Aqua-Pure®

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 1111

3M

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 go to www.3M.com , select country, and use the search engine to search MSDS. 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 125 psi (689 kPa). 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.

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- **Professional Installation Required:** Installation requires shutting water off to home, cutting home water supply pipe and connecting piping and fittings. Specialized tools and skills are 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 water softener will provide years of dependable service. Before starting the installation, please read this entire manual for an overview, and then follow the installation instructions. **Failure to follow the instructions will void the warranty.**

Inspecting And Handling Your Water Softener:

Inspect shipping carton and 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 or on its side to help prevent media from entering valve and being discharged downstream.

Make Sure Your Water Has Been Thoroughly Tested:

An analysis of your water should be made prior to the selection of your water softener. You can typically get this service through your place of purchase, which may require sending 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_2S) _____	ppm
Manganese (Mn) _____	ppm	Other _____	ppm
pH _____	ppm	Other _____	ppm

IMPORTANT NOTES
The test for Hydrogen sulfide (H_2S) must be completed at the well site. For accuracy, the sample must be drawn with the pump RUNNING, and the test be completed within ONE (1) minute after the sample is drawn.
Water softeners are designed to reduce hardness but can handle reasonable amounts of soluble iron if consideration is given to iron content when selecting model and regeneration settings. To treat sulfur (hydrogen sulfide), bacterial iron, precipitated iron or very high levels of soluble iron special equipment in addition to a water softener is required. For best results, the Aqua-Pure® APPM or APIF Series Systems are 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).

CAUTION

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

- **Do not** install if water pressure exceeds 125 psi (689 kPa). 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 80 psi or more, nighttime pressure may exceed 125 psi (689 kPa). 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 is required to take appropriate measures if there is the possibility a vacuum condition 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 5)**

IMPORTANT NOTE

If sediment is present, the installation of a sediment pre-filter is recommended. Even if sediment is not currently present or at a level high enough to be objectionable, a pre-filter can help increase the efficiency of the softener and help reduce the amount of maintenance required.

Installation Site Selection:

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 water softener in the supply line BEFORE the water heater. Temperatures above 110°F (43°C) will damage the water softener and void the factory warranty.
5) DO NOT install the water 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 40°F (4°C).
- **Do not** install on hot water supply lines. The maximum operating water temperature of this water softener is 110°F (43°C).
- **Do not** install in direct sunlight or outdoors.

Facts to Remember While Planning Your Installation:

1) All installation procedures MUST conform to local and state plumbing codes.

2) If lawn sprinklers, 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 your Dealer/Installer or our Customer Service Department at 1-800-222-7880 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. delivers water from the well pump or after the water meter) 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 beginning the installation review 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 water softener installation piping — refer installation to qualified personnel.

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

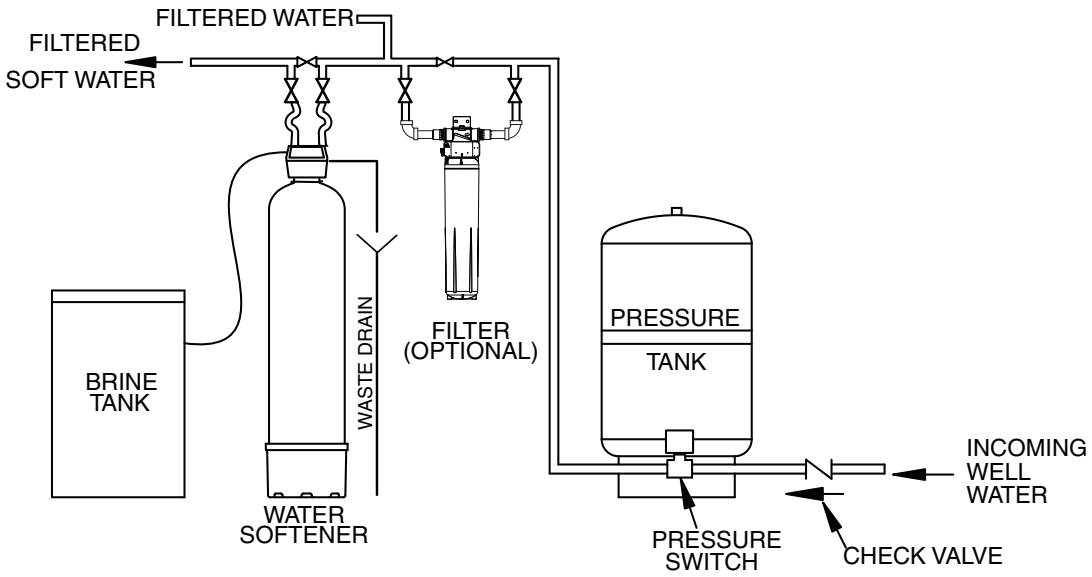
IMPORTANT NOTE

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. Failure to follow installation, operation, and maintenance instructions may result in property damage due to leakage and will void warranty.

