WaterSoft inc.

Installation / Operation Manual

Twin Demand Regeneration Water Softener

(9000/9100 Control Valve)

For Model Numbers :

☐ TD24	☐ TD24V	☐ TD24-91	☐ TD24V-91
☐ TD32	☐ TD32V	☐ TD32-91	☐ TD32V-91
☐ TD48	☐ TD48V	☐ TD48-91	☐ TD48V-91
☐ TD48	☐ TD48V	☐ TD48-91	☐ TD48V-91
	☐ TD96V		☐ TD96V-91

WaterSoft Inc.
Ashland, Ohio

PLEASE NOTE THESE SPECIFICATIONS BEFORE PROCEEDING

OPERATING PRESSURE RANGE : 20 - 125 PSI
OPERATING TEMPERATURE RANGE : 33° F - 120° F
INLET / OUTLET PIPE SIZE - 3/4" FNPT

PLEASE COMPLY WITH ALL APPLICABLE PLUMBING CODES
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" increase and is measured in **Grains Per Gallon (gpg)**.

The problem of hard water in the home / business comes to light in many faucets of daily use. Water spots and scum left behind on 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 into 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. This process is automatically initiated by the control valve on the mineral tank. 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 and flushing any accumulate 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. **Rapid Rinse** - The control valve directs the water flow downward, settling and recompacting the resin bed.
4. **Brine Refill** - The control valve directs fresh water into the brine tank to create new brine solution for the next scheduled regeneration.
5. **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 concentrations of iron (above 5 ppm), iron coloration, iron bacteria or sediment are 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.

Installation Requirements

- A level floor position ahead of piping into water heater.
- Unit must be installed at least 10 feet ahead of the inlet to a water heater to prevent damage due to back-up of hot water.
- DO NOT install the unit in an area of direct sunlight or where freezing temperatures may occur!

Major System Components :

1. **Brine Tank** - This tank holds the salt that is added to the softener. This salt is dissolved with water to form a brine solution used in the softener regeneration process.
2. **Resin Tank** - This tank contains the ion exchange resin media. Water flows through the resin tank under pressure to come into contact with the resin for water softening.
3. **Control Valve** - The valve directs water through the resin tank for water softening and controls the flow of water / brine for the regeneration process.

Softener Location / Other Requirements

- Locate the unit near an unswitched, 120 volt / 60 Hz grounded electrical outlet.
- Check the distance and proper drain installation (e.g. floor drain, washing machine standpipe).
- Determine type and size of piping required for softener connection (e.g. cooper, galvanized, PVC plastic).

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

Note : Where the drain line is elevated above the control valve or exceeds 20 feet in length to reach the drain, use 3/4" I.D. Drain line tubing instead of 1/2" I.D. Drain line tubing is not included.

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 heat 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.*

Note : All plumbing lines not requiring "soft" water should be connected "upstream" of the softener.

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. ***For TD96 or TD96-91 units only*** - The filling material is shipped separately from the tanks. Remove the valve and second tank adapter by unscrewing from center hole. Leave distributor tube in tank while filling. Use a cork or tape to place over top of distributor tube to prevent material from entering tube while filling. Place funnel in hole. Pour several gallons of water in the tanks. First pour in the gravel and then the resin. Remove funnel and cork or tape from distributor tube. Replace the valve and second tank adapter, being careful to position the distributor tube into the distributor tube pilot hole.
3. Turn OFF main water supply and OPEN nearest faucet to relieve pressure.
4. Remove control valve cover.
5. Loosen clips on each side of meter module. Lubricate o-rings on bypass valve / yoke assembly (packed separately) and firmly press onto meter module. Align clips and tighten.
6. Cut main line and install appropriate elbows and extensions. Inlet and outlet connections on the bypass are 3/4" FNPT pipe size.

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.*

Note : A bypass valve is packed separately and an optional 1" FPT bypass is available. It is normal to have "play" in the bypass valve after installation.

7. Rotate handle on bypass valve to the bypass position (the handle will be horizontal with plumbing lines).
8. Turn the main supply line on to restore water service to the home.
9. OPEN nearest faucet to evacuate air and repressurized plumbing lines.
10. Check for leaks!
11. Loosen clips on each side of control valve (opposite meter module). Lubricate o-rings on plastic adapters and firmly press interconnect piping (packed separately) onto control valve. Align clips and tighten.

Note : To access clip closest to back plate, disconnect meter cable from meter module and swing timer door open. Access hole is located in back plate behind timer.

