

# Signature Series

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## *Service Manual*

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*Your new Signature Series Valve is capable of high flow rates with simple to use electronics.*



# Signature Series

## Control Start-Up Procedures

### Main Menu



1. To Enter Main Menu Press the Menu/Enter Button  
(Time of Day will Flash)
2. To Set Time of Day Press the Set/Change Button  
(First Digit will begin to Flash) Example [ 12:00 ]
  - To Change Digit Value Press the Set/Change Button
  - To Accept the Digit Press the Menu/Enter Button
  - (Next Digit will Flash)
  - (Once hours is accepted all digits will Flash)
3. With all Digits Flashing Press the Menu Button to Set A.M. or P.M.
  - To Change Digit Value Press the Set/Change Button Example [ A ]
  - To Accept the Digit Press the Menu/Enter Button
  - (Once A.M./P.M. is Accepted the Next Menu Item will Flash)
4. (Metered Version) To Set the Hardness Press the Set/Change Button
  - To Change Digit Value Press the Set/Change Button Example [ H - 10 ]
  - To Accept the Digit Press the Menu/Enter Button
  - (Next Digit Will Flash)
  - Once the Last Digit is Accepted all Digits will Flash

Note: One cycle must be completed before new setting will be accepted.
4. (Time Clock and Filter Version) To Set Regeneration Frequency Press the Set/Change Button
  - To Change Digit Value Press the Set/Change Button Example [ A - 05 ]
  - To Accept the Digit Press the Menu/Enter Button
  - Once the Last Digit is Accepted all Digits will Flash

Notes: -Maximum Value is 29  
-If Value is Set to 0, Automatic Regeneration will Never Occur  
-One cycle must be completed before new setting will be accepted.
5. To Exit Menu Press the Menu/Enter Button  
Note: If no Buttons are Pressed for 60 Seconds or Longer the Menu will Automatically be Exited.

### Normal Operation

#### 1. (Metered Version)

- Normal Display Alternates Between Time of Day and Gallons of Treated Water Remaining.
- When the display is Showing Gallons Remaining and there is Water Flow the Upper and Lower Colon Lights will Alternate.
- As Treated Water is Used the Gallons Remaining Display will Count Down from a Maximum Value to 0.
- Once the Count Reaches 0 a Regeneration Cycle will be Initiated at the Next Designated Regeneration Time.

#### 2. (Time Clock and Filter Version)

- Normal Display Alternates Between Time of Day and Days Until Regeneration.
- Days Remaining Until the Next Regeneration will Count Down from the Regeneration Day Override Value to 1 Day Remaining.
- Once the Count Reaches 1 a Regeneration Cycle will be Initiated at the Next Designated Regeneration Time.

#### 3. Battery Back-Up (This Unit Uses a Standard 9 volt Alkaline Battery)

##### -Installing the Battery

-To Install the Battery the Back-Cover Must be Removed by Removing the Two Back-Cover Screws.

-Next Insert the Battery into the Battery Holding Clip and Snap the 9 volt Battery Connector onto the Battery.

-Replace Back-Cover

##### -Features of Battery Back-Up

-The Battery Back-Up Maintains the Time of Day During Power Failures.

-The Battery Back-Up Continues to Count Down Gallons Remaining During Power Failure (Metered Version)



Note: During Power Failure to Conserve Battery Power the Display is turned off. However, to Confirm that the Battery is Working you can Press Either Button and the Display will Turn on for Five Seconds.

\* Menus can not be Accessed During Power Failure

\* If a Power Failure Occurs while the Valve is in Regeneration the Regeneration will Resume Operation Once the Power is Restored

### **Starting Extra Regeneration Cycle**

1. Starting Delayed Extra Cycle

-(Metered Version)

-If Gallons Remaining is not Already at 0 Press and Hold the Set/Change Button

-After 3 Seconds the Gallons Remaining Display will Read 0 Example [ 0000 ]

-Regeneration Cycle will be Initiated at the Next Designated Regeneration Time

-(Time Clock and Filter Version)

-If Days Remaining is not Already at 1 Press and Hold the Set/Change Button.

-After 3 Seconds the Days Remaining Display will Read 1 Example [ 1 ]

-Regeneration Cycle will be Initiated at the Next Designated Regeneration Time

2. Starting Immediate Extra Cycle - First, Complete Above Delayed Cycle Steps

-(Metered Version)

-With Gallons Remaining at 0, Press and Hold the Set/Change Button

-After 3 Seconds the Regeneration Cycle will Begin

-(Time Clock and Filter Version)

-With Days Remaining at 1 Press and Hold the Set/Change Button

-After 3 Seconds the Regeneration Cycle will Begin.

3. Fast Cycling Thru Regeneration

-First Complete Above Immediate Cycle Steps

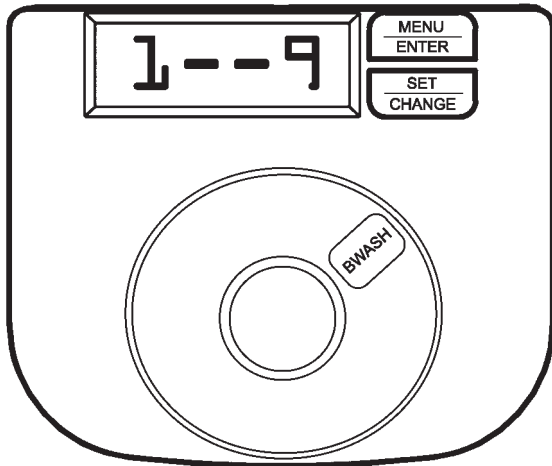
-Press and Hold the Set/Change Button

-After 3 seconds the Valve will Start to Advance to the Next Step

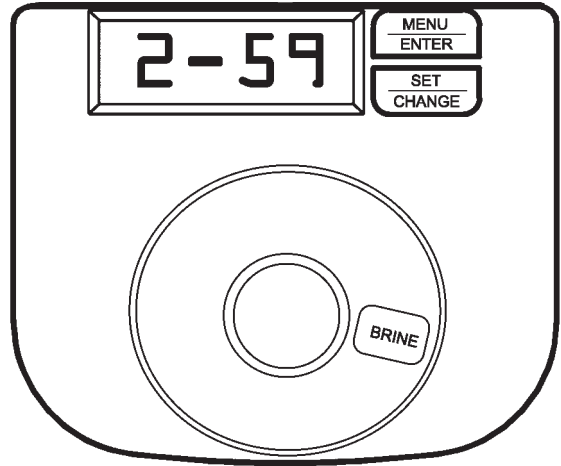
# Signature Series

## Control Start-Up Procedures

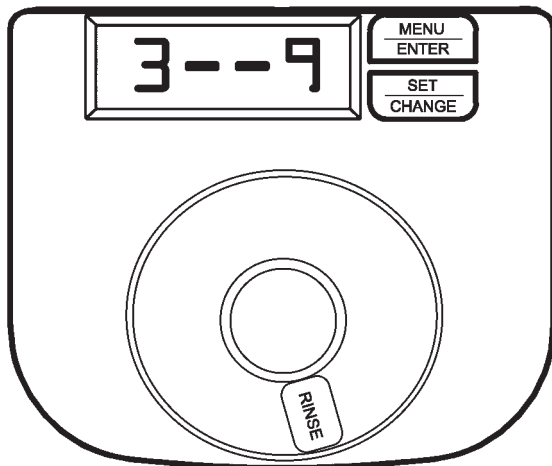
### Sample Regeneration Cycle Displays



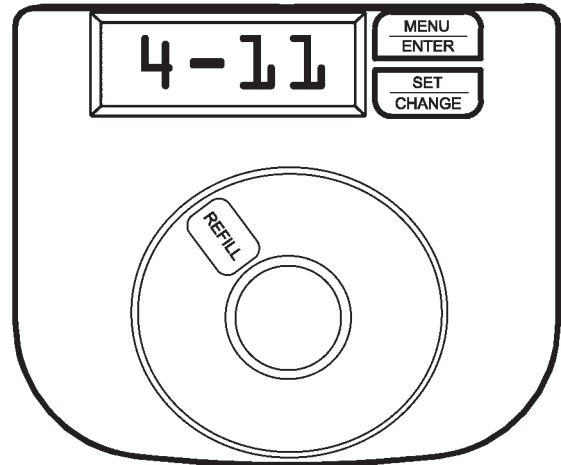
**Step 1:** Less Than 9 Minutes Remaining in the Backwash Step



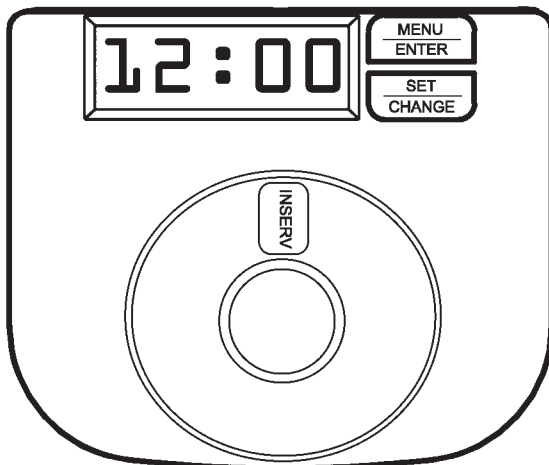
**Step 2:** Less Than 59 Minutes Remaining in the Brine/Rinse Step (For Filters & Reactr, this is a Rest Period)



**Step 3:** Less Than 9 Minutes Remaining in the Rapid Rinse Step



**Step 4:** Less Than 11 Minutes Remaining in the Brine Refill Step (For Filters & Reactr, this Step is Skipped)



**Step 5:** Valve is In Service

#### Notes:

-When the Valve is Between Positions the Display will Flash the Number of the Step it is Moving towards.

-To Fast Cycle Thru Regeneration Press and Hold the Set/Change Button Until the Valve Starts to Advance to the Next Step.

# Signature Series

## Control Start-Up Procedures

### Final Set-Up

With Proper Valve Operation Verified:

1. Add water to the top of the air check. Manually step the valve to the Brine Draw Position and allow the valve to draw water from the brine tank until it stops. Note: The air check will check at approximately the mid point of the screened intake area.
2. Next, manually step the valve to the Brine Refill Position and allow the valve to return to Service automatically.
3. With the valve in Service, check that there is about 3.0" to 5.0" of water above the grid in the brine tank, if used.
4. Fill the brine tank with salt.
5. Set-Up is now finished, the control can now be left to run automatically.

