DURASOFT™

DS-3000

Water Treatment Equipment Control Valve
Installation and Service Manual

Please read this manual carefully before the installing the system.

DS-3000

Table of Contents

Installation Sheet

Equipment Supplier:

Address: ____

Phone: ______________________ Equipment Model: ________________

Installation Date: ________________ Installer's Name: ________________

Influent Water Data:

Dynamic Inlet Water Pressure: ______psi Source: City □ Well □ Lake □ River □

Total Hardness: ___________grains/gallon, ____________________ mg/l (grams/m^3)

Turbidity: _________________NTU, pH: ____________TDS: ______________

Color (Organics): ________________ Total Alkalinity: ________________ ppm (mg/l)

Chlorine: ______ ppm (mg/l), Nitrates: _______ ppm (mg/l), Arsenic: _______ ppm(mg/l)

Iron: ____ ppm (mg/l), Manganese: ____ ppm (mg/l), Hydrogen Sulfide: ____ ppm (mg/l)

Equipment Data:

Softener □ Carbon Filter □ Neutralizing Filter □ Nitrate Removal Unit □ Dealkalizer □

Arsenic Removal Unit □ Oxidizing Filter (Fe, Mn, H2S) □ Suspended Solids Filter □

Dimensions: Mineral Tank: ___________ Brine Tank: __________ inches □ mm □

Active medias: Type: ________________ Volume: _____________ ft^3 □ Liters □

Support Media: Type: ________________ Volume: _____________ ft^3 □ Liters □

Salt used/regeneration: ____________ lbs □ Kgrams □ Injector Size: _________

Backwash Flow Control ___________ (gpm) Refill Flow Control ___________ (gpm)

Brining System: Small □ Medium □ Large □

Equipment Program:

Regeneration start: By clock □ By meter □ Outside Signal □

Equipment capacity: _______________ gallons □ m^3 □ liters □

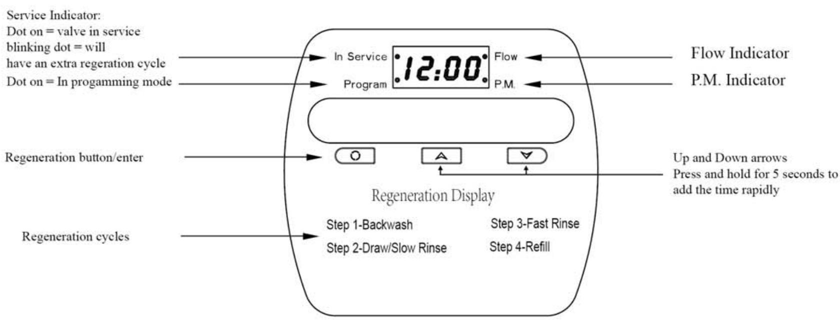
Regeneration days override: ___________ Regeneration time: ________ am □ pm □

Cycle Programming in minutes:

1. Backwash ________________________ 3. Fast Rinse ________________
2. Draw and Slow Rinse ________________ 4. Refill ____________________

Programming

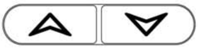
Pre-Programming: Understanding the Displays



Operating Buttons:

Regeneration Button/Enter

- Use to initiate regeneration. If you hold it for approximately 5 seconds, the unit will regenerate immediately. Hold until you hear the unit activate regeneration.
- Clock programmed units only: If you only hold the regeneration button for three seconds, the unit will make a delayed regeneration at the time that it has been pre-programmed to regenerate. The dot in the upper left corner that indicates if the unit is in service, will start blinking to indicate that the unit will have a delayed regeneration.
- When in regeneration, push to move from one step of the regeneration cycle to the next without waiting for programmed times.
- While programming the valve, push to enter a selected value and to go to the next programming step.



UP and DOWN ARROWS

- Use to change the time of the day when unit is in service mode.
- While programming, use to toggle program values.
- Press twice on the up arrow to make the unit display the flow rate.

Programming

Displays:

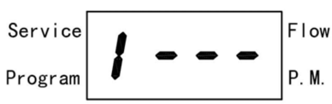
When you first plug in the controller, there are two sets of displays.

1. A clock unit display will alternate between time of day and days to regenerate. The time of day can be changed by using the up and down arrows.

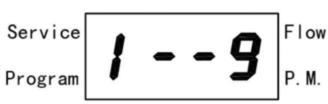
2. A meter unit display will alternate between time of day and volume of water in remaining capacity. At start up, the volume of water displayed is the equipment's capacity.

Other Displays:

Valve is moving to regeneration cycle number 1. The display will show 1 - - - with the number 1 blinking.

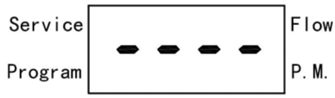


If the programmed time is 10 minutes, the unit will have the display shown below. The controller will show 9 indicating that there is at least 9 minutes remaining.



Programming

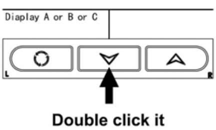
The unit has finished all programmed cycles and it is moving back to the service position.



If it is programmed as a meter delayed unit (7--3) and the regeneration button is pressed for five seconds to initiate a regeneration at the next programmed time, these four dashes will be displayed alternating with the time of day until the unit regenerates.

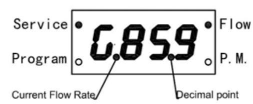
Flow Display:

In metered units while in service, to display the flow rate, double click the up arrow button.

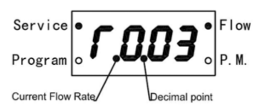


A (Liters/minute) | Example 103 LPM Set unit: Liter

B (US gallons/minute) | Example 85.9 GPM Set unit: Gallon



C (Cubic meters/hour) | Example 0.03 TPH* Set unit: Ton



*** TPH=m³/hour**

Preparing to program

The Valve Controller will come with factory settings that need to be changed. Before installation, it is advisable to pre-program the unit for the particular equipment type, application, and water quality. After understanding the displays, you will be ready to program the unit. Write down all of the values that you want to program.

In the next pages, you will find step by step instructions to follow for different units. The bold text are examples of a selection that you could use. To begin Programming, set the time to 12:01 pm. Use the Up or Down arrow to change the time. Holding down the arrow will change the time at a faster rate. It is recommended to use the Down arrow when you want to go slow as hitting the Up arrow twice is used to show the flow rate.

Programming

US – CLOCK - FILTER

Note: *Time must be set at 12:01pm in order to go into programming mode.*

1	Press both arrows simultaneously and hold them until it displays U - -		
2	U nits Menu **U - - 1** **US units** U - - 2 Metric units/Liters U - - 4 Metric units/meter 3	Select with up or down arrow	Press enter
3	Regeneration initiated by **7 - - 1** **clock** 7 - - 2 meter immediate 7 - - 3 meter delayed	Select with up or down arrow	Press enter
4	Regeneration Time **02:00 AM**	Select with up or down arrow	Press enter
5	Days to Regenerate **A - - 3** **Every three days** (You can select from 1 to 99 days)	Select with up or down arrow	Press enter
6	Backwashing cycle in minutes **1 - 10** (You can select from 0 to 199 minutes)	Select with up or down arrow	Press enter
7	Draw and Slow Rinse minutes **2 - - 0** **No injector in filters** Off Finishes Regeneration 0 Bypasses Cycle	Select with up or down arrow	Press enter
8	Fast Rinse minutes **3 - 10** (You can select from OFF to 199 minutes)	Select with up or down arrow	Press enter
9	Refill minutes **4 OFF** **No refill in filters** (OFF = Regeneration cycle over, go to service)	Select with up or down arrow	Press enter
10	Value Meter K Factor F132 Our 3/4" meter in pulses/gal F34.9 Our 3/4" meter in pulses/liter (Leave default setting, only used in metered units)	Select with up or down arrow	Press enter
11	Control Selection **0 - - 1** **SVE (Single Valve Electronic) Controller** 0 - - 2 For future controller	Select with up or down arrow	Press enter

You are now finished with programming and it displays the time.
Use the arrows to set the correct time of the day.

