

Installation / Operation Manual



Fully Automatic and Demand Regeneration Water Softener

WARNING

Lubricants

Do NOT use Vaseline, oils, hydrocarbon lubricants or spray silicone anywhere! Petroleum base lubricants will cause swelling of o-rings and seals. The use of other lubricants may attack plastic Noryl®. It is recommended that Dow Corning® silicone grease be used as a lubricant for all control valves. Dow Corning® 7 Release Compound is used in the manufacture of Chandler Systems control valves. (Part # LT-150)

Sealants

Pipe dope and liquid thread sealers may contain a carrier that attacks some plastic materials. It is recommended that Teflon® tape be used to seal plastic Noryl® threaded fittings.

PLEASE NOTE THESE SPECIFICATIONS BEFORE PROCEEDING

OPERATING PRESSURE RANGE: 20 – 125 PSI

OPERATING TEMPERATURE RANGE: 33° F – 120° F

INLET / OUTLET PIPE SIZE: 1" FNPT

PROTECT THE SOFTENER AND PIPING FROM FREEZING TEMPERATURES!!

*Please read the entire Owner's Manual and Instructions before installation.
This Owner's Manual must stay with the unit.*

How A Water Softener Works

Water hardness is derived from **Calcium and Magnesium** minerals that have been dissolved into water under the earth's surface. These minerals are found in limestone deposits and are the source of hard water. The amount of hardness in a given water supply is dependent upon the quantity of Calcium and Magnesium present and the length of time water has been in contact with them. This can vary dramatically from well to well and, for this reason, a water analysis is imperative in order to determine the proper treatment method. The degree of hardness increases as the concentration of Calcium and Magnesium **ions** increases and is measured in **Grains Per Gallon (gpg)**.

The problem of hard water in the home / business comes to light in many facets of daily use. Water spots and scum left behind in bathtubs, fixtures and showers: wear and tear on appliances: calcium build-up in hot water heaters and piping; and greater amounts of soaps and detergents being used are just a few examples.

The modern water softener is designed to reduce hardness ions and their unpleasant side effects. Special resin beads in the softener mineral tank are used to change hard water into soft water. The surfaces of these beads are covered with sodium ions. As hard water enters the mineral tank and comes in contact with the resin, an exchange of ions takes place as dissolved Calcium and Magnesium ions cling to the resin surface and sodium ions take their place, thus softening the water. This process is called **Ion Exchange**. Over time, the sodium ions used for the exchange process become depleted and must be replenished.

The water softener provides a **Regeneration** process whereby brine solution enters the mineral tank driving-off the collected hardness ions and replenishes the surface of the resin beads with more sodium ions. The control valve on the mineral tank automatically initiates this process. The regeneration process has four basic cycles as follows:

1. **Backwash** – The control valve directs the water flow in a reverse direction through the mineral tank, separating the resin beads from flushing any accumulated particles to a waste drain.
2. **Brine & Rinse** – In the first part of this cycle, the control valve directs brine solution downward through the mineral tank, driving-off collected hardness ions and replenishing the resin beads with sodium ions. The second part of the cycle rinses hardness ions and excess brine from the mineral tank to the waste drain.
3. **Brine Refill** – The control valve directs fresh water into the salt compartment to create new brine solution for the next scheduled regeneration.
4. **Service** – This is the normal *operating* cycle where hard water enters the mineral tank, comes into contact with the resin beads and exchanges hardness ions for sodium ions – the water then becomes **soft** and ready for use.

Pre-Installation Check List

A water test should always be performed in order to determine total water hardness (in gpg) and total dissolved iron (in parts per million (ppm)). This is critical for proper equipment selection, sizing and for determining the program for regeneration frequency. If heavy concentration of iron (above 5 ppm), iron coloration, iron bacteria or sediment is present, filtration prior to the softener will most generally be required. Certain states may require a licensed plumber for installation.

NOTE: Flexible water supply connectors and flexible drain line tubing may not be allowed in your locale. Please check with local plumbing code officials prior to installation.

Softener Location / Other Requirements

- Locate the unit near an unswitched, 115 volt / 60 Hz grounded electrical outlet.
- Check for distance and proper drain installation (e.g. floor drain, washing machine standpipe).
- Determine type and size of piping required for softener connection (e.g. copper, galvanized, PVC plastic).

NOTE: If household plumbing is galvanized and you intend to make the installation with cooper (or vice versa), obtain di-electric unions to prevent dissimilar metal corrosion.

