Water King

SUBMITTAL DOCUMENTS LIST

System:

910100	RF-100-SX W/ TM4 SIMPLEX SOFTENER

DESCRIPTION	DRAWING NO.	PAGE
SYSTEM SPECIFICATIONS AND PERFORMANCE		**2**
GENERAL ARRANGEMENTS DRAWING	910100	**3**
BILL OF MATERIALS LIST		**4**
RF TA INDEX DRAWING	INDEX02	**5**

Components:

ITEM NO.	PART NO.	DESCRIPTION	QUANT	BROCHURE	PAGE
①	100017	14x65 POLY GLASS MINERAL TANK	1	CAT282A	**6**
②	703006	1-1/2" MANIFOLD ASSY 1-PT FRP TANK	1	CAT282A	**6**
③	479904	RESIN PK 100 14X65 F 3 1/4 , 0.40	1	CAT280A	**7**
④	805081	24X50 BRINE TANK ASSY BM/11 SP	1	CAT610A	**8**
⑤	200126-2	BRINE LINE ASSEMBLY 3/8" BV 1/2" BL	1	CAT613	**10**
⑥	707170-3B5NT	TM4 ERCt ORNG 5/0.75 N AM TOP	1	CAT317A CAT417	**11** **13**
	400904	4" FUNNEL	1	CAT280A	**6**
	720074	PRESSURE GAUGE AND TEST TAP KIT	2	CAT379	**14**
		LIMITED SYSTEM WARRANTY		CAT999	**15**

NOTE: ITEM NO. REFERENCED ON INDEX DRAWING

Water King, Inc.
102 Charbonnet Road, Duson, LA 70529
337 988 2360 * www.waterking.com

SYSTEM SPECIFICATIONS AND PERFORMANCE

Assembly Number: 910100

Description: RF-100-SX W/ TM4 SIMPLEX SOFTENER

Mineral Tank

Size (dia x side shell height) inches	14x65
Number	1
Resin Volume (ft3)	3.25
Preset Exchange Capacity (kilograins)	100

Brine Tank

Size (dia x height) inches	18x40
Number	1
Storage Capacity (lbs Salt)	780
Preset Brine Draw (lbs per regen)	51
Regenerations in Storage	15
Flow Meter	PW 150
Inlet Outlet Pipe Size	1 1/2" FNPT
Drain Pipe Size	3/4" FNPT
Backwash Rate (gpm)	5
Weight and Dimensions	See Drawing

Hydraulic Performance

Head Loss	Flow (gpm)
5 psi	18
10 psi	29
Continuous Flow Rating at 15 psi	**38**
20 psi	45
Peak Flow Rating at 25 psi	**53**

Operating Mode	SX

Operating Mode:

Simplex (-SX). Simplex systems shall have regeneration initiated by time of day or “clock time”. SX systems shall have one brine tank, one Task Master III control valve, and one ERCt controller. Simplex units bypass hard water during regeneration rather than shutting off the flow of water. Ordering an optional shut off kit will prevent hard water bypass.