Programming

US – CLOCK - SOFTENER

Note: *Time must be set at 12:01pm in order to go into programming mode.*

1 Press both arrows simultaneously and hold them until it displays U - -

Select with up or down arrow

2 Units Menu

- **U - - 1 US units**
- U - - 2 Metric units/Liters
- U - - 4 Metric units/meter 3

Press enter

Select with up or down arrow

3 Regeneration initiated by

- **7 - - 1 clock**
- 7 - - 2 meter immediate
- 7 - - 3 meter delayed

Press enter

Select with up or down arrow

4 Regeneration Time

02:00 AM

Press enter

Select with up or down arrow

5 Days to Regenerate

A - - 3 Every three days

(You can select from 1 to 99 days)

Press enter

Select with up or down arrow

6 Backwashing cycle in minutes

1 - 10

(You can select from 0 to 199 minutes)

Press enter

Select with up or down arrow

7 Draw and Slow Rinse minutes (Calculate & Change)

2 - 60

- Off Finishes Regeneration
- 0 Bypasses Cycle

Press enter

Select with up or down arrow

8 Fast Rinse minutes

3 - 10

(You can select from OFF to 199 minutes)

Press enter

9 Refill minutes

4 - 10 Based on RFC flow rate & salt dosage

(RFC: Refill Flow Control)

Select with up or down arrow

Press enter

10 Upflow Selection

5 OFF

(Off = Regeneration over, goes to service)

Select with up or down arrow

Press enter

11 Value Meter K Factor

- F132 Our 3/4" meter in pulses/gal
- F34.9 Our 3/4" meter in pulses/liter

(Leave default setting, only used in metered units)

Select with up or down arrow

Press enter

12 Control Selection

- **0 - - 1 SVE (Single Valve Electronic) Controller**
- 0 - - 2 For future controller

Select with up or down arrow

Press enter

You are now finished with programming and it displays the time.

Use the arrows to set the correct time of the day

Programming

US – METER/IMMEDIATE - SOFTENER

Follow this instructions to program both twin valves exactly the same way

Note: *Time must be set at 12:01pm in order to go into programming mode.*

1 Press both arrows simultaneously and hold them until it displays U - -

2 Units Menu
- **U - - 1 US units**
- U - - 2 Metric units/Liters
- U - - 4 Metric units/meter 3

Select with up or down arrow
Press enter

3 Regeneration initiated by
- 7 - - 1 clock
- **7 - - 2 meter immediate**
- 7 - - 3 meter delayed

Select with up or down arrow
Press enter

4 Volume of treated water
- 8 3 3 Gallons (default valve)

Change to calculated capacity

Select with up or down arrow
Press enter

5 Regeneration Time
- **02:00 AM** (default value)

(Leave as is, immediate units regenerate when capacity reaches zero regardless of set time.)

Select with up or down arrow
Press enter

6 Days to Regenerate
- **A OFF** (default valve)

(Skip as it won't need. It is meter programmed.)

Select with up or down arrow
Press enter

7 Backwashing cycle in minutes
- **1 - 10**

(You can select from 0 to 199 minutes)

Select with up or down arrow
Press enter

8 Draw and Slow Rinse minutes (Calculate & Change)
- **2 - 60**

Off Finishes Regeneration

0Bypasses Cycle

Select with up or down arrow
Press enter

9 Fast Rinse minutes
- **3 - 10**

(You can select from OFF to 199 minutes)

Select with up or down arrow
Press enter

10 Refill minutes
- **4 - 10 Based on RFC flow rate & salt dosage**

(RFC: Refill Flow Control)

Select with up or down arrow
Press enter

11 Upflow Selection
- **5 OFF**

(Off = Regeneration over, goes to service)

Select with up or down arrow
Press enter

12 Value Meter K Factor
- **F132 Our 3/4" meter in pulses/gal**
- F34.9 Our 3/4" meter in pulses/liter

(Note: For other meters change value to their K factor Our bypass meter, K = 72 pulses/gal or 19 pulses/liter)

Select with up or down arrow
Press enter

13 Control Selection
- **0 - - 1 SVE (Single Valve Electronic) Controller**
- 0 - - 2 For future controller

Select with up or down arrow
Press enter

You are now finished with programming and it displays the time.
Use the arrows to set the correct time of the day.

Programming

US – METER/DELAY - SOFTENER

Note: *Time must be set at 12:01pm in order to go into programming mode.*

1 Press both arrows simultaneously and hold them until it displays U - -

2 Units Menu
- **U - - 1 US units**
- U - - 2 Metric units/Liters
- U - - 4 Metric units/meter 3

Select with up or down arrow
Press enter

3 Regeneration initiated by
- 7 - - 1 clock
- 7 - - 2 meter immediate
- **7 - - 3 meter delayed**

Select with up or down arrow
Press enter

4 Volume of treated water
- 8 3 3 Gallons (default valve)

Change to calculated capacity

Select with up or down arrow
Press enter

5 Regeneration Time
- **02:00 AM**

(Select desired time)

Select with up or down arrow
Press enter

6 Days to Regenerate
- **A OFF**

(Skip as it won't need. It is meter programmed.)

Select with up or down arrow
Press enter

7 Backwashing cycle in minutes
- **1 - 10**

(You can select from 0 to 199 minutes)

Select with up or down arrow
Press enter

8 Draw and Slow Rinse minutes (Calculate & Change)
- **2 - 60**
- Off Finishes Regeneration
- 0 Bypasses Cycle

Select with up or down arrow
Press enter

9 Fast Rinse minutes
- **3 - 10**

(You can select from OFF to 199 minutes)

Select with up or down arrow
Press enter

10 Refill minutes
- **4 - 10 Based on RFC flow rate & salt dosage**

(RFC: Refill Flow Control)

Select with up or down arrow
Press enter

11 Upflow Selection
- **5 OFF**

(Off = Regeneration over, goes to service)

Select with up or down arrow
Press enter

12 Value Meter K Factor
- **F132 Our 3/4" meter in pulses/gal**
- F34.9 Our 3/4" meter in pulses/liter

(*Note : For other meters change value to their K factor Our bypass meter,K = 72 pulses/gal or 19 pulses/liter*)

Select with up or down arrow
Press enter

13 Control Selection
- **0 - - 1 SVE (Single Valve Electronic) Controller**
- 0 - - 2 For future controller

Select with up or down arrow
Press enter

You are now finished with programming and it displays the time.
Use the arrows to set the correct time of the day.

Valve Installation

General Information

- **Location:** The equipment should be located in an area close to an adequate drain, electrical power supply, and piping water supply. For residential applications, allow for piping to bring untreated water to outside garden. Installation area should be even and clean.
- **Servicing:** Allow room for cleaning and servicing the equipment. A bypass set up should be installed to allow servicing the valve while providing untreated water to service.
- **Hydraulics:** Make sure that the water supply can deliver the flow required. A minimum dynamic pressure of 20 psi is required for the equipment to work properly.
- **Plumbing:** Make sure you always follow local plumbing codes. While installing, inspect old plumbing for other potential water treatment needs. The drain pipeline should be less than five feet above the valve. It should have the proper diameter and length to minimize back pressure.