### Error Codes

There are five (5) error codes that could indicate a possible problem with the control valve:

- Error 2 -** Homing slot expected. Valve will start looking for home.  
(Normal operation continues)
- Error 3 -** Encoder is not sending a signal  
(Valve requires service to continue)
- Error 4 -** Unable to find homing slot  
(Valve requires service to continue)
- Error 5 -** Motor overload (stalled position or shorted motor)  
(Valve requires service to continue)

-New Signature program is identified by "r2.1" in presentation upon power up.

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## Master Programming Mode

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### Entering Master Programming Mode

-To Enter Master Programming Mode Press and Hold both buttons for 5 seconds.

Note: All Master Programming functions have been preset at the factory. Unless a change is desired it is **NOT** necessary to enter the Master Programming Mode.

### 1. Regeneration Type (t)

This Display is used to set the Regeneration Type. This option setting is identified by the letter 't' in the left digit. There are 2 possible settings:

**Timeclock Filter Delayed.** The control will determine that regeneration is required when the set Regeneration Time has been reached. The Regeneration Frequency setting will determine which days a regeneration cycle will be initiated.

Example: [ t - - c ]

**Meter Delayed (Demand)** The control will determine that a regeneration is required when the available volume of softened water drops to or below zero. Regeneration is to begin immediately at the set Regeneration Time.

Example: [ t - - d ]

The Set/Change Button will adjust this value.

To Accept the Digit Value Press the Menu/Enter Button

### 2. Regeneration Day Override (A) - Meter Mode Only

Press Menu/Enter Button. This display is used to set the maximum amount of time (in days) the unit can be in service without a regeneration. This option setting is identified by the letter 'A' in the left digit. This option will be in the Master Programming Menu only in the Meter Mode. Regeneration will begin at the set Regeneration Time. A 0 setting will cancel this feature. The Max Value for this item is 29.

Example: Override every 7 days - [ A - 07 ] (Factory Setting)  
Cancel setting - [ A - 00 ]

To Adjust this Value Press the Set/Change Button.

To Accept the Digit Value Press the Menu/Enter Button.

### 3. Regeneration Time (r)

Press the Menu/Enter Button. The next display viewed is the option setting for Regeneration Time. It is identified by the letter 'r' in the left digit. Set the desired time of day that a regeneration may occur, if required. The first digit(s) indicates the Hour and the other digit indicates A.M. or P.M..

Example: 2 A.M. regeneration time - [ r 2A ] (Factory Setting for Softeners)  
12 A.M. backwash time - [ r12A ] (Factory Setting for Filters/Reactrs)

To Adjust this Value Press the Set/Change Button.

To Accept the Digit Value Press the Menu/Enter Button.

# Signature Series

## Master Programming Mode

### 4. Regeneration Cycle Step Programming (1)(2)(3)(4)

Press the Menu/Enter Button. The next 4 displays viewed are part of a series of option settings used to program the Regeneration Cycle. Up to 4 steps can be programmed. Each display is used to set the duration time in minutes for that specific step in a regeneration cycle. A step # will turn on for the regeneration cycle step being programmed. Regeneration steps are *skipped* by setting the display to 0 as shown below:

Examples: Regeneration Cycle Step #1 - 10 minutes - [ 1 - 10 ] (Factory Setting)

Regeneration Cycle Step #2 - skipped - [ 2 - - 0 ]

Desired lbs. salt ÷ 3 ÷ (Brine Line Flow Control) size (gpm) = refill time in minutes  
12 lbs. salt ÷ 3 ÷ .50 = 8 minute refill

\* All units are preprogrammed for full salting at factory

Softener Capacity 24K, 32K, 48K, 64K (.50 gpm BLFC)	
Desired Salting (lbs.)	Brine Refill Time (minutes)
9 lbs.	6 minutes
12 lbs.	8 minutes
15 lbs.	10 minutes
24 lbs.	16 minutes
30 lbs.	20 minutes

Softener Capacity 90K, 96K, 120K (1.0 gpm BLFC)	
Desired Salting (lbs.)	Brine Refill Time (minutes)
15 lbs.	5 minutes
24 lbs.	8 minutes
30 lbs.	10 minutes
45 lbs.	15 minutes
60 lbs.	20 minutes

### 5. System Capacity in Grains (c) - Meter Mode Only

Press the Menu/Enter Button. This display is used to set the system capacity in grains and is used in conjunction with the hardness setting to calculate total gallons of treated water available between regenerations. This option is identified by the letter 'c' in the left digit. This option will only be available when Meter Delay is selected in Step 1. The maximum value for this item is 399.

Example: 32,000 grain capacity [ c 0 3 2 ]

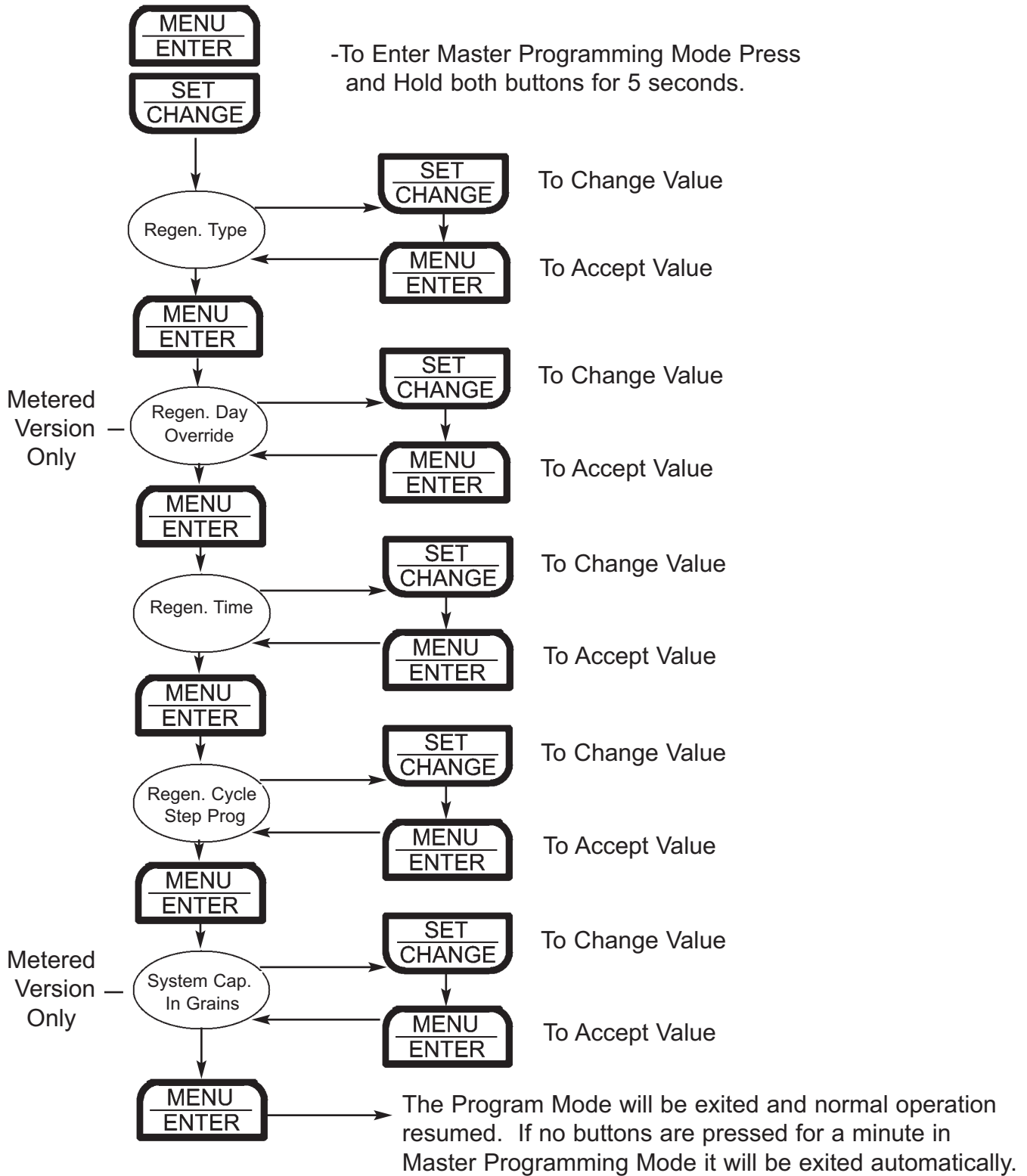
### Exiting the Master Programming Mode

Press the Menu/Enter Button until all steps have been viewed. The Program Mode will be exited and normal operation resumed. If no buttons are pressed for 60 seconds or longer in Master Programming Mode it will be exited automatically.



# Signature Series

## Master Programming Mode Flow Chart

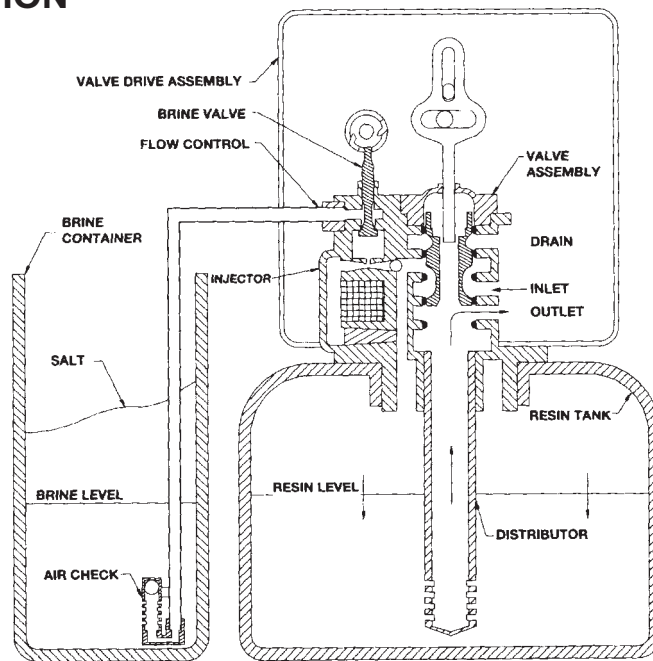


Note: Depending on Current Valve Programming Certain Displays will not be able to be Veiwed or Set.