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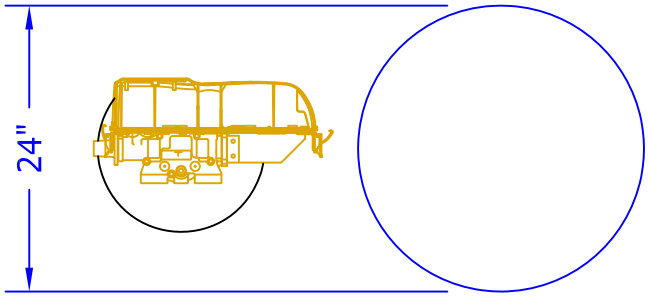
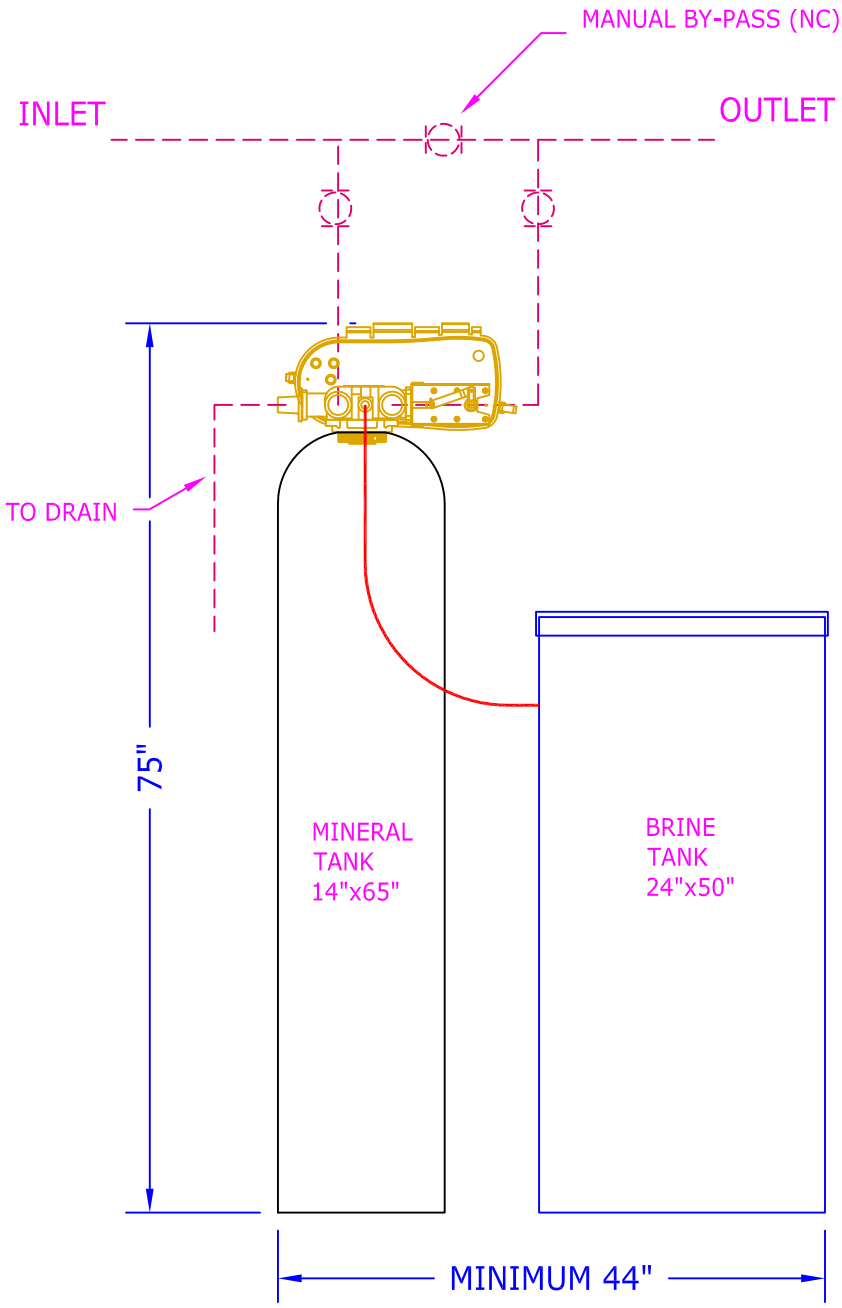


TOP VIEW



ELEVATION

NOTES:
1) PIPING SHOWN IN DASHED LINES TO BE SUPPLIED BY CUSTOMER.
2) ALLOW 1 FOOT ABOVE TANKS FOR LOADING.

