

WaterMate-1^{T.M.}

WATER CONDITIONING SYSTEM



Owner's Manual

©2000-2010

Hellenbrand

Manufactured by
HELLENBRAND, INC.
404 Moravian Valley Road
Waunakee, Wisconsin 53597-2509
Phone: 608-849-3050 • Fax: 608-849-7398
Web: www.hellenbrand.com

This owner's manual is designed to assist owners and installers with the operation, maintenance and installation of your new water softener. It is our sincere hope that this manual is clear, concise and helpful to both owner and installer. We have included detailed instructions on general operating conditions, pre-installation and installation instructions, start-up and timer and meter programming. In addition, we have included a troubleshooting guide for the owner and service instructions complete with diagrams for the installer.

Owners will appreciate the simplified, illustrated format for operation, programming and troubleshooting. In the event that you need professional assistance for servicing your water softener, please contact a qualified plumbing professional.

TABLE OF CONTENTS

Operating Conditions	Page 2
Physical & Capacity Specification.....	Page 3
Job Specification Sheet	Page 3
Soft Water Basics.....	Page 4
Pre-Installation Check List	Page 4
Installation Instructions	Page 4
Start-up	Page 6
Water Softener Disinfection.....	Page 7
Water Softener Draining Procedure.....	Page 7
Programming.....	Page 8
Troubleshooting.....	Page 9
Service Instructions.....	Page 10-11
Service Diagrams	Page 14-18
Warranty	Page 20

FREQUENTLY ASKED QUESTIONS

- Do I still use the same amount of soap in the dishwasher and clothes washer and showers now that I have a water softener?** No, the Water Quality Association states soft water can save up to 55% on detergent use. Start with using 1/2 the amount of detergent previously used, this can be adjusted up or down based on preference. Soft water helps fabrics last longer, because hardness minerals combined with soap can make fabric fibers brittle.
- What is the health impact of drinking soft water?** The sodium added to water by softening is a non-issue most of the time, even for people on a sodium restricted diet. One could soften up to 75 grains per gallon water with sodium chloride and still be well within the US Food and Drug Administration's labeling of a "Low Sodium" beverage. People on a sodium-restricted diet should consult their physician.
- Should I use soft water for my plants?** Some plants may be sensitive to even minute amounts of sodium. Suggest using hard water for watering plants, often a kitchen cold faucet is plumbed for hard water or the outside faucets are usually plumbed for hard water. If not, you can place your softener on bypass and fill water containers at the closest sink. Water from a reverse osmosis system can always be used to water plants.
- Will water spots disappear now that I have soft water?** Water spots caused by hardness scale will disappear with a functioning water softener. However, other natural minerals dissolved in the water may cause spotting in high enough concentrations. These mineral spots will be much easier to wipe away compared to hardness spotting.
- Will soft water cause my water or ice cubes to look or taste different?** Most people can tell the difference in taste between hard and soft water, it is a personal preference. Ice cubes will appear the same, they may look cloudy due to air in water or dissolved minerals, and this will not change because now they are made with softened water. A reverse osmosis drinking water system will provide much clearer ice cubes.

OPERATING CONDITIONS

Your water conditioner has been designed to adequately handle up to 100 grains per gallon of hardness that might be encountered as well as up to 2 ppm of Ferrous Bicarbonate Iron. This is iron that is dissolved in an oxygen-free water supply. It is not visible to the eye in a freshly drawn sample because the water appears clear. But upon standing in contact with air, the ferrous iron will become oxidized to the ferric state and start to precipitate as a reddish brown floc. It can then be seen and if allowed to remain in the supply will cause discolored water. In order for your conditioner to remove the iron, air (oxygen) must be kept from coming in contact with water until after it has been passed through the water conditioner. In some cases,

additional equipment may be required to treat water supplies having special characteristics, such as: ferric hydroxide iron, iron bacteria, low pH, taste and odors, etc. If any question should exist, contact your dealer or send a raw, untreated water sample along with the model number of your conditioner. We will be glad to recommend the proper regeneration interval or specify any additional equipment that might be needed.

This water softener is not intended to be used for treating water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after treatment.

JOB SPECIFICATION SHEET

***WATER TEST**

MODEL NO. _____

_____ Hardness CaCO₃ (gpg) _____ Other _____
 _____ Iron (ppm) _____ Other _____
 _____ pH _____ Other _____

***SIZING INFORMATION**

All Water is Softened Except:

_____ Rear Hose Bib _____ Front Hose Bib _____ Kitchen Cold _____ Toilets
 _____ Other _____

The average family uses 70 gallons per person daily for all water uses in the home, about 50 gallons per person daily if hard water can be supplied to the toilets, and about 30 gallons per person daily for hot water only.

_____ Daily Water Usage (Gallons/Person)
 x _____ Family Size
 = _____ Total Gallons Per Day
 x _____ Grains Per Gallon of Hardness
 = _____ Total Grains Per Day

***REGENERATION SETTINGS**

Time Clock: Automatic Regeneration Every _____ Days Using _____ Lbs./Salt
 Meter Demand: Automatic Regeneration Every _____ Gallons Using _____ Lbs./Salt
 Meter Setting _____ People/ _____ Hardness

*INSTALLATION DATE _____ MANUFACTURE DATE _____

SERIAL NUMBER _____

NOTES _____

*To be filled in by dealer.

CAPACITY & PHYSICAL SPECIFICATIONS

DEMAND MODEL NAME	MINERAL CU.FT.	CAPACITY			SERVICE FLOW RATING GPM/PSI	MINERAL TANK (INCHES)	BRINE TANK SIZE (INCHES)	DLFC (GPM)	BLFC (GPM)	INJ. SIZE	TIME CLK MODEL NAME
		LOW SALT GRAINS/LBS	MED. SALT GRAINS/LBS	HIGH SALT GRAINS/LBS							
WM1-16M	0.50	9,800/3.0	14,100/5.0	16,600/7.5	6.1/6.8	7 x 44	18 x 33	1.2	0.25	0	WM1-16
WM1-24M	0.75	14,700/4.5	21,200/7.5	24,900/11.3	8.4/9.7	8 x 44	18 x 33	1.5	0.50	0	WM1-24
WM1-32M	1.00	19,600/6.0	28,200/10.0	33,200/15.0	10.0/10.7	9 x 48	18 x 33	2.0	0.50	0	WM1-32
WM1-48M	1.50	29,400/9.0	42,300/15.0	49,800/22.5	9.7/10.3	10 x 54	18 x 40	2.4	0.50	1	WM1-48
WM1-64M	2.00	39,200/12.0	56,400/20.0	66,400/30.0	12.0/11.6	13 x 54	18 x 40	3.5	0.50	2	WM1-64
WM1-96M	3.00	58,800/18.0	84,600/30.0	99,600/45.0	12.0/10.6	14 x 65	18 x 40	4.0	1.0	3	WM1-96

CABINET MODELS

DEMAND MODEL NAME	MINERAL CU.FT.	CAPACITY			SERVICE FLOW RATING GPM/PSI	MINERAL TANK (INCHES)	CABINET SIZE (WxHxD)	DLFC (GPM)	BLFC (GPM)	INJ. SIZE	TIME CLK MODEL NAME
		LOW SALT GRAINS/LBS	MED. SALT GRAINS/LBS	HIGH SALT GRAINS/LBS							
WM1-16MC	0.50	9,800/3.0	14,100/5.0	16,600/7.5	6.1/6.8	7 x 35	14x46x22	1.2	0.25	0	WM1-16C
WM1-24MC	0.75	14,700/4.5	21,200/7.5	24,900/11.3	8.4/9.7	8 x 35	14x46x22	1.5	0.50	0	WM1-24C
WM1-32MC	1.00	19,600/6.0	28,200/10.0	33,200/15.0	10.0/10.7	10 x 35	14x46x22	2.0	0.50	0	WM1-32C

1. These conditioners are designed for hardness removal.
2. Limit of 2ppm of "Ferrous Bicarbonate" iron. Add 3 grains per gallon of hardness for each ppm iron when sizing.
3. These conditioners will not purify or make your water safe to drink.
4. Water pressure must be between 25 and 120 psi.
5. Water temperature must not exceed 110°F and the unit cannot be subject to freezing conditions.
6. Product improvements and design changes subject to change without notice.

SOFT WATER BASICS

Hardness

Excess amounts of calcium and magnesium in water produce hardness. A water softener removes the majority of calcium and magnesium to produce softened water.

Hardness is measured in terms of grains. (This grain weight is derived from the average weight of a dry grain of wheat.) When your water is tested the grain hardness is calculated and expressed as grains per gallon (gpg). This calculation, as well as the number of people in your household will help determine what type and size of water softener will most efficiently soften your water.

Your water softener contains an ion exchange media (sometimes called resin or ion exchange material) which removes the hardness from water as it flows through the softener tank. Eventually so much hardness collects on the exchange media that the softener can no longer soften water. At this point it is considered "exhausted". Regeneration is now necessary.

Regeneration

To regenerate the exchange media, it must be rinsed with a brine (salt) solution. This removes the hardness from the exchange media and replaces it with sodium. The exchange media is then ready to remove hardness from water. The hardness minerals and excess brine solution are rinsed down the drain.

During the regeneration cycle the softener is also backwashed. This reversing of the normal flow of water serves to

remove sediment which may have accumulated during the softening process due to the filtering action of the exchange media. Backwashing also loosens and fluffs up the bed of exchange media to insure that during regeneration the brine solution will come into contact with all the media.

Maintenance of Your Softener

Salt to a softener is what gasoline is to a car. Not only must a softener have salt, but it should be the proper type to insure efficient recharging of the unit. Ask your dealer what type of salt may best suit your needs. Always have an adequate supply of salt on hand. Check the salt level of your brine tank every couple of weeks initially to determine how much salt you use - this will depend on how much water you use. As a rule of thumb, with 20 gpg hard water, about a 1/2 lb. of salt per person per day is used. In other words, a family of four uses 60lbs. of salt a month. If your household does not use much water, do not fill your salt keeper over 1/2 full, salt bridging may occur in the brine tank. This may result in hard water due to ineffective regeneration. **Add salt to your salt tank before the salt level falls below the water level** (bottom one-third of tank). Fill the tank approximately three-fourths full.

Salt tanks may require periodic cleaning. Inspect it at least once a year for buildup of insoluble materials. See page 10 for salt tank cleaning instructions.

PRE-INSTALLATION CHECK LIST

Water Pressure: A minimum of 20 pounds of water pressure (psi) is required for regeneration. Maximum water pressure 120 psi.

Water Quality: On rural water supplies there is often a problem with sand or sediment in the water. (This occasionally occurs in public water supplies also.) A sediment filter is recommended to prevent plugging of the resin bed with sand or sediment. Well and/or pump problems affecting the operation of the softener, such as sediment are NOT covered under warranty. To prevent unnecessary and expensive repairs not covered by warranty, install an in-line sediment filter ahead of softener.

Electrical: A continuous 110 volt 60 cycle current supply is required. Make certain the current supply is uninterrupted and cannot be turned off with another switch. All electrical connections must be connected per local codes. Surge protection is recommended with all electric controls.

Existing Plumbing: Existing plumbing must be free from lime and iron build-up. Piping that is built-up heavily with lime and/or

iron must be replaced. If pipe is blocked with iron, additional equipment must be installed ahead of the water softener to correct the problem.

Drain Line: The conditioner should be located close to a drain. Avoid overhead drain lines if possible to prevent back pressure on the brine injector. Overhead drains should not exceed 8 feet above the floor and no more than 20 feet in length. Backwash flow rates in excess of 7 gpm or length in excess of 20' require 1" drain line. **All drain lines must be 1/2" I.D. or larger.**

Bypass Valves: Always provide for the installation of a bypass valve.

Softening: It is recommended that the conditioner be installed to soften both the hot and cold water supply. A separate hard water faucet may be plumbed for drinking purposes if desired. Outside faucets should be left on hard water.

Caution: Water temperature is not to exceed 110°F; the conditioner cannot be subject to freezing conditions, or to a vacuum due to loss of pressure (such as a water main break).