Typical Private Well Installation



Public Water Supply Installation

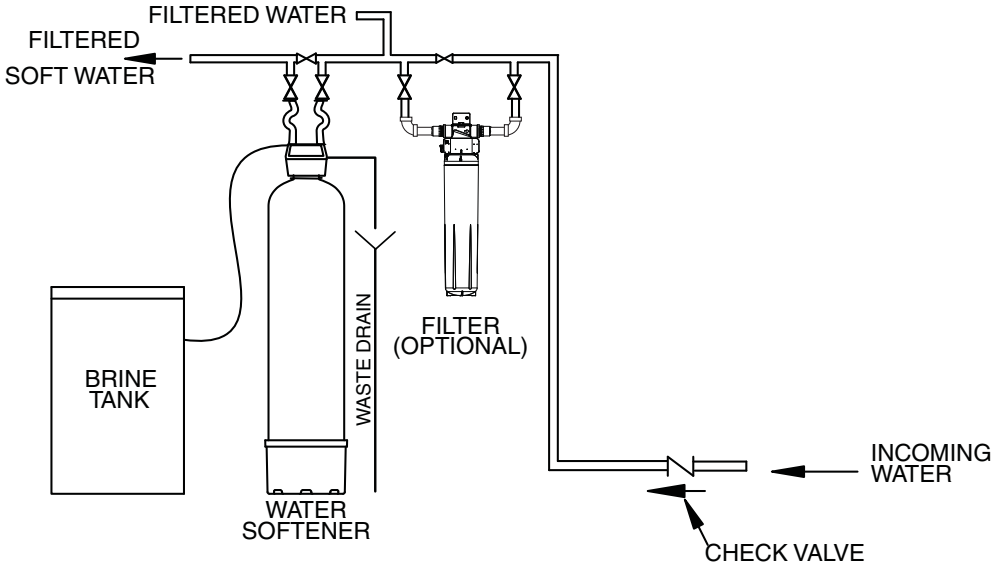


Figure 1

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.

SECTION 2: INSTALLATION

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

(a) Remove unit from shipping box, inspect for damage and ensure all parts needed for installation are present. If parts are missing please contact our customer service department for help @ 1-800-222-7880. Remove the packing from unit and discard according to local, state and federal regulations.

b) Attach bypass valve (Figure 2) using adapter couplings, clips and screws to control valve (Figure 3). On meter initiated models, attach meter between bypass valve and control valve (Figure 3). Ensure the bypass valve is placed into the bypass position as shown in Figure 2 until instructed to place into the service position.

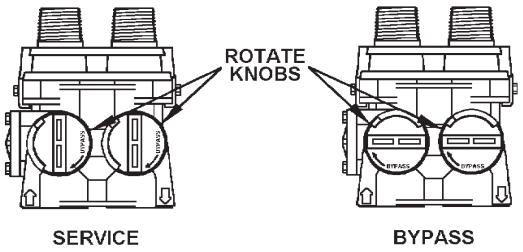


Figure 2. BYPASS VALVE

Step 2

Shut off all water at main supply valve. On a private well system, turn off power to the pump and drain the pressure tank. Make certain pressure is relieved from the complete system by opening the faucet closest to the 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).**

CAUTION

To reduce the risk associated with property damage due to water leakage:
- **Do not** apply heat to any fitting connected to bypass or control valve as damage may result to internal parts or connecting adapters.

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 4

Attach drain line to drain line fitting. To prevent back pressure from reducing flow rate below minimum required for backwash, the 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” ID up to 15 ft. when discharge is lower than inlet.

2) 5/8” ID up to 15 ft. when discharge is slightly higher than the inlet.

3) 3/4” ID when drain is 25 ft. away and/or drain is installed overhead.

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

Step 5

Position the drain line over the drain and secure firmly. To prevent back-siphoning of sewer water, provide an air-gap of at least 2” or 2 pipe diameters between end of drain hose and drain (Figure 4). DO NOT raise drain line more than 10 ft. above floor.

Step 6

Connect one end of the 3/8" poly line to brine valve located on the 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.)

