



INSTALLATION AND OPERATING INSTRUCTIONS

NWS RESIDENTIAL WATER SOFTENERS

MODELS:

NWS100	NWS100M
NWS150	NWS150M
NWS200	NWS200M

**Installer, please leave with homeowner.
Homeowner, retain for future reference.**

INSTR2208 0110





SAFETY INFORMATION

Read, understand, and follow all safety information contained in these instructions prior to installation and use of the NWS Series Water Softener. Retain these instructions for future reference. Failure to follow installation, operation and maintenance instructions may result in property damage and will void warranty.

Intended use:

The NWS Series Water Softener is intended for use in softening water in homes and has not been evaluated for other uses. The system must be installed indoors near the point of entry of a home water line, and be installed by qualified professional installers according to these installation instructions.

EXPLANATION OF SIGNAL WORD CONSEQUENCES

 WARNING	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury and/or property damage.
 CAUTION	Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury and/or property damage.
CAUTION	Indicates a potentially hazardous situation, which, if not avoided, may result in property damage.

WARNING

To reduce the risk associated with choking:

- Do not allow children under 3 years of age to have access to small parts during the installation of this product.

To reduce the risk associated with ingestion of contaminants:

- Do not use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

To reduce the risk of physical injury:

- Shut off inlet water supply and depressurize system as shown in manual prior to service.

To reduce the risk associated with a hazardous voltage:

- If the home electrical system requires use of the cold water system as an electrical safety ground, a jumper must be used to ensure a sufficient ground connection across the filter installation piping — refer installation to qualified personnel.
- Do not use the system if the power cord is damaged — contact qualified service personnel for repair.

To reduce the risk associated with back strain due to the heavy weight of the various system components:

- Follow safe lifting procedures.

CAUTION

To reduce the risk associated skin, eye, and respiratory tract irritation from gravel and filter media during installation:

- Gravel and several types of filter media may be used in this product, depending upon the application. During installation, dust may cause irritation to skin, eyes, and respiratory tract.
- Utilize a NIOSH-approved dust filter mask, protective gloves, and appropriate eye protection when handling and pouring gravel and filter media.
- To request an MSDS relating to this product call 203-238-8965 or visit the web at http://solutions.3M.com/WPS/Portal/3M/EN_US/MSDS (click MSDS search). For emergencies, call 800-364-3577 or 651-737-6501 (24 hours).

CAUTION

To reduce the risk associated with property damage due to water leakage:

- **Read and follow** Use instructions before installation and use of this water treatment system.
- Installation and use **MUST** comply with existing state or local plumbing codes.
- **Protect from freezing**, relieve pressure and drain system when temperatures are expected to drop below 33°F (0.6°C).
- **Do not** install on hot water supply lines. The maximum operating water temperature of this filter system is 110°F (43.3°C).
- **Do not** install if water pressure exceeds 100 psi. If your water pressure exceeds 80 psi (552 kPa), you must install a pressure limiting valve. Contact a plumbing professional if you are uncertain how to check your water pressure.
- **Do not** install where water hammer conditions may occur. If water hammer conditions exist you must install a water hammer arrester. Contact a plumbing professional if you are uncertain how to check for this condition.
- Where a backflow prevention device is installed on a water system, a device for controlling pressure due to thermal expansion must be installed.
- **Do not** use a torch or other high temperature sources near filter system, cartridges, plastic fittings or plastic plumbing.
- On plastic fittings, never use pipe sealant or pipe dope. **Use PTFE thread tape only**, pipe dope properties may deteriorate plastic.
- Take care when using pliers or pipe wrenches to tighten plastic fittings, as damage may occur if over tightening occurs.
- **Do not** install in direct sunlight or outdoors.
- Mount system in such a position as to prevent it from being struck by other items used in the area of installation.
- Ensure all tubing and fittings are secure and free of leaks.
- **SHUT OFF FUEL OR ELECTRIC POWER SUPPLY TO WATER HEATER** after water is shut off.
- **Do not** install system where water lines could be subjected to vacuum conditions without appropriate measures for vacuum prevention.
- **Do not** apply heat to any fitting connected to bypass or control valve as damage may result to internal parts or connecting adapters.
- Install on a flat/level surface. It is also advisable to sweep the floor to eliminate objects that could pierce the brine tank.

To reduce the risk associated with property damage due to plugged water lines:

- Pay particular attention to correct orientation of control valve. Water flow should match arrow on control valve. The Inlet and Outlet of other water treatment equipment products will vary depending on the control valve brand used.

IMPORTANT NOTES

- Failure to follow instructions will void warranty.

TABLE OF CONTENTS

<u>SECTION</u>	<u>DESCRIPTION</u>
1	BEFORE INSTALLATION
2	INSTALLATION
3	REGENERATION INSTRUCTIONS (Timing Setting Instructions)
4	SERVICE INSTRUCTIONS
5	SPECIFICATION AND OPERATING DATA
6	PARTS
7	MAINTENANCE
8	LIMITED WARRANTY

- **Professional Installation Required:** Installation requires shutting water off to home, cutting home water supply pipe and using a welding torch to add piping and fittings. Specialized tools and skills are required. Not a do-it-yourself type of project. Professional installation **required!**

IMPORTANT: SECTION 1: BEFORE INSTALLATION

Congratulations! We believe your purchase of this water softener will prove to be a very wise choice. When properly installed, operated, and maintained, your new softener will provide years of dependable service. Before starting the installation please read this manual all the way through for an overview, and then follow the installation in proper sequence. **Failure to follow instructions will void warranty.**

Inspecting And Handling Your Softener:

Inspect the equipment for shipping damage. If damaged, notify the transportation company and request a damage inspection.

Handle the equipment with care. Damage can result if dropped or if the brine tank is set on sharp, uneven projections on the floor. When handling, do not turn the water softener unit upside down.

Make Sure Your Water Has Been Thoroughly Tested:

An analysis of your water should be made prior to the selection of your water conditioning equipment. Your dealer will generally perform this service for you, and may send a sample to the factory for analysis and recommendations. Enter your analysis below for your permanent record.

Analysis of Your Water:

Hardness _____ gpg	Tannins (Humic Acid) _____ ppm
Iron (Fe) _____ ppm	Hydrogen Sulfide (H ₂ S) _____ ppm
Manganese (Mn) _____ ppm	Other _____ ppm
pH _____	Other _____ ppm

IMPORTANT NOTES

Hydrogen sulfide (H₂S) must be tested for at the well site. For accuracy, the sample must be drawn with the pump RUNNING, and the test be completed within ONE minute after the sample is drawn.

Softeners are designed to reduce hardness but can handle reasonable amounts of soluble iron if consideration is given to content when selecting model and regeneration settings. To treat sulfur (hydrogen sulfide), bacterial iron, precipitated iron or very high levels of soluble iron requires special equipment in addition to a water softener. For best results, 3MAPPM System is recommended for use on waters containing more than 2 ppm of iron.

Check Your Pumping Rate and Water Pressure:

Two water system conditions must be checked carefully to avoid unsatisfactory operation or equipment damage:

- 1) **MINIMUM** water pressure required at the water softener inlet is 20 psi (138 kPa). **IF WATER PRESSURE IS OVER 80 psi (552 kPa), A PRESSURE REDUCING VALVE MUST BE INSTALLED IN THE WATER SUPPLY LINE AHEAD OF THE WATER SOFTENER.**

CAUTION

To reduce the risk associated with property damage due to water leakage:

- **Do not** install if water pressure exceeds 100 psi. If your water pressure exceeds 80 psi (552 kPa), you must install a pressure limiting valve. Contact a plumbing professional if you are uncertain how to check your water pressure.

NOTE: If you have a municipal or a community water supply and daytime water pressure is 85 psi or more, nighttime pressure may exceed 100 psi. Call your local water department or plant operator to obtain pressure readings. If you have a private well, the gauge on the pressure tank will indicate the high and low system pressure. Record your water pressure data below:

Water Pressure:

Low _____ psi

High _____ psi

CAUTION

To reduce the risk associated with property damage due to water leakage:

- **Do not** install system where water lines could be subjected to vacuum conditions without appropriate measures for vacuum prevention.

