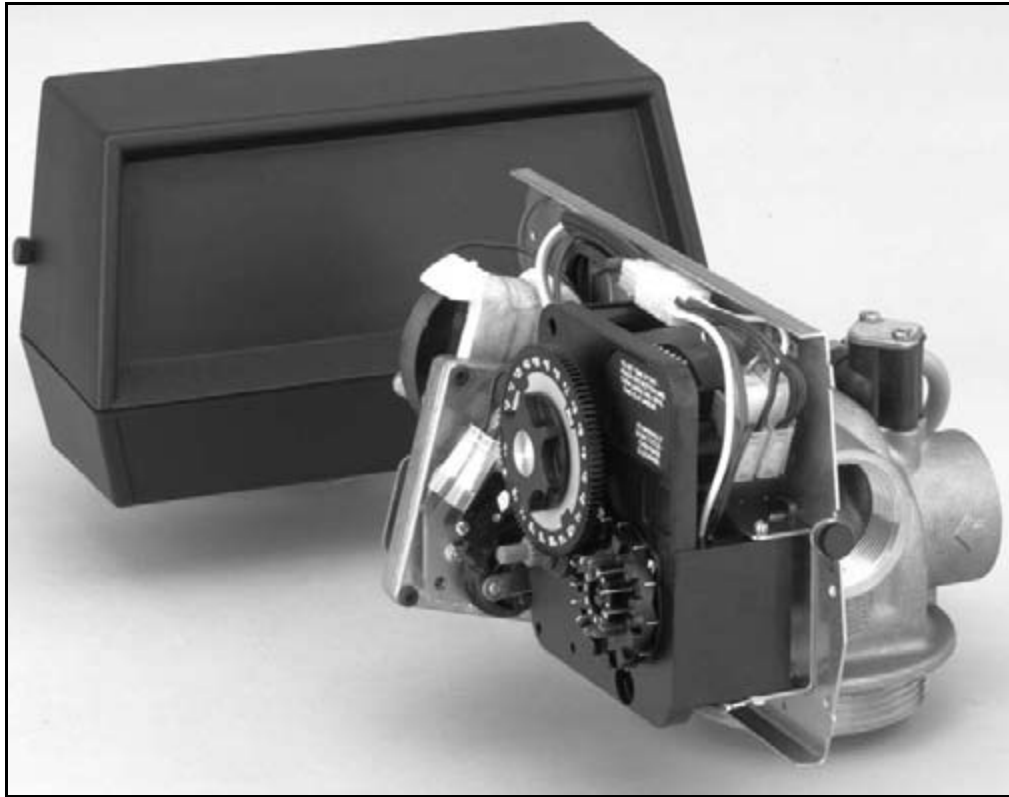


MODEL 2850 CONTROL VALVE

Service Manual



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

MODEL 2850

Job Specification Sheet

* JOB NO. _____

* MODEL NO. _____

* WATER TEST _____

* CAPACITY PER UNIT _____

* MINERAL TANK SIZE DIA. _____ HEIGHT _____

* BRINE TANK SIZE & SALT SETTING PER REGENERATION:

* 2850 CONTROL VALVE SPECIFICATIONS

1) Type of Timer (see pages 16, 17, and 18)

A) 7 day or 12 day

B) * 625 to 10,625 gallon meter or

* 3,125 to 53,125 gallon meter

* Other _____

C) Meter Wiring Package

1) System #4 - 1 tank; 1 meter; immediate or delayed regeneration

2) System #5 - 2 tanks; 2 meters; interlock

3) System #6 - 2 tanks; 1 meter; series regeneration

4) System #7 - 2 tanks; 1 meter; alternator

2) Timer Program Settings (see page 18)

A) Backwash _____ min.

B) Brine & Slow Rinse _____ min.

C) Rapid Rinse _____ min.

D) Brine Tank Refill _____ min.

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 _____

MODEL 2850

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. Make certain the current supply is always hot and cannot be turned off with another switch.

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

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

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

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

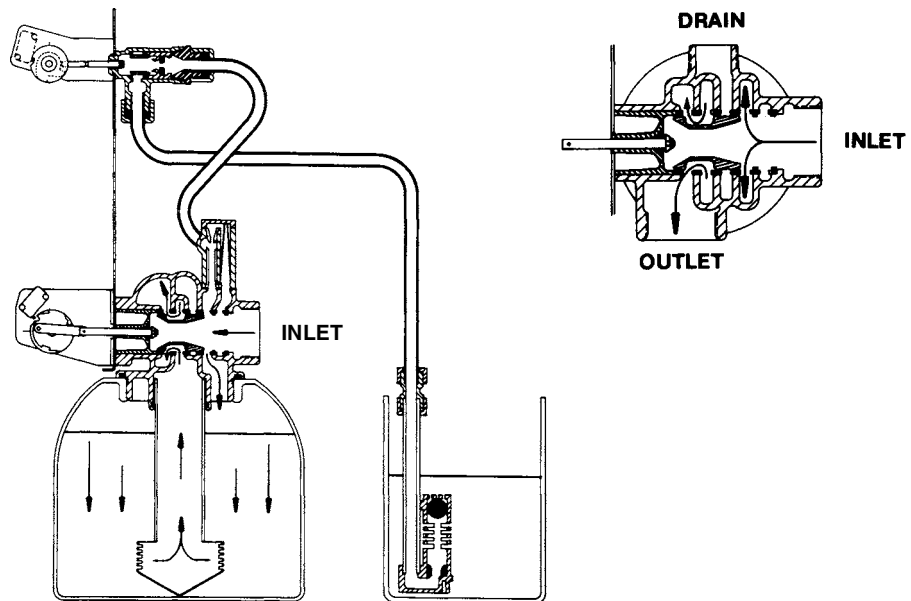
Installation Instructions

1. Place the softener tank where you want to install the unit making sure the unit is level and on a firm base. (Maximum 4 feet apart for twin units.)
2. All plumbing should be done in accordance with local plumbing codes. The pipe size for the drain line should be the same size as the drain line flow control connection. Water meters are to be installed on soft water outlets. Twin units with (1) one meter shall be installed on common soft water outlet of units.
3. Solder joints near the drain must be done prior to connecting the Drain Line Flow Control fitting. Leave at least 6" between the DLFC and solder joints when soldering when the pipes are connected on the DLFC. Failure to do this could cause interior damage to the DLFC.
4. Teflon tape is the only sealant to be used on the drain fitting. The drain from twin units may be run through a common line.
5. Make sure that the floor is clean beneath the salt storage tank and that it is level.
6. Place approximately 1" of water above the grid plate (if used) in your salt tank. Salt may be placed in the unit at this time.
7. Place in by-pass position. Turn on the main water supply. Open a cold soft water tap nearby and let run a few minutes or until the system is free from foreign material (usually solder) that may have resulted from the installation.
8. Place the by-pass in service position.
9. Manually index the softener control into "service" position and let water flow into the mineral tank. When water flow stops, 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.
10. Electrical: All electrical connections must be connected according to codes. Use electrical conduit if applicable. Plug into power supply.

MODEL 2850

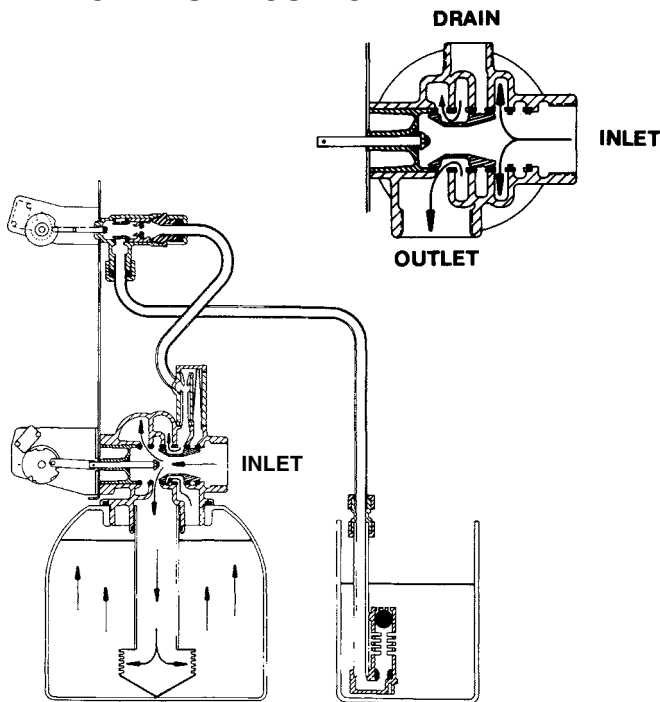
Water Conditioner Flow Diagrams

1 SERVICE POSITION



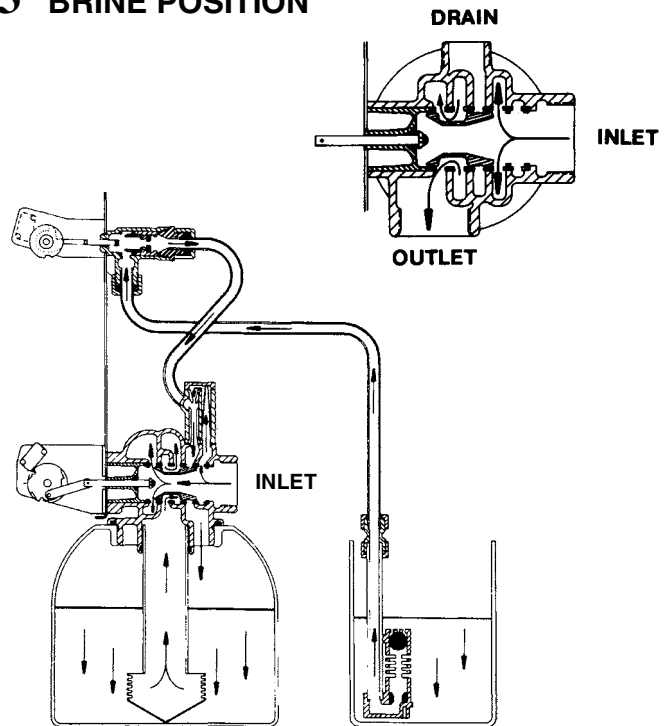
Hard water enters unit at valve inlet and flows down through the mineral in the mineral tank. Conditioned water enters center tube through the bottom distributor — then flows up through the center tube — around the piston and out the outlet of the valve.

2 BACKWASH POSITION



Hard water enters unit at valve inlet — flows through piston — down center tube — through bottom distributor and up through the mineral — around the piston and out the drain line.

3 BRINE POSITION

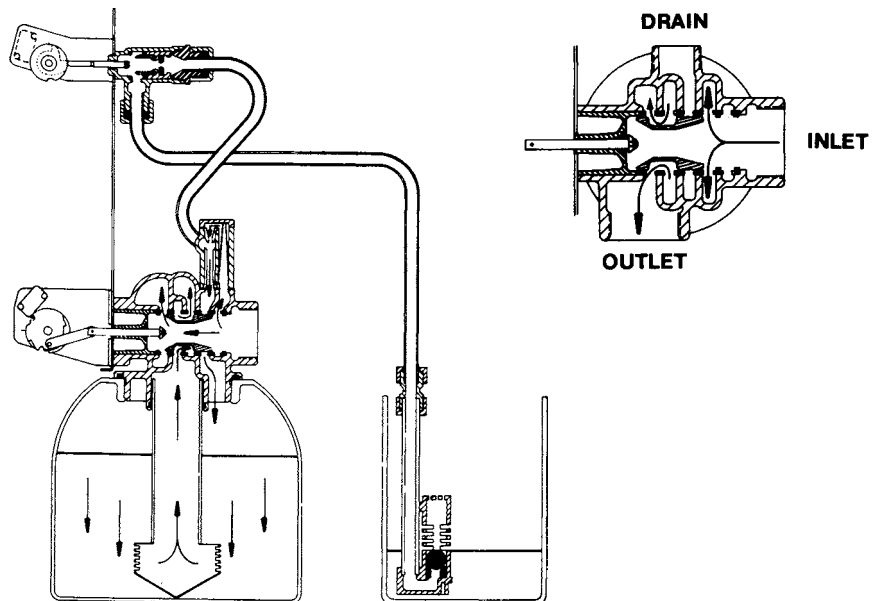


Hard water enters unit at valve inlet — flows up into injector housing and down through nozzle and throat to draw brine from the brine tank — brine flows down through mineral and enters the center tube through bottom distributor and out through the drain line.

MODEL 2850

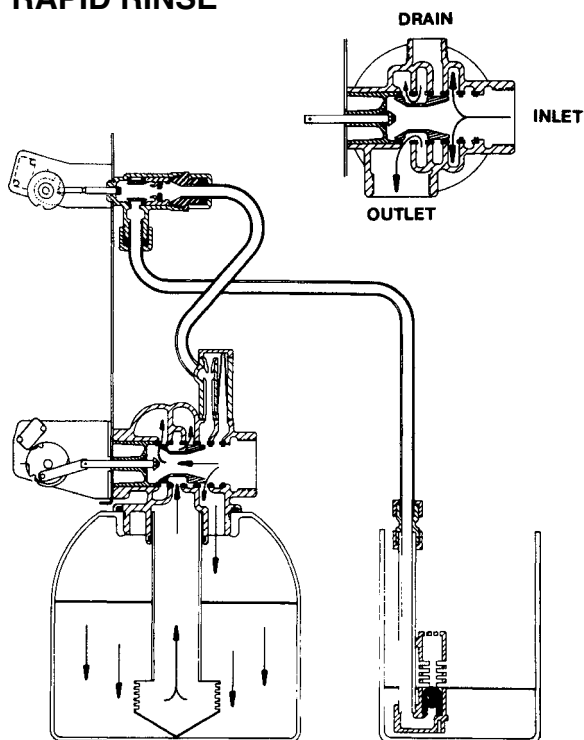
Water Conditioner Flow Diagrams (Cont'd.)

4 SLOW RINSE POSITION



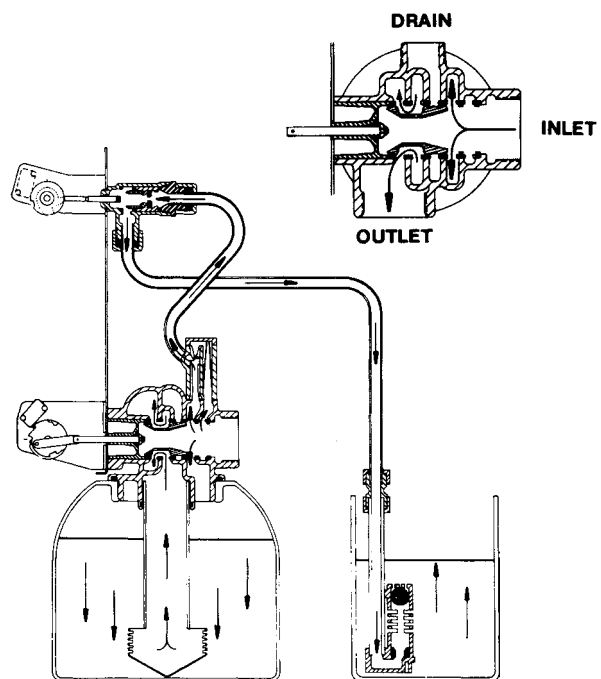
Hard water enters unit at valve inlet — flows up into injector housing and down through nozzle and throat — around the piston — down through mineral — enters center tube through bottom distributor — flows up through center tube — around piston and out through drain line.

