Water King
WATER CONDITIONING

900847

HF SERIES O&M MANUAL

FULLY AUTOMATIC COMMERCIAL WATER SOFTENERS

Installation and Operating Instructions, Service Hints, and Parts Lists

Contents

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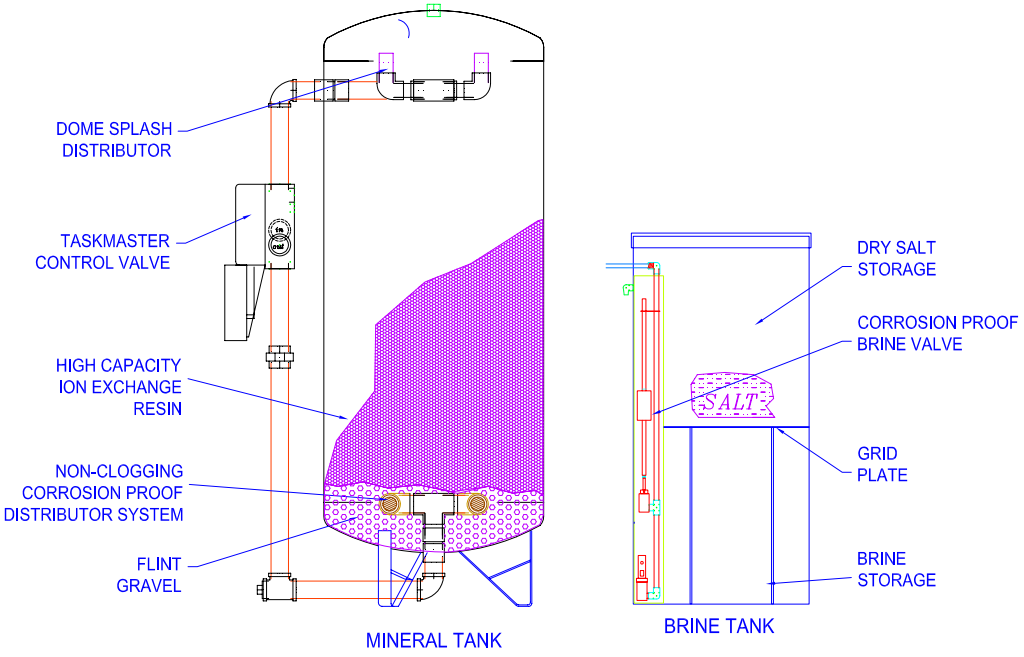
HF Series Water Softeners



Standard

Task Master™ - 2" or 2½" Valve – Side Mount
6-day timer
100 psi Epoxy Lined and Coated Carbon Steel Mineral Tanks
Accumatic™ Brine System.
Resin Polystyrene 8% DVB CL
Multiple Point ABS Distributor
110V, 60Hz, 1Ø

Options

ASME Code Tanks
7-day timer
Demand Initiation
Twin configuration with timers
Twin Alternating with EDRII and PW series meter
Shut Off Kit (SOK) to prevent bypass during regeneration
Pressure Gauge and Test Tap Kit
Skid mounting
220V, 50Hz, 1Ø

Operating Conditions

25 to 100 psi 100°F

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HF Series Sizing Information

Model №	Mineral Tanki	Capacity and Salt		Service Flow (gpm)			Minerals		Brine System		
	Dia. X Side Shell (in.)	Capacity (Kilograins)	Salt Applied (lbs)	Continuous[2]	Peak[3]	Backwash[4] (gpm)	Resin (ft^3)	Gravel (lbs)	Dia. X Side Shell (in)	Salt Storage (lbs)	Brine Valve (in)
HF-150-2	20x54	153	66	50	75	10	5	100	24x40	500	3/8
HF-180-2	20x54	196	106	60	90	10	6	100	24x50	580	3/8
HF-240-2	24x54	245	106	86	117	15	8	150	24x50	580	3/8
HF-300-2	30x60	293	106	107	134	25	10	250	24x50	580	3/8
HF-300-2 1/2				117	150						
HF-450-2	30x60	432	145	98	127	25	15	250	30x50	900	1/2
HF-450-2 ½				112	142						
HF-600-2	36x60	594	244	107	135	35	20	350	39x60	2,040	1/2
HF-600- 2 ½				119	152						
HF-600S-2 ½				137	180						
HF-750-2	36x72	731	244	104	130	35	25	350	39x60	2,040	1/2
HF-750-2 ½				116	150						
HF-750S-2 ½				136	185						
HF-900-2	42x72	837	274	115	147	50	30	500	42x60	2,370	1
HF-900-2 ½				125	157						
HF-900S-2 ½				155	217						
HF-900S-3				215	305						
HF-900S-4F				360	499						
HF1200-2 ½	48x72	1,170	388	120	210	60	40	1,100	50x60	3,360	1 ¼
HF-1200S-3				160	250						
HF-1650-2 ½	54x72	1,609	559	130	260	80	55	1,300	60x60	4,840	1 ¼
HF-1650S-3				190	300						
HF-2100-2 ½	60x72	1,890	559	140	270	100	70	1,600	60x60	4,840	1 ¼
HF-2100S-3				200	240						
HF-2100S-4F				300	450						
HF-2550-2 ½	66x72	2,490	805	140	270	120	85	2,100	72x60	6,970	1 ¼
HF-2550S-3				250	285						
HF-2550S-4F				285	500						
HF-3000S-3	72x72	2,700	805	260	350	140	100	2,600	72X60	6,970	1 ¼
HF-3000S-4F				*300*	*500*						

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HF SERIES SPECIFICATIONS

Mineral Tank (Standard Non Code Vessels). The non-code vessel shall be A36 carbon steel or better rated at 100 psi working pressure designed to a factor of safety of 3.0.

Mineral Tank (Optional Code Vessels). ASME code stamped tanks shall be available. Tank shall be clearly specified as code or non-code with a specified working pressure. Tanks "built to ASME code but not stamped" shall not be acceptable as ASME code. An ASME U1 form shall be provided with each ASME code tank.

Coating and lining. Tanks shall be prepared for internal and external coating with a SPCC 11 near white sand blast. Internal and external coating shall be two 3 - 4 mill coats of white Series 20 Tnemic Epoxy. Paint shall be applied according to manufacturer's recommendations.

Internals (HF-150, 20"Ø to HF-900, 42" Ø). The bottom distributor shall be a multipoint system using 2½" Ø single point molded distributor heads with 2½" of slotted length and a 1½ inch NPT female threaded connection. The slots shall be .012" - .016" wide to retain mineral and the total slot area shall be equal to or larger than the unit pipe size. A top dome splash distributor with an opening equal to or larger than the unit pipe size shall be installed in the mineral tank. The internal distributor piping shall be SCH 80 PVC.

Internals (HF 1200, 48"Ø and up). The bottom distributor shall be either hub and lateral or header lateral design with SCH 80 PVC header or hub piping and SCH 40 PVC slotted laterals. The slots shall be .012" - .016" wide to retain mineral and the total slot area shall be equal to or larger than the unit pipe size. The piping size of the header lateral system shall be greater than or equal to the outlet pipe size. A SCH 80 PVC top dome splash distributor with an opening equal to or larger than the unit pipe size shall be installed in the mineral tank.

Face Piping. The piping connecting the tank to the tank adaptor and valve shall be SCH 40 galvanized steel pipe with NPT fittings.

Super Flow Piping. For models with a -3S, -4S or –6S designation an automated service flow bypass shall be installed. This configuration shall include two extra diaphragm valves per tank that shall cause the service flow to bypass the Task Master™ multiport valve thereby increasing the service flow through the unit. The automated valve shall be a Water King DM series of the same size as the unit piping. Superflow piping shall employ groove fittings.

Flanged Piping. For models with a –4F or –6F designation the inlet and outlet connection shall be 4" or 6" flanges and the pipe shall be groove SCH 40 galvanized steel pipe. Piping shall be roll grooved and hydrotested at the vessel working pressure. Flanged piping systems shall be Super Flow piping configuration.

Media. The resin shall be sodium form polystyrene 8% divinyl benzene cross linked resin with clear spherical beads. Resin beads shall be 16-50 US Standard Mesh with a particle size range of 0.3 to 1.2 mm. The resin shall be clean and packaged in sealed plastic bags weighing 55 lbs or less. Underbedding shall be #20 graded washed flint gravel sieved between 1/8" and 1/16".

Brine System. The brine system shall be of the Accumatic™ high grid plate design. The brine tank shall be blow molded or rotationally molded HDPE, including a cover. The system shall include a SCH 80 PVC float operated brine valve to control refill shut-off and refill flow rate. Brine volume is to be repeatedly accurate within 10% and not dependent on salt bed void space for brine volume. Brine draw is to volumetrically controlled, not timed.

Control Valve. The main control valve(s) shall be the Task Master™ controlled by a time clock to actuate the cycles of backwash, brine, slow rinse, fast rinse, and service. The control valve(s) shall be 100 psi, multi-port control valve(s) with machined brass body, stainless steel piston assembly, Noryl® inserts, Buna-N seals, service and regeneration lights, drive motor assembly, and NEMA 3 enclosure (120VAC/60Hz/3Amps). The valve shall operate with a single motor driven, cam positioned piston. Maximum operating pressure of the valve shall be 80 psi. The valve shall be of a single piston design and not use multiple plungers or diaphragm valves. Each control valve shall be equipped with "Service" and "Regeneration" indicator lights. The valve shall be equipped with threaded ¼" FNPT ports for the installation of sample taps and pressure gauges. (Taps and gauges are optional.) Hard water by-pass shall be available during all regeneration cycles at 70 gpm or at the peak flow rate of the unit, at a pressure drop less than 25 psi, whichever is less. The valve shall be mounted to the piping using a tank adaptor and shall be removable without disturbing the installed piping.

Operating Conditions. Maximum temperature shall be 100°F. Pressure shall be 25 to 100 psi.

Internal Ejectors (HF-150 to 750). For the HF 150 to 750 series softeners brine shall be drawn into the softener with two-piece polyethylene throat and nozzle assembly mounted in a machined opening in the valve body. The internal ejector shall provide both brine flow and brine dilution.

External Ejectors (HF-900, 42"Ø and up). Brine shall be drawn directly into inlet of the mineral tank using an EE series external ejector. This venturi type device shall be SCH 80 PVC with 1" or 1 ½" FNPT connections. The venturi shall be chemically bonded to the housing. The venturi shall be precision machined. Maximum temperature shall be 140°F. The external injector shall provide both brine flow and brine dilution.

Simplex. Simplex systems shall have regeneration initiated by one (1) 6-day time clock or timer controller (standard) designed to allow up to daily regenerations at a set time of day and also control the duration of each of the cycles of regeneration. (Note: Seven-day timer is optional.) Regeneration shall also be manually initiated by advancing the timer knob per operating instructions.

Twin. Twin systems shall consist of two mineral tanks with attached control valves and one brine tank with a brine director. Regeneration initiation shall be by 6 or 7-day timers on each unit. Simultaneous regeneration of twin units shall be prevented by an interconnecting wire between the valves. No external relays or other devices shall be required. (This feature is called "Regeneration Lockout".) Twin units shall bypass during regeneration unless optional shut off kits are specified.

Twin Alternating. Twin alternating systems shall consist of two mineral tanks with attached control valves with ARC timers, one brine tank with brine director, one EDRII controller or ED520, one PW series flow meter and two shut off kits. Regeneration initiation and meter display shall be provided by the EDRII - Electronic Demand Regeneration Controller or ED520. Twin alternating units operate so that once a predetermined amount of water has passed through the PW series flow meter the EDRII initiates regeneration of the exhausted unit placing its twin in service. The timer shall be an Automatic Regeneration Controller (ARC) Timer, which, controls only the softening cycles. The brine director shall be a SCH 80 PVC shuttle type valve operating so that only one of the twin units shall draw brine at a time. A single brine valve shall service both softeners. The shut off kit shall consist of a diaphragm valve, solenoid, and wiring to prevent hard water bypass during regeneration. For HF systems the shut off kit diaphragm valve shall be the same as the outlet piping size. Twin alternating systems provide a continuous flow of softened water with no bypassing of un-softened water during regeneration.

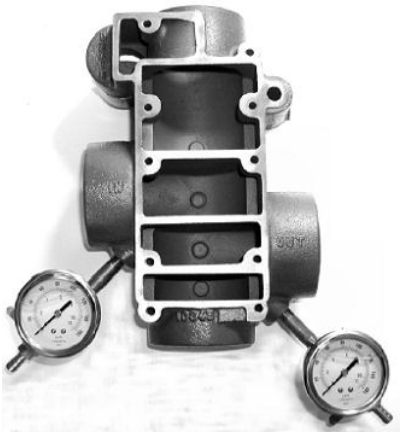
Other items. A standard soft water soap test kit shall be provided. A complete set of instructions, including installation, loading, start-up, adjustments, servicing, and a parts list shall be provided with the equipment.

Qualifications. A company that has continuously manufactured water softeners for at least 10 years shall construct the equipment.

Pressure gauge and test tap kit. A kit containing two liquid filled, stainless steel pressure gauges with 2 ½" Ø face, two brass ball valve sample taps with hose barb connections and associated brass connection fittings shall be provided for mounting in the 1/4" FNPT predrilled and tapped ports in the inlet and outlet of the Task Master II valve.

NOTES ON APPLICATION TABLE:

1. Capacities are based on 20 gpg hardness at intermittent flow rates and are 95% of laboratory results.
2. Continuous flow rates are based on 10 gpm per cubic foot of mineral or a 15 psi pressure drop, whichever is less.
3. Peak flow rates are based on 15 gpm per cubic foot of mineral or a 25 psi pressure drop, whichever is less.
4. Drains must be able to dispose of water at the listed rate for up to 20 minutes.
5. Dimensions listed are actual unit height. Add at least one foot for loading mineral tanks.
6. A twin unit includes two mineral tanks and one brine tank.



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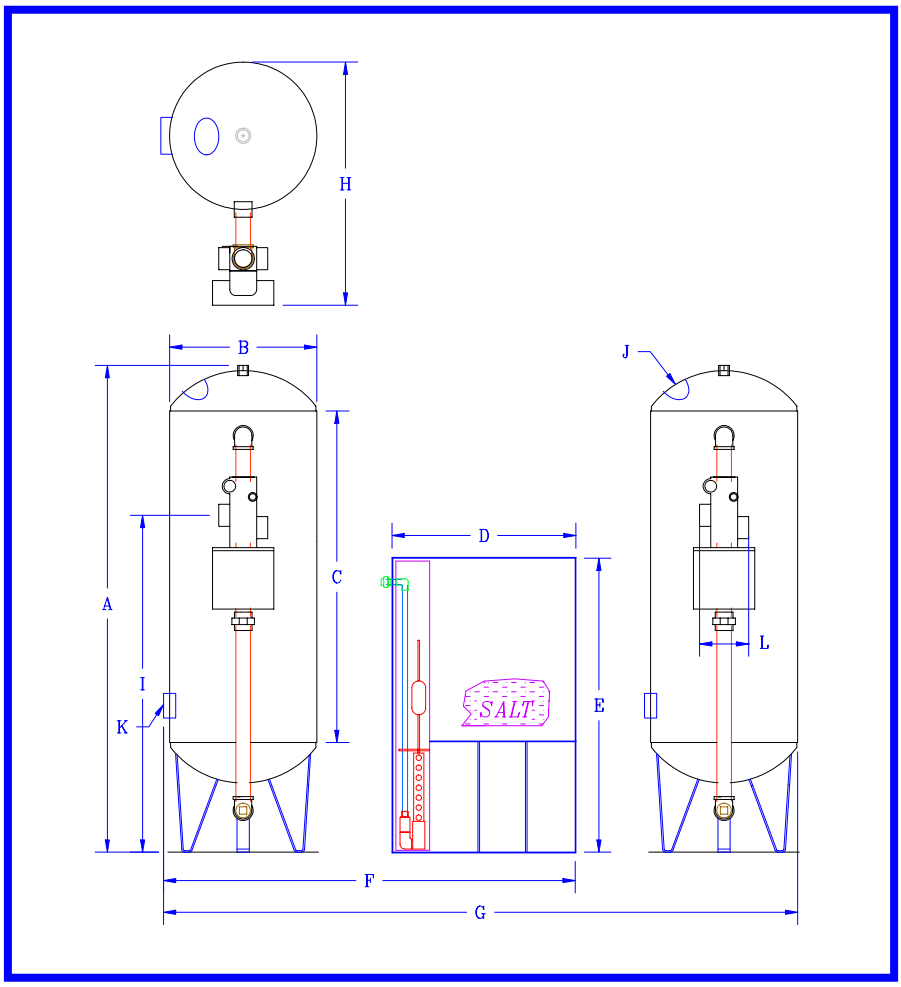
HF Softener Dimensions



HF Shipping Weights		
Model No.	Single Pounds	Twin[6] Pounds
HF 150	859	1661
HF 180	912	1767
HF 200	1040	2023
HF 225	1058	2059
HF 240	1111	2165
HF 300	1514	2971
HF 450	1832	3554
HF 600	2427	4689
HF 750	2782	5399
HF 900	3402	6629
HF 1200	5700	10100
HF 1650	7000	12500
HF 2100	8300	15100
HF 2550	10200	18200
HF 3000	12700	22000

Specifications listed are not skid mounted systems. Skid dimensions – given upon request.