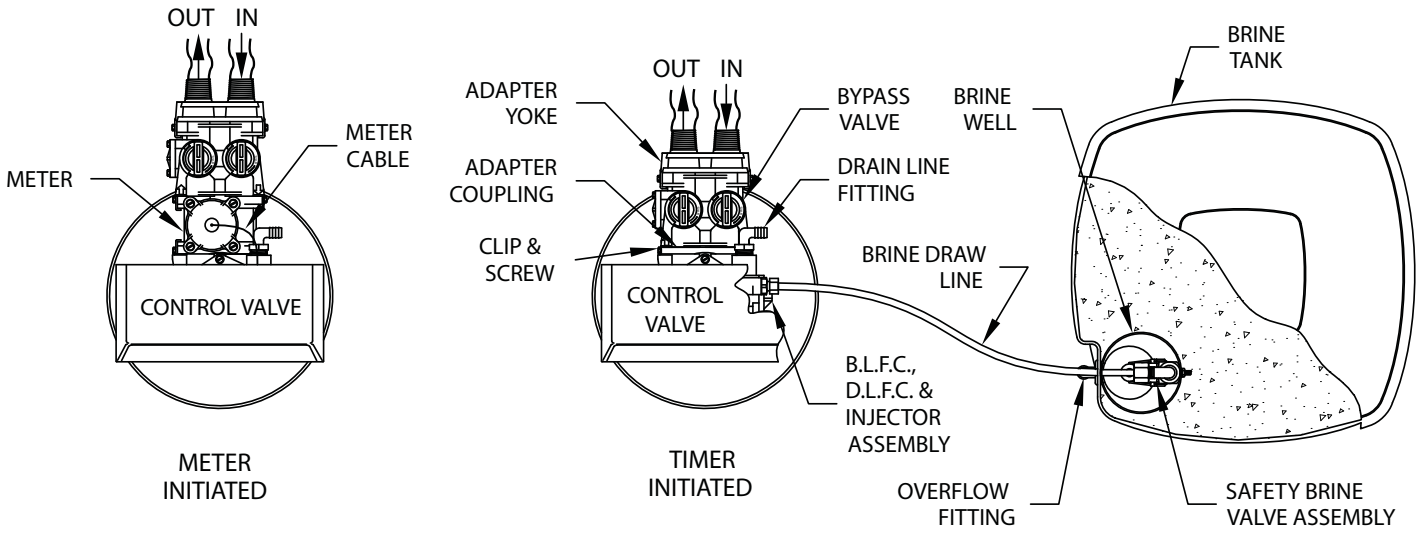


Figure 3. Water Softener and Brine Tank Assembly, Top View

Step 7

Install overflow line to brine tank overflow fitting (Figure 3). Discharge of line must be lower than overflow fitting. Do not interconnect overflow line with valve drain line (Step 6).

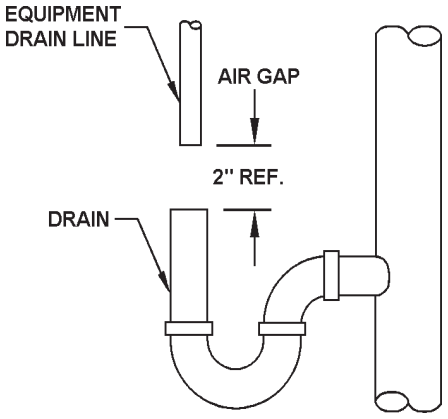


Figure 4. TYPICAL DRAIN

Step 8

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 9

Open main shut off valve to water system or turn on the well pump if on private water well and allow the water line to pressurize to check for leaks, correct if necessary.

Step 10

Set time of day (refer to either Time Clock or Meter instructions on how to set backwashing control in 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

Manually stage the water softener into a backwash cycle by grasping the black bar on the timer assembly and turning the dial until the word "BACKWASH" appears in the window. Next, slowly open the inlet valve on the bypass valve and allow the water softener to pressurize to line water pressure and ensure the unit has no water leaks. This will prevent any air entrapment in the top of the water softener. Once water is flowing steady to drain and without color and air manually stage the water softener into the service position.

Step 12

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 unscented laundry bleach.

Step 13

Put water softener through a complete regeneration - to sanitize the system before use (rrefer to either Time Clock or Meter instructions in Section 3 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) and by adding 4.5 times the manganese content in parts per million (ppm) to the hardness in grains per gallon (gpg). The resulting number is adjusted hardness. The maximum amount of clear water iron is 3.0 parts per million (ppm) and manganese is 2.0 parts per million (ppm).

