CleaverBrooks®

SMR 150M-1500M

962 CONTROLLER

TWIN ALTERNATING COMMERCIAL WATER CONDITIONERS

FILL IN FOR FUTURE REFERENCE

MODEL NO:
SERIAL NO:
DATE INSTALLED:
DEALER:

750-355

IMPORTANT PLEASE READ:

- Warranty of this product extends to manufacturing defects.
- The information, specifications and illustrations in this manual are based on the latest information available at the time of printing. The manufacturer reserves the right to make changes at any time without notice.
- This product should be installed by a plumbing professional on potable water systems only.
- This product must be installed in compliance with all local and state and municipal plumbing and electrical codes. Permits may be required at the time of installation.
- If operating pressure exceeds 100 psi a pressure reducing valve must be installed. If operating pressure drops below 30 psi a booster pump must be installed.
- Do not install the unit where temperatures may drop below 32°F or rise above 100°F.
- A prefilter should be used on installations in which free solids are present.
- A constant voltage of 120V/60Hz (unless otherwise specified) must be supplied to the controller to maintain proper function.
- Union or flange fittings are recommended at the control valve's inlet, outlet, and drain connections
- If distance of drain line is over a 10 ft. vertical or 25 ft. horizontal run, increase drain line one pipe size over that provided on the control valve.
- Do not make a direct connection to the drain. Provide an air gap of at least four times the diameter of the pipe to conform to sanitation codes and to permit observation of the flow.

Please Circle and/or Fill in the Appropriate Data for Future Reference:

Softener Model: MR _____

System Size: Single/Twin/Triple/Quad

Meter Size: _____

Configuration: Timeclock/Twin Alt/Parallel/Progressive

Unit Capacity: _____ Grains

Feed Water Hardness: _____ Grains

Treated Water: _____ Gallons/Liters

BW/Regen Time _____ AM/PM or OFF

Additional Notes: _____

_____

_____

_____

_____

TABLE OF CONTENTS

COMMERCIAL AND INDUSTRIAL PRODUCT WARRANTY

Manufacture warrants all commercial and industrial water treatment products manufactured and/or distributed by it to be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If within that period any products shall be proven to the manufacture's satisfaction to be defective, those products will be replaced, or the price refunded at manufacture's option.

Manufacture's obligations or nonperformance, defective, or any damage caused by its products or their use, and buyer's exclusive remedy therefore, shall be limited to product replacement or refund and shall be conditioned upon the manufacture's receiving written notice together with a demand for such replacement or refund:

The foregoing warranty is exclusive and in lieu of all other expressed implied warranty (except of title) including but not limited to implied warranty of merchantability and fitness for particular purpose.

Manufacture's will not be subject to and disclaims the following:

1. Any other obligations or liabilities arising out of breach of contract or out of warranty.

2. Any obligations whatsoever arising from tort claims (including negligence and strict liability) or arising under other theories of law with respect to products sold or services rendered by the manufacture's or any undertakings, acts, or omissions relating thereto.

3. All consequential, incidental, and contingent damages.

Labor charges, change backs or handling charges are excluded from the manufacture's warranty provisions.

COMMERCIAL AND INDUSTRIAL WATER SOFTENER GUARANTEE

Under normal operating conditions:

1. The softener effluent shall be zero soft as determined by a soap test.

2. The loss of softening resin through attrition during the first three (3) years shall not exceed 3% per year.

3. The softening resin shall not be washed out of the system during backwash.

4. The color and turbidity of the softener effluent shall not be greater than the incoming water.

Any mechanical equipment proving defective in workmanship or material within one year after installation or (18) months after shipment, whichever comes first, shall be replaced FOB factory.