HF Series Dimensions - Inches

Model	A	B	C	D	E	F	G	H	I	J	K	L
HF-150-2	69 ¼	20	54	24	50	50	76	34	52 ½	4 x 6	4 x 6	7 ¾
HF-180-2	69 ¼	20	54	24	50	50	76	34	52 ½	4 x 6	4 x 6	7 ¾
HF-200-2	70 ½	24	54	24	50	54	84	38	53	4 x 6	4 x 6	7 ¾
HF-225-2	70 ½	24	54	24	50	54	84	38	53	4 x 6	4 x 6	7 ¾
HF-240-2	70 ½	24	54	24	50	54	84	38	53	4 x 6	4 x 6	7 ¾
HF-300-2	81 ¼	30	60	24	50	60	96	45	61 ½	4 x 6	4 x 6	7 ¾
HF-300-2 ½	81 ¼	30	60	24	50	60	96	46	61 ½	4 x 6	4 x 6	7 ¾
HF-450-2	81 ¼	30	60	30	60	66	102	45	61 ½	4 x 6	4 x 6	7 ¾
HF-450-2 ½	81 ¼	30	60	30	60	66	102	46	61 ½	4 x 6	4 x 6	7 ¾
HF-600-2	82 ½	36	60	38	60	80	122	53	62	11 x 15	4 x 6	7 ¾
HF-600-2 ½	82 ½	36	60	38	60	80	122	54	62	11 x 15	4 x 6	7 ¾
HF-600S-2 ½	82 ½	36	60	38	60	80	122	54	64	11 x 15	4 x 6	7 ¾
HF-750-2	96	36	72	83	60	80	122	53	66	11 x 15	4 x 6	7 ¾
HF-750-2 ½	96	36	72	38	60	80	122	54	66	11 x 15	4 x 6	7 ¾
HF-750S-2 ½	96	36	72	38	60	80	122	54	78	11 x 15	4 x 6	7 ¾
HF-900-2	98 ½	42	72	42	60	90	138	59	67 ¼	11 x 15	4 x 6	7 ¾
HF-900-2 ½	98 ½	42	72	42	60	90	138	60	67 ¼	11 x 15	4 x 6	7 ¾
HF-900S-2 ½	98 ½	42	72	42	60	90	138	60	78	11 x 15	4 x 6	7 ¾
HF-900S-3	98 ½	42	72	42	60	90	138	61	79	11 x 15	4 x 6	7 ¾
HF-1200-2 ½	106	48	72	48	60	108	168	64	-	12 x 16	4 x 6	7 ¾
HF-1200-3	106	48	72	48	60	108	168	65	-	12 x 16	4 x 6	7 ¾
HF-1650-2 ½	108	54	72	54	60	120	186	70	-	12 x 16	4 x 6	7 ¾
HF-1650-3	108	54	72	54	60	120	186	71	-	12 x 16	4 x 6	7 ¾
HF-2100-2 ½	112	60	72	60	60	132	204	76	-	12 x 16	4 x 6	7 ¾
HF-2100-3	112	60	72	60	60	132	204	77	-	12 x 16	4 x 6	7 ¾
HF-2100-4F	114	60	72	60	60	132	204	78	-	12 x 16	4 x 6	7 ¾
HF-2550-2 ½	114	66	72	66	60	144	222	82	-	12 x 16	4 x 6	7 ¾
HF-2550-3	114	66	72	66	60	144	222	83	-	12 x 16	4 x 6	7 ¾
HF-2550-4F	116	66	72	66	60	144	222	84	-	12 x 16	4 x 6	7 ¾
HF-3000-3	116	72	72	72	60	156	240	89	-	12 x 16	4 x 6	7 ¾
HF-3000-4F	118	72	72	72	60	156	240	90	-	12 x 16	4 x 6	7 ¾

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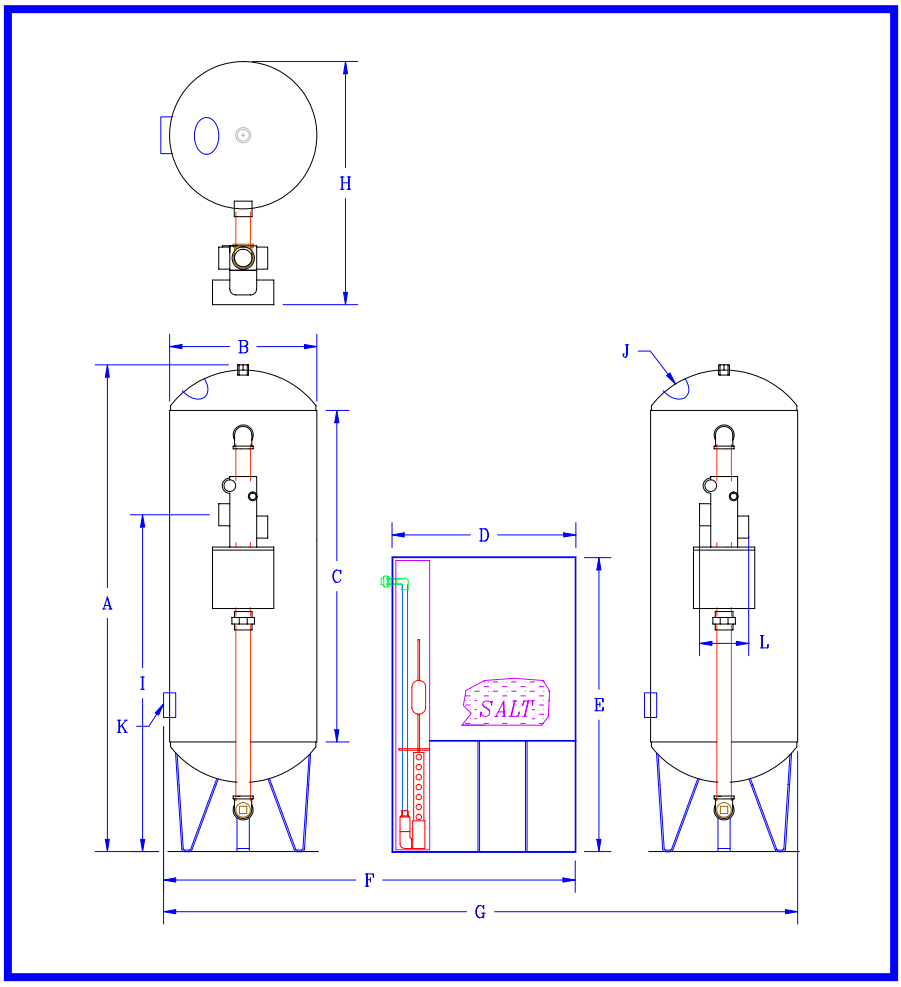
HF Softener Dimensions- Metric



HF Shipping Weights		
Model No.	Single Kilograms	Twin[s] Kilograms
HF 150	400	760
HF 180	420	810
HF 200	480	920
HF 225	490	940
HF 240	510	990
HF 300	690	1360
HF 450	840	1620
HF 600	1110	2140
HF 750	1270	2460
HF 900	1550	3020
HF 1200	2600	4600
HF 1650	3190	5690
HF 2100	3780	6870
HF 2550	4640	8280
HF 3000	5780	10000

SPECIFICATIONS LISTED ARE NOT SKID MOUNTED SYSTEMS. SKID DIMENSIONS – GIVEN UPON REQUEST.

HF Series Dimensions - Centimeters

Model	A	B	C	D	E	F	G	H	I	J	K	L
HF-150-2	175.9	50.8	137.2	61.0	127.0	127.0	193.0	86.4	133.4	10.2 x 15.2	10.2 x 15.2	19.7
HF-180-2	175.9	50.8	137.2	61.0	127.0	127.0	193.0	86.4	133.4	10.2 x 15.2	10.2 x 15.2	19.7
HF-200-2	179.1	61.0	137.2	61.0	127.0	137.2	213.4	96.5	134.6	10.2 x 15.2	10.2 x 15.2	19.7
HF-225-2	179.1	61.0	137.2	61.0	127.0	137.2	213.4	96.5	134.6	10.2 x 15.2	10.2 x 15.2	19.7
HF-240-2	179.1	61.0	137.2	61.0	127.0	137.2	213.4	96.5	134.6	10.2 x 15.2	10.2 x 15.2	19.7
HF-300-2	206.4	76.2	152.4	61.0	127.0	152.4	243.8	114.3	156.2	10.2 x 15.2	10.2 x 15.2	19.7
HF-300-2 ½	206.4	76.2	152.4	61.0	127.0	152.4	243.8	116.8	156.2	10.2 x 15.2	10.2 x 15.2	19.7
HF-450-2	206.4	76.2	152.4	76.2	152.4	167.6	259.1	114.3	156.2	10.2 x 15.2	10.2 x 15.2	19.7
HF-450-2 ½	206.4	76.2	152.4	76.2	152.4	167.6	259.1	116.8	156.2	10.2 x 15.2	10.2 x 15.2	19.7
HF-600-2	209.6	91.4	152.4	96.5	152.4	203.2	309.9	134.6	157.5	27.9 x 38.1	10.2 x 15.2	19.7
HF-600-2 ½	209.6	91.4	152.4	96.5	152.4	203.2	309.9	137.2	157.5	27.9 x 38.1	10.2 x 15.2	19.7
HF-600S-2 ½	209.6	91.4	152.4	96.5	152.4	203.2	309.9	137.2	162.6	27.9 x 38.1	10.2 x 15.2	19.7
HF-750-2	243.8	91.4	182.9	96.5	152.4	203.2	309.9	134.6	167.6	27.9 x 38.1	10.2 x 15.2	19.7
HF-750-2 ½	243.8	91.4	182.9	96.5	152.4	203.2	309.9	137.2	167.6	27.9 x 38.1	10.2 x 15.2	19.7
HF-750S-2 ½	243.8	91.4	182.9	96.5	152.4	203.2	309.9	137.2	198.1	27.9 x 38.1	10.2 x 15.2	19.7
HF-900-2	250.2	106.7	182.9	106.7	152.4	228.6	350.5	149.9	170.8	27.9 x 38.1	10.2 x 15.2	19.7
HF-900-2 ½	250.2	106.7	182.9	106.7	152.4	228.6	350.5	152.4	170.8	27.9 x 38.1	10.2 x 15.2	19.7
HF-900S-2 ½	250.2	106.7	182.9	106.7	152.4	228.6	350.5	152.4	198.1	27.9 x 38.1	10.2 x 15.2	19.7
HF-900S-3	250.2	106.7	182.9	106.7	152.4	228.6	350.5	154.9	200.7	27.9 x 38.1	10.2 x 15.2	19.7
HF-1200-2 ½	269.2	121.9	182.9	121.9	152.4	274.3	426.7	162.6	-	365.8 x 487.7	10.2 x 15.2	19.7
HF-1200-3	269.2	121.9	182.9	121.9	152.4	274.3	426.7	165.1	-	365.8 x 487.7	10.2 x 15.2	19.7
HF-1650-2 ½	274.3	137.2	182.9	137.2	152.4	304.8	472.4	177.8	-	365.8 x 487.7	10.2 x 15.2	19.7
HF-1650-3	274.3	137.2	182.9	137.2	152.4	304.8	172.4	180.3	-	365.8 x 487.7	10.2 x 15.2	19.7
HF-2100-2 ½	284.5	152.4	182.9	152.4	152.4	335.3	518.2	193	-	365.8 x 487.7	10.2 x 15.2	19.7
HF-2100-3	284.5	152.4	182.9	152.4	152.4	335.3	518.2	195.6	-	365.8 x 487.7	10.2 x 15.2	19.7
HF-2100-4F	289.6	152.4	182.9	152.4	152.4	335.3	518.2	198.1	-	365.8 x 487.7	10.2 x 15.2	19.7
HF-2550-2 ½	289.6	167.6	182.9	167.6	152.4	365.8	563.9	208.3	-	365.8 x 487.7	10.2 x 15.2	19.7
HF-2550-3	289.6	167.6	182.9	167.6	152.4	365.8	563.9	210.8	-	365.8 x 487.7	10.2 x 15.2	19.7
HF-2550-4F	294.6	167.6	182.9	167.6	152.4	365.8	563.9	213.4	-	365.8 x 487.7	10.2 x 15.2	19.7
HF-3000-3	294.6	182.9	182.9	182.9	152.4	396.2	609.6	226.1	-	365.8 x 487.7	10.2 x 15.2	19.7
HF-3000-4F	299.7	182.9	182.9	182.9	152.4	396.2	609.6	228.6	-	365.8 x 487.7	10.2 x 15.2	19.7

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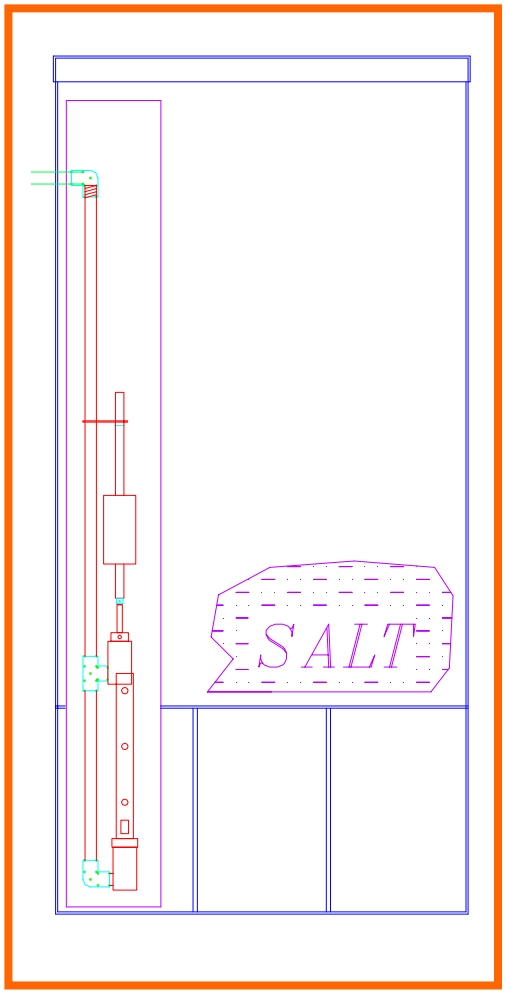
Accumatic

ACCUMATIC™ BRINE SYSTEM



The Accumatic™ brine system consists of a **brine tank** and an **internal or external brine ejector** (also called a throat and nozzle assembly) mounted inside the Task Master II™ or Task Master™ – 2 or 2-½ inch valve or mounted externally as part of a valve nest. Inside the brine tank is a **brine valve**, a protective housing called a **brine well**, and a **salt platform**.

The brine system applies a salt solution to the softener to regenerate the cation exchange resin. Saturated brine (26% NaCl by weight) is drawn from the brine tank by the ejector. Each model of softener has a different injector to generate a different brine flow rate. The corrosion resistant injectors are sized to dilute the saturated brine to 10% NaCl by weight. This brine concentration minimizes salt use during regeneration.

To create the saturated brine, dry salt is added to the brine tank, where it is dissolved in water. Since there is always an excess of salt, the brine solution is saturated. In the high grid plate design, the dry salt is not allowed to fill the bottom of the brine tank.