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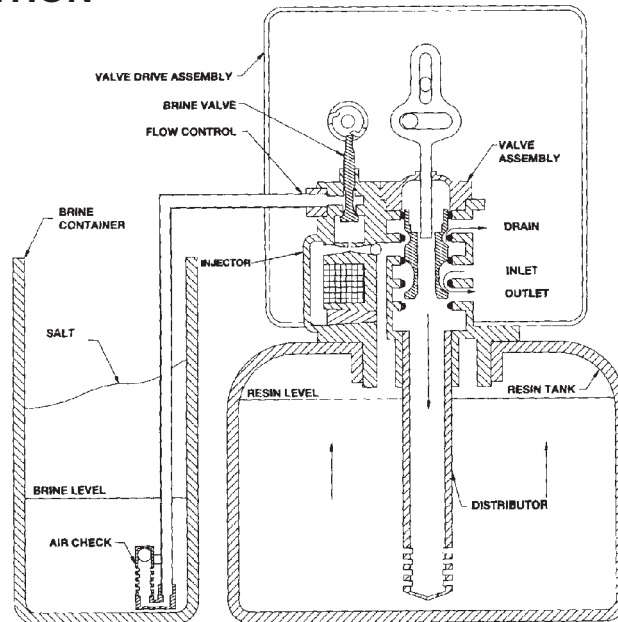
## Water Conditioner Flow Diagrams

### 1.) SERVICE POSITION



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

### 2.) BACKWASH POSITION

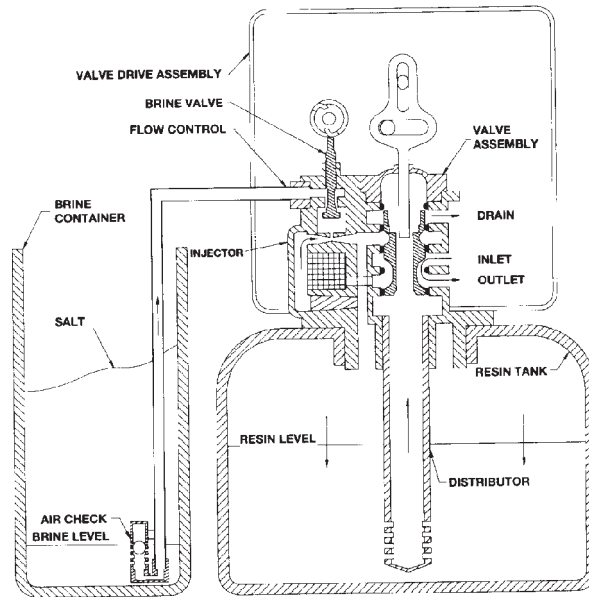


Hard water enters unit at valve inlet - flows around piston - down center tube - thru bottom distributor and up thru the mineral - around the piston and out the drain line.

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## Water Conditioner Flow Diagrams (Cont'd)

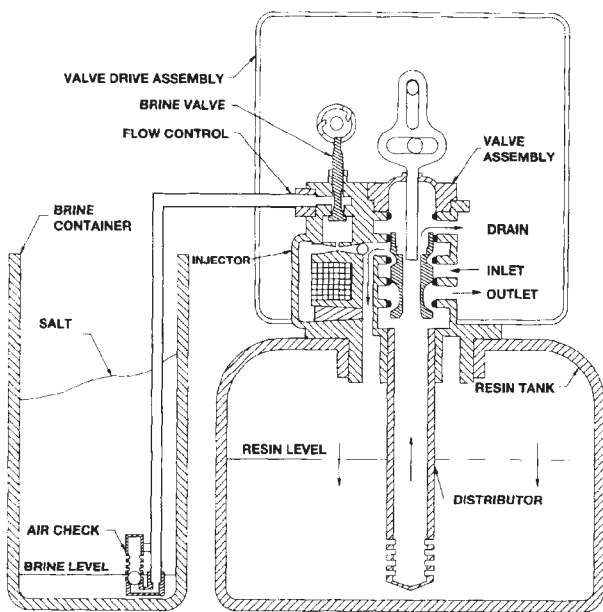
### 3.) BRINE/SLOW RINSE POSITION



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

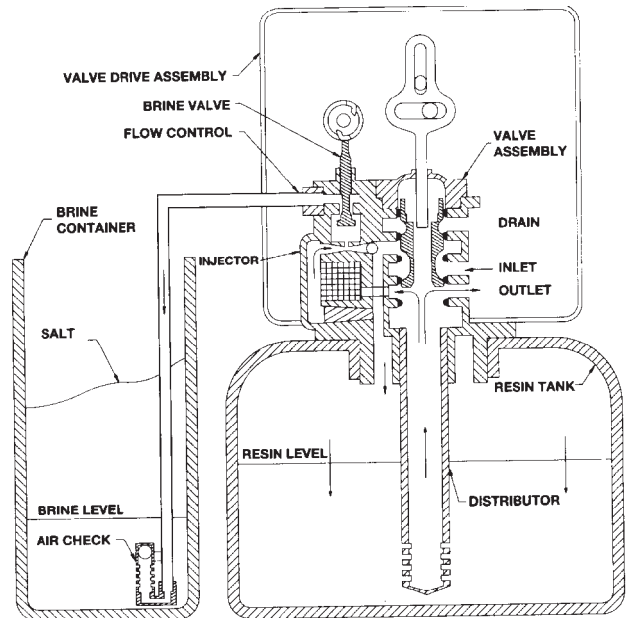
**Slow Rinse.** Hard water enters unit at the valve inlet - flows into injector housing and thru nozzle and throat down thru mineral and enters the center tube thru bottom distributor and out thru the drain line.

### 4.) RAPID RINSE POSITION



Hard water flows from inlet around the piston down thru the mineral into bottom distributor and up thru center tube - thru piston and out thru the drain line.

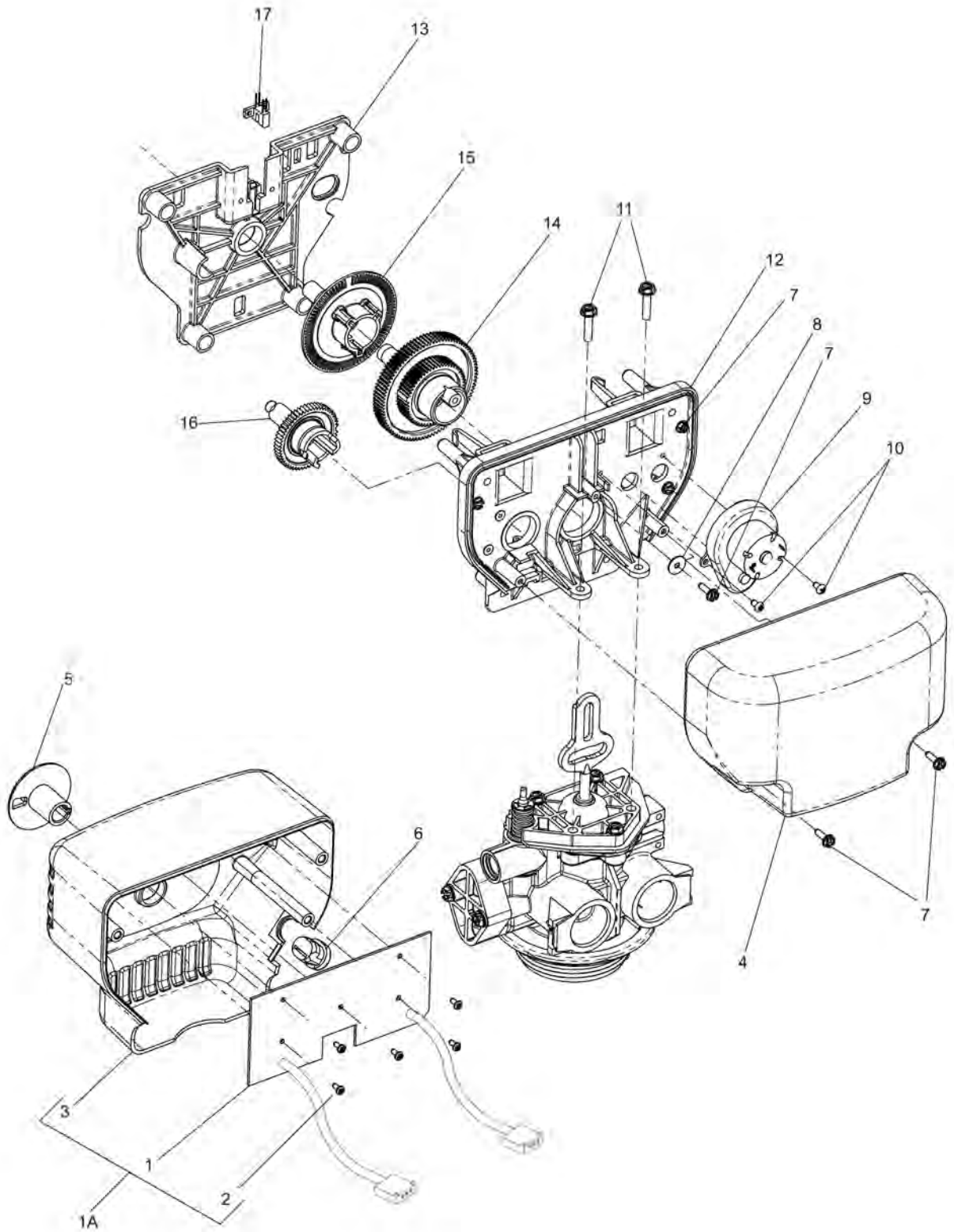
### 5.) BRINE TANK FILL POSITION



Hard water enters unit at valve inlet and flows around the piston down thru the mineral. Conditioned water flows up thru the center tube - flows thru the injector housing - thru the brine valve to fill the brine tank.