SHIPPING WEIGHT	420 Lbs.
OPERATING WEIGHT	

BY:	No.	REVISION	DATE	CK'D
RLR	0	SUBMITTAL FOR APPROVAL	03/25/2011	JEB
RLR	1	REPLACED BRINE TANK 24x50	04/14/2014	JEB

Water King

910100
RF-100 WATER SOFTENER
GENERAL ARRANGEMENT

SCALE	DRAWING NUMBER	SHEET
N.T.S.	RF-100-1.5-SX	01 / 01

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

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BILL OF MATERIALS LIST

Part No.	Description	Loc	ID	Quantity	Unit
910100	RF-100-SX W/ TM4 SIMPLEX SOFTENER				
100017	14x65 POLY GLASS MINERAL TANK CONNECTION: 4"-8" UN TOP COLOR: BLUE	1	Item	1.0000	EA
703006	1-1/2" MANIFOLD ASSY 1-PT FRP TANK SINGLE POINT SLOTTED DISTRIBUTOR WITH DISTRIBUTOR TUBE	1	Sub	1.0000	EA
479904	RESIN PK 100 14X65 F 3 1/4 , 0.40 RESIN PACKAGE 3 1/4 FT3 8% CROSS LINK CATION RESIN 40 POUNDS GRAVEL	1	Sub	1.0000	EA
805081	24X50 BRINE TANK ASSY BM/11 SP ACCUMATIC BRINE TANK ASSEMBLY DIAMETER: 24 INCHES HEIGHT: 50 INCHES BLOW MOLDED HDPE TANK 4" BRINE WELL 3/8" BRINE VALVE 11" HIGH SALT PLATFORM	1	Sub	1.0000	EA
200126-2	BRINE LINE ASSEMBLY 3/8" BV 1/2" BL KIT CONSISTING OF: 1/2" POLY PRO BRINE LINE FITTINGS FOR TM3 & TM4 AND 3/8" BRINE VALVE	1	Sub	1.0000	EA
707170-3B5NT	TM4 ERCt ORNG 5/0.75 N AM TOP 707170- TASK MASTER IV VALVE WITH NPT THREADS & 110V/60HZ AC MOTOR USA PROGRAM 3- SOFTENER TIMED B- ORANGE 5- 5 GPM BW 3/4" N- N. AMERICAN 110V/60HZ T- TOP MOUNT TANK ADAPTOR MATERIAL No 3020864	2	Sub	1.0000	EA
400904	4" FUNNEL	1	Item	1.0000	EA

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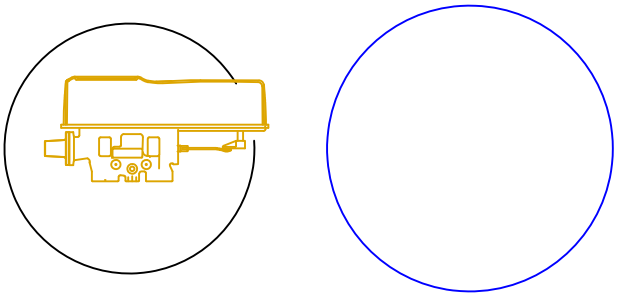
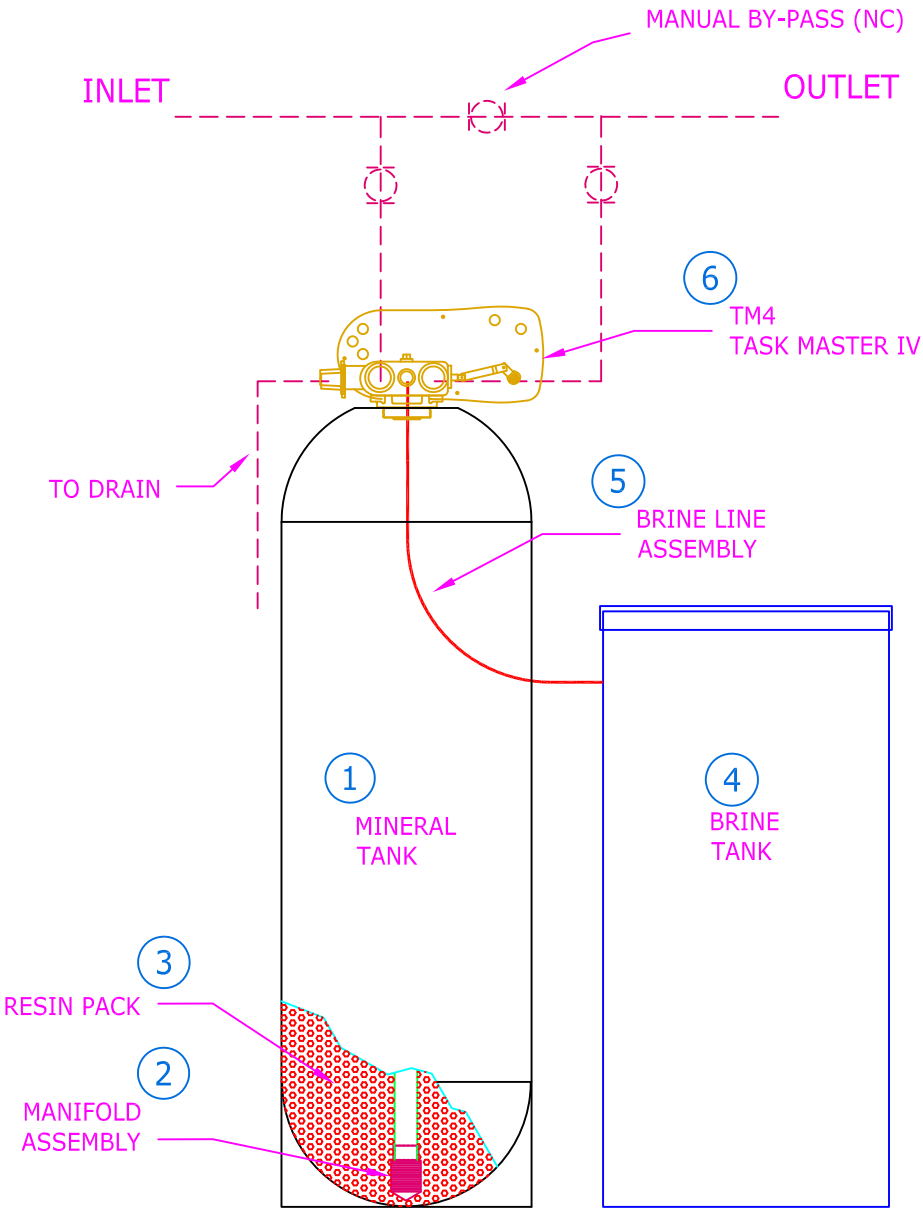