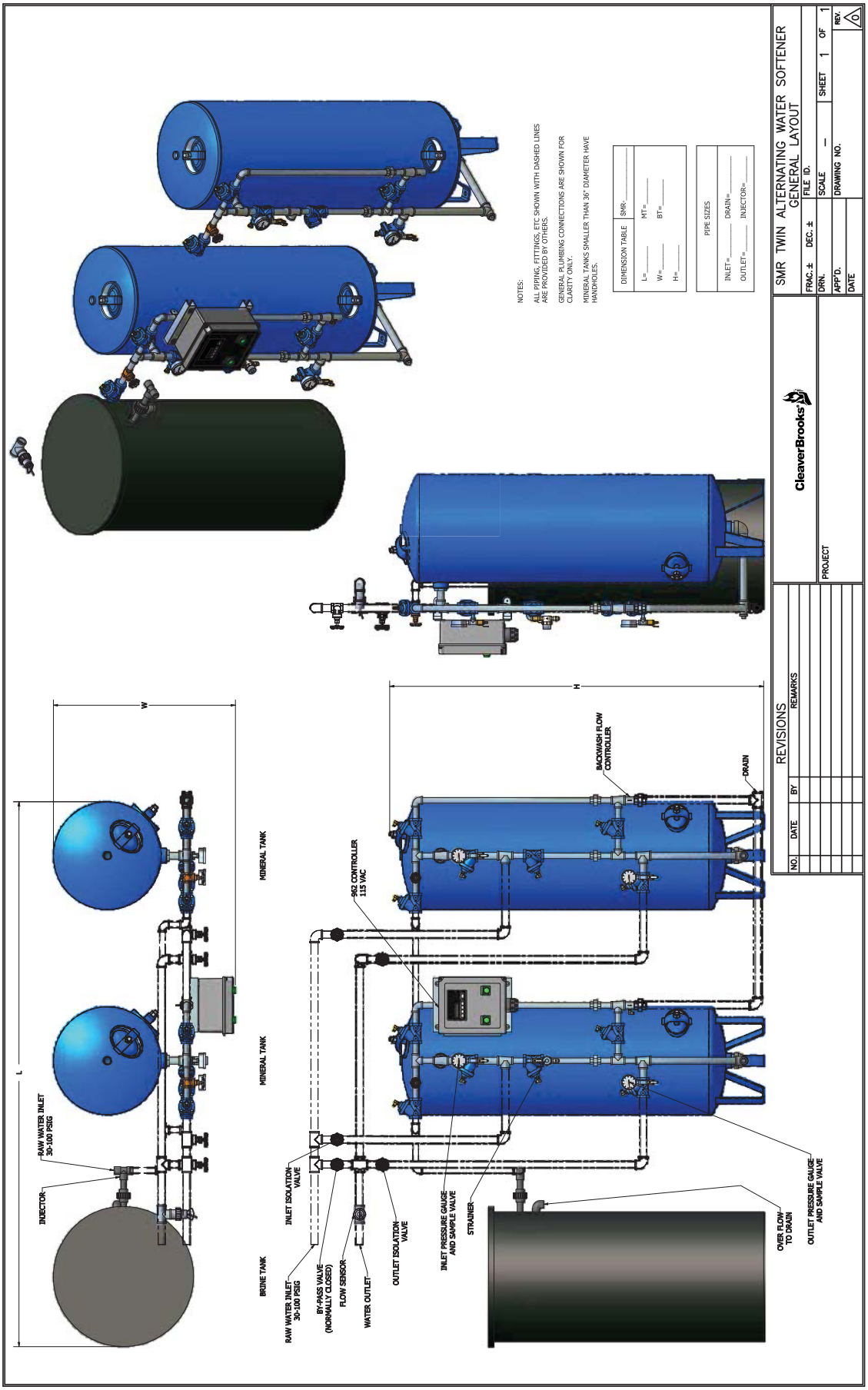
SPECIFICATION TABLE

	MODEL	150		210		300		450		600		750		900		1050		1200		1500	
SYSTEM SIZE	Max Capacity (Kilograins)	150		210		300		450		600		750		900		1050		1200		1500	
	Min Capacity (Kilograins)	100		140		200		300		400		500		600		700		800		1000	
	Valve Size (in)	1½	2	1½	2	2	3	2	3	2	3	2	3	2	3	2	3	3	4	3	4
FLOWRATE	Continuous Flowrate (gpm)	45	57	64	80	92	165	82	140	110	175	90	160	105	188	95	173	215	310	225	405
	Peak Flowrate (gpm)	69	97	86	110	125	230	115	190	125	250	116	230	133	279	124	259	300	410	308	600
	Backwash & Fast Flush (gpm)	10		15		20		20		30		30		45		45		60		80	
	Brine Draw & Rinse (gpm)	2.5		3.5		5		5		7		7		10		10		12		15	
TIMER SETTINGS	Backwash & Fast Flush (min)	10		10		10		10		10		10		10		10		10		10	
	Brine Draw & Rinse (min)	60		60		60		60		60		60		60		60		60		60	
	Fast Flush (min)	6		6		6		6		6		6		6		6		6		6	
SOFTENER TANK	Size (in)	20x54		24x54		30x54		30x60		36x60		36x72		42x60		42x72		48x72		54x72	
	Gravel (lbs)	100		200		300		300		400		400		600		600		900		1200	
	Resin (ft^3)	5		7		10		15		20		25		30		35		40		50	
	Freeboard (in)	24		24		27		20		23		27		20		25		33		34	
BRINE SYSTEMS EQUIPMENT	Tank size	24x50		24x50		24x60		30x60		39x60		39x60		42x60		50x60		52x60		66x46	
	Max Salt Storage (lbs)	700		600		600		1000		1900		1700		1900		2300		2600		3300	
	Injector Code	541-1-RED		541-2-WHT		541-3-BLUE		541-3-BLUE		542-1-RED		542-1-RED		542-2-WHT		542-2-WHT		12-150		15-150	
	Injector Size	¾"		¾"		¾"		¾"		1"		1"		1"		1"		1 ½"		1 ½"	
MAX	Salt Dosage- Max (lbs)	75		105		150		225		300		375		450		525		600		750	
	Brine Valve Float Height (in)	12		19		26		26		19		26		26		19		*N/A		*N/A	
MIN	Salt Dosage- Min (lbs)	30		42		60		90		120		150		180		210		240		300	
	Brine Valve Float Height (in)	3		8		9		9		8		9		9		8		*N/A		*N/A	