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## Valve Powerhead Assembly



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## Valve Powerhead Assembly Parts List

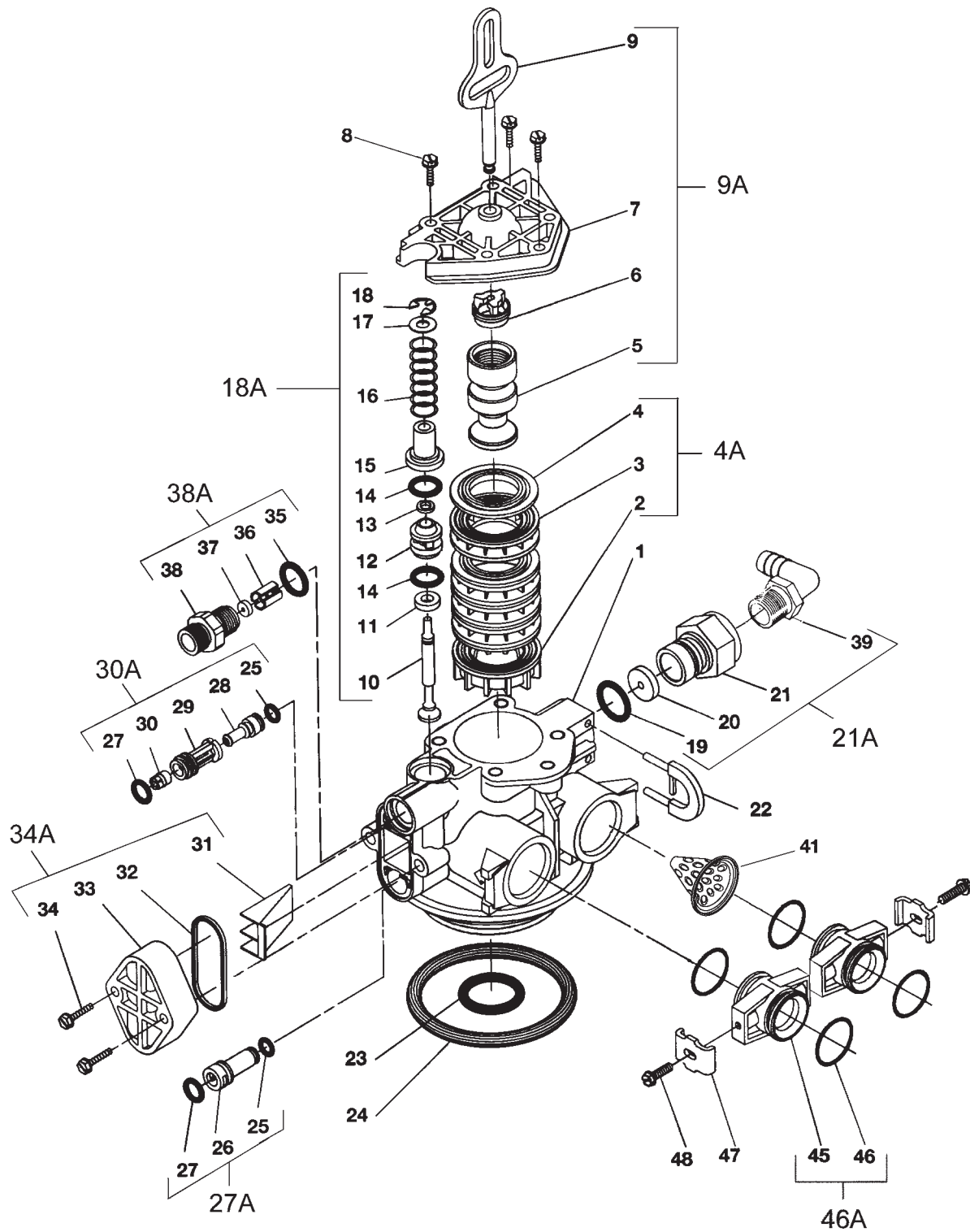
Ref. No.	Quantity	Part No.	Description
0	1	20001X100	Powerhead Assembly Complete (Timeclock Softener)
0	1	20002X100	Powerhead Assembly Complete (Filter)
0	1	20003X100	Powerhead Assembly Complete (Metered Softener w / meter)
0	1	20003X101	Powerhead Assembly Complete (Metered Softener w/o meter)
0	1	20005X100	Powerhead Assembly Complete (Reactr)
<b>1A</b>	1	20001X101	Circuit Board Assembly Includes (1) Ref. #1, (5) Ref. #2 & (1) Ref. #3
1	1	N/S	Circuit Board
2	5	N/S	Screw
3	1	N/S	Front Cover and Label
4	1	20001X106	Rear Cover
5	1	20001X109	Indicator Dial
6	1	20001X110	Hayco Fitting
7	1	20001X111	Screw
8	3	20001X112	Washer
9	1	20001X113	Drive Motor 12 VDC
10	1	20001X114	Screw
11	1	20001X116	Screw
12	1	20001X118	Back Plate
13	1	20001X119	Front Plate
14	1	20001X120	Main Gear
15	1	20001X121	Encoder Wheel
16	1	20001X122	Brine Cam
17	1	20001X124	Encoder
18	1	20001X125	Power Supply (not pictured)

N/S = Non Stocked Item

Bold Ref. No. Indicates Assembly or Kit

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## Control Valve Assembly



# Signature Series

## Control Valve Assembly Parts List

Ref. No.	Quantity	Part No.	Description
0	1	20001X200	Valve Body Complete
1	1	20001X201	Valve Body Only
2	1	N/S	End Spacer
3	4	N/S	Spacer
4	5	N/S	Seal
<b>4A</b>	1	20001X232	Seal & Spacer Kit Includes (1) Ref. #2, (4) Ref. #3 & (5) Ref. #4
5	1	N/S	DownFlow Piston
6	1	N/S	Piston Rod Retainer
7	1	N/S	End Plug Assembly
8	3	N/S	Hex Washer HD. 10-24 X 13/16" Screw
<b>9A</b>	1	20001X231	Piston Assembly Includes (1) Ref. #5, (1) Ref. #6, (1) Ref. #7, & (1) Ref. #9
10	1	N/S	Brine Valve Stem
11	1	N/S	Brine Valve Seat
12	1	N/S	Brine Valve Spacer
13	1	N/S	Quad Ring
14	1	N/S	O-Ring
15	1	N/S	Brine Valve Cap
16	1	N/S	Brine Valve Spring
17	1	N/S	Plain Nylon Washer
18	1	N/S	Retaining Ring
<b>18A</b>	1	20001X210	Brine Assembly Includes Ref. #10 Thru 18
19	1	20251X254	O-Ring
20	1	20251X266	Flow Control Button 1.5 GPM
		20251X267	Flow Control Button 2.0 GPM
		20251X268	Flow Control Button 2.4 GPM
		20251X269	Flow Control Button 3.0 GPM
		20251X270	Flow Control Button 3.5 GPM
		20251X271	Flow Control Button 4.0 GPM
		20251X272	Flow Control Button 5.0 GPM
		20251X274	Flow Control Button 7.0 GPM
21	1	N/S	Plastic Flow Control Housing
<b>21A</b>	1		Flow Control Assembly - Specify GPM on Order. Includes (1) #19, (1) #20, (1) #21, & (1) #39
		20251X256	Flow Control Assembly 1.5 GPM - PVC
		20251X257	Flow Control Assembly 2.0 GPM - PVC
		20251X258	Flow Control Assembly 2.4 GPM - PVC
		20251X259	Flow Control Assembly 3.0 GPM - PVC
		20251X260	Flow Control Assembly 3.5 GPM - PVC
		20251X261	Flow Control Assembly 4.0 GPM - PVC
		20251X262	Flow Control Assembly 5.0 GPM - PVC
		20251X264	Flow Control Assembly 7.0 GPM - PVC
22	1	20001X214	Drain Retainer
23	1	20561X204	O-Ring
24	1	20001X215	O-Ring
25	2	N/S	O-Ring
26	1	N/S	Injector Plug
27	2	N/S	O-Ring
<b>27A</b>	1	20001X217	Injector Plug & O-Ring Assembly Includes (1) #25, (1) #26, & (1) #27
28	1	N/S	Injector Throat
29	1	N/S	Injector Nozzle
30	1	N/S	Vortex Generator
<b>30A</b>	1	20001X219	Injector Assembly - Specify Size. Includes 1 Each of Ref. #25, 27, 28, 29, & 30
31	1	20001X222	Injector Screen
32	1	20001X224	Injector Seal
33	1	20001X223	Injector Cap
34	2	20001X226	10-24 X 1 Hex Washer HD Screw
<b>34A</b>	1	20001X220	Injector Kit - Specify Size. Includes 1 Each of Ref. #30A, 31, 32, 33, & (2) of Ref. #34
35	1	20561X239	O-Ring
36	1	20561X240	BLFC Button Retainer
37	1	20251X318	5 GPM BLFC Button
38	1	20561X241	BLFC Adapter
<b>38A</b>	1	20001X228	BLFC Assembly .5 GPM. Includes 1 Each of Ref. #35, 36, 37, & 38
39	1	20251X255	Drain Line Fitting 90 Degree Elbow 1/2" NPT X 1/2" Tubing

Items 45 Thru 48 Used Only With Clock Regen.