  Need to check the condition of existing plumbing before installing Flotrol valves. It should be free from lime and iron buildup.

  (1) The piping should be replaced when it is built up heavily with lime and/or iron.

  (2) A separate iron removal equipment should be installed ahead of Flotrol valves when piping is clogged with iron.

  (3) A separate filter unit should be installed ahead of Flotrol valves when the incoming water included impurities.
- **Electrical:** Make sure you always follow local electrical regulations. The power supply must be dedicated (uninterrupted) and must satisfy the demand.
- **Operating Parameters:** Equipment should work within operating parameters: Incoming pressure from 20 to 120 psi, running water temperature from 35 to 110°F.
- **Chemical:** Do not use brass in "CORROSIVE WATER".

Installation

- Make sure that tank threads match valve's. (FRP and steel tanks)
- Use only FRP tank from reputable manufacturers.
- Insert the 1.05" outside diameter riser tube, assembled with the lower collector, in the mineral tank. Center riser tube at both ends in the tank and mark the riser tube flush with the top of the tank. (See fig.1)

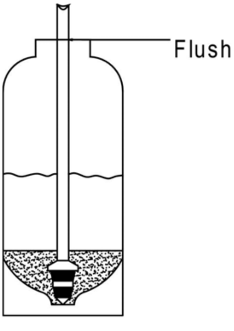


Fig 1

Valve Installation

- Remove riser tube from tank and make a perpendicular cut at the mark. This will provide a ± ¼" safety margin. Make a chamfer on riser if its thickness allows it. Smooth the cut area to prevent scratching the valve-riser o-ring. (See fig.2)

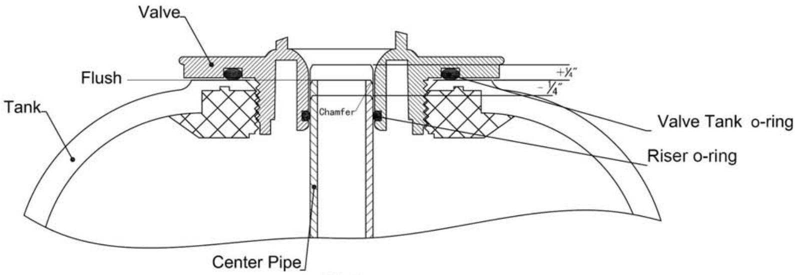


Fig 2

- Apply 100% Silicone as lubricant to valve-tank o-ring and valve-riser o-ring. Do not use any other lubricant (see fig. 2).
- To align valve ports with piping, place empty tank at desired location and screw the valve on it. After valve-tank seal touches tank, manually turn valve 90 degrees. (Turn by hand. Do not use hand tools. Over-tightening could damage threading.) Then adjust the empty tank so that the valve ports are properly aligned with the piping to ensure proper location of the tank.
- Unscrew valve keeping tank in location. Fill ¼ of tank with water to prevent damaging lower collector if under-bedding (support media) is used and to help level the minerals as you pour them. Install riser at tank center. Cover the riser's top to prevent loading mineral into riser. Using a funnel, pour the mineral into the tank together with a small flow of water. (see fig. 3)

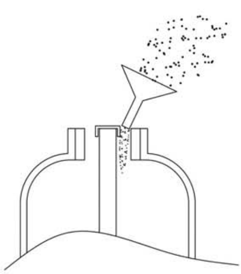


Fig 3

- Remove riser cap and align valve base with riser and tank threads. Manually screw valve on tank. (Turn by hand. Do not use hand tools. Over-tightening could damage threading.) If you followed the previous steps for proper tank placement, the valve ports should be properly aligned with incoming piping.
- For backwash flows equal or lower than 7gpm, the drain piping should be 1/2" diameter and no longer than seven feet. Use 3/4" piping for drain pipelines longer than seven feet.

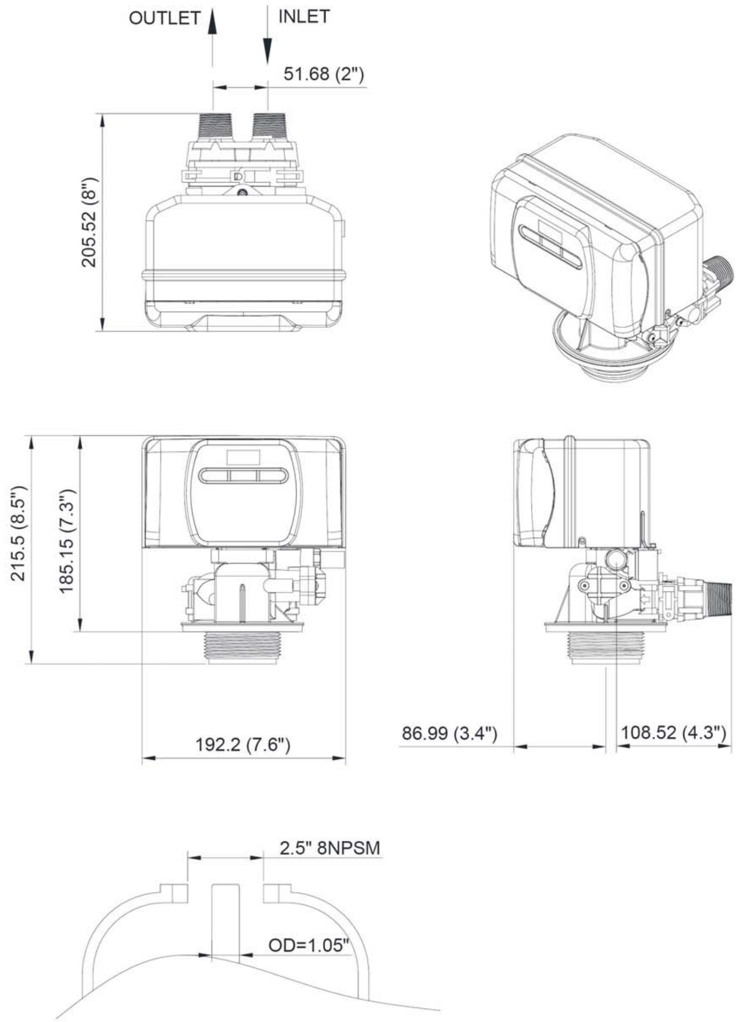
DS-3000

Equipment Installation

1. Shut off main water supply. Make sure the piping installation includes bypass valving.
2. Do any pipe soldering that is needed before connecting to the valve. This will prevent damaging valve ports and the Backwash Flow Controller (BWFC).
3. Teflon tape should be the only sealant used on valve drain and brine ports. Turn by hand. Do not use hand tools. Over-tightening could damage threading.
4. If equipment uses a regenerant such as brine, place regenerant tank on a clean and even surface close to and at the same level as the mineral tank.
5. After piping the equipment valve, open the bypass valve. Close the inlet and outlet to isolate the equipment. Look for the nearest valve located after the water softener on the cold water line. Open that valve and then open the main water supply to rinse out any foreign matter that may have gone into the piping. This will protect the equipment. Close the cold water valve when finished.
6. Close the bypass. Then open the inlet and outlet valves to slowly fill water into the tank. Slowly open the cold water valve (the one you located in step 5) to release air. Once air is released and valve pours water out, close the outlet valve.
7. Connect controller power cord into wall outlet.
8. Turn inlet water valve to be slightly open. Press and hold the ○ regeneration button until controller display shows 1 - - -. The number should be blinking to indicate that the valve is moving to Backwash (position 1). Wait until the remaining air in the tank goes out. Then slowly open more the inlet valve to allow water to go in faster. Check backwash flow rate.
9. For water conditioners, pour water into brine tank to cover air check. This will prevent air from going into the unit when drawing.
10. Press the regeneration ○ button . The display will show 2 - - - with the number blinking indicating that the valve is moving to the Draw and Slow Rinse position.
11. Watch the flow of water at the drain (Total injector's flow). After the unit draws the water in the brine tank, the flow of water will decrease (slow rinse flow rate). Then press the regeneration button ○. The display will show 3 - - - with the number blinking indicating that the valve is moving to the Fast Rinse position.
12. After stopping in Fast Rinse, press the regeneration ○ button. The display will show 4 - - - with the number blinking indicating that the valve is moving to the Refill position. In the Refill position, the valve will refill the brine tank. After the programmed time, the valve will go to the Service Position.
13. Make sure that the proper amount of refill water has gone into the brine tank. On units with a salt grid, check that water has gone at least ½" over the salt grid.
14. Fill the brine tank with salt.
15. Set time of day and review program settings.