*These brine tank have a different float mechanism

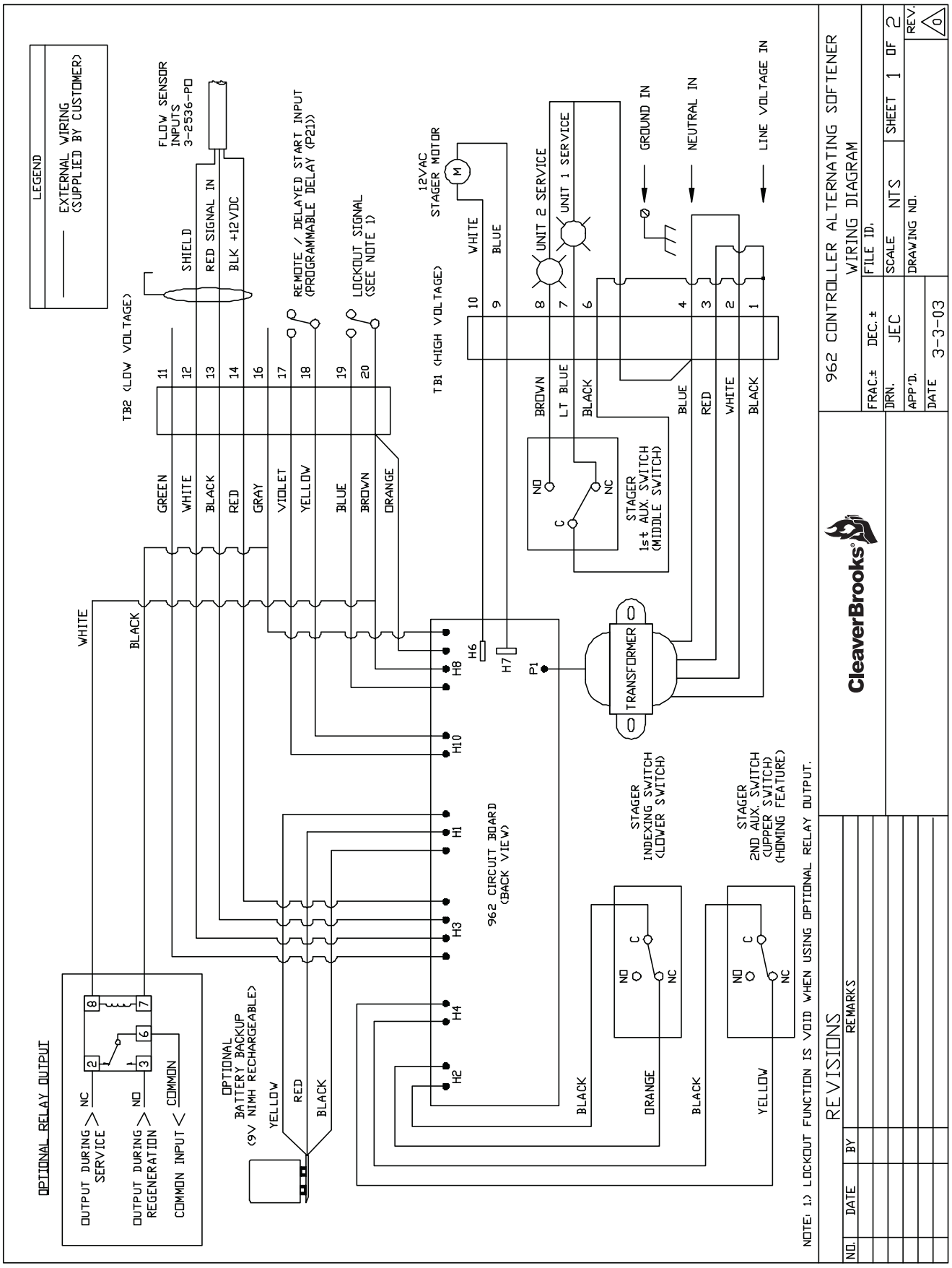
Continuous Flow Rate – Pressure loss not to exceed 15 psi
Peak Flow Rate – Pressure loss not to exceed 25 psi
Temperature Range 35-100 °F

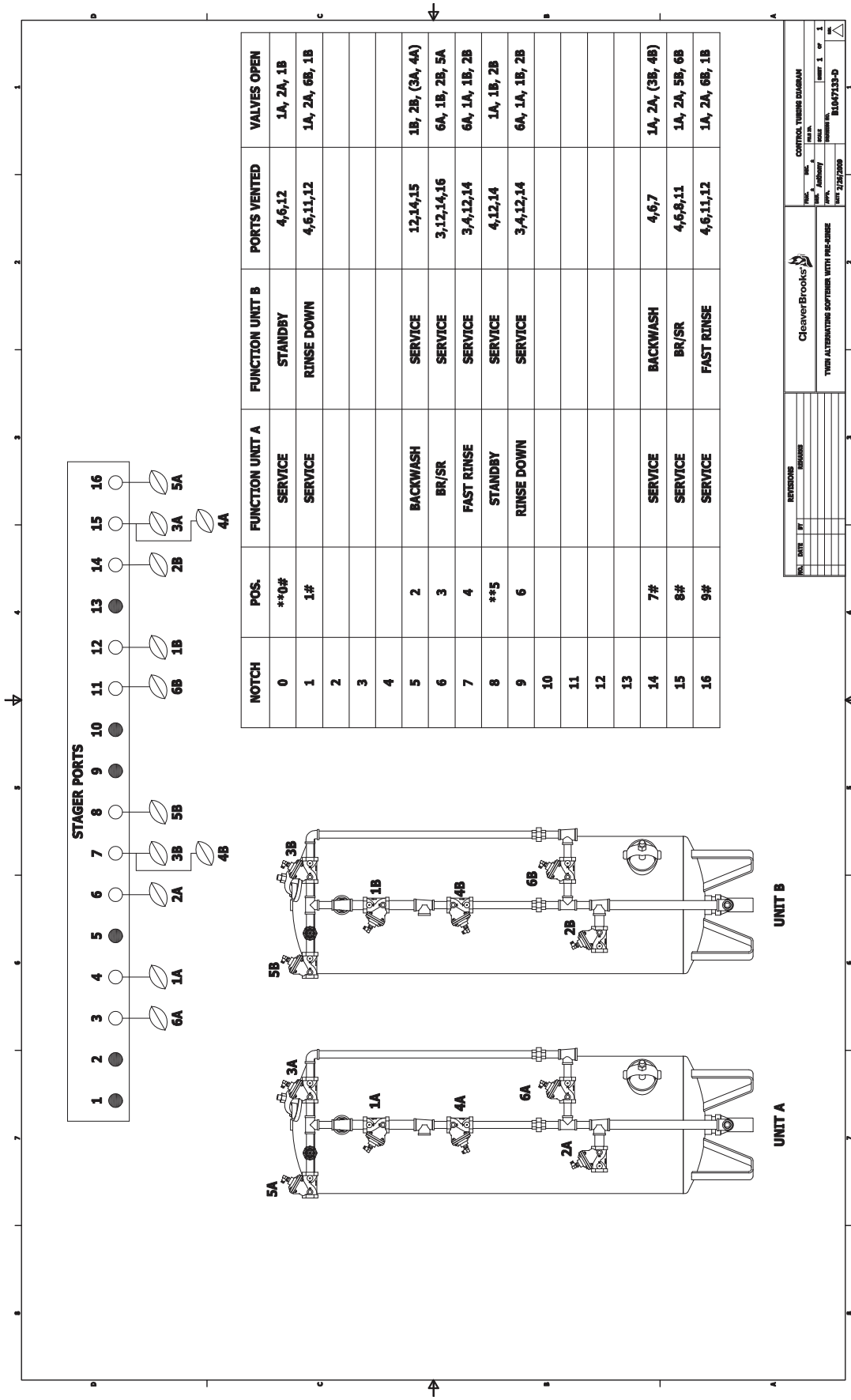
Maximum Salt Dosage 15 lbs/ft^3 – 2,000 grains/ pounds of salt
Minimum Salt Dosage 6 lbs/ft^3 – 3,000 grains/ pounds of salt
Pressure Range 30-100 psig