The saturated brine is drawn from below the grid plate (and below the salt bed) eliminating salt bridging and mushing. The Accumatic™ system controls the amount of brine solution added during regeneration and automatically refills the brine tank with water after regeneration. Because of the high grid plate, brine volume is not dependent upon void space in the salt bed. **Brine drawn during regeneration is repeatable and accurate.**

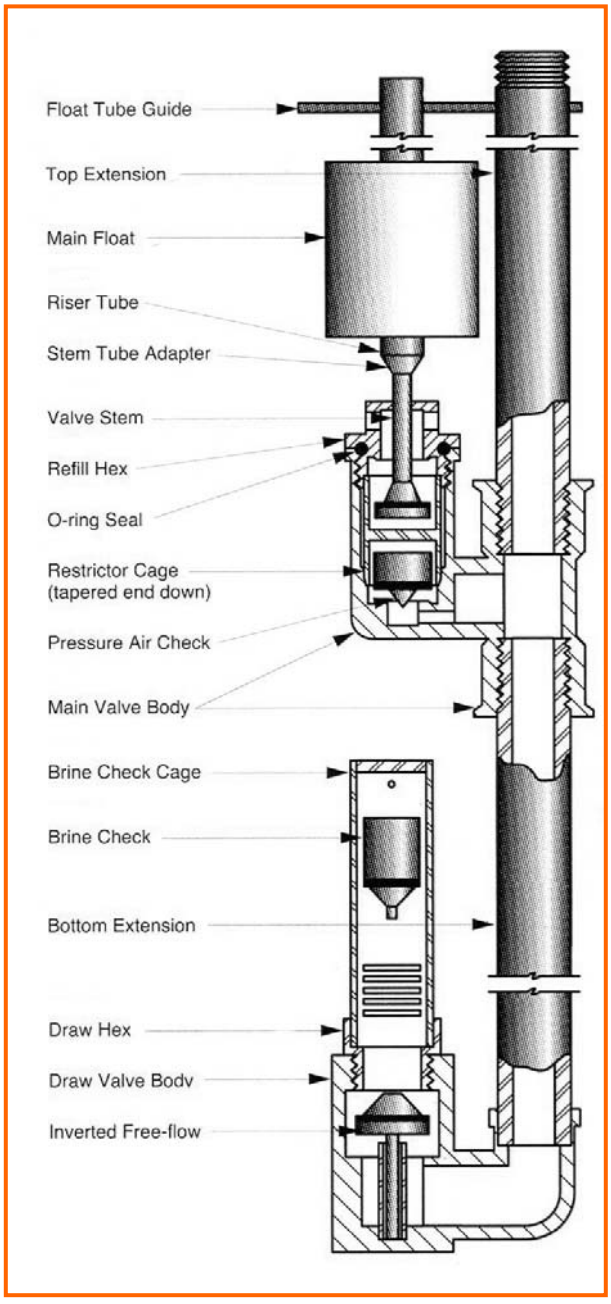
Features

- **Made from Pipe.** The Accumatic™ brine valve is available in ⅜, ½, 1″ and 1¼″ sizes. All sizes are constructed of heavy duty Sch.80 PVC. The sizes are I.D. as in pipe size, not O.D. as in tubing size. Our ⅜″ ID brine valve is the same size as other ½″ O.D. valves. The Accumatic brine valve is made from pipe, not tubing.
- **Very precise measurement of brine.** The Accumatic™ valve provides accurate volumetric control of brine draw. The same amount is drawn every time. The voids of the salt do not affect the brine draw.
- **Brine check** in brine valve prevents air draw into mineral tank.
- **Positive pressure** is applied to seat the brine valve to prevent brine contamination during the service cycle.
- **Standard systems** have a fixed brine float which is factory preset at a brine draw which works for the system. Brine draw can be adjustable by adding the optional adjustable brine float.

ACCUMATIC™ BRINE SYSTEM APPLICATION TABLE						
Water King Model No.	Salt Draw (lbs)	Capacity (Kgr)	Brine Tank Size (inches)	Brine Tank Part No.	Brine Line/ Brine Valve	Salt Storage (lbs)
50	29	49	18x40	805061	⅜"/⅜"	320
70	29	69	18x40	805061	⅜"/⅜"	320
100	66	100	24x40	805076	½"/⅜"	500
120	66	130	24x40	805076	½"/⅜"	500
150	66	153	24x40	805076	½"/⅜"	500
180	106	196	24x50	805077	½"/⅜"	580
240	106	245	24x50	805077	½"/⅜"	580
300	106	293	24x50	805077	½"/⅜"	580
450	145	432	30x50	805177	½"/½"	900
600	244	594	39x60	805178	½"/½"	2,000
750	244	731	39x60	805178	½"/½"	2,000
900	274	837	42x60	805179	--/1"	2,400
1200	388	1,170	50x60	805169	--/1¼"	3,300
1650	559	1,609	60x60	805170	--/1¼"	4,800
2100	559	1,809	60x60	805170	--/1¼"	4,800
2550	805	2,486	72x60	805171	--/1¼"	7,000
3000	805	2,700	72x60	805171	--/1¼"	7,000

ACCUMATIC™ BRINE SYSTEM OPERATION

1. The Task Master™ valve shifts to the brine position. Flow now passes through the brine injector mounted inside the valve body (internal injector). (See part #2 on the exploded view of the Task Master™.) The injector draws a vacuum on the brine line.
2. This vacuum releases the brine valve seal (originally seated by incoming fill water pressure). The Free-flow valve drops open allowing brine to be drawn from the tank. As water is drawn from the tank, the main float will drop to allow re-fill. At the same time, the vacuum draws the air check valve closed to prevent the drawing of air through the re-fill valve.
3. The unit will continue to draw brine until the water level in the brine tank reaches the bottom of the brine riser tube. At this time the brine check will seat. This again prevents air from being drawn into the system. The Task Master™ valve remains in brine position and water continues to pass through the injector even though it is not drawing brine. This cycle is called Slow Rinse. Slow rinse ends when the cycle timer advances the piston to the Fast Rinse position.
4. In the Fast Rinse position (and all other positions except Brine Draw) the brine line is under positive pressure. This positive pressure lifts the inverted free-flow valve, and the air check valve and allows water to begin refilling the brine tank.
5. Refilling continues until the water level in the brine tank reaches the preset level and the float causes the brine valve seat and seal. The continuing positive pressure on the brine line maintains this seal.



ACCUMATIC™ BRINE VALVES

Valve Size (inches)	Part No.
⅜"	706022
½"	706044
1"	706055
1 ¼"	706066

The fresh water, which entered the brine tank, is now in contact with solid salt. Over the next few hours, the water becomes saturated with salt creating saturated brine.

ACCUMATIC™ BRINE SYSTEM SUB ASSEMBLY PART Nº									
Brine Tank Assy Part №	Size	Brine Tank	Brine Well	Grid Plate	Grid Support	Brine Line/ Brine Valve	Brine Valve	Brine Line Assy	Brine Director Assy
805061	18x40	200010-1	505007	200190-1	200629-1	⅜"/⅜"	706022	200126-1	200442-1
805076	24x40	200375	505007	200612	200374	½"/⅜"	706022	200126-2	200442-2
805077	24x50	200376	505014	200145	200366	½"/⅜"	706022	200126-2	200442-2
805177	30x50	200561	505014-1	200531	200266	½"/½"	706044	200126-3	200442-3
805178	39x60	200589-RM	505014-1	200532	200273 (1)	½"/½"	706044	200126-3	200442-3
805179	42x60	200590-RM	505014-1	200533	SW4260-24	--/1"	706055	806696	200442
805169	50x60	200592-RM	505014-1	200536	SW5060-24	--/1¼"	706066	806690	200442
805170	60x60	200591-ZZ	505014-1	200537	SW6060-24	--/1¼"	706066	806690	200442
805171	72x60	200593-ZZ	505014-1	200538	SW7260-24	--/1¼"	706066	806690	200442

Brine Tank. HDPE or fiberglass tank with no accessories or perforations.

Brine Well. 505007 is 4" diameter and 505014 is 5" diameter.

Grid Plate. Masonite grid plate with nylon screen and appropriate cut out for brine well.

Grid Support. 18x40 Brine tank has plastic grid support with plastic legs at 11" height. Order 4 legs. 24x40 has a four piece Masonite grid support at 16". Order 4 pieces. 24x50 and 30x50 brine tanks have four piece Masonite grids support at 24". Order four pieces. SWxxxx are Super Web supports at 24" (note –24) height. Order one assembly.

Brine Line Assemblies. For simplex units the brine line assembly consists of six feet of polypropylene brine line and appropriate Fast & Tite tube x NPT fittings.

Brine Director Assemblies. For twin and twin alternating units a brine director is required. The brine director assembly consists of a ¾" brine director (Part Nº 200442), polypropylene brine line and appropriate Fast & Tite tube x NPT fittings.

The brine line for HF systems 900 and larger with brine tanks 42x60 and larger requires an external brine injector. The brine line assembly consists of a ductile iron diaphragm valve, a brass check valve, and a brass ball valve with appropriate galvanized NPT pipe fittings. The part numbers given are for the entire assembly. For twin and twin alternating units order a separate ¾" brine director (Part Nº 200442). For HF 900 and larger systems, the interconnecting piping between the brine tank and the mineral tanks is not provided with the standard system and is installed by others.

Installation Notes: The brine tank is normally placed 6 to 18 inches from the mineral tank. It may be located up to 20 feet away. The floor should be smooth and level, if not, shim up a piece of ¾" marine plywood to provide a smooth level surface to protect the brine tank. On start up make certain the safety float does not hang against the side of the brine well. Make certain the water level in the brine tank is 2" above the grid plate. Use clean pellet or rock salt.

WK 100 Softener Resin

WK100 IS A MULTIPURPOSE, PREMIUM GRADE, STRONG ACID CATION EXCHANGE RESIN
WK100 IS SUITED FOR SOFTENING, DEALKALIZATION AND CHEMICAL PROCESSING APPLICATIONS.

OPERATING CONDITIONS

Maximum Operating Temp:	250°F (120°C) in H+ form 280°F (140°C) in Na+
Form:	Shipped in Sodium Form
Resin bed Depth:	24"(600 mm) to 36"(900 mm)
Maximum Service Flow:	15 gpm/ft3 (120M3/Hr/M3)
Backwash Expansion space:	40 to 75%
Backwash flow Rate for 40 to 75% expansion at 77ºF (25ºC)	4 to 10 gpm/ft2 (9 to 25 M3/Hr/M2)
Regenerant:	NaCl for Na+ form.
Regeneration level:	3.7 to 10.0 lbs NaCl/ft3 (60-160 g NaCl/l)
Regenerant concentration:	5.0 to 15.0% for NaCl
Regeneration flow rate:	0.25 to 2 gpm/ ft3 (2 to 16 M3/Hr/M3)
Regeneration time:	20-60 minutes
Fast Rinse:	At service flow rate
Slow Rinse:	At regeneration flow rate
Rinse Volume:	25 to 40 gal/ft3 (3 to 5 M3/M3)

INFLUENT LIMITATIONS

Free Chlorine:	Not traceable
Turbidity:	Less than 2 N.T.U

WK 100 RESIN CHARACTERISTICS

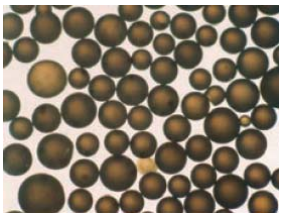
Type	Strong acid cation exchange resin
Matrix Structure	Cross linked polystyrene (8%)
Functional group	Sulphonic acid
Physical form	Moist spherical beads
Ionic form	Hydrogen/ Sodium (KW100 is the sodium form)
Particle Size	0.3-1.2mm
Screen Size U.S.S (wet)	16-50
Total Exchange capacity	2.0 meq/ml (Na^+) form / 1.8 meq/ml (H^+)
Swelling (approx.)	Na^+ to H^+ 7%
Moisture content (approx.)	52% (H^+), 45% (Na^+)
Backwash settled density	50 to 52 lbs/ft^3 (800 to 840 g/l) in H^+ form 52 to 55 lbs/ft^3 (840 to 880 g/l) in Na^+ form
Operating pH range	0-14
Solubility	Insoluble in all common solvents
Shipping weight	0.82 Kg/l (approx.) in H^+ form 0.86 Kg/l (approx.) in Na^+ form

Water King
WATER CONDITIONING

RESIN PACKS

PART NO	DESCRIPTION		TANK (1) 9x48 10x54		RESIN CUBIC FT	GRAVEL CUBIC FT (2)	WEIGHT POUNDS
479900	RESIN PK	30	10X54	F	1	0.15	70
479901	RESIN PK	45	10X54	F	1 1/3	0.15	90
479902	RESIN PK	50	12X52	F	1 1/2	0.15	90
479903	RESIN PK	70	13X54	F	2 1/4	0.30	150
479904	RESIN PK	100	14X65	F	3 1/4	0.40	210
479905	RESIN PK	120	16X65	F	4	0.55	260
479906	RESIN PK	150	21X62	F	5	1.40	390
479907	RESIN PK	240	24X72	F	8	2	600
479908	RESIN PK	300	30X72	F	10	2 1/2	750
479909	RESIN PK	450	36X72	F	15	3	1050
479921	RESIN PK	120	18X54	S	4	1	300
479922	RESIN PK	150	20X54	S	5	1	350
479923	RESIN PK	180	20X54	S	6	1	400
497724	RESIN PK	200	24X54	S	6 2/3	1 1/2	490
479925	RESIN PK	225	24X54	S	7 1/2	1 1/2	530
479926	RESIN PK	240	24X54	S	8	1 1/2	550
479927	RESIN PK	300	30X60	S	10	2 1/2	750
479928	RESIN PK	450	30X60	S	15	2 1/2	1000
479929	RESIN PK	600	36X60	S	20	3 1/2	1350
479930	RESIN PK	750	36X72	S	25	3 1/2	1600
479931	RESIN PK	900	42X72	S	30	5	2000
479932	RESIN PK	1200	48X72	S	40	11	3100
479933	RESIN PK	1650	54X72	S	55	13	4050
479934	RESIN PK	2100	60X72	S	70	16	5100
479935	RESIN PK	2550	66X72	S	85	21	6350
479936	RESIN PK	3000	72X72	S	100	26	7600
480000	SOFTENER	RESIN	WK100	-	1	0	52
480012	GRAVEL	#20	-	-	0	1	100
480000	RESIN	PALLET			40	0	2080

NOTES:
F - FIBERGLASS OR POLY GLASS TANKS
S - STEEL TANKS
GRAVEL WEIGHT IS 100 POUNDS PER CUBIC FT.



102 Charbonnet Road ♦ Duson, Louisiana 70529 ♦ 337 988 2360 ♦ Fax 337 981 7922
wkinfo@waterking.com ♦ Revised 06/20/06

Pre-Installation and Location Check List

1. Water Pressure. 25 psi minimum is required. If pressure is over 100 psi, a pressure reducing valve should be installed.
2. Drain. The unit should be located close to a drain. The drain must be capable of disposing of water at the unit backwash rate for up to 20 minutes.
3. Space requirements. Make sure adequate floor space and headroom is available. The brine tank must be accessible to allow loading and unloading of salt. System valves and controls must be accessible for operation and maintenance.
4. Access. Make certain the pieces of the softener will fit through the doors and openings of the buildings in which they will be installed. Pay particular attention for skid mounted systems.
5. Floor. Locate the conditioner on a firm level foundation, preferable concrete. Provide a method for anchoring the mineral tanks to the floor or wall to prevent tipping.
6. Pipe supports. Plan for pipe supports and routing of interconnecting piping for the water treatment system.
7. Electrical requirements – 120 volt, 60 Hz, 3 amps. Export Model 220V, 50 Hz, 1.5 amps.
8. Brine Tank. Make sure the floor on which the brine tank will stand is smooth and level. If not, make a platform from ¾" marine plywood and shim it to level. This will protect the brine tank. The brine tank is normally placed about 6 inches from the conditioner tank however, it may be located up to 20 feet away.
9. Do not locate the conditioner where it or its connections may be subjected to freezing temperatures.
10. Environmental Conditions. Avoid placing the treatment system adjacent to chemical storage or in corrosive environments. Most systems are located inside a building or at least under a shed to protect equipment and operators from the elements.
11. Floor loads. The tanks will be full of water during normal operation. Structural design of slabs and buildings must accommodate the weight of the treatment system components.

Assembly and Plumbing

1. Place and anchor mineral and brine tanks.
2. Install piping according to the TYPICAL PIPING ARRANGEMENT.
3. Balanced piping. In order to insure equal water distribution, it is necessary that both units have identical plumbing arrangements between the inlet manifold and the valve, and between the valve and the outlet manifold.
4. Inlet and outlet piping. Connect the inlet of the conditioner to the raw water supply. When facing the tank adapter, the inlet is on your left. Connect the outlet of the conditioner to the service line. As shown on the installation drawings, inlet, outlet, and bypass valves should be used to facilitate servicing of the conditioner. Unions may be installed between the tank adapter and inlet and outlet valves.
5. Drain. Install the drain piping to tank adapter. The drain elbow may be rotated 360° to facilitate plumbing installation. Do not reduce the pipe size below what is provided on conditioner. The drain line should be as short as possible and should discharge as low as possible. Never extend the drain line more that 40 feet. If water pressure is below 30 psi, the discharge end of the drain line must not be higher than the control valve of the conditioner. A drain flow control, properly sized to provide the appropriate backwash flow rate, must be installed in the drain line.
6. Brine Tank. Locate the brine tank as close to the conditioner tank as possible. Be sure tank is on a flat, level surface free of sharp objects. Turn the tank so that the brine valve will be located at the side nearest the conditioner tank. The brine valve should be accessible, but not located where salt may accidentally be poured into the brine well. Connect the brine line tubing or customer supplied brine line between the Taskmaster valve and the brine valve.
7. Tie in all appropriate electrical connections to the control panel according to WIRING DIAGRAM.
8. Bring power to control panel. Connect appropriate wires to flow meters and actuators.
9. Flush pipes with fresh water to remove any debris. Remove protective coverings from pipe connections. Tie all piping to appropriate connections.
10. Follow the RESIN LOADING instructions (900860) for filling the softener with gravel and resin.
11. Set the regeneration cycle of the controller.
12. After the controller has been programmed, manually cycle the controller and check for proper operation.
13. Open inlet valve. Fill system with water. As water enters the vessels, air trapped in the system must be released through vent valves on top of filters. Set the controller to service position and allow the effluent to drain for a few minutes to release any media fines and debris in pipes.