   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 of persons 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 NWS 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

	HARDNESS — gpg											
Persons In Family	**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				

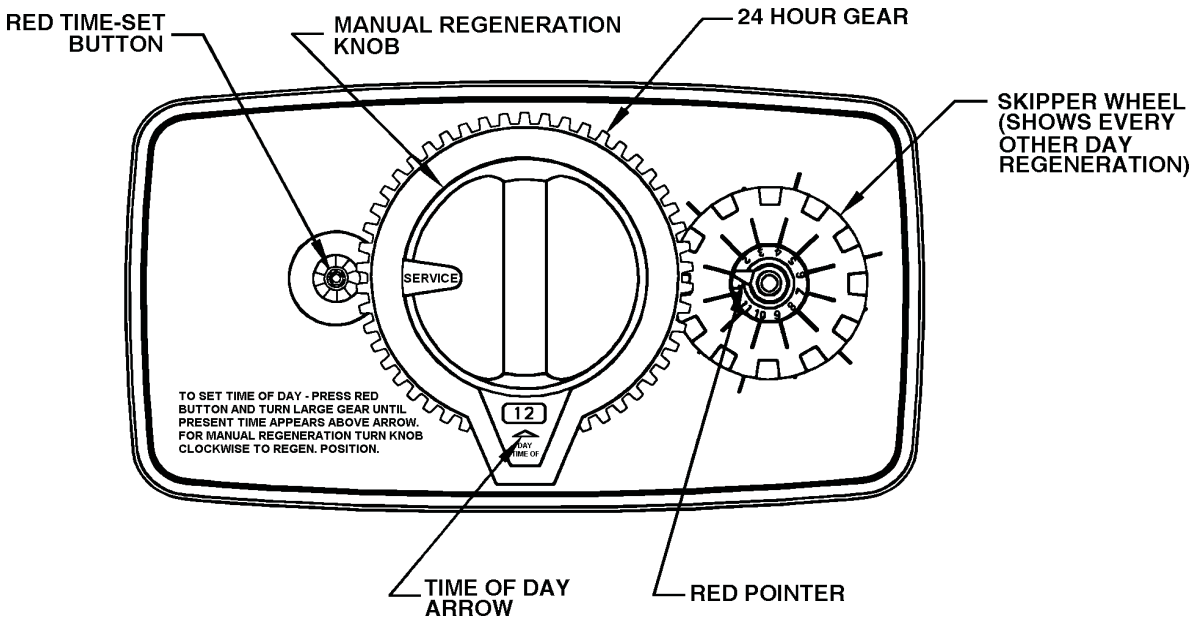
Model(s) 150

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

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

HOW TO SET TIME CLOCK REGENERATION CONTROL:



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.

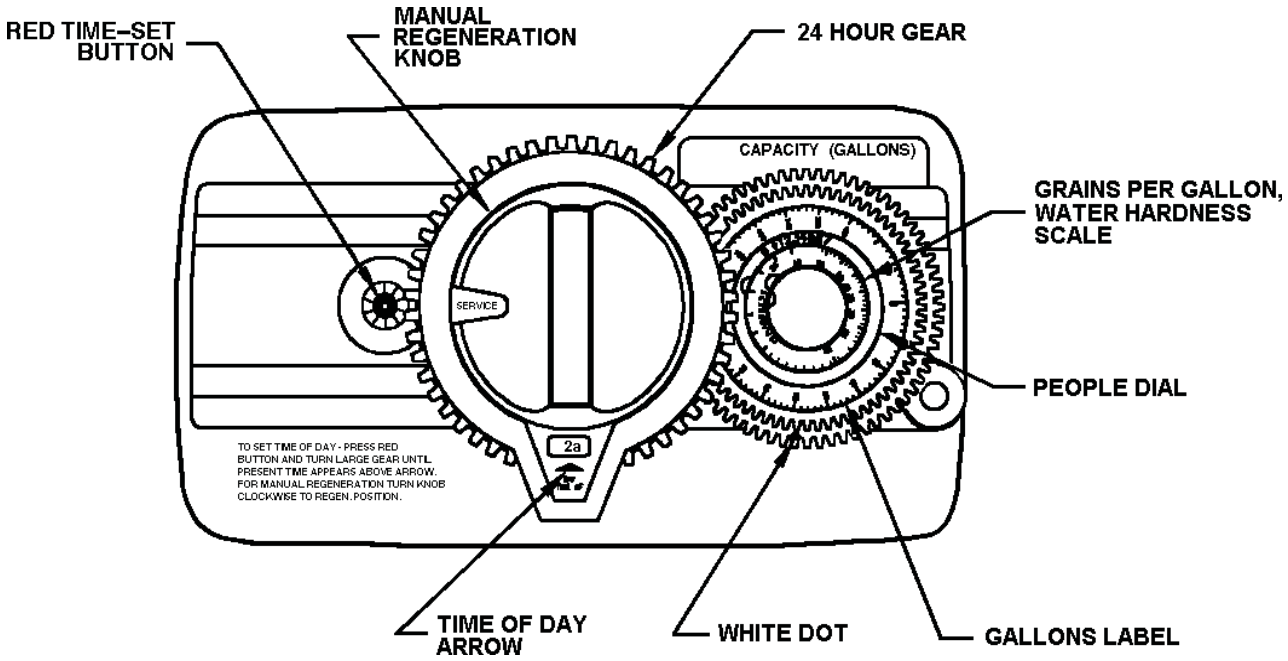
Turn the manual regeneration knob clockwise.