CAUTION: *If sweat soldering copper pipe (remember to always use lead free solder and flux), cover yoke or bypass valve with wet rags to prevent damage to connections and control valve!! If using PVC or plastic pipe, primers and solvent cements specifically recommended for use with potable water are required.*

Installation Procedure

Water Supply Connections and Bypass Valve

To allow for softener servicing, swimming pool filling or lawn sprinkling, a manual bypass valve has been installed at the factory. The bypass valve allows hard water to be manually routed around the softener.

1. Position softener at desired location for installation.
2. Turn OFF main water supply and OPEN nearest faucet to relieve pressure.
3. Cut main line and install appropriate elbows and extensions.

CAUTION: *Arrows located on the sides of control valve body and bypass valve indicate proper direction of water flow. Install inlet and outlet in direction of arrows.*

4. Rotate handle on bypass valve to the bypass position.
5. Turn the main supply line on to restore water service to the home.
6. OPEN nearest faucet to evacuate air and depressurize plumbing lines.
7. Check for leaks!!

Drain Line Connection

1. Remove drain line hose barb located on back side of control valve. Wrap threads of hose barb with Teflon tape. Reinstall drain line hose barb. **CAUTION:** *Hand tighten only!!*
2. Install 1 / 2" I.D. drain line tubing (not included) from hose barb to an open drain. A 4" air gap between the end of the drain line and the open drain is required to prevent wastewater backflow. Keep the drain line as short as possible. An overhead drain line can be used if necessary, but should discharge below the control valve. A siphon trap (taped loop) at the outlet of the drain line is advisable to keep the drain line full and assure correct flow during regeneration. Elbows or other fittings must be kept at a bare minimum.

NOTE: Where the drain line is elevated above the control valve or exceeds 20 foot in length, 3 / 4" I.D. drain line tubing should be used. A hose clamp (optional, not included) can be used to secure drain line tubing to drain barb.

Brine Line and Overflow Connection

1. Position brine tank on a smooth level surface near the softener resin tank. If necessary, the brine tank can be placed at a higher level than the resin tank, but ***never at a lower level.***
2. Install one end of 3 / 8" O.D. by 1 / 4" I.D. brine line tubing (included with unit) to compression fitting located on right side of control valve.
3. Remove brine tank cover or salt compartment lid.
4. Remove cap from brine well.
5. Insert opposite end of brine line through outer hole in brine tank.
6. Connect brine line to compression fitting on safety brine valve located inside brine well.
7. Install 1 / 2" I.D. drain line 90 elbow on outside of brine tank.
8. Run the opposite end of brine tank drain line to a suitable drain.

NOTE: The brine tank drain line is gravity flow and must discharge below the overflow fitting.

CAUTION: *DO NOT "TEE" to the main drain line from control valve.*

NOTE: The brine overflow is provided as a back up in the event the safety float shut-off should fail, allowing the brine tank to overflow. This drain connection would then carry the excess water to the drain and prevent flooding of the floor. Therefore, no liability will or can be assumed by the manufacturer of the softener should this occur.

Electrical Connection

1. Plug the cord from the control valve into a standard 115 volt / 60 Hz receptacle.

NOTE: **DO NOT** plug into an outlet controlled by a wall switch or pull chain that could inadvertently be turned off.

2. For your protection, this unit is equipped with a 3-prong plug and should be plugged into a grounded receptacle. If the receptacle is designed only to accept 2-prong plugs, obtain a 3-prong adapter and secure the ground wire to the receptacle plate mounting screw.

WARNING: ***DO NOT remove grounding plug! An improperly grounded unit could cause injury from electrical shock!***

Pressurizing The System

1. The control valve ***must be in the SERVICE position!*** The word SERVICE is imprinted in the notch on the manual regeneration knob.

WARNING: ***NEVER turn regeneration knob counter clockwise as this will cause damage to the control valve!***