14. Check system connections for any leaks. Repair if necessary and repeat the start-up procedure.
15. Manually cycle controller and check for proper sequencing of valves. Do not leave in backwash position for any length of time until you are positive all air is out of system and the system has test cycled through 3 or 4 quick manual sequencing.
16. Close all normally closed manual valves and open all normally open manual valves.
17. CONTINUOUSLY monitor the service flow rate of the system. A large drop in outlet pressure indicates that the softener may be clogged and should be immediately backwashed. Manually advance the positions on the controller to backwash the vessel.
18. NOTE: NEVER EXCEED A DIFFERENTIAL PRESSURE OF 15 PSI. Higher flow rates and pressure drops can also cause a loss of media through the service line and/or damage to the internal distributor system.
19. Lower flow rates and pressure can cause channeling where the water finds a path of least resistance through the media allowing water to escape un-softened.
20. REGULARLY monitor the flow rate of the backwash supply. Ensure that the flow control continues to operate properly. The recommended backwash rate must be maintained to clean the media but not be exceeded to prevent media loss. The backwash flow control should be removed and cleaned periodically.
21. INSPECT the system to see that all mechanical equipment is operating. Become familiar with the sound of properly running mechanical items. This will aid in early detection of faulty equipment.

Start Up

1. Items to complete before start up
   - 1.1. Assemble project documentation including plans, specifications, submittals, and O&M manuals.
   - 1.2. Determine safety requirements of facility and make certain we are in compliance.
   - 1.3. Determine contact names and persons to be present during start up.
   - 1.4. Before start up piping must be complete including required hydrotests and sanitation.
   - 1.5. The water treatment system must be completely installed including electrical wiring, piping and controls.
   - 1.6. Resin or filter media and gravel must be installed in tanks.
   - 1.7. Water must be supplied to the brine tank. Start up can take place without salt in the brine tank.
2. On-site installation verification
   - 2.1. Piping
     - 2.1.1. Does it match the plans? Is the piping configuration logical?
     - 2.1.2. Is it properly installed? Is quality of workmanship adequate?
     - 2.1.3. Are the manual bypass valves and the manual isolation valves in the correct location?
     - 2.1.4. Is drain piping correctly sized?
     - 2.1.5. Are the flow meter(s) positioned correctly?
     - 2.1.6. Is the direction of flow correct on check valves and diaphragm valves?
     - 2.1.7. For shut off kits and super flow kits, check valve installation, tubing installation and wiring.
   - 2.2. Brine System
     - 2.2.1. Is the brine tank correctly installed? Is the grid plate in place? Are the brine valve and brine director in place
     - 2.2.2. Is the brine line correctly installed with a direct path to the mineral tank? Is it free of kinks? Is it tight to prevent vacuum leaks?
     - 2.2.3. Make certain the float is not dragging in the brine tank.
     - 2.2.4. Is the water level up to the float in the brine tank? Is the water level in the brine tank 2” above the grid plate?
     - 2.2.5. Is the vent hole in the Styrofoam float tube open? If not move float up to clear this hole.

2.2.6. Is the external injector properly installed? Is the correct injector in the valve?

2.3. Electrical

2.3.1. Review electrical with electrical contractor. Tie in all appropriate electrical connections to the control panel according to WIRING DIAGRAM.

2.3.2. Double check wiring.

2.3.3. Does it match electrical drawings from manuals?

2.3.4. Check terminals strips for correct locations and tightness.

2.4. Controls

2.4.1. Control Valves

2.4.2. Electronic Demand Regenerator (EDR) Program at this time

2.4.3. Flow Meter

2.4.4. Solenoid Valves

3. Cycle Testing

3.1. Isolate system

3.1.1. Close Outlet Valves

3.1.2. Open Bypass Valve

3.1.3. Open Inlet Valves (s l o w l y)

3.1.4. Vent each Vessel

3.2. Power up and make certain every thing works

3.2.1. On twin system, one unit will go to stand by. ASCO will energized & get warm. Diaphragm Valve will be closed. Check with paper clip. If it goes in more than 1 ¼, valve is open. Warm ASCO, Valve should be closed.

3.2.2. Work with the Unit in Stand By

3.2.3. Manually start regeneration from the timer. Piston will move to backwash cycle. Check flow to drain. Watch for resin in drain. Water may be discolored. (color throw) Does flow match O & M? Do not leave in this cycle longer than one minute.

3.2.4. Advance timer to brine draw position. Is water level in Brine Tank moving down?

3.2.5. Advance Timer to Fast Rinse Position. Check flow to drain. Does flow match O & M? Watch for resin. Water may be discolored. (color throw) Do not leave in this cycle longer than one minute.

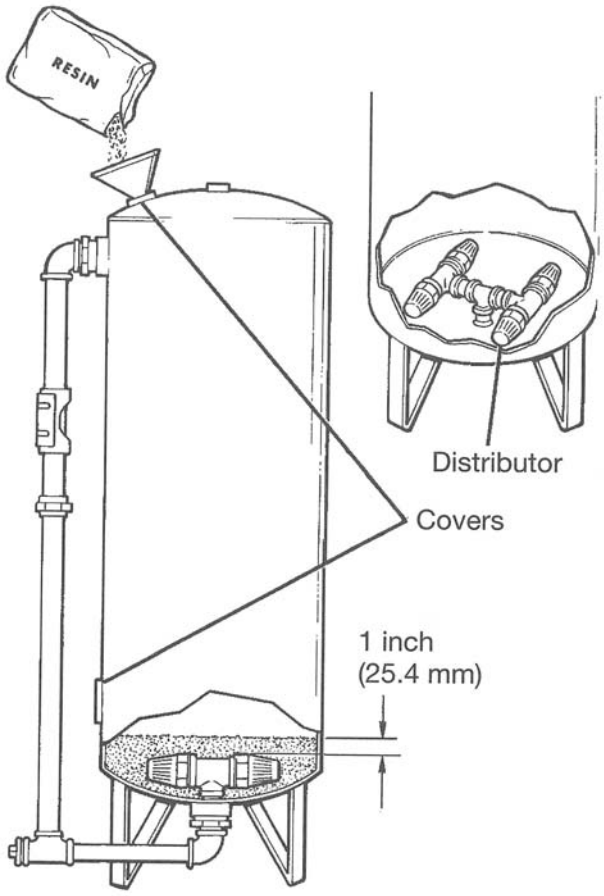
3.2.6. Advance timer to service position.

3.2.7. Repeat short cycles until water to drain is clear.

3.2.8. Repeat with other units.

4. Place System Online
   - 4.1. Ask operator for permission to open outlet valves.
   - 4.2. Open outlet valves slowly.
   - 4.3. Close Bypass Valve.
   - 4.4. Water pressure should stabilize.
5. Check Operation of EDR II
   - 5.1. Verify water flow from EDR
   - 5.2. Re-program EDR preset regeneration volume to 1. As water passes through the flow meter the unit will soon automatically start regeneration. Verify that a 3-minute start signal was sent from EDR II to Taskmaster control valve. (The purpose of this test is to verify the start signal. The cycle timer operation has already been verified in the previous step.)
   - 5.3. Re-program EDR II with presets to original calculations.
6. Final Equipment Check
   - 6.1. Make certain both outlet valves are open.
   - 6.2. Check system over completely.
   - 6.3. Is the system making soft water?
7. Training Session Syllabus
   - 7.1. Explain the water softening process including ion exchange and brine regeneration.
   - 7.2. Explain each step of the regeneration process.
   - 7.3. Go through each component of the system explaining its function, and specifications. Reference appropriate sections of the O&M manual.
   - 7.4. Explain the programming of the EDRII using the EDRII manual.
   - 7.5. Explain how to start a manual regeneration.
   - 7.6. Answer all questions.
8. Exit
   - 8.1. Take pictures of installation for record purposes if possible.
   - 8.2. Obtain names and contact information for all attendees and observers at start up and start up training.
   - 8.3. Exit facility making certain to sign out if required.

INSTALLATION OF RESIN AND GRAVEL IN MF & HF SYSTEMS



Remove all handhole or manway covers and inspect the interior of the tank for debris. The interior should be reasonably clean. Check the under drain system for tightness of fittings and very carefully inspect for damage that may have occurred in shipment.

Install and level the gravel support bed through the side openings of the tank. Gravel must be loaded carefully to prevent under drain damage. Leveling is facilitated by filling the lower tank dome with water and spreading gravel evenly. Make sure the entire distribution system is covered with at least 2" of #20 Gravel 1/8" x 1/16". Check specifications for exact quantities.

Replace and secure the side opening cover. Check the sealing surfaces for smoothness and cleanliness. Carefully center the gasket and make sure there is no gravel lodged between the tank, gasket, or cover.

Load the RESIN through the top opening of the tank. Check specifications for exact quantities. There is no need for leveling. The resin bed will level itself during backwash.

Remove all RESIN from the top of the tank and manway. Fill the tank with water. Allow the unit to stand a minimum of two hours before backwashing or placing the unit in service. This is to allow the RESIN to absorb water and to prevent it from being washed to the drain during the initial backwash.

After soaking, replace the top cover until the unit is ready for start-up. The media is now installed in the vessel.

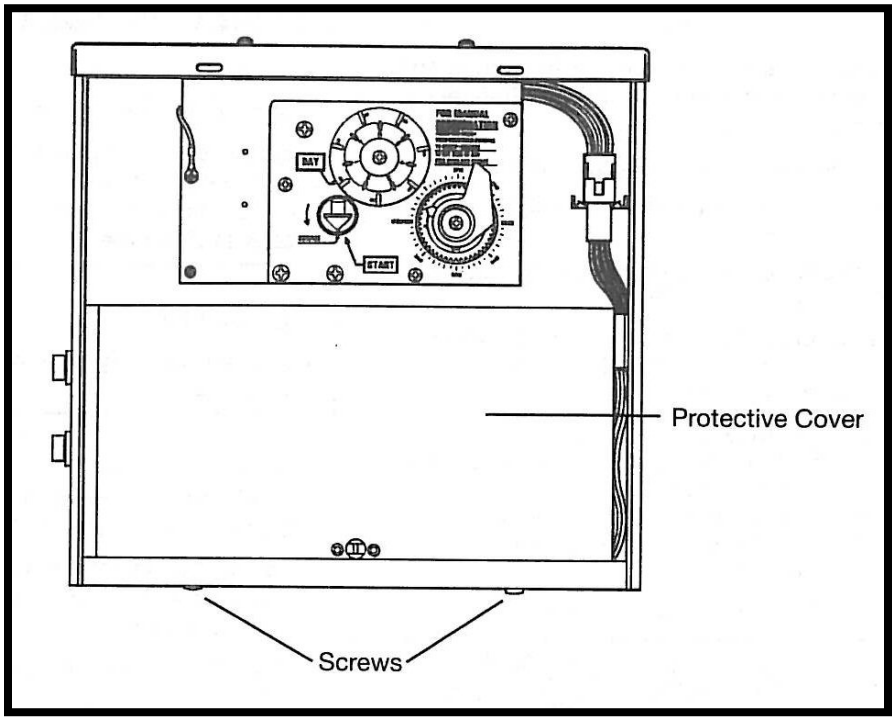
HF Valve Installation

The HF regeneration/control valve is a fully automatic, all brass water softener/filter valve. It accomplishes the cycles of softening with a single moving wetted part. The piston is motor driven. The timer switches and relays are enclosed in a NEMA 3 metal control box. Service and regeneration lights are mounted on the face of the box. The valve body is pre-tapped for inlet /outlet pressure gauges and sample taps. Brine draw rate is controlled by an external venturi educator mounted at the brine tank. Accurate brine education allows regeneration at the optimum brine dilution (10%).

All plumbing (inlet, outlet, and drain) is connected to the tank adapter. The valve can be removed for service without disturbing any of the plumbing connections. Standard electrical is 110 Volt AC at 60 Hertz. Fifty (50) Hertz at 220 Volts AC is also available. Standard models include twelve (12) day timers. Seven (7) day timers are available if requested. For use with meter regenerated systems, an ARC (auto reset controller) is supplied in place of a traditional clock initiated timer.

HF Valve Installation Procedure

- Unpackage the control valve being careful not to damage machined surface. (Bottom of casting)
- Place gasket on valve using 2 bolts to hold gasket in position.
- Place valve on adapter. Install with ten (10) Allen head cap screws and tighten evenly.
- Complete the electrical connections: 100 VAC, 155 VAC and 230 VAC units: Remove the protective cover and complete the wiring to terminals 2, 4 and 7 of the terminal block as per the wiring diagram. Reinstall the protective cover.
- Note: Conduit is recommended.
- 24 VAC Units: The power supply transformer should have a minimum rating of 200 volt-amps to run the drive motor and timer motor. If additional electrical components, such as solenoid valves, are connected to the terminal block, the volt-amp rating of the transformer must be increased to accommodate the added load.



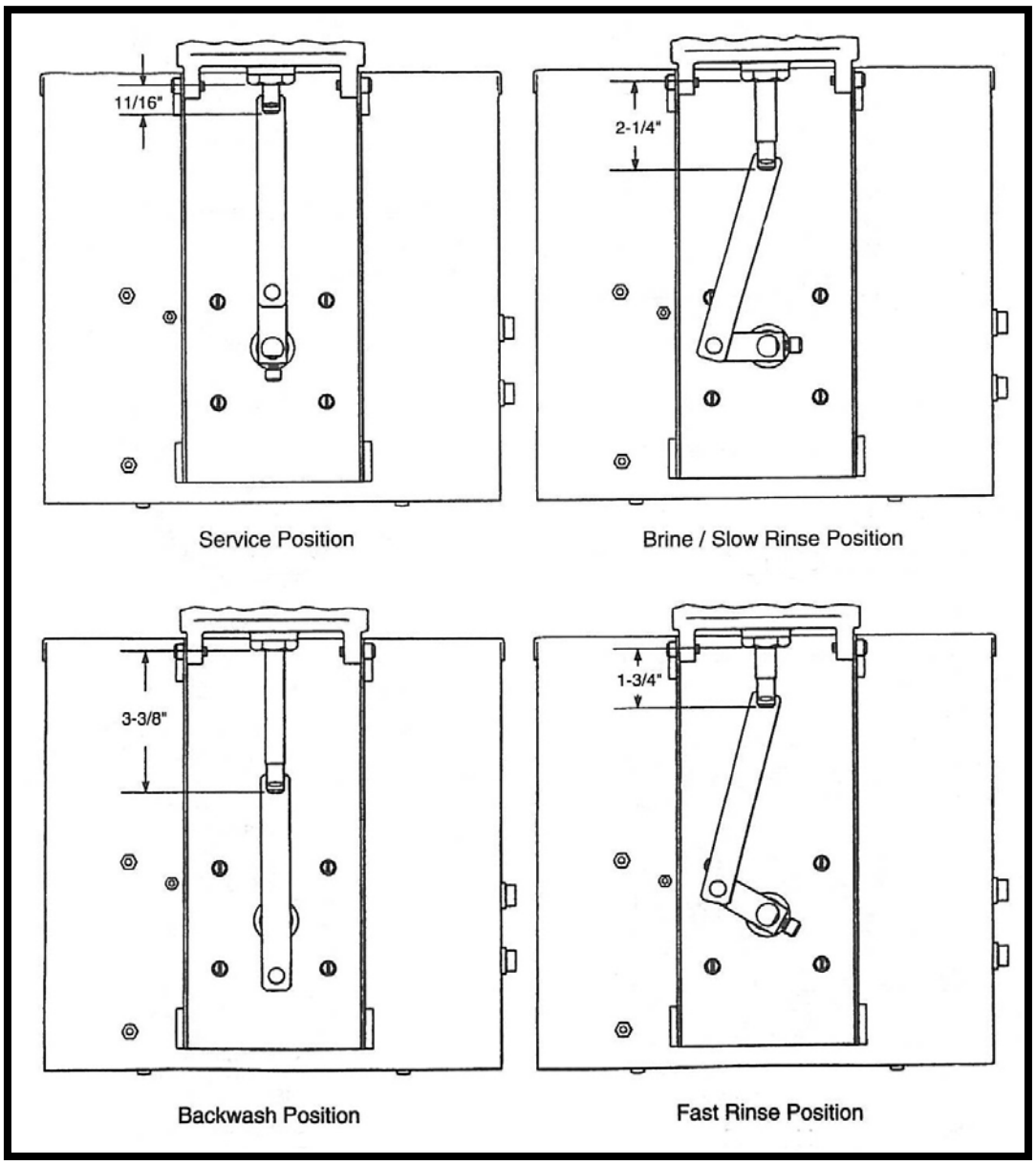
Check Valve Positions

1. Push in red knob on timer, turn counter clock wise untill arrow points to the START position to move the piston to the BACKWASH position.
2. Push in the red knob on timer, turn counter clock wise to the BRINE/SLOW RINSE position. Make certain the valve draws brine.
3. Manually rotate the timer counter clock wise slowly, until the piston moves to the FAST RINSE position. Allow the valve to remain in the FAST RINSE position to refill the brine tank and to rinse the brine out of the resin tank.