DS-3000

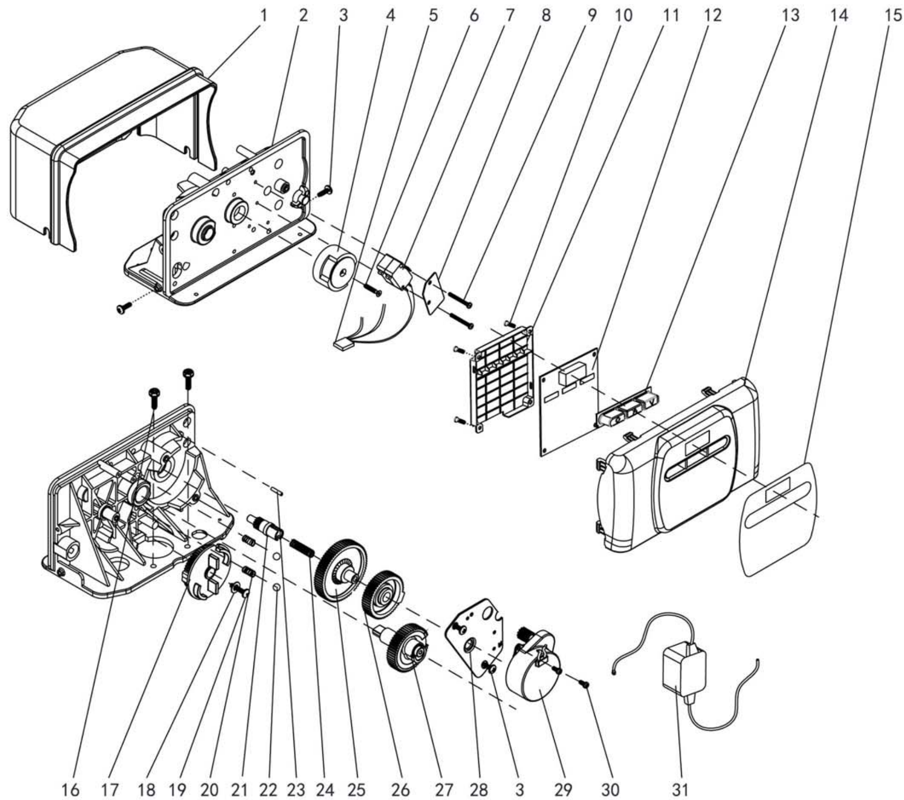
Dimensional Drawing



Unit: mm (Inch)

DS-3000

Power Head Assembly



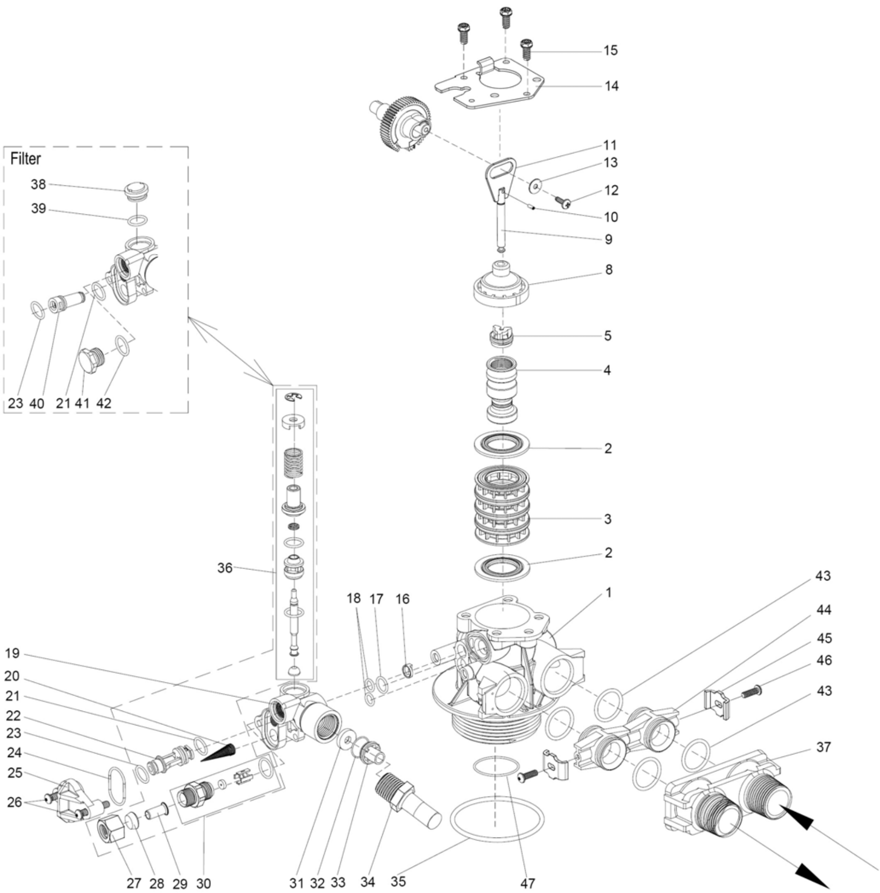
Power Head Assembly Parts List

Item No.	Quantity	Part No.	Description
1	1	051-00060-00	Back Cover
2	1	051-00051-00	Back Plate
3	2	066-00002-00	Screw
4	**1**	**051-00277-00**	**Home & Cycle Cam**
5	1	047-00044-00	Power Cable
6	1	066-00013-00	Screw
7	**2**	**043-00000-00**	**Home & Cycle Switches**
8	1	052-00049-00	Insulator-Drive Assembly
9	2	066-00055-00	Screw
10	3	066-00051-00	Screw
11	1	051-00279-00	PCB Fit Cover
12	**1**	**036-00007-00**	**Circuit Board**
13	1	054-00003-00	Front Panel Button
14	1	051-00278-00	Front Cover
15	1	069-01131-00	Main Label
16	2	066-00018-00	Screw-Back Plate Mounting
17	**1**	**057-00031-00**	**Brine Cam**
18	1	078-00009-00	Washer-Brine Cam
19	1	066-00014-00	Screw NO6-20*3/4
20	2	058-00002-00	Spring-Detent-Main Gear
21	1	057-00016-00	Idler Pinion
22	2	078-00008-00	Ball-0.25inch Dia
23	1	068-00003-00	Spring Pin-HA
24	1	058-00001-00	Spring - Idler
25	1	057-00014-00	Idler Gear
26	**1**	**057-00035-00**	**Driver Gear**
27	**1**	**057-00036-00**	**Main Gear & Shaft**
28	1	052-00329-00	Motor Mounting Plate
29	**1**	**053-00009-00**	**Motor**
30	2	066-00011-00	Screw-Motor Mtg.& Ground Wire
31	1	**042-00002-00**	Transformer 110V/120V/60HZ to 24VAC US
	1	**042-00000-00**	Transformer 230V/50HZ to 24VAC Euro

NOTE: Bold faced items are recommended spare parts.