TOP VIEW



ELEVATION

BY:	No.	REVISION	DATE	CK'D
RLR	0	SUBMITTAL FOR APPROVAL	04/18/2016	JEB

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Water King

RF SX INDEX DRAWING

SCALE	DRAWING NUMBER	SHEET
N.T.S.	INDEX02	01 / 01

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FIBERGLASS COMPOSITE MINERAL VESSELS

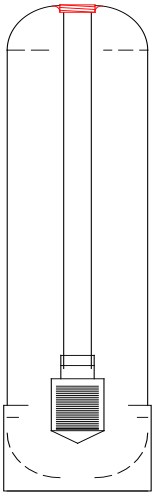
Water King RF Series systems use fiberglass composite vessels with a fiberglass exterior and polyethylene liner.

Standard Vessels. Composite tanks shall be 100% non-metallic construction, seamless, molded vessels with no welds or joints. The inner shell shall be constructed of polyethylene and the outside shall be wound with continuous fiberglass, roving to provide superior strength under pressures up to 150 psi. All tanks, vessels, and the materials used in their construction shall be accepted or certified by the Water Quality Association and ANSI/NSF Standard 44. Working pressure rating shall be 100 psi with a design factor of safety of at least 4:1. The tanks have a circular plastic base. Water King's fiberglass composite tanks are covered by a 5-year warranty from Pentair. Standard colors shall be blue or natural.

Note on temperature ratings. Composite polyester tanks with polyethylene lining with threaded fittings shall be rated at 120°F.

Commercial Application. The Task Master IV™ valve is "top mounted" on a 4-inch diameter threaded opening, which is molded directly into the fiberglass tank.

703006 Single Point Distributor



MANIFOLD ASSEMBLY

The bottom distributor on vessels 24" diameter and smaller is a single point plastic distributor 2 3/8" in diameter and 2 inches long with 0.012 inch slots. The distributor tube is 1 ½" Sch 40 PVC.

WK 100 SOFTENER RESIN

WK100 is a multipurpose, premium grade, strong acid cation exchange resin
WK100 is suited for softening, 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
Iron and Heavy metals:	Less than 0.1 ppm

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

ACCUMATIC BRINE SYSTEM

The Accumatic™ brine system consists of a brine tank and an internal (also called Throat & Nozzle Assembly) or external brine ejector mounted inside (injector) the Task Master IV™ or mounted externally (educator) as part of a valve nest. The brine tank consists of a brine valve, a brine well, a salt platform, and an overflow assembly.