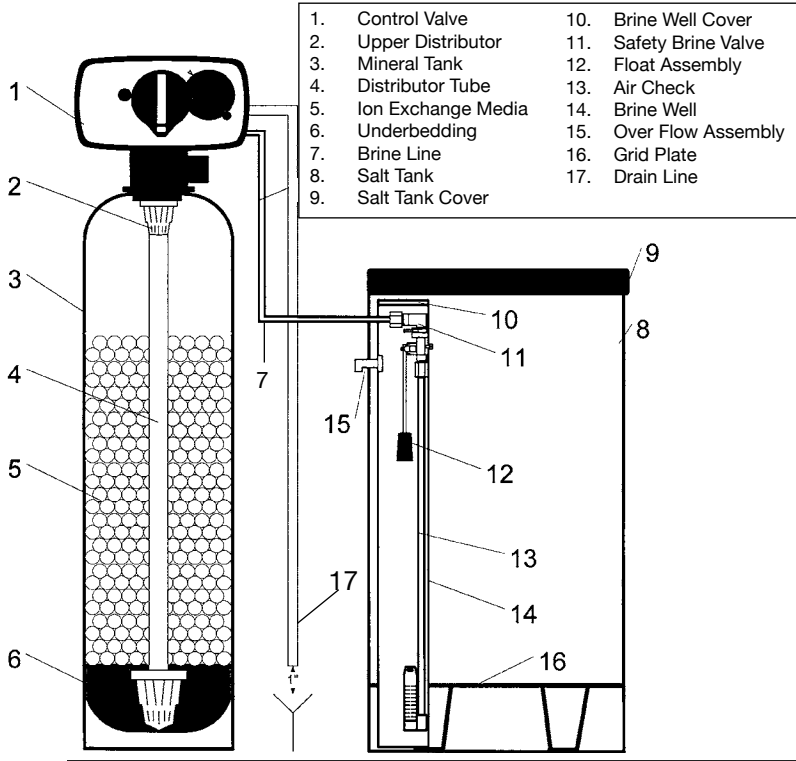
INSTALLATION INSTRUCTIONS

1. Place the conditioner where you want to install, making sure it is level and on a firm base.
2. Do all necessary plumbing (inlet to inlet, outlet to outlet and minimum 1/2" inside diameter drain line to drain). All plumbing should be done in accordance with local plumbing codes.
3. **Important:** Solder joints within 6" of the control valve must be presoldered to assure that the control valve is protected from any excessive heat.
4. Use only Teflon tape or paste on the drain fitting. **Important:** Hand tighten the drain fitting only, and if necessary, a partial turn with a wrench. Do not tighten the fitting excessively or it may crack the injector body. Install with a proper air gap.
5. Connect the brine line found in the salt tank to the brine connection on the lower right side of the control valve with compression fittings in cloth bag attached to the control valve. Remove the nut, gripper and retainer sleeve from the safety brine valve elbow and insert tubing through nut, gripper and retainer sleeve. Install tubing insert (**taped to**

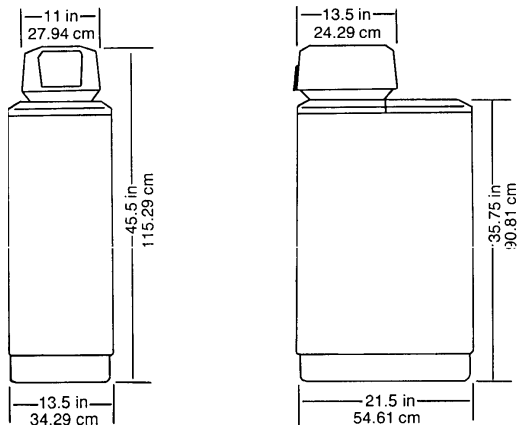
brine well cap) inside tubing and attach tubing to safety brine valve elbow. Make sure the floor is clean beneath the salt tank and that it is level.

Note: On cabinet models, the brine line is connected at the factory. Make sure the floor is clean beneath the cabinet tank and that it is level.

6. On demand meter models, insert meter cable into meter dome.
7. A 1/2" (inside diameter) gravity drain line should be connected to the overflow elbow on the side of the salt tank and run to a drain below the level of the elbow. This overflow drainage system provides protection from water damage in the event of a brine shut-off malfunction. Tubing is not provided to do this. **In all cases where an overflow could result in water damage for various reasons, this overflow protection must be used. Do not connect the tubing to the drain line on the control valve discharge line and do not run this line above the overflow elbow height at any point. Provide air gap.**



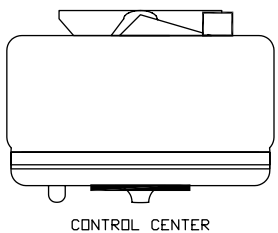
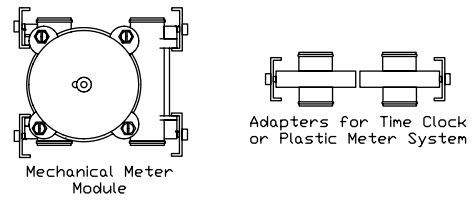
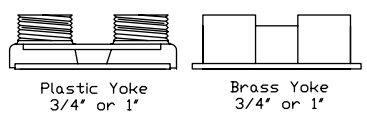
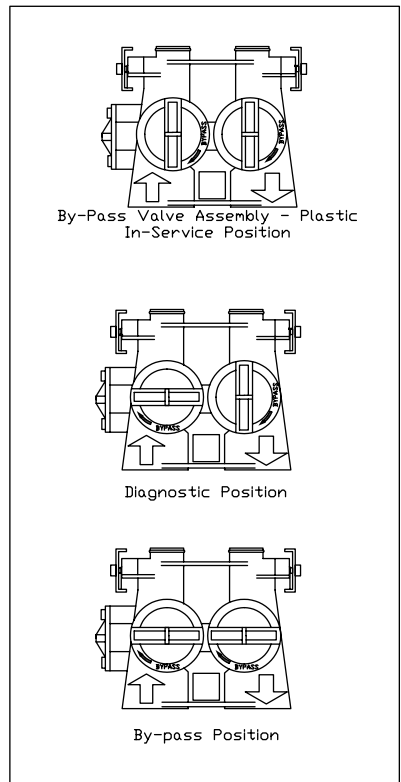
Optional Cabinet Models (Valve Cover Not Included)



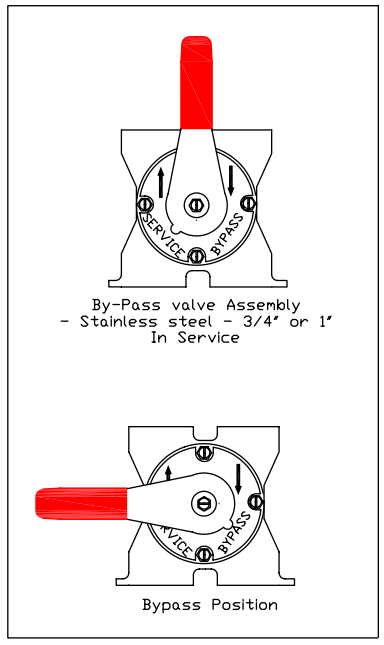
CONNECTION OPTIONS

**BYPASS ASSEMBLIES - MUST BUY COMPLETE ASSEMBLIES, PARTS ARE NO LONGER AVAILABLE
SEE PRICE LIST FOR COMPLETE YOKE/BYPASS OPTIONS**

PLASTIC BYPASS VALVE



STAINLESS STEEL BY-PASS



START-UP

The initial start-up will probably be done by the technician installing the softener system. If not, the following instructions will step you through the process.

1. Complete all plumbing connections: inlet, outlet, drain line and brine line in accordance with local plumbing codes.
2. With a hose or bucket, manually add water to the salt tank to approximately 1" above the grid plate. **NOTE:** Self-contained (cabinet models) systems do not have a grid plate. Place 6" of water in cabinet.
3. Place the bypass lever (black plastic covered handle) in bypass position. Turn on the main water supply. Open a cold soft water faucet to flush the piping of any air and/or foreign material. Run until the water is clear.

NOTE: The various regeneration positions may be dialed manually by turning the center knob on the front of the control until the indicator shows that the softener is in the desired position.

4. Manually advance the conditioner to the rapid rinse position by turning the center knob clockwise until "rapid rinse" appears in the window (Figure 5). Slowly open the bypass valve by moving the bypass lever towards the service position until it is all the way in service. After 1-2 minutes, close the bypass valve by moving the bypass lever to bypass. Manually advance the conditioner to the service position by turning the center knob clockwise until "in service" appears in the window (Figure 6).

5. Manually advance the conditioner control to the backwash position by turning the center knob clockwise until "backwash" appears in the window (Figure 7). While in the backwash position, move the bypass lever toward the service position slightly to allow the softener tank to slowly fill with water. This will remove all air through the drain line. When all the air is removed and a steady stream of water can be seen at the drain, move the bypass lever all the way to the service position. Run until the water at the drain is clear.
6. After the water has cleared, manually advance the conditioner to the brine and rinse position by turning the manual regeneration knob clockwise until "brine & rinse" appears in the window (Figure 8). Check that water in the brine tank is being drawn out.
7. Manually advance the conditioner to the brine refill position by turning the center knob clockwise until "brine refill" appears in the window (Figure 9). Check that water is being added to the brine tank, then advance to service (Fig. 6)
8. Open a cold soft water faucet and run until water is clear and free of air.
9. Plug the electrical supply cord into a grounded outlet, that cannot be turned off by a switch. Salt may be placed in the unit at this time.

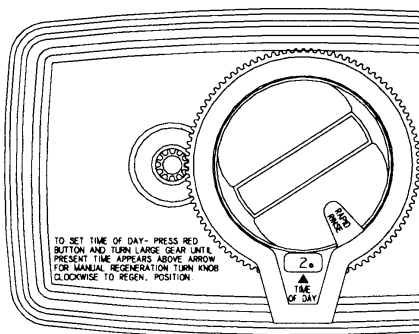


Figure 5

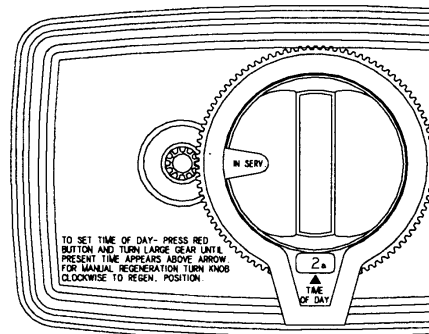


Figure 6

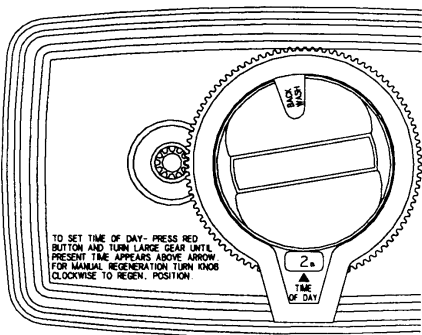


Figure 7

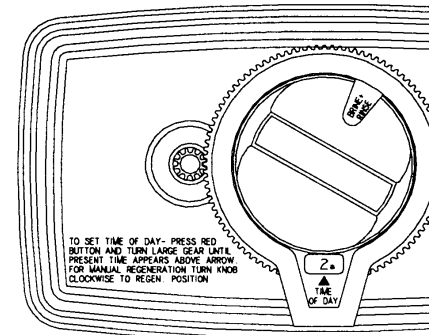


Figure 8

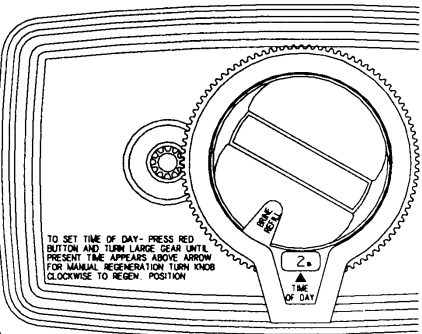


Figure 9

WATER SOFTENER DISINFECTION

The materials of construction of the modern water softener will not support bacterial growth nor will these materials contaminate a water supply. However, the normal conditions existing during shipping, storage, and installation indicate the advisability of disinfecting a softener after installation, before the softener is used to treat potable water. In addition, during normal use a softener may become fouled with organic matter or in some cases, with bacteria from the water supply.

Therefore, every softener should be disinfected after installation, some will require periodic disinfection during their normal life. Disinfect as follows:

SODIUM HYPOCHLORITE (household bleach)

5.25% SODIUM HYPOCHLORITE solutions are available

under such trade names such as Clorox, Linco, Bo Peep, White Sail and Eagle Brand Bleach. If stronger solutions are used, such as those sold for commercial laundries, adjust the dosage accordingly.

1. Dosage:

a. Polystyrene resin; 1.2 fluid ounce per cubic foot of mineral (see Capacity & Physical Specifications chart, page 2).

2. Salt tank:

a. Backwash the softener, and add the required amount of hypochlorite solution to the brine well of the salt tank. (The salt tank should have water in it to permit the solution to be carried into the softener.)

b. Proceed with the normal regeneration.

WATER SOFTENER DRAINING PROCEDURE

In cold weather climates it is common for plumbing systems that are not in use to be "winterized" or drained of all water to prevent any damage that may be caused by the excessive expansion of water when it freezes. To prevent damage to a water softener it must be **properly** drained also. A simple way to properly drain or winterize a water softener is to use compressed air to force all of the water out of the softener mineral tank. The following procedure will explain the process:

- 1) Initiate the softener into a manual regeneration cycle, allow the unit to complete the backwash cycle (this will clean the media) and start into the brine-draw cycle. Allow the regeneration to continue in the brine draw cycle until the brine is drawn out of the salt tank and the air check at the bottom of the brine pick-up tube shuts off. At this time no more brine is introduced into the softener and the slow rinse process begins.
- 2) Turn the water supply inlet and outlet valves off to the water softener as soon as the air check shuts off and no more brine is being drawn into the softener (at the beginning of the slow rinse process).
- 3) Unplug the electric power leaving the softener control valve in the brine draw cycle.
- 4) Disconnect the brine tube at the top of the salt tank and force air into the brine tube toward the softener mineral tank and control valve. The air will force the brine/water solution that was drawn into the mineral tank out to drain through the control valve drain line. (An air compressor blow gun attachment with a portable air compressor works well.)