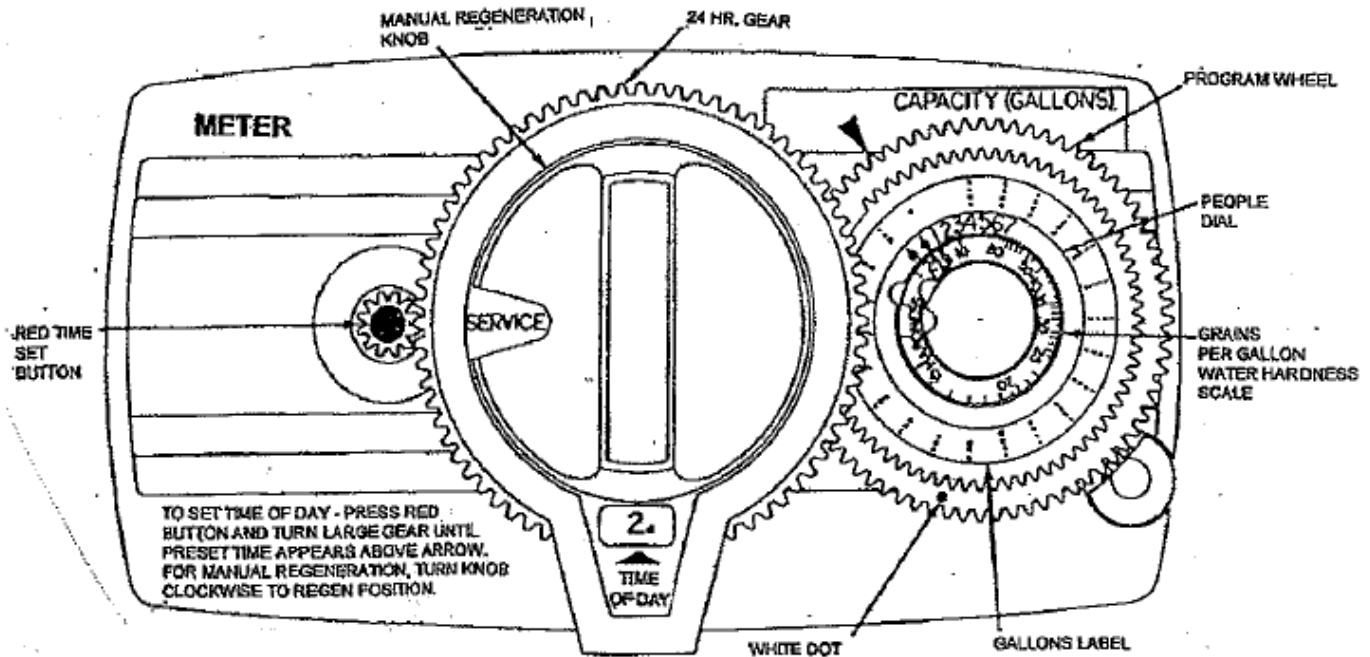
2. Slowly rotate handle of the bypass valve to the SERVICE position.
3. Open the nearest faucet to evacuate air from plumbing lines.
4. Check for leaks!

Control Valve Operation

Each control valve position can be manually selected by rotating the regeneration knob CLOCKWISE until the desired position appears in the knob notch.

1. Manually index regeneration knob to **BACKWASH** position and allow water to run to drain for 3-4 minutes or until clear.
2. Manually index regeneration knob to **BRINE REFILL** position and allow the brine tank to fill just over the salt grid plate.
3. Manually index regeneration knob to **BRINE & RINSE** position and allow the control valve to draw water from the brine tank until the water stops flowing.
4. Manually index regeneration knob to **BRINE REFILL** position and allow softener to refill brine tank. The valve will return to the SERVICE position when finished.

Metered Controls



Setting The Regeneration Schedule

1. Locate the program wheel just to right of the manual regeneration knob.
2. Rotate program wheel until the white dot located on the outermost gear is aligned with the capacity (gallons) arrow on the control panel.
3. Place your thumb firmly on the white dot to hold the outer gear while setting the program wheel.
4. Lift out the "people" dial and rotate it so that the number of people in the family is aligned with the compensated hardness in grains per gallon. The capacity arrow will now be aligned to the gallons of water that will be used between each regeneration as shown on the gallons label located outside the "people" dial.

Setting The Time Of Day

1. Depress the red button on left side of valve control panel.
2. Rotate the 24-hour gear on the manual regeneration knob until the time of day appears in the window (note a.m. and p.m.).
3. Check that red time of regeneration is factory pre-set to occur at 2:00 a.m. on each day for which a program tab is extended.

NOTE: If a different regeneration time is desired, set the time of day ahead or behind the actual time of day. If this is done, it is recommended that time dial be re-labeled.

Start Up Procedure

Disinfection

For disinfection of your unit, please follow the Sani-System Procedure on the back of the packet provided.

Filling The Brine Tank With Salt

To expect a high level of performance and reliability, a salt manufactured specifically for water softeners must be used. Salt of this grade is virtually free from dirt and other particulates that would eventually cause the softener to malfunction. Any high quality water softener salt (such as solar salt) will suffice. If iron is present in the raw water, use of iron inhibiting salt is recommended. The salt level will decrease after each regeneration cycle. Consequently, the salt compartment will need to be check and replenished periodically.