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 ejector to generate a different brine flow rate. The corrosion proof ejectors 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 Rugged PVC Pipe. The Accumatic brine valve is available in ⅜, ½, ¾", 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.

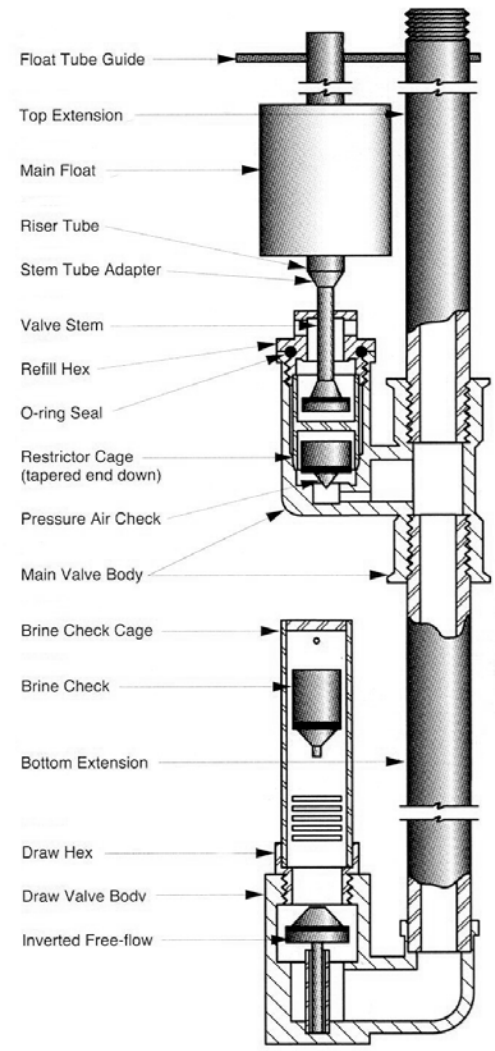
Very precise measurement of brine. The Accumatic™ valve provides accurate volumetric control of brine draw. The same amount is drawn every time. The voids of the salt do not affect the brine draw.

Brine check in the 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 Operation:



1. The Task Master IV™ 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 IV™.) 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 IV™ 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.
6. 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.

Component Information:

Brine Tank Is manufactured from High Density Polyethylene or fiberglass with no accessories or perforations.

Brine Well. 505007 and 505011 are 4" in diameter and 505014 and 505015 are 5" in diameter.

Grid Plate. Plastic Salt Platforms are used for Brine Tanks 30" in diameter and smaller. Masonite Salt Platform with nylon screen are used on Brine Tanks 39" in diameter and larger.

Grid Support. Brine tanks with 18" in diameter shall have plastic legs. Brine tanks with 24" through 30" in diameter shall have Schedule 40 PVC legs. Brine tanks with 39" in diameter and larger shall have Super Web type support.

Brine Line Assemblies. For simplex units with 30" diameter brine tanks and smaller, the brine line assembly consists of six feet of polypropylene brine line and appropriate Fast & Tite tube fittings.

Brine Director Assemblies. For twin and twin alternating units with 30" diameter brine tanks and smaller a brine director is required. The brine director assembly consists of a ¾" brine director (Part № 200442), polypropylene brine line and appropriate Fast & Tite tube fittings.
The brine system for MF systems 750 and larger with brine tanks 39" in diameter 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 interconnecting piping between the brine tank and the mineral tanks is not provided with the standard system and is installed by others. These systems with external eductors do not require brine directors.

BRINE LINE ASSEMBLY

Brine Line Assembly (BLA). The brine tank is connected to the mineral tank with Polyethylene tubing and Liquid-Tite Tube x NPT connectors. The brine inlet fitting to the valve is ½" MNPT and the connection to the brine tank matches the brine valve fitting.

Fittings. Water King standard systems use polypropylene tubing and Fast & Tite® fittings. Patented Fast & Tite® fittings install in seconds without tools and provide a tight, sure, leak proof seal without clamps or adjustments. A unique 302 stainless steel grab ring for tube retention, coupled with a Nitrile O-Ring for positive seal, assures good tube connection with only hand tight assembly. Vibration or tube movement will not break the seal and cause leakage. Fast & Tite® fittings meet FDA and NSF-51 requirements for food contact.