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).

Conditioned water may be drawn after rinse water stops flowing from the water softener drain line.

HOW TO SET METER REGENERATION 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.

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) plus 4.5 times the manganese in parts per million (ppm). Unlike the time clock version we recommend a maximum of 1 ppm of Iron and 1 ppm of Manganese on meter initiated models. Suggest this sentence be placed in bold text.

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.	A. Assure permanent electrical service (check fuse, plug, pull chain or switch.)
	B. Timer not working.	B. Replace timer motor.
	C. Timer improperly set.	C. Increase frequency of regeneration and/or salt setting.
	D. Safety brine valve not opening.	D. Replace safety brine valve.
	E. Salt “bridged” in brine tank.	E. Breakup salt.
2) Hard water, (unit using salt; liquid level in brine tank **NOT** too high).	A. Bypass open.	A. Close bypass (replace if necessary).
	B. Timer improperly set.	B. Increase frequency of regeneration, or reset timer if needed.
	C. No salt in brine tank.	C. Add salt; maintain above water level.
	D. Excessive water usage.	D. Increase frequency of regeneration and/or salt setting (See Section 3).
	E. Unit installed backwards.	E. Reinstall unit.
	F. Unit undersized	F. Replace with larger unit.
3) Liquid level in brine tank TOO high.	A. Brine valve not closing.	A. Replace brine valve.
	B. Salt setting too high.	B. Reset timer.
	C. Injector screen plugged.	C. Clean injector and screen.
	D. Drain line frozen, plugged or restricted.	D. Free drain.
	E. Salt "mushed" or sand from salt plugging bottom of brine tank.	E. Clean out brine tank (See Instructions, Section 7).
	F. Incorrect brine line flow control (BLFC).	F. Replace with correct flow control (See Specifications).
4) System regenerates at wrong time-of-day.	A. Power outage occurred.	A. Reset timer.
	B. Intermittent power.	B. Locate and correct power supply, ensure it is not tied into a switched circuit.
5) Water continuously flows to drain.	A. Foreign material in control valve.	Remove piston assembly and inspect bore; remove foreign material and check control in various regeneration positions.
	B. Internal control leak.	Replace seals and/or piston assembly.
	C. Control valve jammed in brine or backwash position.	Replace piston, seals and spacers.
6) Water tastes salty.	A. Salt setting too high.	A. Reset program cycle.
	B. Cyclone (distributor) tube too short.	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 de ization.
8) Low water pressure (low flow rate).	A. Iron build-up in line to water conditioner.	A. Clean line to water conditioner.
	B. Iron build-up in water conditioner.	B. Clean control and add Iron reduction media to resin bed; increase frequency of regeneration.
	C. Well pumping sand.	C. Install sand trap.
	D. Pump losing capacity.	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.	A. Install Sulfur Reduction System.
	B. Bacterial iron in water supply.	B. Install Chem-Free Iron Reduction System.
	C. Algae in water supply.	C. Pour approximately one cup unscented laundry bleach into brine well just before regeneration as frequently as necessary.
11) Loss of resin through drain line.	A. Air in water system.	A. Assure that well system has proper air eliminator control; check for dry well condition.
	B. Incorrect Drain Line Flow Control (DLFC).	B. Replace with correct DLFC.

SECTION 5: SPECIFICATION AND OPERATING DATA

	Time Clock Initiated			Meter Initiated		
ITEM	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)						
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 @ Service Flow Rate, psi (kPa)	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	65 (246)	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)
Media 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)	100 (45.4)	125 (56.7)	160 (72.6)	101 (45.8)	126 (57.1)	161 (73)

Maximum operating temperature 110°F (43.3°C); Electrical requirements 110V/60Hz (220V/50Hz); Operating pressure 20-125 psi. Most types of water softener salt may be used (See Maintenance). 3M Purification Inc. does not allow the use of block type water softener salt. Specifications subject to change without notice.

NOTES:

1) Meter Initiated Water 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.

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).