1. Fill the brine tank with water softener salt as described above.

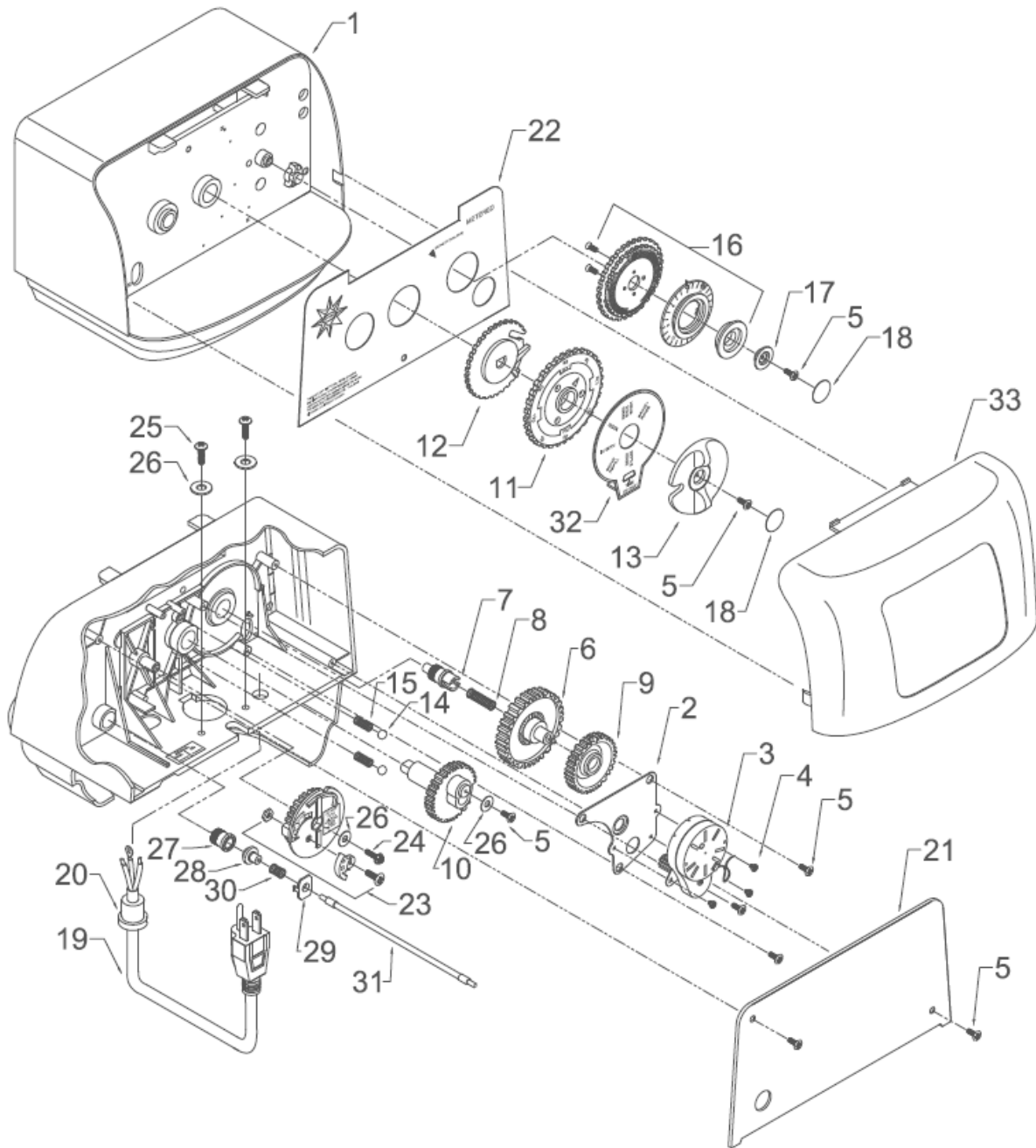
WARNING: Do not fill salt above level of the brine well!

2. Replace brine tank.
3. Replace control valve cover.

Final Check

1. Be certain the bypass valve is in the SERVICE position.
2. Make sure the electric cord is connected to an uninterrupted 115-volt outlet.
3. Check that the time of day is set.
4. Double check regeneration schedule.
5. Make final check for leaks!
6. Leave this manual with the unit.

