



Water Softening Systems



MODEL NUMBERS:

2P75MCONT 2P100MCONT
2P150MCONT 2P200MCONT
2P250MCONT

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Pre-installation Instructions

Description of the water softener system

This water softener system includes a brine (salt) tank and a resin (media) tank with a backwashing control valve. Incoming water flows into the control valve and is directed down through the ion exchange softening resin. This resin exchanges the hardness ions for softer ions. The softened water then returns to the control valve where it is directed into the service lines.

Periodically the control valve will go through a regeneration cycle. The frequency of this regeneration process will depend on the size of water softener, incoming water quality and amount of water used. This cycle is factory preset to begin at 2:00 A.M. At this time the control valve will draw the brine solution out of the salt tank and flush both the accumulated hardness and excess salt to the drain. The control valve will then put fresh water back into the salt tank to make brine for the next regeneration cycle.

Water Quality

The water should be tested to determine the concentration, or levels of the items listed below:

Hardness - Hardness in drinking water is defined as those minerals that dissolve in water having a positive electrical charge (cations). The primary components of hardness are calcium (Ca⁺⁺) and magnesium (Mg⁺⁺) ions. But dissolved iron (Fe⁺⁺) and manganese (Mn⁺⁺) also contribute to total "adjusted" hardness. Hardness produces scale, soap scum and white mineral deposits which shorten the life of water using appliances, plumbing and fixtures. Water that has less than 1 grain of hardness is considered to be "soft" water.

pH - A measurement of the acidity of the water. pH is reported on a scale from 0 to 14. Neutral water has a pH of 7.0, lower values indicate acidic water. If your pH is below 6.8 you may consider installing an acid neutralizer before the water softener to elevate the pH.

Iron - A naturally occurring metallic element. Iron levels in excess of 0.3 milligrams/liter (mg/l) combine with oxygen causing orange or red (rust) stains on plumbing fixtures. Iron exists in some water sources in clear water (ferrous) state, red water (ferric) state or bacterial form. Iron levels that exceed 2.0 mg/l require special ion exchange resin for reduction, or if bacterial or ferric (red water) iron is present or iron level exceeds 4.0 mg/l, an iron filter should be installed ahead of this water softener.

Manganese - A naturally occurring metallic element. Manganese levels as low as 0.05 milligrams/liter (mg/l) can combine with oxygen to cause dark brown or black staining on fixtures. Additionally, manganese can cause an odor in the water similar to a "rotten egg" smell. This water softener may reduce manganese as well as iron; however, an iron filter may be required in some cases.

Tannin - A naturally occurring humic acid. Tannin is caused by water passing through decaying vegetation. Coffee and Tea are prime examples of tannin in water. Tannin levels as low as 0.5 milligrams per liter can cause a yellow discoloration in water. Consult your dealer for a system designed to remove both tannin and hardness.

Hydrogen Sulfide - A naturally occurring gas. Hydrogen sulfide, more commonly referred to as sulfur gas, causes a distinct odor similar to "rotten eggs." Due to its gaseous nature, hydrogen sulfide must be tested at the well site within 1 minute of drawing the sample. If sulfur is present additional equipment will be required. An air injecting iron filter can typically treat up to 2 milligrams per liter of sulfur gas.

Pre-installation Instructions (cont.)

Location Considerations

The proper location to install the water softener system will ensure optimum performance and satisfactory water quality. The following factors should be considered in selecting the location of the equipment.

1. The water softener should be installed after the pressure tank on a private well system or after the water meter on municipal water. Operating pressure of the softener must be limited to within 30 – 100 psi range.
2. The water softener should be installed as close as possible (preferably within 15') to an adequate floor or laundry drain capable of handling the backwash cycle volume and flow rate (refer to unit specifications).
3. All water conditioning equipment should be installed prior to the water heater. Water temperatures exceeding 100°F can damage the internal components of the control valve and filter tank. Install with at least 10' of pipe before the water heater to prevent thermal damage to the equipment. An expansion tank may need to be installed in the line to the water heater in order to allow for thermal expansion and comply with local plumbing codes.
4. The water softener should not be subject to freezing temperatures.
5. Ensure that any cartridge or in-line type filter installed prior to the water softener does not restrict the water flow and pressure available for backwash and interfere with normal operation.
6. Appliances requiring extended periods of continuous or high flow water use (i.e. geothermal heat pumps, swimming pools, lawn irrigation, outside hose bibs, etc.) should bypass the water softener. (see installation diagram Fig. 1).
7. Ground straps (shown in Figure 1) are only necessary when the home's electrical system utilizes the metal piping as the systems ground. To maintain the ground jumper wiring must be installed around non-metal connectors or pipe (plastic) if it is used for softener installation.