5 RAPID RINSE



Hard water enters unit at valve inlet — flows directly from inlet down through mineral into center tube bottom distributor and up through center tube — around piston and out through the drain line.

6 BRINE TANK REFILL POSITION

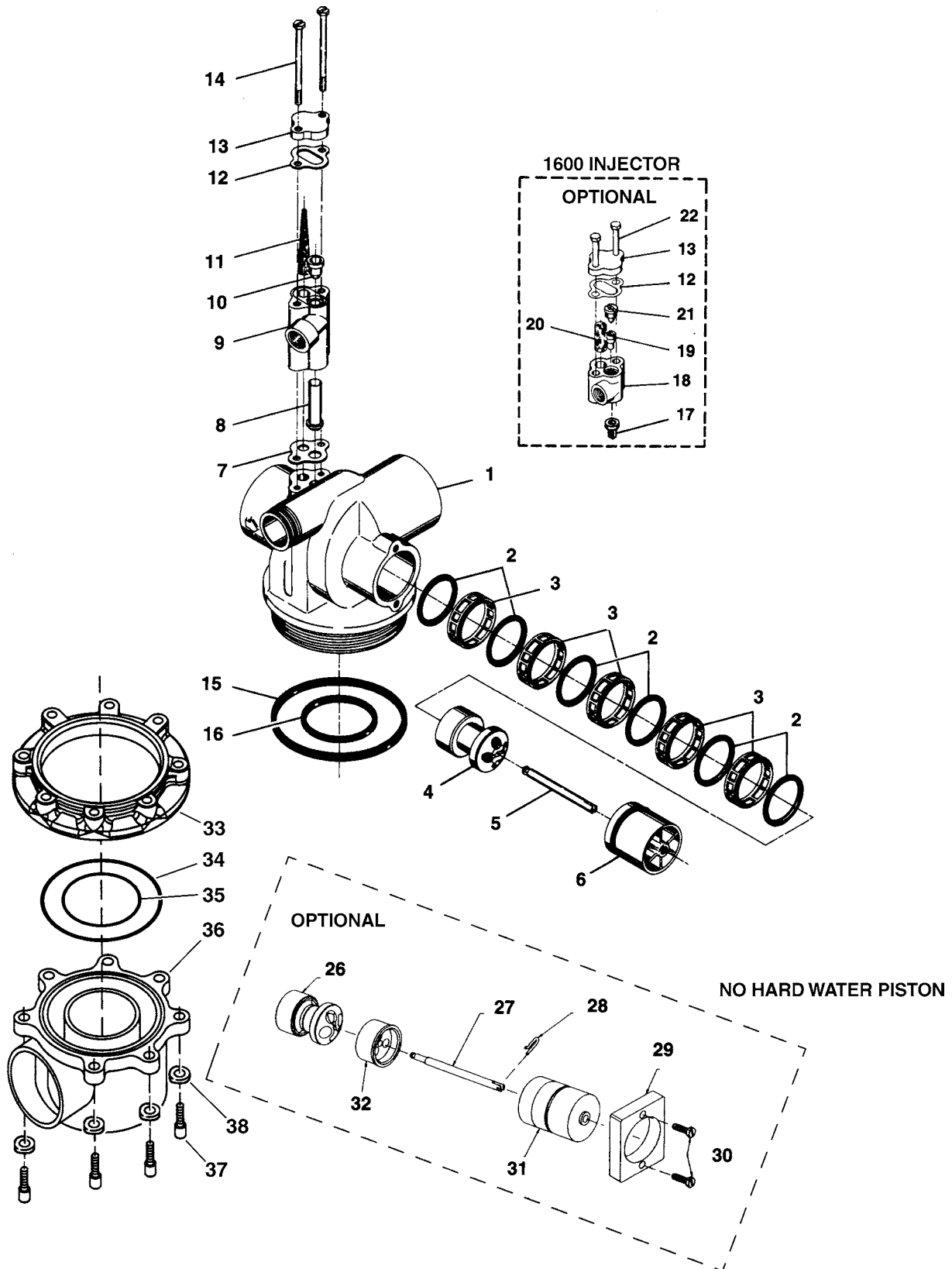


Hard water enters unit at valve inlet — flows up through the injector housing — through the brine valve to refill the brine tank.

MODEL 2850

Control Valve with 1700 Injector

(See Opposite Page for Parts List)



MODEL 2850

Control Valve with 1700 Injector

Parts List

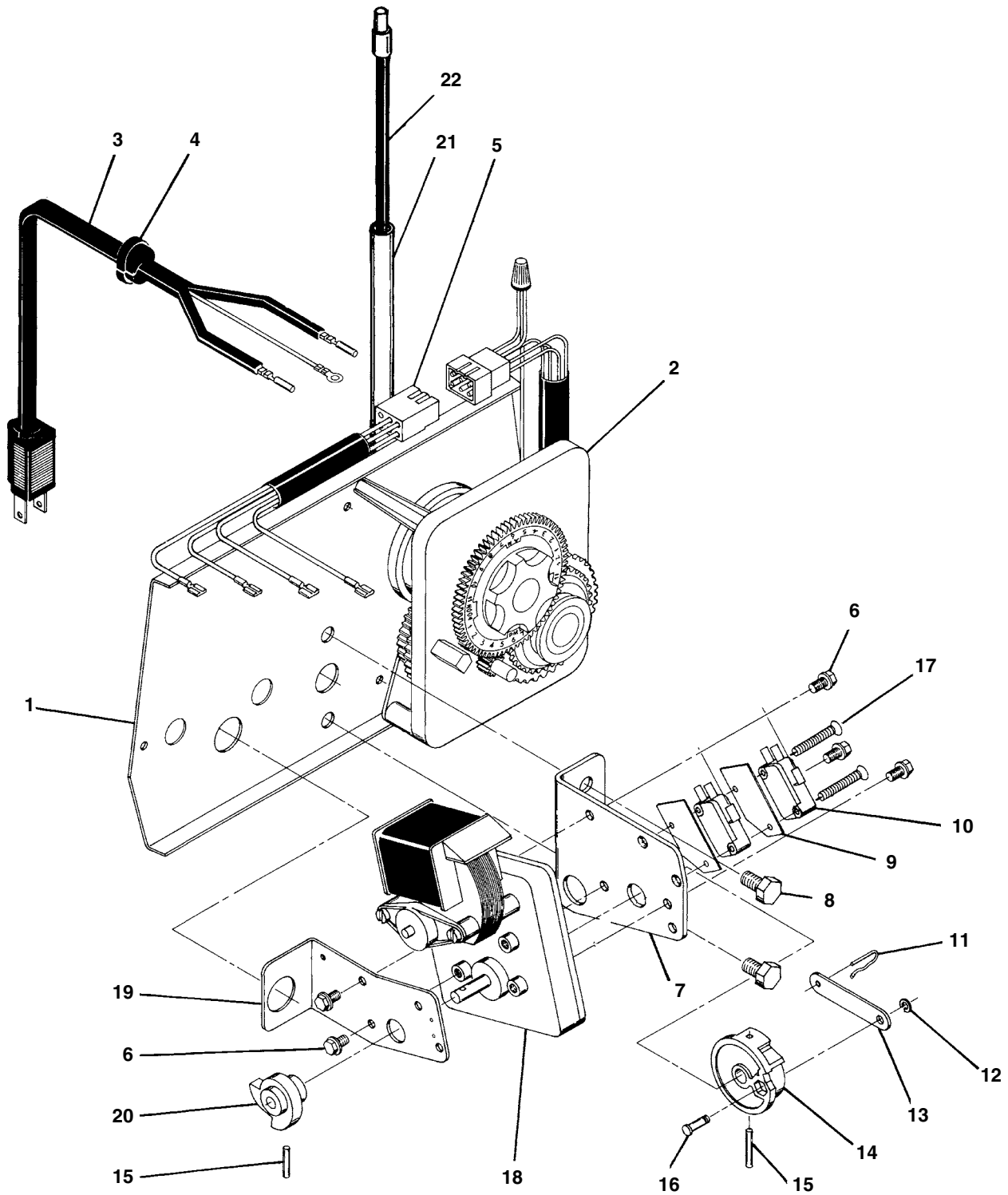
| Item No. | Quantity | Part No. | Description |
|----------------------------|----------|----------|--|
| 1 | 1 | 16250 | Valve Body |
| | | 16250-01 | Valve Body Machined |
| 2 | 6 | 16101 | Seal |
| | | 16101-02 | Silicone Seals |
| 3 | 5 | 16638-01 | Spacer |
| | 1 | 16638 | Spacer, Hot Water |
| 4 | 1 | 16092 | Piston |
| 5 | 1 | 16436 | Piston Rod |
| 6 | 1 | 16395 | End Plug Assembly |
| | 1 | 16395-01 | End Plug Assembly, Hot Water |
| 7 | 1 | 14805 | Injector Body Gasket |
| 8 | 1 | 14802 | Injector Throat |
| 9 | 1 | 17777 | Injector Body |
| 10 | 1 | 14801 | Injector Nozzle |
| 11 | 1 | 14803 | Injector Screen |
| 12 | 1 | 10229 | Injector Cover Gasket |
| 13 | 1 | 11893 | Injector Cover |
| 14 | 2 | 14804 | Screw - Injector Body |
| 15 | 1 | 16455 | O-Ring - Top of Tank |
| *16 | 1 | 13577 | O-Ring |
| 17 | 1 | 16221 | Air Disperser |
| 18 | 1 | 17776 | Injector Body |
| 19 | 1 | 10914 | Injector Throat |
| 20 | 1 | 10227 | Injector Screen |
| 21 | 1 | 10913 | Injector Nozzle |
| 22 | 2 | 10692 | Screw - Injector Body |
| | | 17656 | Screw, Metric - Injector Body |
| 23 | 1 | 60366 | DLFC 1" NPT (not shown) - specify size |
| 24 | 1 | 17996 | Air Disperser, 1700 (not shown) |
| 25 | 1 | 19608-15 | Disperser, Upper (not shown) |
| 26 | 1 | 19606 | Piston |
| 27 | 1 | 19300 | NHWP-P Piston Rod |
| 28 | 1 | 10909 | Connecting Link Pin |
| 29 | 1 | 19339 | NHWP-P Spacer |
| 30 | 2 | 13386 | Screw |
| 31 | 1 | 16395-02 | NHWP-P End Plug Assy. |
| 32 | 1 | 19298-01 | NHWP-P Piston Assy. |
| Optional Side Mount | | | |
| 33 | 1 | 40316 | Side Mount Adapter |
| 34 | 1 | 40368 | O-Ring, 2-160 |
| 35 | 1 | 40372 | O-Ring, 2-142 |
| 36 | 1 | 40310 | Base, Rotating |
| 37 | 7 | 19768 | Screw, Adapter |
| 38 | 7 | 40375 | Washer |

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

MODEL 2850

Control Drive Assembly

(See Opposite Page for Parts List)