Control Valve Drive Assembly (Metered Version)

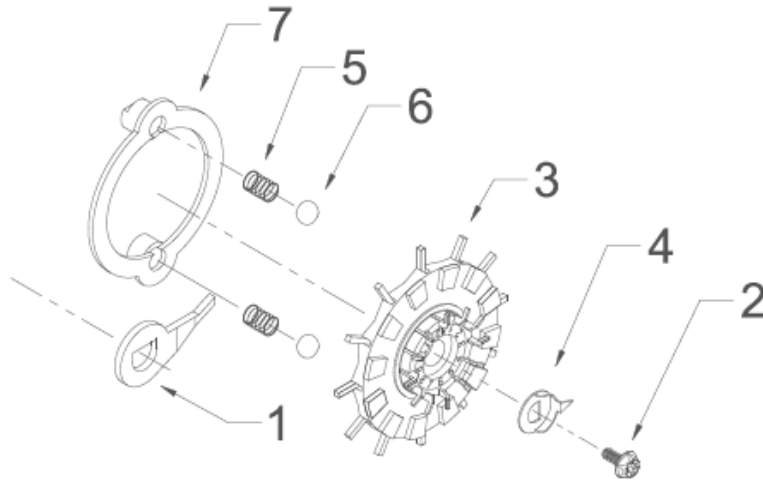


Valve Drive Assembly Parts List (Metered Version)

Ref #	Description	Part #	Qty
0	Metered Softener Powerhead Assy. Complete	20563H100	1
1	Drive Housing	20563X101	1
2	Motor Mounting Plate	20251X102	1
3	Motor, 110 V / 60 Hz	20251X425	1
4	Motor Mount and Ground Screw	20251X427	3
5	Component Mounting Screw	20251X406	8
6	Idler Gear	20251X421	1
7	Idler Pinion	20251X419	1
8	Idler Spring	20251X420	1
9	Drive Gear	20251X422	1
10	Main Gear and Shaft	20561X111	1
11	24 Hour Gear	20251X403	1
12	Cycle Actuator Arm	20253X110	1
13	Manual Regeneration Knob	20561X114	1
14	Ball, 1/4" Diameter SST	20251X413	2
15	Spring Detent	20251X414	2
16	Program Wheel Assy.-Specify "K"	20563X119	1
17	Program Wheel Retainer	20253X111	1
18	Program Wheel Cover Label	20563X121	2
19	Power Cord	20561X123	1
20	Strain Relief	20251X102	1
21	Back Cover	20561X126	1
22	Silver Front Label	20563X127	1
23	Brine CAM Assembly 6-36 – Inc. CAM, CAM Screw, CAM Nut & "LBS OF SALT" Label	20561X130	1
24	Brine CAM Mounting Screw	20561X131	1
25	Drive Mounting Screw	20561X134	2
26	Washer	20561X135	1
27	Program Wheel Drive Pinion	20563X137	1
28	Drive Pinion Clutch	20563X138	1
29	Spring Retainer	20563X139	1
30	Spring	20563X140	1
31	Cable Assy. Standard 8.25"	20563X141	1
	Cable Assy. Ext. 6.75"	20563X142	1
32	Valve Position Dial Standard	20561X138	1
33	Designer Cover	N/A	1

Shaded Ref # Indicates Assembly or Kit

Control Valve Drive Assembly (*Timeclock Version*)