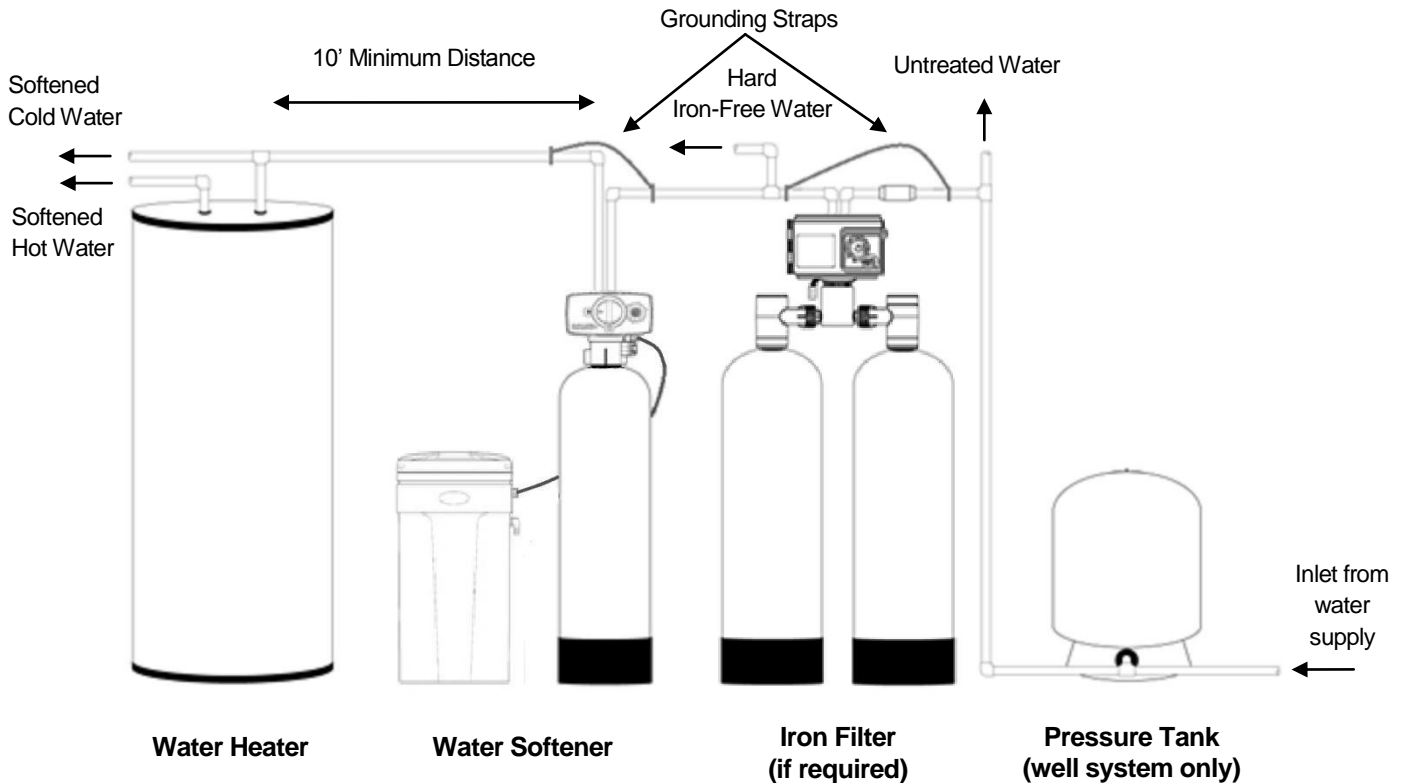


FIGURE 1: Typical Installation

Installation Instructions

- STEP 1:** Carefully remove all components from packaging. **DO NOT DISCARD PACKAGING** until all water softener components and fittings have been located.
- STEP 2:** Use clips and screws provided and attach bypass valve to the inlet/outlet of the meter module. See figure 2 below.

IMPORTANT: The installer is required to insert the meter cable into the top of the meter module.