SMR TWIN ALTERNATING WATER SOFTENER
GENERAL LAYOUT
CleaverBrooks
NOTES:
ALL PIPING, FITTINGS, ETC SHOWN WITH DASHED LINES ARE PROVIDED BY OTHERS.
GENERAL PLUMBING CONNECTIONS ARE SHOWN FOR CLARITY ONLY.
MINERAL TANKS SMALLER THAN 36" DIAMETER HAVE HANDHOLES.
DIMENSION TABLE
SMR:
L=
MT=
W=
BT=
H=
PIPE SIZES
INLET=
DRAIN=
OUTLET=
INJECTOR=
REVISIONS
NO.
DATE
BY
REMARKS
PROJECT
FRAC. ±
DEC. ±
FILE ID.
DRN.
SCALE
SHEET 1 OF 1
APP'D.
DRAWING NO.
REV:
DATE
W
L
H
INJECTOR
RAW WATER INLET 30-100 PSIG
MINERAL TANK
MINERAL TANK
BRINE TANK
962 CONTROLLER 115 VAC
BACKWASH FLOW CONTROLLER
DRAIN
INLET ISOLATION VALVE
RAW WATER INLET 30-100 PSIG
BY-PASS VALVE (NORMALLY CLOSED)
FLOW SENSOR
WATER OUTLET
OUTLET ISOLATION VALVE
INLET PRESSURE GAUGE AND SAMPLE VALVE
STRAINER
OVER FLOW TO DRAIN
OUTLET PRESSURE GAUGE AND SAMPLE VALVE

SMR DIMENSIONS AND PIPE CONNECTIONS CHART

MODEL	PIPE SIZES			DIMENSIONS		
	INLET/OUTLET	DRAIN	INJECTOR	HEIGHT	WIDTH	LENGTH
150-1½	1½	1	¾"	6'-0"	2'-6"	7'-4"
150-2	2				2'-10"	
210-1½	1½	1	¾"	6'-1"	2'-8"	8'-0"
210-2	2				3'-0"	
300-2	2	1	¾"	6'-4"	3'-6"	9'-0"
300-3	3				3'-8"	
450-2	2	1	¾"	6'-10"	3'-6"	9'-6"
450-3	3				3'-8"	
600-2	2	1½	1"	7'-5"	4'-0"	11'-3"
600-3	3				4'-2"	
750-2	2	1½	1"	8'-5"	4'-0"	11'-3"
750-3	3				4'-2"	
900-2	2	2	1"	7'-10"	4'-6"	12'-6"
900-3	3				4'-8"	
1050-2	2	2	1"	8'-10"	4'-6"	13'-2"
1050-3	3				4'-8"	
1200-3	3	2	1 ½"	8'-4"	5'-4"	15'-8"
1200-4	4				5'-8"	
1500-3	3	2	1 ½"	8'-5	5'-10"	17'-10"
1500-4	4				6'-2"	


LEGEND
EXTERNAL WIRING (SUPPLIED BY CUSTOMER)
FLOW SENSOR INPUTS 3-2536-PQ
SHIELD
RED SIGNAL IN
BLK +12VDC
REMOTE / DELAYED START INPUT (PROGRAMMABLE DELAY (P21))
LOCKOUT SIGNAL (SEE NOTE 1)
12VAC STAGER MOTOR
TB2 (LOW VOLTAGE)
TB1 (HIGH VOLTAGE)
GREEN
WHITE
BLACK
RED
GRAY
VIOLET
YELLOW
BLUE
BROWN
ORANGE
WHITE
BLUE
UNIT 2 SERVICE
UNIT 1 SERVICE
GROUND IN
NEUTRAL IN
LINE VOLTAGE IN
BROWN
LT BLUE
BLACK
BLUE
RED
WHITE
BLACK
NO
C
NC
STAGER 1st AUX. SWITCH (MIDDLE SWITCH)
TRANSFORMER
P1
H6
H7
H8
H10
H1
H3
H4
H2
962 CIRCUIT BOARD (BACK VIEW)
STAGER INDEXING SWITCH (LOWER SWITCH)
STAGER 2ND AUX. SWITCH (UPPER SWITCH) (HOMING FEATURE)
OPTIONAL BATTERY BACKUP (9V NIMH RECHARGEABLE)
YELLOW
RED
BLACK
BLACK
ORANGE
BLACK
YELLOW
OPTIONAL RELAY OUTPUT
OUTPUT DURING SERVICE > NC
OUTPUT DURING REGENERATION > NO
COMMON INPUT < COMMON
NOTE: 1) LOCKOUT FUNCTION IS VOID WHEN USING OPTIONAL RELAY OUTPUT.
REVISIONS
NO. DATE BY REMARKS
CleaverBrooks®
962 CONTROLLER ALTERNATING SOFTENER WIRING DIAGRAM
FRAC.± DEC.± FILE ID.
DRN. JEC SCALE NTS SHEET 1 OF 2
APP'D. DRAWING NO.
DATE 3-3-03
REV. 0