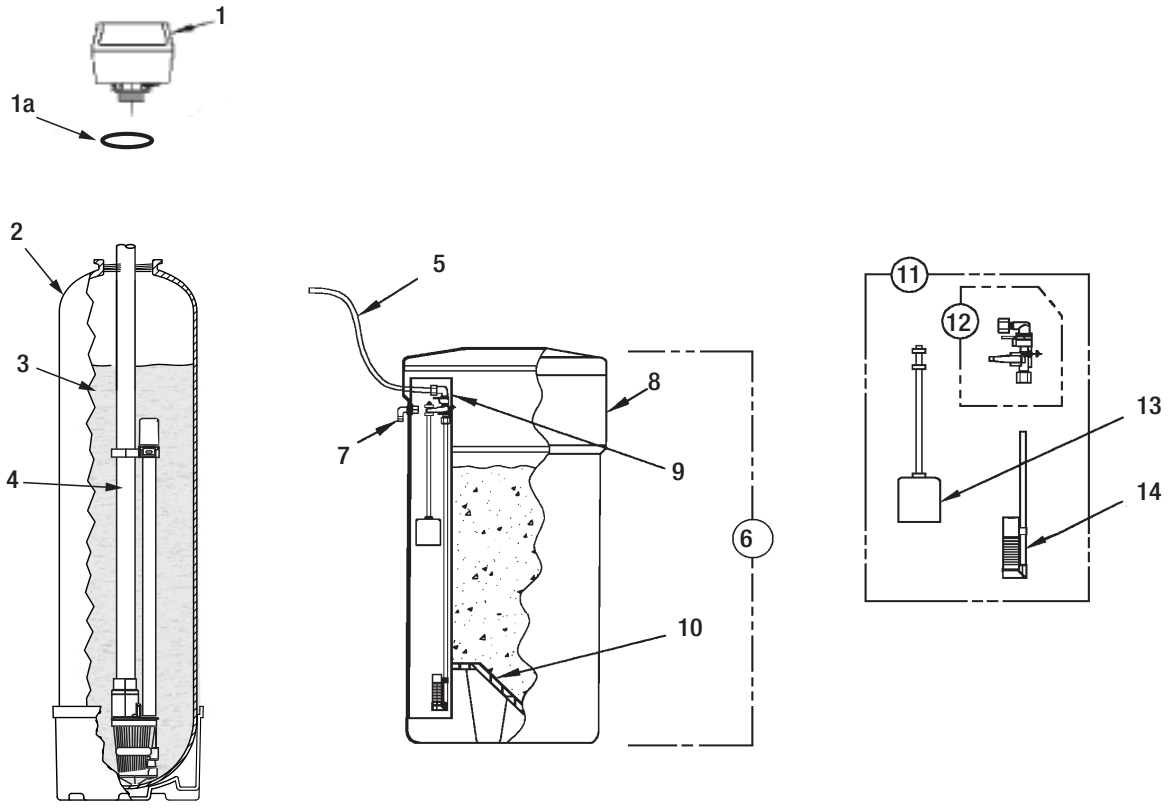
4) For system to operate properly, pumping rate of well pump MUST be sufficient to backwash unit at rate specified.