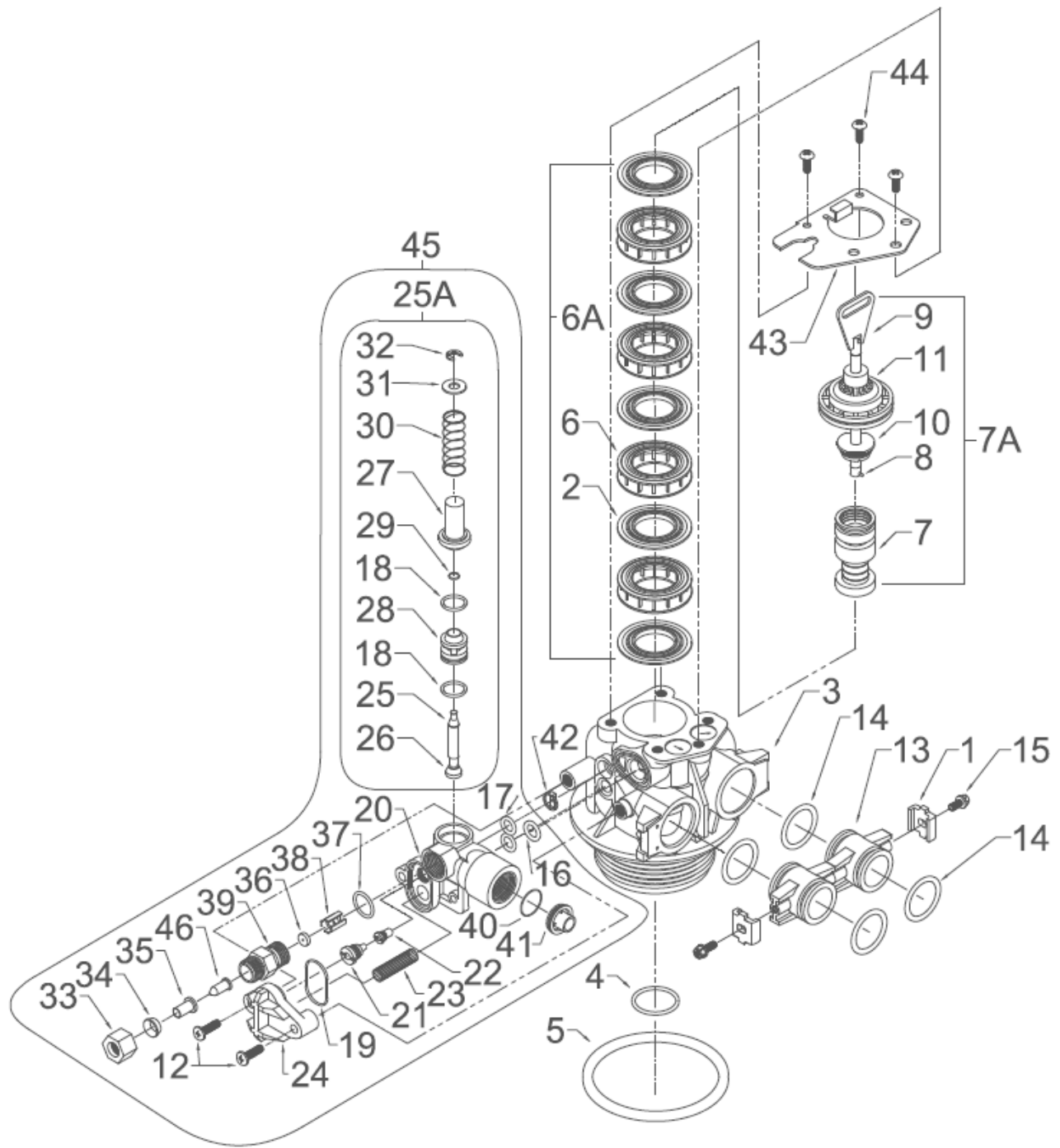
Control Drive Assembly Parts List (*Timeclock Version*)

Ref #	Description	Part #	Qty
0	Timered 12 Day Softener Powerhead Assy. Complete	20561H100	1
Not Shown	Drive Housing	20561X101	1
Not Shown	Front Label – Blue/Silver	20561X217	1
1	Cycle Actuator Alarm	20251X402	1
2	Component Mounting Screw	20251X406	1
3	Skipper Wheel Assy. – 12 Day	20251X408	1
4	Regen Pointer	20251X410	1
5	Skipper Wheel Detent Spring	20251X412	2
6	Ball, 1/4" DIA SST	20251X413	2
7	Skipper Wheel Ring	20251X435	1

All Items Same as Metered Version Except :

- #1 Replaces Metered Item #12
- #2 thru #7 Replace Metered Items
- #16 thru #18 Metered Items
- #27 thru #31 Are Not Included
- Shaded Ref # Indicates Assembly or Kit

Control Valve Drive Assembly (Metered or Clock Version)



Control Valve Drive Assembly Parts List

(Metered or Clock Version)

Ref #	Description	Part #	Qty
0	Valve Body Complete	20561X200	1
1	Adapter Clip	20561X201	2
2	Seal	20561X202	5
3	Valve Body Only 1.05" Dist.	20561X203	1
4	Dist Tube O-Ring 1.05" O.D.	20561X204	1
5	Valve to Tank O-Ring	20561X205	1
6	Spacer	20561X207	4
6A	Seal & Spacer Kit – Incl. 5-#2 & 4- #6	20561X253	1
7	Piston Only	20561X208	1
7A	Piston & End Plug Assy. – Incl. #7 to #11	20561X254	1
8	Piston Pin	20561X209	1
9	Piston Rod Assembly	20561X210	1
10	Piston Retainer	20561X211	1
11	End Plug Assembly	20561X212	1
12	Injector Mounting Screw	20561X214	2
13	Bypass Adapter (Automatic Only)	20561X215	2
14	Bypass Adapter O-Ring	20561X216	4
15	Adapter Clip Screw 9-18 x 5/8"	20561X217	2
16	Drain O-Ring	20561X218	1
17	Injector O-Ring	20561X219	2
18	Brine Spacer O-Ring	20561X220	2
19	Injector Cover O-Ring	20561X221	1
20	Injector Body	20561X222	1
21	Injector Nozzle, #1 White	20251X205	1
	Injector Nozzle, #2 Blue	20251X241	1
	Injector Nozzle, #2 PVC	20251X235	1
22	Injector Throat, #1 White	20251X206	1
	Injector Throat, #2 Blue	20251X242	1
	Injector Throat, #2 PVC	20251X236	1
23	Injector Screen	20251X204	1
24	Injector Cover	20561X226	1
25	Brine Stem Only	N/S	1
25A	Brine Valve Assy. - Incl. #18, #25 to #32	20561X225	1
26	Brine Valve Seat	2025X315	1
27	Brine Valve Cap	N/S	1
28	Brine Valve Spacer	N/S	1
29	Quad Ring	20251X312	1
30	Brine Valve Spring	N/S	1
31	Brine Valve Washer	N/S	1
32	Retaining Ring	N/S	1

