

Installation Instructions and Owner's Manual

N, NMS, NES, & INT2 Series Water Softening Systems



MODEL NUMBERS:

Time Clock

NC Series

N Series

High Efficiency

NC-HE Series

N-HE Series

Mechanical Metered

NMCS Series

NMS Series

High Efficiency

NMCS-HE Series

NMS-HE Series

MODEL NUMBERS:

Electronic Metered

NECS Series

NES Series

NESCC Series

INT2 Series

High Efficiency

NECS-HE Series

NES-HE Series

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Table of Contents

Pre-installation Instructions	Page 2
Installation Instructions	Page 4
Brine Tank	Page 5
Bypass Valve	Page 5
N, NC & N-HE Time Clock Timer Setting	Page 7
NMS, NMC & NMS-HE Meter Setting	Page 9
NECS, NES, NESCC, NES-HE, INT2 Series Programming	Page 10
Unit Model Specifications	Page 12
Component Parts Breakdown & List	Page 14
N, NC & N-HE Control Valve Breakdown	Page 15
N, NC & N-HE Control Valve Parts List	Page 16
NMS, NMCS & NMS-HE Control Valve Breakdown	Page 17
NMS, NMCS & NMS-HE Control Valve Parts List	Page 18
NECS, NES, NESCC, NES-HE, INT2 Control Valve Breakdown	Page 19
NECS, NES, NESCC, NES-HE, INT2 Control Valve Parts List	Page 20
Troubleshooting	Page 21
Ten Year Limited Warranty	Page 23

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.

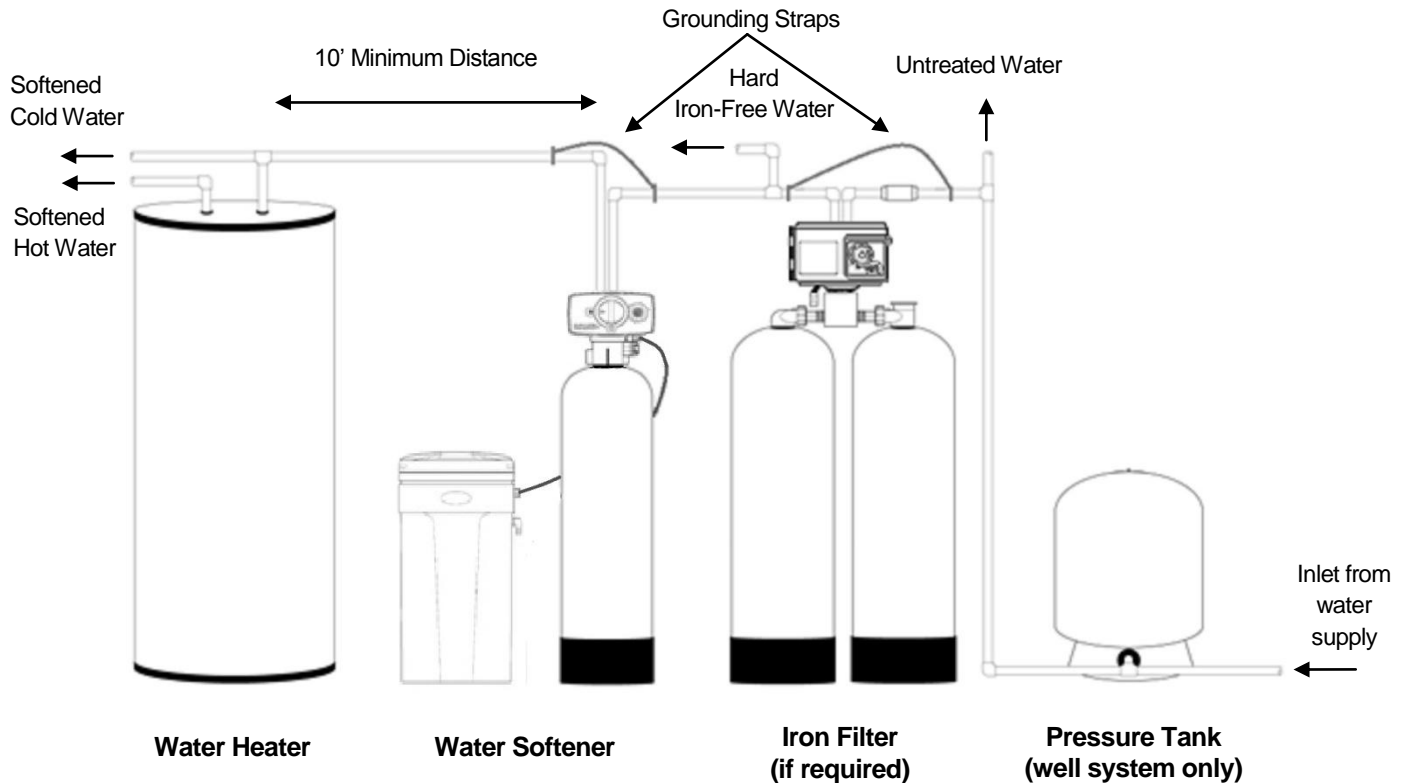


FIGURE 1: Typical Installation

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 control valve. See figure 2 below.

IMPORTANT: Mechanical metered (NMS Series) units require the installer to insert the meter cable into the top of the meter module.