CAUTION: You do not want to apply any more pressure than necessary to force the brine/water out of the mineral tank.

The small amount of brine/water that may be left in the mineral tank will not expand enough to cause any damage to the softener when it freezes.

If your softener is equipped with an optional bottom drain on the mineral tank, you will have to follow all of the same

procedures with the exception of the need for compressed air. With the brine tube disconnected from the salt tank, raise it to a level above the softener control valve and temporarily secure it in this position. Now open the drain valve at the bottom of the mineral tank and allow all brine/water to drain from the mineral tank.

CAUTION: If a hose is connected to the drain valve to direct the brine/water to a floor drain be sure it runs downward and is unobstructed. When brine/water quits running at the drain, be sure to leave the drain valve open until you start the system up again.

- 5) At this time the salt tank has very little water left in it. What liquid is left is saturated brine, provided that there is still salt left in the tank. Saturated brine will not freeze solid and cause any damage and does not have to be drained.

If there is no salt left in the salt tank when the system is drained we recommend dumping all of the water out of the brine tank at this time. See cleaning instructions on page 10.

- 6) **CAUTION:** It is important at this time to be assured that the inlet/outlet water supply piping is properly drained. Depending on how the water supply piping was routed to the water softener control valve, a water loop or trap may have been created.

Sometimes drain valve(s) are installed at the bottom of the loop to assure all water can be drained out. If not it may be necessary to disconnect the control valve from the piping system and open the inlet/outlet valve(s) to allow all the water to drain from the piping. This should be done when the rest of the plumbing system is drained.

- 7) Draining or winterizing of your softener is complete. Refer to the start-up procedures on page 6 when you are ready to start your softener.

MISCELLANEOUS

REMEMBER: Salt is the fuel to run your water softener. Buy the best clean salt available.

1. Salt Usage: Use only a processed coarse salt such as pellets or solar salt.

2. Salt tank Cleaning: It is recommended to periodically clean the salt tank no matter what kind of salt you are using. To clean self-contained models, either disassemble the unit completely or use a wet vacuum to clean it out. See page 10 for cleaning instructions.

PROGRAMMING

1. Set the time of day in the time of day window. Time of regeneration is pre-set for 2:00 a.m. If you wish to regenerate at a different time, you will have to compensate by offsetting the time of day. Determine time you want regeneration to take place and figure the time difference between 2:00 a.m. and actual regeneration time. If regeneration is to take place earlier than 2:00 a.m., set the time of day for the actual time plus the difference figured above (set time ahead). If regeneration is to take place later than 2:00 a.m., set time of day for the actual time minus the difference figured above (set time behind). Instructions for setting the time of day are printed in the bottom left hand corner on the face of the timer.

2A. WaterMate-1 Series Timer: To set days that regeneration is to occur, slide tabs on skipper wheel outward to expose the trip fingers (Figure 10). Each tab is one day. Tab at red pointer is tonight. Moving clockwise from the red pointer, extend or retract fingers moving on the skipper wheel to obtain desired regeneration schedule. Regeneration may be once every 12 days, every 6 days, every 4 days, every 3 days, every 2 days, or everyday.

2B. Regeneration Interval: To choose the proper regeneration interval, first determine the total grains of hardness to be removed daily. The average family uses 70 gallons per person daily for all water uses in the home, about 50 gallons per person daily if hard water can be supplied to the toilets and about 30 gallons per person daily for hot water softened only.

Let us assume that we have a family of three persons, the water is 20 grains hard, and all water is to be softened. Let us also keep in mind that we would like to have a 3 to 4 day regeneration interval to conserve water.

$3 \text{ persons} \times 70 \text{ gallons per day} \times 20 \text{ grains per gallon of hardness} \times 4 \text{ days} = 16,800 \text{ grains minimum softener capacity.}$

Check the label on the back of your timer cover for your salt setting. Go to the capacity rating chart on page 2 and find your model number and see what your capacity is in relation to the salt setting. If you need to adjust it, remove the valve cover and set the salt dial accordingly (Figure 11).

NOTE: Add three (3) grains of hardness per each ppm of iron present when programming for regeneration frequency. Example: 20 grains and 1 ppm of iron would be considered as 23 grains hard (compensated hardness).

3A. WaterMate-1 Timer: Residential Applications - To set the program wheel, simply lift the "people dial" and rotate so that the number of people in the household is aligned with the grains per gallon on the water hardness scale (Figure 12). Release the dial and check for firm engagement at setting. Add three (3) grains of hardness per ppm of iron present. Example: 20 grains and 1 ppm of iron would be considered 23 grains hard (compensated hardness). Salt setting is preset at factory on all Demand Regeneration Timer units.

3B. Commercial Applications – Calculate the gallon capacity of the system, subtract the necessary reserve requirements and set the gallons available opposite the small white dot on the program wheel gear. Add three (3) grains of hardness per ppm of iron present.

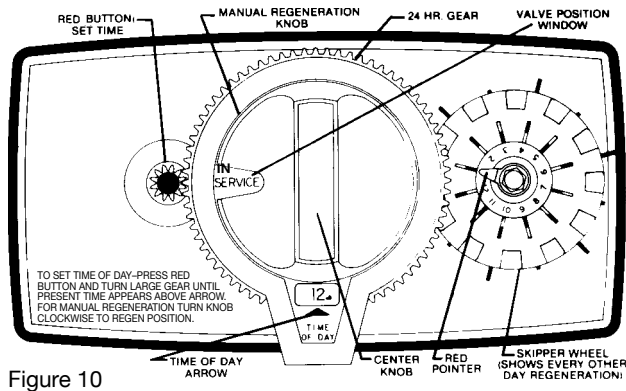


Figure 10

WATERMATE-1 TIME CLOCK

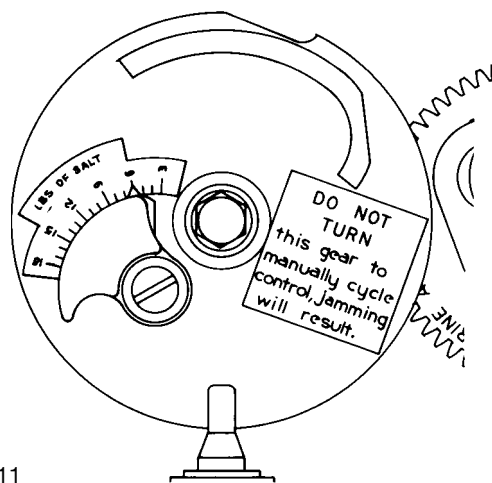


Figure 11

SALT ADJUSTMENT DIAL

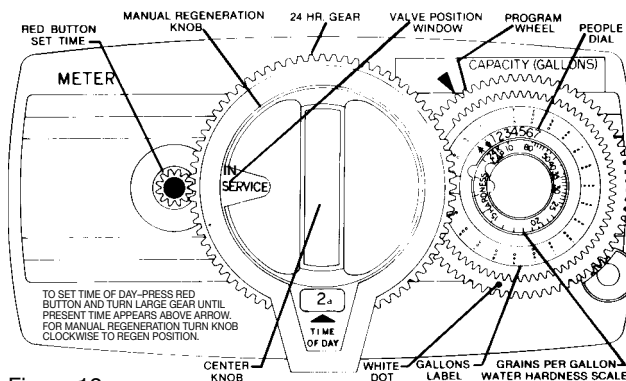


Figure 12

WATERMATE-1 METER DEMAND

TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
1. Softener fails to regenerate.	A. Electrical service to unit has been interrupted. B. Power failure. C. Timer motor is defective. D. Timer is defective.	A. Assure Permanent Electrical Service (check fuse, plug, pull chain or switch). B. Reset time of day. C. Replace timer motor. D. Replace powerhead.
2. Softener delivers hard water.	A. Bypass valve is open. B. No salt in brine tank. C. Injectors or screen plugged. D. Insufficient water flowing into brine tank. E. Hot water is hard and cold water is soft. F. Leak at distributor tube. G. Internal valve leak.	A. Close bypass valve. B. Add salt to brine tank and maintain salt level above water level. C. Clean or replace injectors and screen. D. Check brine tank fill time and clean brine line flow control if plugged. E. Softener capacity exceeded, flush hot water heater and set up to regenerate more often. F. Replace distributor tube if cracked. Check o-ring and tube pilot. G. Replace seals and spacer and/or piston.
3. Unit uses too much salt.	A. Improper salt setting. B. Excessive water in brine tank.	A. Check salt usage and salt setting. B. See problem No. 7.
4. Loss of water pressure.	A. Iron build-up in line to water conditioner. B. Iron build-up in water conditioner. C. Inlet of control plugged due to foreign material broken loose from pipes by recent work done on plumbing system. D. Heavy iron build-up, resin will not clean up and deliver soft water.	A. Clean line to water conditioner. Install additional filtering equipment ahead of the conditioner. Use a resin cleaner with your salt. B. Clean control valve. Increase frequency of regeneration & use a resin cleaner with your salt. Install additional filtering equipment ahead of the conditioner. C. Remove piston and clean control. D. Replace resin bed and install additional filtering equipment ahead of the conditioner.
5. Loss of resin through drain line.	A. Air in water system. B. Distributor tube is defective. C. Upper distributor is defective.	A. Assure that well system has proper air elimination control. Check for dry well condition. B. Replace distributor tube. C. Replace upper distributor.
6. Iron in conditioned water.	A. Fouled resin bed.	A. Check backwash, brine draw and brine tank refill, increase frequency of regeneration. If unit is equipped with a low water piston, install a standard piston. Use a resin cleaner with your salt. Install additional filtering equipment ahead of softener.
7A. Excessive water in salt tank. 7B. Salt Water in Service Line	A. Plugged injector system. B. Plugged injector system. C. Foreign material in brine valve. D. Foreign material in brine line flow control button. (BLFC) E. Timer not cycling. F. Brine tank salt problem. G. Plugged drain line flow control	A. Clean or replace injector and screen. B. Clean injector and replace screen C. Clean or replace brine valve. D. Clean brine line flow control. E. Check timer motor and replace if necessary. Manually cycle control to make sure none of the gears are stripped. Replace timer if necessary. F. Clean brine tank. G. Clean flow control
8. Softener fails to draw brine.	A. Drain line flow control is plugged. B. Injector is plugged. C. Injector screen plugged. D. Line pressure is too low. E. Internal control leak. G. Salt tank has excess debris.	A. Clean drain line flow control. B. Clean or replace injectors. C. Replace screen. D. Increase line pressure. Line pressure must be at least 25 PSI at all times. E. Change seals and spacers and/or piston assembly. G. Clean salt tank.
9. Control cycles continuously.	A. Faulty timer mechanism.	A. Replace timer.
10. Drain flows continuously.	A. Foreign material in control. B. Internal control leak. C. Control valve jammed. D. Weak timer motor. E. Timer is jammed.	A. Remove piston assembly and inspect bore. Remove foreign material and check control in various regeneration positions. B. Replace seals and/or piston assembly. C. Replace timer. Check piston and seals and spacers. D. Replace timer motor. E. Replace timer.
11. Air in lines.	A. Defective air check.	A. Replace air check tube assembly.

GENERAL SERVICE HINTS FOR WATERMATE SERIES METER CONTROL

Problem: Softener delivers hard water

Cause could be that . . . Reserve capacity has been exceeded.

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

Cause could be that . . . Program wheel is not rotating with meter output.

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

Cause could be that . . . Meter is not measuring flow.

Correction: Check output by observing rotation of small gear on front of timer (Note - Program wheel must not be against regeneration stop for this check).

Each tooth to tooth is approximately 30 gallons. If not performing properly, replace meter.

Note: Make sure cable is inserted properly into both the meter dome and back of timer.

IMPORTANT – TO BEGIN EACH SERVICE OPERATION:

1. Unplug electrical cord from outlet.
2. Turn off water supply to conditioner:
 - a. If the conditioner installation has a three valve bypass system, first open the valve in the bypass line, then close the valves at the conditioner inlet and outlet.
 - b. If the conditioner has an integral bypass valve, put it in the bypass position.
- c. If there is only a shut-off valve near the conditioner inlet, close it.
3. Relieve water pressure in the conditioner by putting the control in the backwash position momentarily. Return the control to the service position.