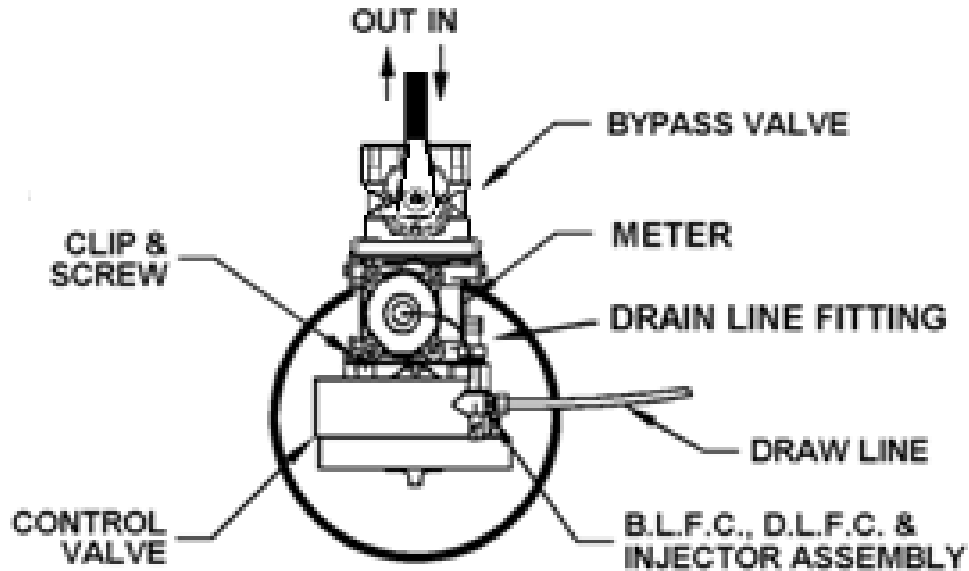


FIGURE 2: Top View of Control Valve

- STEP 3:** Place unit at desired installation position. **DO NOT plug into electrical outlet at this time (see STEP 15 on page 6). DO NOT put salt in the brine tank at this time (see STEP 14 on page 6).**
- STEP 4:** Shut off water at main supply. Relieve pressure by opening nearest faucet. On private well systems, turn off power to pump and drain pressure tank. **SHUT OFF POWER OR FUEL SUPPLY TO WATER HEATER.**
- STEP 5:** Cut main supply line as required to fit plumbing to inlet and outlet of bypass valve. **DO NOT PLUMB INLET AND OUTLET BACKWARDS.** Piping should be supported. Do not apply heat to any fitting attached to the bypass or control valve.
- STEP 6:** Use polyethylene drain line tubing provided (**NO VINYL TUBING**) to run drain line from control valve discharge fitting to floor drain or sump pit capable of handling the backwash rate of the softener (refer to specifications and flow rate on page 8). **DISCHARGE END OF THE DRAIN LINE MUST BE FIRMLY SECURED!** There must be an air gap at the end of the drain line to prevent siphoning of waste water and meet plumbing code. Total length of drain line should be 15' or less. **AVOID OVERHEAD DRAINS.**

Installation Instructions (cont.)

- STEP 7:** Connect one end of the 3/8" brine line to the control valve quick connect fitting. Insert the other end of the brine line through the hole in the brine tank and into the quick connect fitting on the safety brine valve. Remove the quick connect collet retainer clip (if included) before inserting the brine line into each fitting, press the tube in very firmly and replace the retainer clip behind the collet. **NOTE: THE BRINE TUBING SHOULD BE INSERTED 5/8" INTO THE FITTING. DO NOT PUT SALT INTO THE BRINE TANK AT THIS TIME.**

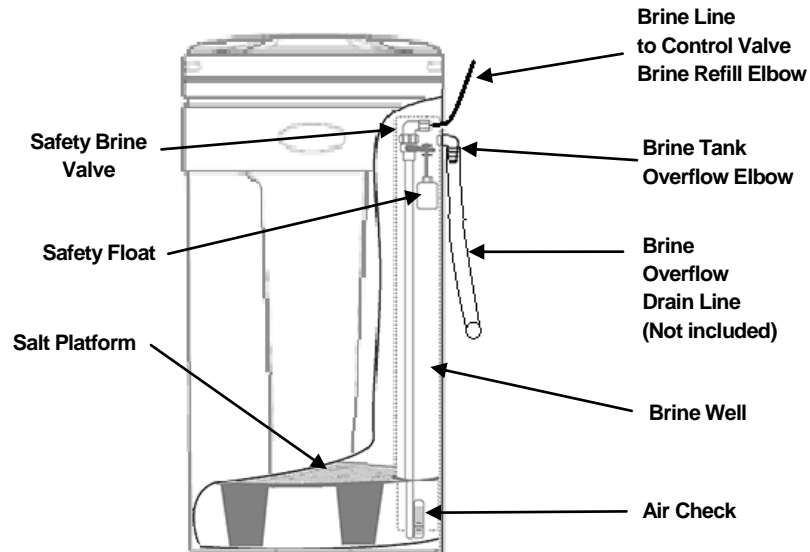


FIGURE 3: Brine Tank Components

- STEP 8:** Install overflow tubing from overflow elbow on brine tank to floor drain. Tubing must be lower than overflow elbow at all times. **DO NOT CONNECT DRAIN LINE FROM SOFTENER CONTROL VALVE TO BRINE TANK OVERFLOW. DO NOT CONNECT BRINE TANK DRAIN LINE TO THE SOFTENER DRAIN LINE.**
- STEP 9:** Place bypass valve in the "Bypass" position (refer to Figure 4 below). Open main supply valve or turn on power to pump on private well systems.