The installer should take appropriate measures if there is the possibility a vacuum may occur. This would include the installation of an appropriate device in the supply line to the system, i.e., a vacuum breaker or backflow prevention device. Vacuum damage voids the factory warranty.

- 2) The pumping rate of your well must be sufficient for satisfactory operation and **BACKWASHING** of the water softener. (See **SPECIFICATIONS AND OPERATING DATA, Section 6**)

Locate Water Conditioning Equipment Correctly:

Select the location of your water softener with care. Various conditions which contribute to proper location are as follows:

- 1) Locate as close as possible to water supply source.
- 2) Locate as close as possible to a drain.
- 3) Locate in correct relationship to other water conditioning equipment (Figure 1, page 2-1).
- 4) Locate the softener in the supply line **BEFORE** the water heater. Temperatures above 110°F (43.3°C) will damage the softener and void the factory warranty.
- 5) **DO NOT** install the softener in a location where freezing temperatures occur. Freezing may cause permanent damage and will also void the factory warranty.
- 6) Allow sufficient space around the installation for easy servicing.
- 7) Provide a non-switched 110V, 60Hz (220V, 50Hz for specified systems) power source for the control valve.

WARNING

To reduce the risk associated with ingestion of contaminants:

- **Do not** use with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.

CAUTION

To reduce the risk associated with property damage due to water leakage:

- **Protect from freezing**, relieve pressure and drain system when temperatures are expected to drop below 33°F (0.6°C).
- **Do not** install on hot water supply lines. The maximum operating water temperature of this filter system is 110°F (43.3°C).

Facts to Remember While Planning Your Installation:

- 1) All installation procedures **MUST** conform to local and state plumbing codes.
- 2) If lawn sprinkling, a swimming pool, or geothermal heating/cooling or water for other devices/activities are to be treated by the water softener, a larger model **MUST** be selected to accommodate the higher flow rate plus the backwashing requirements of the water softener. Consult our Customer Service Department at 1-866-990-9785 for alternative instructions if the pumping rate is insufficient.
- 3) Remember that the water softener **INLET** is attached to the pipe that supplies water (i.e. runs to the pump) and the **OUTLET** is the line that runs toward the water heater.

CAUTION

To reduce the risk associated with property damage due to plugged water lines:

- Pay particular attention to correct orientation of control valve. Water flow should match arrow on control valve. The Inlet and Outlet of other water treatment equipment products will vary depending on the control valve brand used.

- 4) Before commencing the installation it is advisable to study the existing piping system and to determine the size, number and type of fittings required.

WARNING

To reduce the risk associated with a hazardous voltage:

- If the home electrical system requires use of the cold water system as an electrical safety ground, a jumper must be used to ensure a sufficient ground connection across the filter installation piping — refer installation to qualified personnel.

- 5) Sweep the floor to eliminate objects that could pierce the brine tank.

IMPORTANT NOTE

Sodium Information: Water softeners utilizing sodium chloride for regeneration add sodium to the water softened water. Persons who are on sodium restricted diets should consider the added sodium as part of their overall sodium intake. As a reference as to how much sodium is added to softened water consider the following. For each grain per gallon of water hardness that is exchanged from the water supply, 7.5 milligrams per liter of sodium will be added to the softened water. e.g. 10 grains per gallon (gpg) exchanged will add 75 milligrams of sodium to the softened water.

SECTION 2: INSTALLATION

Proper installation sequence of water conditioning equipment is very important. Refer to the following diagram for your particular water supply.

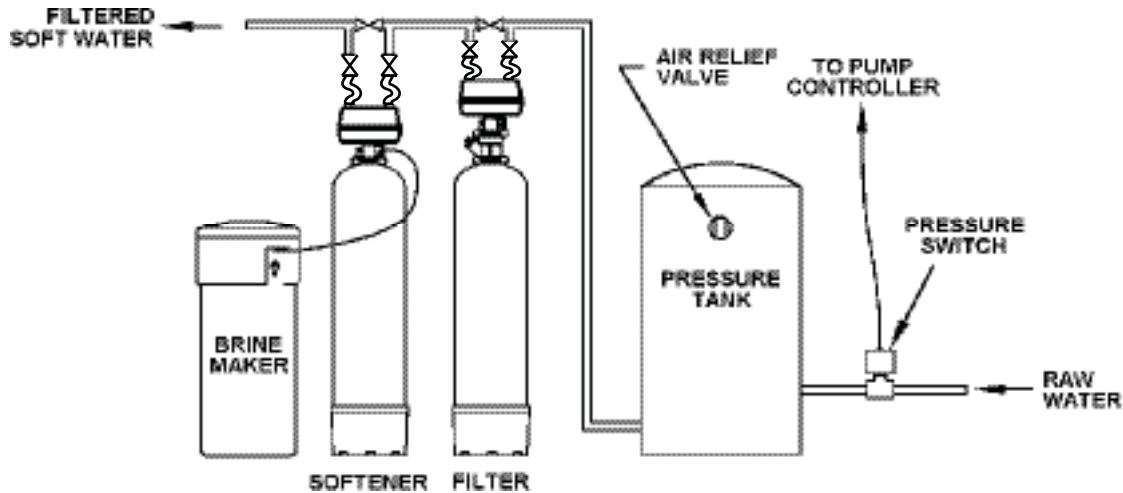


Figure 1

CAUTION

To reduce the risk associated with property damage due to water leakage:

- **Read and follow** Use instructions before installation and use of this water treatment system.
- Installation and use **MUST** comply with existing state or local plumbing codes.

To reduce the risk associated with property damage due to plugged water lines:

- Pay particular attention to correct orientation of control valve. Water flow should match arrow on control valve. The Inlet and Outlet of other water treatment equipment products will vary depending on the control valve brand used.

Step 1

- Remove control valve by removing quick connect clamp and using a garden hose or bucket, to fill SOFTENER TANK with water (this filling method prevents air entrapment that can cause loss of resin during initial regeneration procedure). Replace control valve. Make sure clamp is reassembled as shown in Figure 2 "LATCH" arrows should point toward each other.
- Attach BYPASS VALVE/YOKE ASSEMBLY (Figure 3) using ADAPTER COUPLINGS, CLIPS and SCREWS to CONTROL VALVE (Figure 4). On Meter initiated models, attach METER between BYPASS VALVE and CONTROL VALVE (Figure 4).

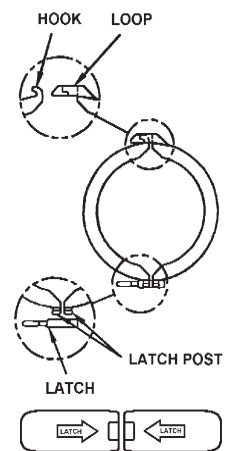


Figure 2. CLAMP ASSEMBLY

Step 2

Shut off all water at main supply valve. On a PRIVATE WELL SYSTEM, turn off power to pump and drain pressure tank. Make certain pressure is relieved from complete system by opening nearest faucet to drain system.

CAUTION

To reduce the risk associated with property damage due to water leakage:

- **SHUT OFF FUEL OR ELECTRIC POWER SUPPLY TO WATER HEATER** after water is shut off.

Step 3

Cut main supply line as required to fit plumbing INLET and OUTLET of BYPASS VALVE ASSEMBLY. Use flexible tubing connections to connect the valve to household plumbing (as shown in schematic).

Step 4

Solder or solvent weld plumbing. DO NOT apply heat to any fitting connected to BYPASS or CONTROL VALVE as damage may result to internal parts or connecting adapters. MAKE CERTAIN WATER FLOW ENTERS THROUGH INLET AND DISCHARGES THROUGH OUTLET.