12. Move second mineral tank into position.
13. Loosen clips on each side of second tank adapter. Lubricate o-rings on plastic adapters and firmly press other end of interconnect piping onto second tank adapter. Align clips and tighten.

- Drain Line Connection -

1. Remove drain line barb and wrap threads 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 open drain is required to prevent waste water 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 syphon 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 feet in length, 3/4" I.D. drain line tubing should be used.

- 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, behind backplate.
3. Remove brine tank cover.
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 tubing (not included) to the overflow fitting in brine tank located just below the brine line.
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.*

Notice : The brine overflow is provided as a back-up in the event the safety float shut-off should fail, allowing the brine tank to overfill. 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. The control valve ***must be in the service position!*** If needed, rotate manual regeneration knob on timer clockwise until white dot aligns with raised arrow. (See Figure 3.)
2. 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.

3. 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 electric shock!*

- Pressurizing The System -

1. The control valve ***must be in the service position!*** If needed, rotate manual regeneration knob on timer clockwise until white dot aligns with raised arrow. (See Figure 3.)

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

2. Slowly rotate the handle of the bypass valve to the SERVICE position. The handle will be parallel with plumbing lines.
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 **manual regeneration knob** clockwise until micro switch located on rear of timer door is aligned with each cycle position on the program wheel. (See Figure 1.) Verification of each cycle position can be made by checking indicator on right side of control valve. (See Figure 2.)

Note : To expose the program wheel, disconnect meter cable from meter module. Grab onto the lower right corner of the timer face and pull outward.

Warning : When selecting cycle position you ***must wait*** until positioning of upper and lower pistons has stopped before advancing the timer further. (See 9000 Service Manual, page 4.)

1. Manually index **manual regeneration knob** to **BACKWASH** position and allow water to run to drain for 3 to 4 minutes. (See Figure 1.)

Warning : *Turn handle on bypass prior to selecting the backwash position. After backwash position has been established,* ***slightly*** *turn handle parallel on bypass to evacuate air from the media tank. Fully open it when all air is depleted. This procedure will prevent media from being uplifted into control valve.*

2. Manually index **manual regeneration knob** to **BRINE REFILL** position and allow the brine tank to fill just over the salt grid plate. (See Figure 1.)
3. Manually index **manual regeneration knob** to **BRINE & RINSE** position and allow the control valve to draw water from the brine tank until it stops. (See Figure 1.)
4. Manually index **manual regeneration knob** to **SERVICE** position. (See Figure 1.)
5. Repeat steps 1 through 4 for tank # 2.
6. Manually index **manual regeneration knob** to **BRINE TANK REFILL** position and allow the control valve to automatically fill the brine tank. (See Figure 1.)

Note : Control valve will advance to service position automatically.

7. Snap timer door closed.
8. Push meter cable firmly into meter module.

- Setting The Regeneration Schedule -

1. Knowing the amount of resin in the tank, calculate the gallons available, using the following capacities as a guide :

Capacity Per Regeneration

96,000 grains - 3.0 cu. ft.

64,000 grains - 2.0 cu. ft.

48,000 grains - 1.5 cu. ft.

32,000 grains - 1.0 cu. ft.

24,000 grains - .75 cu. ft.

$$\frac{\text{Unit Capacity}}{\text{Compensated Hardness of } H_2O} = \text{Gallons}$$

Note : If water contains iron and / or manganese, multiply the total parts per million (ppm) by "four" (4) and then add to the grains per gallon (gpg) of hardness. Use this COMPENSATED HARDNESS level when programming the regeneration frequency.

i.e. 24 grain water, with tank having a usable 24,000 grain capacity :

$$\frac{\text{24,000 grain capacity}}{\text{24 grain water}} = \text{1,000 gallons available}$$

2. Since the 9000 control regenerates with soft water from the other tank, you must subtract the water used for regeneration. The following is the gallons used for regeneration of each model.

TD24 - 61 gallons	TD24V - 61 gallons
TD32 - 72 gallons	TD32V - 72 gallons
TD48 - 83 gallons	TD48V - 83 gallons
TD64 - 128 gallons	TD64V - 128 gallons
	TD96V - 175 gallons

i.e. : using the above example for an TD24

1,000	gallons available
- 61	gallons used for regeneration
939	gallons

The control valve should be programmed for approximately 9400 gallons. (Always round down to even one hundred gallon settings.)

3. **To set unit capacity**
   To set capacity based on previous example, rotate program wheel counterclockwise until white dot on outer most gear is aligned with capacity (gallons) arrow. (See Figure 1.) Place your thumb firmly on white dot to hold outer gear while setting program wheel. Lift out on center of program wheel and rotate until 900 gallons is opposite the capacity (gallons) arrow.