MODEL 2850

Control Drive Assembly

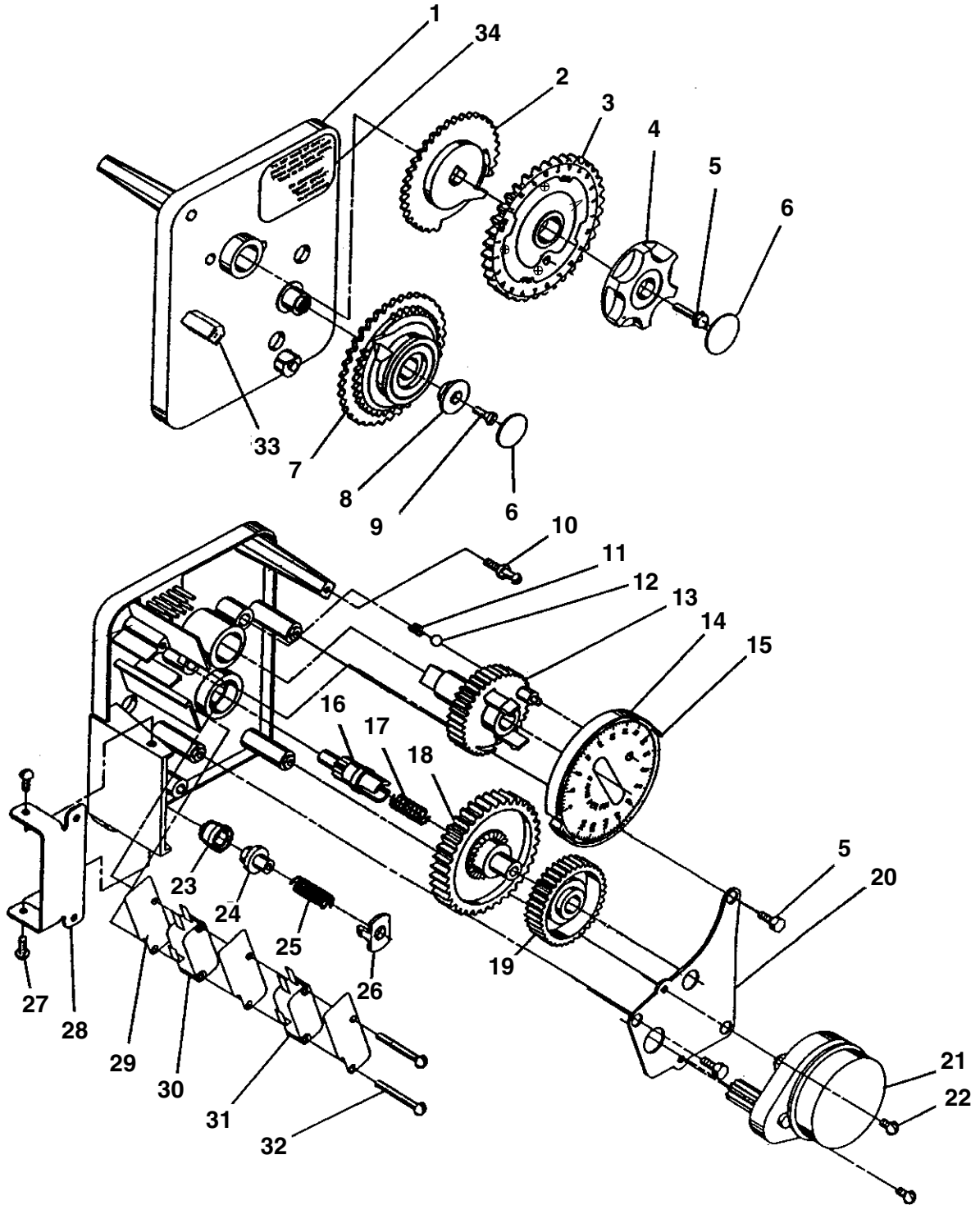
Parts List

| Item No. | Quantity | Part No. | Description |
|----------|----------|-----------|---|
| 1 | 1 | 40264 | Back Plate w/ Thumb Screws |
| 2 | 1 | | Timer - 3200 7 Day - 3200 12 Day - 3210 Meter |
| 3 | 1 | 11838 | Power Cord |
| 4 | 1 | 13547 | Strain Relief |
| 5 | 1 | 11667 | Wire Harness |
| 6 | 5 | 10872 | Screw - Motor Mounting |
| 7 | 1 | 10774 | Bracket - Motor Mounting |
| 8 | 2 | 10231 | Screw - Drive Mounting |
| 9 | 2 | 10302 | Insulator |
| 10 | 2 | 10218 | Switch |
| 11 | 1 | 10909 | Connecting Link Pin |
| 12 | 1 | 10250 | Retaining Ring |
| 13 | 1 | 10621 | Connecting Link |
| 14 | 1 | 12576 | Drive Cam - STF (Black) |
| | 1 | 12102 | Drive Cam - RR (White) |
| 15 | 2 | 10338 | Roll Pin |
| 16 | 1 | 13366 | Drive Bearing |
| 17 | 2 | 14923 | Screw - Switch Mounting |
| 18 | 1 | 10769 | Motor |
| 19 | 1 | 11826 | Bracket - Brine Valve Side |
| 20 | 1 | 12777 | Brine Valve Cam - STF (Black) |
| | 1 | 10815 | Brine Valve Cam - RR (White) |
| | 1 | 12472 | Brine Valve Cam - SVO (not shown)* |
| 21 | 1 | 17470 | Meter Cable Guide Assembly |
| 22 | 1 | 17741 | Meter Cable Assembly |
| 23 | 2 | 10300 | Screw - Timer Mounting (not shown) |
| 24 | 1 | 12114 | Outboard Bearing Bracket (not shown)* |
| 25 | 2 | 15742 | Screw (not shown) |
| 26 | 2 | 15833 | Spacer (not shown) |
| 27 | 1 | 19291-020 | Cover, 1-piece Black, (not shown) |
| 28 | 2 | 19367 | Screw, Cover (not shown) |

MODEL 2850 ECONOMINDER®

Timer Assembly

(See Opposite Page for Parts List)



MODEL 2850 ECONOMINDER®

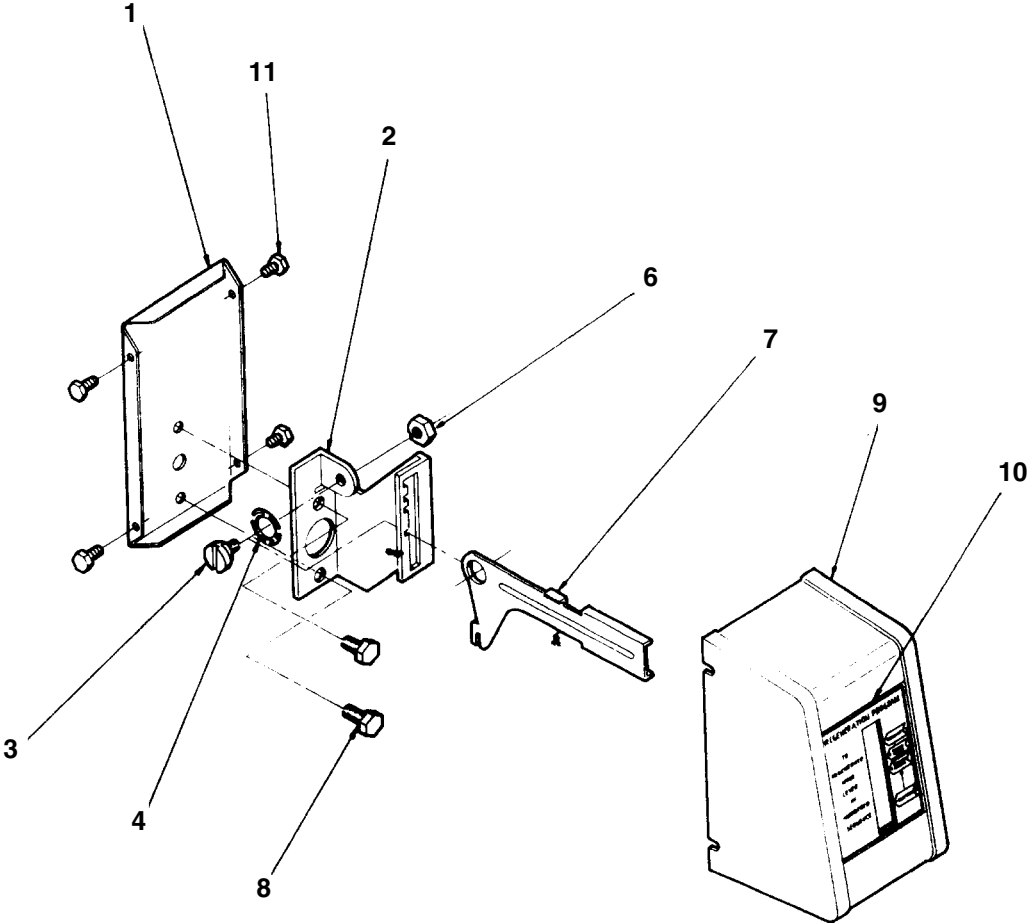
Timer Assembly

Parts List

| Item No. | Quantity | Part No. | Description |
|-----------|----------|----------|---|
| 1 | 1 | 13870-01 | Timer Housing Assembly |
| 2 | 1 | 13802 | Cycle Actuator Gear |
| 3 | 1 | 40096-24 | 24 Hour Gear Assembly, 12 Midnight |
| | | 40096-02 | 24 Hour Gear Assembly, 2 a.m. |
| 4 | 1 | 13886-01 | Knob |
| 5 | 4 | 13296 | Screw - Timer Knob and Motor Plate Mtg. |
| 6 | 2 | 11999 | Button Decal |
| 7 | 1 | 60405-15 | Program Wheel Assy. (Specify Hardness Capacity) |
| 8 | 1 | 13806 | Program Wheel Retainer |
| 9 | 1 | 13748 | Screw - Program Wheel Mtg. |
| 10 | 1 | 14265 | Spring Clip |
| 11 | 1 | 15424 | Spring - Detent |
| 12 | 1 | 15066 | Ball - 1/4 in. Dia. |
| 13 | 1 | 13911 | Main Drive Gear |
| 14 | 1 | 19210 | Program Wheel |
| 15 | 21 | 15493 | Roll Pin |
| 16 | 1 | 13018 | Idler Shaft |
| 17 | 1 | 13312 | Spring - Idler |
| 18 | 1 | 13017 | Idler Gear |
| 19 | 1 | 13164 | Drive Gear |
| 20 | 1 | 13887 | Motor Mounting Plate |
| 21 | 1 | 18743 | Motor - 120V., 60 Hz. |
| | | 19659 | Motor - 24V., 60 Hz. |
| 22 | 2 | 13278 | Screw, Motor Mounting |
| 23 | 1 | 13830 | Drive Pinion - Program Wheel |
| 24 | 1 | 13831 | Clutch - Drive Pinion |
| 25 | 1 | 14276 | Spring |
| 26 | 1 | 14253 | Spring Retainer |
| 27 | 3 | 11384 | Screw - Timer Hinge and Ground Wire |
| 28 | 1 | 13881 | Hinge Bracket |
| 29 | 3 | 14087 | Insulator |
| 30 | 1 | 10896 | Switch |
| 31 | 1 | 15320 | Switch |
| 32 | 2 | 11413 | Screw - Switch Mounting |
| 33 | 1 | 14007 | Decal - Time of Day |
| 34 | 1 | 14045 | Decal - Instructions |
| Not Shown | 1 | 13902 | Harness |
| Not Shown | 2 | 12681 | Wire Connector |
| Not Shown | 1 | 15354-01 | Ground Wire 17748-01 F.E |

MODEL 2850

Manual Drive Assembly



MODEL 2850

Manual Drive Assembly

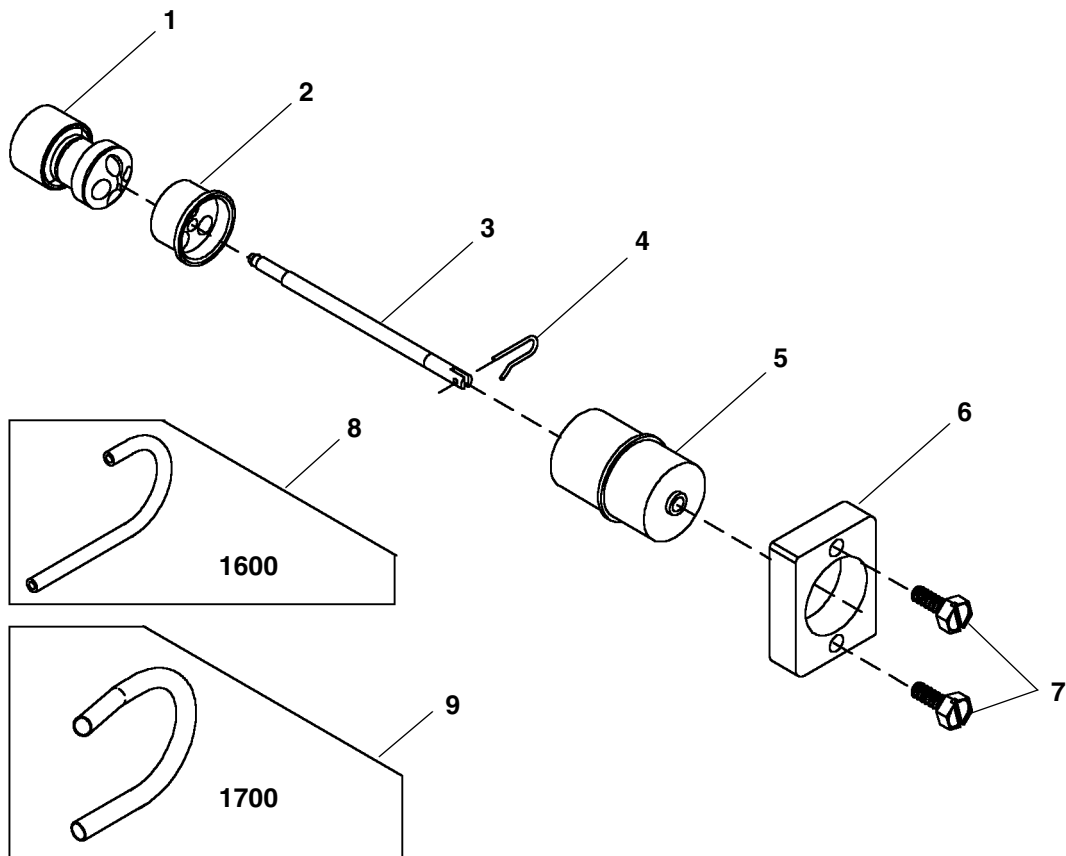
Parts List

| Item No. | Quantity | Part No. | Description |
|-----------------|-----------------|-----------------|---------------------------------|
| 1..... | 1 | 12593 | Back Plate |
| 2..... | 1 | 12592 | Lever Position Bracket |
| 3..... | 1 | 12596 | Pivot Screw |
| 4..... | 1 | 12707 | Spring Washer |
| 5..... | 1 | 10909 | Pin, Link (Not Shown) |
| 6..... | 1 | 11235 | Nut |
| 7..... | 1 | 12594 | Valve Position Lever |
| 8..... | 2 | 10231 | Screw - Valve Mounting |
| 9..... | 1 | 60224 | Cover Assembly |
| 10 | 1 | 12597 | Valve Position Label - Softener |
| | 1 | 14219 | Valve Position Label - Filter |
| 11 | 4 | 10300 | Screw - Cover Mounting |

MODEL 2850

No Hard Water Bypass Piston Assembly

(See opposite page for parts list)



MODEL 2850

No Hard Water Bypass Piston Assembly

Parts List

| Item No. | Quantity | Part No. | Description |
|----------|----------|---------------|--|
| 1..... | 1 | 19606 | Piston, 2850, No Hard Water Bypass |
| 2..... | 1 | 19298-01..... | Piston Assy. No Hard Water Bypass |
| | 1 | 19298 | Piston, 2850 Bypass |
| | 1 | 19312 | O-Ring, -025 |
| 3..... | 1 | 19300 | NHWP-P Piston Rod |
| 4..... | 1 | 10909 | Pin, Link |
| 5..... | 1 | 16395-02..... | End Plug Assy., No Hard Water Bypass |
| | 1 | 19302 | End Plug |
| | 1 | 16394 | O-Ring |
| | 1 | 13008 | Retainer |
| | 1 | 10209 | Quad |
| 6..... | 1 | 19339 | Spacer, No Hard Water Bypass |
| 7..... | 2 | 13386 | Screw, Hex Hd. 1/4-20 x 1" |
| 8..... | 1 | 19337 | Brine Tube, 1600, No Hard Water Bypass |
| | 2 | 10329 | Nut, 3/8 |
| | 2 | 10330 | Sleeve, 3/8" |
| | 2 | 10332 | Insert, 3/8" |
| 9..... | 1 | 19338 | Tube |
| | 2 | 15414 | Nut |

Options

| | | |
|---------|---------------|---|
| 1 | 60114-00..... | Filter, Piston Conv. to No Hard Water Bypass Std. |
| 1 | 60114-01..... | Piston Assy., Replacement |
| 1 | 60114-02..... | No Hard Water Bypass Conc., 1600 |
| 1 | 60114-03..... | No Hard Water Bypass Conc., 1700 |

MODEL 3210 ECONOMINDER®

Commercial Demand Regeneration Control Timer Settings

Typical Programming Procedure

Calculate the gallon capacity of the system, subtract the necessary reserve requirement and set the gallons required by lifting the gallon dial and rotating it so that the number of gallons required is aligned with the white dot on program wheel gear. Release and check for firm engagement with gear.

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

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

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

How To Set The Time Of Day:

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

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

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

How To Manually Regenerate Your Water Condition At Any Time:

Turn the manual regeneration knob clockwise one "click".