DS-3000

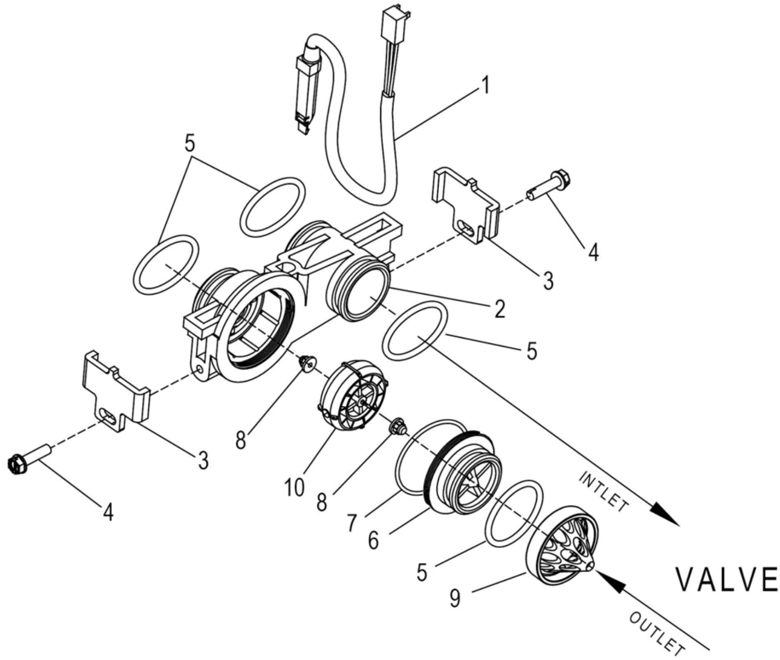
Control Valve Assembly



Control Valve Assembly Parts List

Item No.	Quantity	Part No.	Description
1	1	051-00378-00	Valve Body
2	**5**	**060-00020-00**	**Seal**
3	**4**	**051-00017-00**	**Spacer**
4	**1**	**052-00177-00**	**Piston**
5	1	051-00011-00	Retainer, Piston Rod
8	1	051-00040-00	End Plug
9	1	052-00178-00	Piston Rod
10	1	068-00004-00	Spring Pin-PRA
11	1	052-00032-00	Plate
12	1	066-00002-00	Screw
13	1	078-00006-00	Washer
14	1	052-00035-00	End Plug Retainer
15	3	066-00017-00	Screw-End Plug Retainer
16	1	051-00055-00	Air Disperser
17	**1**	**060-00017-00**	**O-Ring - Drain**
18	**2**	**060-00018-00**	**O-Ring - Injector**
19	1	051-00372-00	New Injector Body
20	1	075-00004-00	Injector Screen
21	**1**	**060-00002-00**	**O-Ring**
22	**1**	**See Page 27**	**Injector**
23	**1**	**060-00003-00**	**O-Ring**
24	1	060-00025-00	O-Ring - Injector Cover
25	1	051-00062-00	Injector Cover
26	2	066-00019-00	Screw-Injector Mounting
27	1	052-00180-00	R.F.C.. Fitting Nut
28	1	051-00002-00	R.F.C. Ferrule
29	1	052-00184-00	R.F.C. Tube Insert
30	**1**	**See Page 27**	**Refill Flow Control**
31	1	See Page 27	B.W.F.C. Button
32	1	060-00028-00	O-Ring-D.L.F.C.
33	1	051-00058-00	B.W.F.C. Button Retainer
34	1	051-00228-00	Straight Drain Hose Barb
35	**1**	**060-00070-00**	**O-Ring**
36	**1**	**100-00178-00**	**Brine Valve - Assembly**
37	1	051-00020-00	Yoke 1" NPT
	1	051-00227-00	Yoke 1" BSPT
38	1	051-00514-00	Brine Valve Plug
39	1	060-00007-00	O - Ring
40	1	051-00015-00	Injector plugged
41	1	051-00039-00	R.F.C. Plug
42	1	060-00008-00	O - Ring
43	4	060-00004-00	O-Ring - Adapter Coupling
44	1	051-00019-00	Adapter Couplings
45	2	052-00028-00	Adapter Clip
46	2	066-00045-00	Screw-Adapter Coupling
47	1	060-00048-00	O-Ring

Turbine Meter Assembly (3/4"), PN 100-00004-00

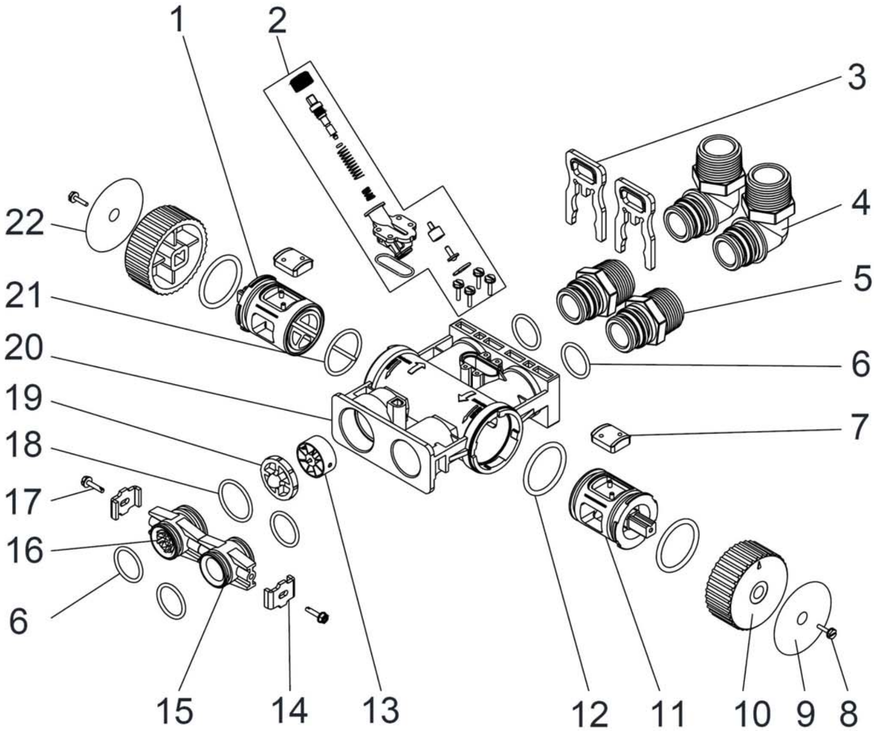


Item No.	Quantity	Part No.	Description
1	1	047-00000-00	Meter Cable Assembly
2	1	051-00034-00	Meter turbine housing
3	2	052-00029-00	Adapter Clip
4	2	066-00045-00	Screw,tcp,No.8-18x9/16,b,JIS SUS304
5	**4**	**060-00004-00**	**O-ring, As-119**
6	1	051-00037-00	Cover Bearing
7	1	060-00015-00	O-ring, As-028
8	2	051-00035-00	Bearing
9	1	051-00052-00	Flow Straightener
10	1	099-01844-00	3/4'Flow Impeller Assembly

Note: Bold faced items are recommended spare parts.