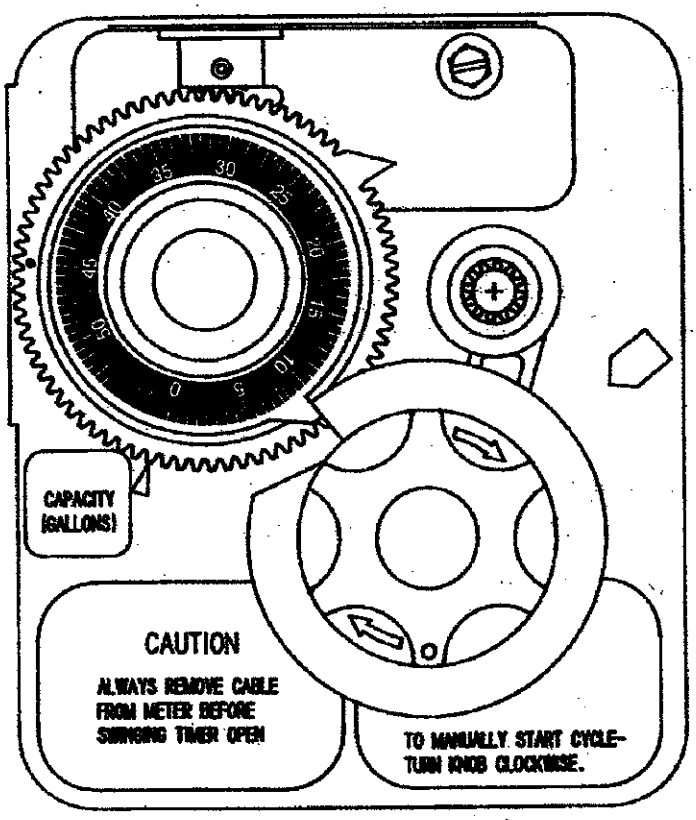


Figure 3

Start-Up Procedure

- Disinfection -

The materials used in the construction of the modern water softener will not support the growth of bacteria. However, the conditions existing during shipment, storage and installation are unknown and thus dictates the disinfection of a softener after installation, before it is used to treat potable water. With this in mind, your newly installed water softener should be disinfected using the recommended procedure described in this section. Ordinary chlorine laundry bleach is an excellent disinfection agent for this purpose. The proper dosage for your particular softener model is listed below.

Figure 6

Unit Capacity	Cubic Feet of Resin	Chlorine Dosage
24,000	0.75	.9 ounces
32,000	1.00	1.2 ounces
48,000	1.50	1.8 ounces
64,000	2.00	2.4 ounces
96,000	3.00	3.6 ounces

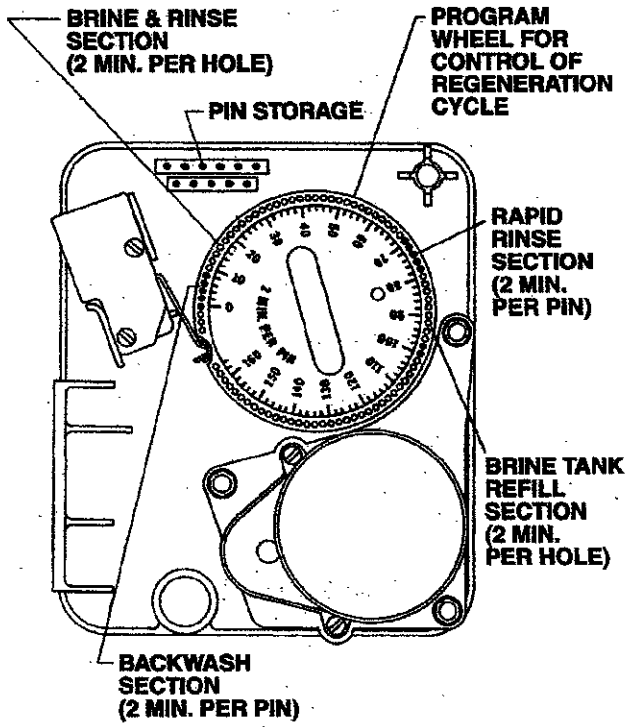


Figure 1

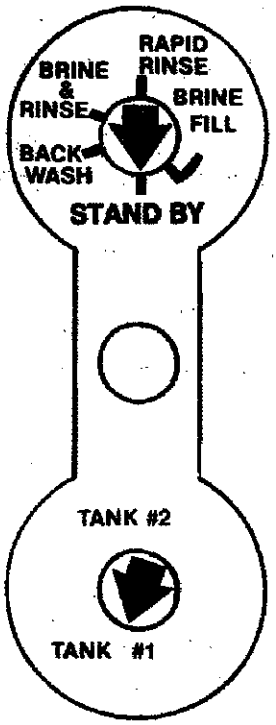


Figure 2

1. Measure the proper amount of chlorine bleach as shown above.
2. Pour the chlorine directly into brine well located inside brine tank.
3. Replace brine well cap.