SERVICE INSTRUCTIONS

A. INSTRUCTIONS FOR CLEANING SALT TANK

1. With the unit in the service position and water supply turned on, manually advance the control valve to "Brine & Rinse" position and unplug power supply. This will draw out the majority of water in the tank.
2. Follow instructions for "IMPORTANT - TO BEGIN EACH SERVICE OPERATION:" as stated above.
3. Remove salt tank cover and brine well cover.
4. Scoop out as much old salt as possible.
5. Disconnect brine tubing from safety brine valve.
6. Remove safety brine valve assembly from brine well.
7. Place one hand in brine well to hold overflow nut and remove 2 piece overflow.
8. Remove brine well and grid plate from brine tank.
9. Remove any remaining salt and/or impurities from salt tank.
10. Using clean water and a brush or rag, wipe and rinse inside of salt tank. Also wipe and rinse the grid plate and brine well.
11. Reassemble salt tank reversing steps 4-8. NOTE: If grid plate is damaged or cracked, replace with new grid plate.
12. Put salt tank back in place making sure there is no debris or foreign material beneath it.
13. Reconnect brine tubing to safety brine valve.
14. Manually add clean water until it is approximately 1-2 inches above grid plate.
15. Put on brine well cover and add new salt. IMPORTANT: DO NOT ADD THE OLD SALT WHICH WAS REMOVED EARLIER UNLESS IT IS CLEAN AND NOT MUSHY- WE RECOMMEND USING NEW SALT.
16. Turn on the water supply to the unit and advance to brine refill position to purge any air from line.
17. Follow the disinfection instructions found on page 8.
18. Put on salt tank cover.

B. TO REPLACE TIME BRINE VALVE, INJECTORS, AND SCREEN

1. Disconnect brine tube and drain line connections at the injector body.
2. Remove the two injector body mounting screws. The injector and brine module can now be removed from the control valve. Remove and discard valve body o-rings.
- 3a. To replace brine valve.
 1. Pull brine valve from injector body, also remove & discard o-ring at bottom of brine valve hole.
 2. Apply silicone lubricant to new o-ring and re-install at bottom of brine valve hole.
 3. Apply silicone lubricant to o-ring on new valve assembly and press into brine valve hole, shoulder on bushing should be flush with injector body.
- 3b. To replace injectors and screen.
 1. Remove injector cap and screen, discard o-ring. Unscrew injector nozzle and throat from injector body.

2. Screw in new injector throat and nozzle, be sure they are seated tightly. Install a new screen.
3. Apply silicone lubricant to o-ring and install around oval extension on injector cap.
4. Apply silicone lubricant to three new o-rings and install over three bosses on injector body.
5. Insert screws thru injector cap and injector. Place this assembly thru hole in time housing and into mating holes in the valve body. Tighten screws.
6. Reconnect brine tube and drain line.
7. Return bypass or inlet valving to normal service position. Water pressure should now be applied to the conditioner and any bypass line shut off.
8. Check for leaks at all seal areas. Check drain seal with the control in the backwash position.
9. Plug electrical cord into outlet.
10. Set time of day and cycle the control valve manually to assure proper functions. Make sure the control valve is returned to the service position.
11. Make sure there is enough brine in the brine tank.
12. Rotate program wheel counter-clockwise until it stops at regeneration position.
- *13. Start regeneration cycle manually if water is hard.

C. TO REPLACE TIMER

1. Pull cable out of meter cover. Remove the control valve cover.
- *2. Remove screw and washer at drive yoke. Remove timer mounting screws. The entire timer assembly will now lift off easily.
3. Put new timer on top of valve. Be sure drive pin on main gear engages slot in drive yoke (rotate control knob if necessary).
4. Replace timer mounting screws. Replace screw and washer at drive yoke.
5. Return bypass or inlet valving to normal service position. Water pressure should be applied to the conditioner and any bypass line shut off.
6. Plug electrical cord into outlet.
7. Set time of day, program wheel, and salt usage. Cycle the control valve manually to assure proper functions.
8. Make sure the control valve is returned to the service position.
9. Replace the control valve cover. *Be sure meter cable is in place.
10. Make sure there is enough brine in the brine tank.
11. Rotate program wheel counter-clockwise until it stops at regeneration position.
- *12. Start regeneration cycle manually if water is hard.
13. Plug cable into meter cover. Rotate cable to align drive flat if necessary.

D. TO REPLACE PISTON ASSEMBLY

- * 1. Pull cable out of meter cover. Remove the control valve cover.
2. Remove screw and washer at drive yoke. Remove timer mounting screws. The entire timer assembly will now lift off easily. Remove end plug retainer plate.
3. Pull upward on end of piston yoke until assembly is out of valve.
4. 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.
5. Take new piston assembly as furnished 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. Replace end plug retainer plate.
6. Put new timer on top of valve. Be sure drive pin on main gear engages slot in drive yoke (rotate control knob if necessary.)
7. Replace timer mounting screws. Replace screw and washer at drive yoke.
8. Return bypass or inlet valving to normal service position. Water pressure should be applied to the conditioner and any bypass line shut off.
9. Plug electrical cord into outlet.
10. Set time of day. Cycle the control valve manually to assure proper function. Make sure the control valve is returned to the service position.
11. Replace the control valve cover. *Be sure meter cable is in place.
12. Make sure there is enough brine in the brine tank.
- *13. Rotate program wheel counter-clockwise until it stops at regeneration position.
14. Start regeneration cycle manually if water is hard.
- *15. Plug cable into meter cover. Rotate cable to align drive flat if necessary.

E. TO REPLACE SEALS & SPACERS

- *1. Pull cable out of meter cover. Remove the control valve cover.
2. Remove screw and washer at drive yoke. Remove timer mounting screws. The entire timer assembly will now lift off easily. Remove end plug retainer plate.
3. Pull upward on end of piston yoke until assembly is out of valve. Remove and replace seals and spacer with fingers.
4. 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.
5. Take new 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. Replace end plug retainer plate.
6. Place timer on top of valve. Be sure drive pin on main gear engages slot in drive yoke (rotate control knob if necessary).
7. Replace timer mounting screws. Replace screw and washer at drive yoke.
8. Return bypass or inlet valving to normal service position. Water pressure should now be applied to the conditioner and any bypass line shut off.
9. Plug electrical cord into outlet.
10. Set time of day. Cycle the control valve manually to assure proper functions. Make sure the control valve is returned to the service position.

11. Replace the control valve back. *Be sure meter cable is in place.
Make sure there is enough brine in the brine tank.
12. Rotate program wheel counter-clockwise until it stops at regeneration position.
13. Start regeneration cycle manually if water is hard.
- * 14. Plug cable into meter cover. Rotate cable to align drive flat if necessary.

*F. TO REPLACE METER

1. Pull cable out of meter cover.
2. Remove two screws and clips at bypass valve or yoke.
3. Pull resin tank away from plumbing connections.
4. Remove two screws and clips at control valve. Pull meter module out of control valve.
5. Apply silicone lubricant to four new o-rings and assemble to four ports on new meter module.
6. Assemble meter to control valve. **Note: meter portion of module must be assembled at valve outlet.**
7. Attach two clips and screws at control valve. Be sure clip legs are firmly engaged with lugs.
8. Push resin tank back to the plumbing connections and engage meter ports with bypass valve or yoke.
9. Remove two clips and screws at bypass valve or yoke. Be sure clip legs are firmly engaged with lugs.
10. Return bypass or inlet valving to normal service position. Water pressure should now be applied to the conditioner and any bypass line shut off.
11. Check for leaks at all seal areas.
12. Plug electrical cord into outlet.
13. Set time of day. Make sure the control valve is returned to the service position.
14. Rotate program wheel counter-clockwise until it stops at regeneration position.
15. Start regeneration cycle manually if water is hard.
16. Plug cable into meter cover. Rotate cable to align drive flat if necessary.

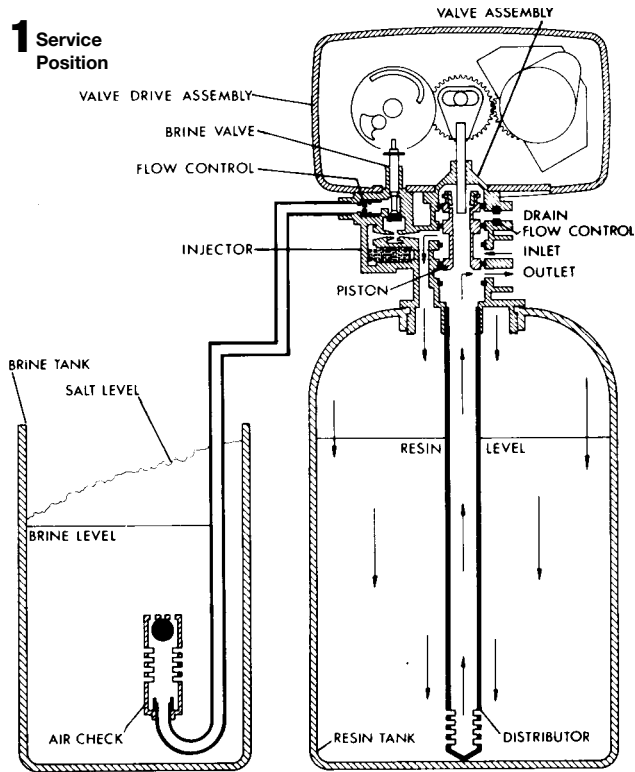
*G. TO REPLACE METER COVER AND/OR IMPELLER

1. Pull cable out of meter cover.
2. Remove four screws on cover.
3. Lift cover off of meter module, discard o-ring.
4. Remove and inspect impeller for gear or spindle damage, replace if necessary.
5. Apply silicone lubricant to new o-rings and assemble to the smallest diameter on meter cover.
6. Assemble cover to meter module. Be sure impeller spindle enters freely into cover. Press firmly on cover and rotate if necessary to assist in assembly.
7. Replace four screws and tighten.
8. Return bypass or inlet valving to normal service position. Water pressure should now be applied to the conditioner and any bypass line shut off.
9. Check for leaks at all seal areas.
10. Plug electrical cord into outlet.
11. Set time of day. Make sure the control valve is returned to the "in-service" position.
12. Rotate program wheel counter-clockwise until it stops at regeneration position.
13. Start regeneration cycle manually if water is hard.
14. Plug cable into meter cover. Rotate cable to align drive flat if necessary.

* Demand Regeneration Units

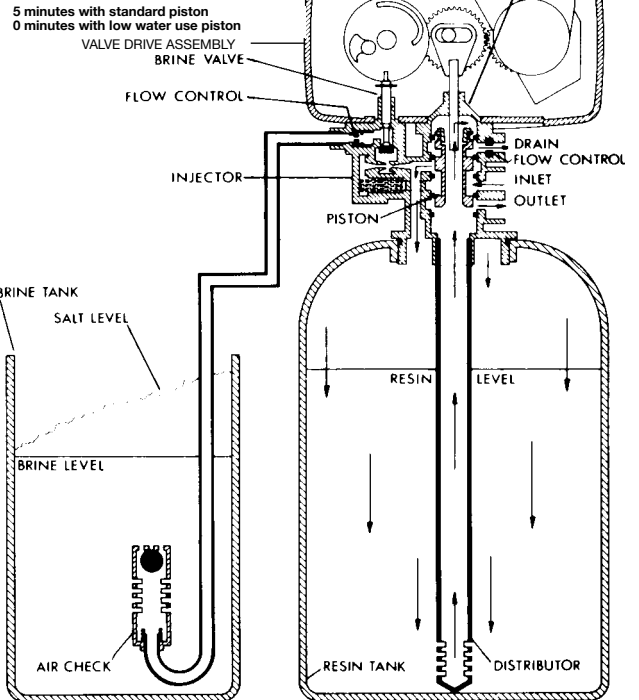
WATER CONDITIONER FLOW DIAGRAMS

1 Service Position



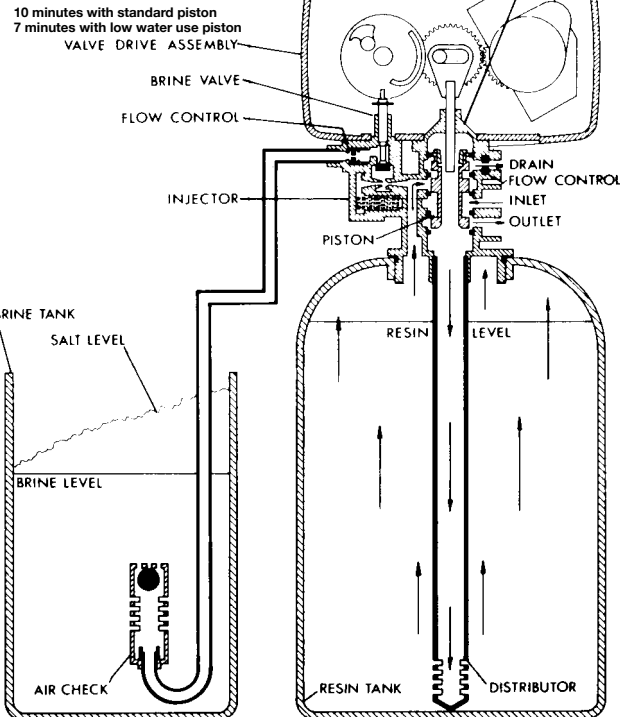
Hard water enters the unit at the valve inlet - flows around the lower piston groove - thru the passage to the top of tank - down thru the resin and enters the distributor as conditioned water. The conditioned water flows up thru the center tube to the valve outlet.

