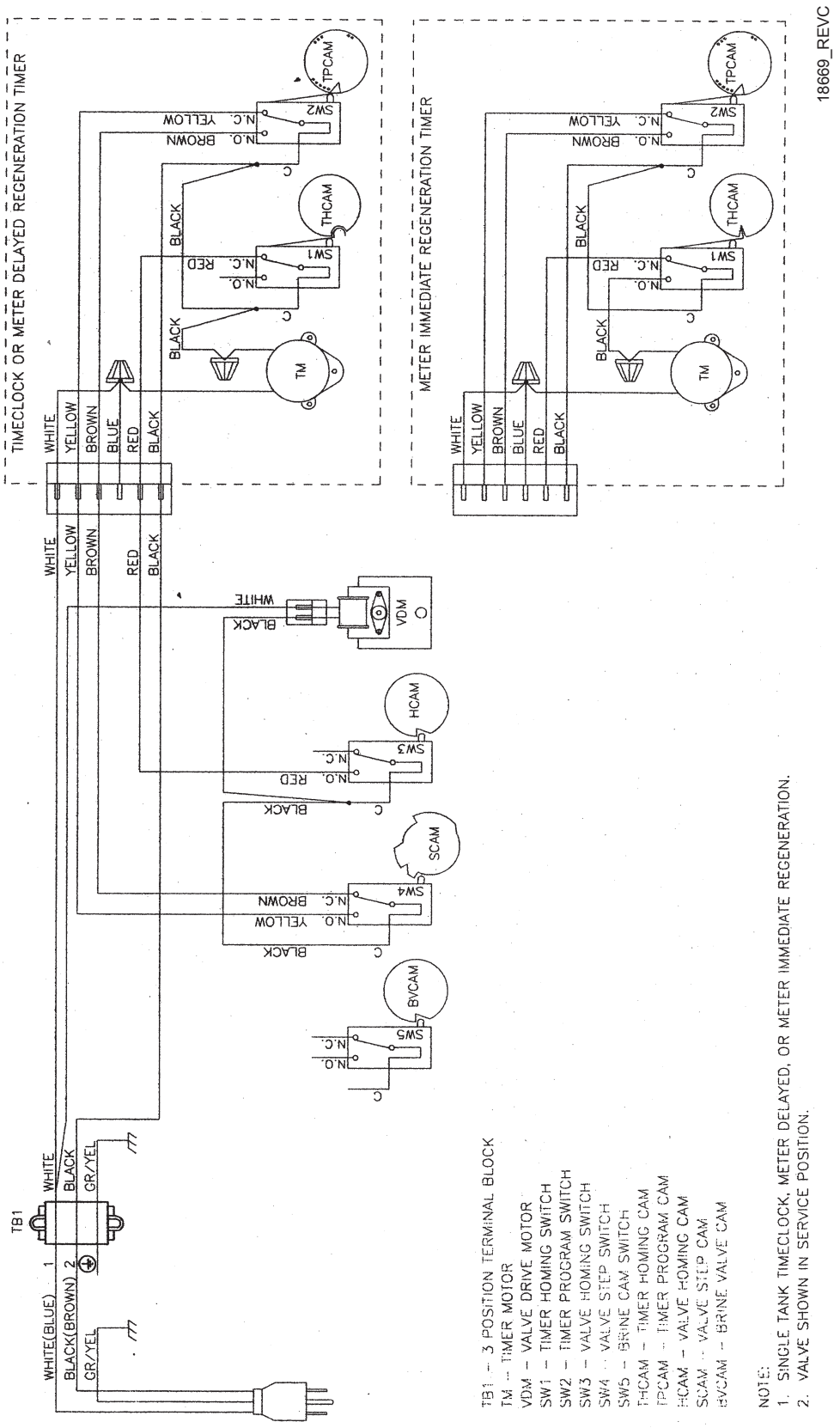
System #6 - Twin Series Regeneration Installation with a Remote Meter