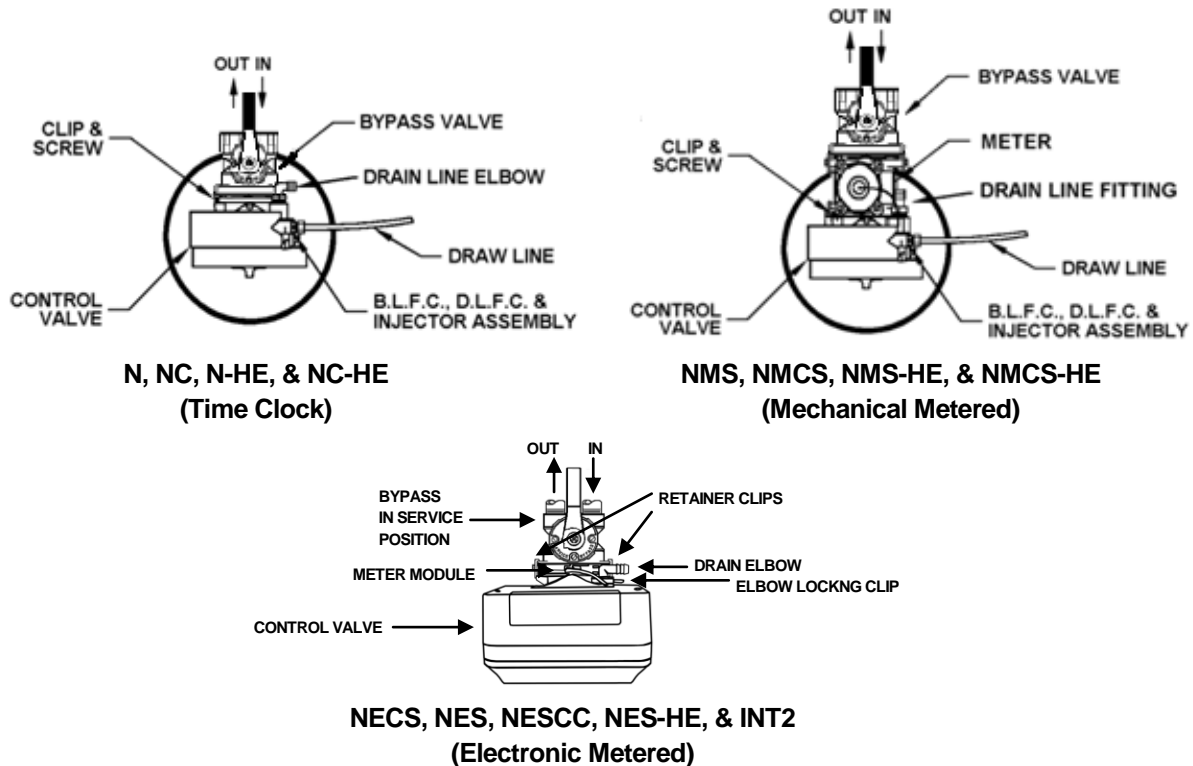


FIGURE 2: Top View of Control Valve

STEP 3: Place unit at desired installation position. **DO NOT plug into electrical outlet at this time (see STEP 15 on page 6 or see STEP 10 on page 5). 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 12). **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.**

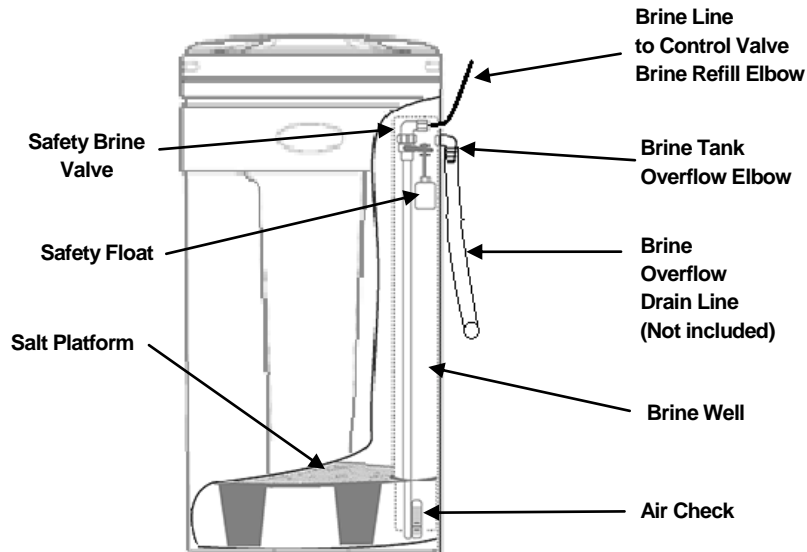


FIGURE 3: Brine Tank Components

- 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.

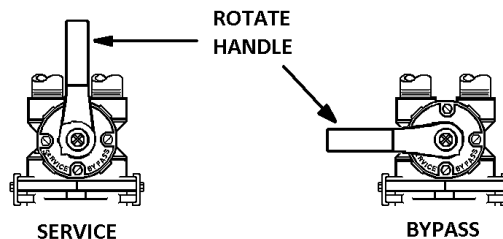


FIGURE 4: Stainless Steel Bypass Valve Operation

- STEP 10:** For all models **except** NES Series rotate the Manual Regeneration knob (see Fig. 5, page 7 or Fig. 6, page 9) clockwise to the "Backwash" position.

For the NES Series plug transformer into an un-switched electrical outlet and attach the power cord into the control valve. Then press and hold down the center "ADVANCE" button for 5 seconds and release after "GO TO BW" appears on the screen (see Fig. 7, page 10). Wait until the valve reaches the backwash position before going to STEP 11.

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. Fully open bypass valve to the “Service” position.
- 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:** For N & NMS Series, 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 before continuing (if applicable). If the water level does not drop, refer to page 23 for Troubleshooting.
- For the NES Series press the center “ADVANCE” button and the control valve will go to the brine draw position. Verify that the water level in the brine tank is dropping. Allow water level to drop below the salt grid before continuing. If the water level does not drop, refer to section 8 of 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:** For N & NMS Series rotate the Manual Regeneration knob to the “Rapid Rinse” position and allow the regeneration to complete automatically.
- The NES Series should be advanced by the center “ADVANCE” button to the fast 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 (note AM and PM) (refer to Fig. 5, Fig. 6, or Fig. 7, depending on the model number).
- STEP 20:** Set the regeneration frequency (refer to Fig. 5, Fig. 6, or Fig. 7, depending on the model number). The NMS and NES Series units determine frequency based on gallons used.

N, NC & N-HE Series Time Clock Setting Instructions

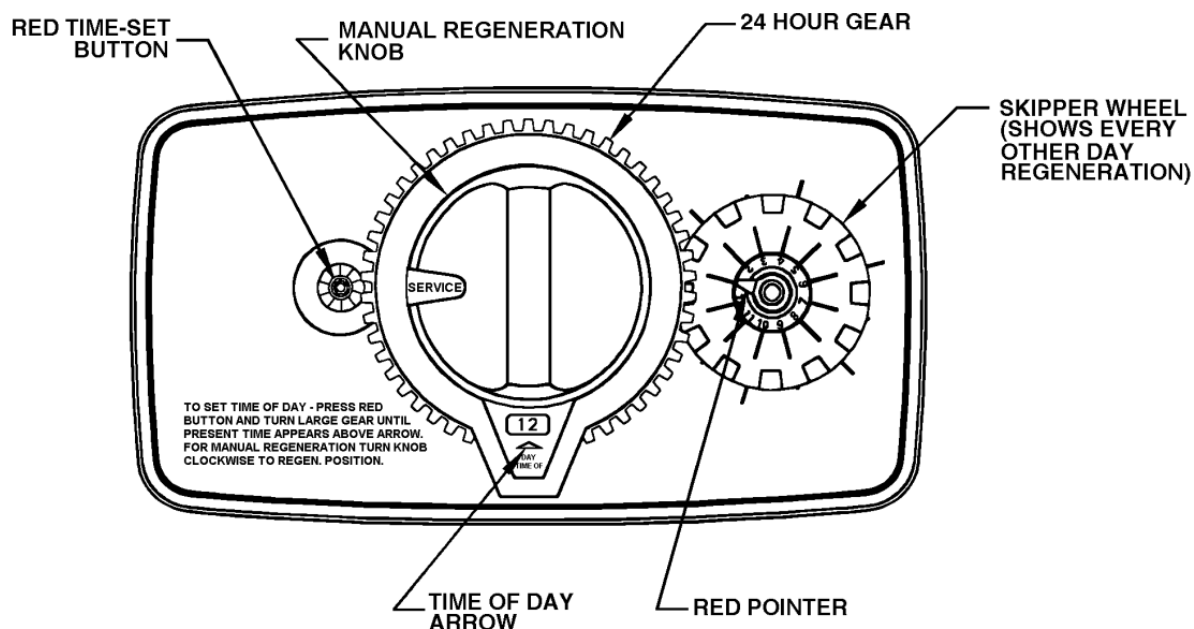


FIGURE 5: Front of Time Clock Timer Assembly

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 Days 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)

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

2. Refer to the appropriate table for your water softener model number (pages 8 and 9) to determine how many TIMES in a 12 day cycle the softener should regenerate. If the adjusted hardness falls between two numbers on the chart always use the higher number (never round down).