2 Preliminary Rinse Position



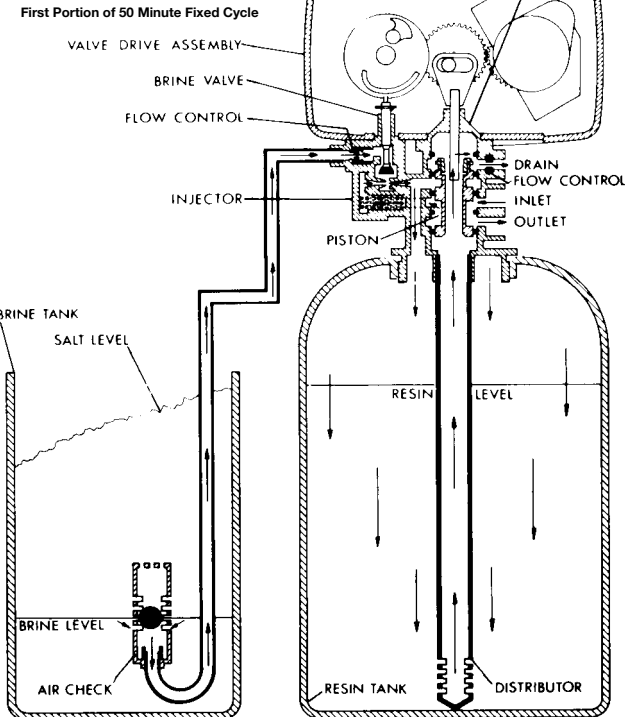
Hard water enters the unit at the valve inlet - flows around the lower piston groove - down thru the top of tank passage - downward thru the resin - up the distributor tube - thru the center hole in the piston - over the top edge of the piston and out the drain line.

3 Backwash Position



Hard water enters the unit at the valve inlet - flows around the lower piston groove and lower piston land - down thru the center tube and out the distributor - up thru the resin - thru the top of the tank passage - around the upper piston groove and out the drain line.

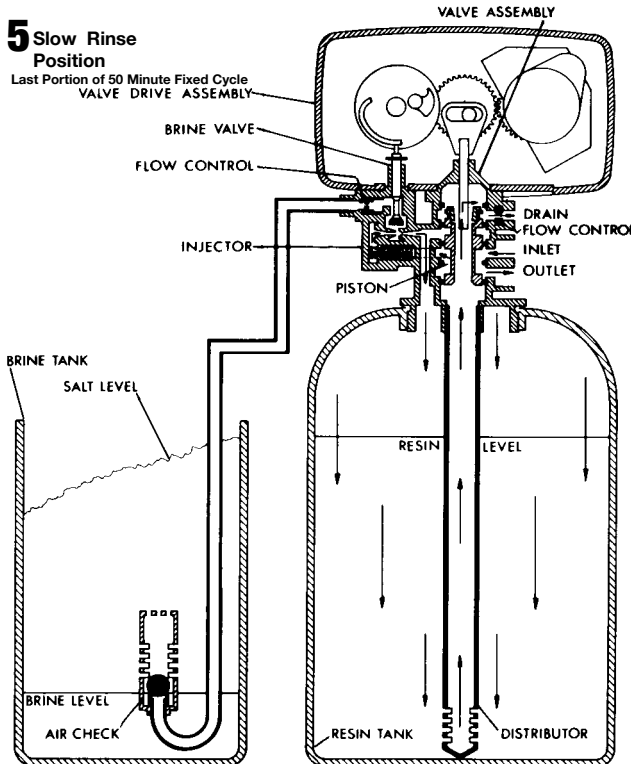
4 Brine Position



Hard water enters the unit at the valve inlet - flows around the lower piston groove - thru the injector nozzle and orifice to draw brine from the brine tank. The brine flows down thru the resin - into the distributor - up thru the center tube - thru the center hole in the piston - and out the drain line.

5 Slow Rinse Position

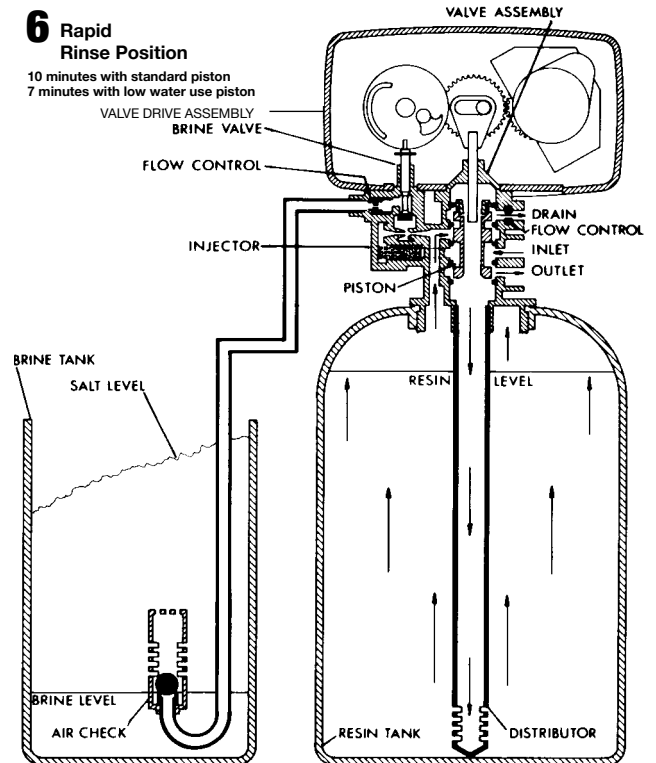
Last Portion of 50 Minute Fixed Cycle



After all the brine has been drawn from the brine tank, hard water continues to enter thru the valve inlet - flows around the lower piston groove - thru the nozzle and orifice - down thru the resin and into the distributor - up thru the center tube - thru the center hole in the piston and out the drain line.

6 Rapid Rinse Position

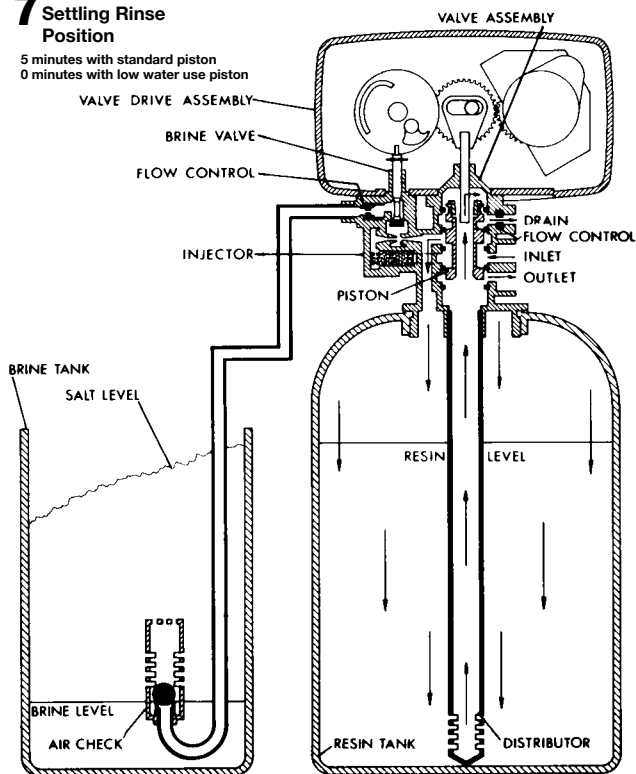
10 minutes with standard piston
7 minutes with low water use piston



Hard water enters the unit at the valve inlet - flows around the lower piston groove and lower piston land - down thru the center tube and out the distributor - up thru the resin - thru the top of tank passage - around the upper piston groove and out the drain line.

7 Settling Rinse Position

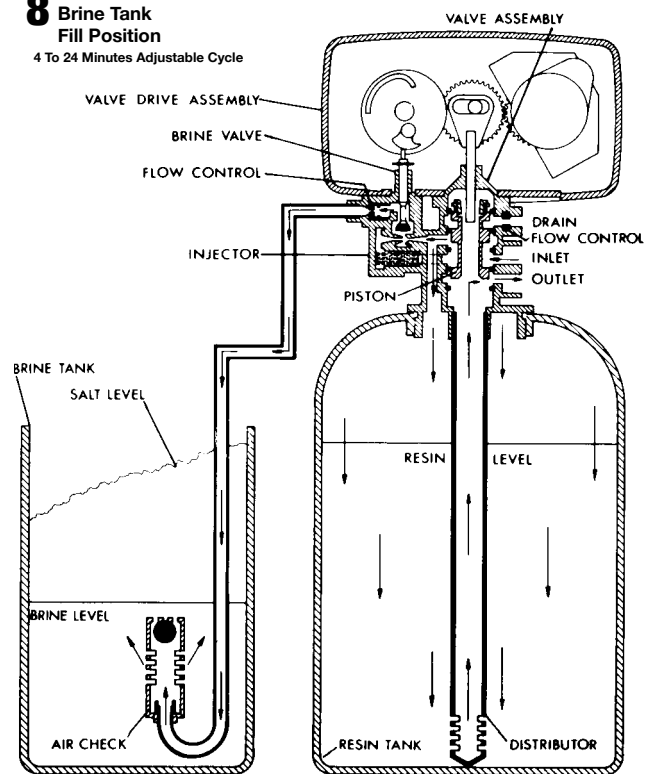
5 minutes with standard piston
0 minutes with low water use piston



Hard water enters the unit at the valve inlet - flows around the lower piston groove - down thru the top of tank passage - downward thru the resin - up the distributor tube - thru the center hole in the piston - over the top edge of the piston and out the drain line.

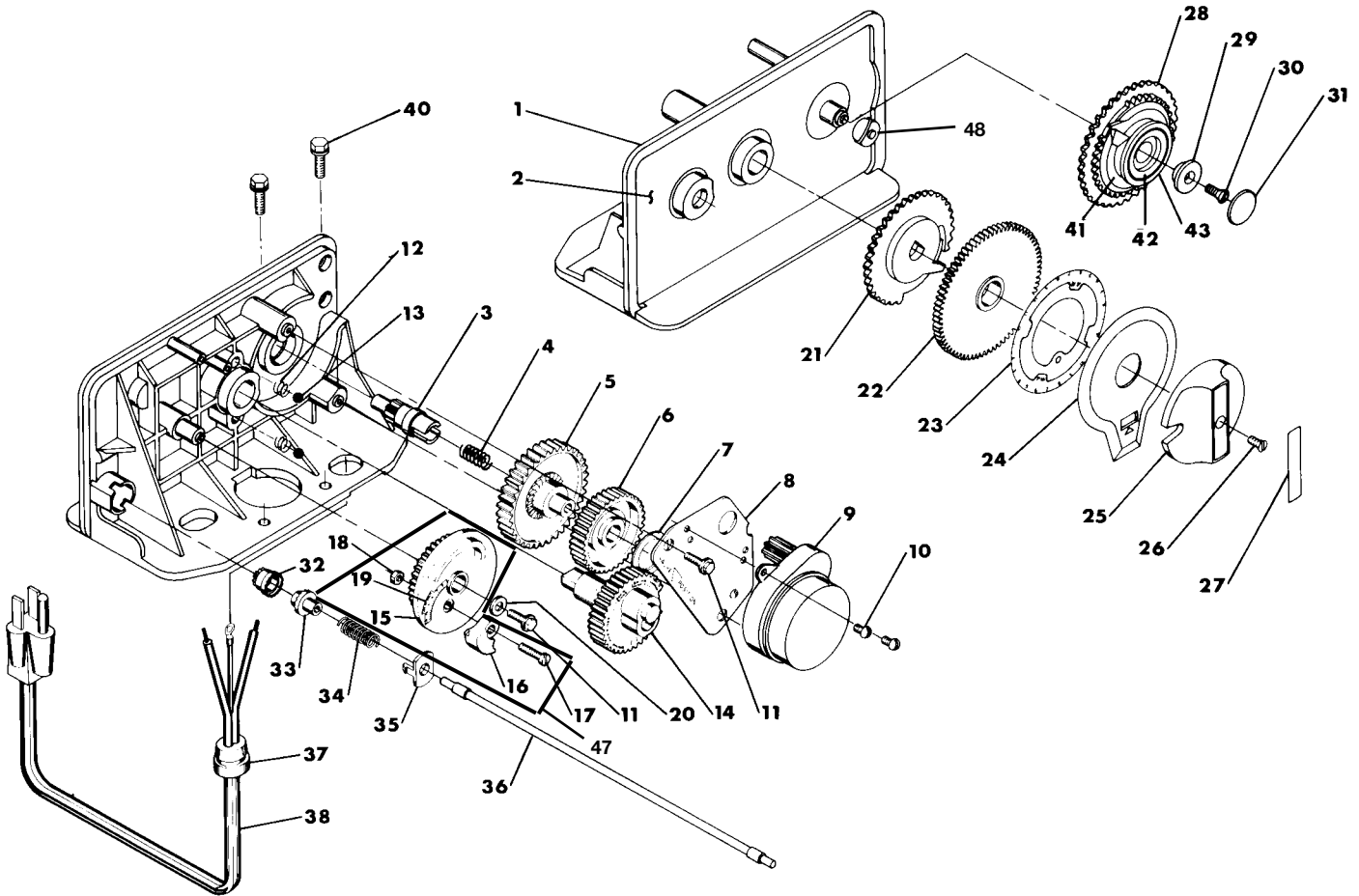
8 Brine Tank Fill Position

4 To 24 Minutes Adjustable Cycle



Hard water enters the unit at the valve inlet - flows around the lower piston groove - thru the injector throat - thru the brine valve and flow control to fill the brine tank. Hard water also flows around the lower piston groove - thru the passage to the top of tank - down thru the resin and enters the distributor as conditioned water. The conditioned water flows up thru the center tube to the valve outlet.