Note : This procedure will need to be repeated after the first tank regenerates.

- 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 particulate that would eventually cause the softener to malfunction. A pellet type salt is recommended although 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 brine tank will need to be checked and replenished periodically.

1. Fill the brine tank with water softener salt as described above. 250 lbs. of salt maximum.

Warning : *Do not fill salt above level of the brine well.*

2. Replace brine tank lid.
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. Double check regeneration schedule.
4. Make final check for leaks!
5. Fill out and mail warranty card.
6. Leave this manual with the unit.

Operation, Care and Cleaning

- Operation of Bypass Valve -

When the handle on the bypass valve is in the **SERVICE** position, water is directed through the water softener. Water may be bypassed by turning the handle to the **BYPASS** position on the BYPASS valve. Water to the home will bypass softener and be ***untreated***.

You should manually bypass the softener if :

1. The outside lines do not bypass the water softener and water is to be used for lawn sprinkling or other similar uses.
2. Servicing the water softener.
3. A water leak from the water softener is evident.
4. ***Shock treating*** water well and piping with chlorine or other disinfectant.

How To Set the Regeneration Cycle Program

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

To expose cycle program wheel, grasp timer in lower right hand corner and pull, releasing snap retainer and swinging timer to the left. Meter cable ***must*** be removed from meter dome before opening timer.

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

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

How To Change The Length Of The Backwash Time:

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

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

How To Change The Length Of Brine & Rinse Time :

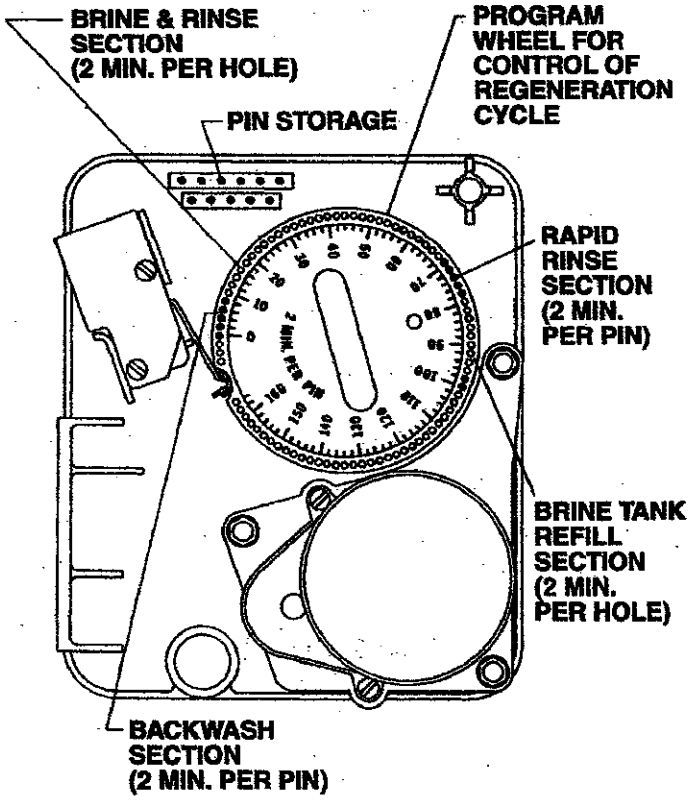
The group of holes between the last pin in the backwash section and the second group of pins determines the length of time that your unit will brine and rinse. (2 minutes per hole)

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

How To Change The Length Of Rapid Rinse :

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

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



How To Change The Length Of Brine Tank Refill Time :

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

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

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

WaterSoft inc.

Limited Warranty Water Treatment Equipment

This warranty cannot be transferred - it is extended only to the original purchaser or first user of the product. by accepting and keeping this product, you agree to all of the warranty terms and limitations of liability described below.

(Mail your product registration card within 30 days of purchase to ensure your warranty coverage or proof of purchase will required.)

Important Warning : Read carefully the WaterSoft Water Treatment Equipment Installation, Operating and Maintenance Instructions Manual to avoid serious personal injury and property HAZARDS and to ensure safe and proper care of this product.