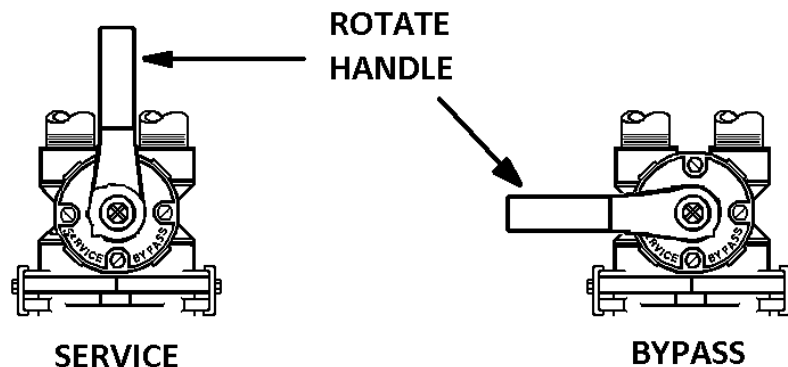


FIGURE 4: Stainless Steel Bypass Valve Operation

- STEP 10:** Rotate the Manual Regeneration knob (see Fig. 5, page 7) clockwise to the "Backwash" position.

Installation Instructions (cont.)

- STEP 11:** Refer to Figure 4 (page 5) for appropriate bypass valve operation. Rotate bypass lever of stainless steel bypass $\frac{1}{4}$ of the way to Service allowing unit to fill slowly. Filling the mineral tank in this position will force any trapped air to the drain. When only water flows to the drain; slowly open the bypass valve to the “Service” position, pausing briefly if more air is expelled.
- STEP 12:** Add enough water to the brine tank to a level approximately 1” above the salt grid or 5” above the bottom of the brine tank if no salt grid is included.
- STEP 13:** Rotate the Manual Regeneration knob to the “Brine+Rinse” position. Continue slowly turning the knob until resistance is felt and you hear 3 clicks. Verify that the water level in the brine tank is dropping. Allow water level to drop below the salt grid (if applicable) before continuing. If the water level does not drop, refer to section 8 on page 13 for Troubleshooting.
- STEP 14:** Fill the brine tank with water softener salt.
- STEP 15:** Plug the softener into an un-switched electrical outlet, if not done previously.
- STEP 16:** Rotate the Manual Regeneration knob to the “Rapid Rinse” position and allow the regeneration to complete automatically.
- STEP 17:** Check for leaks and correct as necessary.
- STEP 18:** Turn power or fuel supply back on to water heater.
- STEP 19:** Set the current time of day on the timer. Be sure to note AM vs PM (refer to Fig. 5 on page 7).
- STEP 20:** Set the regeneration frequency (refer to Fig. 5 on page 7).