CONTROL VALVE POWERHEAD ASSEMBLY DEMAND REGENERATION MODEL



ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION
1	1	102219	Drive Panel
2	1	101967	Label
3	1	106492	Idle Shaft
4	1	106496	Spring - Idle
5	1	102306	Idle Gear
6	1	106493	Drive Gear
7	1	102873	Curved Washer
8	1	102307	Motor Mounting Plate
9	1	102094	Motor
10	3	102482	Screw - Motor Mounting
11	4	102468	Screw - Mounting
12	2	49-14457	Detent Spring
13	2	106494	Ball - 1/4" Diameter
14	1	101741	Main Gear & Shaft
15	1	101356	Brine Cam
16	1		Cam Segment (Sold with #15)
17	1	49-11980	8-32x5/8" Screw
18	1	49-11081	Hex Nut
19	1	101978	Salt Label, 3-16
20	1	102866	#10 Washer
21	1	101745	Cycle Actuator Gear
22	1	49-13009	24 Hour Gear
23	1	101956	24 Hour Label
24	1	101486	Valve Position Dial - Std Piston
	1	49-14278	Valve Position Dial - Low Water Piston

ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION
25	1	101947	Knob
26	1	102462	Screw
27	1	101964	Label on Control Knob
28	1	102888	Program Wheel Assembly
29	1	102420	Program Wheel Retainer
30	1	102461	Screw, Top Collector
31	1	101953	Cover Label
32	1	102235	Drive Pinion
33	1	101416	Clutch
34	1	102554	Spring, Meter Clutch
35	1	102403	Spring Retainer
36	1	101342	Flexible 8.25" Cable
37	1	102566	Strain Relief
38	1	49-11842	Power Cord
39	2	103087	Wire Nut
40	2	102467	Screw - Drive Mounting
41	1	Consult Dealer	Gallon Label
42	1	Consult Dealer	Hardness "K" Label
43	1	Consult Dealer	People Label
44	1	101440	Cover
45	1	100843	Label Front Cover
46	1	101977	Label Back Cover
(1-43)	1	102344	Complete Assembly
47	1	101357	Brine Cam Assembly
48	1	49-14252	Meter Clutch Cap

Not Shown

EXPRESS SERIES – CONTROL VALVE POWERHEAD ASSEMBLY DEMAND REGENERATION MODEL

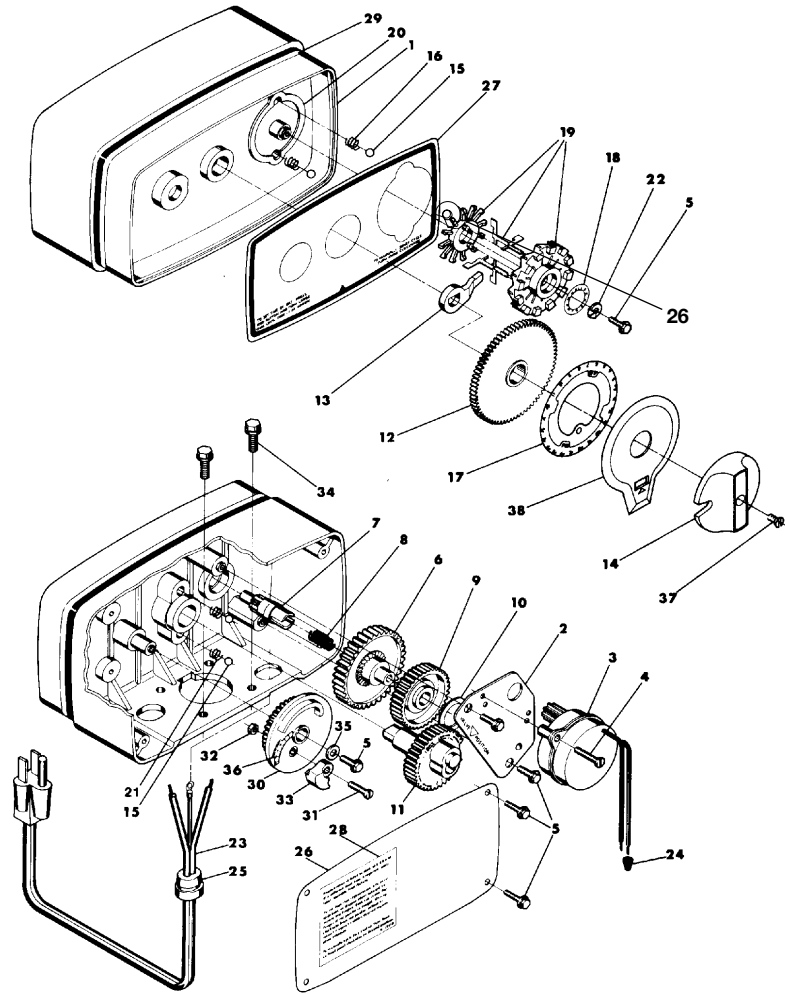


Figure 14

ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION	ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION
1	1	101780	Drive Housing Assembly	27	1	101955	Front Label - Silver
2	1	102307	Motor Mounting Plate	28	1	101977	Rear Label
3	1	102094	Motor - 120V., 60 Hz.	29	1	101957	Tape Stripe - Silver
4	3	102482	Screw - Motor Mtg. & Grd. Wire	30	1	101357	Brine Cam Assy, 3-16
5	7	102468	Screw - Component Mtg. Hex	31	1	49-11980	Screw - Time Fill Cam
6	1	102306	Idler Gear	32	1	49-11081	Nut - Time Fill Cam Hex 8-32
7	1	106492	Idler Shaft	33	1		Cam Segment (Sold with #30)
8	1	106496	Spring - Idler	34	2	102467	Screw - Drive Mounting
9	1	106493	Drive Gear	35	1	102866	#10 Washer
10	1	102873	Curved Washer	36	1	101978	Label - "lbs of salt - 3-16
11	1	101741	Main Gear & Shaft			101979	Label - "lbs of salt - 6-32
12	1	49-13009	24 Hour Gear	37	1	102235	Drive Pinion - Program Wheel
13	1	101745	Cycle Actuator Gear	38	1	101416	Clutch - Drive Pinion
14	1	101907	Knob - Manual Regeneration	39	1	102403	Spring Retainer
15	2	106494	Ball - 1/4 Dia.	40	1	102554	Spring
16	2	106495	Spring - Detent	41	1	101342	Flexible 8.25" Cable Assembly
17	1	101956	24 Hour Label - Silver	42	1	101486	Valve Position Dial-Standard Piston
18	1	102461	Top Collector Screw		1	49-14278	Valve Position Dial-Low Water Piston
19	1	102888	Program Wheel Assembly - Specify Hardness Capacity	43	1	101964	Knob Label - Silver
20	1	102420	Program Wheel Retainer	44	1	102462	Screw
21	1	101953	Cover Label - Program Wheel	45	1	102340	Complete Drive Assembly
22	1	49-11842	Electrical Cord	46	1	101357	Brine Cam Assembly - 3-16
23	2	65-60080	Wire Connector			49-60514-01	Brine Cam Assembly - 6-32
24	1	102566	Strain Relief	47	1	102883	Program Wheel with 3/4" STD Range Gallon Label
25	1	49-13229	Back Cover	48	1	49-60405-20	Program Wheel with 3/4" EXT Range Gallon Label
26	1	49-14252	Meter Clutch Cap				

CONTROL VALVE POWERHEAD ASSEMBLY TIME CLOCK REGENERATION MODEL

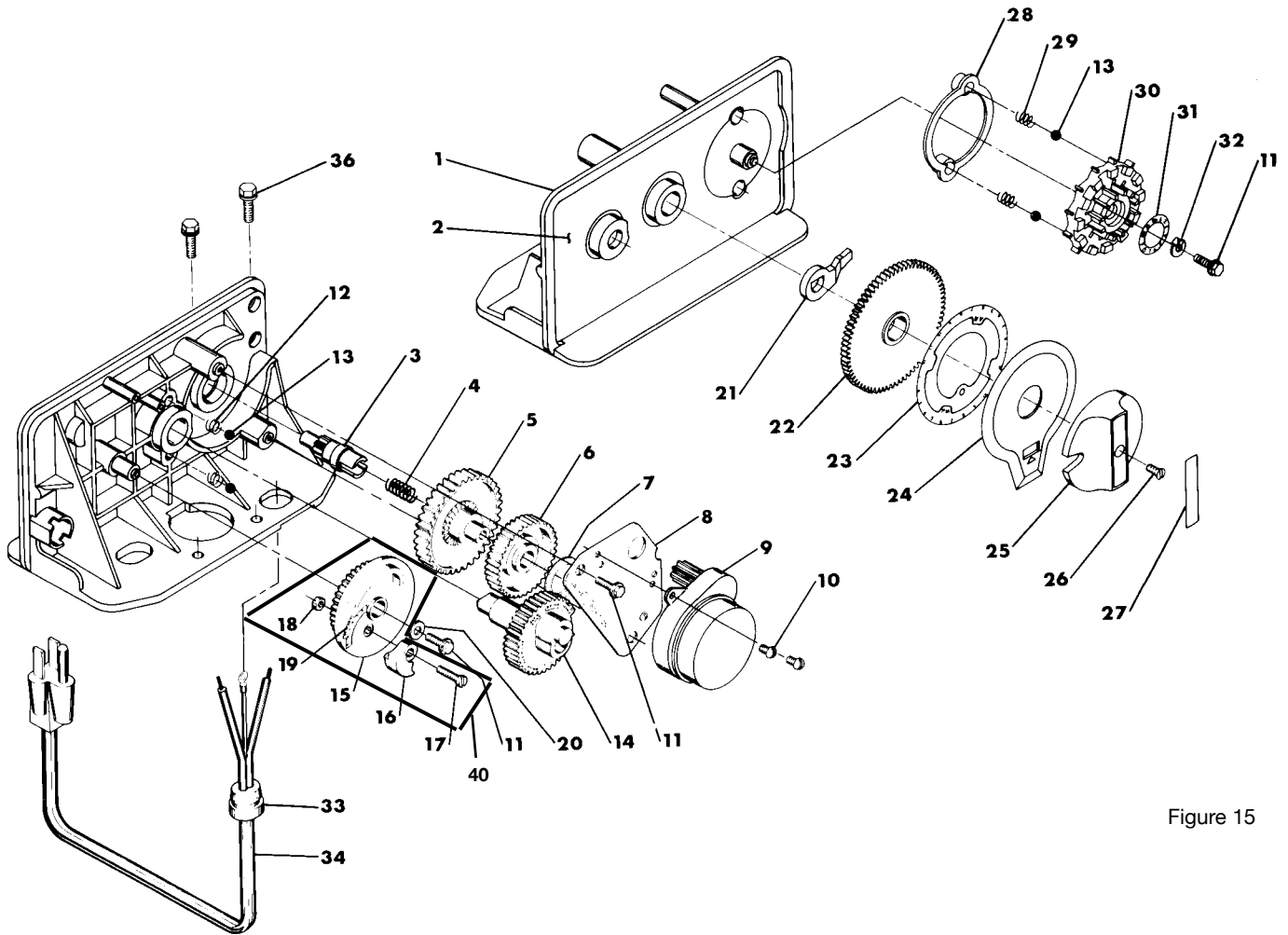


Figure 15

ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION	ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION
1	1	102218	Drive Panel	21	1	49-13011	Cycle Actuator Gear
2	1	101966	Label	22	1	49-13009	24 Hour Gear
3	1	106492	Idler Shaft	23	1	101956	24 Hour Label
4	1	106496	Spring - Idler	24	1	101486	Valve Position Dial - Standard Piston
5	1	102306	Idler Gear	24	1	49-14278	Valve Position Dial-Low Water Piston
6	1	106493	Drive Gear	25	1	101947	Control Knob
7	1	102873	Curved Washer	26	1	102462	Screw
8	1	102307	Motor Mounting Plate	27	1	101964	Label Knob
9	1	102094	Motor	28	1	102434	Skipper Wheel Ring
10	3	102482	Screw - Motor Mounting	29	2	106495	Spring - Skipper Wheel 12-Day
11	5	102468	Hex Screw - Mounting	30	1	102889	Skipper Wheel Assembly
12	2	49-14457	Detent Spring	31	1	49-13429	Skipper Wheel Label
13	4	106494	Ball - 1/4" Diameter	32	1	49-13014	Regeneration Pointer
14	1	101741	Main Gear & Shaft	33	1	102566	Strain Relief
15	1	101356	Brine Cam	34	1	49-11842	Power Cord
16	1		Cam Segment (Sold with #15)	35	2	65-60080	Wire Nut
17	1	49-11980	Screw	36	2	102467	Screw - Drive Mounting
18	1	49-11081	Nut	37	1	101440	Cover
19	1	101978	Salt Label 3-16	38	1	100843	Label Front Cover
		101979	Salt Label 6-32	39	1	101977	Label Back Cover
20	1	102866	Washer	(1-36)	1	102343	Complete Assembly
				40	1	101357	Brine Cam Assembly