System #7 - Twin Alternator Installation with a Remote Meter

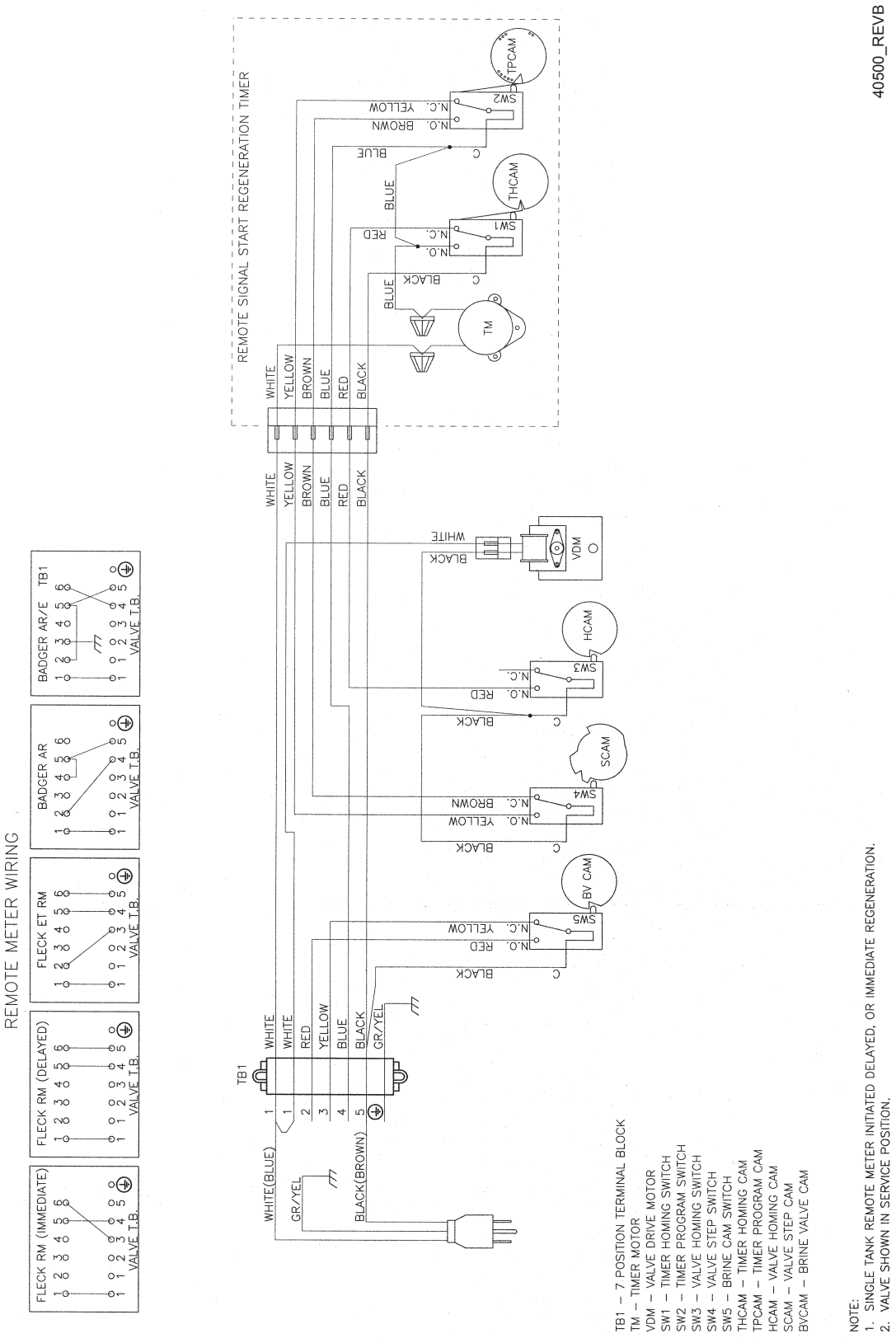


System #4 Immediate/Delayed Regeneration Valve Wiring

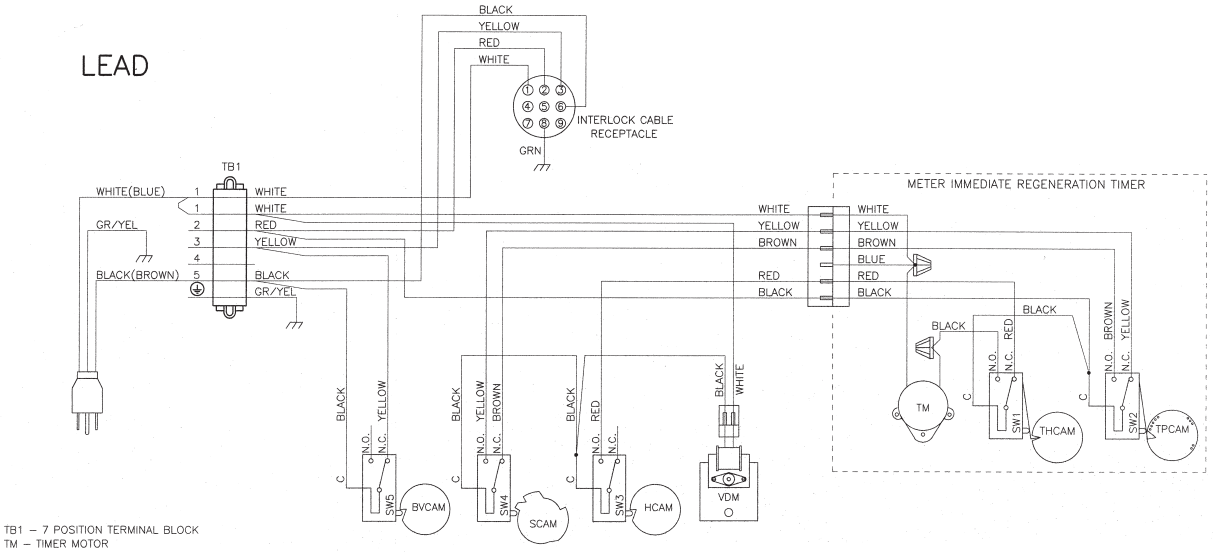


TB1 – 3 POSITION TERMINAL BLOCK
TM – TIMER MOTOR
VDM – VALVE DRIVE MOTOR
SW1 – TIMER HOMING SWITCH
SW2 – TIMER PROGRAM SWITCH
SW3 – VALVE HOMING SWITCH
SW4 – VALVE STEP SWITCH
SW5 – BRINE CAM SWITCH
THCAM – TIMER HOMING CAM
TPCAM – TIMER PROGRAM CAM
HCAM – VALVE HOMING CAM
SCAM – VALVE STEP CAM
BVCAM – BRINE VALVE CAM

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


REMOTE METER WIRING
FLECK RM (IMMEDIATE)
FLECK RM (DELAYED)
FLECK ET RM
BADGER AR
BADGER AR/E
TB1
VALVE T.B.
REMOTE SIGNAL START REGENERATION TIMER
WHITE
YELLOW
BROWN
BLUE
RED
BLACK
GR/YEL
WHITE(BLUE)
BLACK(BROWN)
TM
SW1
SW2
SW3
SW4
SW5
THCAM
TPCAM
HCAM
SCAM
BV CAM
VDM
N.O.
N.C.
C
TB1 – 7 POSITION TERMINAL BLOCK
TM – TIMER MOTOR
VDM – VALVE DRIVE MOTOR
SW1 – TIMER HOMING SWITCH
SW2 – TIMER PROGRAM SWITCH
SW3 – VALVE HOMING SWITCH
SW4 – VALVE STEP SWITCH
SW5 – BRINE CAM SWITCH
THCAM – TIMER HOMING CAM
TPCAM – TIMER PROGRAM CAM
HCAM – VALVE HOMING CAM
SCAM – VALVE STEP CAM
BVCAM – BRINE VALVE CAM
NOTE:
1. SINGLE TANK REMOTE METER INITIATED DELAYED, OR IMMEDIATE REGENERATION.
2. VALVE SHOWN IN SERVICE POSITION.
40500_REVB