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

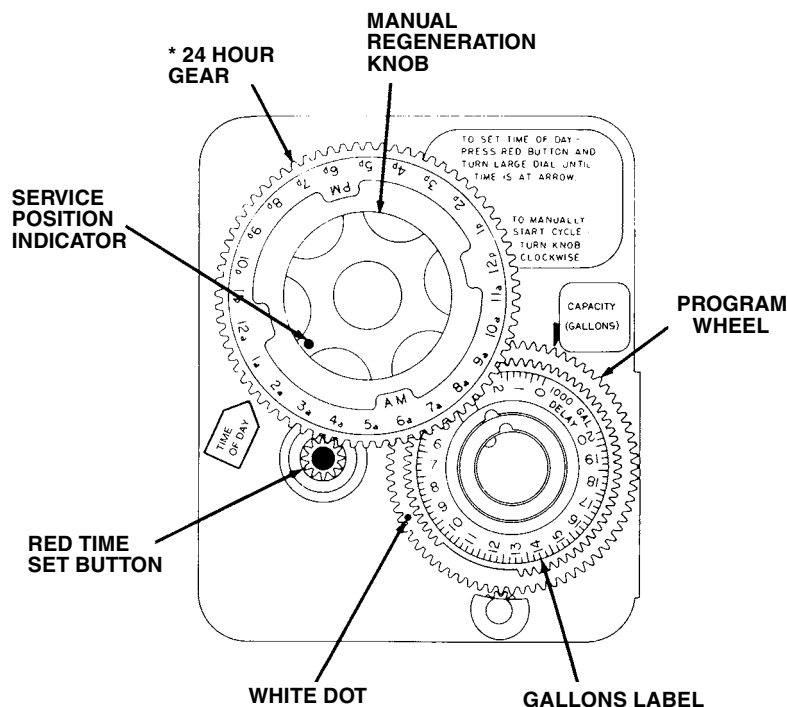
The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.

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

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

Immediate Regeneration Timers:

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



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

MODEL 3200 TIMER

Timer Setting Procedure

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

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

How To Set The Time Of Day:

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

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

Release the red button to again engage the drive gear.

How To Manually Regenerate Your Water Conditioner At Any Time:

Turn the manual regeneration knob clockwise.

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

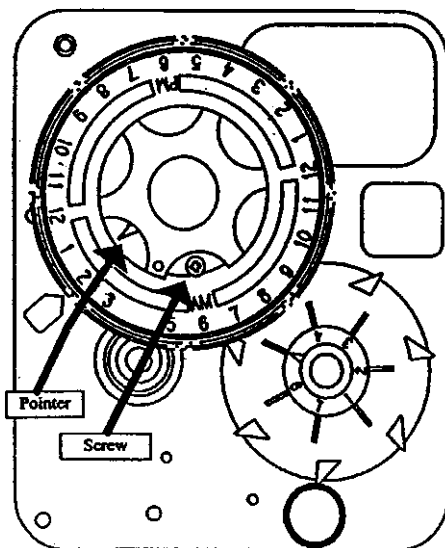
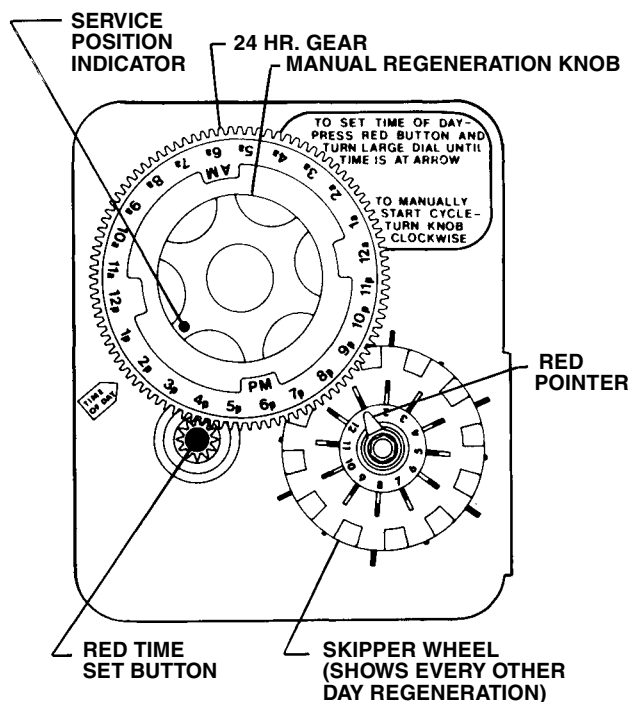
The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.

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

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

How to Adjust Regeneration Time:

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



3200 ADJUSTABLE REGENERATION TIMER

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

MODEL 3200 & 3210 TIMER SERIES

Regeneration Cycle Program Setting Procedure

(Brine Tank Refill Separate From Rapid Rinse)

How To Set The Regeneration Cycle Program:

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

3200 & 3210 Series Timers (Figure to Right)

To expose cycle program wheel, first pull cable out of meter dome of 3210 timers, grasp timer in upper left-hand corner and pull, releasing snap retainer and swinging timer to the right.

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

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

Timer Setting Procedure for 3200 and 3210 Timer

How To Change The Length Of The Backwash Time:

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

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

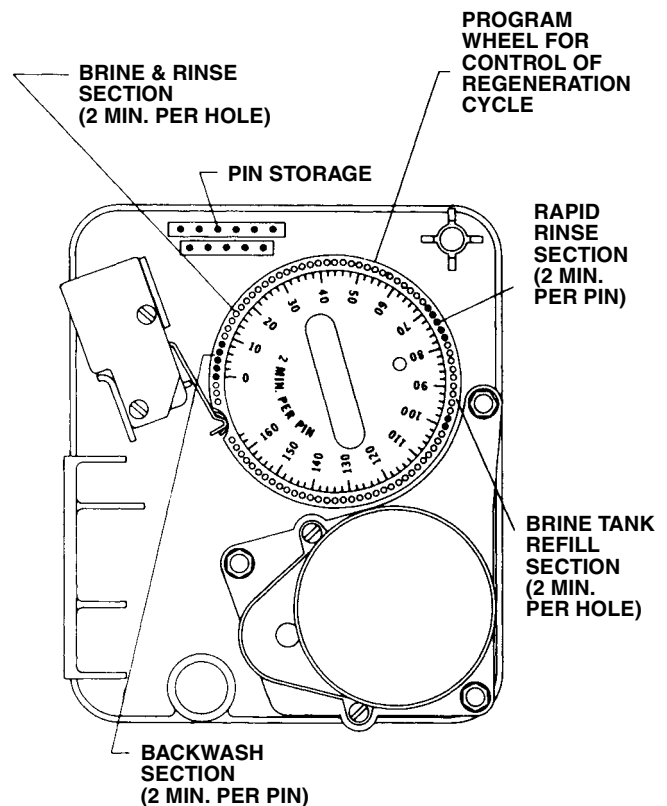
How To Change The Length Of Brine And Rinse Time:

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

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

How To Change The Length Of Rapid Rinse:

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



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

How To Change The Length Of Brine Tank Refill Time:

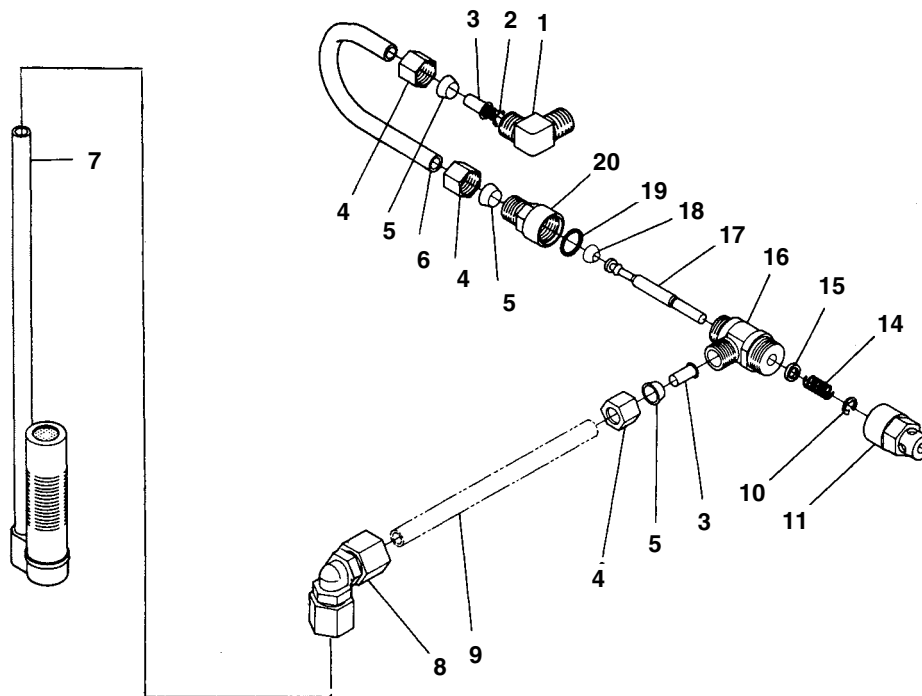
The second group of holes in the program wheel determines the length of time that your water conditioner will refill the brine tank. (2 min. per hole.)

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

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

MODEL 2850

1600 Series Brine System Assembly

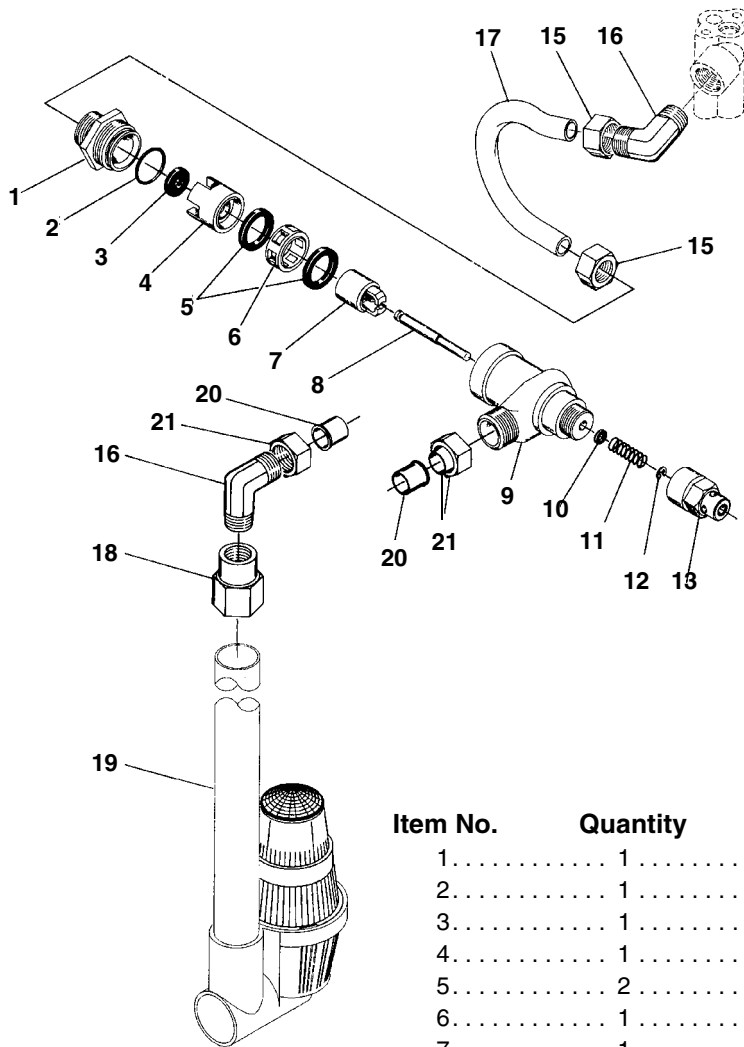


Parts List

| Item No. | Quantity | Part No. | Description |
|----------|----------|--------------|---------------------------------------|
| 1 | 1 | 10328 | 90° Elbow - 1/4 Pipe Thd. to 3/8 Tube |
| 2 | 1 | 12767 | Brine Line Screen |
| 3 | 2 | 10332 | Insert Sleeve (3/8 Tube) |
| 4 | 3 | 10329 | Fitting Nut (3/8 Tube) |
| 5 | 3 | 10330 | Delrin Sleeve (3/8 Tube) |
| 6 | 1 | 16508 | Brine Valve Tube |
| 7 | 1 | 60002 | #500 Air Check Assembly |
| | 1 | 60003 | #500 Air Check Assembly, HW |
| 8 | 1 | 12794 | 90° Elbow - 3/8 Tube to 3/8 Tube |
| 9 | 1 | Not Supplied | Brine Line Tube (3/8 Flexible Tube) |
| 10 | 1 | 10250 | Retaining Ring |
| 11 | 1 | 11749 | Stem Guide |
| 12 | | | Not Assigned |
| 13 | | | Not Assigned |
| 14 | 1 | 10249 | Brine Valve Spring |
| 15 | 1 | 12550 | Quad Ring |
| 16 | 1 | 12748 | Brine Valve Body |
| 17 | 1 | 12552 | Brine Valve Stem |
| 18 | 1 | 12626 | Brine Valve Seat |
| 19 | 1 | 11982 | O-Ring |
| 20 | 1 | 60020-25 | BLFC .25 GPM |
| | | 60020-50 | BLFC .50 GPM |
| | | 60020-100 | BLEC 1.0 GPM |

MODEL 2850

1700 Series Brine System Assembly

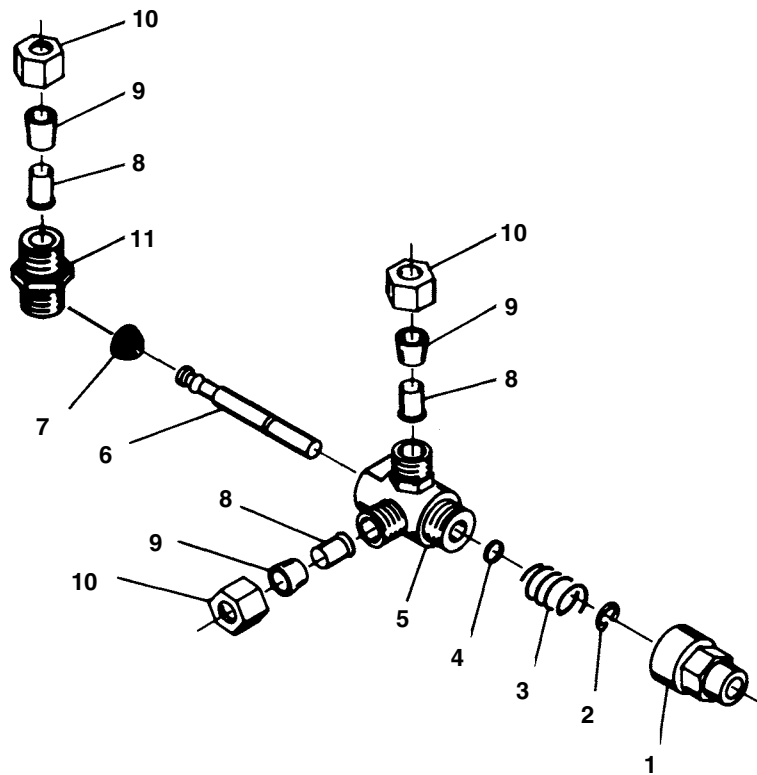


Parts List

| Item No. | Quantity | Part No. | Description |
|----------|----------|----------|------------------------------------|
| 1 | 1 | 14792 | End Plug |
| 2 | 1 | 13201 | O-Ring - End Plug |
| 3 | 1 | | Washer Flow Control (specify size) |
| 4 | 1 | 14785 | Flow Control Retainer |
| 5 | 2 | 14811 | Piston Seals |
| 6 | 1 | 14798 | Spacer |
| 7 | 1 | 14795 | Brine Valve Piston |
| 8 | 1 | 14797 | Brine Valve Stem |
| 9 | 1 | 14790 | Brine Valve Body |
| 10 | 1 | 12550 | Quad Ring - Brine Stem |
| 11 | 1 | 15310 | Spring - Brine Valve |
| 12 | 1 | 10250 | Retaining Ring |
| 13 | 1 | 15517 | Stem Guide |
| 15 | 2 | 15414 | Nut and Sleeve |
| 16 | 2 | 15413 | Elbow |
| 17 | 1 | 16460 | Brine Tube |
| 18 | 1 | 15434 | Reducer Coupling - 1/2 NPT 3/8 NPT |
| 19 | 1 | 60009 | #900 Air Check Assembly |
| | | 60009-01 | #900 Air Check Assembly, Hot Water |
| 20 | 2 | 16123 | Nut |
| 21 | 2 | 16124 | Sleeve |