Meter Setting Instructions

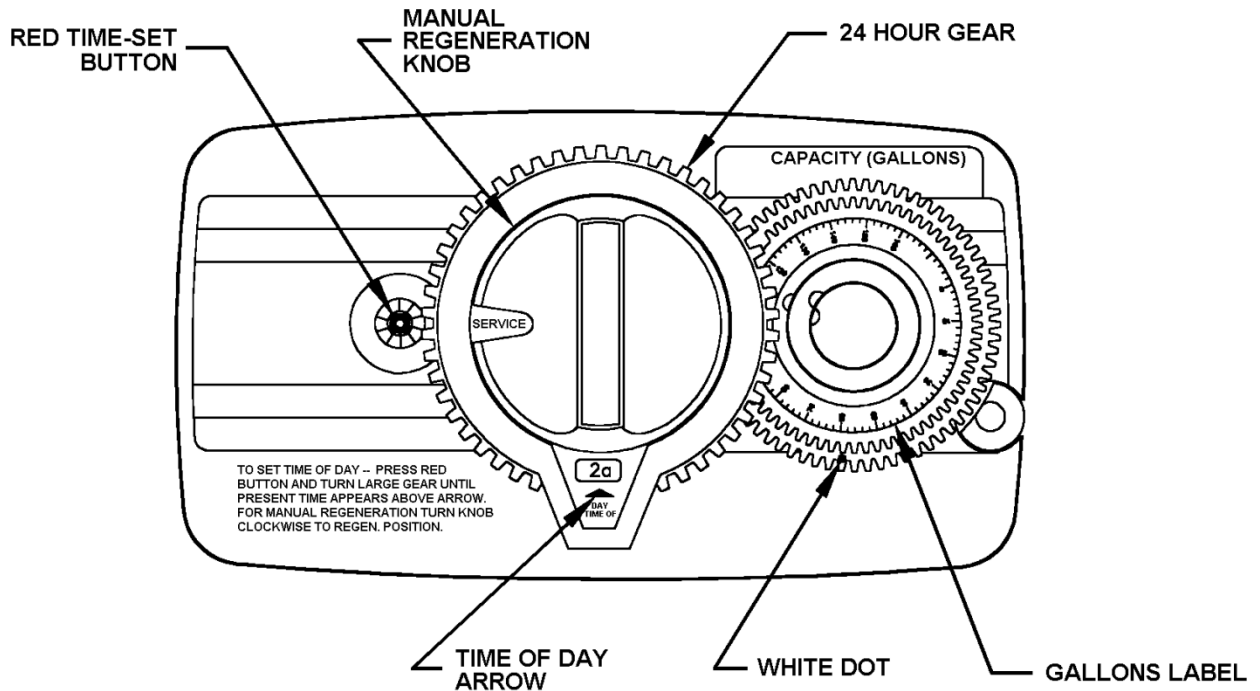


FIGURE 5: Front of Mechanical Meter Timer Assembly

How to set Time of Day:

1. Press and hold the red button to disengage the 24 hour gear.
2. Turn the large 24 hour gear until the actual time of day is at the time of day arrow.
3. Release the red button to again engage the 24 hour gear.

How to set the Frequency of Regeneration:

1. Calculate the Adjusted Hardness by multiplying the iron concentration (ppm) by 3 and adding to the water hardness test results.

Example: Hardness = 25 gpg (grains per gallon)
Iron = 1.0 ppm (part per million)

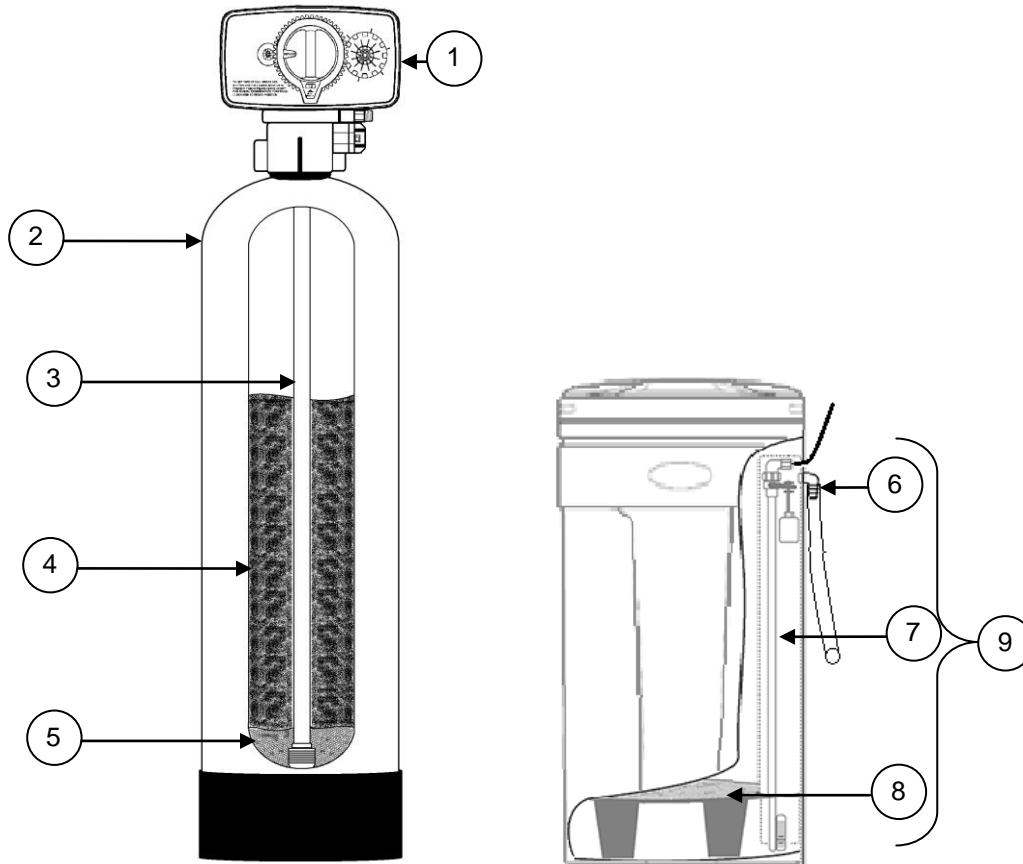
$$\text{Adjusted Hardness} = 28 \text{ gpg} \qquad [25 + (3 \times 1.0)]$$
$$25 + 3 = 28$$