Example: Water Softener Model N-1
3 people in family
Adjusted hardness 28 gpg

Result: Set softener to regenerate 4 TIMES in 12-day cycle (once every 3 days)

3. Rotate the skipper wheel until the number 1 is at the red pointer. Each number represents a day. The number by the red pointer is tonight.
4. Slide the metal tabs outward on the desired days of regeneration.

How to Manually Initiate a Regeneration Cycle:

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

N, NC & N-HE Series Time Clock Setting Instructions (cont.)

People	Adjusted Hardness -- Grains per Gallon							
	5	10	15	20	25	30	35	40
1	1	1	1	1	2	2	2	2
2	1	1	2	2	3	3	4	
3	1	2	3	3	4	4	6	
4	1	2	3	4	6	6		
5	2	3	4	6	6			
6	2	3	4	6				
7	2	4						

TABLE 1: Model Number N-1, NC-1 & N-1-HE

People	Adjusted Hardness -- Grains per Gallon									
	5	10	15	20	25	30	35	40	45	50
1	1	1	1	1	1	1	2	2	2	2
2	1	1	1	2	2	2	3	3	3	
3	1	1	2	2	3	3	4	4		
4	1	2	2	3	3	4	4			
5	1	2	3	3	4	6				
6	1	2	3	4	6					
7	2	3	4	6	6					
8	2	3	4	6						
9	2	3	6							
10	2	3	6							

TABLE 2: Model Number N-1.5, N-1.5-HE

People	Adjusted Hardness -- Grains per Gallon											
	5	10	15	20	25	30	35	40	45	50	55	60
1	1	1	1	1	1	1	1	1	2	2	2	2
2	1	1	1	1	2	2	2	2	2	3	3	
3	1	1	2	2	2	2	3	3	3	4		
4	1	1	2	2	3	3	4	4	4			
5	1	2	3	3	3	4	4	6				
6	1	2	2	3	4	6	6					
7	1	2	3	4	4	6						
8	1	2	3	4	6	6						
9	1	2	3	4	6							
10	2	3	4	6	6							

TABLE 3: Model Number N-2, N-2-HE

NMS, NMCS, NMS-HE Series Meter Setting Instructions

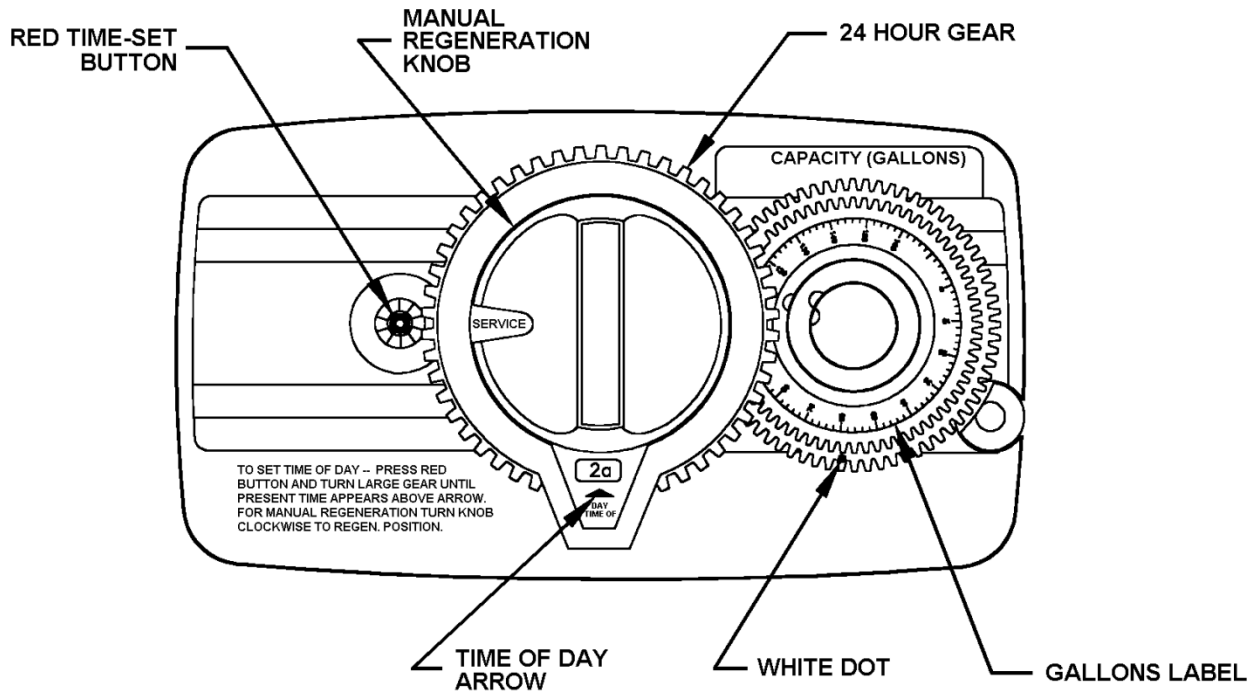


FIGURE 6: Front of Mechanical Meter Timer Assembly

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)

$$\begin{aligned} \text{Adjusted Hardness} &= 28 \text{ gpg} & [25 + (3 \times 1.0)] \\ & & 25 + 3 = 28 \end{aligned}$$

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.

NECS, NES, NESCC, NES-HE, INT2 Series Programming

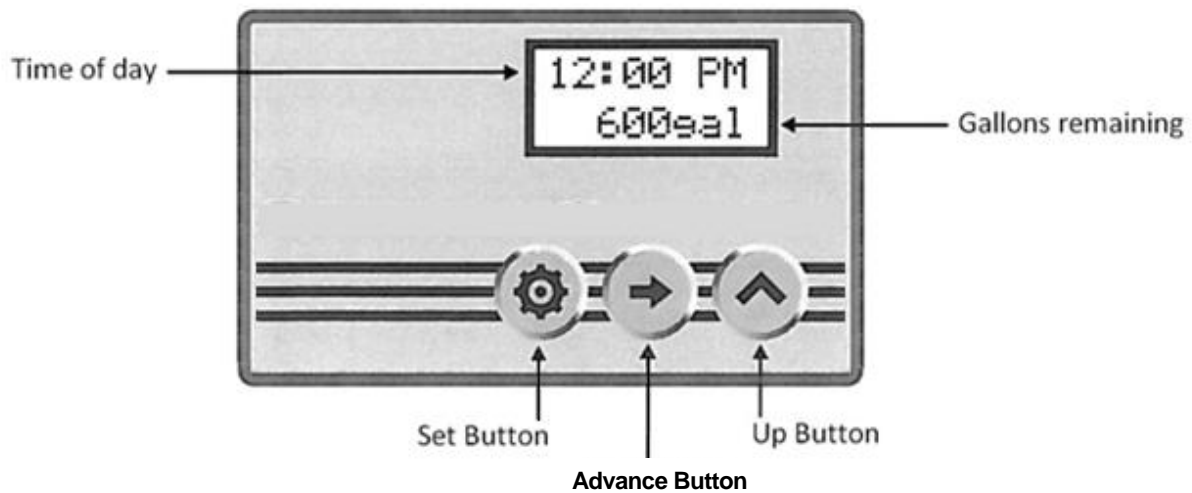


FIGURE 7: Front of Electronic Meter Timer Assembly



SET BUTTON

1. Press and hold "Set Button" for 5 seconds to enter Programming Mode.
2. When valve is in Programming Mode, press "Set Button" to confirm setting and advance to next menu option.