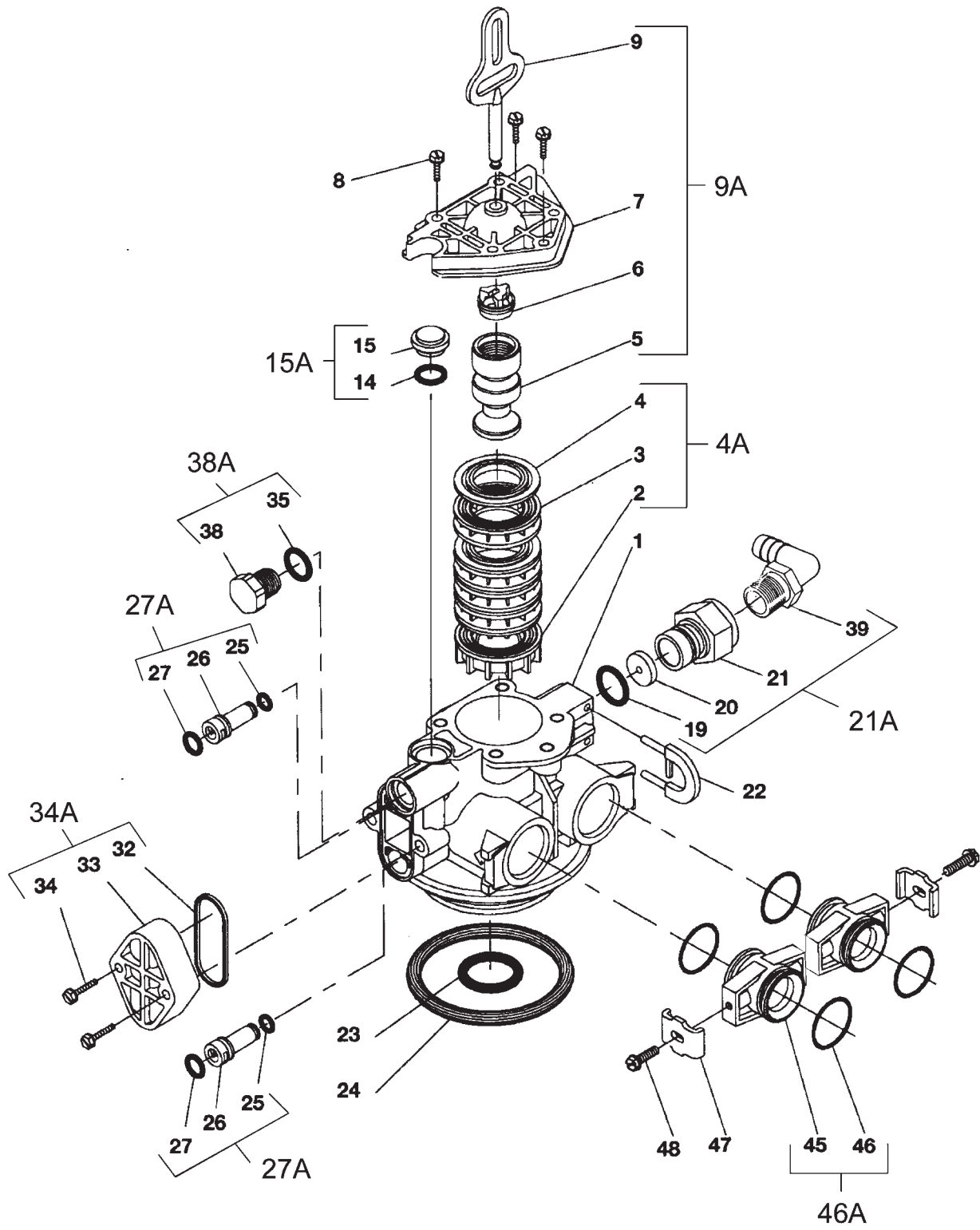
45	2	N/S	Adapter Coupling
46	4	20561X216	O-Ring
<b>46A</b>	1	20561X215	Adapter Coupling & O-Ring Assembly. Includes Ref. (1) #45 & (2) #46
47	2	20561X201	Mounting Clip
48	2	20561X217	8-18 X 5/8" Hex Washer HD Screw

N/S = Non Stocked Item

Bold Ref. No. Indicates Assembly or Kit

# Signature Series

## Control Valve Assembly (Filter)





# Signature Series

## Control Valve Assembly (Filter) Parts List

Ref. No.	Quantity	Part No.	Description
0	1	20001X200	Valve Body Complete
1	1	20001X201	Valve Body Only
2	1	N/S	End Spacer
3	4	N/S	Spacer
4	5	N/S	Seal
<b>4A</b>	1	20001X232	Seal & Spacer Kit Includes (1) Ref. #2, (4) Ref. #3 & (5) Ref. #4
5	1	N/S	DownFlow Piston
6	1	N/S	Piston Rod Retainer
7	1	N/S	End Plug Assembly
8	3	N/S	Hex Washer HD. 10-24 X 13/16" Screw
<b>9A</b>	1	20001X231	Piston Assembly Includes (1) Ref. #5, (1) Ref. #6, (1) Ref. #7, & (1) Ref. #9
14	1	N/S	O-Ring
15	1	N/S	Brine Valve Cap
15A	1	20001X230	O-Ring & Brine Valve Plug Assembly
19	1	20251X254	O-Ring
20	1	20251X266	Flow Control Button 1.5 GPM
		20251X267	Flow Control Button 2.0 GPM
		20251X268	Flow Control Button 2.4 GPM
		20251X269	Flow Control Button 3.0 GPM
		20251X270	Flow Control Button 3.5 GPM
		20251X271	Flow Control Button 4.0 GPM
		20251X272	Flow Control Button 5.0 GPM
		20251X274	Flow Control Button 7.0 GPM
21	1	N/S	Plastic Flow Control Housing
<b>21A</b>	1		Flow Control Assembly - Specify GPM on Order. Includes (1) #19, (1) #20, (1) #21, & (1) #39
		20251X256	Flow Control Assembly 1.5 GPM - PVC
		20251X257	Flow Control Assembly 2.0 GPM - PVC
		20251X258	Flow Control Assembly 2.4 GPM - PVC
		20251X259	Flow Control Assembly 3.0 GPM - PVC
		20251X260	Flow Control Assembly 3.5 GPM - PVC
		20251X261	Flow Control Assembly 4.0 GPM - PVC
		20251X262	Flow Control Assembly 5.0 GPM - PVC
		20251X264	Flow Control Assembly 7.0 GPM - PVC
22	1	20001X214	Drain Retainer
23	1	20561X204	O-Ring
24	1	20001X215	O-Ring
25	2	N/S	O-Ring
26	1	N/S	Injector Plug
27	2	N/S	O-Ring
<b>27A</b>	1	20001X217	Injector Plug & O-Ring Assembly Includes (1) #25, (1) #26, & (1) #27
32	1	20001X224	Injector Seal
33	1	20001X223	Injector Cap
34	2	20001X226	10-24 X 1 Hex Washer HD Screw
35	1	N/S	O-Ring
38	1	N/S	Filter Plug
<b>38A</b>	1	20001X229	O-Ring & Filter Plug Assembly. Includes Ref. #35 & #38
39	1	20251X255	Drain Line Fitting 90 Degree Elbow 1/2" NPT X 1/2" Tubing

Items 45 Thru 48 Used Only With Clock Regen.

45	2	N/S	Adapter Coupling
46	4	20561X216	O-Ring
<b>46A</b>	1	20561X215	Adapter Coupling & O-Ring Assembly. Includes Ref. (1) #45 & (2) #46
47	2	20561X201	Mounting Clip
48	2	20561X217	8-18 X 5/8" Hex Washer HD Screw

Filter Components Not Shown

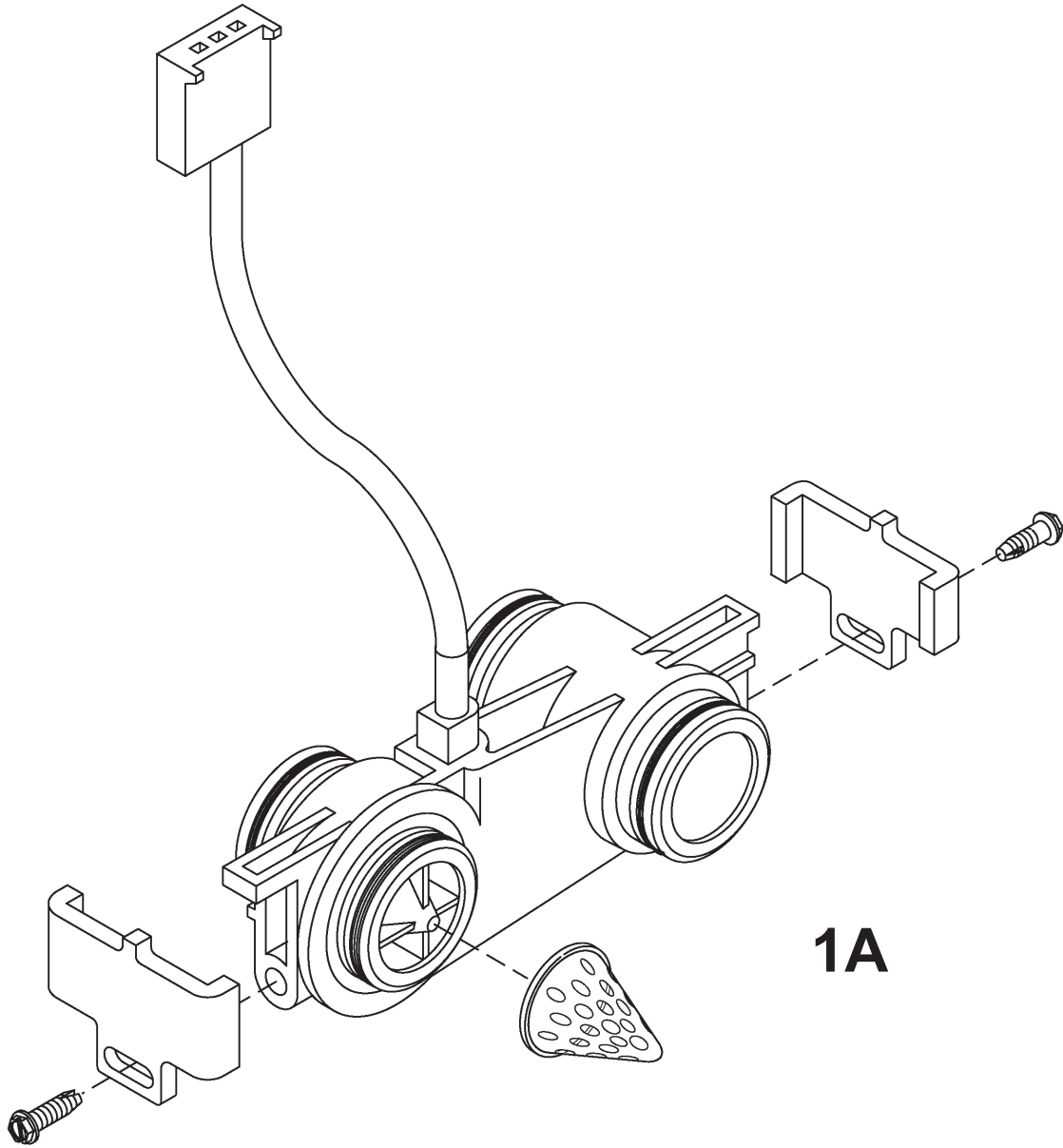
<b>34A</b>	1	20001X221	Filter Conversion Kit. Includes 1 Each of Ref. # 15A, 27A, 38A, 32, 33, & 2 Each of Ref. #34
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N/S = Non Stocked Item