DS-3000

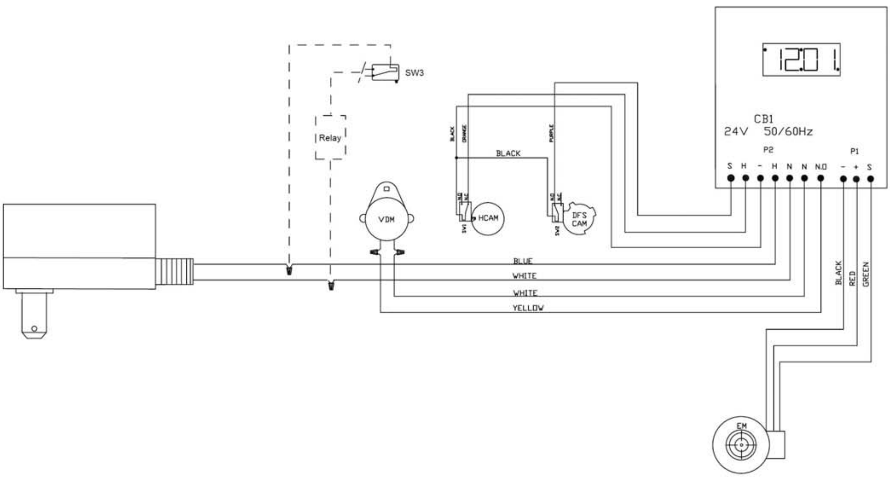
Bypass Assembly



Bypass Assembly Parts List

Item No.	Quantity	Part No.	Description
1	1	051-00467-00	Plug Outlet
2	1	099-02392-00	Flow Valve Assembly
3	2	051-00472-00	Retainer
4	2	051-00480-00	1"Elbow Connector(NPT)
	2	051-00516-00	1"Elbow Connector(BSP)
	2	051-00545-00	3/4"Elbow Connector(NPT)
	2	051-00547-00	3/4"Elbow Connector(BSP)
5	2	051-00479-00	1"Straight Connector(NPT)
	2	051-00515-00	1"Straight Connector(BSP)
	2	051-00544-00	3/4"Straight Connector(NPT)
	2	051-00546-00	3/4"Straight Connector(BSP)
6	5	**060-00004-00**	**O-ring AS119**
7	2	**060-00130-00**	**Block**
8	6	066-00002-00	Screw 4-20x1/2
9	1	069-01148-00	Label-Inlet
10	2	051-00470-00	Knob
11	1	051-00468-00	Plug-Inlet
12	3	**060-00132-00**	**O-ring 36x3.5**
13	1	099-01478-00	Bypass Turbine Assembly
14	2	052-00028-00	Clip Mounting
15	1	051-00019-00	Adapter Coupling-IN
16	1	051-00471-00	Adapter Coupling-OUT
17	2	066-00045-00	Screw 8-18
18	1	060-00108-00	O-ring 29x2.5
19	1	099-01935-00	Flow meter Ball Bearing Cover
20	1	051-00465-00	Bypass Valve Body(with needle valve/without meter)
	1	099-02394-00	Bypass Valve Body(with needle valve/with meter)
	1	051-00466-00	Bypass Valve Body(without needle valve/without meter)
	1	099-02395-00	Bypass Valve Body(without needle valve/with meter)
21	1	060-00104-00	Seal-Top
22	1	069-01149-00	Label-Outlet

Valve Wiring Diagram



CB1-F20SVE Circuit Board
VDM-Valve Drive Motor
EM-Electronic Flow Meter (Optional)
SW1-Homing Switch
SW2-Step Switch
SW3 – Auxiliary Switch
HCAM-Homing Cam
DFSCAM-Downflow Step Cam

Service Instructions

A. TO REPLACE INJECTORS SCREEN AND BRINE VALVE

1. Turn off water supply to conditioner:
   a. On three valves bypass system: First open bypass valve, then close the inlet and outlet valves.
   b. On an integral bypass valve: Place it in the bypass position.
   c. If it only has shut off valves on inlet and outlet, close them.
2. Relieve water pressure in the conditioner by starting a manual regeneration. To do this, push the regeneration button until it displays 1--- Wait until it stops, then push the regeneration button again prior to each display change (2---) , 3--- , 4--- , and finally ---- to return to the service position.
3. Unplug electrical cord from wall outlet.
4. Disconnect brine tube and drain line connections at the injector body.
5. To replace injectors and screen:
   a. Remove injector cap by unscrewing its two screws.
   b. Pull out the injector by using bent pliers or a flat screwdriver.
   c. Install new injector after applying silicon lubricant on the two o-rings.
   d. Replace the cap o-ring using silicone on new o-ring and screw bank the injector cap.
6. To replace brine valve:
   a. Remove injector housing from valve body.
   b. Pull brine valve out of injector housing and remove o-ring left inside of housing.
   c. Apply silicone to new o-ring and re-install it inside of housing.
   d. Apply silicone on new brine valve o-rings insert it into the injector housing until it is flush with housing.
   e. Make sure that water disperser bushing (white) is installed into main valve cavity where the injector discharges.
   f. Replace the three o-rings on the three ports connecting housing to the main valve. Use silicone on them.
7. Replace injector cap. Insert two screws through injector cap. Tighten screws.
8. Reconnect brine tube and drain line.
9. Return bypass or inlet/outlet valves to service position. Inlet water pressure is now applied to the conditioner and any bypass line should be closed.
10. Check for leaks at all sealing areas of the injector's housing.
11. Plug electrical cord into wall outlet.
12. Set time of day and cycle the control valve by pushing the regeneration button checking for proper functioning in all cycles. Make sure to go back to the service position.
13. Make sure there is enough salt in brine tank.
14. Regenerate the conditioner if water is hand.

B. TO REPLACE PISTON ASSEMBLY

1. Follow step A.1 through A.3.
2 Lift the front cover up from center bottom while holding the top and set aside. Loosen the two side screws on back cover and slide it up and out. On metered units, disconnect meter cable from the front cover.
3. Remove screw and washer at piston drive yoke. Remove the two timer mounting screws. Timer is being held by a bracket on metallic retainer plate on the bank and you will have to lift timer a little and jiggle it free to remove it.
4. Remove retainer metallic plate from valve body.
5. Pull out the piston to be inspected. Inspect valve for foreign matter and alignment of seals. Remove seals and spacer for inspection and clean valve body.
6. It is advisable to replace the seals and spacers to prevent another service call. Lubricate news seal and piston with silicone.
7. Replace seals and spacers in order making sure that they are laying flat on top of each other.
8. Install new piston in one continuous move making sure to not disturb the seals and spacers. Replace retainer making sure that the bolts are tightened evenly.

TO REPLACE PISTION ASSEMBLY (Cont'd.)

9. Assemble timer on top of valve. Engage timer on metallic bracket plate, making sure that drive pin on main gear engages the slot in drive yoke, and screw piston drive yoke with washer on the drive gear.
10. Install cover and set unit back reversing steps A.1 through A.3.
11. Do steps from A.11 to A.14.

Service Instructions (Continued)

C. TO REPLACE TIMER

1. Follow steps from B.1 to B.3.
2. Follow steps from B.9 to B.11.

D. TO REPLACE METER

1. Follow steps A.1 through A.3.
2. Remove meter sensor cable from meter.
3. Remove metallic clips holding control valve to yoke or to bypass valve.
4. Pull resin tank away from plumbing connections and remove meter.
5. Remove flow aligner from valve outlet and clean it up. Make sure comic tip is facing outward.
6. After lubricating the new meter o-rings with silicone, assemble meter to valve ports making sure that meter is on valve outlet port.
7. Push resin tank back to the pluming connections and engage meter ports with bypass valve or yoke.
8. Attach clips to bypass valve or yoke by screwing them in making sure that they are properly engaged.
9. Return bypass or inlet / outlet valves to normal service position. Water pressure should be applied to the conditioner, and any bypass line must be shut off.
10. Check for leaks at all sealing areas.
11. Follow steps from A.11 to A.14.