MODEL 2850

1600 Service Valve Operator



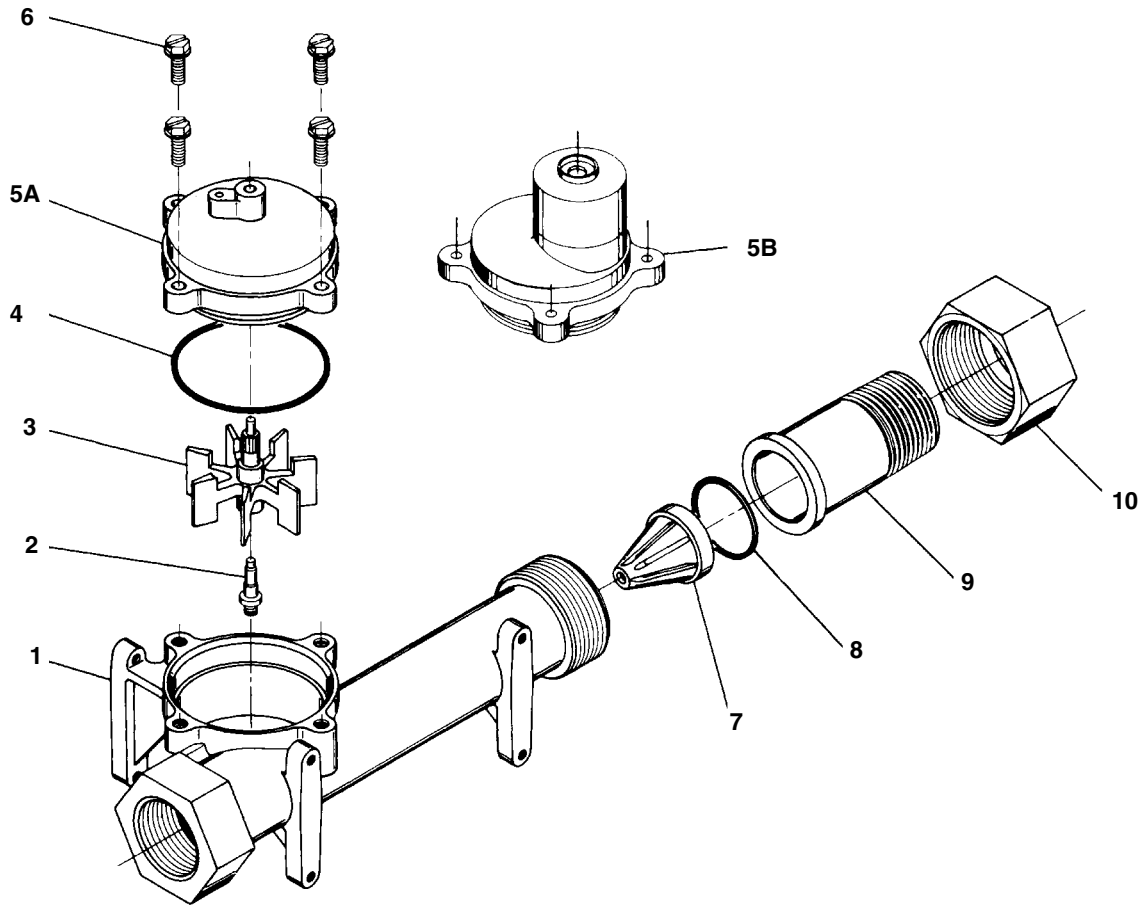
Parts List

| Item No. | Quantity | Part No. | Description |
|----------|----------|----------|-------------------------------------|
| 1..... | 1 | 11749 | Brine Valve Nut |
| 2..... | 1 | 10250 | Retaining Nut |
| 3..... | 1 | 10249 | Brine Valve Spring |
| 4..... | 1 | 12550 | Seal O-Ring |
| 5..... | 1 | 10785 | Service Actuator Assembly - .25 gpm |
| 6..... | 1 | 12552 | Brine Valve Stem |
| 7..... | 1 | 12626 | Brine Valve Seat |
| 8..... | 3 | 10332 | Insert Sleeve |
| 9..... | 3 | 10330 | Delrin Sleeve |
| 10..... | 3 | 10329 | Fitting Nut |
| 11..... | 1 | 10331 | Male Connector 1/4 P to 3/8 T |

MODEL 2850 ECONOMINDER®

1-1/2" Meter Assembly

(See Opposite Page for Parts List)



MODEL 2850 ECONOMINDER®

1-1/2" Meter Assembly

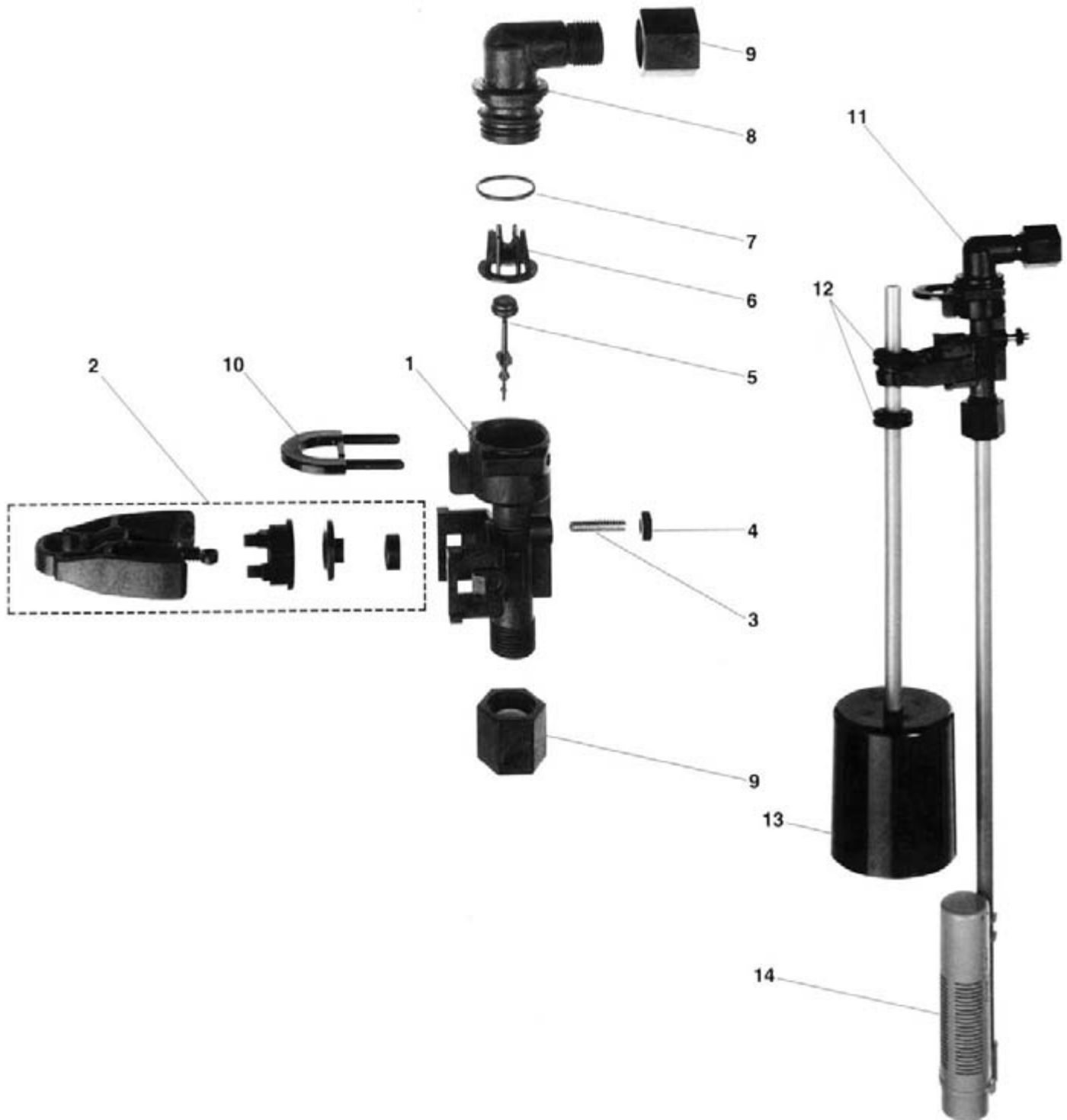
Parts List

| Item No. | Quantity | Part No. | Description |
|-----------------|-----------------|-----------------|---------------------------------------|
| 1..... | 1 | 17569 | Meter Body |
| 2..... | 1 | 13882 | Post, Impeller |
| 3..... | 1 | 13509 | Impeller |
| 4..... | 1 | 13847 | O-Ring — Meter Cover |
| 5A..... | 1 | 15218 | Meter Cover Assembly (Std.) |
| 5B..... | 1 | 15237 | Meter Cover Assembly (Extended Range) |
| 6..... | 4 | 12112 | Screw Meter Cover |
| 7..... | 1 | 17542 | Flow Straightener |
| 8..... | 1 | 12733 | O-Ring — Quick Connect |
| 9..... | 1 | 17544 | Nipple — Quick Connect |
| 10..... | 1 | 17543 | Nut — Quick Connect |

MODEL 2850

2310 Safety Brine Valve

(See Opposite Page for Parts List)



MODEL 2850

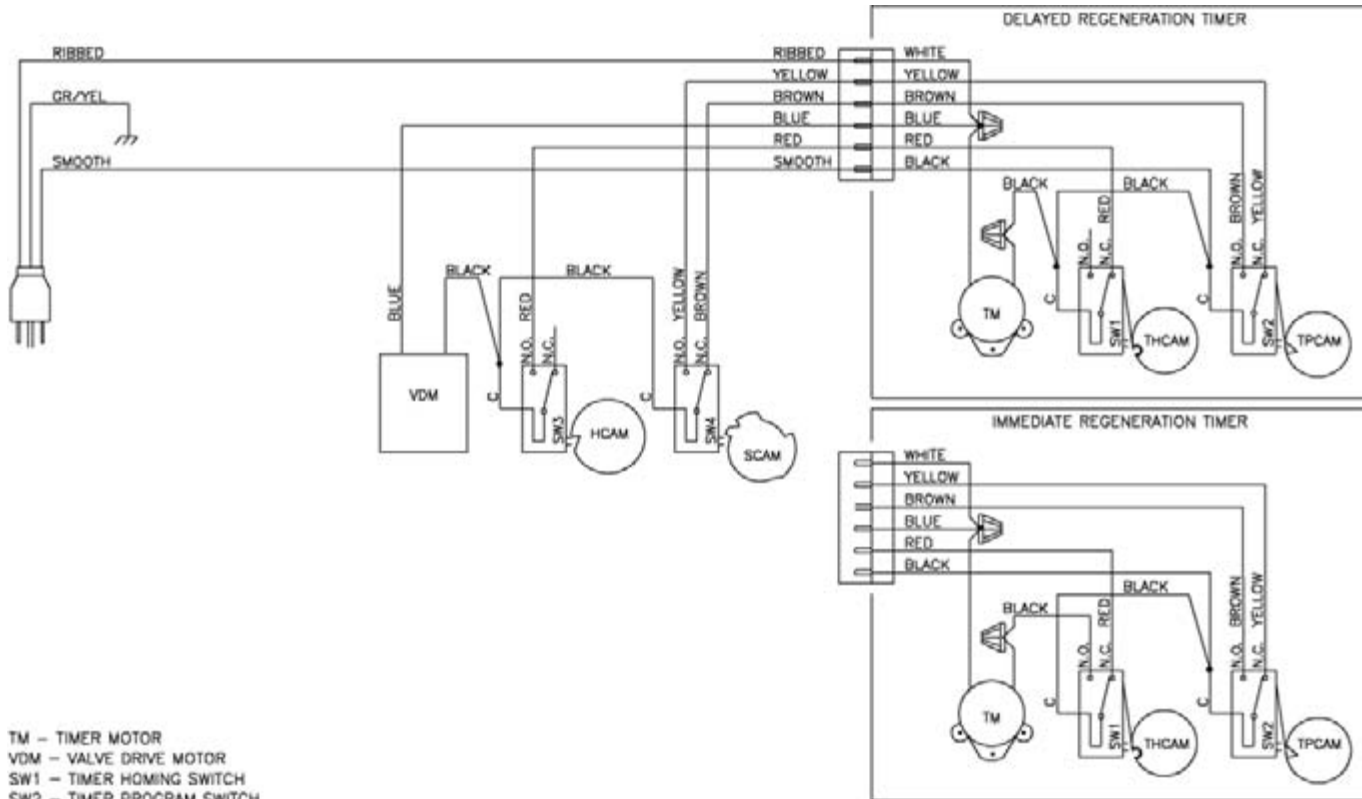
2310 Safety Brine Valve

Parts List

| Item No. | Quantity | Part No. | Description |
|----------|----------|---------------|--|
| 1..... | 1 | 19645 | Safety Brine Valve Body |
| 2..... | 1 | 19803 | Safety Brine Valve Arm Assembly |
| 3..... | 1 | 19804 | Stud, 10-24 |
| 4..... | 1 | 19805 | Nut, 10-24 |
| 5..... | 1 | 19652-01..... | Poppet & Seal |
| 6..... | 1 | 19649 | Flow Dispenser |
| 7..... | 1 | 11183 | O-Ring, -017 |
| 8..... | 1 | 19647 | Elbow, Safety Brine Valve |
| 9..... | 2 | 19625 | Nut Assembly, 3/8 |
| 10..... | 1 | 18312 | Retaining Clip |
| 11..... | 1 | 60014 | Safety Brine Valve, 2310 (includes items 1-10) |
| 12..... | 2 | 10150 | Grommet (included with item 13) |
| 13..... | 1 | 60068 | Float Assembly, 2310 |
| 14..... | 1 | 60002 | 500 Air Check Assembly |