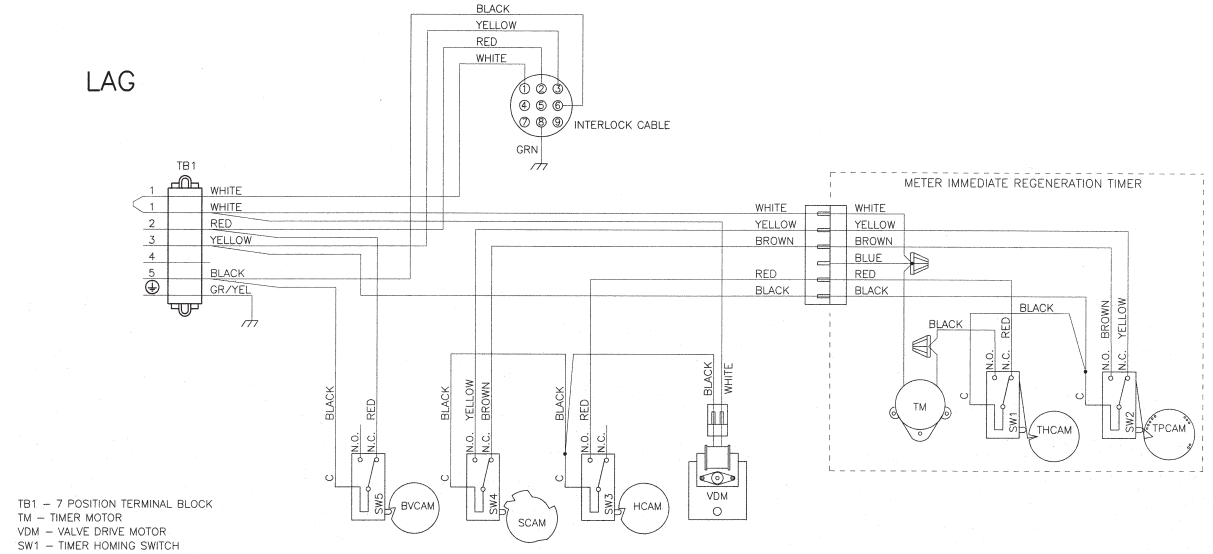
System #5 Duplex Valve Wiring



TB1 – 7 POSITION TERMINAL BLOCK
TM – TIMER MOTOR
VDM – VALVE DRIVE MOTOR
SW1 – TIMER HOMING SWITCH
SW2 – TIMER PROGRAM SWITCH
SW3 – VALVE HOMING SWITCH
SW4 – VALVE STEP SWITCH
SW5 – BRINE CAM SWITCH
THCAM – TIMER HOMING CAM
TPCAM – TIMER PROGRAM CAM
HCAM – VALVE HOMING CAM
SCAM – VALVE STEP CAM
BVCAM – BRINE VALVE CAM

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

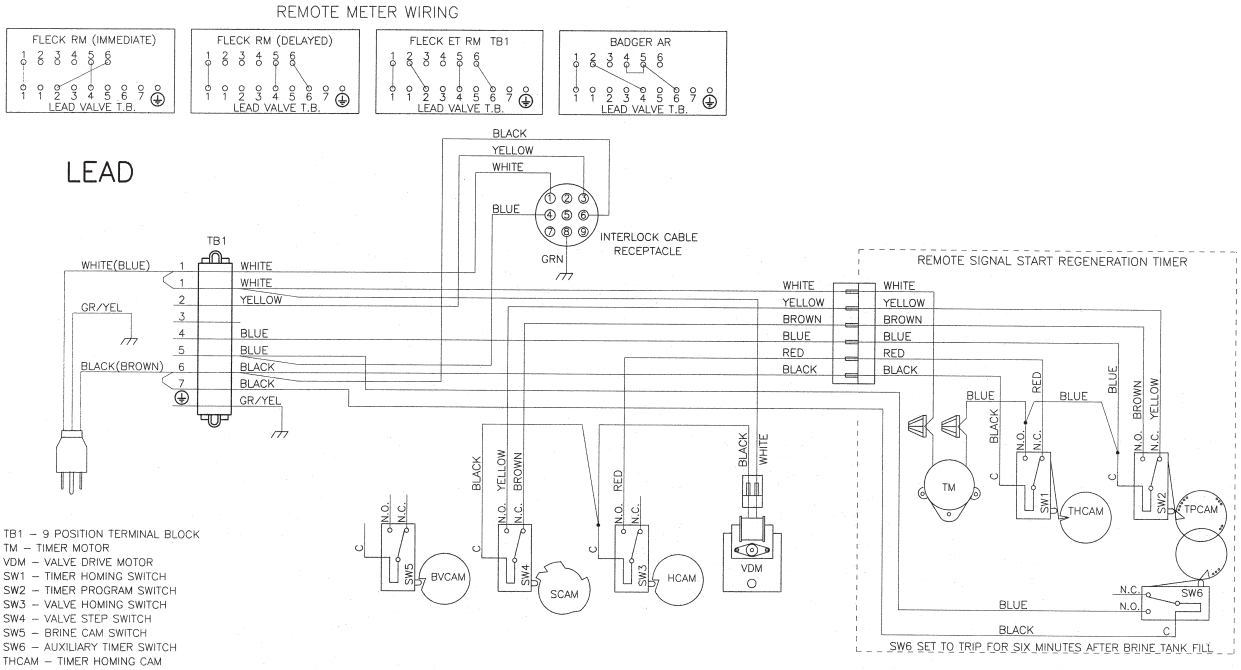
18690-01_REVD



TB1 – 7 POSITION TERMINAL BLOCK
TM – TIMER MOTOR
VDM – VALVE DRIVE MOTOR
SW1 – TIMER HOMING SWITCH
SW2 – TIMER PROGRAM SWITCH
SW3 – VALVE HOMING SWITCH
SW4 – VALVE STEP SWITCH
SW5 – BRINE CAM SWITCH
THCAM – TIMER HOMING CAM
TPCAM – TIMER PROGRAM CAM
HCAM – VALVE HOMING CAM
SCAM – VALVE STEP CAM
BVCAM – BRINE VALVE CAM