2. Lift the "People Dial" on the gallon setting wheel.
3. Rotate the "People Dial" until the number of people in the household is aligned with the adjusted water hardness.
4. Release the "People Dial" and ensure that it reengages the gallon wheel.

How to Manually Initiate a Regeneration Cycle:

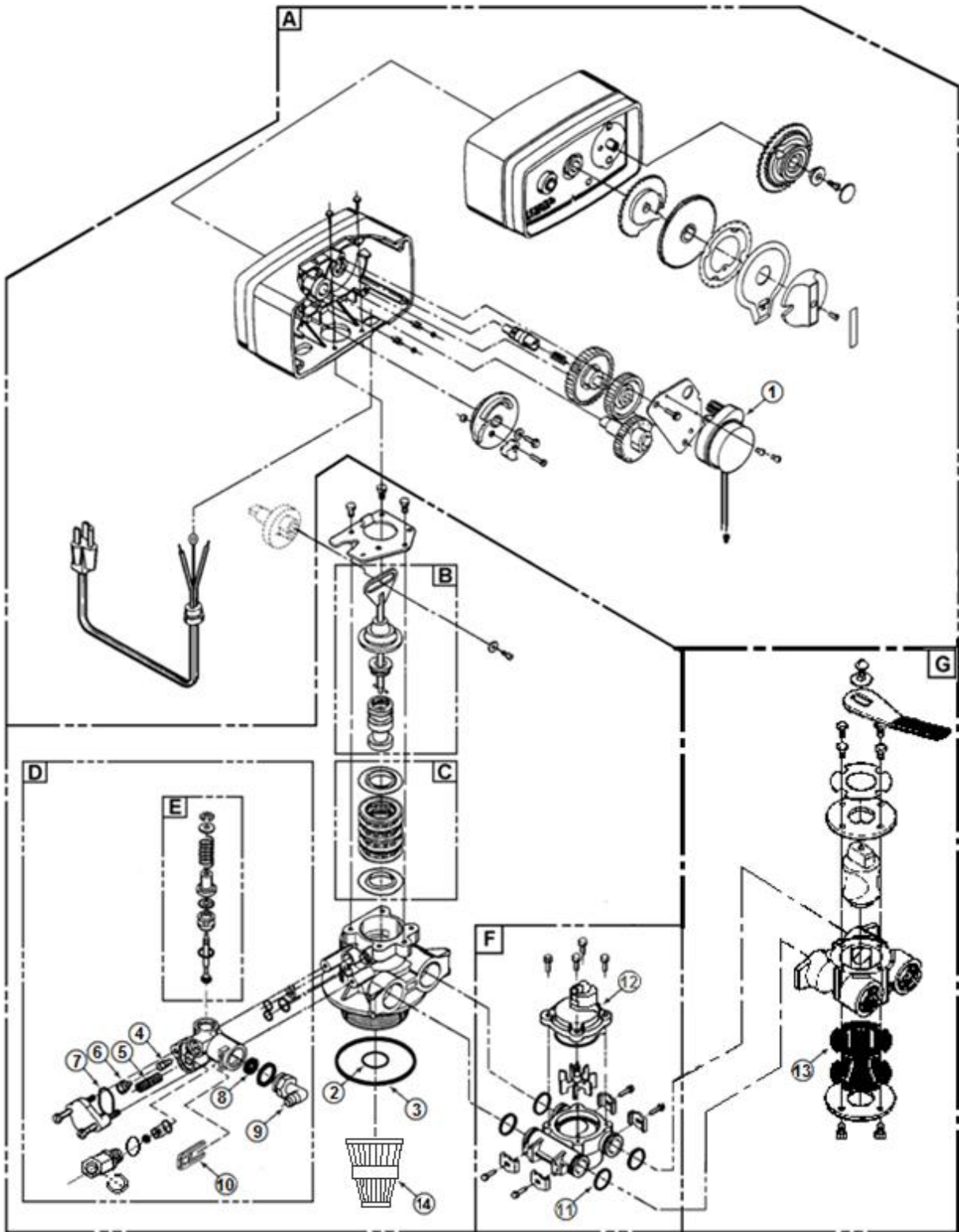
1. Grab the manual regeneration knob and turn clockwise SLIGHTLY.
2. The drive gear will engage the backwash knob which will make a complete revolution and return to the "Service" position after the regeneration cycle.