After about 11 minutes the valve will return to the SERVICE position.

NOTE: Drive motor must stop at each position before rotating red knob on timer to next position.

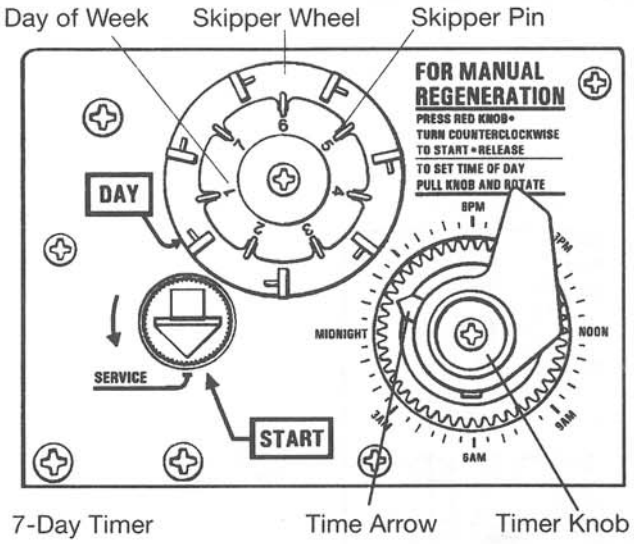
HF Valve Positions

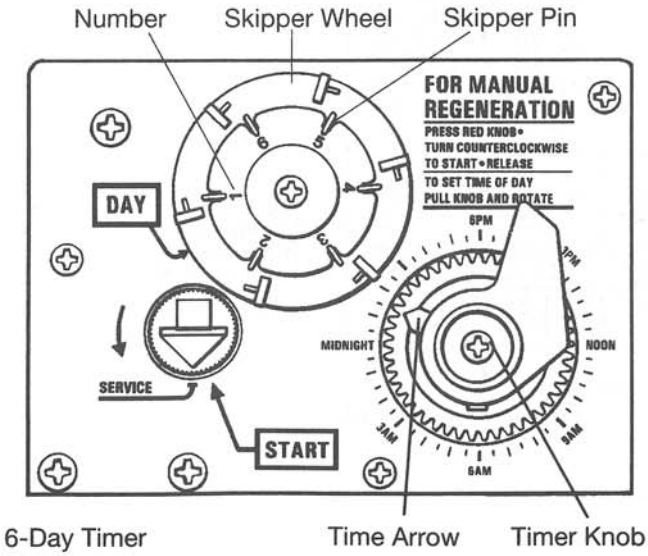


Set Timer

Determine a regeneration schedule for the conditioner and adjust the automatic timer as follows

1. Pull all the skipper pins out (away from control).
2. Rotate skipper wheel until day arrow points to day of week or number 1.
3. Depress skipper pin(s) for day(s) regeneration is required.
4. Pull timer knob out (away from the timer face) and rotate until time arrow on timer knob points to correct time of day on face plate.
5. Timer will automatically initiate regeneration on preset days at 2:30 A.M. To alter time, simply reset timer knob to an earlier or later time which will change the time of regeneration by the same number of hours. (Time indicated at time arrow will no longer be correct.)





Manually Initiated Regeneration

Push in Red Knob and turn counter clock wise to START position. Release REd Knob and conditioner will go through a complete Regeneration.

Water King Part Numbers
707200 Six Day Timer
707200-3 Seven Day Timer

Regeneration Cycle Time Instructions

Pin Time Chart

Backwash or Fast Rinse		Brine and Slow Rinse	
No.of Pins Out	Time Minutes	No. of Pins In	Time Minutes
1	8	2	1.5
2	11	3	4.5
3	14	4	7.5
4	17	5	10.5
5	20	6	13.5
6	23	7	16.5
7	26	8	19.5
8	29	9	22.5
9	32	10	25.5
10	35	11	28.5
11	38	12	31.5
12	41	13	34.5
13	44	14	37.5
14	47	15	40.5
15	50	16	43.5
*		*	

* Each additional pin either pulled out or pushed in equals 3 minutes.

Set Backwash Timing

Pull pins as shown for backwash time desired. Reference Pin Time Chart.

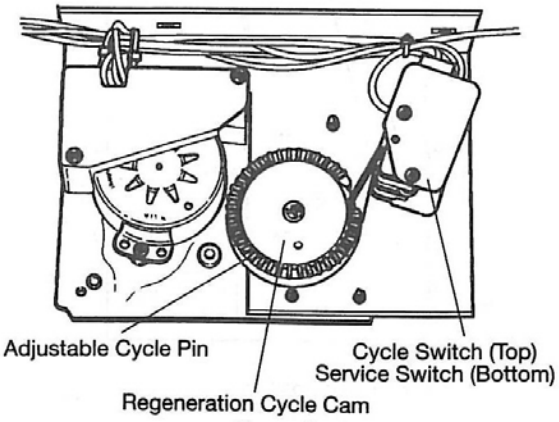
Set Brine/Rinse Timing

Depress pins as shown for desired brine/rinse time, minimum of two pins down. Reference Pin Time Chart.

Set Fast Rinse Timing

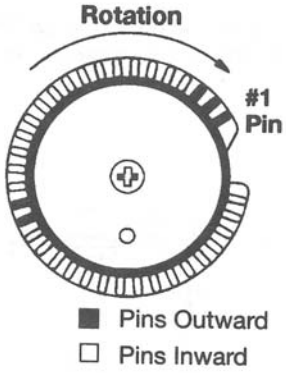
Pull pins as shown for desired fast rinse time. Reference Pin Time Chart.

Timer - Rear View



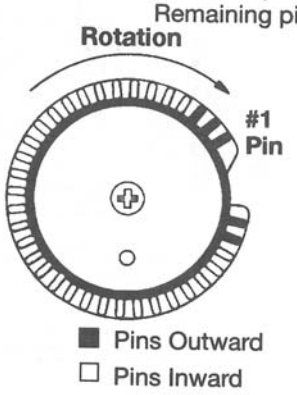
Typical Water Conditioning Cycle

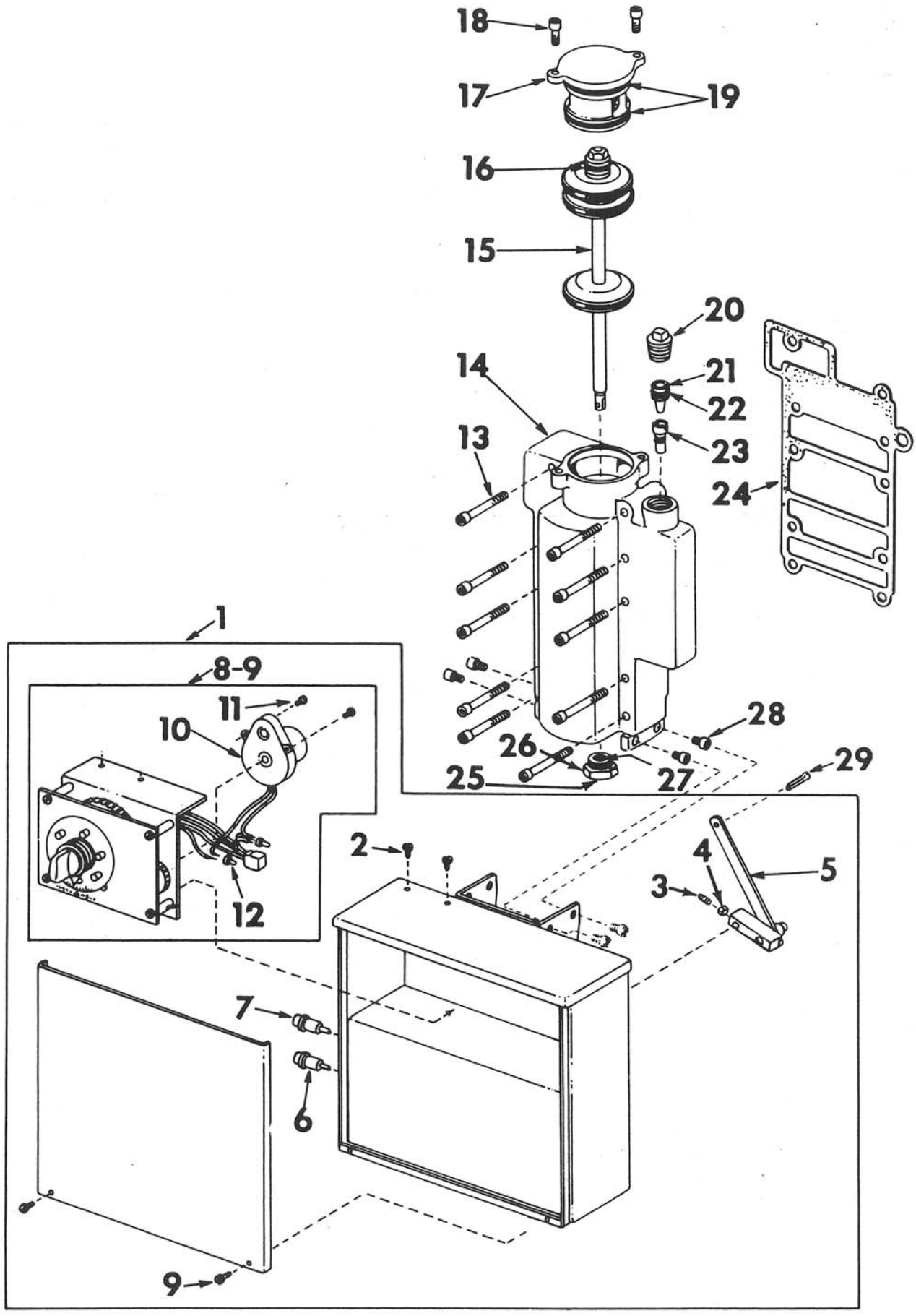
Backwash ..... 14 min. ..... 3 pins outward
Brine / Rinse ..... 40.5 min. ..... 15 pins inward
Fast Rinse ..... 11 min. ..... 2 pins outward
Remaining pins inward



Variation Water Conditioning Cycle

Backwash ..... 14 min. ..... 3 pins outward
Brine / Rinse ..... 88.5 min. ..... 31 pins inward
Fast Rinse ..... 11 min. ..... 2 pins outward
Remaining pins inward





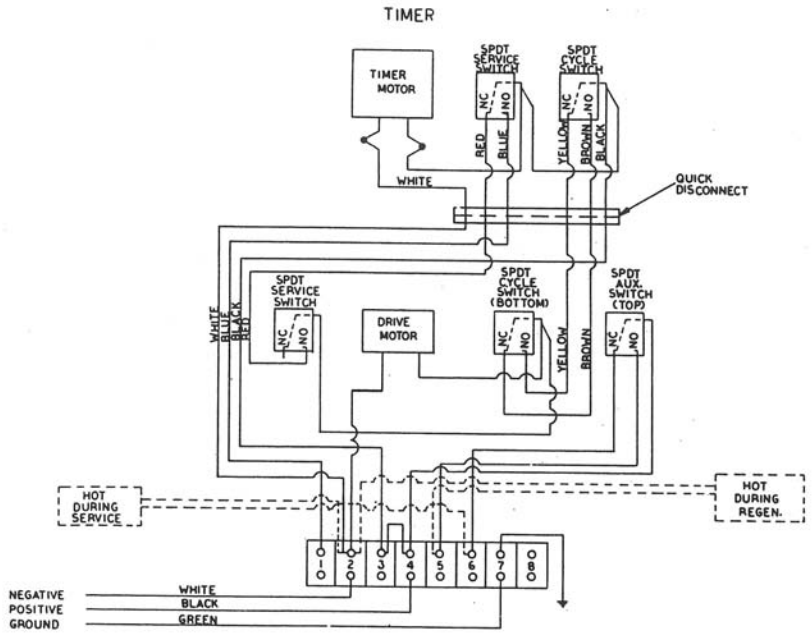
Literature № 900886 TASKMASTER VALVE EXPLODED VIEW

Internal Throat and Nozzle Assembly Part № and Performance for Taskmaster Valve on HF Systems

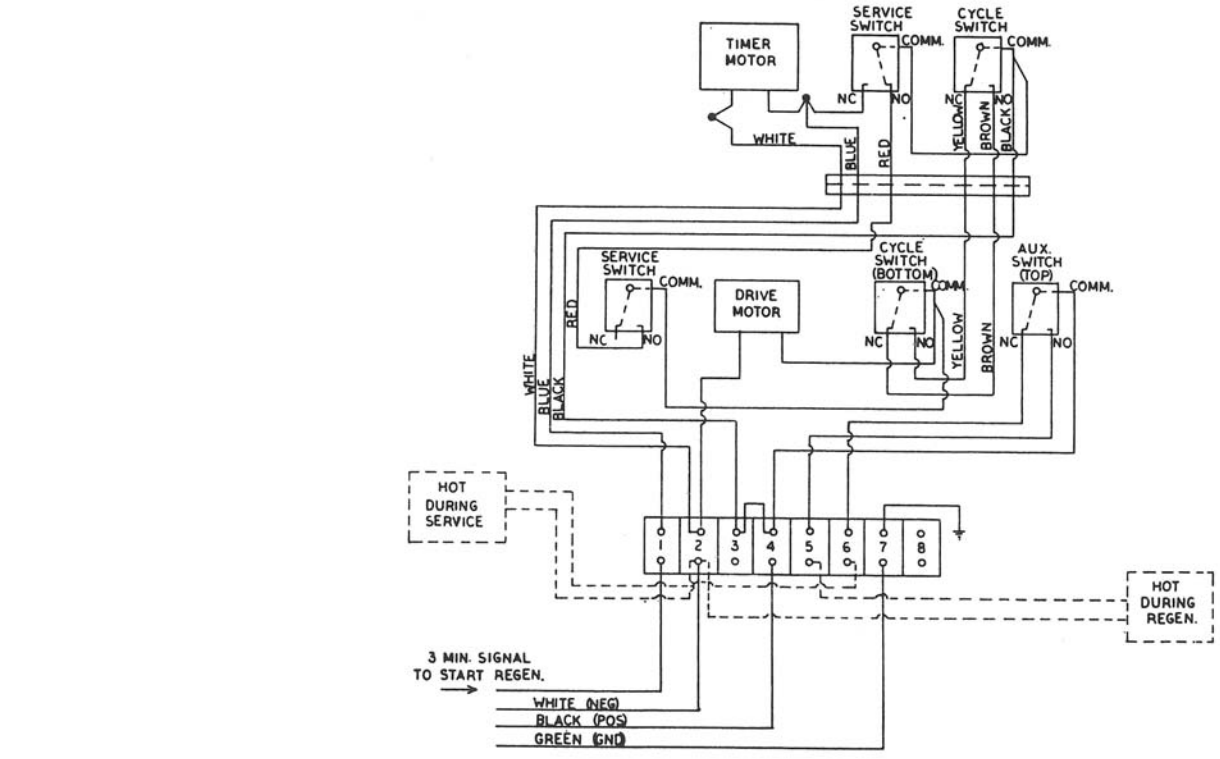
Model No.	Nozzle	Throat	Saturated Brine Draw gpm	Slow Rinse gpm	Dilute Brine to Mineral Tank gpm
150	320041	320049	1.4	2.3	3.7
240	320041	320049	1.4	2.3	3.7
300	320043	320051	1.7	2.8	4.5
450	320046	320054	2.6	4.5	7.1
600	320046	320054	2.6	4.5	7.1
750	320046	320054	2.6	4.5	7.1
900 and up	Use external ejectors.				
Filters	Plugged Injectors Part № 320005				