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

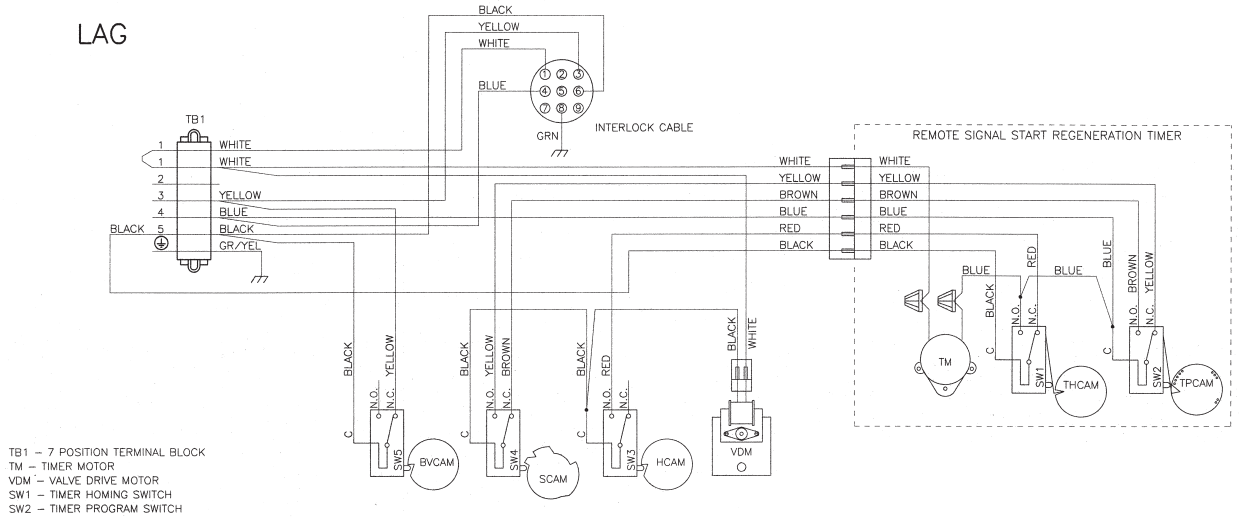
18690-02_REVD



TB1 – 9 POSITION TERMINAL BLOCK
TM – TIMER MOTOR
VDM – VALVE DRIVE MOTOR
SW1 – TIMER HOMING SWITCH
SW2 – TIMER PROGRAM SWITCH
SW3 – VALVE HOMING SWITCH
SW4 – VALVE STEP SWITCH
SW5 – BRINE CAM SWITCH
SW6 – AUXILIARY TIMER SWITCH
THCAM – TIMER HOMING CAM
TPCAM – TIMER PROGRAM CAM
HCAM – VALVE HOMING CAM
SCAM – VALVE STEP CAM
BVCAM – BRINE VALVE CAM

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.

18671-01_REVD

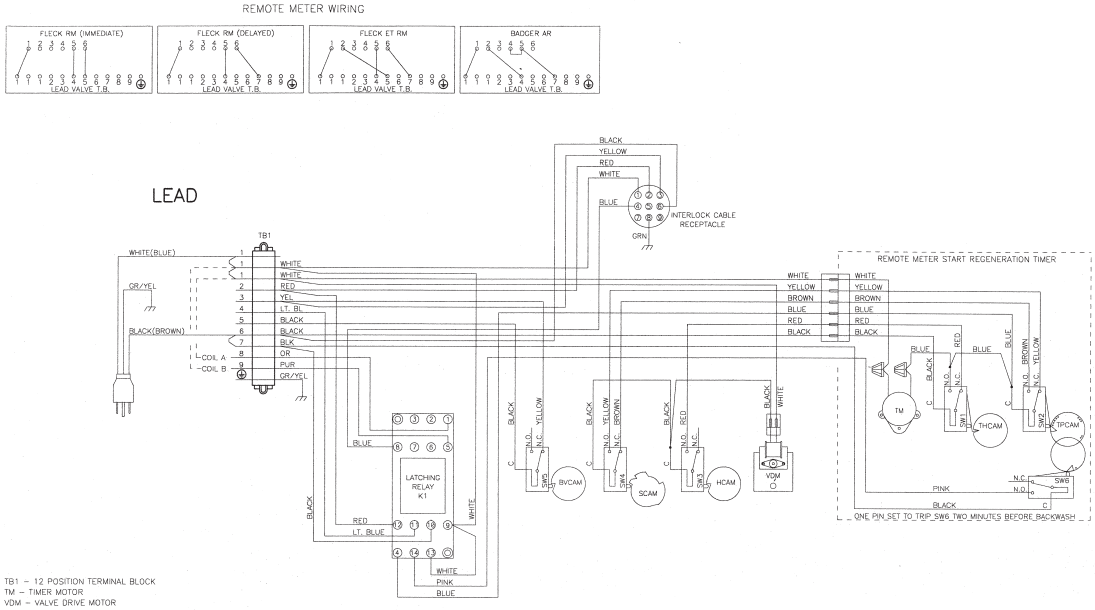


TB1 – 7 POSITION TERMINAL BLOCK
TM – TIMER MOTOR
VDM – VALVE DRIVE MOTOR
SW1 – TIMER HOMING SWITCH
SW2 – TIMER PROGRAM SWITCH
SW3 – VALVE HOMING SWITCH
SW4 – VALVE STEP SWITCH
SW5 – BRINE CAM SWITCH
THCAM – TIMER HOMING CAM
TPCAM – TIMER PROGRAM CAM
HCAM – VALVE HOMING CAM
SCAM – VALVE STEP CAM
BVCAM – BRINE VALVE CAM

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.