SECTION 6: PARTS

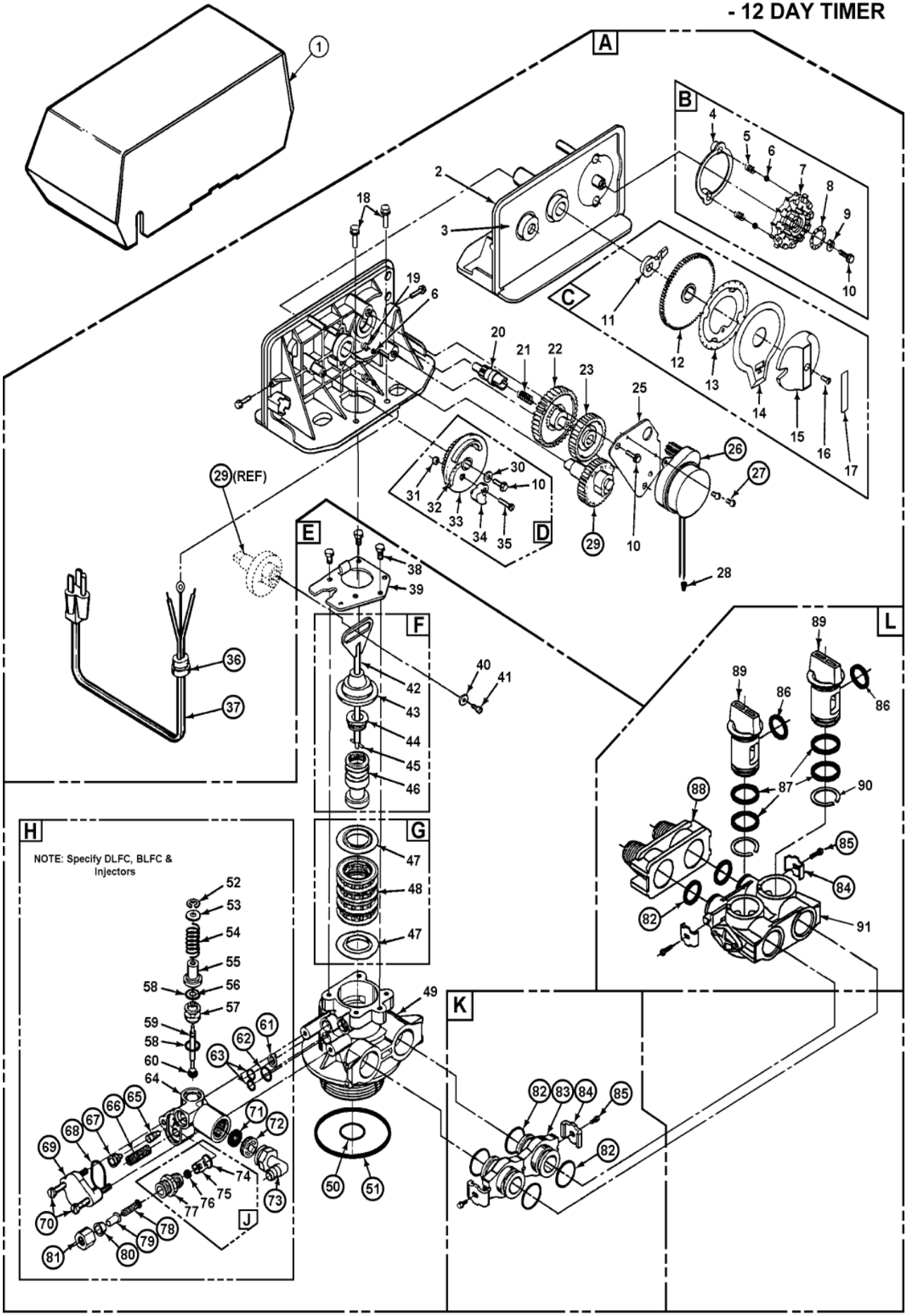
NWS/NWS-M SERIES COMPONENTS PARTS LIST TWO TANK MODELS

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
1a	O-Ring	12281	12281	12281
2	Media Tank w/Base (Incl. Ref. 9)	6236001-0844	6236001-1044	6236001-1054
3	Media	H-050P (2)	H-050P (3)	H-050P (4)
4	Turbulator	6236232	6236232	6236233
5	Brine Line Tubing	13000X	13000X	13000X
6	Brine Tank, Complete Brine Tank, Complete w/Extension Kit	BT1534X --	BT1534X --	-- BT1534X
7	Overflow Fitting	BT16	BT16	BT16
8	Brine Tank Shell w/Cover	BT1534L	BT1534L	BT1534X
9	Brine Well w/Cap	BT15BW	BT15BW	BT15BW
10	Grid Plate Grid Plate w/Extension Kit	BT15GP --	BT15GP --	-- BT1534X-EXT
11	Safety Brine Valve, Complete	BT15SBVA	BT15SBVA	BT15SBVA
12	Safety Brine Valve	60014	60014	60014
13	Float Assembly	60068X	60068X	60068X
14	Air Check Assembly	60002	60002	60002

NOTE: When ordering components, always specify model number.