Ref. No.	Part No. 110V-60 Cy.	Description	Part No. 220V-50 Cy.
1	607068	Timer & Drive Motor Assembly 6 Day	—
1	607069	Timer & Drive Motor Assembly 7 Day	607103
2	400173	Screw — 6-32 x ⅜" Lg. (2 Req.)	
3	400177	Set Screw - ⅜" - 16 Cup Point	
4	400131	Jam Nut - ⅜" - 16	
5	720092	Drive Link Assembly (w/Items 3 & 4)	
6	300608	Pilot Light (Service)	300645
7	300607	Pilot Light (Regeneration)	300644
8	607076	Timer Assembly 6 Day (6/7 RPM)	607131
	607064	Timer Assembly 7 Day (1 RPM)	607102
9	607065	Timer Assembly A.R.C. Operation	
10	300556	Timer Motor 6 Day	300593
	300594	Timer Motor 7 Day	300610
11	400158	Screw 4-40 x 3/16" (2 Req.)	
12	300082	Wire Terminal (2 Req.)	
13	400166	Mach. Screw 5/16 - 18 x 2¾" Lg. (10 Req.)	
14	320099	Valve Body	
15	507223	Piston Assembly (w/No.16) - OLD NO. 507049	
16	400078	"O" Ring	
17	320108	Drain Casting	
18	400165	Mach. Screw 5/16 x 5/8" Lg. (2 Req.)	
19	402006	"O" Ring (2 Req.)	
20	420227	Pipe Plug ¾ NPT Brass	
21	320040	Nozzle #45 (For 20" x 54" Tank)	
	320041	Nozzle #39 (For 24" x 54" Tank)	
	320043	Nozzle #31 (For 30" x 60" Tank)	
	320044	Nozzle #29 (For 36" x 60" Tank)	
	320045	Nozzle #27 (For 36" x 72" Tank)	
	320046	Nozzle #22 (For 42" x 72" Tank)	
22	400050	"O" Ring	
23	320048	Throat #22 (For 20" x 54" Tank)	
	320049	Throat #16 (For 24" x 54" Tank)	
	320051	Throat #7 (For 30" x 60" Tank)	
	320052	Throat 15/64" (For 36" x 60" Tank)	
	320053	Throat ¼" (For 36" x 72" Tank)	
	320054	Throat 17/64" (For 42" x 72" Tank)	
24	400623	Gasket	
25	340003	1¼" Valve Cap, Back	
26	400060	"O" Ring	
27	400077	"O" Ring	
28	400150	Capscrew 5/16-18 x ⅜" Lg. (4 Req.)	
29	400504	Cotter Pin	

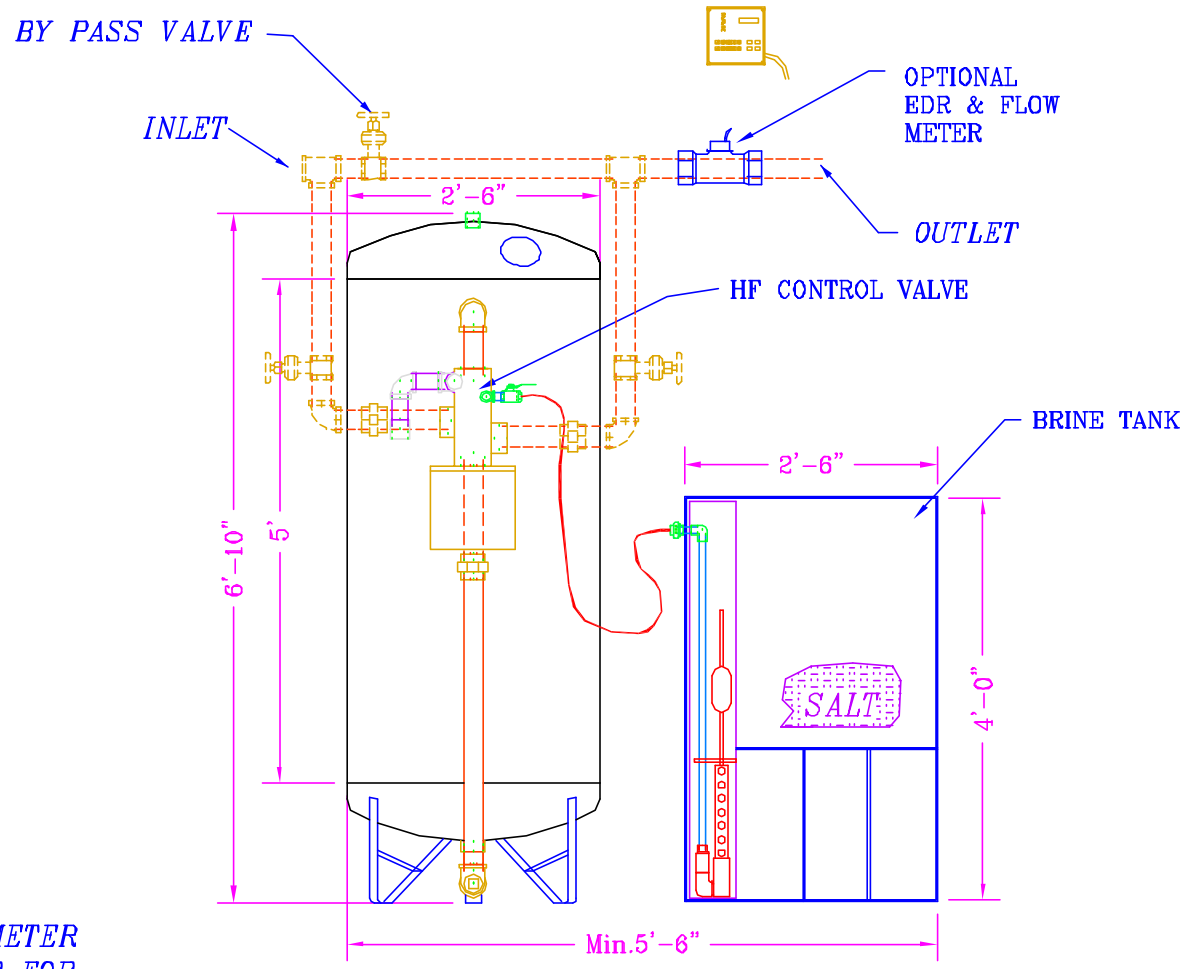
HF SIDE MOUNT VALVES	Part №
HF-150-2" & HF-180-2"	807144
HF-200-2", HF-225-2", & HF-240-2"	807145
HF-300-2" & HF-450-2"	807146
HF-600-2"	807147
HF-750-2"	807148
HF-900-2"	807149
HF-1200-2" through HF-3000-2"	807137
HF-2100S-4F	902006-T
HF-2100S-4F	902006-11
HF-2100S-4F	902006-11A
HF-2550S-4F	902009
HF-2550S-4F	902009-T
HF-2550S-4F	902009-11
HF-2550S-4F	902009-11A
HF-3000S-4F	902011
HF-3000S-4F	902011-T
HF-3000S-4F	902011-11
HF-3000S-4F	902011-11A



WIRING DIAGRAM
SIX AND SEVEN DAY TIMER - 38MM.



A.R.C. TIMER



NOTE:

PIPING SHOWN IN DASHED LINES IS TO BE SUPPLIED BY CUSTOMER ACTUAL LOCATION & LENGTH MAY VARY

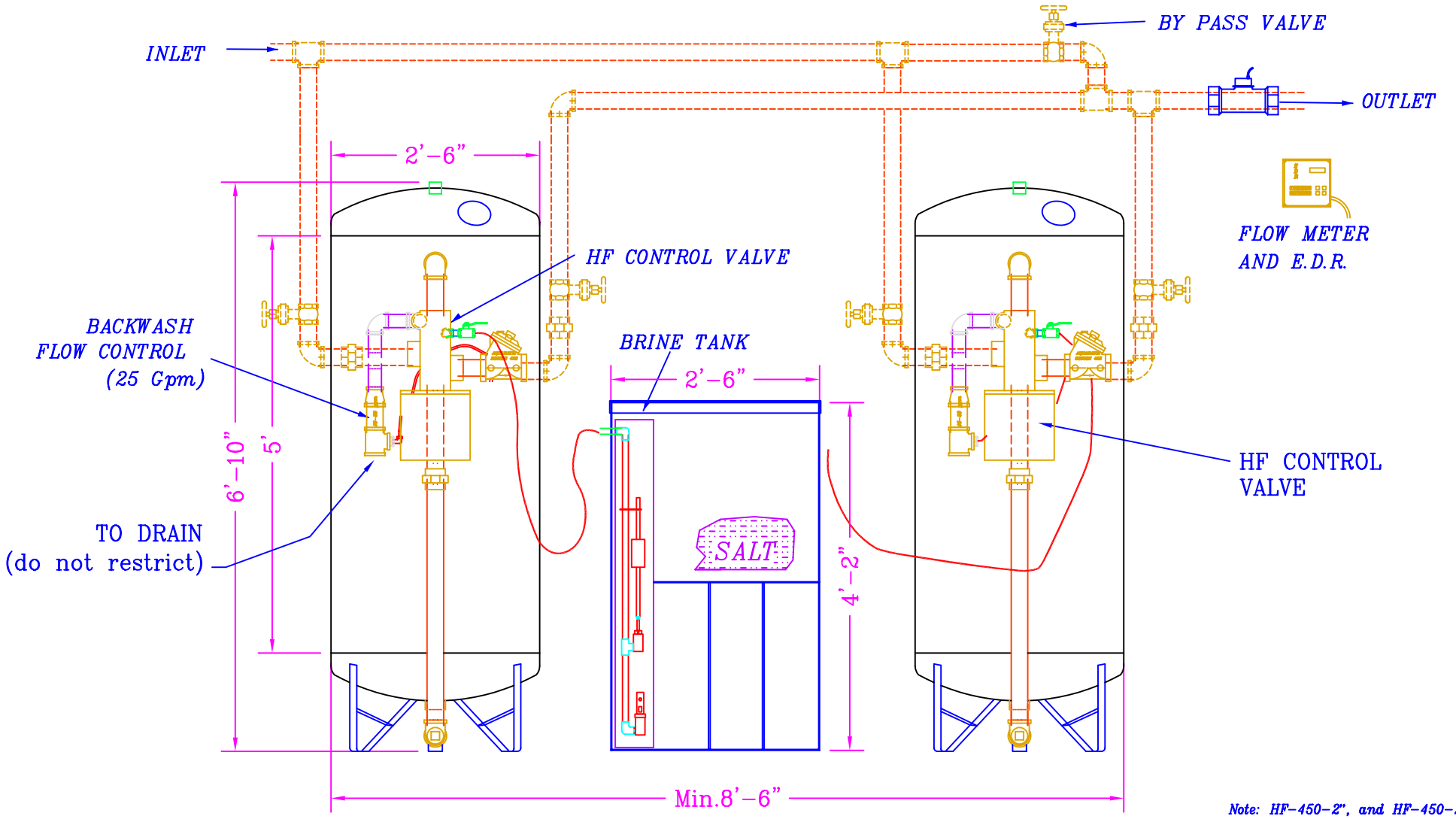
FLOW METER REQUIRES (15) PIPE DIAMETER LENGTHS BEFORE METER & (10) AFTER FOR PROPER OPERATION

BY:	No.	REVISION	DATE	CK'D
	0	PRELIMINARY	8/30/99	.
	1	.	.	
		PLOTTED / PRINTED: 00/00/99		

Water King
WATER CONDITIONING
Water King, Inc.
103 Charbonnet Rd., Duson, Louisiana, U.S.A. 70529
Telephone: (337) 985-2350 * Fax: (337) 981-7922
www.waterking.com

HF-450-2" SINGLE WATER SOFTENER
TYPICAL LAYOUT/PIPING ARR.

DR. BY R.RICHARDSON	ENG.: .	DRY WEIGHT
CH. BY	FILE C:\CATALOG\WKHF4602.dwg	OPERATING WT.
DATE 8/30/99	DRAWING NUMBER WKHF4502	SHEET 1 / 1
SCALE 024"=1'0" NONE		



PIPING SHOWN IN DASHED LINES IS TO BE SUPPLIED BY CUSTOMER ACTUAL LOCATION & LENGTH MAY VARY

NOTE:
FLOW METER REQUIRES (15) PIPE DIAMETER LENGTHS BEFORE METER & (10) AFTER FOR PROPER OPERATION

Note: HF-450-2", and HF-450-2 1/2" are identical except for pipe size.

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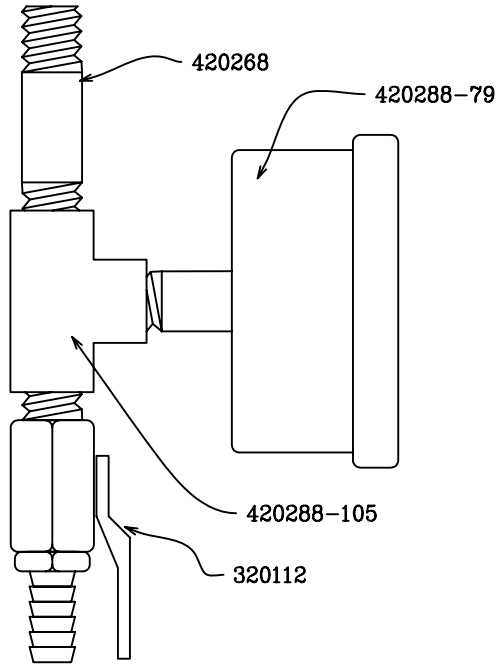
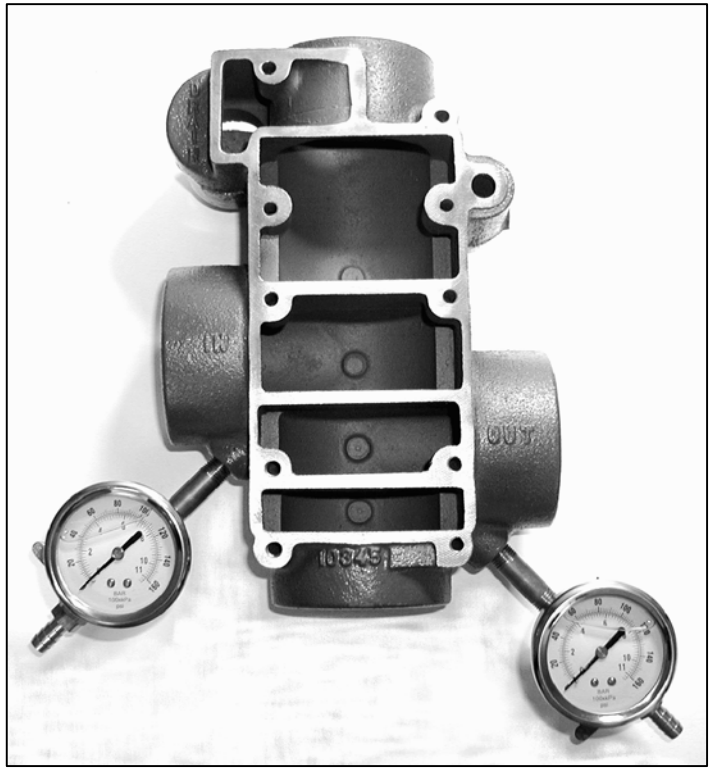
Water King, Inc.
102 Charbonnet Rd., Duson, Louisiana, U.S.A. 70529
Telephone: (337) 988-2360 • Fax: (337) 981-7922
www.waterking.com

HF-450-2"-TA TWIN ALT. WATER SOFTENER
TYPICAL PIPING ARRANGEMENT

DR. R.RICHARDSON	ENG.: .	DRY WEIGHT
CH.	FILE: C:\CATALOG\WK4502T.dwg	OPERATING WT.
APP.		
DATE 6/30/99	DRAWING NUMBER WK4502T	SHEET 1 / 1
SCALE 3/64"=1" NONE		





HF Series-Pressure Gauge & Test Tap Kit # 720075-7

Specifications:

Pressure gauge and test tap kit;

A kit containing two liquid filled, stainless steel pressure gauges with 2 ½" Ø face, two brass ball valve sample taps with hose barb connections and associated brass connection. Fittings shall be provided for mounting in the $\frac{1}{4}$" FNPT pre drilled and tapped ports in the inlet and outlet of the Task Master valve.