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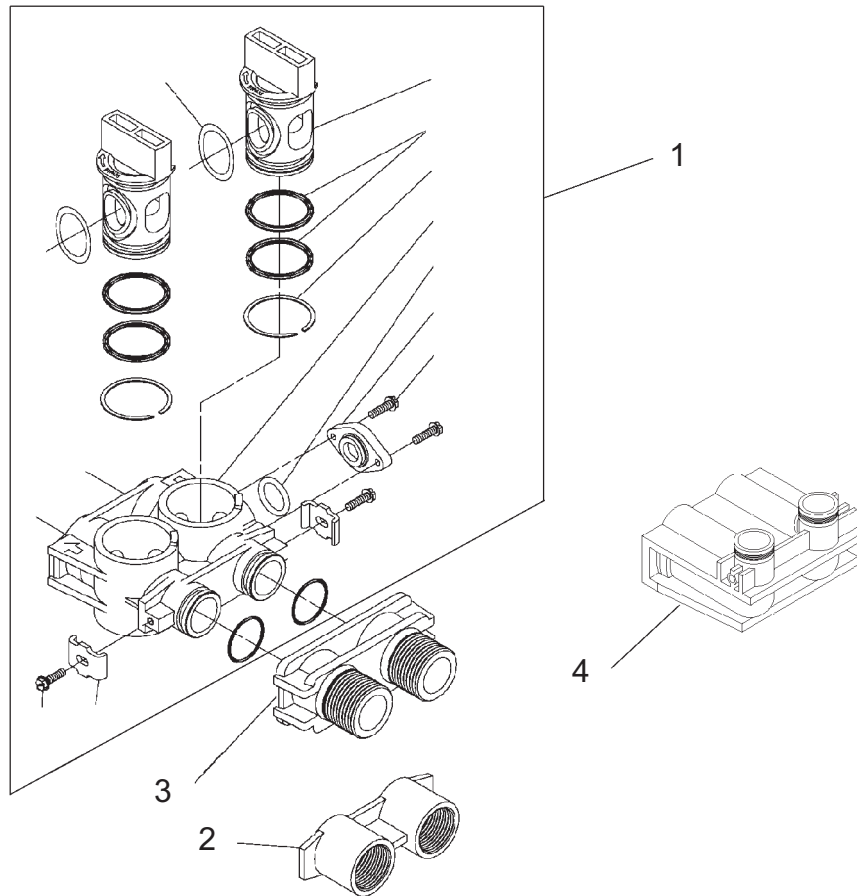
## 3/4" Turbine Meter Assembly



Ref. No.	Quantity	Part No.	Description
1A .....	1 .....	20564X200 .....	Meter Assembly, Turbine Complete

# Signature Series

## By-Pass Valve Assembly, Plastic

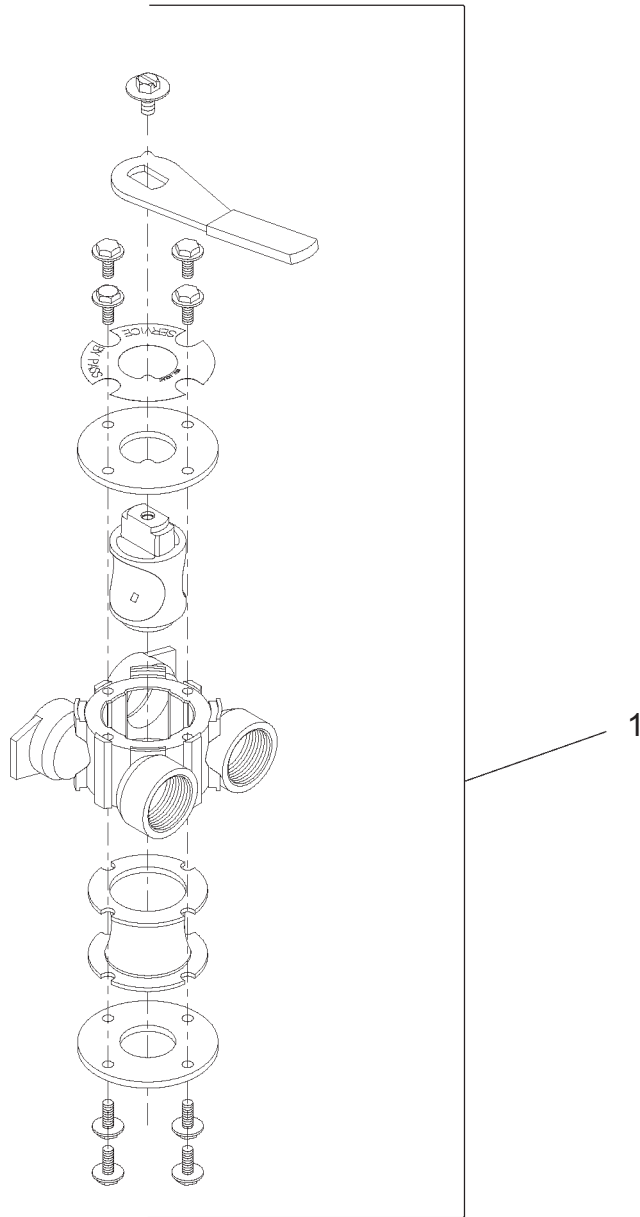


### Parts List

Ref. No.	Quantity	Part No.	Description
1	1	20561X292	Plastic Bypass Valve Assembly
2	1	20561X290	1/2" Yoke - Stainless Steel
	1	20561X291	1" Yoke - Stainless Steel
3	1	20561X288	1/2" Yoke - Plastic
	1	20561X289	1" Yoke - Plastic
4	1	20561X296	Adapter Coupling Assembly 90°

# Signature Series

## By-Pass Valve Assembly, Brass

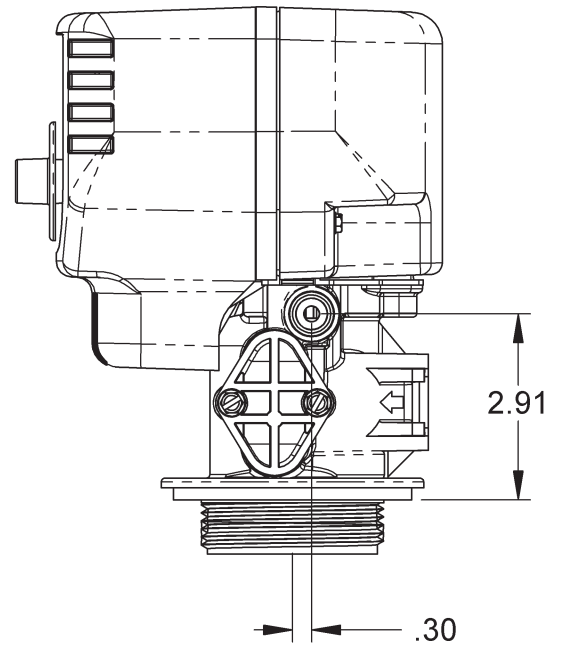
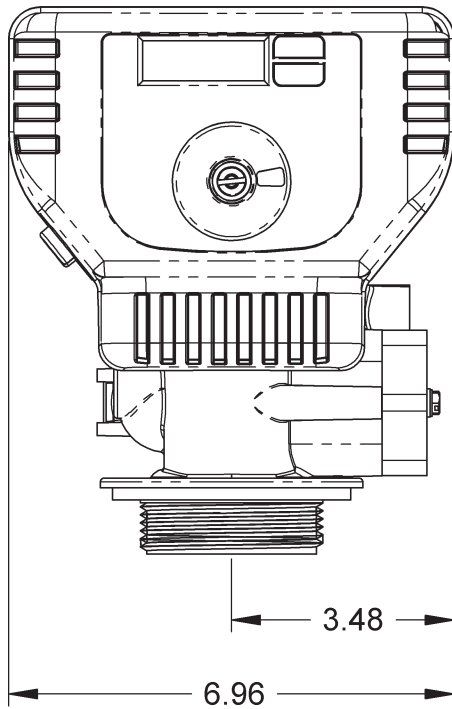
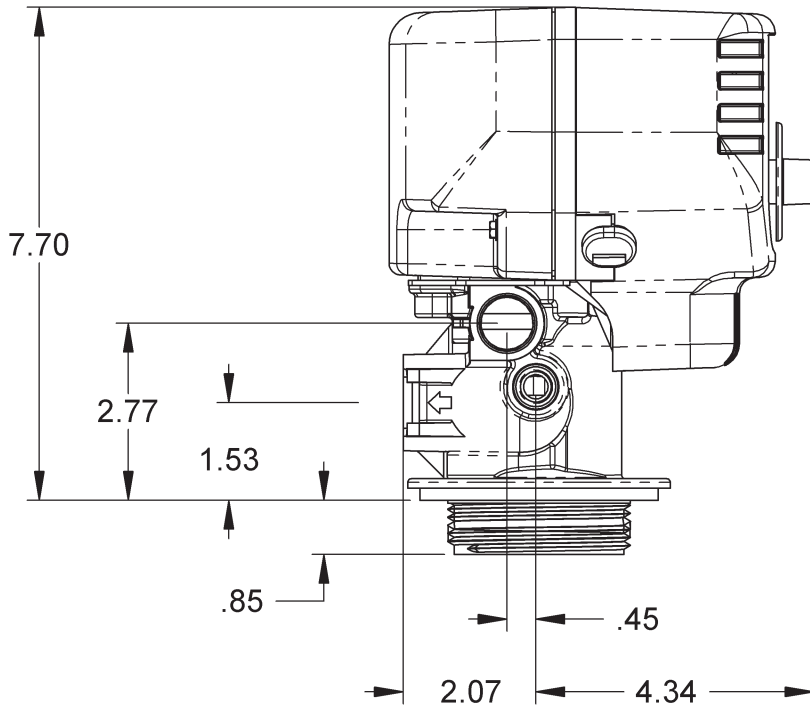


### Parts List

Ref. No.	Quantity	Part No.	Description
1 .....	1 .....	20561X270 .....	Bypass Valve 1/2" Stainless Steel
.....	1 .....	20561X283 .....	Bypass Valve 1" Stainless Steel