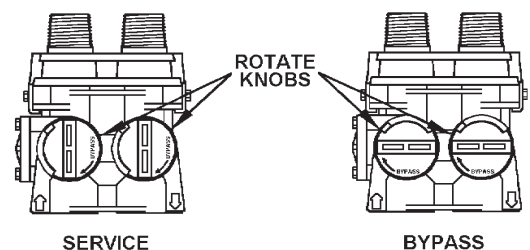


Figure 3. BYPASS VALVE

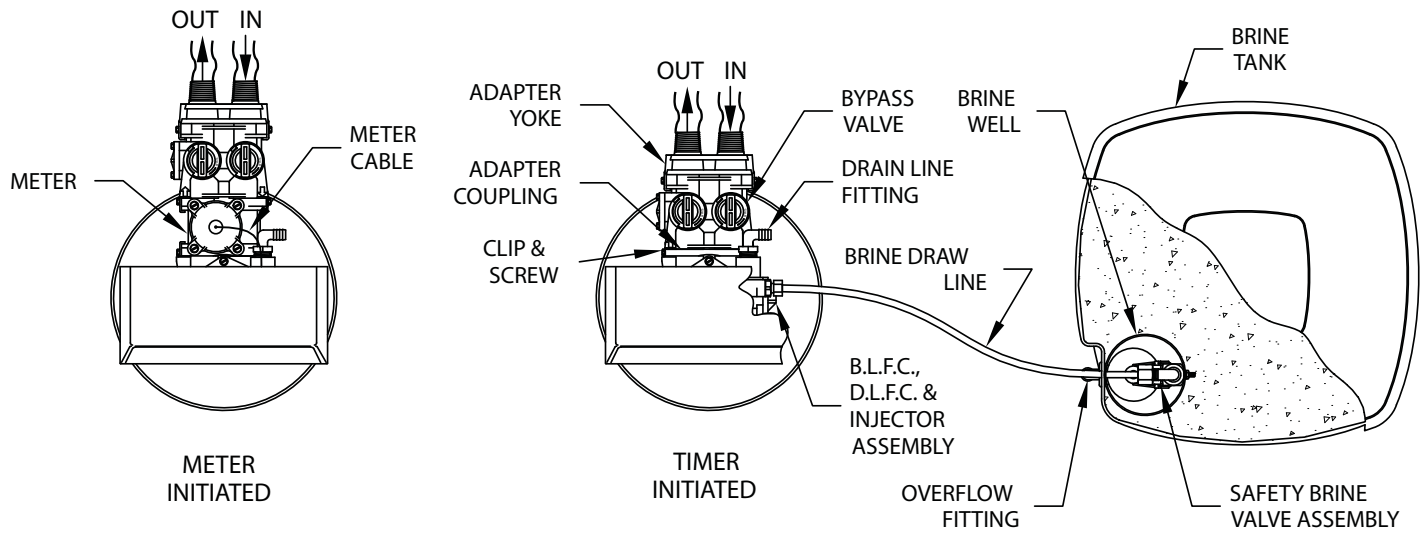


Figure 4. Softener and Brine Tank Assembly, Top View

CAUTION

To reduce the risk associated with property damage due to plugged water lines:

- Pay particular attention to correct orientation of control valve. Water flow should match arrow on control valve. The Inlet and Outlet of other water treatment equipment products will vary depending on the control valve brand used.

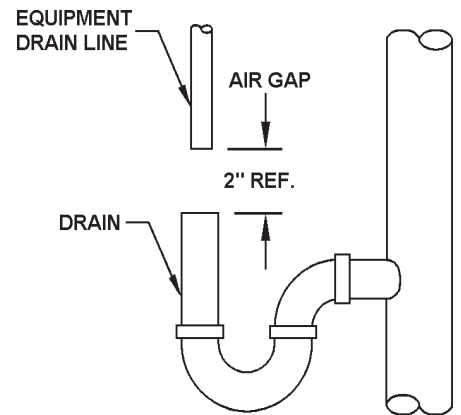


Figure 5. TYPICAL DRAIN

Step 5

Attach DRAIN LINE to DRAIN LINE FITTING. To prevent back pressure from reducing flow rate below minimum required for backwash, DRAIN LINE MUST be sized according to run length and relative height. Be careful not to bend flexible drain tubing sharply enough to cause "kinking" (if kinking occurs DRAIN LINE MUST BE REPLACED). Typical examples of proper DRAIN LINE diameters are:

- 1) 1/2 in. ID up to 15 ft. when discharge is lower than INLET.
- 2) 5/8 in. ID up to 15 ft. when discharge is slightly higher than INLET.
- 3) 3/4 in. ID when drain is 25 ft. away and/or drain is installed overhead.

Some areas prohibit the use of flexible drain lines. Check with local code officials prior to installation.

Step 6

Position DRAIN LINE over drain and secure firmly. To prevent backsiphoning of sewer water, provide an air-gap of at least 2 in. or 2 pipe diameters between end of drain hose and drain (Figure 5). DO NOT raise DRAIN LINE more than 10 ft. above floor.

Step 7

Connect one end of the 3/8 in. poly brine line to BRINE VALVE located on right side of CONTROL VALVE. Connect other end to ELBOW inside of BRINE WELL. Brass sleeves and plastic ferrules must be used where necessary. (See Figure 3 and CONTROL VALVE PARTS drawing, Section 6).

Step 8

Install OVERFLOW LINE to brine tank OVERFLOW FITTING (Figure 4). Discharge of line must be lower than OVERFLOW FITTING. DO NOT INTERCONNECT OVERFLOW LINE WITH VALVE DRAIN LINE (STEP 6).

Step 9

On time clock initiated models, set REGENERATION FREQUENCY. Refer to REGENERATION FREQUENCY SCHEDULES (Section 3) to determine correct frequency, then refer to HOW TO SET TIME CLOCK REGENERATION CONTROL (Section 3) for instructions on setting frequency. For meter initiated models, refer to HOW TO SET METER REGENERATION CONTROL.

NOTE: Regeneration settings for both time clock and meter initiated models are factory preset for the most efficient salt use and minimum water consumption used for regeneration (as little as 50 gallons/89 liters), and conform to the INDUSTRY SALT EFFICIENCY STANDARDS (required by some states). REGENERATION FREQUENCY SCHEDULES are designed for use with factory regeneration settings (listed in SPECIFICATIONS AND OPERATING DATA, Section 5).

The control valve design permits adjustment of the salt dosage. This adjustment may be necessary when unusual operating conditions exist, such as high concentrations of iron or hardness and/or high flow rates or daily water consumption. This adjustment is easily performed by loosening the screw holding the white cam (on backside of timer) and adjusting the pointer to the desired pounds of salt.

NOTE: For salt dosages greater than 15 lbs., grid leg extensions must be attached to bottom of grid legs.

Step 10

Set TIME OF DAY (refer to appropriate HOW TO SET TIME CLOCK/METER REGENERATION CONTROL, Section 3). When shifting to daylight saving time (and back), you may wish to adjust TIME OF DAY accordingly.

NOTE: TIME OF REGENERATION is preset for 2:00 a.m. because at this time water consumption is generally minimal (a built-in hard water bypass does, however, permit water to be drawn during regeneration). Should your lifestyle require **regular** use of water during the 2:00 to 3:00 a.m. regeneration period, or if other water treatment equipment is also set for 2:00 a.m. regeneration, the TIME OF REGENERATION will need changing. To change, adjust time of day on 24-HOUR GEAR ahead or behind actual time of day. For example, if 1:00 a.m. regeneration is desired and actual time of day is 10:00 a.m., **advance** 24-HOUR GEAR one hour to 11:00 a.m.; or, should 3:00 a.m. regeneration be desired, set gear back one hour to 9:00 a.m.

Step 11

Before loading salt, using a pail or garden hose, add approximately 3 gals. water to brine tank (6 gals. for units with extended grid legs). Then add initial salt fill to brine tank, and one cup full of laundry bleach.

Step 12

Put softener through a complete regeneration - to sanitize the system before use (refer to HOW TO SET TIME CLOCK (or METER) REGENERATION CONTROL for instructions on manual regeneration.)

Installation is now complete, and your water softener is now ready for service!

SECTION 3: REGENERATION INSTRUCTIONS

INSTRUCTIONS FOR USING REGENERATION FREQUENCY SCHEDULES:

(Time Clock Initiated Models Only)

- 1) Determine **ADJUSTED HARDNESS** by adding three (3) times the iron content in parts per million (ppm) to the hardness in grains per gallon (gpg). The resulting number is **ADJUSTED HARDNESS**.

EXAMPLE: Hardness is 14 gpg and iron is 2 ppm. **ADJUSTED HARDNESS** is 20 gpg (14 plus 3 times 2).