Troubleshooting

Read This First

1. Bold font identifies the most frequent causes that are the easiest to identify and to fix. In case of a problem, check these first.
2. Piston needs to be disassembled for inspection when:
   a. Unit goes into regeneration and motor is unsuccessfully trying to move piston. Check first if motor is the correct one for the unit, supplied power is appropriate, and transmission gears and cams are fine and aligned.
   b. Valve is in the service position and there is a leak to drain.

SYMPTOM	PROBABLE CAUSE	SOLUTION
1. Softener fails to regenerate automatically.	A. Power supply (LED off): Lack of power to unit or damaged PC board.	A. Plug unit to constant power source. Make sure the transformer delivers power. Confirm that cord is plugged correctly in PC board. Replace timer.
	B. Power supply (LED on): Displayed time is off due to power outage or installation intermittent power supply delaying the regeneration with any use of water not being registered by the electronic meter.	B. Plug unit to constant power source. Set correct time and manually start a regeneration if needed.
	C. Jammed timer or burned motor.	C. Replace timer and/or motor.
	D. Jammed regenerating piston.	D. Disassemble valve and replace piston, seals and spacers as needed.
2. Loss of capacity.	A. Increased raw water hardness.	A. Reset unit to new capacity.
	B. Diluted or insufficient brine.	B. Always keep salt above water level. Make sure programmed salt dosage is adequate and that the refill water goes over the salt grid.
	C. Fouled or oxidized resin.	C. Contact equipment supplier or qualified service supplier to confirm cause. Identify culprit and set up preventive measures. Identify foulant and clean or replace resin.
	D. Low flows below the meter range may go undetected for an imaginary loss of capacity. Low flows may channel the resin bed for a real capacity loss.	D. Identify and eliminate piping leaks. Ask equipment supplier for instructions on how to operate humidifiers and RO units.

(continued)

Troubleshooting

SYMPTOM	PROBABLE CAUSE	SOLUTION
3. Poor water quality.	A. External short circuiting: Bypass valve not completely closed.	A. Make sure bypass valve is closed.
	B. Check items listed above in #2: Low flows or damaged resin.	B. See solutions listed in #2
	C. Internal short circuiting: Riser tube o-ring, piston seal that is second from the bottom, and/or the lower part of piston damaged.	C. Equipment supplier or qualified service supplier to inspect, confirm cause, and replace damaged parts.
4. High water pressure drop through unit.	A. Scaling/fouling of inlet pipe.	A. Clean or replace pipeline. Identify culprit and pretreat to prevent.
	B. Fouled or oxidized resin.	B. Clean or change resin. Pretreat to prevent.
	C. Improper backwash.	C. Set correct backwash flow rate and time.
5. Excessive water in brine tank and/or salty water to service.	A. Program is incorrect.	A. Reprogram the unit with correct values.
	B. Plugged drain line. High back pressure. Unit refilling instead of drawing.	B. Check flow rate to drain during backwash and drain piping layout. Clean backwash flowcontrol and fix piping if needed.
	C. Brine valve doesn't close during service. Dirty or damaged.	C. In service position, disconnect brine line to confirm leak. Clean or replace brine valve as needed.
	D. Distorted flow in the injector because of foreign mater.	D. Identify matter to define how to prevent it from happening again. Clean the injector.
	E. Low pressure at injector's inlet.	E. Remove injector housing. Clean and replace injector's screen.
6. High salt usage.	A. High salt dosage setting in program.	A. Reprogram the unit with correct values.
	B. Excessive water in brine tank.	B. See symptom #5.
7. Softener fails to use salt.	A. Injector doesn't draw brine.	A. See symptom #5. Internal valve short circuiting. Check sealing between injector inlet and discharge.
	B. Brine pipe line not sealed properly allowing air to be drawn instead.	B. Identify and fix leaks.
	C. On pump supply systems, power is not supplied at the regeneration time.	C. Storage tank level control's wiring is failing to power the pump.

Troubleshooting

SYMPTOM	PROBABLE CAUSE	SOLUTION
8. Control valve cycles continuously.	A. Faulty home switch.	A. Check for loose or damaged home and cycle switches. Replace or align them correctly. See error message on page 28.
9. Continuous flow to drain during service.	A. Foreign matter inside of valve preventing sealing.	A. Have a qualified service technician open valve and clean the internals. Even if the seals appear fine, replacing them is recommended.
	B. Damaged piston and/or seals.	B. Have a qualified service technician open valve and replace the piston, seals, and spacers (piston kit).
	C. Piston not stopped in the service position.	C. See error messages on page 28. Check the micro switches and replace if needed.

Troubleshooting (error codes)

Error Codes

Note: Error codes appear only while in service. If any Error is displayed, remove cover to check the micro-switches and motor connector. The Home Switch is next to the plate and has a transparent insulator.
Power is brought to the home switch in a black wire to the common and from there it goes to power the common in the step switch which has a black insulator.
SW1 = Home Switch SW2 = Step Switch SW3 = Auxiliary switch
HCAM = Home Cam SCAM = Cycle Cam

Display	Description	Probable Cause
Err 0	Going into regeneration, display shows 1 ---, but motor does not move. After 10 minutes, the display shows Err 0.	1) Motor may be burned. 2) Wire nuts to motor may be loose. Make sure wires are connected. Change motor.
Err 1	The unit goes into regeneration. It will either make all the stops or not. It will continue to go around for about 5 minutes and then stops anywhere. Unit will show the step that follows 2--- but it will go pass home to stop anywhere.	Home switch (SW1) contact failed while in service or during regeneration. Step switch (SW2) failed while regenerating. Check that the micro-switches are well positioned and/or replace if needed.
Err 2	Unit doesn't go into regeneration.	SW2 failed to contact while in service. Check that the micro-switch is well positioned and/or replace if needed.
Service display	Motor is moving. Display shows "in service", but the unit does not stop.	Board send power to motor but no power goes to micro-switches. Check wiring and micro-switches and/or replace if needed.

Note: Besides not having power to the motor or the motor being burned, all the other possibilities are related to the micro-switches failing to make the normally closed contact. All of them can be fix by:

Unplug unit (power off). Make sure micro-switches are working, contacts are being made by the cams, and the wire nuts are making good contact. Plug unit again after switches and contacts have been fixed. Unit will go by itself to home if it was not there.