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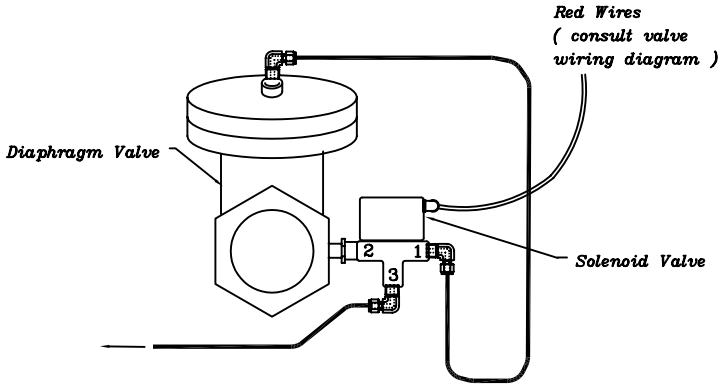
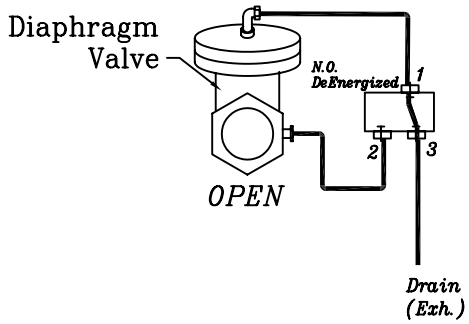
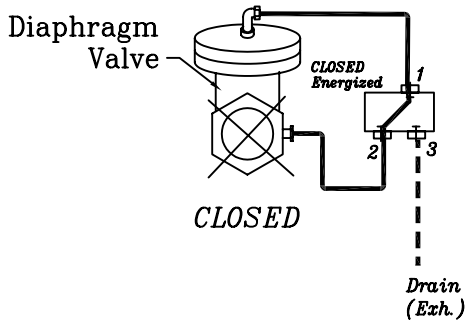
www.waterking.com

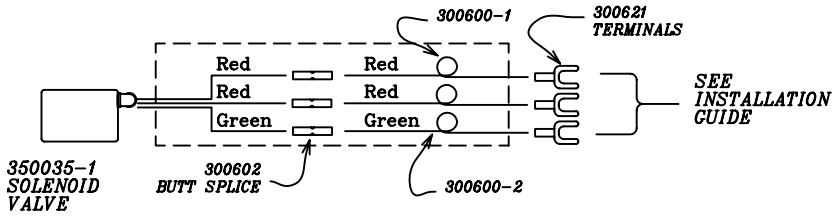
LIT.# 900864-1







	DIAPHRAGM VALVE	CLOSE NIPPLE	KIT PART #
1–1/2"	320106	410175	720088
2"	320174	410193	720089
2–1/2"	320136	410208	720090
702086 SOLENOID WIRING KIT			



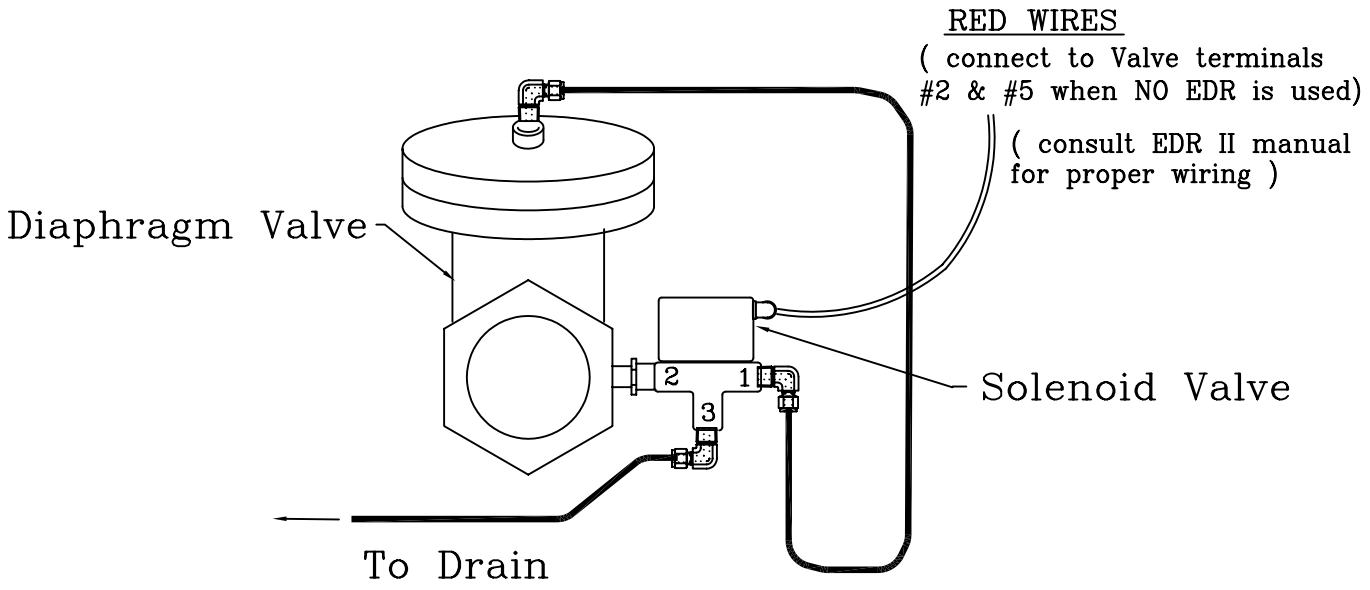
PURPOSE:
The Shut Off Kit prevents hard water bypass during regeneration and holds unit in Stand By on twin alternating units

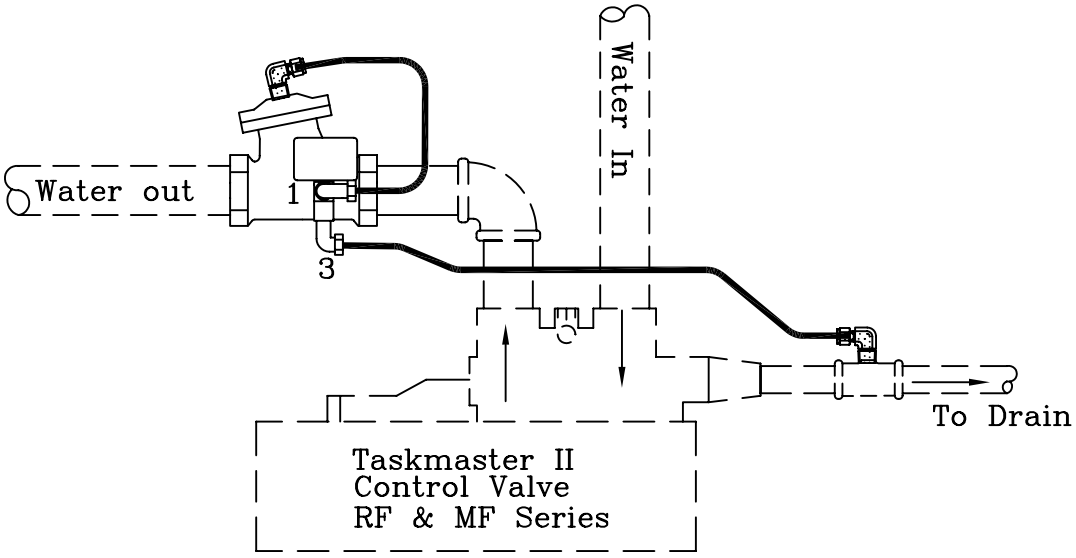
Shut Off Kit

Lit.# 900975

03/29/2005

RF, MF VALVE SHUT-OFF KIT INSTALLATION GUIDE

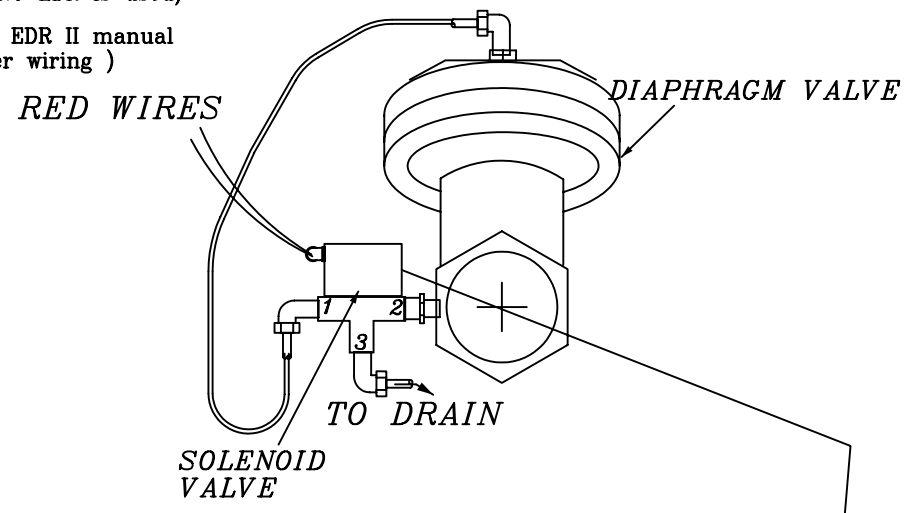




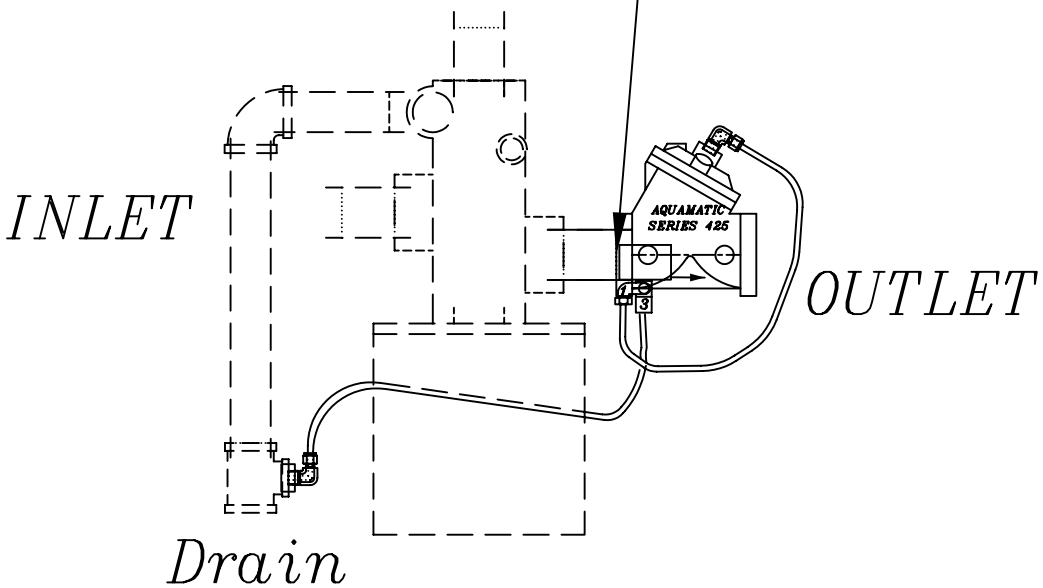
HF VALVE
SHUT–OFF KIT
INSTALLATION GUIDE

(connect to Valve terminals
#2 & #5 when NO EDR is used)

(consult EDR II manual
for proper wiring)



Locate on valve or pipe having highest constant pressure.

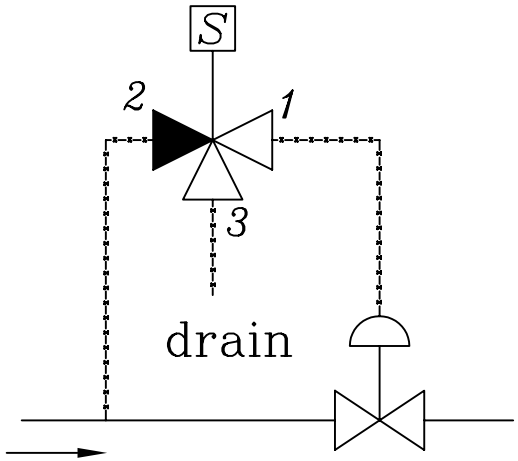


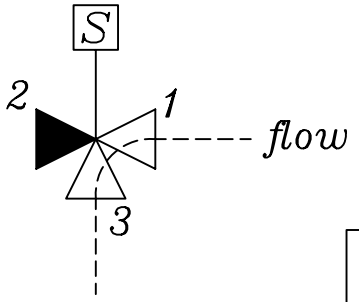
TaskMaster II
control valve
HF SERIES

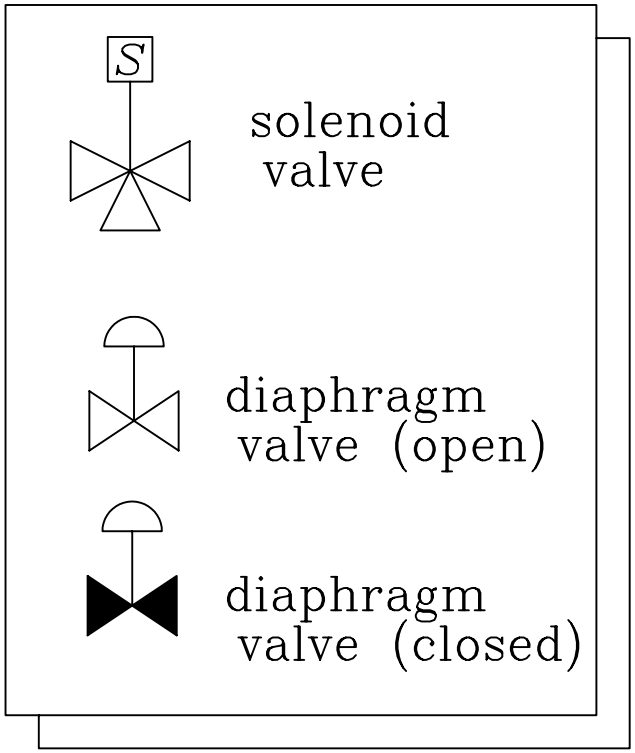
"SHUT-OFF KIT"