- 2) Select **REGENERATION FREQUENCY SCHEDULE** corresponding to your model. Locate box intersected by **NUMBER IN FAMILY** and **ADJUSTED HARDNESS** (if **ADJUSTED HARDNESS** is between two numbers in schedule, use higher number). Number in box represents **FREQUENCY** or **NUMBER OF** times per 12 **DAYS** timer should be set to regenerate. Refer to **HOW TO SET TIME CLOCK REGENERATION CONTROL** to set correct frequency.

EXAMPLE: You have Model NWS100, 4 in family and 20 gpg adjusted hardness. Refer to **REGENERATION FREQUENCY SCHEDULE** for Model Series 100 and locate box intersected by 4 in family and 20 gpg adjusted hardness. The figure "3" in box indicates a **REGENERATION** frequency of **THREE TIMES PER 12 DAYS** (if a "1", "2", "4", etc. were in box, frequencies of once, twice and four times per twelve days, respectively, would be indicated.)

REGENERATION FREQUENCY SCHEDULES (TIMES PER 12 DAYS)

Model(s) 100

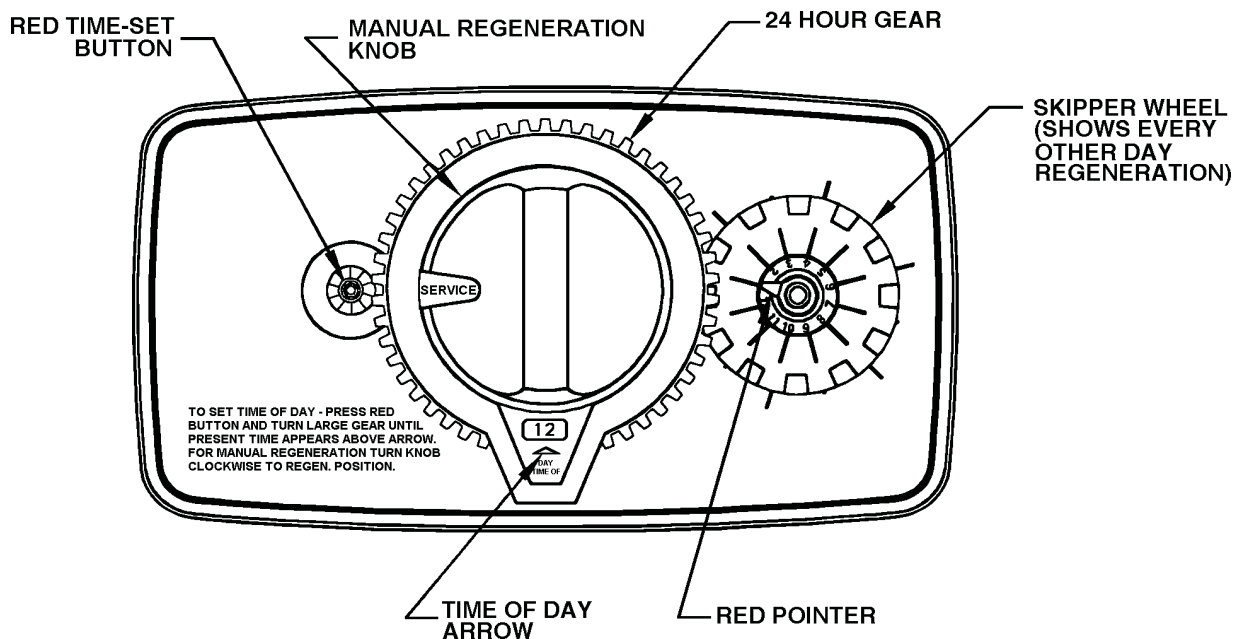
Persons In Family	HARDNESS — gpg											
	5	10	15	20	25	30	35	40	45	50	55	60
1	1	1	1	1	1	2	2	2	2	2	2	2
2	1	1	2	2	2	3	3	3	4	4	4	6
3	1	2	2	3	3	4	4	6	6	6	6	12
4	1	2	3	3	4	6	6	6	12	12	12	12
5	1	2	3	4	6	6	12	12	12	12	12	12
6	2	3	4	6	6	12	12	12	12	12	12	
7	2	3	4	6	6	12	12	12	12			
8	2	3	6	6	12	12	12	12				

Model(s) 150

Persons In Family	HARDNESS — gpg														
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
2	1	1	1	1	2	2	2	2	3	3	3	3	3	4	4
3	1	1	1	2	2	3	3	3	4	4	4	6	6	6	6
4	1	1	2	2	3	3	4	4	6	6	6	6	6	12	12
5	1	2	2	3	3	4	4	6	6	6	12	12	12	12	12
6	1	2	3	3	4	6	6	6	12	12	12	12	12	12	12
7	1	2	3	4	4	6	6	12	12	12	12	12	12	12	12
8	1	2	3	4	6	6	12	12	12	12	12	12	12		
9	1	3	4	6	6	12	12	12	12	12	12				
10	2	3	4	6	6	12	12	12	12	12					

Model(s) 200

Persons In Family	HARDNESS — gpg																	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2
2	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4
3	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	6	6	6
4	1	1	2	2	2	3	3	3	4	4	4	6	6	6	6	6	6	12
5	1	1	2	2	3	3	4	4	4	6	6	6	6	12	12	12	12	12
6	1	2	2	3	3	4	4	6	6	6	6	12	12	12	12	12	12	12
7	1	2	2	3	4	4	6	6	6	12	12	12	12	12	12	12	12	12
8	1	2	3	3	4	6	6	6	12	12	12	12	12	12	12	12	12	
9	1	2	3	4	4	6	6	12	12	12	12	12	12	12	12			
10	1	2	3	4	6	6	12	12	12	12	12	12	12					



HOW TO SET DAYS ON WHICH WATER SOFTENER IS TO REGENERATE:

Rotate the skipper wheel until the number “1” is at the red pointer. Set the days that regeneration is to occur by sliding tabs on the skipper wheel outward to expose trip fingers. Each tab is one day. Finger at red pointer is tonight. Moving clockwise from the red pointer, extend or retract fingers to obtain the desired regeneration schedule.

HOW TO SET THE TIME OF DAY:

- 1) Press and hold the red button in to disengage the drive gear.
- 2) Turn the large gear until the actual time of day is opposite the time of day pointer.
- 3) Release the red button to again engage the drive gear.
- 4) Time of regeneration is preset for 2:00 a.m.

HOW TO MANUALLY REGENERATE YOUR WATER SOFTENER AT ANY TIME.

Turn the manual regeneration knob clockwise.

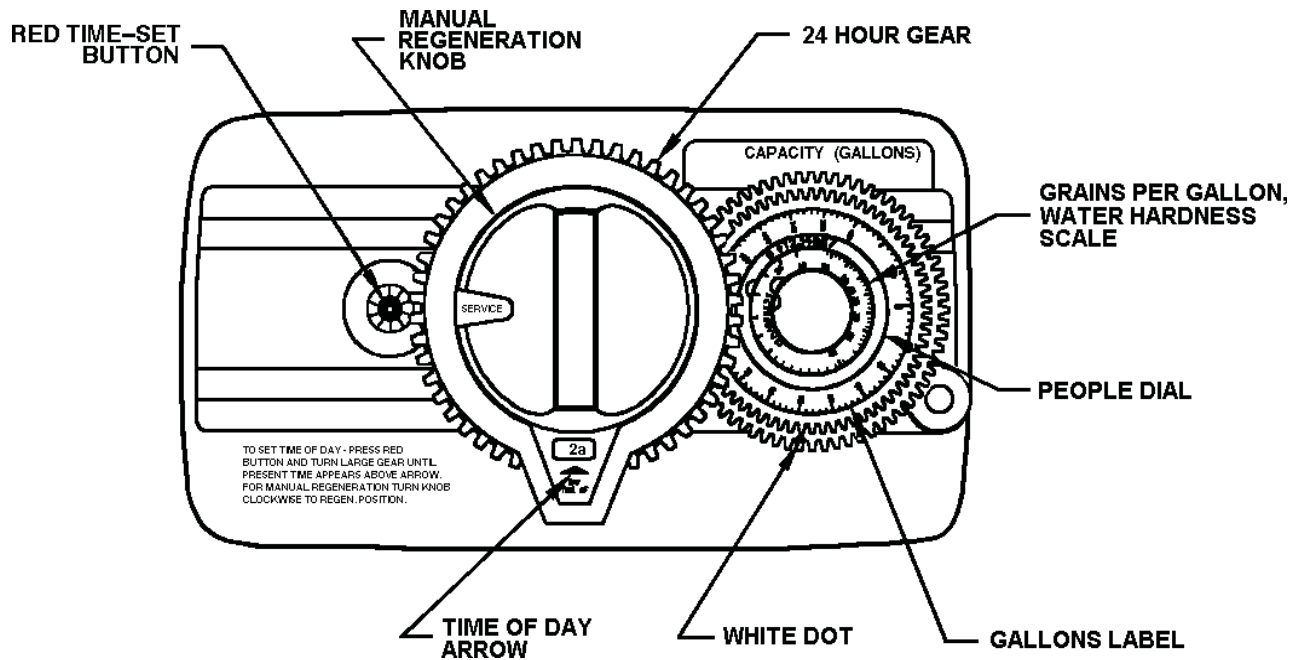
A slight, clockwise movement of the manual regeneration knob engages the program wheel and starts the regeneration program.