NOTCH	POS.	FUNCTION UNIT A	FUNCTION UNIT B	PORTS VENTED	VALVES OPEN
0	**0#	SERVICE	STANDBY	4,6,12	1A, 2A, 1B
1	1#	SERVICE	RINSE DOWN	4,6,11,12	1A, 2A, 6B, 1B
2					
3					
4					
5	2	BACKWASH	SERVICE	12,14,15	1B, 2B, (3A, 4A)
6	3	BR/SR	SERVICE	3,12,14,16	6A, 1B, 2B, 5A
7	4	FAST RINSE	SERVICE	3,4,12,14	6A, 1A, 1B, 2B
8	**5	STANDBY	SERVICE	4,12,14	1A, 1B, 2B
9	6	RINSE DOWN	SERVICE	3,4,12,14	6A, 1A, 1B, 2B
10					
11					
12					
13					
14	7#	SERVICE	BACKWASH	4,6,7	1A, 2A, (3B, 4B)
15	8#	SERVICE	BR/SR	4,6,8,11	1A, 2A, 5B, 6B
16	9#	SERVICE	FAST RINSE	4,6,11,12	1A, 2A, 6B, 1B

WATER SOFTENER GENERAL OPERATION

Hard water passes through the valve manifold into the top of the softener tank. It flows downward through the mineral bed and out through the bottom of the tank to service. As the water passes through the mineral bed, the hardness present is removed through the process of ion exchange and at the same time sediment present is removed by filtration action of the mineral. Once the mineral has extracted all the hardness it can, it must be regenerated and have its capacity restored by the following procedure:

REGENERATION

1. Backwash: The flow through the mineral bed is reversed and allowed to flow to drain. The up-flow action washes any sediment or foreign material collected in the unit out to drain. At the same time the mineral itself is restratified, thereby eliminating any possibility of channeling (approximately 10 minutes).
2. Brine Draw: The flow through the unit is returned to down-flow to drain at a slow controlled rate and during the first stage of this step the brine is injected to react with the mineral and restore its softening capacity (approximately 20 minutes).
3. Slow Rinse: The flow through the unit is a slow flow of water to rinse all of the exchanged hardness and salt from the unit (approximately 40 minutes).
4. Fast Flush: The downward flow to drain in this step is increased to a high rate which will repack the mineral bed and remove the last traces of salt and hardness from the regenerated equipment just before its return to service (approximately 6 minutes).

HOW THE STAGER FUNCTIONS

The regeneration of the equipment provided is carried out through the redirection of flow through the valve manifold. This manifold consists of individual diaphragm valves, which are controlled by the hydraulic stager mounted at the bottom of the stager controller. The stager applies or relieves water pressure to close or open valves as required. When water pressure is applied to the top of a diaphragm valve, it forces a diaphragm in causing it to close the seat assembly. When pressure is relieved from the top of the valve, by venting it to drain through the stager, the water pressure under the diaphragm forces it out thereby opening the seat assembly.

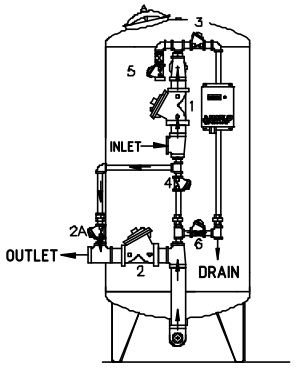
Note: If stager somehow gets out of sequence either:

- Rotate thumb wheel in direction of arrow.
- Be patient, unit will return to service position and be in sequence within 2 hours.

FLOW DIAGRAM WATER SOFTENERS

PRE RINSE

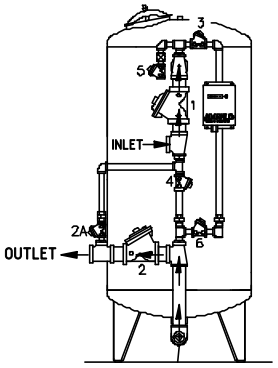
VALVES OPEN: 1,2A,6
VALVES CLOSED: 2,3,4,5



NOTE BY PASS VALVE 2A IS INCLUDED ON SINGLE UNITS ONLY

SERVICE

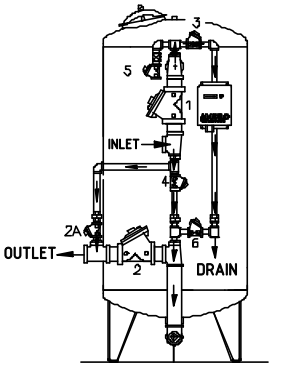
VALVES OPEN: 1,2
VALVES CLOSED: 2A,3,4,5,6



NOTE: BY PASS VALVE 2A IS INCLUDED ON SINGLE UNITS ONLY.

BACKWASH

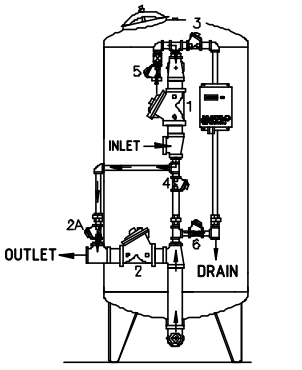
VALVES OPEN: 2A,3,4
VALVES CLOSED: 1,2,5,6



NOTE BY PASS VALVE 2A IS INCLUDED ON SINGLE UNITS ONLY.

BRINE/RINSE

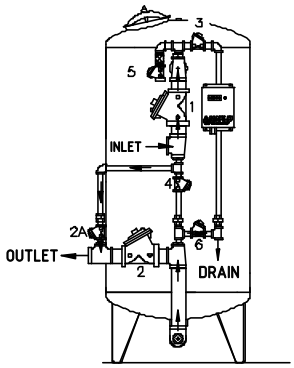
VALVES OPEN: 2A,5,6
VALVES CLOSED: 1,2,3,4



NOTE: BY PASS VALVE 2A IS INLCUDED ON SINGLE UNITS ONLY.