ADVANCE BUTTON

1. Press and hold "Advance Button" for 5 seconds to initiate an immediate regeneration cycle.
2. Press and release "Advance Button" during a regeneration cycle to immediately advance the valve to the next step in the regeneration process.
3. When the valve is in Programming Mode, press the "Advance Button" to move the cursor.



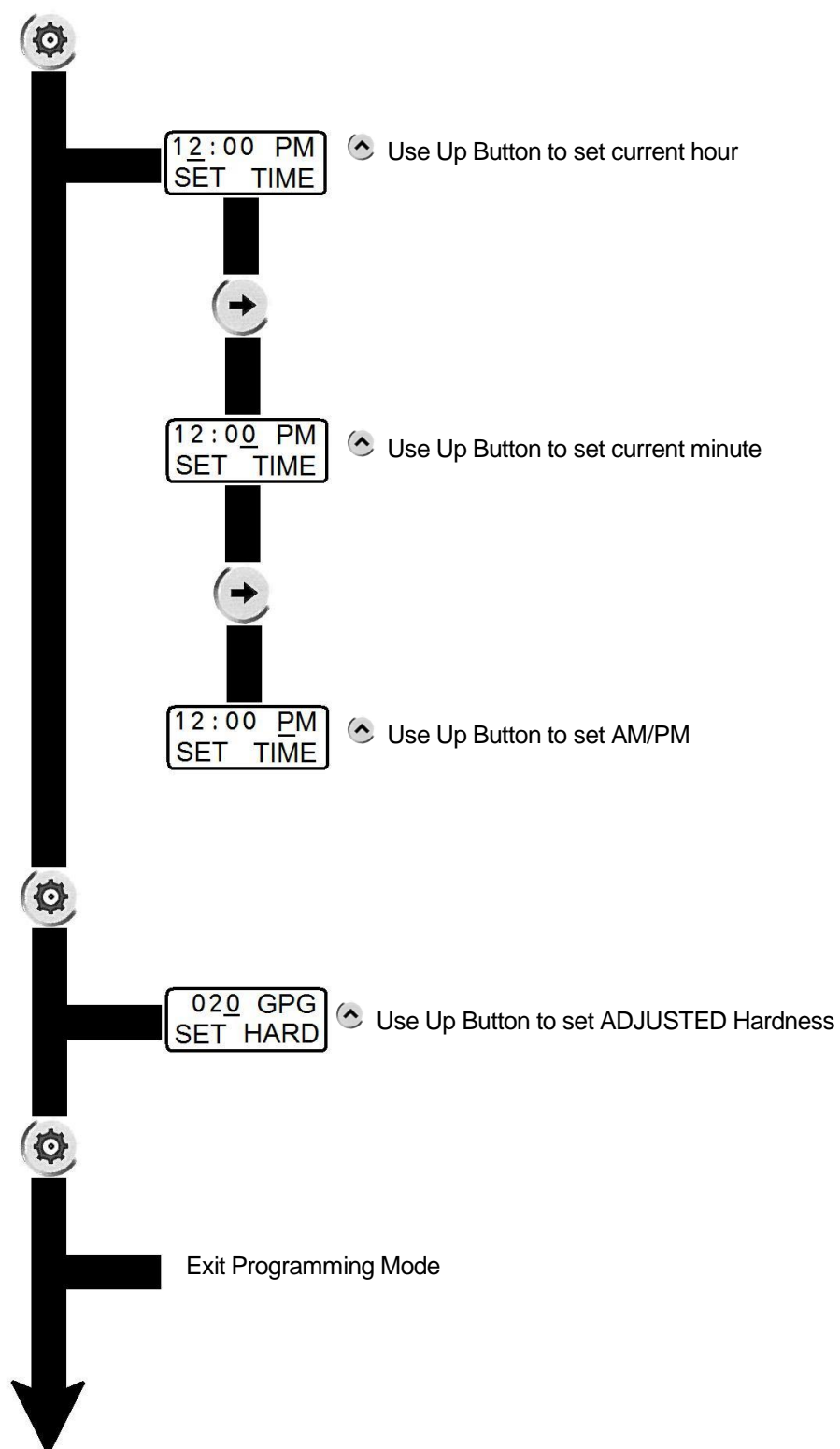
UP BUTTON

1. When the valve is in the Programming Mode, press "Up Button" to adjust setting.

NECS, NES, NESCC, NES-HE Series Programming

Enter Programming Mode:

Press and Hold the SET Button for 5 seconds.



Specifications

DESCRIPTION	UNIT MODEL NUMBER						
	NC-0.75-S NMCS-0.75-S	NC-1-S NMCS-1-S	N-0.75-S NMS-0.75-S	N-1-S NMS-1-S	N-1.5-S NMS-1.5-S	N-2-S NMS-2-S	N-2.5-S NMS-2.5-S
MEDIA VOLUME, ft³	0.75	1	0.75	1	1.5	2	2.5
CAPACITY, grains							
Factory Salt @ 9 lb/ft ³	18,000	24,000	18,000	24,000	36,000	48,000	60,000
Max. Salt @ 15 lb/ft ³	22,500	30,000	22,500	30,000	45,000	60,000	75,000
SERVICE FLOW RATES, gpm							
Continuous (3 gpm/ ft ³)	2	3	2	3	5	6	8
Service (8 gpm/ ft ³)	6	8	6	8	10	12	14
Peak*	12	13	12	13	13	14	15
BACKWASH & RAPID RINSE, gpm	2.4	3.0	1.5	2.4	3.0	4.0	4.0
BRINE FILL, gpm	0.5	0.5	0.5	0.5	0.5	0.5	0.5
SERVICE PIPE SIZE, inches	¾"	¾"	¾"	¾"	¾"	¾"	¾"
For 1" replace "-S" w/ "-1S" in model #							
TOTAL WATER USED, gallons	73	86	55	74	87	128	130
DIMENSIONS, inches							
Mineral Tank (diameter x height)	10 x 35	10 x 35	8 x 44	9 x 48	10 x 54	12 x 48	13 x 54
Brine Tank (diameter x height)	12 x 34	12 x 34	14 x 34	14 x 34	14 x 34	18 x 33	18 x 33
Overall (depth x width x height)	13 x 22 x 43	13 x 21 x 43	15 x 22 x 52	18 x 27 x 56	18 x 28 x 62	18 x 30 x 56	18 x 32 x 62
APPROXIMATE SHIP WT., lbs (kg)	70	84	77	87	114	145	168

DESCRIPTION	UNIT MODEL NUMBER			
	NC-1-S-HE NMCS-1-S-HE	N-1-S-HE NMS-1-S-HE	N-1.5-S-HE NMS-1.5-S-HE	N-2-S-HE NMS-2-S-HE
MEDIA VOLUME, ft³	1.0	1.0	1.5	2.0
CAPACITY, grains				
Factory Salt @ 6 lb/ft ³	27,000	27,000	40,500	54,000
Max. Salt @ 15 lb/ft ³	36,000	36,000	54,000	72,000
SERVICE FLOW RATES, gpm				
Continuous (3 gpm/ ft ³)	3	3	5	6
Service (8 gpm/ ft ³)	8	8	12	13
Peak*	13	14	14	15
BACKWASH & RAPID RINSE, gpm	3.0	2.4	3.0	4.0
BRINE FILL, gpm	0.5	0.5	0.5	0.5
SERVICE PIPE SIZE, in.	¾"	¾"	¾"	¾"
For 1" replace "-S" w/ "-1S" in model #				
TOTAL WATER USED (gallons)	86	74	87	128
DIMENSIONS, inches				
Mineral Tank (diameter x height)	10 x 35	9 x 48	10 x 54	12 x 48
Brine Tank (diameter x height)	12 x 34	14 x 34	14 x 34	18 x 33
Overall (depth x width x height)	13 x 23 x 43	18 x 27 x 56	18 x 28 x 62	18 x 30 x 56
APPROXIMATE SHIP WT., lbs	86	86	111	142

GENERAL REQUIREMENTS:

Water Temperature	33°F - 100°F
Water Pressure	25 - 100 psi
Electrical Requirements	110v/60hz
Electrical Current Draw	0.5 amps

NOTES:

*The control valve can handle flow rates greater than the peak flow rates shown above. What matters is the flow rate the unit can handle and still provide zero water hardness.