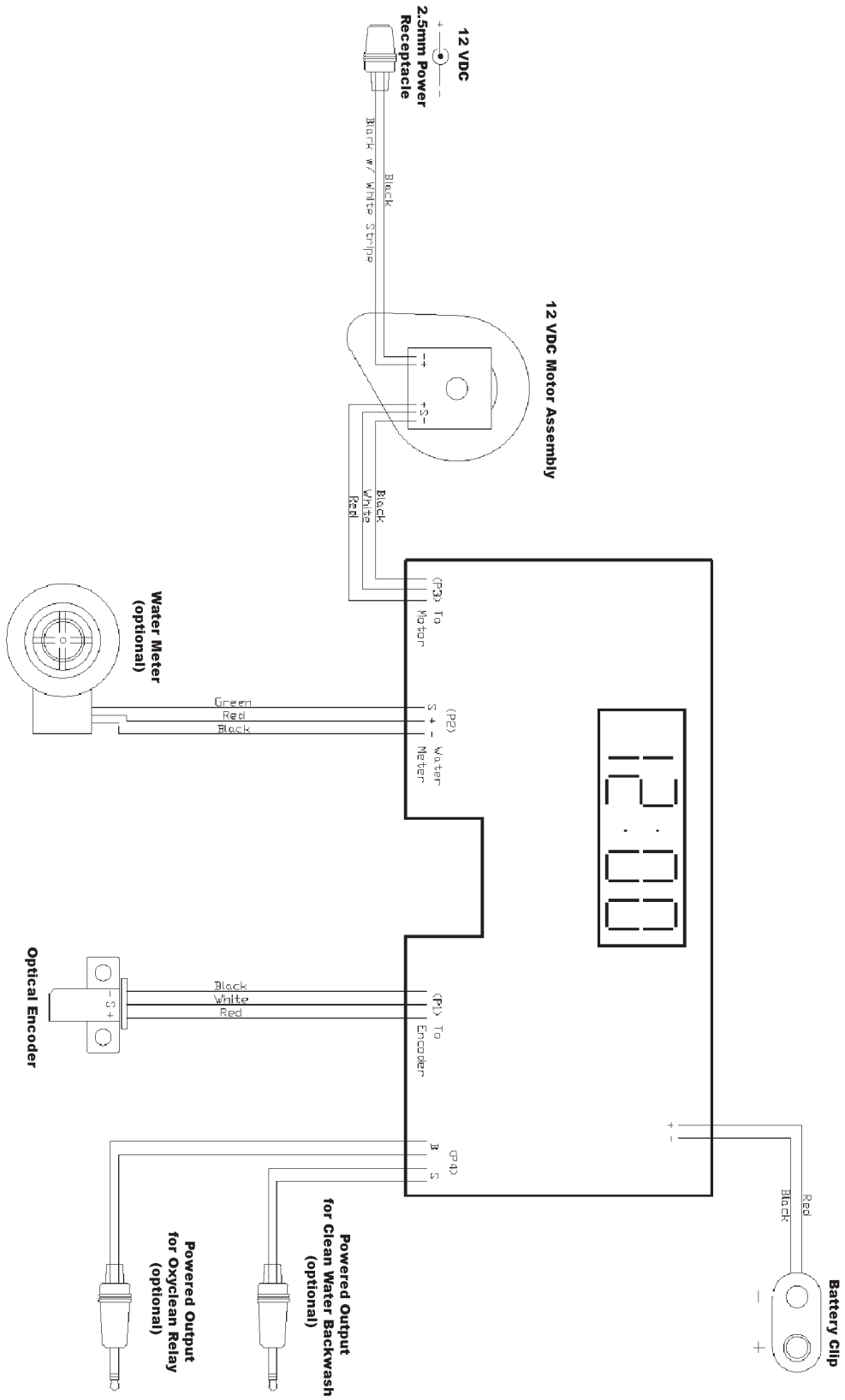
# Signature Series

## Dimensional Drawing



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## Valve Wiring Diagram



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## Service Instructions

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### A. To REPLACE BRINE VALVE, INJECTORS, AND SCREEN

1. Turn off water supply to conditioner:
  - a. If the conditioner installation has a “three valve” by-pass system, first open the valve in the by-pass line, then close the valves at the conditioner inlet and outlet.
  - b. If the conditioner has an integral by-pass valve, put it in the by-pass position.
  - c. If there is only a shut-off valve near the conditioner inlet, close it.
2. Relieve water pressure in the conditioner by stepping the control into the backwash position momentarily. Return the control to the service position.
3. Unplug electrical cord from outlet.
4. Disconnect brine tube and drain line connections at the injector body.

#### 5A. To Replace Brine Valve.

1. Remove the control valve back cover. Disconnect the meter signal wire from the meter.
2. Remove screw and washer at drive yoke. Remove powerhead mounting screws. The entire powerhead assembly will now lift off easily.
3. Remove piston retaining plate screws and Pull upward on end of piston yoke until assembly is out of valve.
4. Pull brine valve from injector body, also remove and discard O-ring at bottom of brine valve hole.
5. Apply silicone lubricant to new O-ring and reinstall at bottom of brine valve hole.
6. Apply silicone lubricant to O-ring on new Brine valve assembly and press into brine valve hole, shoulder on bushing should be flush with injector body.

#### 5B. To Replace Injectors and Screen.

1. Remove injector cap screws, remove cap & discard gasket. Remove vortex generator from end of the injector assembly.
2. Remove injector assembly. Apply silicone lubricant to new injector assembly o-rings and install. Be sure to push injector assembly in tightly so o-rings are seated. Replace vortex generator. Install a new screen.
3. Apply silicone lubricant to new gasket and install around oval extension on injector cap.

6. Insert screws thru injector cap and into mating holes in the valve body. Tighten screws.
7. Reconnect brine tube and drain line.
8. Return by-pass or inlet valving to normal service position. Water pressure should now be applied the conditioner, and any by-pass line shut off.
9. Check for leaks at all seal areas. Check drain seal with the control in the backwash position.
10. Plug electrical cord into outlet.
11. Set time of day and cycle the control valve manually to assure proper function. Make sure control valve is returned to the service position.
12. Make sure there is enough salt in the brine tank.
13. Start regeneration cycle manually if water is hard.

### B. To Replace Powerhead

1. Remove the control valve back cover. Remove the three screws along the outer edge of the back plate and remove the front cover. Disconnect the power supply and the circuit board signal wire from the motor and feed them back through the control. Disconnect the optical sensor signal wire. Disconnect the meter signal wire from circuit board and feed back through the control.
2. Remove screw and washer at drive yoke. Remove powerhead mounting screws. The entire powerhead assembly will now lift off easily.
3. Put new powerhead on top of the valve. Be sure the drive pin on main gear engages slot in drive yoke (wide side of drive yoke upright must face to the left away from the motor).
4. Replace powerhead mounting screws. Replace screw and washer at drive yoke.
5. Reconnect meter signal, optical sensor, power supply, and circuit board signal wires.
6. Reinstall front cover and back cover.

### C. To Replace Piston Assembly

1. Follow Steps A.1 through A.3.
2. Remove control valve back cover. Disconnect the meter signal wire from the meter.
3. Remove screw and washer at drive yoke. Remove powerhead mounting screws. The entire powerhead assembly will now lift off easily.
4. Remove piston retaining plate screws.
5. Pull upward on end of piston yoke until assembly is out of valve.

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## Service Instructions (Cont'd.)

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### **TO REPLACE PISTON ASSEMBLY (Cont'd.)**

6. Inspect the inside of the valve to make sure that all spacers and seals are in place, and that there is no foreign matter that would interfere with the valve operation.
7. Take new piston assembly as furnished and push piston into valve by means of the end plug. Twist drive yoke carefully in a clockwise direction to properly align it with drive gear. Reinstall piston retaining plate screws.
8. Place powerhead on top of valve. Be sure drive pin on main gear engages slot in drive yoke (wide side of drive yoke upright must face to the left away from the motor).
9. Replace powerhead mounting screws. Replace screw and washer at drive yoke.
10. Reconnect brine tube and drain line.
11. Return by-pass or inlet valving to normal service position. Water pressure should now be applied to the conditioner, and any by-pass line shut off.
12. Replace the control valve back cover.
13. Follow Steps A.9 through A.13.

### **D. TO REPLACE SEALS AND SPACERS**

1. Follow Steps A.1 through A.3.
2. Remove the control valve back cover. Disconnect the meter signal wire from the meter.
3. Remove screw and washer at drive yoke. Remove powerhead mounting screws. The entire powerhead assembly will now lift off easily. Remove piston retaining plate screws.
4. Pull upward on end of piston rod yoke until assembly is out of valve. Remove and replace seals and spacers.
5. Take piston assembly and push piston into valve by means of the end plug. Twist yoke carefully in a clockwise direction to properly align it with drive gear. Reinstall piston retaining plate screws.
6. Place powerhead on top of valve. Be sure drive pin on main gear engages slot in drive yoke (wide side of drive yoke upright must face to the left away from motor).
7. Replace powerhead mounting screws. Replace screw and washer at drive yoke.
8. Return by-pass or inlet valving to normal service position. Water pressure should now be applied to the conditioner, and any by-pass line shut off.
9. Replace the control valve back cover.
10. Follow Steps A.9 through A.13.

### **E. TO REPLACE METER**

1. Follow Steps A.1 through A.3.
2. Remove two screws and clips at by-pass valve or yoke. Pull resin tank away from plumbing connections.
3. Remove signal wire from meter.
4. Remove two screws and clips at meter and pull the meter out of the control valve.
5. Apply silicone lubricant to four new O-rings and assemble to four ports on new meter.
6. Assemble meter to control valve. Note, meter portion of module must be assembled at valve outlet. Install two screws and clips.
7. Install signal wire into new meter.
8. Push resin tank back to the plumbing connections and engage meter ports with by-pass valve or yoke.
9. Attach two clips and screws at by-pass valve or yoke. Be sure clip legs are firmly engaged with lugs.
10. Return by-pass or inlet valving to normal service position. Water pressure should now be applied to the conditioner, and any by-pass line shut off.
11. Check for leaks at all seal areas.
12. Follow steps A.9 through A.13.

### **F. TO CHECK DRIVE MOTOR OPERATION**

1. Remove the control valve back cover.
2. To verify drive motor operation, push service button located on back of motor. Motor should run. Release button. After 1 minute the control should automatically advance to Rapid Rinse (cycle #3) Position. It will remain in Rapid Rinse for 5 minutes and then advance to Service Position.