Polypropylene Tubing. Polypropylene tubing meets FDA, NSF Standard 51 for all food contact applications. Polypropylene tubing exhibits excellent chemical resistance to chlorinated water applications. Polypropylene tubing is commonly used in outdoor applications where UV light stabilization is required.

Brine Line Assemblies:

200126-2	BRINE LINE ASSEMBLY 3/8" BV 1/2" BL KIT CONSISTING OF: 1/2" POLY PRO BRINE LINE FITTINGS FOR TM3 AND 3/8" BRINE VALVE
200126-3	BRINE LINE ASSEMBLY 1/2" BV 1/2" BL KIT CONSISTING OF: 1/2" POLY PRO BRINE LINE FITTINGS FOR TM3 AND 1/2" BRINE VALVE

TASK MASTER IV

Commercial Industrial Water Softener and Filter Valve

- The **Task Master IV** is a cast and machined 316 Stainless Steel, five cycle, water softener control valve.
- The valve piston diameter is 1.685 inches with 1 ½" and 2" FNPT or FBSPT inlet outlet fittings available.
- The valve Cv = 15.
- There is only one moving part – the piston.
- The valve body and piston are 316 SS and the piston is stainless steel with EPDM seals.
- The valve has two different tank adaptors allowing for top mount or side mount configurations.

- The housing for the brine ejector is cast into the valve body making it an integral part of the valve.
- The piston is motor driven. Operation is not dependent on water pressure. It shifts smoothly without water hammer.
- The valve design assures synchronization of the drive assembly with the electronic timer and optical sensors making certain the piston is correctly positioned for each of the five cycles of softening.
- ERCt 99-day electronic timer with ability to independently program each cycle time.
- ERCd demand regeneration timer with variable reserve. ERCd operates a twin alternating system.
- The electrical enclosure is NEMA 4.
- Since brining and process control often must be coordinated with the regeneration cycles of a softener, the valve is designed to provide an on/off signal and dry contacts for external electrical functions.

- **Temperature rating is 180°F. Maximum operating pressure is 125 psi.**
- **Service flow Cv = 15. Backwash rate is 71 gpm at 25 psi head loss.**

Control Valve Specifications.
The main control valve(s) shall be the Task Master IV with electronic controller to actuate the cycles of backwash, brine, slow rinse, fast rinse, and service for a water softener (or backwash, rinse and service for a filter). The control valve(s) shall be Task Master IV 5-Cycle, multi-port control valve(s) with machined and passivated CF8M Type 316 Stainless Steel body, Type 316 Stainless Steel piston assembly, and EPDM inserts and seals with electronic controller and drive motor assembly in a NEMA 4/IP65 Style Enclosure. The valve shall operate with a single motor driven piston positioned by optical sensors. Valve inlet and outlet shall be 1 ½" FNPT or FBSPT. Backwash drain shall be ¾" or 1 ½" FNPT or FBSPT depending on flow. The brine inlet shall be ½". The one piece brine eductor shall be installed in the valve. The valve shall be equipped with threaded ¼" FNPT ports for the installation of sample taps and pressure gauges. 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. No hard water bypass option is obtained by adding a shut off kit to the valve. The valve shall be of a single piston design and shall not use multiple plungers or diaphragm valves. Maximum rated power shall be 125 watts with available current options of 115 VAC, 230 VAC, 100 VAC, 200 VAC, in 50 or 60 Hertz. Ambient operating temperature range shall be 34°F (1°C) to 150°F (65°C). Fluid temperature range shall be 34°F (1°C) to 180°F (82°C). Operating pressure range shall be 20-125 psi (1.38 - 8.6 bar).

Top Mount Tank Adaptor

Side Mount Tank Adaptor

Stainless Steel "Overmolded" Piston

BSPT = British Standard Pipe Thread
NPT = National Pipe Thread (US)
F = Female; **M** = Male

ERCt CONTROLLER

NEMA 4 / IP65 Style Enclosure

Intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, and hose-directed water; undamaged by the formation of ice on the enclosure. The enclosure door must be kept tightly closed. Any modifications to this product (i.e. added holes for cable entry/mounting, conduit connections...etc.) may void the intended NEMA4/IP65 rating. NEMA 4/IP65 and UL rated fittings should be used when modifying the enclosure.