FAST FLUSH

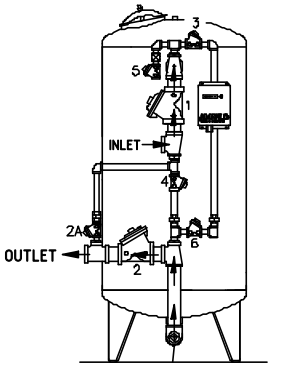
VALVES OPEN: 1,2A,6
VALVES CLOSED: 2,3,4,5



NOTE BY PASS VALVE 2A IS INCLUDED ON SINGLE UNITS ONLY

STANDBY

VALVES OPEN: 1
VALVES CLOSED: 2,2A,3,4,5,6



NOTE: BY PASS VALVE 2A IS INCLUDED ON SINGLE UNITS ONLY.

BRINE MAKER OPERATION

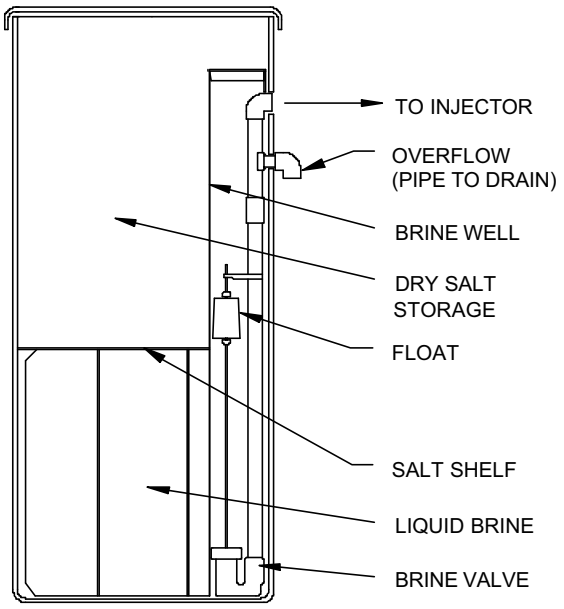
The brine-maker is an automatic brining system, which is easily adjusted to provide maximum operating efficiency of your water softener. It is a combination salt storage and brine-measuring tank complete with an automatic valve.

The brine-maker consists of:

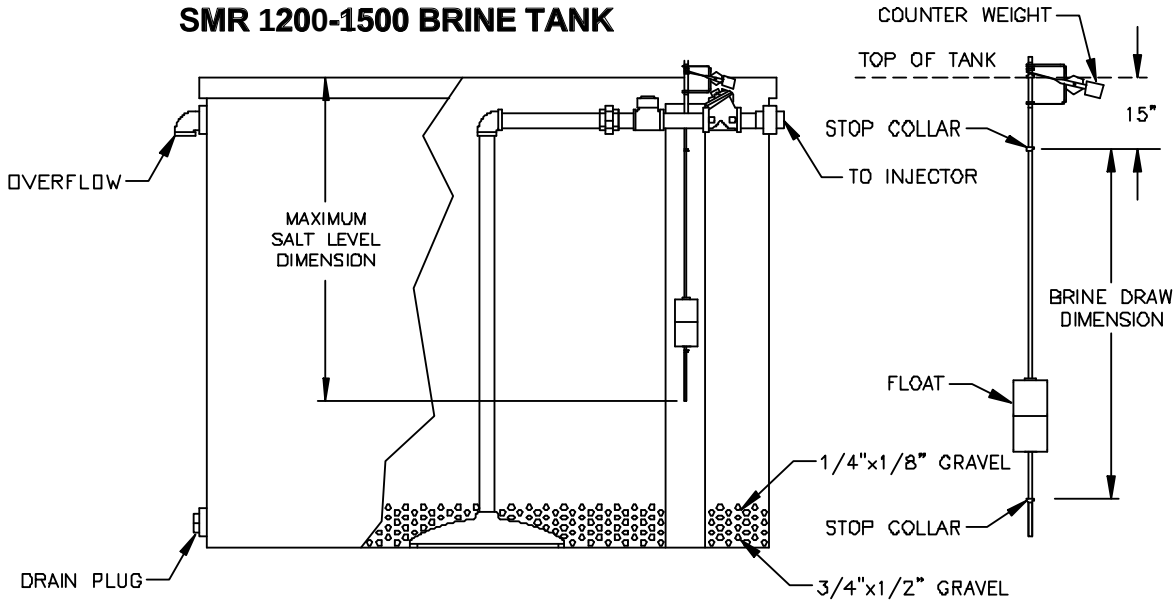
1. An automatic brine valve which is housed in a closed tube or “well”.

2. Salt Platform -
   a) **SMR Models 150-1050 -** A brine tank with a platform dividing it into two sections.
   b) **SMR Models 1200-1500 -** A brine tank with a saturator and gravel fill.

SMR 150-1050 BRINE TANK



SMR 1200-1500 BRINE TANK



After each regeneration, water flows from the brine valve and into the brine tank.
When the water level rises the float begins to rise until it closes the automatic valve. Salt stored in the tank slowly dissolves to form concentrated brine.

As brine is formed, the liquid volume increases and the level rises in the salt. The resulting level maybe 2 to 10 inches above the float depending on the amount of salt used for regeneration.

During regeneration, the brine injector creates suction, which opens the brine valve and draws into the softener tank. When the float falls to the lower limit (set by the stop collar) the automatic valve seats and prevents air from entering the system. After the slow rinse step is complete the process repeats itself.

PIPING INSTALLATION:

1. Install piping as shown on the layout drawing. Include unions and shut-off valves on the inlet and outlet of each softener. Also, include a shut-off valve for each injector provided with the system. It is recommended that a union be installed in each softener drain-line to facilitate cleaning the backwash flow control.

2. **Do not** reduce drain-line pipe size. **Do not** install a shut off valve in the drain-line. Provide an air gap in the drain line in accordance with local codes (minimum four (4) pipe diameters).

3. If your system has a water meter thoroughly read the meter instructions manual located in the back of this manual before installing any water meters or flow sensors,. Water meters typically must be installed in a particular manner (i.e. horizontal, plane or with recommend pipe lengths) to function properly.