Not Shown

CONTROL VALVE POWERHEAD ASSEMBLY TIME CLOCK REGENERATION MODEL

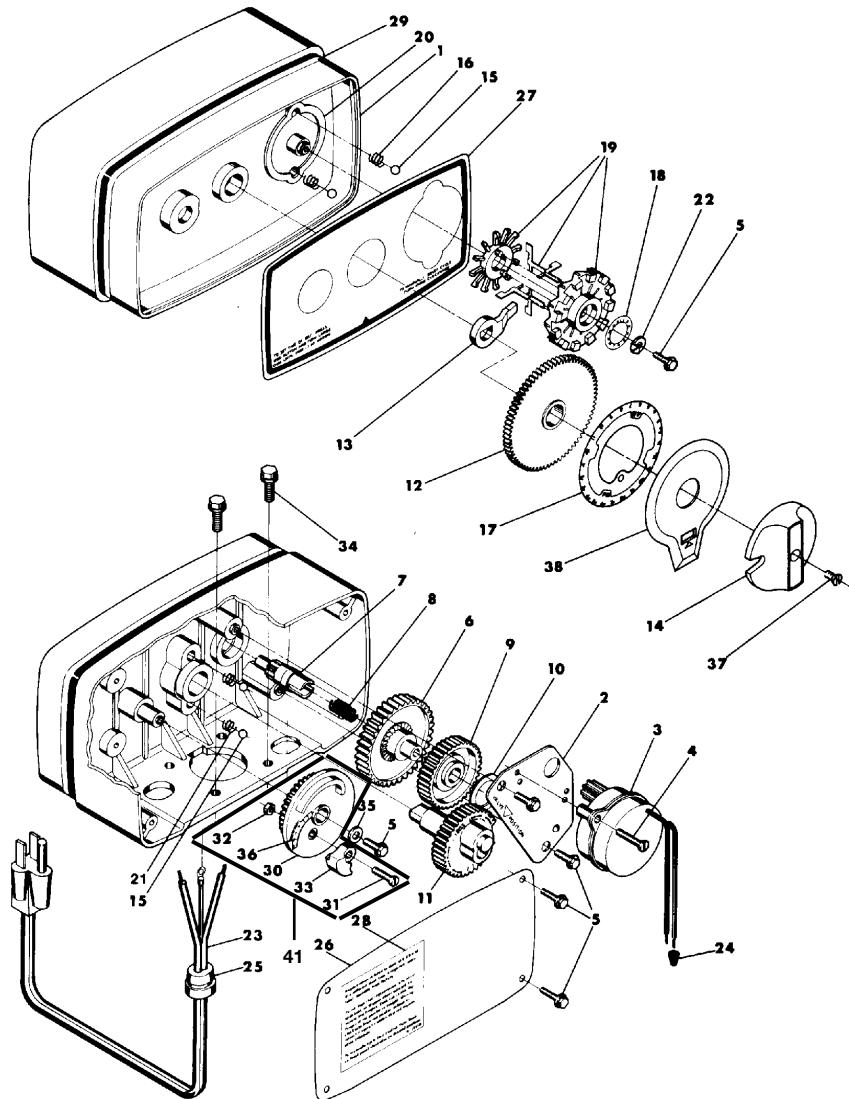


Figure 16

ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION	ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION
1	1	101788	Drive Housing	22	1	49-13014	Regeneration Pointer
2	1	102307	Motor Mounting Plate	23	1	49-11842	Electrical Cord
3	1	102094	Motor - 120V., 60 Hz.	24	2	103087	Wire Connector
4	3	102482	Screw - Motor Mtg. & Grd. Wire	25	1	102566	Strain Relief
5	8	102468	Screw - Component Mtg.	26	1	49-13229	Back Cover
6	1	102306	Idler Gear	27	1	101952	Front Label - Blue/Silver on Black
7	1	106492	Idler Shaft	28	1	101977	Rear Label
8	1	106496	Spring - Idler	29	1	101951	Tape Stripe - Blue on Silver
9	1	106493	Drive Gear	30	1	101357	Brine Cam Assy, 3-18
10	1	102873	Curved Washer	31	1	49-11980	Screw - Time Fill Cam
11	1	101741	Main Gear & Shaft	32	1	49-11081	Nut - Time Fill Cam
12	1	49-13009	24 Hour Gear	33	1	49-13169	Cam Segment (Sold with #30)
13	1	49-13011	Cycle Actuator Gear	34	2	102467	Screw - Drive Mounting
14	1	101947	Knob - Manual Regeneration	35	1	102866	#10 Washer
15	4	106494	Ball - 1/4 Dia.	36	1	101978	Label - "lbs of salt - 3-18
16	4	106495	Spring - Detent		1	101979	Label - "lbs of salt - 6-33
17	1	101956	24 Hour Label - Silver	37	1	102461	Top Collector Screw-Knob
18	1	49-13429	Skipper Wheel Label	38	1	101486	Valve Position Dial-Standard Piston
19	1	102899	Skipper Wheel Assembly-12 Day	39			Not Assigned
20	1	102434	Skipper Wheel Ring	40	1	102334	Complete Drive Assembly-12 Day
21	1	49-14457	Spring	41	1	101357	Brine Cam Assembly

WM CONTROL VALVE ASSEMBLY

ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION
1	1	102858	Valve Body Assembly - 1" Dist.
	1	102857	Valve Body Assembly - 13/16" Dist. (optional)
2	5	102494	Seal
3	4	102542	Spacer
4	1	102254	Piston - Standard
	1	49-13781	Piston - Low Water
5	1	102225	Piston Pin
6	1	102415	Piston Retainer
7	1	102316	End Plug Assembly - Standard - White
	1	49-13446-20	End Plug Assembly - Low Water - Gray
8	1	102446	Piston Rod Assembly
9	1	102411	End Plug Retainer
10	3	102465	Screw
11	1	102188	O-ring - Distributor Tube - 1"
	1	102175	O-ring - Distributor Tube-13/16" (optional)
12	1	102187	O-ring - Top of Tank
13	1	101500	Air Disperser
14	1	102172	O-ring drain port
15	2	102173	O-ring Injector
16	1	101245	Injector Body
17	1	102511	Brine Valve Seat
18	2	102183	O-ring - Brine Spacer
19	1	102561	Brine Valve Stem with Seat
20	1	102544	Brine Valve Spacer

21	1	102423	Quad Ring
22	1	101364	Brine Valve Cap
23	1	49-11973	Spring- Brine Valve
24	1	49-16098	Washer - Brine Valve
25	1	49-11981-01	Retaining Ring
26	1	102458	Injector Screen
27	1	49-10914	Injector Throat - Specify Size
28	1	49-10913	Injector Nozzle - Specify Size
29	1	102174	O-ring - Injector Cover
30	1	101378	Injector Cover
31	2	102469	Screw - Injector Mounting
32	1		D.L.F.C. Button - Specify Size
		101555	1.2 GPM D.L.F.C Button
		101557	1.5 GPM D.L.F.C Button
		101573	2.0 GPM D.L.F.C Button
		101575	2.4 GPM D.L.F.C Button
		101582	3.0 GPM D.L.F.C Button
		101584	3.5 GPM D.L.F.C Button
		101587	4.0 GPM D.L.F.C Button
		101589	5.0 GPM D.L.F.C Button
		101594	7.0 GPM D.L.F.C Button
33	1	102407	D.L.F.C. Retainer
34	1	102155	O-ring - B.L.F.C.
35	1	102402	B.L.F.C. Button Retainer
36	1		B.L.F.C. Button - Specify Size
		101549	25 B.L.F.C. Button
		101550	5 B.L.F.C. Button
		101553	1.0 B.L.F.C. Button
37	1	49-13244-01	B.L.F.C. Fitting
38			Not Assigned
39	1	100557	B.L.F.C. Tube Insert
40	1	100695	B.L.F.C. Ferrule
41	1	100693	B.L.F.C. Fitting Nut
42	2	101157	Adapter Coupling with O-rings
43	4	102162	O-ring - Adapter Coupling
44	2	101412	Adapter Clip
45	2	102488	Screw - Adapter Clip
46		102905	Adapter - 3/4" N.P.T. (optional)
		102904	Adapter - 1" N.P.T. (optional)
47	1	49-13363	Washer
48	1	102468	Screw
49	1	102267	Piston Assembly - Standard
	1	102270	Piston Assembly - Low Water
50	1	101919	Seal/Spacer Kit
51	1	101296	Brine Valve Assembly
52	1	49-60084	Injector Assembly (SPECIFY MODEL #)
53	1	103720	5600 O' Ring Kit
54	1	103745	5600 Standard Piston Rebuild Kit
55	1	103746	5600 Low Water Piston Rebuild Kit

See Capacity & Physical Specs chart, page 3.

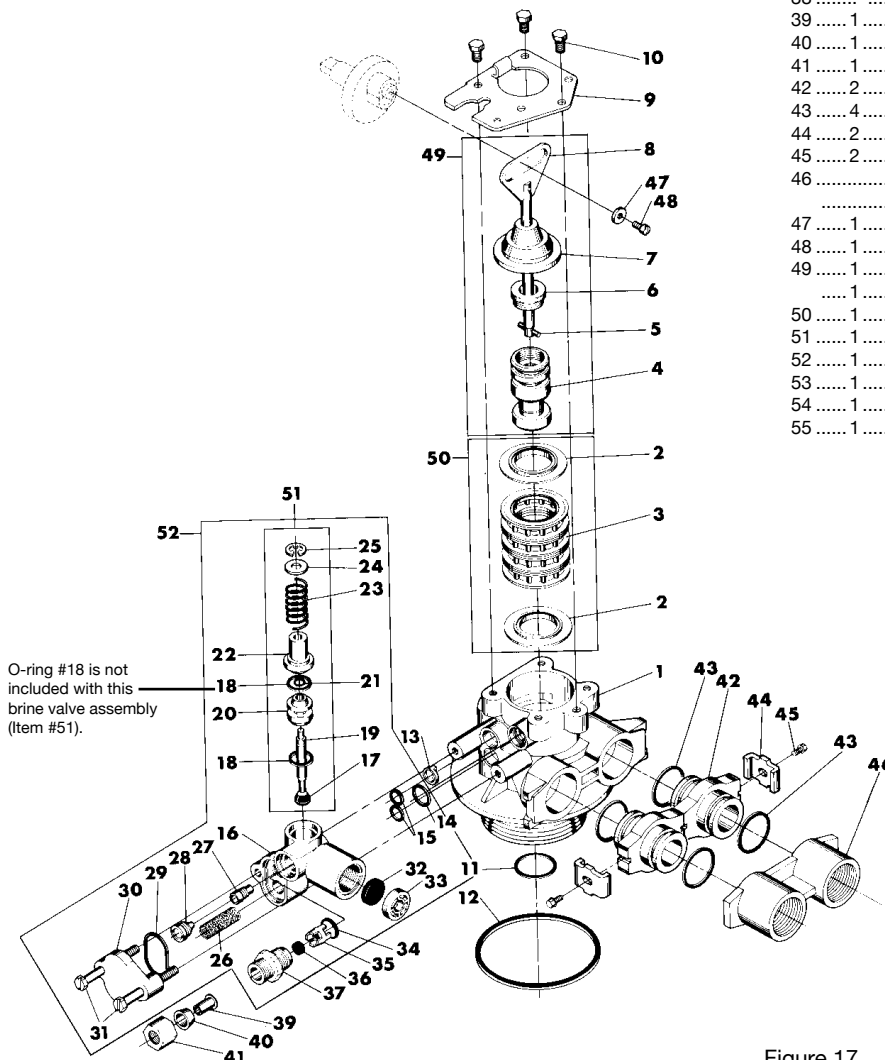
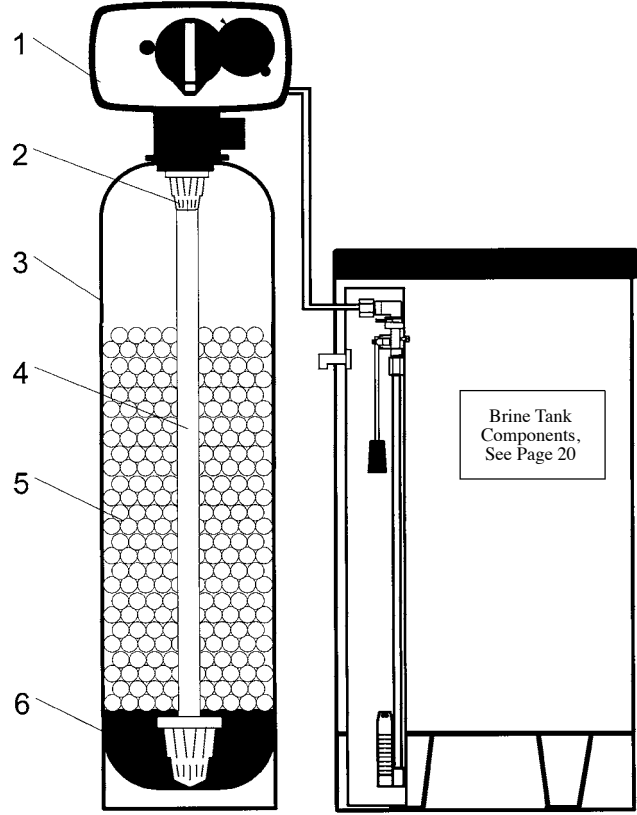