The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing (SERVICE POSITION).

Even though it takes three hours for this center knob to complete one revolution, the regeneration cycle of your unit might be set only one-third of this time.

In any event, conditioned water may be drawn after rinse water stops flowing from the water softener drain line.

HOW TO SET METER GENERATION CONTROL:



TYPICAL RESIDENTIAL APPLICATION:

To program, just set the time, set the hardness and it automatically monitors system needs and regenerates only when necessary. To set time of day, press red time set button and turn 24-hour gear until present time of day is opposite "time of day arrow." Set program wheel by lifting the "people" dial and rotating it so that the number of people in the household is aligned with the grains per gallon water hardness (adjusted hardness*) scale. Release the dial and check for firm engagement at setting. (This method will provide reserve capacity of one day's supply based on 75 gallons per person.)

OPTIONAL PROGRAMMING PROCEDURE:

Calculate the gallon capacity of the system, subtract the necessary one day's reserve requirement and set the gallons available opposite the small white dot on the program wheel gear. Note: drawing shows 850 gallon setting. The capacity (gallons) arrow denotes remaining gallons exclusive of fixed reserve.

HOW TO SET THE TIME OF DAY:

- 1) Press and hold the red button in to disengage the drive gear.
- 2) Turn the large gear until the actual time of day is opposite the time of day pointer.
- 3) Release the red button to again engage the drive gear.

HOW TO MANUALLY REGENERATE YOUR WATER SOFTENER AT ANY TIME:

A slight, clockwise movement of the manual regeneration knob engages the program wheel and starts the regeneration process.

The black center knob will make one revolution in the following approximately three hours and stop in the position shown in the drawing.

Even though it takes three hours for this center knob to complete one revolution, the regeneration cycle of your unit might be set for only one-third of this time.

In any event, conditioned water may be drawn after rinse water stops flowing from the water conditioner drain line.

NOTE: The backside of the timer is set the same as the standard time clock regenerated models.

* Adjusted hardness equals hardness in grains per gallon (gpg) plus 3 times the iron in parts per million (ppm).

SECTION 4: SERVICE INSTRUCTIONS

Problem	Cause	Solution
1) Hard water, (unit NOT using salt; liquid level in brine tank NOT too high).	A. Electrical service to unit interrupted. B. Timer not working. C. Timer improperly set. D. Safety brine valve not opening. E. Salt "bridged" in brine tank.	A. Assure permanent electrical service (check fuse, plug, pull chain or switch.) B. Replace timer motor. C. Increase frequency of regeneration and/or salt setting. D. Replace safety brine valve. E. Breakup salt.
2) Hard water, (unit using salt; liquid level in brine tank NOT too high).	A. Bypass open. B. Timer improperly set. C. No salt in brine tank. D. Excessive water usage. E. Unit installed backwards. F. Unit undersized	A. Close bypass (replace if necessary). B. Increase frequency of regeneration, or reset timer if needed. C. Add salt; maintain above water level. D. Increase frequency of regeneration and/or salt setting (See HOW TO SET TIMER). E. Reinstall unit. F. Replace with larger unit.
3) Liquid level in brine tank TOO high.	A. Brine valve not closing. B. Salt setting too high. C. Injector screen plugged. D. Drain line frozen, plugged or restricted. E. Salt "mushed" or sand from salt plugging bottom of brine tank. F. Incorrect brine line flow control (BLFC).	A. Replace brine valve. B. Reset timer. C. Clean injector and screen. D. Free drain. E. Clean out brine tank (See Instructions). F. Replace with correct flow control (See Specifications).
4) System regenerates at wrong time-of-day.	A. Power outage occurred.	A. Reset timer.
5) Water continuously flows to drain.	A. Foreign material in control valve. B. Internal control leak. C. Control valve jammed in brine or backwash position.	Remove piston assembly and inspect bore; remove foreign material and check control in various regeneration positions. Replace seals and/or piston assembly. Replace piston, seals and spacers.
6) Water tastes salty.	A. Salt setting too high. B. Cyclone (distributor) tube too short.	A. Reset program cycle. B. Replace.
7) White spots on glassware and dark surfaces.	A. Sodium residual resulting from water having very high hardness or total dissolved solids (TDS).	A. Installation of additional water treatment equipment such as reverse osmosis or demineralization.
8) Low water pressure (low flow rate).	A. Iron build-up in line to water conditioner. B. Iron build-up in water conditioner. C. Well pumping sand. D. Pump losing capacity.	A. Clean line to water conditioner. B. Clean control and add Iron-X Mineral Cleaner to resin bed; increase frequency of regeneration. C. Install sand trap. D. Contact pump repair service.
9) "Rotten egg" smell (from hot water ONLY).	A. Magnesium rod in water heater.	A. Replace with aluminum rod or remove.
10) "Rotten egg" smell (from both hot and cold water).	A. Hydrogen sulfide ("sulfur") in water supply. B. Bacterial iron in water supply. C. Algae in water supply.	A. Install Sulfur Reduction System. B. Install Chem-Free Iron Reduction System. C. Pour approximately 1/2 cup laundry bleach into brine well just before regeneration as frequently as necessary.
11) Loss of resin through drain line.	A. Air in water system. B. Incorrect Drain Line Flow Control (DLFC).	A. Assure that well system has proper air eliminator control; check for dry well condition. B. Replace with correct DLFC.