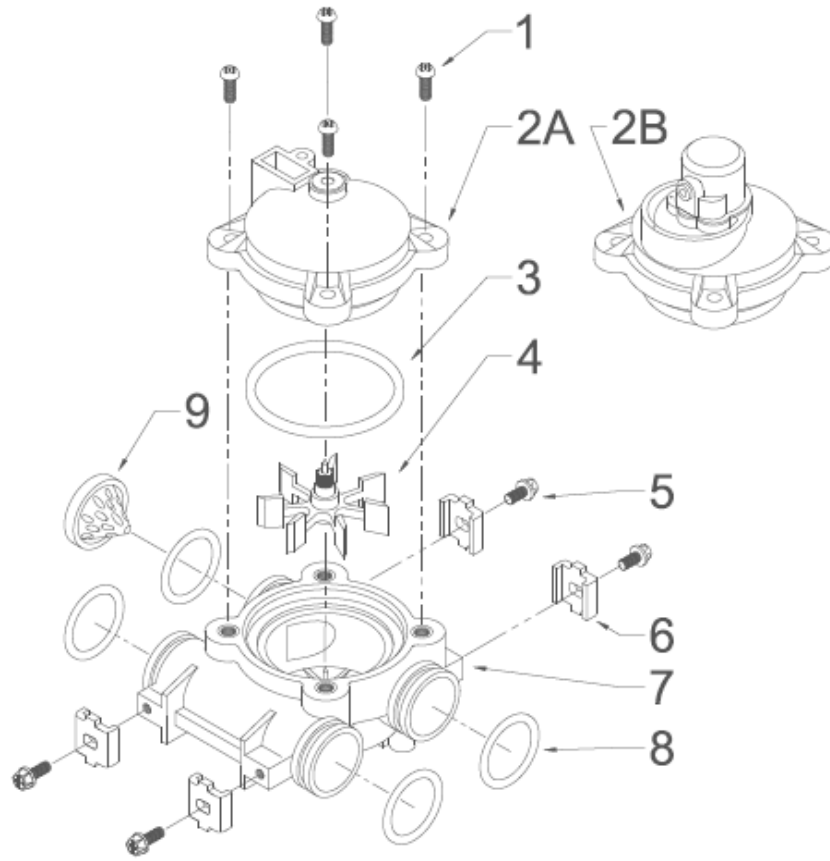
Ref #	Description	Part #	Qty
33	Brine Line Compression Nut	20251X304	1
34	Brine Line Ferrule	20251X305	1
35	Brine Line Brass Insert	20251X303	1
36	BLFC Button .5 GPM	20251X318	1
37	Brine Line O-Ring	20561X239	1
38	BLFC Button Retainer	20561X240	1
39	BLFC Brass Fitting	20561X241	1
40	Flow Control Button 1.5 GPM	20251X266	1
	Flow Control Button 2.0 GPM	20251X267	1
	Flow Control Button 2.4 GPM	20251X268	1
	Flow Control Button 3.0 GPM	20251X269	1
	Flow Control Button 3.5 GPM	20251X270	1
	Flow Control Button 4.0 GPM	20251X271	1
	Flow Control Button 5.0 GPM	20251X272	1
	Flow Control Button 7.0 GPM	20251X274	1
41	DLFC Button Retainer	20561X246	1
42	Air Dispenser	20561X248	1
43	End Plug Retainer	20561X249	1
44	10-24 X 1/2" Screw	20561X240	3
45	Injector Model Assy. #1 Inj., .5 BLFC, Specify DLFC, Incl. (2) #12, (1) #16, (2) #17 & #18, (1) each #19 thru #25, (1) each #26 thru #38	20561X260	1