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## Troubleshooting Guide

SYMPTOM	PROBABLE CAUSE	CORRECTION
1. Softener fails to regenerate automatically.	<ul style="list-style-type: none"> <li>A. Power supply plugged into intermittent or dead power source.</li> <li>B. Disconnected meter cable.</li> <li>C. Improper control valve programming.</li> <li>D. Defective power supply.</li> <li>E. Defective circuit board or meter.</li> <li>F. Defective drive motor.</li> </ul>	<ul style="list-style-type: none"> <li>A. Connect to constant power source.</li> <li>B. Reconnect cable.</li> <li>C. Reset program settings.</li> <li>D. Replace power supply.</li> <li>E. Replace or Repair</li> <li>F. Check motor operation by activating the service button on back of motor.</li> </ul>
2. Regeneration at wrong time.	<ul style="list-style-type: none"> <li>A. Time of day improperly set, due to power failure.</li> <li>B. Regeneration time set improperly.</li> </ul>	<ul style="list-style-type: none"> <li>A. Reset time of day programming and install 9 volt battery.</li> <li>B. Reset Regeneration time programming.</li> </ul>
3. Loss of capacity.	<ul style="list-style-type: none"> <li>A. Increased raw water hardness.</li> <li>B. Brine concentration and/or quantity.</li> <li>C. Resin fouling.</li> <li>D. Poor distribution, Channeling (uneven bed surface).</li> <li>E. Internal valve leak.</li> <li>F. Resin age.</li> <li>G. Resin Loss.</li> </ul>	<ul style="list-style-type: none"> <li>A. Reset unit to the new capacity.</li> <li>B. Keep brine tank full of salt at all times. Clean it yearly. Salt may be bridged. If using a salt grid plate ensure refill water is over it.</li> <li>C. Call dealer, find out how to confirm it, clean the resin and prevent future fouling.</li> <li>D. Call dealer. Check distributors and backwash flow.</li> <li>E. Call dealer. Replace spacers, seals and/or piston.</li> <li>F. Call dealer. Check for resin oxidation caused by Chlorine. Mushy resin.</li> <li>G. Call dealer. Check for correct bed depth. Broken distributors. Air or gas in bed: Well gas eliminator. Loose brine line.</li> </ul>
4. Poor water quality.	<ul style="list-style-type: none"> <li>A. Check items listed in #1, #2, &amp; #3.</li> <li>B. Bypass valve open.</li> <li>C. Channeling.</li> </ul>	<ul style="list-style-type: none"> <li>B. Close by-pass valve.</li> <li>C. Check for too slow or high service flow. Check for media fouling.</li> </ul>
5. High salt usage.	<ul style="list-style-type: none"> <li>A. High salt setting.</li> <li>B. Excessive water in brine tank.</li> <li>C. Constant flow through the unit.</li> <li>D. Improperly set hardness, Regeneration frequency or regeneration day override programming.</li> </ul>	<ul style="list-style-type: none"> <li>A. Adjust brine tank refill time.</li> <li>B. See symptom No. 7.</li> <li>C. Indicates plumbing leak (ie. toilet tank).</li> <li>D. Reset programming</li> </ul>

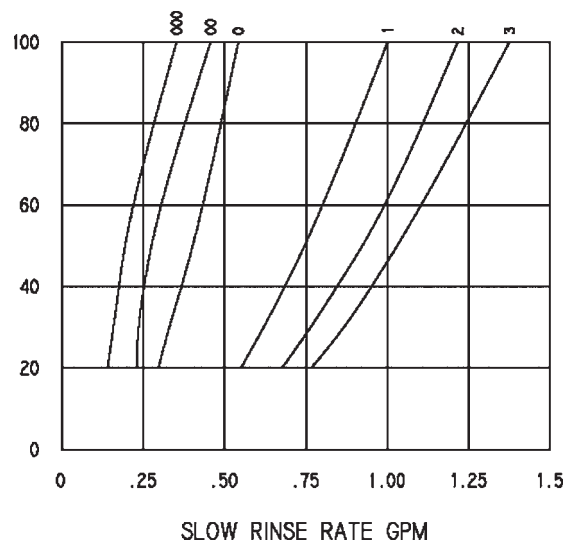
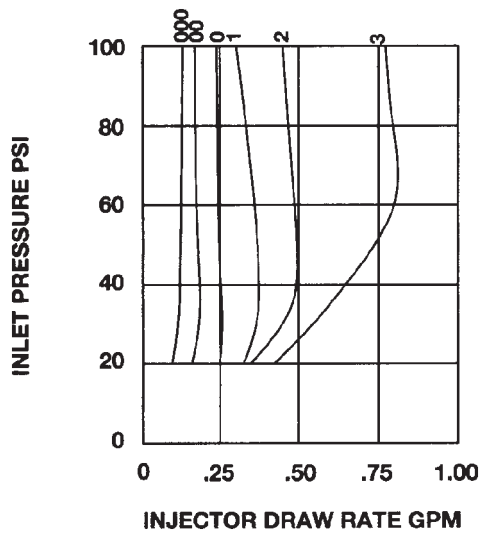
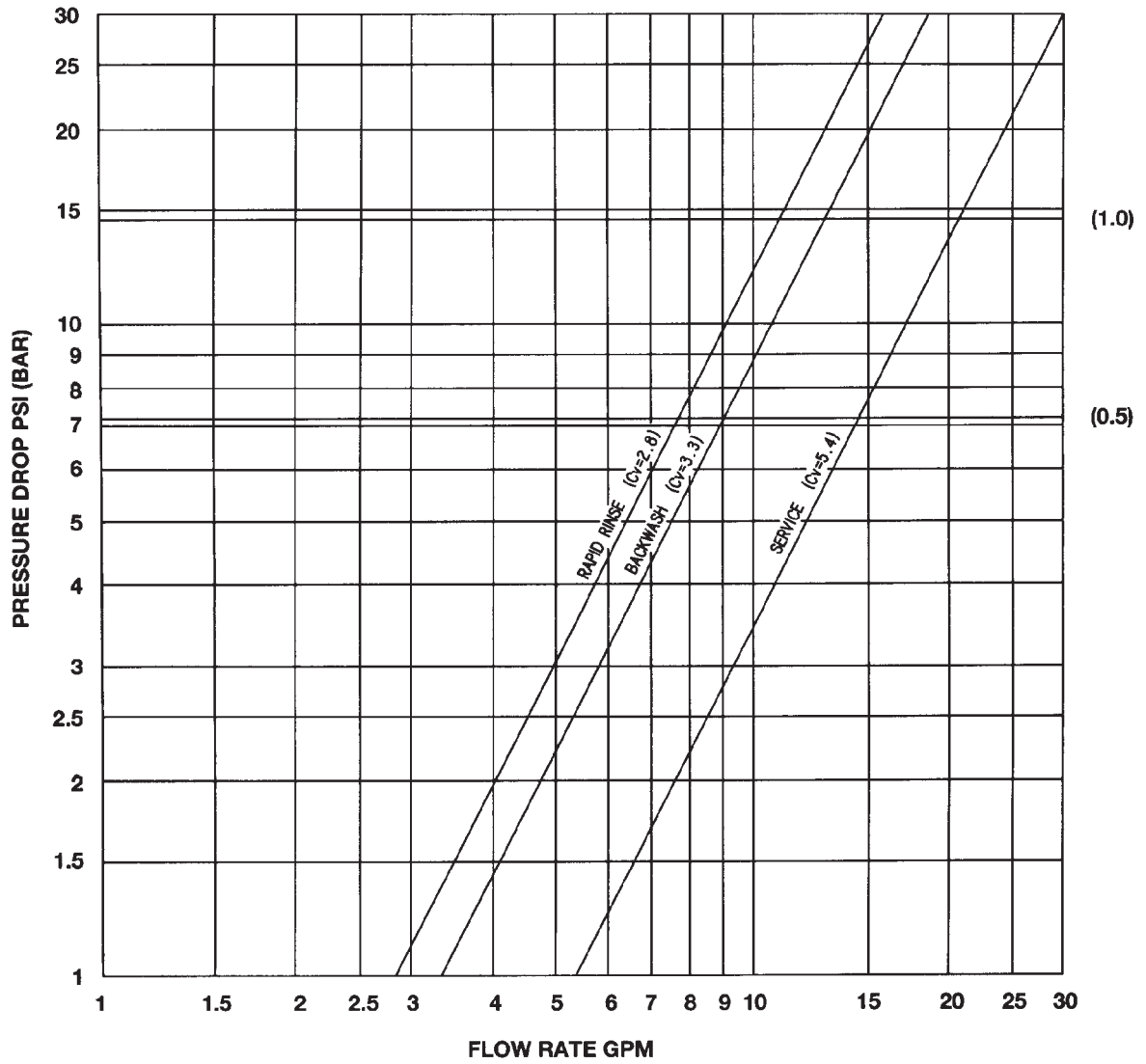
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## Troubleshooting Guide (Cont'd.)

SYMPTOM	PROBABLE CAUSE	CORRECTION
6. Loss of water pressure.	<p>A. Scaling/Fouling of inlet pipe.</p> <p>B. Fouled resin.</p> <p>C. Improper backwash.</p>	<p>A. Clean or replace pipeline. Pretreat to prevent.</p> <p>B. Clean resin. Pretreat to prevent.</p> <p>C. Too many resin fines and/or sediment. Call dealer, reset backwash flow rate, and/or adjust time</p>
7. Excessive water in brine tank and/or salty water to service.	<p>A. Plugged Drain Line.</p> <p>B. Dirty or damaged brine valve.</p> <p>C. Plugged Injector.</p> <p>D. Low inlet pressure.</p> <p>E. Excessive brine refill cycle time.</p>	<p>A. Check flow to drain. Clean flow control.</p> <p>B. Clean or replace brine valve.</p> <p>C. Clean injector and replace screen.</p> <p>D. Increase pressure to allow injector to perform properly (20psig minimum).</p> <p>E. Reset brine refill cycle time.</p>
8. Softener fails to use salt.	<p>A. Check items listed in #1.</p> <p>B. Improper control valve programming.</p> <p>C. Plugged/restricted drain line.</p> <p>D. Injector is plugged.</p> <p>E. No water in brine tank.</p> <p>F. Water pressure is too low.</p> <p>G. Brine line injects air during brine draw.</p> <p>H. Internal control leak.</p>	<p>B. Check and reset programming.</p> <p>C. Clean drain line and/or flow control.</p> <p>D. Clean or replace injector and screen.</p> <p>E. Check for restriction in BLFC. Ensure safety float is not stuck. Check brine tank for leaks.</p> <p>F. Line pressure must be at least 20 psi.</p> <p>G. Check brine line for air leaks.</p> <p>H. Call dealer, Check piston, seals and spacers for scratches and dents.</p>
9. Control cycles continuously.	<p>A. Faulty circuit board.</p>	<p>A. Replace circuit board.</p>
10. Continuous flow to drain.	<p>A. Foreign material in control.</p> <p>B. Internal control leak.</p> <p>C. Valve jammed in backwash, brine, or rapid rinse position.</p> <p>D. Motor stopped or jammed.</p>	<p>A. Call dealer. Clean valve, rebuild unit.</p> <p>B. Same as above.</p> <p>C. Same as above</p> <p>D. Replace motor.</p>

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## Flow Data, Injector Draw & Slow Rinse Rates





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