SYSTEM #4-SINGLE VALVE REGENERATION

Immediate and Delayed Valve Wiring

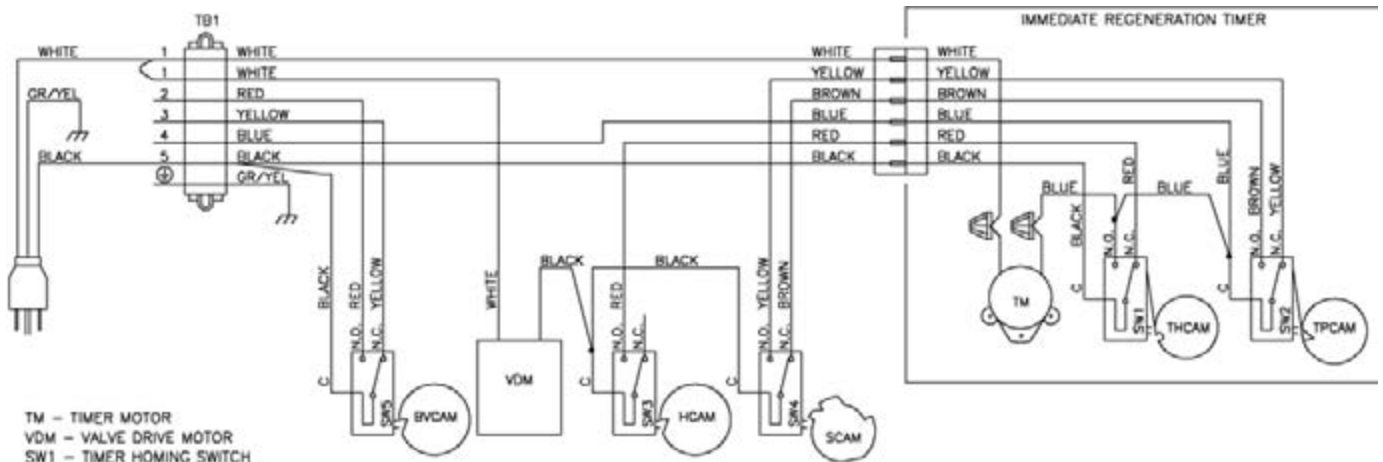


- TM – TIMER MOTOR
- VDM – VALVE DRIVE MOTOR
- SW1 – TIMER HOMING SWITCH
- SW2 – TIMER PROGRAM SWITCH
- SW3 – VALVE HOMING SWITCH
- SW4 – VALVE STEP SWITCH
- THCAM – TIMER HOMING CAM
- TPCAM – TIMER PROGRAM CAM
- HCAM – VALVE HOMING CAM
- SCAM – VALVE STEP CAM

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

SYSTEM #4-WITH REMOTE STARTER

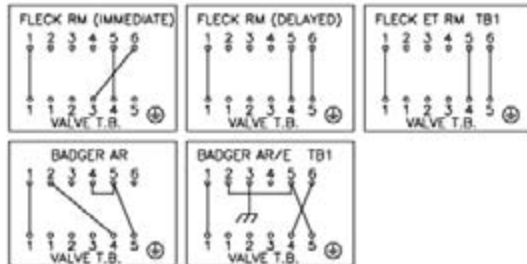
Valve Wiring



- 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

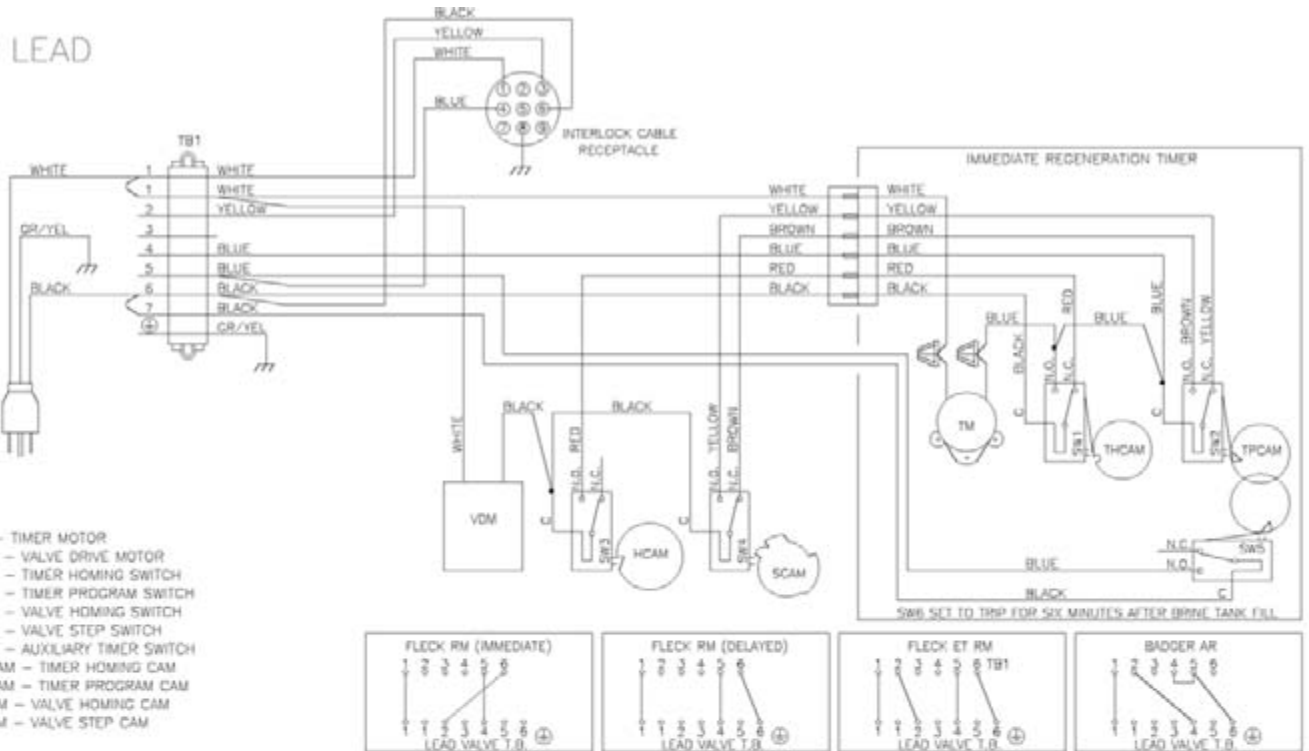
NOTE:
SINGLE TANK REMOTE METER INITIATED DELAYED, OR IMMEDIATE REGENERATION

REMOTE METER WIRING



SYSTEM #6-SERIES REGENERATION

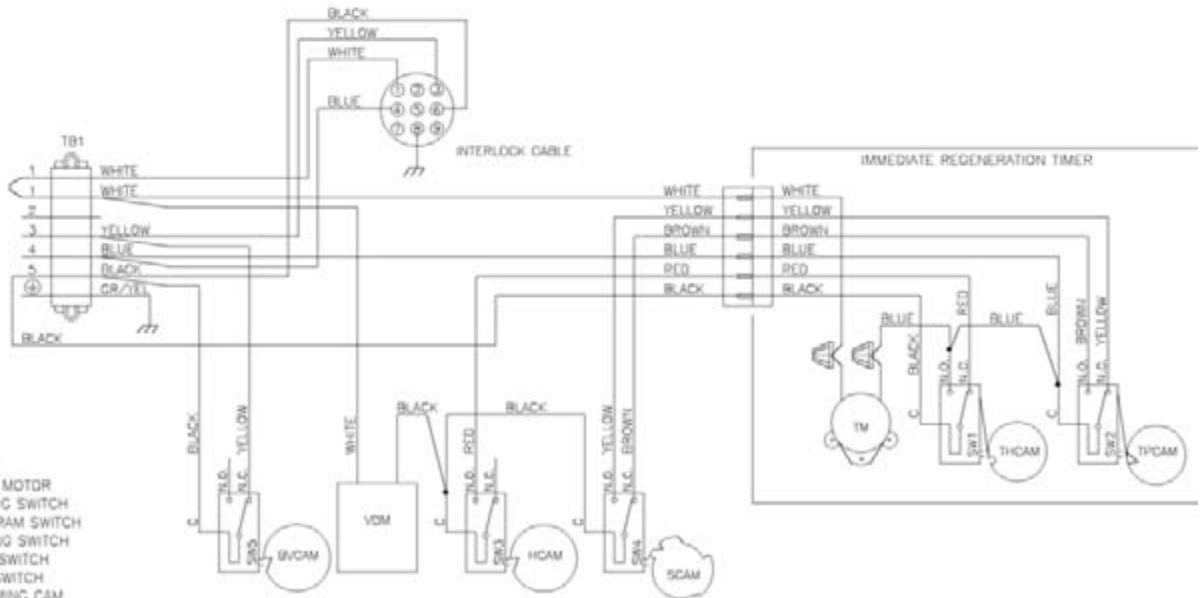
Valve Wiring



- TM - TIMER MOTOR
- VDM - VALVE DRIVE MOTOR
- SW1 - TIMER HOMING SWITCH
- SW2 - TIMER PROGRAM SWITCH
- SW3 - VALVE HOMING SWITCH
- SW4 - VALVE STEP SWITCH
- SW5 - AUXILIARY TIMER SWITCH
- THCAM - TIMER HOMING CAM
- TPCAM - TIMER PROGRAM CAM
- HCCAM - VALVE HOMING CAM
- SCAM - VALVE STEP CAM

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

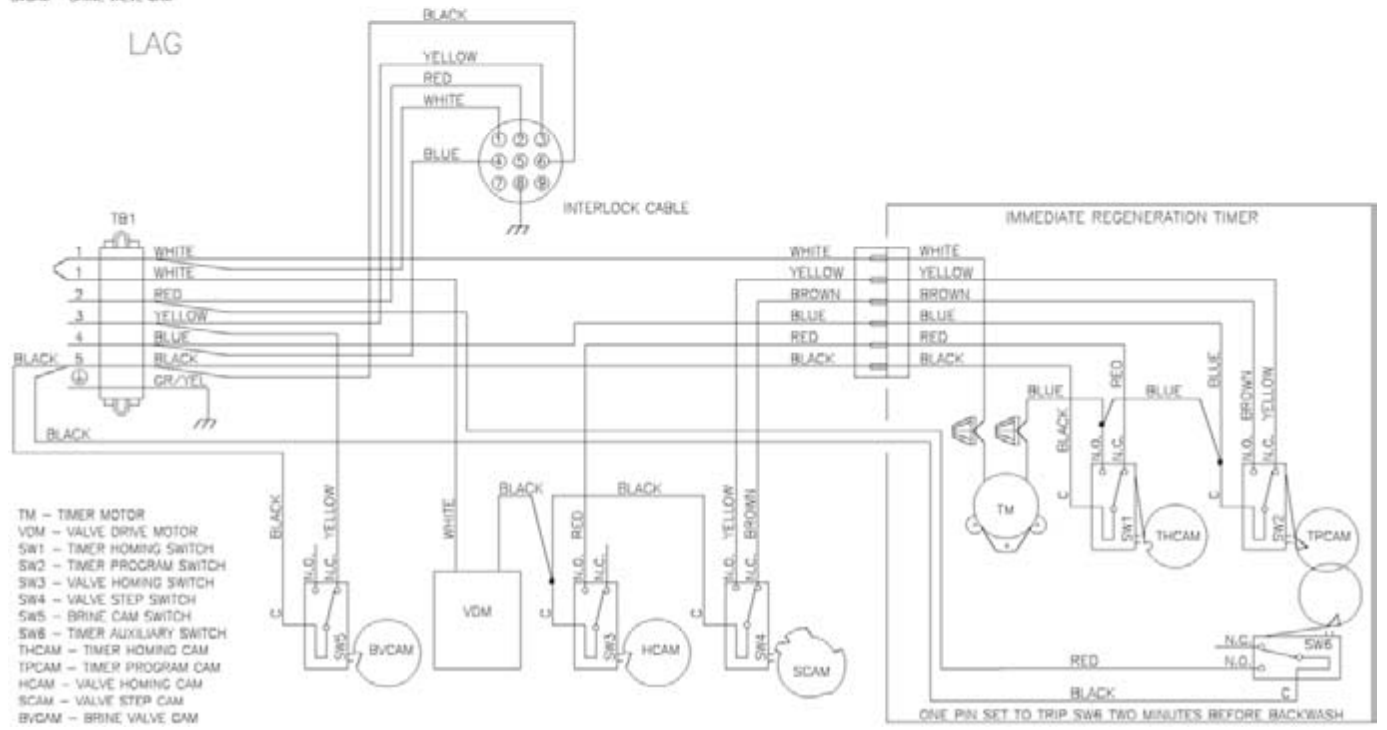
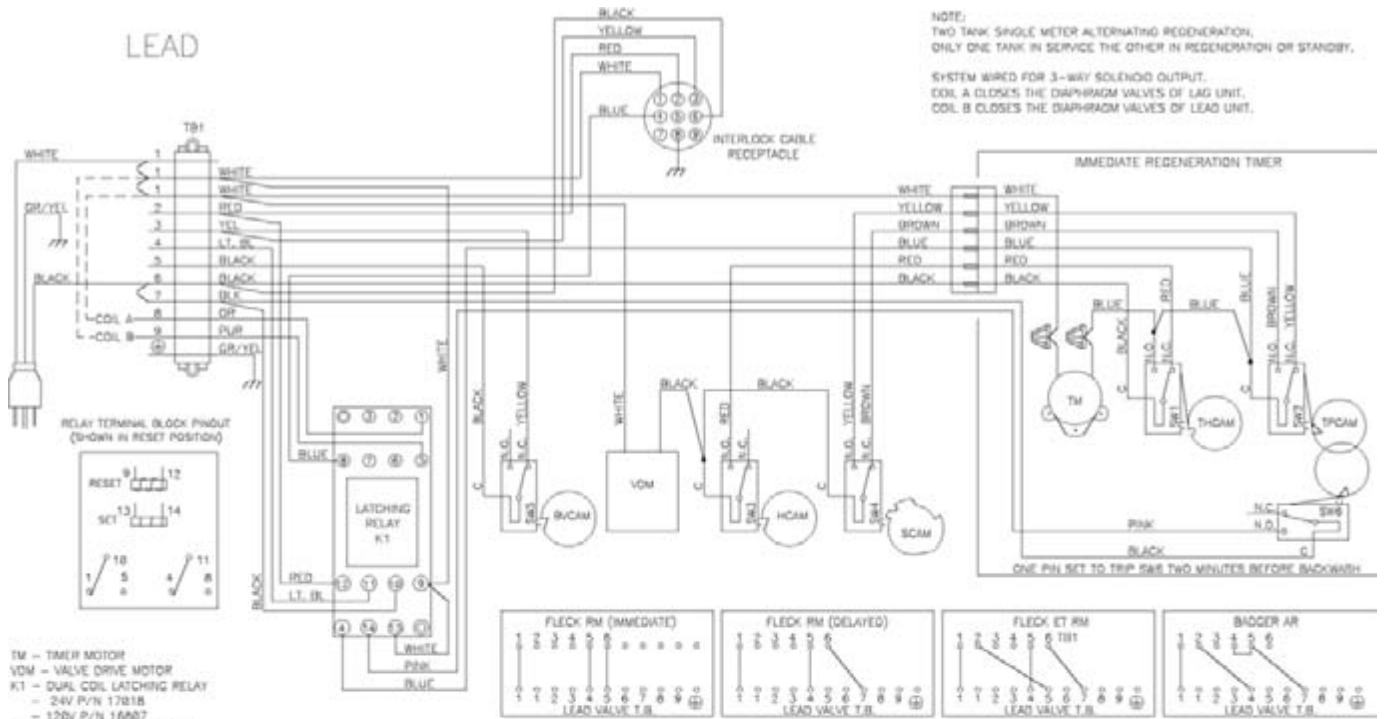
LAG