SECTION 5: SPECIFICATION AND OPERATING DATA

ITEM	Timer Initiated			Meter Initiated		
	NWS100	NWS150	NWS200	NWS100M	NWS150M	NWS200M
Nominal Media Volume, cu. ft. (cu mtr)	1.0 (0.03)	1.5 (0.05)	2.0 (0.06)	1.0 (0.03)	1.5 (0.05)	2.0 (0.06)
Salt Dosage, lbs (kg):						
Factory Setting (1)	6.0 (2.7)	9.0 (4.1)	12.0 (5.4)	6.0 (2.7)	9.0 (4.1)	12.0 (5.4)
Maximum Setting	15.0 (6.8)	24.0 (11)	24.0 (11)	15.0 (6.8)	24.0 (11)	24.0 (11)
Nominal Softening Capacity, Grains (2)						
At factory salt setting	18,600	27,900	37,200	18,600	27,900	37,200
At maximum salt setting	30,000	45,000	54,000	30,000	45,000	54,000
Operating Flow Rates, gpm (lpm) (3)						
Continuous (no duration limit)	4.0 (15)	6.0 (23)	7.0 (27)	4.0 (15)	6.0 (23)	7.0 (27)
Service (10 minutes or less)	7.0 (27)	8.0 (30)	8.5 (32)	7.0 (27)	8.0 (30)	8.5 (32)
Pressure Loss @ Operating Flow Rates, psi (kPa)						
Continuous	6.0 (41)	8.0 (55)	9.0 (62)	6.0 (41)	8.0 (55)	9.0 (62)
Service	15.0 (103)	15.0 (103)	15.0 (103)	15.0 (103)	15.0 (103)	15.0 (103)
Regeneration Flow Rates, gpm (lpm)						
Backwash (4)	1.5 (5.7)	2.4 (9.1)	2.4 (9.1)	1.5 (5.7)	2.4 (9.1)	2.4 (9.1)
Brine/Rinse	0.33 (1.25)	0.33 (1.25)	0.33 (1.25)	0.33 (1.25)	0.33 (1.25)	0.33 (1.25)
Rapid Rinse	1.5 (5.7)	2.4 (9.1)	2.4 (9.1)	1.5 (5.7)	2.4 (9.1)	2.4 (9.1)
Brine Refill	0.5 (1.9)	0.5 (1.9)	0.5 (1.9)	0.5 (1.9)	0.5 (1.9)	0.5 (1.9)
Approx Water Used	64 (242)	90 (341)	91 (344)	64 (242)	90 (341)	91 (344)
Inlet/Outlet Pipe Size, Inches (cm)	1.0 (2.5)	1.0 (2.5)	1.0 (2.5)	1.0 (2.5)	1.0 (2.5)	1.0 (2.5)
Mineral Tank Depth & Height w/Control Valve, Inches (cm)	8x44 (20x112)	10x44 (25x112)	10x54 (25x137)	8x44 (20x112)	10x44 (25x112)	10x54 (25x137)
Overall Depth & Height w/ Control Valve, Inches (cm)	15x51 (38x130)	15x51 (38x130)	15x61 (38x155)	17x51 (43x130)	17x51 (43x130)	17x61 (43x155)
Brine Tank, W x D x H, Inches (cm)	15x15x34 (38x38x86)	15x15x34 (38x38x86)	15x15x34 (38x38x86)	15x15x34 (38x38x86)	15x15x34 (38x38x86)	15x15x34 (38x38x86)
Approx. Salt Storage, lbs. (kg)	160 (73)	160 (73)	160 (73)	160 (73)	160 (73)	160 (73)
Approximate Shipping Weight, lbs. (kg)	89 (40)	116 (53)	141 (64)	90 (41)	117 (53)	142 (64)

Maximum operating temperature 110°F (43.3°C); Electrical requirements 110V/60Hz (220V/50Hz); Operating pressure 20-100 psi. All types water softener salt may be used (See MAINTENANCE). Specifications subject to change without notice.

NOTES:

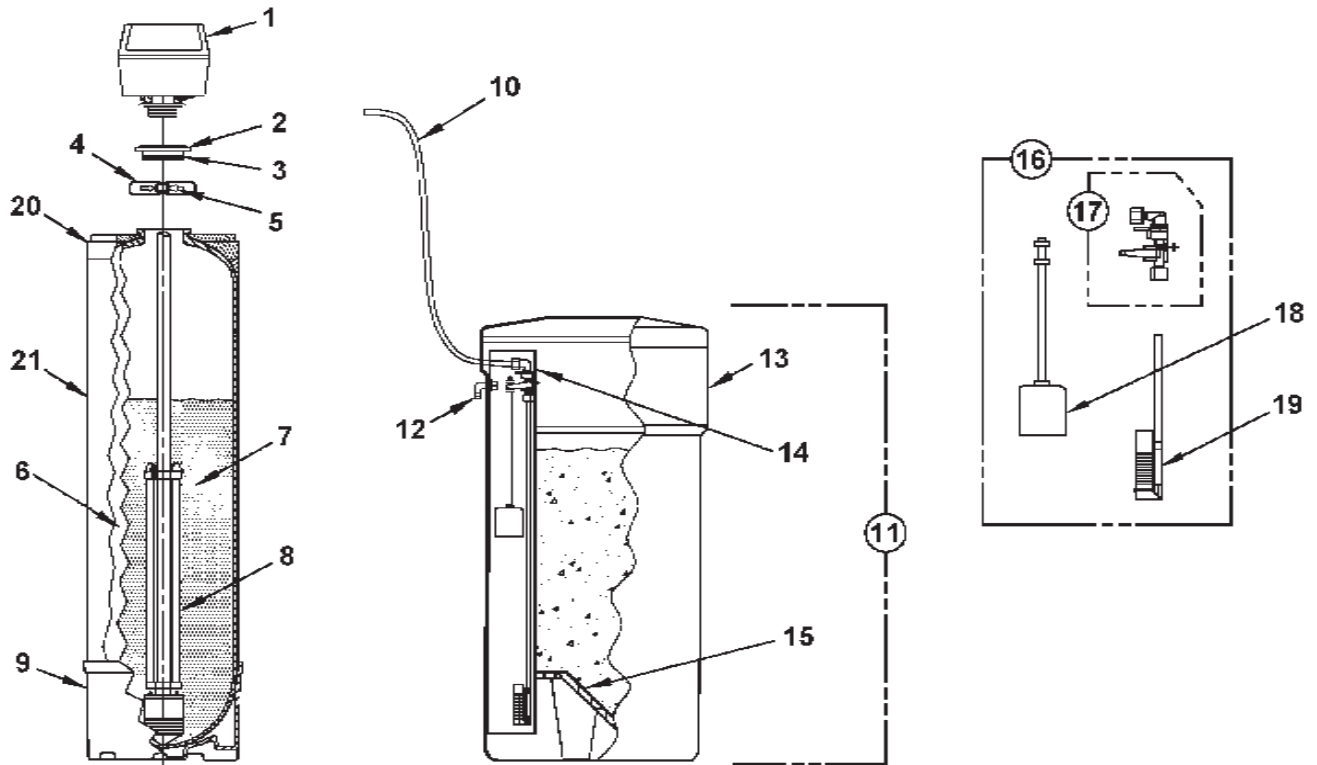
- 1) Meter Initiated Softeners: Dial settings based on this capacity. Consult dealer before changing salt dosage.
- 2) Actual capacity may vary substantially depending on water analysis and operating conditions. Softening capacities for systems containing 1.0 cubic feet and larger are based on Radium 226/228, Barium and Softening.
- 3) For satisfactory performance indicated flow rates and duration should not be exceeded. Flow rates specified are adequate for normal residential applications. Do not use Service Flow Rate when sizing commercial applications or if treated water is to supply a geothermal heat pump, swimming pool, etc. (contact dealer before selecting equipment).
- 4) For system to operate properly, pumping rate of well pump MUST be sufficient to backwash unit at rate specified.