Component Parts Breakdown



Ref #	Description	UNIT				
		2P75MCONT	2P100MCONT	2P150MCONT	2P200MCONT	2P250MCONT
1	Mech. Metered Valve w/bypass	NM-075-S Vlv Assy w/BP	NM-1-S Vlv Assy w/BP	NM-1.5-S Vlv Assy w/BP	NM-2-S Vlv Assy w/BP	NM-2.5-S Vlv Assy w/BP
2	Mineral Tank	MTP0844GR	MTP0948GR	MTP1054GR	MTP1248GR	MTP1354GR
3	Distributor	D100S-48	D100S-48	D100S-54	D100S-48	D100S-54
4	Resin	(1.5) H05P	(2) H05P	(3) H05P	(4) H05P	(5) H05P
5	1/4" X 1/8" Gravel	QC20	QC20	QC20	QC25	QC25
6	Overflow Fitting	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO
7	Safety Brine Valve	SBV14ASSY	SBV14ASSY	SBV14ASSY	SBV14ASSY	SBV14ASSY
8	Salt Platform	BTSG12	BTSG14	BTSG14	BTSG18SQ	BTSG18SQ
9	Brine Tank Assy.	BT1234ASSY	BT1434ASSY	BT1434ASSY	BTSQ18ASSY	BTSQ1833ASSY

Metered Control Valve Breakdown



Metered Control Valve Parts List

REF #	Part Number	Description
A	NMS-PH	Power Head, Mechanical Metered
B	60102-00	Piston Assembly
C	60125	Seal and Spacer Kit
D	60084-0102NMS	Injector and Drain Housing Assy, Blank DLFC, #1 Injector, 0.5 GPM BLFC
E	60032	Brine Stem Assembly
F	60088	Meter Module, Right Angle, Standard Range
G	60040SS	Bypass Valve, Stainless, 3/4" NPT (Standard)
1	18743-1	Motor, 120v/60hz, 1/30 RPM
2	13304	O-Ring, Distributor, -121
3	12281	O-Ring, Tank, -338
4	10914-1	Injector Throat, #1, White (2P75MCONT, 2P100MCONT, 2P150MCONT)
	10914-2	Injector Throat, #2, Blue (2P200MCONT, 2P250MCONT)
5	10227	Injector Screen
6	10913-1	Injector Nozzle, #1, White (2P75MCONT, 2P100MCONT, 2P150MCONT)
	10913-2	Injector Nozzle, #2, Blue (2P200MCONT, 2P250MCONT)
7	13303	O-Ring, -021
8	12086	Flow Control Washer, 1.5 GPM (2P75MCONT)
	12088	Flow Control Washer, 2.4 GPM (2P100MCONT)
	12089	Flow Control Washer, 3.0 GPM (2P150MCONT)
	12091	Flow Control Washer, 4.0 GPM (2P200MCONT, 2P250MCONT)
9	NE-DRAIN ELB	Drain Elbow, Quick Connect x 1/2" barbed
10	NE-DRAIN CLIP	Quick Release Clip, Drain Elbow
11	NE-CON ORG	Connector O-Ring
12	14038	Meter Cap Assembly, Standard Range, Includes O-Ring
13	14105	Seal, Single Lever Bypass Valve
14	18280-02	Top Screen, Bayonet Style