Specifications (cont.)

DESCRIPTION	UNIT MODEL NUMBER						
	NECS-0.75-S	NECS-1-S	NES-0.75-S	NES-1-S	NES-1.5-S	NES-2-S	NES-2.5-S
MEDIA VOLUME, ft³	0.75	1.0	0.75	1.0	1.5	2.0	2.5
CAPACITY, grains							
Factory Salt @ 9 lb/ft ³	18,000	24,000	18,000	24,000	36,000	48,000	60,000
Max. Salt @ 15 lb/ft ³	22,500	30,000	22,500	30,000	45,000	60,000	75,000
SERVICE FLOW RATES, gpm							
Continuous (3 gpm/ft ³)	2	3	2	3	5	6	8
Service (8 gpm/ft ³ , <=15psi drop)	6	8	6	8	10	12	14
Peak*	14	14	12	13	13	14	15
BACKWASH & RAPID RINSE, gpm	2.4	3.0	2.0	2.4	3.0	4.0	4.0
BRINE FILL, gpm	1.0	1.0	1.0	1.0	1.0	1.0	1.0
SERVICE PIPE SIZE, in. (cm)	¾"	¾"	¾"	¾"	¾"	¾"	¾"
For 1" replace -S w/ -1S in model #							
FACTORY REGENERATION SETTINGS							
Default size setting	SMALL	SMALL	SMALL	SMALL	MEDIUM	LARGE	LARGE
Backwash (minutes)	6	6	6	6	6	8	8
Brine Draw (minutes)	55	55	55	55	60	60	60
Fast Rinse (minutes)	4	4	4	4	6	6	6
Brine Refill (minutes)	3	3	3	3	4	6	6
TOTAL WATER USED, gallons	52	58	47	52	68	112	114
DIMENSIONS, inches							
Mineral Tank (diameter x height)	10 x 35	10 x 35	8 x 44	9 x 48	10 x 54	12 x 48	13 x 54
Brine Tank (diameter x height)	12 x 34	12 x 34	14 x 34	14 x 34	14 x 34	18 x 33	18 x 33
Overall (depth x width x height)	13 x 22 x 43	13 x 21 x 43	15 x 22 x 52	18 x 27 x 56	18 x 28 x 62	18 x 30 x 56	18 x 32 x 62
APPROXIMATE SHIP WT., lbs.	71	86	71	86	111	142	168

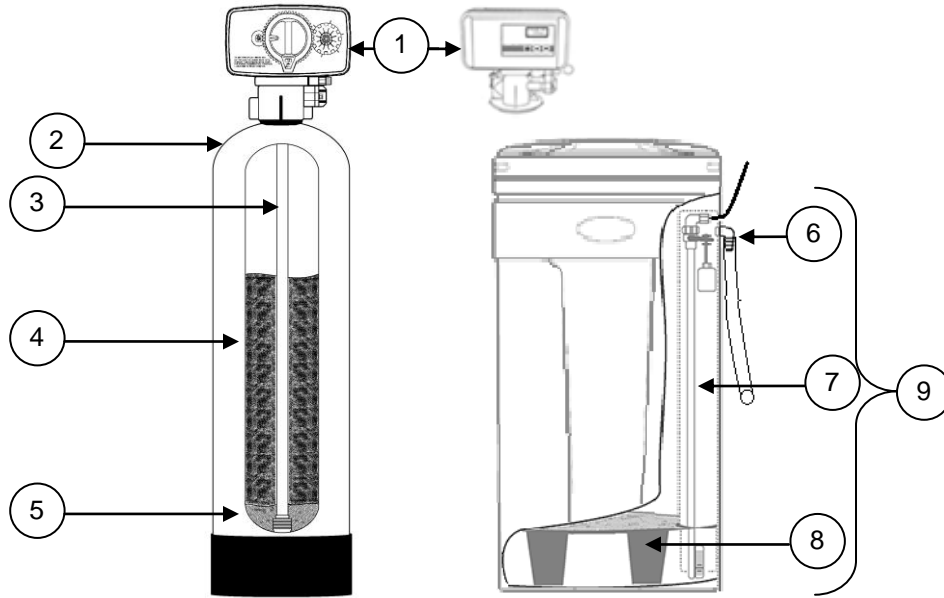
DESCRIPTION	UNIT MODEL NUMBER ¹							
	NESCC-1-S	NESCC-1.3-S		NECS-1-S-HE	NES-1-S-HE	NES-1.5-S-HE	NES-2-S-HE	INT2-S
MEDIA VOLUME, ft³ (liters)	1.0	1.3		1.0	1.0	1.5	2	1.0
CAPACITY, grains								
Factory Salt @ 9 lb/ft ³	24,000	32,000		-NA-	-NA-	-NA-	-NA-	24,000
Factory Salt @ 6 lb/ft ³	-NA-	-NA-		27,000	27,000	40,500	54,000	-NA-
Max. Salt @ 15 lb/ft ³	30,000	40,000		36,000	36,000	54,000	72,000	30,000
SERVICE FLOW RATE, gpm								
Continuous (3 gpm/ft ³)	3	4		3	3	5	6	3
Service (8 gpm/ft ³ , <=15psi drop)	8	10		8	8	12	13	8
Peak*	14	15		14	14	15	16	14
BACKWASH & RAPID RINSE, gpm	3.0	3.0		3.0	2.4	3.0	4.0	2.0
BRINE FILL, gpm	1.0	1.0		1.0	1.0	1.0	1.0	1.0
SERVICE PIPE SIZE, in. (cm)	¾"	¾"		¾"	¾"	¾"	¾"	¾"
For 1" replace -S with -1S in model #								
FACTORY REGENERATION SETTINGS								
Default size setting	SMALL	-NA-		-NA-	-NA-	-NA-	-NA-	SMALL
Backwash (minutes)	6	6		6	6	6	8	6
Brine Draw (minutes)	55	55		45	45	50	60	45
Fast Rinse (minutes)	4	4		4	4	6	6	4
Brine Refill (minutes)	3	4		2	2	3	4	3
TOTAL WATER USED, gallons	58	64		52	46	62	110	43
DIMENSIONS, inches								
Mineral Tank, diameter x height	10 x 35	10 x 44		10 x 35	9 x 48	10 x 54	12 x 48	10 x 35
Brine Tank, depth x width x height	CABINET	CABINET		13 x 13 x 35	15 x 15 x 35	15 x 15 x 35	18 x 33	13 x 13 x 35
Overall, length x width x height	13 x 22 x 45	13 x 22 x 50		13 x 23 x 43	15 x 24 x 56	15 x 25 x 62	18 x 27 x 56	13 x 28 x 44
APPROXIMATE SHIP WT., lbs.	86	135		86	86	111	142	90

GENERAL REQUIREMENTS:

Water Temperature	33°F - 100°F
Water Pressure	25 - 100 psi
Electrical Requirements	110v/60hz
Electrical Current Draw	0.5 amps

NOTES: *The control valve can handle flow rates greater than the peak flow rates shown above. What matters is the flow rate the unit can handle and still provide zero water hardness.