18671-02_REVD

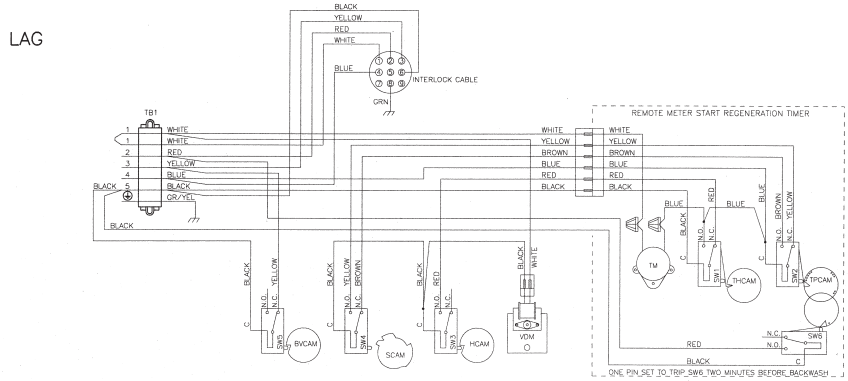
System #7 Duplex 24V / 120V 3-Way Valve Wiring



TB1 – 12 POSITION TERMINAL BLOCK
TM – TIMER MOTOR
VDM – VALVE DRIVE MOTOR
K1 – DUAL COIL LATCHING RELAY
– 24V P/N 17818
– 120V P/N 16887
SW1 – TIMER HOMING SWITCH
SW2 – TIMER PROGRAM SWITCH
SW3 – VALVE HOMING SWITCH
SW4 – VALVE STEP SWITCH
SW5 – BRINE CAM SWITCH
SW6 – TIMER AUXILIARY SWITCH
THCAM – TIMER HOMING CAM
TPCAM – TIMER PROGRAM CAM
HCAM – VALVE HOMING CAM
SCAM – VALVE STEP CAM
BVCAM – BRINE VALVE CAM

NOTE:
1. TWO TANK SINGLE REMOTE METER ALTERNATING REGENERATION.
ONLY ONE TANK IN SERVICE THE OTHER IN REGENERATION OR STANDBY.
2. SYSTEM WIRED FOR 3-WAY SOLENOID OUTPUT.
COIL A CLOSES THE DIAPHRAGM VALVES OF LAG UNIT.
COIL B CLOSES THE DIAPHRAGM VALVES OF LEAD UNIT.
3. VALVE SHOWN IN SERVICE POSITION.