Troubleshooting

PROBLEM	CAUSE	SOLUTION
1. Softener fails to regenerate	A. Electrical service to unit has been interrupted	A. Ensure permanent electrical service to unit (switch, circuit breaker, plug, etc.)
	B. Meter cable not inserted into meter	B. Insert meter cable into meter
	C. Defective timer motor	C. Replace timer motor
	D. Faulty meter assembly	D. Replace meter assembly
2. Softener delivers hard water	A. Bypass valve is open	A. Close bypass valve
	B. No salt in brine tank	B. Add salt to brine tank and maintain salt level above water level
	C. Brine tank overfilled with water	C. See Problem # 8 below
	D. Insufficient water flowing into brine tank	D. Check brine tank fill time and clean brine line flow control
	E. Leak at distributor tube	E. Check length of distributor tube and condition of pilot tube o-ring
	F. Internal valve leak	F. Replace piston and seals/spacer kit
	G. Softener not regenerating	G. See Problem # 1 above
	H. Slow leak in plumbing that is not registered by the meter IE dripping faucet	H. Eliminate sources of slow leaks
	I. Softener resin fouled by iron	I. Manually regenerate with a strong solution of resin cleaner for iron or re-bed the softener
3. Unit uses too much salt	A. Improper salt setting	A. Correct salt setting
	B. Excessive water in brine tank	B. See Problem # 8 below
	C. Leak in plumbing that is sufficient to be registered by the meter IE running toilet	C. Eliminate sources of leaks
4. Loss of water pressure	A. Softener too small for application	A. Check application requirements and resize water softener as required
	B. Foreign material buildup in water softener	B. Perform an extended backwash: 1) Place unit in manual regeneration 2) When backwash begins, unplug the unit from the electrical outlet 3) Allow unit to remain in backwash for 30+ minutes 4) Plug unit back into electrical Outlet, allow regeneration to finish automatically
5. Loss of resin through drain line	A. Air in water system	A. Locate source of air in system: 1) Check for low water table conditions in well 2) Check for positive seal on brine line connections
	B. Drain line flow control is too large	B. Ensure proper drain line flow control is installed
	C. Mineral tank is overfilled	C. Remove excess resin or allow resin to discharge to proper level during backwash
6. Loss of resin into service line	A. Softener is installed backwards	A. Re-plumb the softener correctly and clean resin from faucet screens, flush valves and water heater
	B. Hot water has backed up into the softener and melted components	B. Re-plumb the softener correctly (minimum 10' pipe before water heater or install an expansion tank) and replace damaged components
	C. Broken distributor basket	C. Replace distributor basket
	D. Gravel underbed shifted to one side	D. Redistribute gravel to cover distributor

Troubleshooting

PROBLEM	CAUSE	SOLUTION
7. Iron in softened water	A. Iron exceeds recommended level or is not "Clearwater" iron or iron bacteria is present	A. Test incoming water supply and install an iron filter prior to softener, as needed
	B. Softener resin fouled by iron	B. Manually regenerate with a strong solution of resin cleaner for iron or re-bed the softener
8. Excessive water level in brine tank	A. Restricted drain flow control	A. Clean drain line flow control
	B. Drain line too long or installed overhead or restricted	B. Verify drain line is not restricted or improperly installed
	C. Vinyl drain line was used	C. Replace drain line with rigid or semi-rigid material with no kinks and as few elbows as possible
	D. Brine valve sticking or leaking (soft water)	D. Replace brine valve assembly
	E. Injector or injector screen plugged (hard water)	E. Clean or replace injectors and screen
	F. Fittings on either end of the brine line are not air tight.	F. Fully insert brine line into quick connect fittings.
9. Salty water	A. Brine tank is overfilled (salty taste goes away after water usage)	A. See Problem # 8
	B. High TDS (salty taste does not go away after water usage)	B. Install a reverse osmosis system to reduce TDS
10. Water leaks to drain continuously	A. Foreign material in control valve	A. Remove and inspect piston and seal kit. Replace as necessary
	B. Drive motor stopped during regeneration cycle	B. Check for obstruction in piston and seals. Replace drive motor. Inspect condition of power head gears
	C. Internal valve seal leak	C. Replace seals and/or piston

TEN YEAR LIMITED WARRANTY

WARRANTY – WATCO warrants this water conditioner against any defects that are due to faulty material or workmanship during the warranty period. This warranty does not include damage to the product resulting from accident, neglect, misuse, misapplication, alteration, installation or operation contrary to printed instructions, or damage caused by freezing, fire, flood, or Acts of God. From the original date of consumer purchase, we will repair or replace, at our discretion, any part found to be defective within the warranty period described below. Purchaser is responsible for any shipping cost to our facility and any local labor charges.

- One year on the entire water conditioner
- Five years on the control valve
- Five years on the brine tank
- Ten years on the mineral tank

GENERAL CONDITIONS – Should a defect or malfunction occur, contact the dealer that you purchased the product from. If you are unable to contact the dealer, contact WATCO (see contact info below). We will require a full description of the problem, model number, date of purchase, and selling dealer’s business name and address.

We assume no warranty liability in connection with this water conditioner other than specified herein. This warranty is in lieu of all other warranties, expressed or implied, including warranties of fitness for a particular purpose. We do not authorize any person or representative to assume for us any other obligations on the sale of this water conditioner.

FILL IN AND KEEP FOR YOUR RECORDS

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Original Purchaser	Date of Purchase	Model #	
<hr/>		<hr/>	
Address of Original Installation		City	State
<hr/>		<hr/>	
Dealer Purchased From	Dealer Address	City	State

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