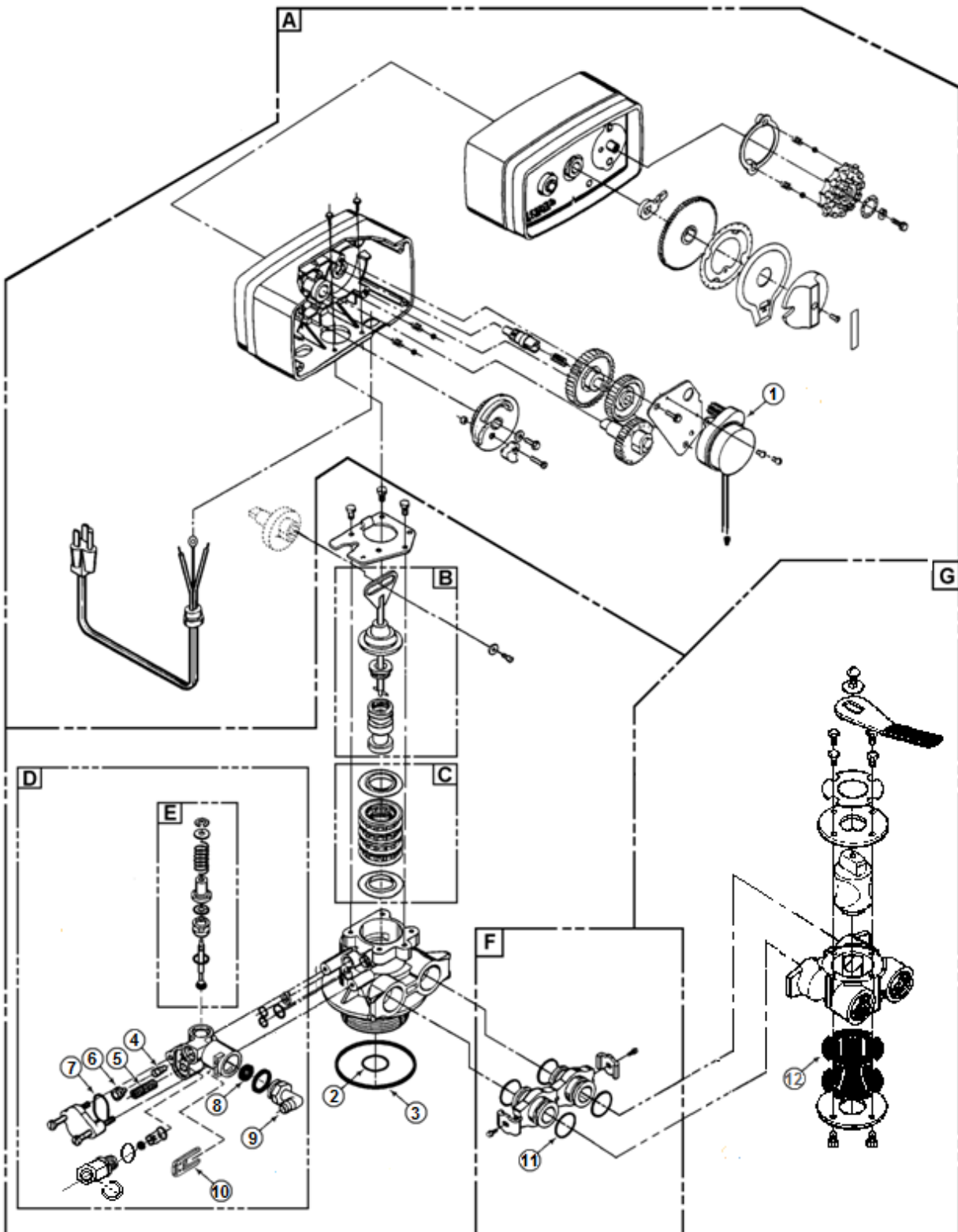
Component Parts Breakdown



Ref #	Description	UNIT					
		NC-0.75-S NMCS-0.75-S NECS-0.75-S	NC-1-S NMCS-1-S NECS-1-S	N-1-S NMS-1-S NES-1-S	N-1.5-S NMS-1.5-S NES-1.5-S	N-2-S NMS-2-S NES-2-S	N-2.5-S NMS-2.5-S NES-2.5-S
1	Timeclock Valve less bypass	NC-1 Vlv Assy L/BP	NC-1 Vlv Assy L/BP	N-1 Vlv Assy L/BP	N-1.5 Vlv Assy L/BP	N-2 Vlv Assy L/BP	N-2.5 Vlv Assy L/BP
	Mech. Metered Valve less bypass	NMCS-1 Vlv Assy L/BP	NMCS-1 Vlv Assy L/BP	NM-1 Vlv Assy L/BP	NM-1.5 Vlv Assy L/BP	NM-2 Vlv Assy L/BP	NM-2.5 Vlv Assy L/BP
	Elect. Metered Valve less bypass	NEC-1 Vlv Assy L/BP	NE-1 Vlv Assy L/BP	NE-1 Vlv Assy L/BP	NE-1.5 Vlv Assy L/BP	NE-2 Vlv Assy L/BP	NE-2.5 Vlv Assy L/BP
2	Mineral Tank	MTP1035GR	MTP1035GR	MTP0948GR	MTP1054GR	MTP1248GR	MTP1354GR
3	Distributor	D100S-48	D100S-48	D100S-48	D100S-54	D100S-48	D100S-54
4	Resin	(1.5) H05P	(2) H05P	(2) H05P	(3) H05P	(4) H05P	(5) H05P
5	1/4" X 1/8" Gravel	QC20	QC20	QC20	QC20	QC20	(1.5) QC20
6	Overflow Fitting	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO
7	Safety Brine Valve	SBV14ASSY	SBV14ASSY	SBV14ASSY	SBV14ASSY	SBV14ASSY	SBV14ASSY
8	Salt Platform	BTSG12	BTSG12	BTSG14	BTSG14	BTSG18SQ	BTSG18SQ
9	Brine Tank Assy.	BT1234ASSY	BT1234ASSY	BT1434ASSY	BT1434ASSY	BTSQ18ASSY	BTSQ1833ASSY