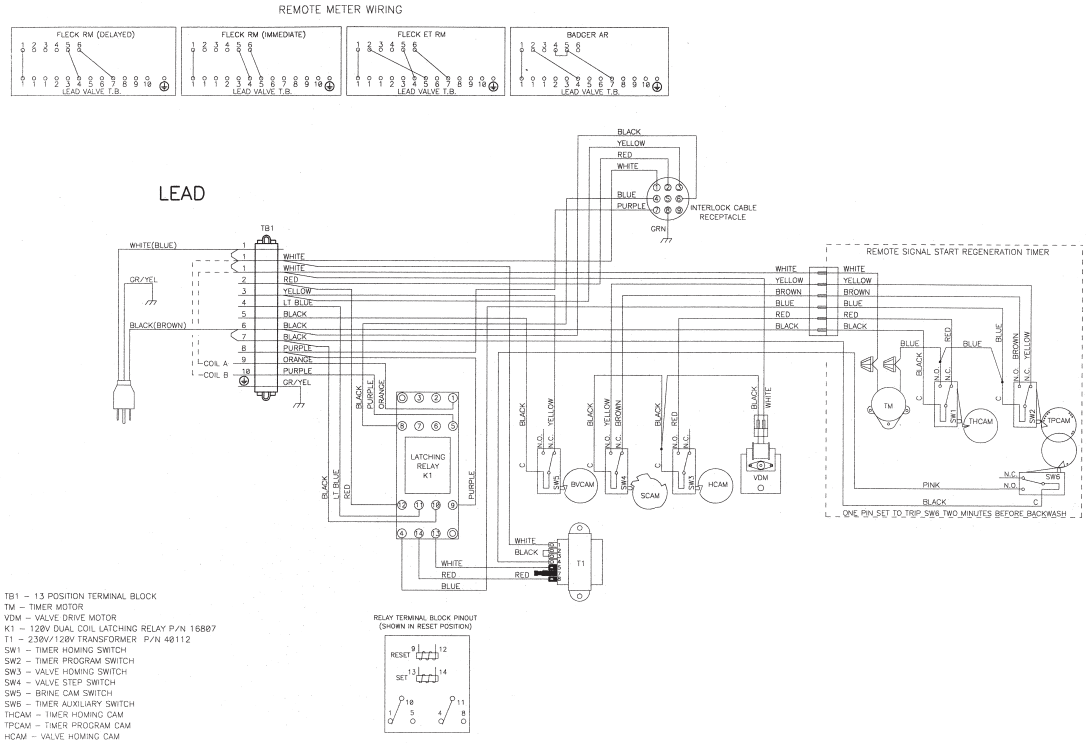
40503-01_REVB



TB1 – 7 POSITION TERMINAL BLOCK
TM – TIMER MOTOR
VDM – VALVE DRIVE MOTOR
SW1 – TIMER HOMING SWITCH
SW2 – TIMER PROGRAM SWITCH
SW3 – VALVE HOMING SWITCH
SW4 – VALVE STEP SWITCH
SW5 – BRINE CAM SWITCH
SW6 – TIMER AUXILIARY SWITCH
THCAM – TIMER HOMING CAM
TPCAM – TIMER PROGRAM CAM
HCAM – VALVE HOMING CAM
SCAM – VALVE STEP CAM
BVCAM – BRINE VALVE CAM

NOTE:
1. TWO TANK SINGLE REMOTE METER ALTERNATING REGENERATION.
ONLY ONE TANK IN SERVICE THE OTHER IN REGENERATION OR STANDBY.
2. SYSTEM WIRED FOR 3-WAY SOLENOID OUTPUT.
COIL A CLOSES THE DIAPHRAGM VALVES OF LAG UNIT.
COIL B CLOSES THE DIAPHRAGM VALVES OF LEAD UNIT.
3. VALVE SHOWN IN SERVICE POSITION.

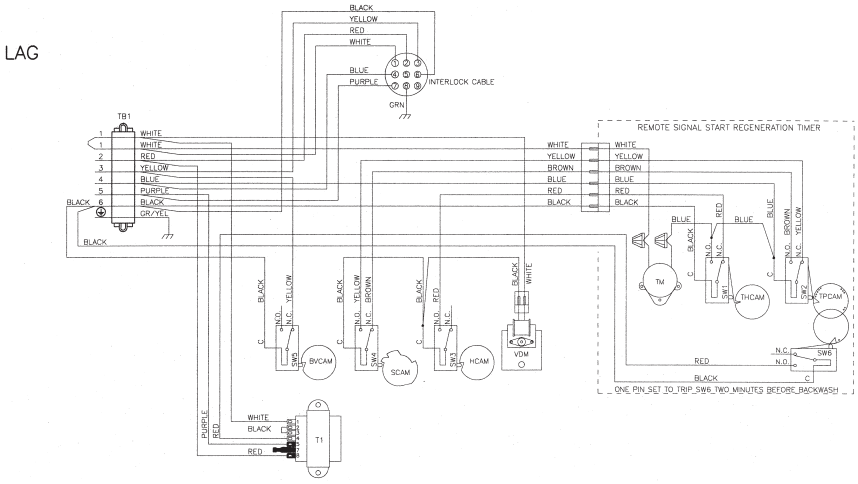
40503-02_REVB



TB1 – 13 POSITION TERMINAL BLOCK
TM – TIMER MOTOR
VDM – VALVE DRIVE MOTOR
K1 – 120V DUAL COIL LATCHING RELAY P/N 16807
T1 – 230V/120V TRANSFORMER P/N 40112
SW1 – TIMER HOMING SWITCH
SW2 – TIMER PROGRAM SWITCH
SW3 – VALVE HOMING SWITCH
SW4 – VALVE STEP SWITCH
SW5 – BRINE CAM SWITCH
SW6 – TIMER AUXILIARY SWITCH
THCAM – TIMER HOMING CAM
TPCAM – TIMER PROGRAM CAM
HCAM – VALVE HOMING CAM
SCAM – VALVE STEP CAM
BVCAM – BRINE VALVE CAM

NOTE:
1. TWO TANK SINGLE REMOTE METER ALTERNATING REGENERATION.
   ONLY ONE TANK IN SERVICE THE OTHER IN REGENERATION OR STANDBY.
2. SYSTEM WIRED FOR 3-WAY SOLENOID OUTPUT.
   COIL A CLOSES THE DIAPHRAGM VALVES OF LAG UNIT.
   COIL B CLOSES THE DIAPHRAGM VALVES OF LEAD UNIT.
3. VALVE SHOWN IN SERVICE POSITION.