P&ID

DE-ENERGIZED / SERVICE

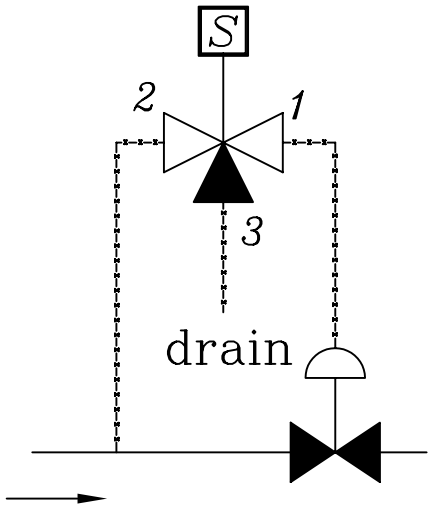


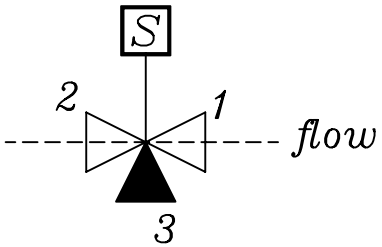


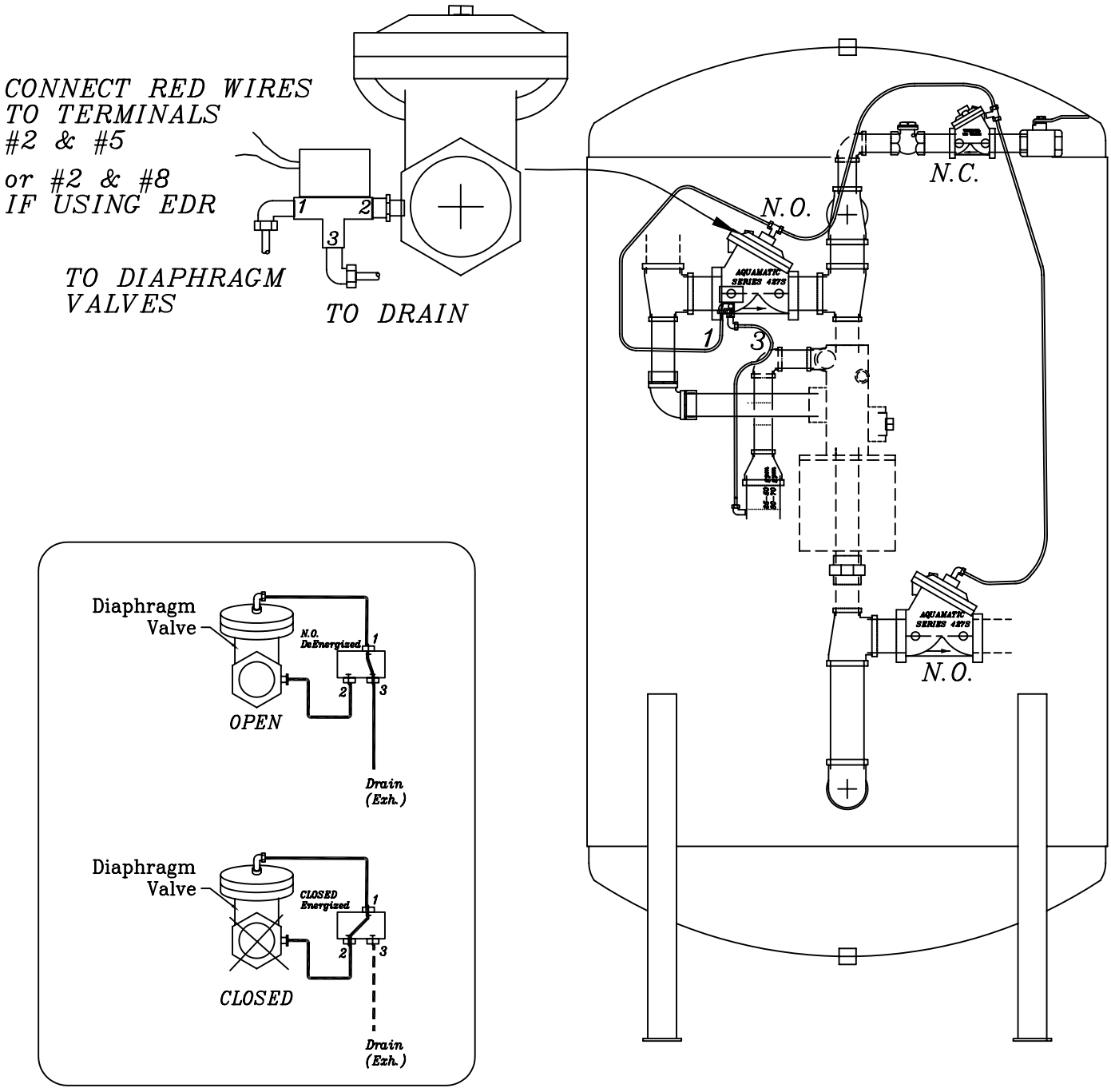


ENERGIZED

STAND-BY / REGENERATION

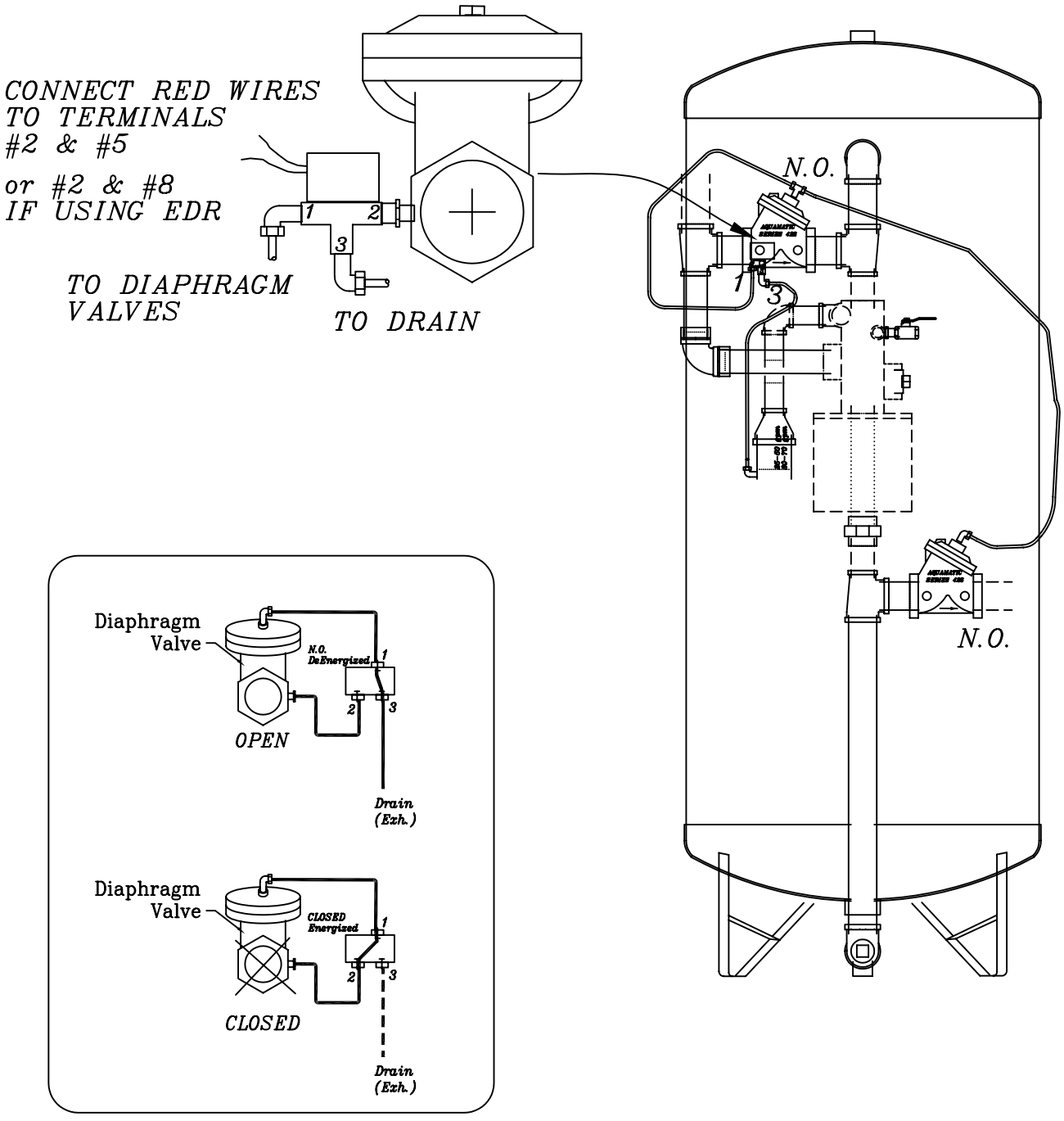






HF SUPER FLOW SHUT–OFF KIT TUBING DIAGRAM

Lit. # 900975–1



HF SUPER FLOW SHUT–OFF KIT TUBING DIAGRAM

Lit. # 900975–1a

Softener Problems - Trouble Shooting

1. No brine draw. The water softener does not draw brine during the brine cycle of regeneration. If the water (actually saturated brine) level in the brine tank does not drop during the brine cycle of regeneration then the unit is “not drawing brine”. If the unit does not draw brine, it cannot make soft water causing problem 2 – Hard water to service. Possible causes and solutions are given below:
   - 1.1. Brine shut off valve closed. If the brine shut-off valve is closed, the brine cannot enter the mineral tank. Make certain this valve is open.
   - 1.2. Low water pressure. Both the external brine ejector and the throat and nozzle assemblies are venturi type devices, which create a vacuum as water passes through the jets in the ejector. If the water pressure is too low, the flow through the venture will not create enough vacuum to draw brine from the brine tank. Pressures below 25 psi (172 kPa) are likely to cause brine draw problems. Consider an auxiliary water source for the brine system or switch to a pumped brine system.
   - 1.3. Electrical power off. The Taskmaster must be powered to cycle. Make certain the valve is plugged in and has power. Is there power to the unit? Is the power cord plugged in? Is there a remote switch in the line that is off?
   - 1.4. Plugged nozzle. The brine ejectors have small orifices that can become clogged with detritus or scale. Remove the nozzle plug and clean the nozzle and throat. If they are removed, make sure the o-rings are in place and properly seated when reinstalled. External ejectors can also be removed and cleaned by disconnecting local piping.
   - 1.5. Air leaks in brine line. Since brine is drawn based on the vacuum from the ejector, the brine line must be air tight with no leaks. If the brine line is leaking, salt deposits or corrosion usually are evident at joints. To seal leaks, use pipe tape on the threads, clean the seats on pipe unions, and tighten the bonnet on the brine shut-off valve.
   - 1.6. Worn piston seals. If the seals on the piston in the Taskmaster valve are not tight, the valve will not draw brine. A seal kit can be installed or the piston can be replaced.
   - 1.7. Restriction in brine valve or brine line. The brine line and valve must be clear to function properly. The brine valve must be removed and cleaned or replaced and the brine line must be cleaned or replaced.
   - 1.8. Restriction in flow control. The brine passes though the softener bed and is wasted to drain through the backwash rate of flow controller (BWOFC). If the small orifices in the BWOFC, excess head loss will be created on the discharge side of the venturi causing the unit not to draw brine. Remove and clean or replace the backwash rate of flow controller.
   - 1.9. Brine well fills too fast, shuts off brine valve prematurely. The large styrofoam float near the top of the brine valve is called the check float. It should close when subjected to vacuum from the brine ejector. Make sure

refill ball check is in base of brine valve; if it is, then replace brine valve and check the brine well screens. Clean or replace.

1.10. Sediment buildup in bottom of brine tank. The liquid volume below the grid plate should be free from solids to allow the brine valve to work correctly. If excessive dirt or debris is found in the bottom of the brine tank it must be cleaned.

1.11. Piston out of calibration. If the cam mechanism on the valve does not seat the piston in the right position, the water will not flow through the valve correctly and the valve will not draw brine. Consult brochure number 900844 to see the piston position for each cycle of regeneration. If the valve is out of calibration it can be adjusted by moving the white cam on the drive motor. Consult the factory for detailed instructions.

2. Hard water to service. The water in the softener outlet or down stream from the softener is hard. If the unit is not drawing brine the water will be hard. Possible causes and solutions are given below:

2.1. No Salt. Make sure there is salt in the brine tank.

2.2. Salt bridging. As the solid salt in the brine tank dissolves the salt bed must collapse. If cavities form at the bottom of the salt bed, a condition called bridging occurs. Break up salt with a stick, being careful not to damage the grid plate.

2.3. Bypass valve open. If the unit or system bypass valve is open part of the water is bypassing the softener. Make sure the bypass valve is fully closed. To make sure the bypass seat is sealing, close the bypass and outlet valves. If water runs to service, repair or replace the bypass valve.

2.4. Float setting. The brine tank must fill above the grid plate for the water to contact and dissolve the solid salt. Make sure the float is properly adjusted.

2.5. Timer erratic and the unit does not regenerate at the proper time. Make sure the timer is powered continually. Incorrect time of day indicates there has been an interruption in the power. If the unit still malfunctions, replace the timer.

2.6. Sediment build up on grid plate. Excessive sediment will prevent contact between the water and the salt required to create a saturated brine. Clean the brine tank and grid plate.

2.7. Improper salt dosage, low salting units. The Accumatic brine systems are factory preset to draw the correct amount of brine.

2.8. High TDS. If the water has a TDS over 1200 ppm the leakage or residual hardness after softening will be high, even at high salt. Under these water quality conditions a softener may not work and deionizer or reverse osmosis treatment system may be indicated.

2.9. Resin fouling by iron. High iron can foul a resin bed. Reducing agents can be applied during brining or special salt with a reducing agent can be used to help clean the resin. If the fouling cannot be reversed, the resin must be replaced.

2.10. Remote bypass in plumbing. Check for bypass in other areas of building. Shut off the inlet, outlet and bypass of the conditioner check for the flow of water at a soft water faucet.

2.11. Twin units, one unit hard one unit soft. Check the brine director valve for proper operation. Foreign matter carried in from the brine tank can cause the brine director valve to lock in one position. Remove and clean the brine director.

3. Mineral to service. If resin beads are observed on the service or outlet side of the softener the mineral tank is not holding resin. Possible causes and solutions are given below:

   3.1. Distributor missing in tank bottom. The gravel underbedding an ultimately the fine screens in the bottom distributors in the mineral tank are designed to prevent loss of resin during service and rinse cycles of the softening process. For top mount softeners usually with fiberglass tanks, remove the control valve, exposing the tank adapter. Remove the tank adapter. Remove the minerals and gravel. Remove, inspect, and replace distributors as necessary. For side mount units usually with steel tanks, remove the plug at the bottom of the mineral tank. If mineral and gravel are present, it is likely that a distributor is out of place. Remove the mineral and gravel from the tank. Remove, inspect, and replace distributors as necessary. Distributors should be reinspected immediately before the gravel is installed. Use caution to avoid collapsing the distributors when using wrenches and pliers. If resin is over two years old replacement is recommended since the unit is already out of service.

   3.2. Unit installed backwards. If the inlet is connected to the outlet, the flows are reversed and water flows from the bottom to the top of the tank with the valve in the service position causing resin to be washed into the service lines. If the unit is installed backwards consult piping diagrams and reinstall.

4. Low servcie flow with SOK. Insufficient service flow rate in units equipped with optional shut-off kits or super flow kits. The Taskmaster is designed to allow hard water bypass during regeneration. Shut off kits consist of a diaphragm valve on the softener outlet, which is closed during regeneration. The diaphragm is closed by a solenoid operated by a switch on the Taskmaster valve. Possible causes and solutions are given below:

   4.1. Solenoid valve not closing. The solenoid valve must seal when closed. With the control valve in the, service position, disconnect the tubing from the valve. No water should flow out of the solenoid valve. Dirt, rust, scale, or other detritus may prevent the valve from closing. If water does flow out in this position, the solenoid is not functioning properly and should be cleaned, repaired, and replaced as necessary.

   4.2. Diaphragm valve not opening fully. If there is a build up of scale on the diaphragm shaft, it is possible that the seat will only partially open.

   4.3. Vent port in side of the diaphragm plugged. The diaphragm must vent to properly open. The vent port can be cleaned with a fine wire or nail.

5. Overflowing brine tank. The brine tank has a pressurized fresh water supply to operate the brine ejector and to refill the tank. If the brine valve is leaking, the brine tank may overflow. Possible causes and solutions are given below:
    5.1. Contamination. Dirt from rock salt or other foreign material can become lodged in the brine valve seat. Empty and clean the brine tank and brine valve. Refill with a clean, bagged, evaporated, processed type of salt.
    5.2. Float binding. Make sure the brine valve float is not binding on the brine well.
    5.3. Leaking brine valve. Remove the brine valve, clean, tighten all fittings, and reinstall. Examine the brine valve carefully for cracks in the fittings. If the valve is still not working, replace it.
6. Unit will not regenerate automatically. Possible causes and solutions are given below:
    6.1. Timer motor operation. Is the timer motor running? If not the place the timer.
    6.2. Valve motor relay switches. Valve motor micro switch is not opening or closing. Adjust the micro switch stack. If the valve motor micro switch is burned out replace the micro switch.
    6.3. Timer motor relay. Timer micro switch is not opening or closing. Adjust the micro switch. If the timer micro switch is burned out, replace the micro switch.
7. Piston binding. The control valve binds, and stops during the regeneration cycle. This indicates the piston is lodged to the extent that the drive motor will not push it into position causing the valve to be stuck in one of the cycles of regneration. Possible causes and solutions are given below:
    7.1. Sand and hot water backup will damage piston seals and may cause piston to bind. If sand is present, water should be prefiltered. Prevent hot water form entering the conditioner. If piston is damaged, rebuild the existing with a seal kit or replace the piston with a piston kit.
    7.2. Bad drive motor. If the drive motor is weak or burnt, it will not advance the piston. If the piston seems to move easily, then the drive motor may be defective, requiring replacement.
8. Leak to drain. Possible causes and solutions are given below:
    8.1. Internal to control valve. If the control valve is out of calibration, it is possible for water to flow to drain. Check the plunger calibration.
9. Salt in service line. Possible causes and solutions are given below:
    9.1. Plugged injector Clean the nozzle and throat of injector
    9.2. Low pressure Maintain a minimum pressure of 25 psi (172 kPa)
    9.3. Drain line or flow control restricted Remove restriction
    9.4. Brine line restricted or crimped Remove restriction, free brine line
    9.5. Excessive amount of brine in the brine tank Adjust brine float. Check for loose or missing brine plugs
    9.6. Insufficient rinse time Increase fast rinse time.
    9.7. Intermittent pressure drop behind unit. Install a check valve in the inlet line to the unit

10. Resin in drain. Possible causes and solutions are given below:

10.1. Backwash rate too high. During backwash the bed is fluidized. The bed expansion is sensitive to the backwash flow rate, which should be 4 to 6 gpm/ft2 of bed area. If the backwash rate of flow control has lost a flow orifice or is the wrong size the backwash rate may be too high. Hot water can damage the backwash rate of flow controller. If the rate is not correct, repair or replace the backwash rate of flow controller.

10.2. Resin deteriorated. With age and especially with long-term exposure to chlorine, the resin will deteriorate and the beads will crack. Broken resin beads will be washed out during backwash. Broken beads are readily observed under a microscope or magnifier. Replace deteriorated resin. Examine and consider replacement of distributors when old resin is removed.