CONTROL VALVE
- 12 DAY TIMER



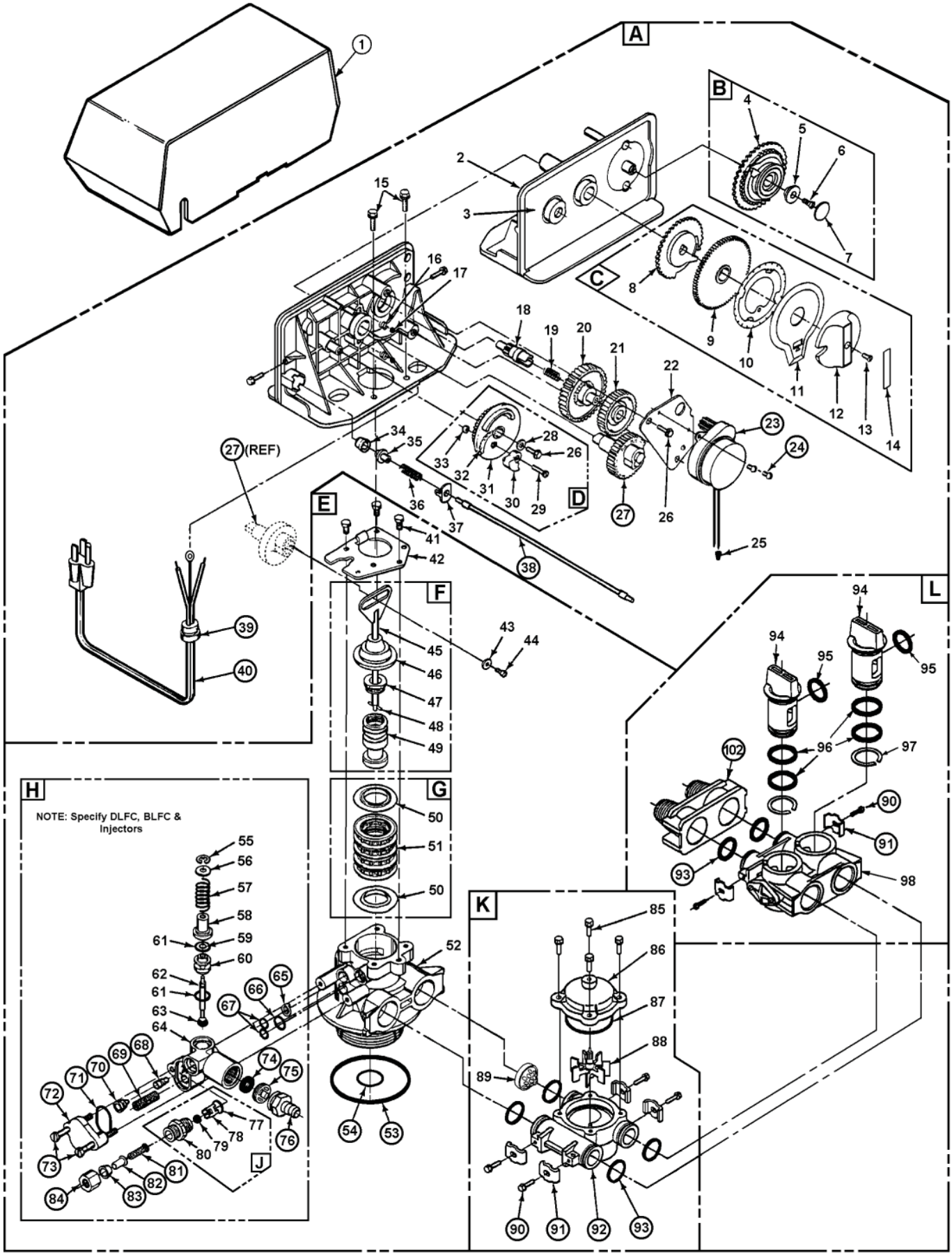
ONLY THOSE PARTS CIRCLED IN DRAWING AND/OR LISTED BELOW ARE STOCK ITEMS
ALL OTHERS ARE SPECIAL ORDER, NON-RETURNABLE

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)
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
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
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: Models 100 and 100M Model 150, 150M, 200 and 200M
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
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)
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
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
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: Model 100 and 100M Model 150, 150M,200 and 200M
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:

Most types 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. 3M Purification does not allow the use of block type salt with water softeners.

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 of salt used and regeneration frequency. The clean-out should be done when the salt level is low. Steps to follow:

1) Disconnect brine draw line at either end.
2) Turn brine tank upside down and discard old salt.
3) Remove the salt grid platform and rinse out with a garden hose.
4) Reinstall salt grid platform and 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 MEDIA BED:

If iron is present in the water supply, the water softener media bed will eventually become iron-fouled, resulting in reduced softening capacity and rust-stained fixtures. Mixing one to two ounces of Iron reduction media with every 80 lbs. of salt added to brine tank will minimize these problems from occurring. Iron reduction media 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 refer to appropriate instructions on how to set back-washing control in 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

Limited Warranty: 3M Purification Inc. warrants this Product to be free from defects in material and workmanship during normal use for the warranty period set forth below. The warranty period commences from the date of purchase. This warranty does not cover failures resulting from abuse, misuse, alteration or damage not caused by 3M Purification Inc. or failure to follow installaation and use instructions. No warranty is given as to the service life of any filter cartridge, membrane, or media as it will vary with local water conditions and water consumption.

3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOMER OR USAGE OF TRADE.

If the Product is found defective within the warranty period, your exclusive remedy and 3M Purification Inc.'s sole obligation shall be, at 3M Purification Inc.'s option, to replace or repair the Product or refund the purchase price of the Product. This warranty does not cover labor. The remedy stated in this paragraph is Customer's sole remedy and 3M Purification Inc.'s exclusive obligation.

Warranty Period:
- One (1) year on the entire product unit
- Five (5) years on the media tank only (does not include internal component parts)
- Five (5) years on the control valve
- Five (5) years on salt storage container and components*

Limitation of Liability: 3M Purification Inc. will not be liable for any loss or damage arising from this 3M Purification Inc. product, whether direct, indirect, special, incidental, or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability. Some states and countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Warranty Claims:
To obtain warranty service, call 1-800-222-7880 or mail your request to: 3M Purification Inc., 400 Research Parkway, Meriden, CT 06450. Proof of purchase (original sales receipt) must accompany the warranty claim, along with a complete description of the Product, model number and alleged defect. **This warranty gives you specific legal rights, and you may have other rights which may vary from state to state, or country to country.**

* Water Softeners only

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