- 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
- HCCAM - VALVE HOMING CAM
- SCAM - VALVE STEP CAM
- BVCAM - BRINE VALVE CAM

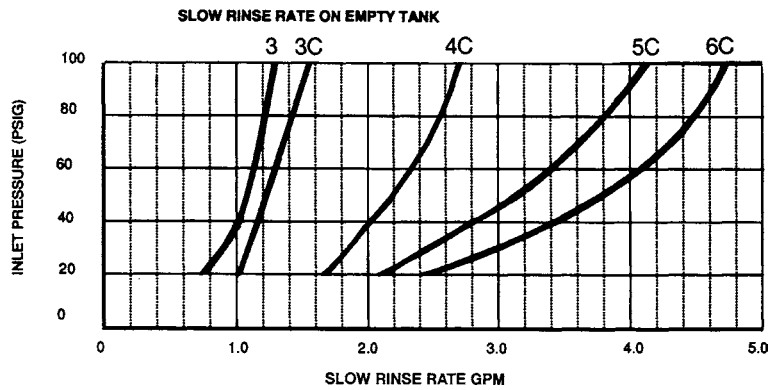
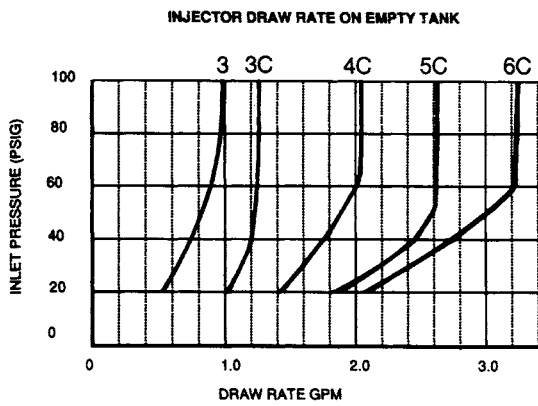
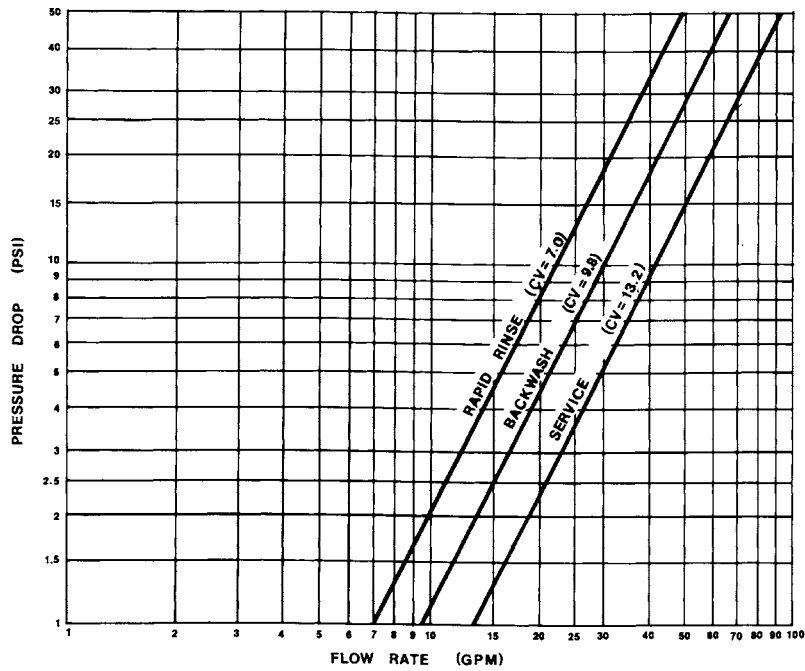
SYSTEM #7-ALTERNATING REGENERATION

24V/120V/3-Way Solenoid Output Valve Wiring



MODEL 2850

Flow Data & Injector Draw Rates



MODEL 2850

**Typical Timer Settings At Various Salting Levels*

Salting @ 6# Per Ft³

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

Salting @ 10# Per Ft³

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

Salting @ 15# Per Ft³

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

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

MODEL 2850

Service Instructions

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

MODEL 2850

Service Instructions

| PROBLEM | CAUSE | CORRECTION |
|-----------------------------------|--|--|
| 7. Excessive water in brine tank. | A. Plugged drain line flow control. B. Plugged injector system. C. Timer not cycling. D. Foreign material in brine valve. E. Foreign material in brine line flow control. | A. Clean flow control. B. Clean injector and screen. C. Replace timer. D. Replace brine valve seat and clean valve. E. Clean brine line flow control. |
| 8. Softener fails to draw brine. | A. Drain line flow control is plugged. B. Injector is plugged. C. Injector screen plugged. D. Line pressure is too low. E. Internal control leak. F. Service adapter did not cycle. | A. Clean drain line flow control. B. Clean injector. C. Clean screen. D. Increase line pressure to 20 P.S.I. E. Change seals, spacers and piston assembly. F. Check drive motor and switches. |
| 9. Control cycles continuously. | A. Missadjusted, broken or shorted switch. | A. Determine if switch or timer is faulty and replace it, or replace complete power head. |
| 10. Drain flows continuously. | A. Valve is not programming correctly. B. Foreign material in control. C. Internal control leak. | A. Check timer program and positioning of control. Replace power head assembly if not positioning properly. B. Remove power head assembly and inspect bore. Remove foreign material and check control in various regeneration positions. C. Replace seals and piston assembly. |

General Service Hints For Meter Control

Problem: Softener Delivers Hard Water.

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

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

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

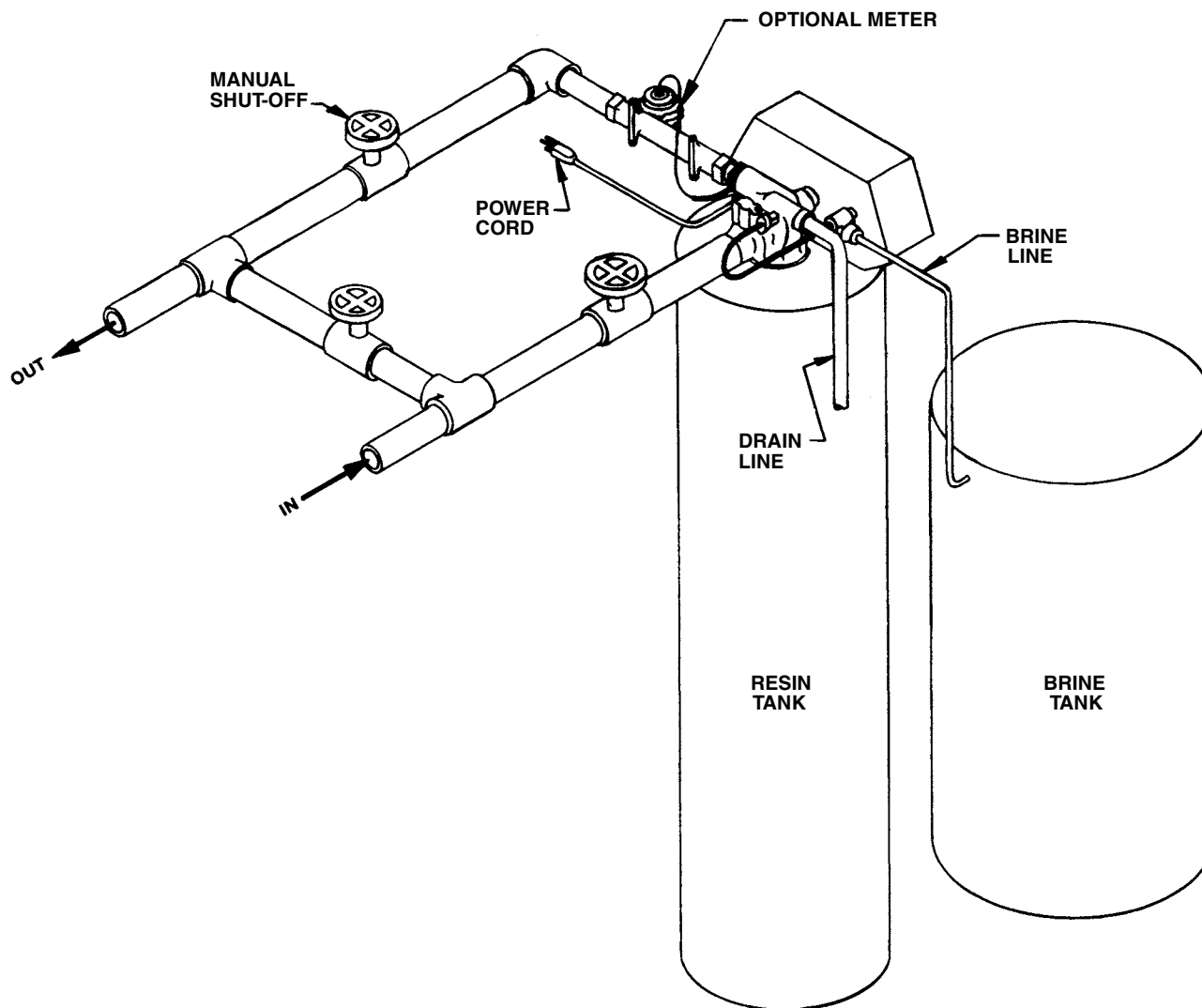
Correction: Pull cable out of meter cover and rotate manually. Program wheel must move without binding and clutch must give positive clicks when program wheel strikes regeneration stop. If it does not, replace timer.

Cause could be that . . . Meter Is Not Measuring Flow.

Correction: Check meter with meter checker.