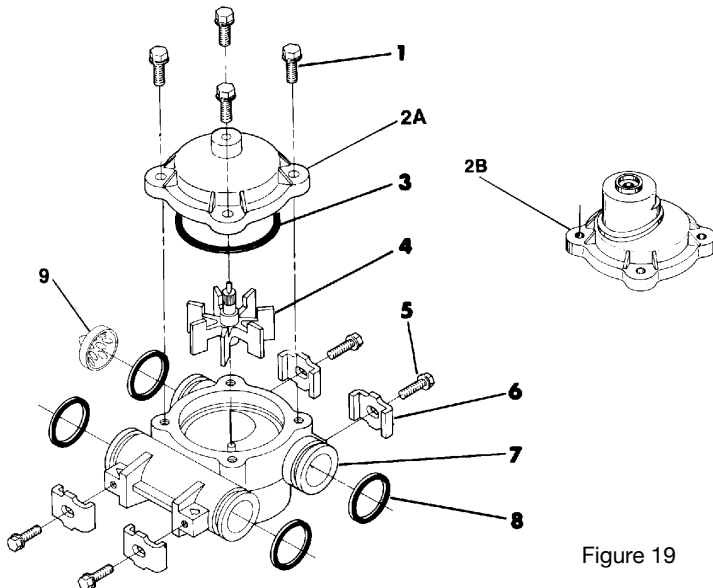
Figure 17

WATERMATE-1 WATER CONDITIONER AND SALT TANK ASSEMBLY

ITEM NO.	NO. REQ'D	STANDARD	EXPRESS	DESCRIPTION
1	1	6-07	6-007	WM1-16 TC Control Valve Assembly
1	1	6-08	6-008	WM1-24 TC Control Valve Assembly
1	1	6-09	6-009	WM1-32 TC Control Valve Assembly
1	1	6-10	6-010	WM1-48 TC Control Valve Assembly
1	1	6-13	6-013	WM1-64 TC Control Valve Assembly
1	1	6-14	6-014	WM1-96 TC Control Valve Assembly
1	1	6-07M	6-007M	WM1-16M Control Valve Assembly
1	1	6-08M	6-008M	WM1-24M Control Valve Assembly
1	1	6-09M	6-009M	WM1-32M Control Valve Assembly
1	1	6-10M	6-010M	WM1-48M Control Valve Assembly
1	1	6-13M	6-013M	WM1-64M Control Valve Assembly
1	1	6-14M	6-014M	WM1-96M Control Valve Assembly
2	1	101537		Top Distributor (Included with Item#1)
3	1	104531	104530	7"x44" Tank for WM1-16(M)
1	1	104535	104534	8"x44" Tank for WM1-24(M)
1	1	104539	104538	9"x48" Tank for WM1-32(M)
1	1	104552	104551	10"x54" Tank for WM1-48(M)
1	1	104566	104564	13"x54" Tank for WM1-64(M)
1	1	104465		14"x65" Tank for WM1-96(M)
1	1	104529		7"x35" Tank for WM1-16(M)C
1	1	104532		8"x35" Tank for WM1-24(M)C
1	1	104542		10"x35" Tank for WM1-32(M)C
4	1	101506		Distributor Tube - All 35" & 44" Tanks
1	1	101509		Distributor Tube - 9" x 48" Tank
1	1	101513		Distributor Tube - 10"x54" Tank
1	1	101513		Distributor Tube - 13"x54" Tank
1	1	101514		Distributor Tube - 14"x65" Tank
5	*	101107		Softening Resin-See pg 3 for amount
6	*	100983		Underbedding



WATERMATE METER MODULE DEMAND REGENERATION SERIES

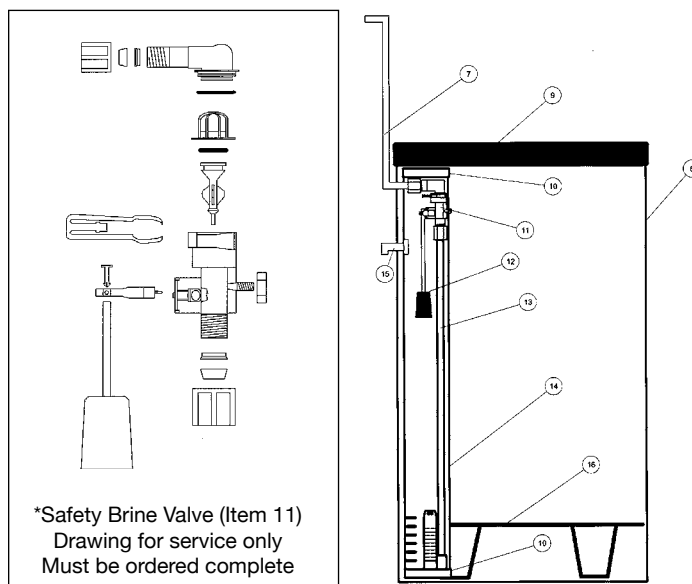


ITEM NO.	NO. REQ'D	PART NO.	DESCRIPTION
1	4	102467	Screw - Meter Cover Assembly
2A	1	101381	Meter Cover Assembly - Standard Range
2B	1	101384	Meter Cover Assembly - Extended Range
3	1	102176	O-ring - Meter Cover Assembly
4	1	101802	Impeller
5	4	102488	Screw - Adapter Clip
6	4	102412	Adapter Clip
7	1	101249	Meter Body
8	4	102162	O-ring - 119 Meter Body
9	1	101729	Flow Straightener (not shown)
(1-4,7,8)	1	102056	Complete Meter Assembly - Standard Range
(1-4,7,8)	1	102057	Complete Meter Assembly - Extended Range

Figure 19

SALT TANK ASSEMBLIES

Item	Description	Qty	Part #
7-13a	Salt Tank Assy (18x33)-Black	1	104411
b	Salt Tank Assy (18x33)-Blue	1	104417
c	Salt Tank Assy (18x40)-Black	1	104418
d	Salt Tank (11x11x36)-Black	1	104511
7	3/8" x 6" Brine Line	1	102671
8a	18x33 Salt Tank Tank-Black	1	104490
b	18x33 Salt Tank Tank-Blue	1	104491
c	18x40 Salt Tank Tank-Black	1	104492
d	11x11x36 Tank-Black	1	104486
9	Salt Tank Cover	1	Included with 8a,b,c
10-14a	Safety Brine Valve Assy 33"	1	101302
b	Safety Brine Valve Assy 41"	1	104172
c	Safety Brine Valve Assy	1	101304
10	Cap, Brine Well 4"	1	101365
11*	Safety Brine Valve	1	101274
12	Float Assembly	1	101660
13	Air Check	1	101181
14 a,c	Brine Well 33"	1	102876
b	Brine Well 41"	1	102877
15	2-Piece Overflow	1	102217
16 a,b	Grid Plate 18" / 4" Hole	1	101758
c,d	Grid Plate 11x11 / 4" Hole	1	101756



WATERMATE SERIES WATER SOFTENERS LIMITED WARRANTY

Hellenbrand, Inc., warrants to the original consumer purchaser that the WaterMate and the parts listed below will be free from defects in material and/or workmanship from the date of the original installation for the following time periods:

For a Period of FIVE YEARS: The control valve including electrical parts, internal parts, and valve body.

For a Period of TEN YEARS: The fiberglass and/or polyglass mineral tanks, 6" Diameter-13" Diameter

For a Period of FIVE YEARS: The fiberglass and/or polyglass mineral tanks, 14" Diameter - Up

For a Period of FIVE YEARS: The salt storage/cabinet tank.

For a Period of ONE YEAR: Any other component.

Any parts used for replacement are warranted for the remainder of the original warranty period applicable to the part.

THIS WARRANTY IS EFFECTIVE TO THE ORIGINAL CONSUMER PURCHASER ONLY, AND ONLY AS LONG AS THE WATERMATE REMAINS AT THE ORIGINAL INSTALLATION SITE.

No sales representative, distributor, agent, dealer, reseller or any other person is authorized to make any other warranty on behalf of Hellenbrand, Inc. Upon expiration of the applicable warranty period(s), Hellenbrand, Inc., shall have no further liability related to the products/parts to which the warranty period(s) apply, except with respect to valid warranty claims asserted during the appropriate warranty period(s).

If a part described above becomes defective within the specified warranty period, you should notify your WaterMate sales representative and arrange a time during normal business hours for the inspection of the water conditioner at the original installation site. Any part found defective within the terms of this warranty will, at Hellenbrand, Inc.'s option, be repaired or replaced. You are responsible for freight from our factory and local service charges. This paragraph sets forth the exclusive remedy for any valid warranty claims against Hellenbrand, Inc.

THIS WARRANTY DOES NOT COVER defects caused by sand, sediment or bacteria fouling, accident, fire, flood, Act of God, misuse, misapplication, neglect, alteration, installation or operation contrary to Hellenbrand, Inc.'s printed instructions, or installation, repair or service by anyone other than Hellenbrand, Inc., or an authorized Hellenbrand reseller.

As a manufacturer, we do not know the characteristics of your water supply or the purpose for which you are purchasing this water conditioner. Please understand that the quality of water supplies may vary seasonally or over a period of time, and that your water usage rate may vary as well. Water characteristics can also change considerably if your water conditioner is moved to a new location. For these reasons, we assume no liability for the determination of the proper equipment necessary to meet your requirements and we do not authorize others to assume such obligations for us.

REMEDIES FOR DEFECTS OR FAILURES, TO THE EXTENT PERMITTED BY APPLICABLE LAW, ARE LIMITED TO THE REMEDIES PROVIDED IN THIS WARRANTY. ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY WARRANTY WHICH MIGHT ARISE BY IMPLICATION OR OPERATION OF LAW, WHETHER FROM THE SELLER AND/OR MANUFACTURER OF THIS PRODUCT, IS HEREBY EXCLUDED AND DISCLAIMED, TO THE EXTENT ENFORCEABLE UNDER APPLICABLE LAW, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR NON-INFRINGEMENT, OR ANY WARRANTIES ARISING FROM COURSE OF PERFORMANCE, COURSE OF DEALING, OR FROM USAGES OF TRADE.

UNDER NO CIRCUMSTANCES SHALL HELLENBRAND, INC., BE LIABLE TO THE ORIGINAL CONSUMER PURCHASER OR TO ANY OTHER PERSON FOR ANY INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES OR FOR ANY OTHER LOSS, DAMAGE, OR EXPENSE OF ANY KIND, INCLUDING LOSS OF PROFITS, WHETHER ARISING OUT OF BREACH OF WARRANTY, BREACH OF CONTRACT, IN TORT OR OTHERWISE, AND REGARDLESS OF WHETHER HELLENBRAND, INC., WAS AWARE OF THE POSSIBILITY OF SUCH LOSS. THESE LIMITATIONS WILL APPLY REGARDLESS OF ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

Some states do not allow limitations on how long an implied warranty lasts or exclusions or limitations of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Updated 3/06