4. After the piping has been completed, make sure to close all isolation valves.

NOTES:

- Install the piping conforming to federal, provincial, and local codes.
- Union or flanges are recommended at the control valve's inlet, outlet, and drain connections
- To enhance the monitoring of the system's performance sample valves and pressure gauges are be installed at the inlet and outlet piping to each control valve.
- If distance of drain line is over a 10 ft. vertical or 25 ft. horizontal run, increase drain line one pipe size over that provided on the control valve.
- Do not make a direct connection to the drain. Provide an air gap of at least four times the diameter of the pipe to conform to sanitation codes and to permit observation of the flow.
- It is not recommended that an overhead or a long horizontal drain run be used. The increased backpressure will cause problems when drawing brine.

SOFTENER LOADING

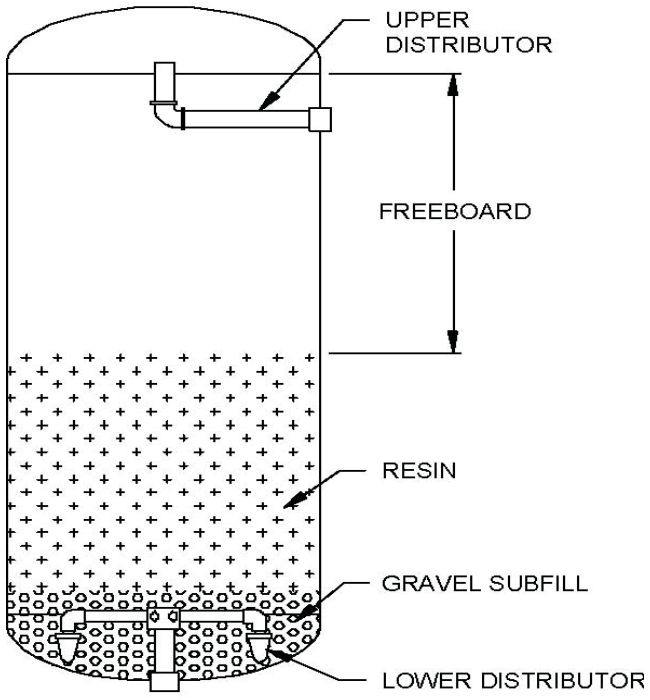
- ✓ Do not begin loading until you have confirmed all of the required media is on site.
- ✓ Locate your unit on the Specification Table for the correct amount of gravel and resin per tank and separate quantities.
- ✓ Before loading, visually check the lower distributor for shipping damage. All radial arms and baskets strainers are in place and pointing downward. Tighten any loose laterals. **Do not load tank if there is damage is evident.** Call the factory if any damage is observed.
- ✓ Slowly open the inlet valve and fill the tank half way or as full as possible with water. There might be a flow of water to drain.
- ✓ Care should be exercised in the loading of the gravel in order to insure that the distributors are not damaged. The equipment provided has a PVC lower distributor system.

GRAVEL LOADING

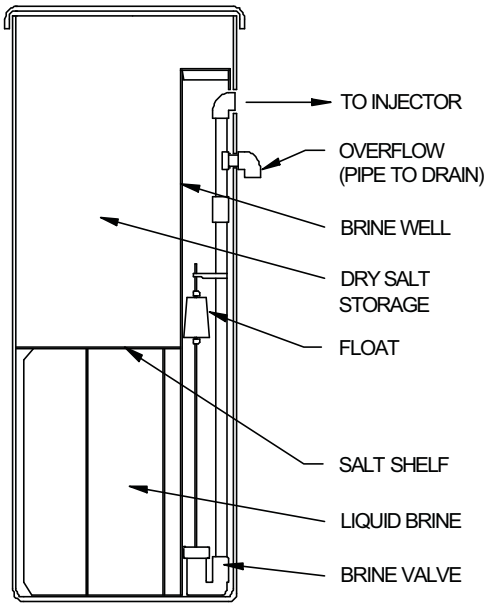
1. Slowly and gently pour the gravel marked for the mineral tank into the unit.
2. Drain the tank down until the gravel and water levels are the same.
3. Carefully level the gravel before loading the resin.

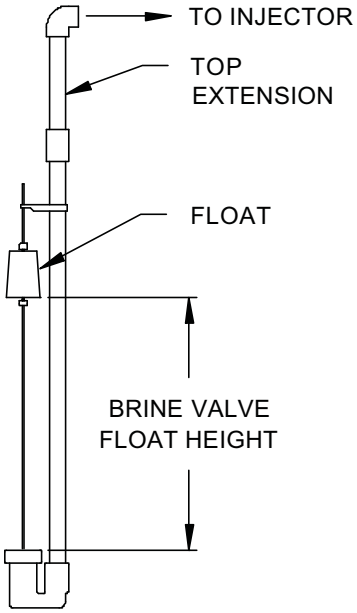
RESIN LOADING

1. Reopen the inlet valve and fill the tank to 1/3 to 1/2 full of water.
2. Pour the quantity of resin marked for the tank in through the top opening.
3. Reopen the inlet valve and fill the tank with water to the top access opening.
4. Close and secure the top access opening.
5. Open inlet valve and continue to fill the tank with water until it is fully pressurized.



BRINE TANK INSTALLATION





1. The brine tank should be installed on a smooth level surface. If none is available, the tank should be placed on a smooth piece of exterior plywood and leveled by placing shims underneath the plywood.

2. Make sure that the salt shelf inside the tank is level and that the brine well is near to vertical as possible. Check the specifications table and make sure that the float setting is the proper height for the model provided. Brine tanks are shipped with the float set for maximum salting. If incorrect, slide the float to the proper setting. **Float should be approximately one inch above grid plate**.