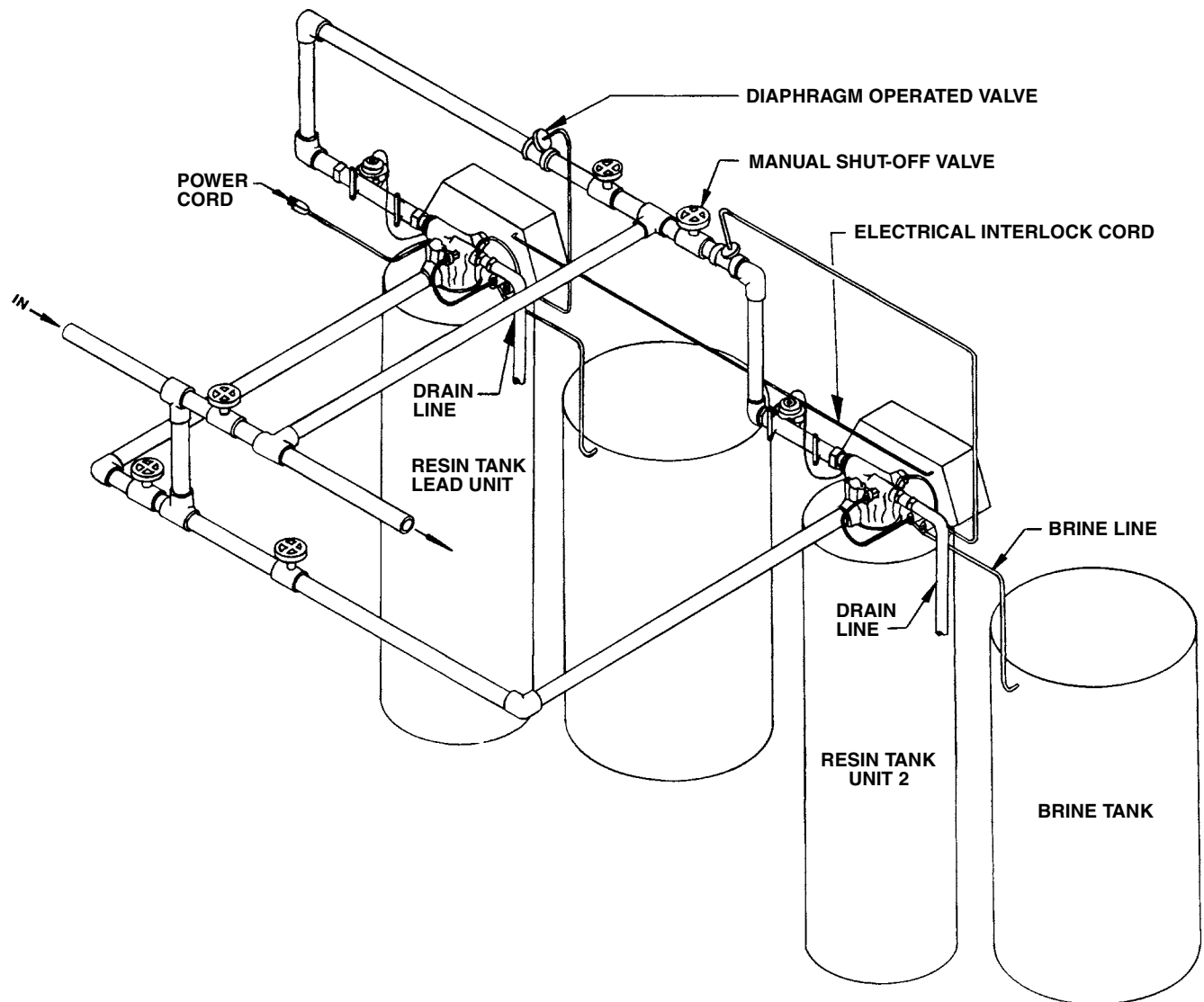
MODEL 2850

System #4 - Typical Single Tank Installation with Optional Meter



MODEL 2850

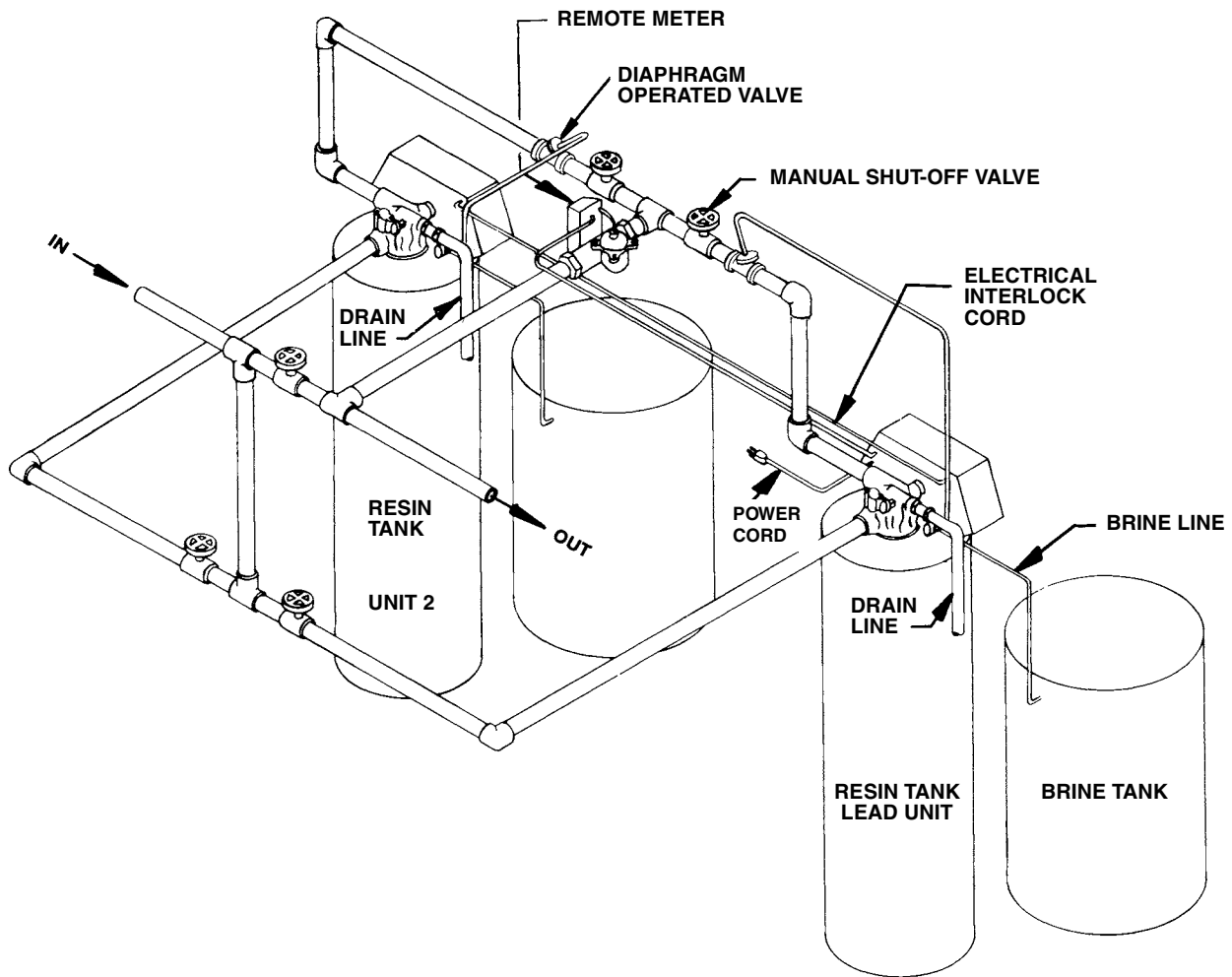
System #5 Interlock - Typical Twin Tank Installation with Optional Meter Interlock and no Hard Water Bypass



2 tanks, 2 meters; interlock system. Both units in service at the same time. When one of the meters zero out, that unit starts into a regeneration. The other unit remains in service, even if it zeroes out during this time.

MODEL 2850

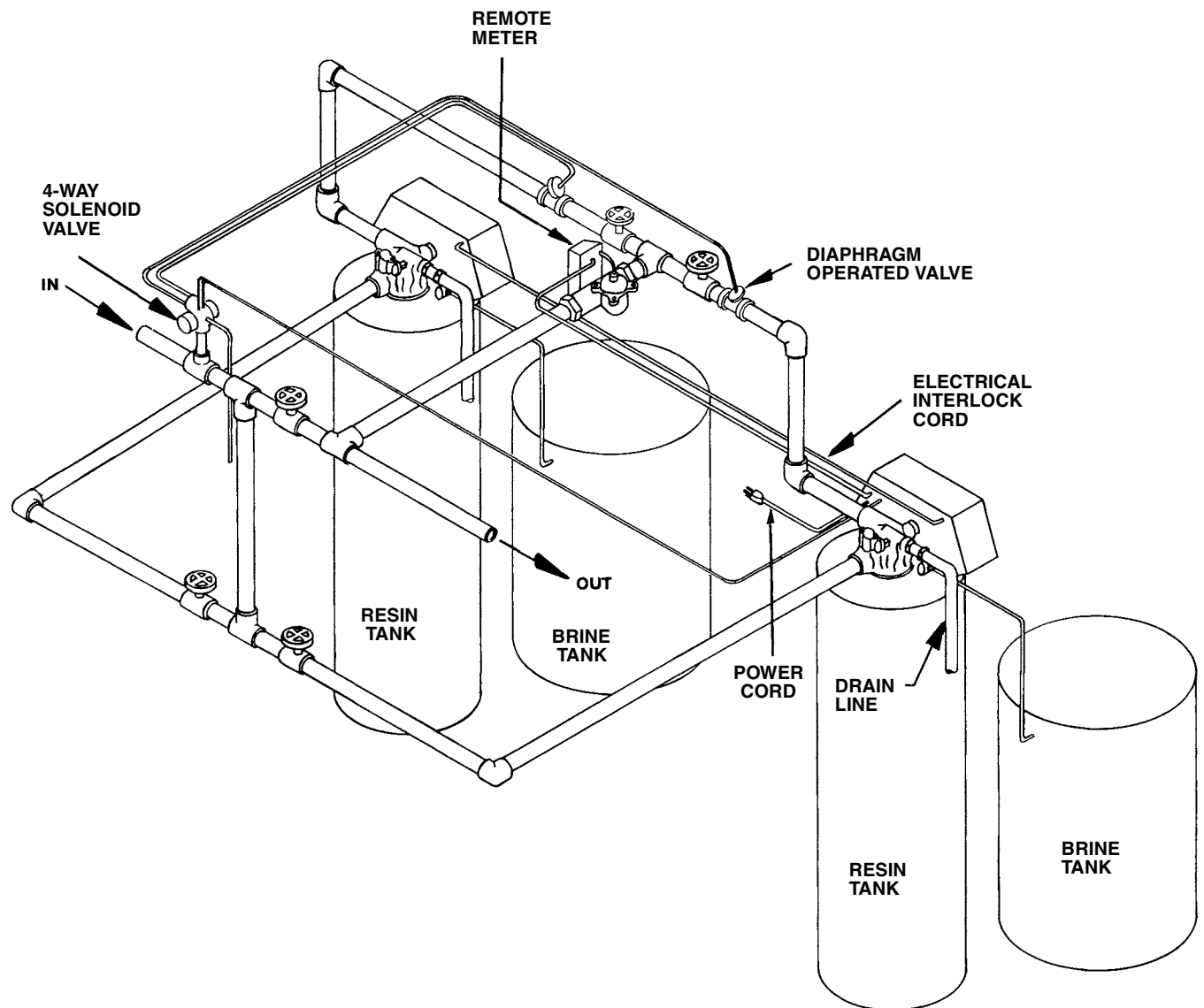
System #6 - Twin Series Regeneration Installation with a Remote Meter



2 tanks, 1 meter; series regeneration system. Both units in service at the same time. When the meter zeroes out; the "lead" unit regenerates. Once the lead unit has returned to the service position, the "lag" unit will regenerate.

MODEL 2850

System #7 - Twin Alternator Installation with a Remote Meter



2 tanks, 1 meter; alternator system. One unit in service, the other is on stand-by. When the meter zeroes out, the unit in service goes into a regeneration cycle, the stand-by unit, goes into service.

MODEL 2850

Service Assemblies

| | |
|-----------------------------|---|
| 60029 | 1600 Brine Valve For Illustrations, See Page 19 |
| 1 10249 | Brine Valve Spring |
| 1 10250 | Retaining Ring |
| 2 10329 | 3/8" Brass Nut |
| 2 10330 | 3/8" Ferrule |
| 2 10332 | 3/8" Sleeve |
| 1 11749 | B/V Stem Guide |
| 1 11982 | O-Ring Brine Valve |
| 1 12552 | 1600 Brine Valve Stem |
| 1 12626 | Shut Off Valve Seat |
| 1 12748 | Brine Valve Body |
| 1 12550 | Quad Ring |
| 60034 | 1700 Brine Valve For Illustration, See Page 20 |
| 1 10250 | Brine Valve Spring |
| 1 12550 | Quad Ring |
| 1 13201 | Quad Ring |
| 1 14785 | Flow Control Retainer |
| 1 14790 | Brine Valve Body |
| 1 14792 | Brine Valve End Plug |
| 1 14795 | Brine Valve Piston |
| 1 14797 | Brine Valve Stem |
| 1 14798 | Spacer |
| 2 14811 | Piston Seal |
| 1 15310 | Brine Valve Spring |
| 1 15517 | Stem Guide |
| 1 15414 | Nut Ferrule 1/2" |
| 1 16123 | Nut 1/2" |
| 1 16124 | Ferrule 1/2" |
| 60080 | 1600 Injector Assembly For Illustration, See Page 6 |
| 1 10227 | Injector Screen |
| 1 11893 | Injector Cap |
| 1 10229 | Injector Cover Gasket |
| 1 10328 | 90° Elbow 1/4" NPT x 3/8 Tube |
| 2 10692 | Screw |
| 1 10913 | Injector Nozzle |
| 1 10914 | Injector Throat |
| 1 11475 | Injector Body Gasket |
| 1 17776 | Injector Body |

| | |
|-----------------------------|---|
| 60381 | 1700 Injector Assembly For Illustration, See Page 6 |
| 1 11893 | Injector Cap |
| 1 10229 | Injector Cover Gasket |
| 1 17777 | Injector Body |
| 1 14801 | Injector Nozzle |
| 1 14802 | Injector Throat |
| 1 14803 | Injector Screen |
| 2 14804 | Screw |
| 1 14805 | Injector Body Gasket |

| | |
|-----------------------------|---|
| 60105 | 2850 Piston Assembly For Illustration, See Page 6 |
| 1 10909 | Connecting Rod Pin |
| 1 16092 | Piston |
| 1 16395 | End Plug Assembly |
| 1 16436 | Piston Rod |

| | |
|--------------------------------|---|
| 60129 | 2850 Seal and Spacer Kit For Illustration, See Page 6 |
| 6 16101 | Seal |
| 5 16638-01 | Spacer |

| | |
|--------------------------------|------------------------------|
| 60129-10 | Seal & Spacer Kit |
| 6 16101-02 | Seal, 2850, Silicone |
| 5 16638-01 | Spacer, 9500/2850 |

| | |
|-----------------------------|--|
| 60050-21 | Drive Motor Assembly, 120V, STF For Illustration, See Page 8 |
| 2 10218 | Micro Switch |
| 2 14923 | Screw #14 x 1-1/3 |
| 2 10302 | Insulator |
| 2 10338 | Roll Pin 3/22 x 7/8 |
| 1 10769 | Drive Motor 120V/60Hz |
| 1 10774 | Motor Bracket — Drive Side |
| 5 10872 | Screw #8 x 5/16 |
| 1 11667 | Wire Harness |
| 1 11826 | Motor Bracket B/V Side |
| 1 12576 | Drive Cam — STF |
| 1 12777 | Brine Valve Cam |
| 1 13366 | Drive Bearing |
| 1 10250 | Retaining Ring |
| 1 10621 | Connecting Link |
| 1 17904 | Plug |

MODEL 2850

Service Assemblies (Cont'd.)

60105-001 . . . Piston Assy., 2850, 560CD

- 1 10909 Pin, Link
- 1 16092 Piston, 2850
- 1 16395-001 End Plug Assy., 2850, 560CD
- 1 16436 Rod, Piston, 1-1/2" Valve

60105-01 . . . Piston Assy., 2850, Hot Water

- 1 10909 Pin, Link
- 1 16029 Piston, 2850
- 1 16395-01 End Plug Assy., 2850, Hot Water
- 1 16436 Piston, 1-1/2" Valve

60050-31 . . . Drive Motor Assembly, 120V, Tri Stack

- 2 10218 Micro Switch
- 2 14923 Screw #4 x 1 1/3
- 2 10302 Insulator
- 2 10338 Roll Pin 3/22 x 7/8
- 1 10769 Drive Motor 120V/60 Hz
- 1 10774 Motor Bracket — Drive Side
- 5 10872 Screw #8 x 5/16
- 1 11667 Wire Harness
- 1 11826 Motor Bracket B/V Side
- 1 12576 Drive Cam — STF
- 1 12472 Tri-Stack Cam
- 1 13366 Drive Bearing
- 1 10250 Retaining Ring
- 1 10621 Connecting Link

Flow Controls

- 60366-35 DLFC 1" NPT 3.5 GPM
- 60366-40 DLFC 1" NPT 4.0 GPM
- 60366-50 DLFC 1" NPT 5.0 GPM
- 60366-60 DLFC 1" NPT 6.0 GPM
- 60366-70 DLFC 1" NPT 7.0 GPM
- 60701-10 DLFC, 1" F x 1" F 10 GPM
- 60701-12 DLFC, 1" F x 1" F 12 GPM
- 60701-15 DLFC, 1" F x 1" F 15 GPM
- 60701-20 DLFC, 1" F x 1" F 20 GPM
- 60701-25 DLFC, 1" F x 1" F 25 GPM
- 60702-10 DLFC, 1" M x 1" F 10 GPM
- 60702-12 DLFC, 1" M x 1" F 12 GPM
- 60702-15 DLFC, 1" M x 1" F 15 GPM
- 60702-20 DLFC, 1" M x 1" F 20 GPM
- 60702-25 DLFC, 1" M x 1" F 25 GPM

NHWP-P Pistons

- 60114-00 Filter Conversion Kit
- 60114-01 Piston Assembly Only
- 60114-02 1600 Conversion Kit
- 60114-03 1700 Conversion Kit

Side Mount Adapter

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

