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).

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.
• 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:

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<th>Parameter</th>
<th>Value</th>
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<td>Hardness</td>
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<td>Iron (Fe)</td>
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<td>Tannins (Humic Acid)</td>
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<td>Hydrogen Sulfide (H₂S)</td>
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<td>Other</td>
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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.

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<th>CAUTION</th>
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<tr>
<td>To reduce the risk associated with property damage due to plugged water lines:</td>
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<td>• 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.</td>
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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.

<table>
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<th>WARNING</th>
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<td>To reduce the risk associated with a hazardous voltage:</td>
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<td>• 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.</td>
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5) Sweep the floor to eliminate objects that could pierce the brine tank.

<table>
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<th>IMPORTANT NOTE</th>
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<td>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.</td>
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SECTION 2: INSTALLATION

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

**Step 1**

(a) 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.

(b) 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).

**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 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.
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 4. Softener and Brine Tank Assembly, Top View

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

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### Model(s) 200

#### HARDNESS — gpg

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</tbody>
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### 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.

---

3-2
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

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

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

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)

<table>
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<th>REF NO.</th>
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<th>NWS150</th>
<th>NWS200</th>
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<td>NWS100M</td>
<td>NWS150M</td>
<td>NWS200M</td>
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<td>1</td>
<td>Control Valve, Time Clock Initiation, with Cover, less Bypass Control Valve, Meter Initiation, with Cover, less Bypass</td>
<td>N100150-5W</td>
<td>N100240-5W</td>
<td>N100240-5W</td>
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<td>N12J150-5W</td>
<td>N12N240-5W</td>
<td>N12R240-5W</td>
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<td>Adapter Assy., Flg-Thrd (Incl. Ref. 3)</td>
<td>FA45TX</td>
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<td>O-Ring</td>
<td>ORG-234</td>
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<td>Clamp Assy. (Incl. Ref. 5)</td>
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<td>Latch, Clamp</td>
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<td>Media Tank w/Base (Incl. Ref. 9)</td>
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<td>MTP1044FB</td>
<td>MTP1054FB</td>
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<td>H-10P &amp; H-050P</td>
<td>H-10P(x2)</td>
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<td>Cyclone Assy.</td>
<td>CO4N-44</td>
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<td>CO4N-54</td>
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<td>Tank Base</td>
<td>T06-8P</td>
<td>T06-10P</td>
<td>T06-10P</td>
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<td>Brine Line Tubing</td>
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<td>Brine Tank, Complete</td>
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<td>BT1534X</td>
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<td>Brine Tank, Complete w/Extension Kit</td>
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<td>BT1534X-EXT</td>
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<td>Overflow Fitting</td>
<td>BT16</td>
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<td>Brine Tank Shell w/Cover</td>
<td>BT1534L</td>
<td>BT1534L</td>
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<td>14</td>
<td>Brine Well w/Cap</td>
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<td>15</td>
<td>Grid Plate</td>
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<td>Grid Plate w/Extension Kit</td>
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<td>BT15GP-EXT</td>
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<td>16</td>
<td>Safety Brine Valve, Complete</td>
<td>BT15SBVA</td>
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<td>Safety Brine Valve</td>
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<td>18</td>
<td>Float Assembly</td>
<td>60068X</td>
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<td>19</td>
<td>Air Check Assembly</td>
<td>60002</td>
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<td>20</td>
<td>Media Tank Jacket Cap</td>
<td>T40BK-08</td>
<td>T40BK-10</td>
<td>T40BK-10</td>
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<td>21</td>
<td>Media Tank Jacket</td>
<td>T40BL0844P</td>
<td>T40BL1044P</td>
<td>T40BL1054P</td>
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**NOTE:** When ordering components, always specify model number.
### PARTS LIST - 12 DAY TIMER

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

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 Disperser
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   Drain Line Flow Control Button:
            1.5 GPM (1001 Two Tank)
            2.4 GPM (1001 Space-Maker, 1501 & 2001 Two Tank)
71 12088   Drain Line Flow Control Button:
37 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   Adapter Yoke, 1” NPT
88 18706-02 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**

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

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 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 Adapter Yoke, 1” NPT
     18706-02 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