Power Loss Memory Retention

The ERCt Controller features battery-free time and date retention during the loss of power. This is designed to last a minimum of 8 hours depending on the installation. The controller will continue to keep time and day in dynamic memory while there is no AC power.

Information entered or calculated by the controller is stored in two different ways:

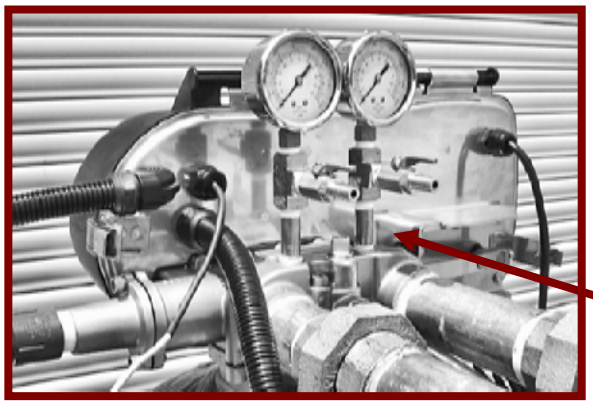
1. Static Memory:
   - Media volume
   - Regenerant setting
   - Time of regeneration
   - Days between regeneration

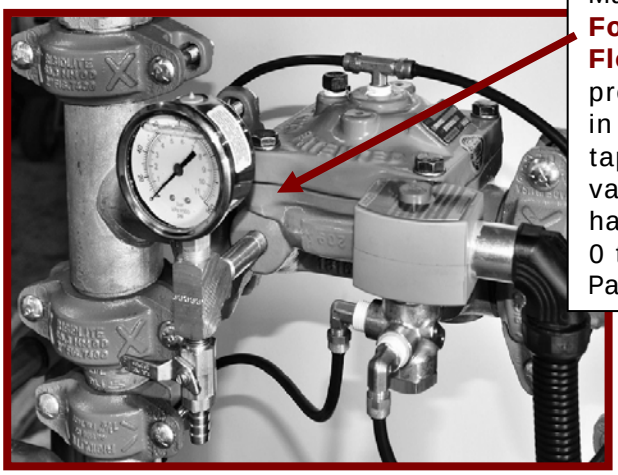
2. Dynamic Memory:
   - Current day of week
   - Running clock

ERCt Parameters:

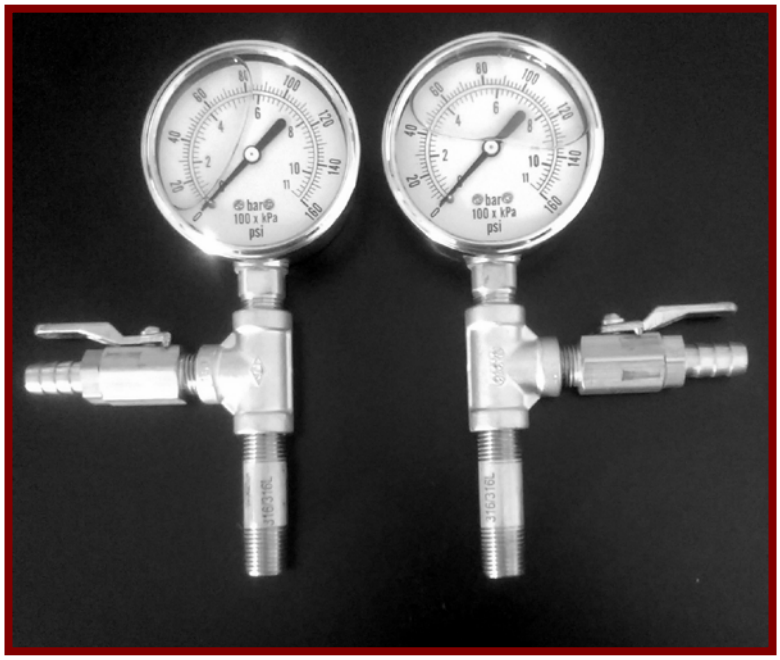
Backwash Cycle:	0-250 minutes
Regenerant Draw Cycle:	0-250 minutes
Slow Rinse Cycle:	0-250 minutes
Fast Rinse Cycle:	0-250 minutes
Days between regeneration:	0-99 days
Day of the week regeneration:	Monday-Sunday
Remote regeneration Switch Delay:	3-250 seconds