Model Numbers Covered
Water Softeners, Media Filters, Upflow Filters, PROVECTR's, UV, RO, Filters, Chemical Feed

*FOR AS LONG AS YOU OWN AND LIVE IN YOUR SINGLE FAMILY HOME, this warranty covers your water treatment equipment, if you are the first user of this WaterSoft water treatment equipment and purchased it for single family home use - subject to all of the conditions, limitations and exclusions listed below. Purchasers who buy the WaterSoft water treatment equipment for other purposes, and other component parts are subject to more limited warranties and you should read all of the terms included in this form to make sure you understand your warranty.

What is covered by this warranty?
WaterSoft warrants that at the time of manufacture, the water treatment equipment shall be free from defects in material and workmanship as follows :

Thermoplatistic Mineral Tanks	10 years
Softener/Filter Control Valves	5 years
Brine Tank Assemblies	3 years
Chemical Feed Pumps	1 year
Reverse Osmosis System	1 year
Other Accessories & Parts	1 year

* This warranty does not include media and/or cartridge filter elements.

Additional Terms & Conditions
What WaterSoft will do if you have a covered warranty claim
WaterSoft will at its option either make repairs to correct any defect in material or workmanship or supply and ship either new or used replacement parts or products. WaterSoft will not accept any claims for labor or other costs.

Additional Exclusions and Limitations
This warranty is non-transferable and does not cover any failure or problem unless it was caused solely by a defect in material or workmanship. In addition, this warranty shall not apply :

- if the water treatment equipment is not correctly installed, operated, repaired and maintained as described in the Installation, Operating & Maintenance Instructions Manual provided with the product.
- if the tank is not the size indicated for the supply line size of the installation, as described in the manual.
- if the unit has not always been operated within the factory calibrated temperature limits, and at a water pressure not exceeding 125 psi.
- to any failure or malfunction resulting from abuse (including freezing), improper or negligent; handling, shipping (by anyone other than WaterSoft), storage, use, operation, accident; or alteration, lightning, flooding or other environmental conditions;
- to any failure or malfunction resulting from failure to keep the unit full of potable water, free to circulate at all times; and with the tank free of damaging water sediment or scale deposits;
- this warranty does not cover labor costs, shipping charges, service charges, delivery expenses, property damage, administrative fees or any costs incurred by the purchaser in removing or reinstalling the water treatment equipment.
- the warranty does not cover any claims submitted to WaterSoft more than 30 days after expiration of the applicable warranty, and does not apply unless prompt notice of any claim is given to an authorized WaterSoft distributor or to WaterSoft or a designated contractor is provided access to the installation and to the water treatment equipment.

THESE WARRANTIES ARE GIVEN IN LIEU OF ALL OTHER EXPRESS WARRANTIES. NO WATER SOFT REPRESENTATIVE OR ANY OTHER PARTY IS AUTHORIZED TO MAKE ANY WARRANTY OTHER THAN THOSE EXPRESSLY CONTAINED IN THIS WARRANTY AGREEMENT.

Additional Warranty Limitations
ANY IMPLIED WARRANTIES THE PURCHASER MAY HAVE, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL NOT EXTEND BEYOND THE APPLICABLE TIME PERIODS SPECIFIED ABOVE. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

Limitations of Remedies
The remedies contained in this warranty are the purchaser's exclusive remedies. In no circumstances will WaterSoft or the seller of the product be liable for more than, and purchaser-user's remedies shall not exceed, the price paid for the product. In no case shall WaterSoft or seller be liable for any special, incidental, contingent or consequential damages. Special, incidental, contingent and consequential damages for which WaterSoft is not liable include, but are not limited to, inconvenience, loss or damage to property, consequential mold damage, loss of profits, loss of savings or revenue, loss of use of the products or any associated equipment, facilities, buildings or services, downtime, and the claims of third parties including customers. Some states do not allow the exclusion or the limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you.

What to do if you have a problem covered by this warranty
Any warranty coverage must be authorized by WaterSoft. Contact the person from whom you purchased the product, who ***must*** receive authorization from a WaterSoft distributor or WaterSoft. If you do not receive a prompt response, call WaterSoft directly at 800-462-3790. Notice of a warranty claim relating to replacement parts or products should be submitted by the authorized distributor to WaterSoft at the following address :
WaterSoft Inc., Warranty Claim Dept., 710 Orange St., Ashland, OH 44805
If your product is new and not used and you wish to return it, contact your WaterSoft distributor.

12/09