Ref #	Description	Units						
		NC-1-S-HE NMCS-1-S-HE NECS-1-S-HE	N-1-S-HE NMS-1-S-HE NES-1-S-HE	N-1.5-S-HE NMS-1-S-HE NES-1.5-S-HE	N-2-S-HE NMS-2-S-HE NES-2-S-HE	NESCC-1-S	NESCC-1.3-S	INT2-S
1	Timeclock Valve less bypass	N-1-HE Vlv Assy L/BP	N-1-HE Vlv Assy L/BP	N-1.5-HE Vlv Assy L/BP	N-2-HE Vlv Assy L/BP	-NA-	-NA-	-NA-
	Mech. Metered Valve less bypass	NM-1-HE Vlv Assy L/BP	NM-1-HE Vlv Assy L/BP	NM-1.5-HE Vlv Assy L/BP	NM-2-HE Vlv Assy L/BP	-NA-	-NA-	-NA-
	Elect. Metered Valve less bypass	NEC-1-HE Vlv Assy L/BP	NE-1-HE Vlv Assy L/BP	NE-1.5-HE Vlv Assy L/BP	NE-2-HE Vlv Assy L/BP	NEC-1 Vlv Assy L/BP	NE-1.5 Vlv Assy L/BP	INT2-S Vlv Assy L/BP
2	Mineral Tank	MTP1035GR	MTP0948GR	MTP1054GR	MTP1248GR	MTP1035GR	MTP1044GR	MTP1035GR
3	Distributor	D100S-48	D100S-48	D100S-54	D100S-48	D100S-48	D100S-48	D100S-48
4	Resin	(1.5) UHE05P	(2) UHE05P	(3) UHE05P	(4) UHE05P	(2) H05P	(2.5) H05P	(2) H05P
5	1/4" X 1/8" Gravel	QC20	QC20	QC20	QC20	QC20	QC20	QC20
6	Overflow Fitting	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO	BT-OVERFLO
7	Safety Brine Valve	SBV14ASSY	SBV14ASSY	SBV14ASSY	SBV14ASSY	SBV14ASSY	SBV14ASSY	SBV14ASSY
8	Salt Platform	BTSG12	BTSG14	BTSG14	BTSG18SQ	-NA-	-NA-	BTSG12
9	Brine Tank Assy.	BT1234ASSY	BT1434ASSY	BT1434ASSY	BTSQ18ASSY	CABINET UNIT	CABINET UNIT	BT1234ASSY

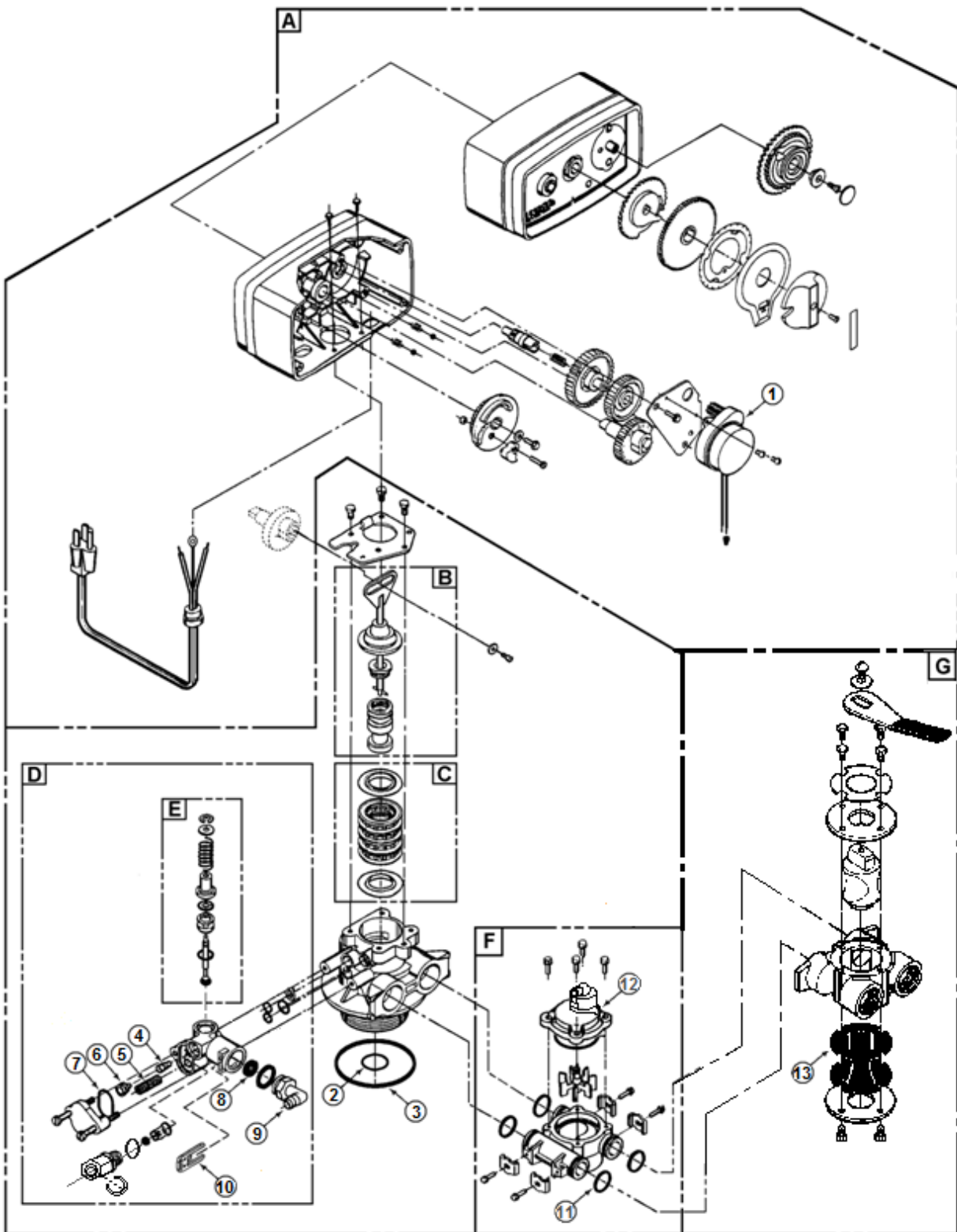
N, NC, N-HE Time Clock Control Valve Breakdown



N, NC, N-HE Time Clock Control Valve Parts List

REF #	Part Number	Description
A	N-PH	Power Head, Time Clock
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	60900-41	Coupling, Adapter S/ASSY
G	60040SS	Bypass Valve, Stainless, ¾" NPT (Standard)
	60041SS	Bypass Valve, Stainless, 1" NPT (Optional, use -1S suffix instead of -S)
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 (NC-1, N-1, N-1-HE, N-1.5, N-1.5-HE)
	10914-2	Injector Throat, #2, Blue (N-2, N-2-HE)
5	10227	Injector Screen
6	10913-1	Injector Nozzle, #1, White (NC-1, N-1, N-1-HE, N-1.5, N-1.5-HE)
	10913-2	Injector Nozzle, #2, Blue (N-2, N-2-HE)
7	13303	O-Ring, -021
8	12088	Flow Control Washer, 2.4 GPM (N-1, N-1-HE)
	12089	Flow Control Washer, 3.0 GPM (NC-1, N-1.5, N-1.5-HE)
	12091	Flow Control Washer, 4.0 GPM (N-2, N-2-HE)
9	NE-DRAIN ELB	Drain Elbow, Quick Connect x ½" barbed
10	NE-DRAIN CLIP	Quick Release Clip, Drain Elbow
11	NE-CON ORG	Connector O-Ring
12	14105	Bypass Valve Seal, Single Lever
NOT SHOWN	13753-02	Black Front Cover