PRESSURE GAUGE AND TEST TAP KIT





Pressure gauge and test tap kit. A kit containing two liquid filled, stainless steel pressure gauges with 2 ½" Ø face, two 304 stainless steel sample taps with hose barb connections and associated ¼" stainless steel nipples.
For an RF system, the gauges shall be mounted in the ¼" FNPT predrilled and tapped ports in the inlet and outlet of the Task Master IV™ valve.
For a system with a Super Flow or Shut Off Kit, the pressure gauges may be mounted in the ¼" FNPT predrilled and tapped ports in the diaphragm valves. Pressure gauges shall have two scales, 0 to 160 psi and 0 to 11 bar.
Part Number **720074**



LIMITED SYSTEM WARRANTY

Water King, Inc. warrants to the original purchaser ("Purchaser") that the Industrial and Commercial Water Conditioning Equipment ("Products") are free from defects in materials and workmanship for twelve (12) months from the date of shipment. Water King will repair or replace with a rebuilt unit, at its sole option and discretion, products proven to be defective within the warranty period.

Terms: No Products may be returned to Water King without prior, express, written permission and a Returned Goods Authorization (RGA) as evidenced by an RGA number issued by Water King. Returned products must be securely packaged, clearly marked with the Purchaser's name and RGA number, and shipped to the location designated on the RGA. Purchaser assumes the risk of shipping loss or damage and is responsible for all shipping, handling, removal, and reinstallation costs associated with defective product's repair or replacement. Any Product repairs not covered by this warranty will be billed at Water King's regular repair rates.

NOTE: All WATER KING systems and parts must be repaired or replaced with WATER KING parts purchased from WATER KING. This warranty shall be rendered void by use of parts not purchased from WATER KING.

Warranty Is Void If:

- Products or tanks have been used under conditions exceeding manufacturer's stated product limitations.
- Products or tanks have been subjected to negligent or abnormal use, abuse, mishandling, or accident.
- Warranty specifically does not cover sandblasting of tank, fractures caused by distribution systems, or fractures caused by external impact to the tank (Revised 8/12/91).
- Products or tanks have been improperly installed, operated, maintained, repaired, altered, or stored.
- Operational failure has resulted from corrosion, rust, sediment, or other foreign materials.
- Products or tanks have been exposed to damaging circumstances outside of Water King's control.
- The manufacturing date has been removed from the unit.

Warranty specifically does not cover sandblasting of tank, fractures caused by distribution systems, or fractures caused by external impact to the tank (Revised 8/12/91).

In an event where a specific state does not allow exclusion or limitation of incidental or consequential damages, or limitations on the length of an implied warranty, the above limitations or exclusions may not apply. This warranty gives Purchaser specific legal rights, and Purchaser may also have other legal rights, which vary from state to state.

LIMITED PARTS WARRANTY

Defective Goods:

Water King, Inc requires preauthorization of all returned items. Please call our office with the following information:

- Part number
- Invoice number
- Date of purchase
- Reason for return

A completed RGA Form including a RGA Number will be faxed or mailed to the customer the same day. A copy of the RGA Form must accompany the packing list on the return shipment. The customer is responsible for return freight charges. RGA's expire 30 days after issued. Water King, Inc will base credit on condition and inspection of returned items upon receipt to our warehouse. Credit will be issued for items with manufacturing defects, only. Credit cannot be issued for returned items that have been misused, misapplied or damaged.

Customer Returns:

Water King, Inc will accept returns on new/unused parts provided an RGA number has been issued. A **25% restocking charge will be assessed and the remaining 75% will be credited to the customer's account.** Credit cannot be issued for damaged or used products. The customer will be responsible for return freight.

This warranty sets forth Water King's sole obligation and purchaser's exclusive remedy for defective products. In no small event shall Water King, Inc. be liable for any loss, inconvenience, or damage whether consequential, incidental, contingent, or direct. The forgoing warranties are exclusive and in lieu of all other express warranties. Implied warranties, including, but not limited to the implied warranty of merchantability and fitness for a particular purpose, shall not extend beyond the duration of the applicable express warranty provided herein.

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