Filter Components Not Shown			
	Description	Part #	Qty
	Filter Module Assy. Specify DLFC	20562X263	1
	Drain Line Fitting Straight 1/2" NPT x 1/2" Tubing	20561X256	1
	Drain Line Fitting 90° Elbow 1/2" NPT x 1/2" Tubing	20251X255	1
	Brine Valve Plug – Filter Only	20562X102	1
	Brine Valve Plug O-Ring	20561X220	1
	BLFC Plug – Filter Only	20562X103	1
	BLFC Plug O-Ring	20561X239	1
	Piston Assy. – Filter Only	20562X254	1
	Injector Nozzle Undrilled		1

N/S – Indicates Non-Stocked Item

Shaded Ref # - Indicates Assembly or Kit

Meter Assembly



Meter Assembly Parts List

Ref #	Description	Part #	Qty
0	Meter Module Complete – Std. Range	20563X200	1
1	Meter Cover Assy. Screw	20561X134	4
2A	Meter Cover Assy. – Std. Range	20563X202	1
	Meter Cover Assy. – Ext. Range	20563X211	1
2B	Meter Cover – Right Angle – Std. Range	20253X202	1
	Meter Cover – Right Angle – Ext. Range	20253X211	1
3	Meter Cover Assy. O-Ring	20563X203	1
4	Impeller	20563X204	1
5	Adapter Clip Screw	20561X217	4
6	Adapter Clip	20561X201	4
7	Meter Body	20563X207	1
8	Meter Body O-Ring	20561X216	4
9	Flow Straightener	20563X209	1

Troubleshooting Guide

SYMPTOM	PROBABLE CAUSE	CORRECTION
1. Softener fails to regenerate automatically	Power supply plugged into intermittent or dead power source	Connect to constant power source.
	Disconnected meter cable	Reconnect cable.
	Improper control valve programming	Reset program settings.
	Defective power supply	Replace power supply.
	Defective meter	Replace or repair.
	Defective drive motor	Check motor operation.
2. Regeneration at wrong time	Time of day improperly set, due to power failure	Reset time of day programming.
3. Loss of capacity	Increase raw water hardness	Reset unit to the new hardness.
	Brine concentration and/or quantity	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.
	Resin fouling	Call Dealer, find out how to confirm it. Clean the resin and prevent future fouling.
	Poor distribution, channeling (uneven bed surface)	Call Dealer. Check distributors and backwash flow.
	Internal valve leak	Call Dealer. Replace spacers, seals and/or piston.
	Resin age	Call Dealer. Check for resin oxidation caused by chlorine. Mushy resin.
	Resin loss	Call Dealer. Check for correct bed depth. Broken distributors. Air or gas in bed, well gas eliminator, loose brine line.
4. Poor water quality	Not regenerating enough	Check regeneration cycle.
	Bypass valve open	Close bypass valve.
	Channeling	Check for too slow or high service flow. Check for media fouling.
5. High salt usage	High salt setting	Adjust brine tank refill time.
	Excessive water in brine tank	See symptom # 7.
	Constant flow through the unit	Indicates plumbing leak (i.e. toilet tank).
	Improperly set hardness, regeneration frequency or regeneration day override programming	Reset programming.
6. Loss of water pressure	Sealing / fouling of inlet pipe	Clean or replace pipeline. Pre-treat to prevent.
	Fouled resin	Clean resin. Pre-treat to prevent.
	Improper backwash	Too many resin fines and/or sediment. Call Dealer. Reset backwash flow rate and/or adjust.

SYMPTOM	PROBABLE CAUSE	CORRECTION
7. Excessive water in brine tank and/or salty water to service	Plugged drain line	Check flow to drain. Clean flow control.
	Dirty or damaged brine valve	Clean or replace brine valve.
	Plugged injectors	Clean injectors and replace screen.
	Low inlet pressure	Increase pressure to allow injector so perform properly (20 psig minimum)
	Excessive brine refill cycle time	Check salt setting.
8. Softener fails to use salt	Check items listed in #1	
	Improper control valve programming	Check and reset settings.
	Plugged/restricted drain line	Clean drain line and/or flow control
	Injectors are plugged	Clean or replace injectors and screen
	No water in brine tank	Check for restriction in BLFC. Ensure safety float is not stuck. Check brine tank for leaks.
	Water pressure is too low	Line pressure must be at least 20 psi
	Brine line injects air during brine draw	Check brine line for air leaks
	Internal control leak	Check piston, seals and spacers for scratches and dents
9. Control cycles continuously	Debris in seal and spacers	Clean or replace seals & spacers/ piston assembly
10. Continuous flow to drain	Foreign material in control	Clean valve or rebuild unit
	Internal control leak	Same as above.
	Valve jammed in backwash, brine or rapid rinse position	Same as above.
	Motor stopped or jammed	Replace motor.