40504-01_REVB



TB1 – 8 POSITION TERMINAL BLOCK
TM – TIMER MOTOR
T1 – 230V/120V TRANSFORMER P/N 40112
VDM – VALVE DRIVE MOTOR
SW1 – TIMER HOMING SWITCH
SW2 – TIMER PROGRAM SWITCH
SW3 – VALVE HOMING SWITCH
SW4 – VALVE STEP SWITCH
SW5 – BRINE CAM SWITCH
SW6 – TIMER AUXILIARY SWITCH
THCAM – TIMER HOMING CAM
TPCAM – TIMER PROGRAM CAM
HCAM – VALVE HOMING CAM
SCAM – VALVE STEP CAM
BVCAM – BRINE VALVE CAM

NOTE:
1. TWO TANK SINGLE REMOTE METER ALTERNATING REGENERATION.
   ONLY ONE TANK IN SERVICE THE OTHER IN REGENERATION OR STANDBY.
2. SYSTEM WIRED FOR 3-WAY SOLENOID OUTPUT.
   COIL A CLOSES THE DIAPHRAGM VALVES OF LAG UNIT.
   COIL B CLOSES THE DIAPHRAGM VALVES OF LEAD UNIT.
3. VALVE SHOWN IN SERVICE POSITION.

40504-02_REVB

60036-02 Brine Valve, 1800, Design 3

1.....11772.....Spring, 3150 Brine Valve
1.....11774.....Ring, Retaining
1.....18713 .....Brine Valve Body, 1800
1.....16497-01 .....Stem Assy, 1800 Brine Valve New Style
1.....16498-01 .....Stem Guide Assy, Brine

60277-xx .....1800 Injector Assembly

4.....12473 .....Screw, Hex Wsh, 10-24 x 5/8
1.....15127 .....Injector Throat Assy
1.....15128-xx .....Injector Nozzle - Specify Size
2.....15246 .....O-ring, -116
1.....16340 .....Body, Injector, 1800, D/F
1.....16341-01 .....Cap, Injector, 1800

60106-00 .....Piston Assy, 3900/3150 Std

1.....14818 .....Ring, Piston Rod, Snap
1.....14922 .....O-ring, -035, Piston
1.....16130 .....Piston, High Backwash
1.....15125 .....Rod, Piston, 3150
1.....16398-01 .....End Plug Assy, 3150, White

60113-01 .....Piston Assy, 3150, NHWBP, D-Flow Conversion/Replacement

1.....16398-01 .....End Plug Assy, 3150, White
1.....19611-01 .....Piston Assy, 3150, NHWBP, O-ring
1.....19708 .....Rod, Piston, 3150 NHWBP
1.....14818 .....Ring, Piston Rod, Snap

60131 .....Seal & Spacer Kit 2930/3130/3150

2.....10368 .....Spacer, Narrow, 3150/3900
5.....10369 .....Spacer, 2", 2900/3150
8.....11720.....Seal, Piston, 2900/3150

60057-01 .....Drive Assy, 3150, 120V, B/Fill 3900 Upper Sys #5 or Sys # 7

4.....10302 .....Insulator, Limit Switch
3.....10872 .....Screw, Hex Wsh, 8-32 x 17/64
1.....11080.....Screw, Flt Hd Mach, 8-32 x 3/8
3.....10218 .....Switch, Micro
2.....12660 .....Nut, Hex, 10-24 SS
2.....17567 .....Screw, Hex Wsh Hd, 8 x 1/2
1.....15120 .....Bracket, Motor Mtg, 3150/3900
1.....40392 .....Motor, Drive, 115V, 50/60 Hz SP1
1.....16052 .....Bushing, 3150/3900
1.....17797 .....Bracket, Switch Mounting 3150/3900
2.....12624 .....Screw, Phil Pan, 40 x 1 1/2

60150-3150 ...SVO Assy, 3150

60393 .....Meter Assy, 2900, 2" Std

60394 .....Meter Assy, 2900, 2" Ext

Side Mount Adapter

61414.....Adapter, Assy, Sdmnt, 3130/3150 Rotating
61414NP.....Adapter Assy, Sdmnt, 3130/3150 Nickel Plated Rotating
61414-20 .....Adapter Assy, Sdmnt
61414-20NP .....Adapter Assy, Sdmnt

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