SECTION 6: PARTS

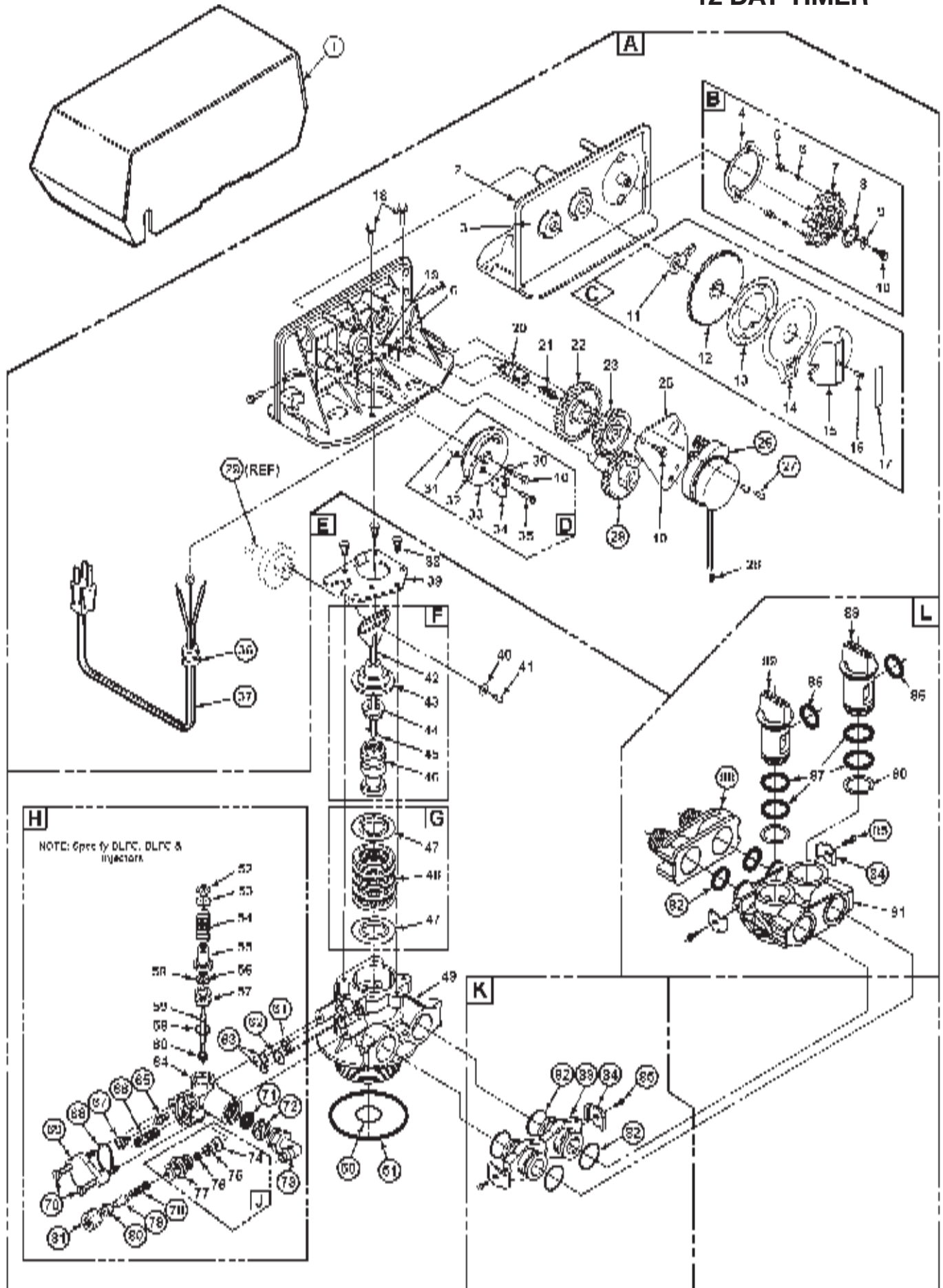
COMPONENTS PARTS LIST TWO TANK MODELS (NS & NSM SERIES)

REF NO.	DESCRIPTION	NWS100 NWS100M	NWS150 NWS150M	NWS200 NWS200M
1	Control Valve, Time Clock Initiation, with Cover, less Bypass Control Valve, Meter Initiation, with Cover, less Bypass	N100150-5W N12J150-5W	N100240-5W N12N240-5W	N100240-5W N12R240-5W
2	Adapter Assy., Flg-Thrd (Incl. Ref. 3)	FA45TX	FA45TX	FA45TX
3	O-Ring	ORG-234	ORG-234	ORG-234
4	Clamp Assy. (Incl. Ref. 5)	FC45XX	FC45XX	FC45XX
5	Latch, Clamp	FC45C	FC45C	FC45C
6	Media Tank w/Base (Incl. Ref. 9)	MTP0844FB	MTP1044FB	MTP1054FB
7	Media	H-10P	H-10P & H-050P	H-10P(x2)
8	Cyclone Assy.	C04N-44	C04N-44	C04N-54
9	Tank Base	T06-8P	T06-10P	T06-10P
10	Brine Line Tubing	13000X	13000X	13000X
11	Brine Tank, Complete Brine Tank, Complete w/Extension Kit	BT1534X --	BT1534X --	-- BT1534X-EXT
12	Overflow Fitting	BT16	BT16	BT16
13	Brine Tank Shell w/Cover	BT1534L	BT1534L	BT1534L
14	Brine Well w/Cap	BT15BW	BT15BW	BT15BW
15	Grid Plate Grid Plate w/Extension Kit	BT15GP --	BT15GP --	-- BT15GP-EXT
16	Safety Brine Valve, Complete	BT15SBVA	BT15SBVA	BT15SBVA
17	Safety Brine Valve	60014	60014	60014
18	Float Assembly	60068X	60068X	60068X
19	Air Check Assembly	60002	60002	60002
20	Media Tank Jacket Cap	T40BK-08	T40BK-10	T40BK-10
21	Media Tank Jacket	T40BL0844P	T40BL1044P	T40BL1054P

NOTE: When ordering components, always specify model number.



CONTROL VALVE -12 DAY TIMER



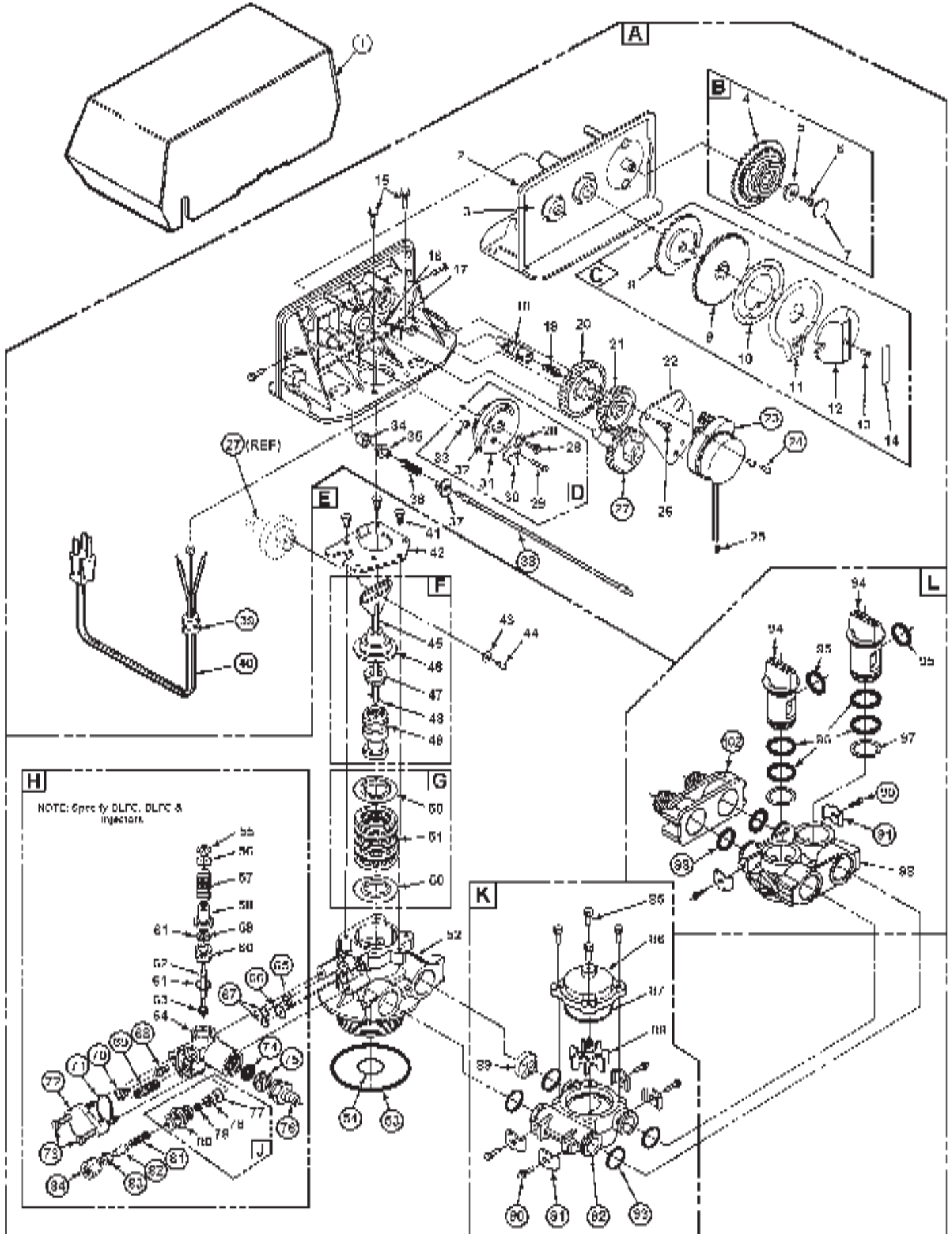
**ONLY THOSE PARTS CIRCLED IN DRAWING AND/OR LISTED BELOW ARE STOCK ITEMS
ALL OTHERS ARE SPECIAL ORDER, NON-RETURNABLE**