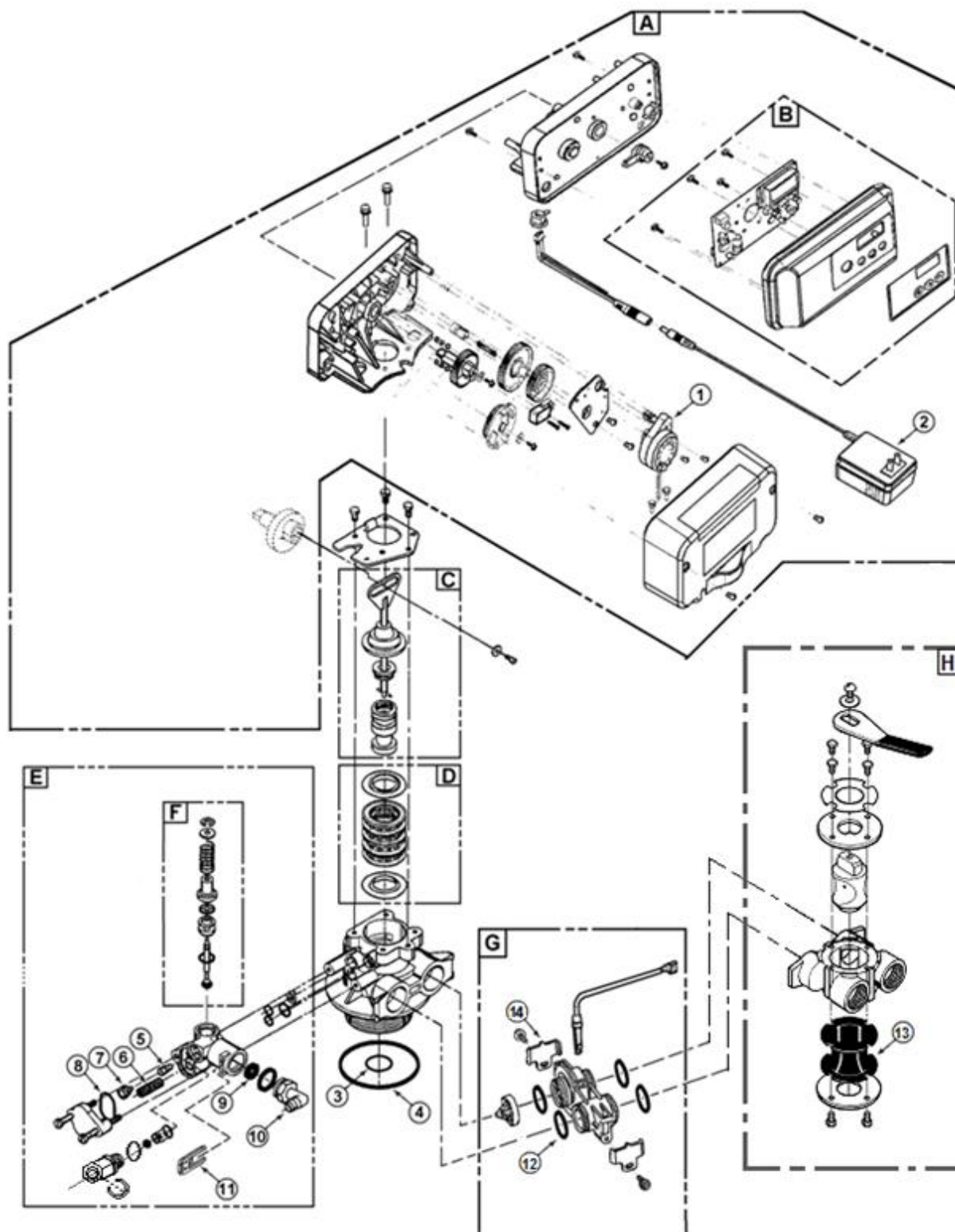
NMS, NMCS, NMS-HE Metered Control Valve Breakdown



NMS, NMCS, NMS-HE 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, ¾" NPT (Standard)
	60041SS	Bypass Valve, Stainless, 1" NPT (Optional, use -1S suffix instead of -S)
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 (NMCS-1, NMS-1, NMS-1-HE, NMS-1.5, NMS-1.5-HE)
	10914-2	Injector Throat, #2, Blue (NMS-2, NMS-2-HE)
5	10227	Injector Screen
6	10913-1	Injector Nozzle, #1, White (NMCS-1, NMS-1, NMS-1-HE, NMS-1.5, NMS-1.5-HE)
	10913-2	Injector Nozzle, #2, Blue (NMS-2, NMS-2-HE)
7	13303	O-Ring, -021
8	12088	Flow Control Washer, 2.4 GPM (NMS-1, NMS-1-HE)
	12089	Flow Control Washer, 3.0 GPM (NMCS-1, NMS-1.5, NMS-1.5-HE)
	12091	Flow Control Washer, 4.0 GPM (NMS-2, NMS-2-HE)
9	NE-DRAIN ELB	Drain Elbow, Quick Connect x ½" 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
NOT SHOWN	13753-02	Black Front Cover

NECS, NES, NESCC, NES-HE Metered Control Valve Breakdown



NECS, NES, NESCC, NES-HE Metered Control Valve Parts List

REF #	Part Number	Description
A	NE-PH	Powerhead, Metered
B	NE-FC	Front Panel and Circuit Board Assembly
C	60102-NES	Piston Assembly
D	60125	Seal and Spacer Kit
E	60084-0123NES	Injector and Drain Housing Assy, 2.4 gpm DLFC, #1 Injector, 1 GPM BLFC
F	60032	Brine Stem Assembly
G	EM-1	Meter Module (includes cable)
H	60040SS	¾" Stainless Steel Bypass Valve
1	42349	Motor, 24v/60hz, 2 RPM
2	NE-TRANS	Transformer, 110v Input--24v Output
3	13304	O-Ring, Distributor, -121
4	12281	O-Ring, Tank, -338
5	10914-1	Injector Throat, #1, White (for NE-1, NEC-1 and NE-1.5)
	10914-2	Injector Throat, #2, Blue (for NE-2)
6	10227	Injector Screen
7	10913-1	Injector Nozzle, #1, White (for NE-1, NEC-1 and NE-1.5)
	10913-2	Injector Nozzle, #2, Blue (for NE-2)
8	13303	O-Ring, -021
9	12088	Flow Control Washer, 2.4 GPM (for model NE-1)
	12089	Flow Control Washer, 3.0 GPM (for model NEC-1 and NE-1.5)
	12090	Flow Control Washer, 3.5 GPM (for models NE-2 Only)
10	NE-DRAIN ELB	Drain Elbow, Quick Connect x ½" barbed
11	NE-DRAIN CLIP	Quick Release Clip, Drain Elbow
12	NE-CON ORG	Connector O-Ring
13	14105	Bypass Valve Seal, Single Lever
14	NE-CLIPS	Clips and screws set for NES & FES

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 OXY Series 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 – First Sales, LLC. 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
- 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 First Sales, LLC. @ (260)693-1972. 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

Original Purchaser	Date of Purchase	Model #	
Address of Original Installation		City	State
Dealer Purchased From	Dealer Address	City	State

First Sales, LLC.
12630 U.S. 33 North, Churubusco, IN 46723
Phone: (260)693-1972 Fax: (260)693-0602