Assembly Kits

3/8" AIR CHECK

100-00001-00	Residential Type, Small

REFILL FLOW CONTROLS ASSEMBLY

100-00164-00	RFC Assembly (0.125GPM)
100-00165-00	RFC Assembly (0.25GPM)
100-00166-00	RFC Assembly (0.5GPM)
100-00163-00	RFC Assembly (1.0GPM)

REFILL FLOW CONTROLS (RFC washers)

060-00082-00	0.125 GPM
060-00078-00	0.25 GPM
060-00081-00	0.5 GPM
060-00077-00	1.0 GPM

BRINE VALVE

100-00178-00	Brine Valve Assembly

DISTRIBUTOR/COLLECTOR

051-00000-00	Upper Distributor
051-00077-00	Lower Distributor

PISTON ASSEMBLY KIT

100-00196-00	F20SVE Brass Piston Kit
100-00233-00	F20SVE Plastic Piston Kit

BYPASS ASSEMBLY

100-00118-00	1" Bypass with straight MNPT connectors
100-00119-00	1" Bypass with straight MNPT connectors and meter
100-00120-00	1" Bypass with mixing valve, straight MNPT connectors and meter
100-00121-00	1" Bypass with mixing valve and straight MNPT connectors
100-00122-00	1" Bypass with elbow MNPT connectors
100-00123-00	1" Bypass with elbow MNPT connectors and meter
100-00124-00	1" Bypass with mixing valve, elbow MNPT connectors and meter
100-00125-00	1" Bypass with mixing valve, elbow MNPT connectors
100-00186-00	1" Bypass with straight MBSP connectors
100-00187-00	1" Bypass with straight MBSP connectors and meter
100-00188-00	1" Bypass with mixing valve and straight MBSP connectors and meter
100-00189-00	1" Bypass with mixing valve and straight MBSP connectors
100-00190-00	1" Bypass with elbow connectors
100-00191-00	1" Bypass with elbow connectors and meter
100-00192-00	1" Bypass with mixing valve, elbow MBSP connectors and meter
100-00193-00	1" Bypass with mixing valve and elbow MBSP connectors
100-00242-00	3/4" Bypass with straight MNPT connectors
100-00243-00	3/4" Bypass with straight MNPT connectors and meter
100-00244-00	3/4" Bypass with mixing valve, straight MNPT connectors and meter
100-00245-00	3/4" Bypass with mixing valve and straight MNPT connectors
100-00246-00	3/4" Bypass with elbow MNPT connectors
100-00247-00	3/4" Bypass with elbow MNPT connectors and meter
100-00248-00	3/4" Bypass with mixing valve, elbow MNPT connectors and meter
100-00249-00	3/4" Bypass with mixing valve, elbow MNPT connectors
100-00250-00	3/4" Bypass with straight MBSP connectors
100-00251-00	3/4" Bypass with straight MBSP connectors and meter
100-00252-00	3/4" Bypass with mixing valve and straight MBSP connectors and meter
100-00253-00	3/4" Bypass with mixing valve and straight MBSP connectors
100-00254-00	3/4" Bypass with elbow connectors
100-00255-00	3/4" Bypass with elbow connectors and meter
100-00256-00	3/4" Bypass with mixing valve, elbow MBSP connectors and meter
100-00257-00	3/4" Bypass with mixing valve and elbow MBSP connectors

1/2" BACK WASH FLOW CONTROLS ASSEMBLY

100-00147-00	BWFC Assembly 5.0 GPM
100-00148-00	BWFC Assembly 7.0 GPM

BACK WASH FLOW CONTROLS (BWFC washers)

060-00079-00	1.0 GPM
060-00103-00	1.3 GPM
060-00074-00	1.7 GPM
060-00102-00	2.2 GPM
060-00075-00	2.7 GPM
060-00121-00	3.0 GPM
060-00101-00	4.0 GPM
060-00100-00	5.0 GPM
060-00073-00	7.0 GPM

INJECTORS (SMALL)

100-00170-00	015 Purple Injector
100-00171-00	025 Blue Injector
100-00172-00	050 Red Injector
100-00022-00	075 Green Injector
100-00019-00	100 Black Injector
100-00020-00	200 Grey Injector
100-00023-00	400 White Injector

SEAL & SPACER KIT

100-00056-00	F20 Seal & Spacer Kit

DS-3000

Spec Sheet

VALVE MATERIAL	Nory1

PORTS

Material	Noryl
I/O	1"
Base	2.5"
Riser,OD	1.05"
Drain	1/2"
Brine	3/8"

FLOWS

Service (gpm at 15 psi drop)	19.5
Service Cv	5.0
Backwash (gpm at 25 psi drop)	7.0
Backwash Cv	1.4

RATINGS

Brining System	Small
Electrical	220/24V and 110/24V for 50/60Hz
Pressure	Hydrostatic: 300 psi
	Operating: 20 - 125 psi
Running Water Temperature	35 - 110°F (1 - 40℃)

OPTIONS

- Injector Model numbers:
  015, 025, 050, 075, 100, 200 and 400 to use from 0.15 ft³ to 4.0 ft³ of resin

- Backwash Flow Controllers:
  1/2" housing for 1.0, 1.3, 1.7, 2.2, 2.7, 3.0, 4.0, 5.0 and 7.0

- Refill Flow Controllers:
  0.125, 0.25, 0.5 and 1.0

- Auxillary Microswitch Mounting Capability

- Regeneration Start Options:
  Time Clock
  Water Meter
  Manually

- Timer: Single Valve Electronics (SVE)

LIMITED WARRANTY

DuraSoft warrants the DuraSoft brand water treatment system manufactured by DuraSoft and installed by a duly authorized DuraSoft dealer, to be free from defects in materials and workmanship to the original residential purchaser (hereinafter CONSUMER) for a period of 2(two) years from the date of purchase. All aspects of this warranty are subject to the following limitations, terms and conditions.

DURATION OF WARRANTY

If the DuraSoft equipment consisting of the Mineral and Storage Tanks, Controls and Valves, Ion Exchange Resin and Treatment Media, is determined to have failed as a result of a manufacturing defect within the 2 year warranty period, the DuraSoft will, at its sole discretion, repair or replace the defective part at NO CHARGE to the CONSUMER (excluding labor, and applicable shipping and handling costs) for the duration of the warranty period.

LIMITATIONS OF COVERAGE

This warranty extends only to the original purchaser for damage resulting from defects in materials and workmanship, and does not include damage caused by the CONSUMER'S neglect or abuse, or by accident, to damage caused by wind, hail or abnormal weather conditions, or to damage caused by acts of God, civil insurrection or extraordinary circumstances beyond the control of DuraSoft.

DuraSoft shall not be liable for any direct or indirect damage resulting from the use of the equipment, and in no event shall the extent of this warranty coverage exceed the purchase price of the equipment.

DuraSoft cannot know the characteristics of a CONSUMER'S water supply or the purpose for which one is purchasing the DuraSoft equipment. Also, water qualities vary seasonally and over time. therefore, the DuraSoft assumes no liability for the determination of the proper equipment necessary to meet a CONSUMER'S requirements, nor does it authorize others to assume such obligations on its behalf.

This warranty excludes any equipment which was not manufactured by the DuraSoft and installed by an authorized DuraSoft dealer or on which the date code has been removed or altered. Any tampering or attempted repair performed by anyone other than an authorized dealer, including the CONSUMER, voids this warranty.

MISCELLANEOUS

In order to be considered for validation, all claims for warranty coverage must be accompanied by a copy of the purchase agreement indicating the date of initial installation, and a copy of the Consumer's current utility bill. the DuraSoft reserves the right to inspect the the DuraSoft Equipment prior to honouring any warranty claim.

This warranty is only issued by the DuraSoft, and the CONSUMER is hereby advised that DuraSoft Electric Corporation is not the manufacturer of the equipment, and provides no additional or separate warranty whatsoever in connection with the equipment.

This warranty gives you specific legal rights, and you may have other rights which may vary from state to state. Any and all inquiries or claims under this warranty must be submitted in writing to the dealer you purchased the equipment from.

OPERATION PARAMETERS

Operating Temperatures	Maximum 100°F (37.8°C)	Minimum 40°F (4.4°C)
Operating Pressure	Maximum 85psi (6.0 kg/cm2)	Minimum 40psi (2.80 kg/cm2)
pH Parameters	Maximum 11	Minimum 2
Iron	Maximum 0.2 ppm	
TDS (Total Dissolved Solids)	< 1800 ppm	
Turbidity	< 5NTU	