PARTS LIST - 12 DAY TIMER

REF	PART No.	DESCRIPTION
A	60353-13	Power Head Assy., Complete, L/Cover, NS/NLS Series (Incl. Ref. Items 2-37)
B	14381X	Skipper Wheel Assy. (Incl. Ref. Items 4-10)
C	13010X	24-Hour Gear Assy. (Incl. Ref. Items 11-17)
D	13168-36X	Brine Cam Assy. 6-36 lb. Salt (Incl. Ref. Items 10, 30 through 35)
E	14449-00X	Control Valve Body Assy. (Incl. Ref. Items 38-81)
F	60102-00	Piston Kit (Incl. Ref. Items 42-46)
G	60125	Seal Kit (Incl. Ref. Items 47 & 48)
H	60084-50X	Brine Valve Assy., 0.50 GPM (Incl. Ref. Items 52-81)
J	60022-50	Brine Line Flow Control Assy., 0.50 GPM, (Incl. Ref. Items 74-77)
K	10090X	Adapter Coupling Assy. (Incl. 2 ea. Ref. Items 83-85 & 4 ea. Item 82)
L	60049/18706X 60049/18706-02X	1" Bypass Valve Assy. 3/4" Bypass Valve Assy. (Optional)

1	22601X	Valve Cover, Specify Model
26	18743	Motor, 120v/60 Hz
27	11384	Motor Mtg. & Ground Screw
29	13170	Main Gear
36	13547	Strain Relief
37	11842	Power Cord, 110V 60Hz
50	13304	Distributor Tube O-Ring
51	12281	Tank O-Ring
61	13497	Air Dispenser
62	12638	Drain O-Ring
63	13301	Injector O-Ring
65	10914	Injector Throat - Specify Size
66	10227	Injector Screen
67	10913	Injector Nozzle - Specify Size
68	13303	Injector Cover O-Ring
69	13166	Injector Cover
70	13315	Injector Mounting Screw
71	12086 12088	Drain Line Flow Control Button: 1.5 GPM (1001 Two Tank) 2.4 GPM (1001 Space-Maker, 1501 & 2001 Two Tank)
72	13173	Drain Line Flow Control Retainer
73	12338	Drain Line Fitting
78	12767	Brine Line Screen
79	10332	Brine Line Tube Insert
80	10330	Brine Line Ferrule
81	10329	Brine Line Fitting Nut
82	13305	Adapter Coupling O-Ring
83	13709	Adapter Coupling
84	13255	Adapter Clip
85	13314	Adapter Coupling Screw
88	18706 18706-02	Adapter Yoke, 1" NPT Adapter Yoke, 3/4" NPT

CONTROL VALVE - METER INITIATED



**ONLY THOSE PARTS CIRCLED IN DRAWING AND/OR LISTED BELOW ARE STOCK ITEMS
ALL OTHERS ARE SPECIAL ORDER, NON-RETURNABLE**

PARTS LIST - METER TIMER

REF	PART No.	DESCRIPTION
A	60354-13	Power Head Assy., Complete, L/Cover, NWS Series (Incl. Ref. Items 2-40)
B	14039X	Program Wheel Assy. (Incl. Ref. Items 4-7, Specify "K" Label or Model)
C	13010X	24-Hour Gear Assy. (Incl. Ref. Items 8-14)
D	13168-36X	Brine Cam Assy. 6-36 lb. Salt (Incl. Ref. Items 26, 28-33)
E	14449-00X	Control Valve Body Assy. (Incl. Ref. Items 41-84)
F	60102-00	Piston Kit (Incl. Ref. Items 45-49)
G	60125	Seal Kit (Incl. Ref. Items 50 & 51)
H	60084-50X	Brine Valve Assy., 0.50 GPM (Incl. Ref. Items 55-84)
J	60022-50	Brine Line Flow Control Assy., 0.50 GPM, (Incl. Ref. Items 77-80)
K	60086	Meter Assy. (Incl. Ref. Items 85-93)
L	60049/18706X 60049/18706-02X	1" Bypass Valve Assy. 3/4" Bypass Valve Assy. (Optional)

1	22601X	Valve Cover, Specify Model
23	18743	Motor, 120v/60 Hz
24	11384	Motor Mtg. & Ground Screw
27	13170	Main Gear
38	14043	Flexible Cable
39	13547	Strain Relief
40	11842	Power Cord, 110V/60Hz
53	13304	Distributor Tube O-Ring
54	12281	Tank O-Ring
65	13497	Air Disperser
66	12638	Drain O-Ring
67	13301	Injector O-Ring
68	10914	Injector Throat - Specify Size
69	10227	Injector Screen
70	10913	Injector Nozzle - Specify Size
71	13303	Injector Cover O-Ring
72	13166	Injector Cover
73	13315	Injector Mounting Screw
74	12086 12088	Drain Line Flow Control Button: 1.5 GPM (0751 Space-Maker, 1001 Two Tank) 2.4 GPM (1001 Space-Maker, 1501 & 2001 Two Tank)
75	13173	Drain Line Flow Control Retainer
76	13308	Drain Line Fitting
81	12767	Brine Line Screen
82	10332	Brine Line Tube Insert
83	10330	Brine Line Ferrule
84	10329	Brine Line Fitting Nut
90	13314	Adapter Coupling screw
91	13255	Adapter Clip
92	13821	Meter Body
93	13305	Meter Body O-ring
102	18706 18706-02	Adapter Yoke, 1" NPT Adapter Yoke, 3/4" NPT

SECTION 7: MAINTENANCE

REPLENISHMENT OF SALT SUPPLY:

The salt storage capacity of the brine tank is approximately 160 lbs. During each regeneration a specific amount of salt is consumed, thus requiring its periodic replenishment (the frequency is dependent on the regeneration schedule). Always replenish salt before the supply is exhausted to assure a continuous supply of softened water.

TYPE OF SALT TO USE:

Any type of water softener salt may be used. There are advantages and disadvantages to every type of salt. Please ask your local dealer for his advice. Your unit is designed to compensate for the disadvantages.

BRINE TANK CLEAN-OUT:

To prevent service problems the brine tank should be emptied and flushed out with a garden hose when dirt and other insolubles accumulate. The clean-out frequency depends on the type salt used and regeneration frequency. The clean-out should be done when the salt level is low. Steps to follow:

- 1) Disconnect brine line at either end.
- 2) Turn brine tank upside down and discard old salt.
- 3) Rinse out with a garden hose.
- 4) Reconnect brine line.
- 5) Add about 3 gals. of water (6 gals. for units with extended grid legs) to brine tank before adding new salt. Perform approximately once a year if rock salt is used; with other types of salt, approximately once every other year.

PREVENTING IRON-FOULING OF MINERAL BED:

If iron is present in the water supply, the softener mineral bed will eventually become iron-fouled, resulting in reduced softening capacity and rust-stained fixtures. Mixing one to two ounces of IRON-X Mineral Cleaner with every 80 lbs. of salt added to brine tank will minimize these problems from occurring. IRON-X™ is available from your dealer.

PERIODICALLY CHECK TIME OF DAY SETTING:

Power outages will cause TIME OF DAY timer setting to become incorrect. To reset, refer to appropriate HOW TO SET TIME CLOCK (or METER) REGENERATION CONTROL, Section 3.

MALFUNCTION OF UNIT:

Your water softener, under normal conditions, should provide years of trouble-free service; however, since it is a mechanical device, it can malfunction. (Refer to Section 4, SERVICE INSTRUCTIONS, if necessary).

CHANGE OF OPERATING CONDITIONS:

Should your family size, your water usage habits, or your water quality change, the regeneration program settings may have to be adjusted. Consult your dealer if any of the above occur.

SECTION 8: LIMITED WARRANTY

For any warranty questions, please refer to the enclosed warranty card or call 1-800-222-7880 or mail your request to:

3M Purification Inc.
400 Research Parkway
Meriden, CT 06450



3M Purification Inc.
400 Research Parkway
Meriden, CT 06450
1-800-222-7880
www.3Mpurification.com

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