3. Place brine valve into the brine well and set at the bottom of the brine tank. Note: If minimum brine draw is desired, remove the pipe nipple and coupling from the brine assembly. Install remaining brine valve assembly into elbow using Teflon tape or Teflon paste, and set float to minimum salt level see Specification Table for settings. Place brine valve into brine well. Brine valve assembly will not sit on bottom of brine tank.

4. Connect the brine valve to the brine injector. Open the manual injector feed water valve and allow the brine tank to fill with water. To speed this process the tank can be filled with a garden hose to about 2” below the platform. The tank will continue to fill until the float rises and shuts of the flow (approximately 1” above the platform). Note: In the process of making brine for the first regeneration, the solution volume will increase (one gallon of water will be 1.2 gallons of brine). The final level of the liquid will be several inches above the platform.

5. If the refill water shuts off below the platform or too far above the platform, the brine valve should be remove and the float adjusted up or down until is shuts off approximately 1” above the platform. Place the brine well cap seal in place and open the manual valve in the brine line to the softener tank.

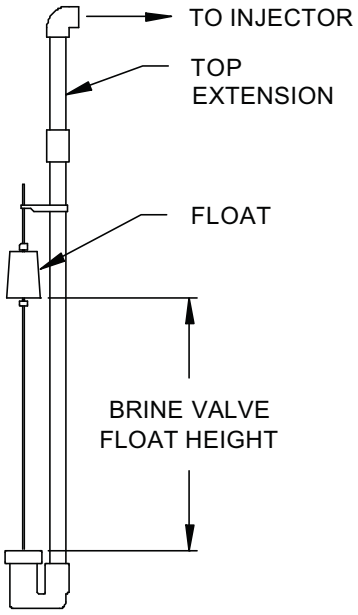
MINIMUM SALTING ADJUSTMENT

Minimum salting is the most efficient use of salt. But it does minimize the capacity of the unit, which will decrease the time between regenerations. **Only** make this adjust after the unit has completed a brine tank refill step and the water level was checked to be above the salt platform. Follow these instructions to adjust your unit to regenerate with minimum salt usage.

- Adjust brine tank refill time to the minimum setting according to the specification table. Refer to the "Setting the regeneration cycle timer page.

- Monitor the water daily for hardness. It may also be necessary to adjust the regeneration frequency, since the capacity of the unit has changed.

1. Remove brine valve assembly from brine well.
2. Remove air check from assembly.
3. Shorten the riser tube by removing the top extension pipe.
4. Reassemble brine valve assembly.
5. Reinstall the assembly into the brine well.
   The assembly will no longer reach the bottom of the brine tank.



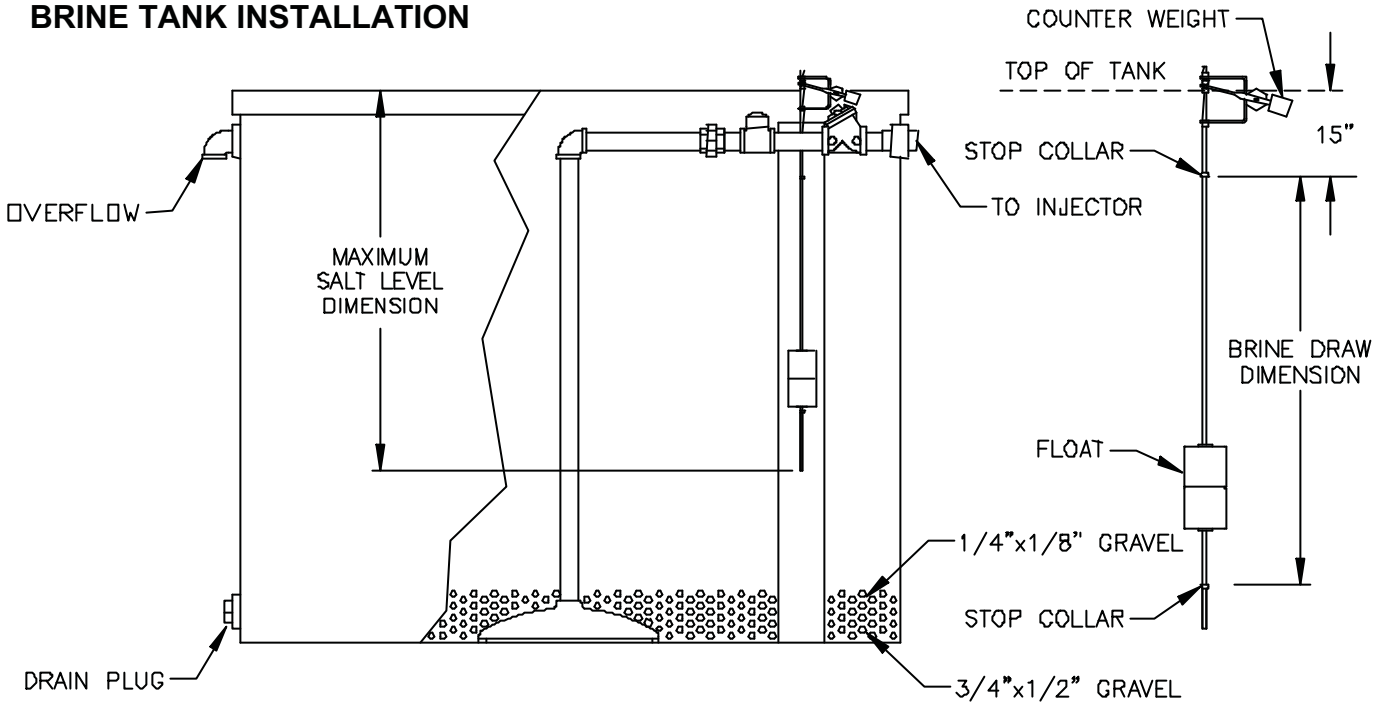
RECOMMENDED TYPES OF SALT

Only purified salt should be used in the brining system. Palletized salt (“Button”, “Nugget”, and “Pellet”) or block salt (free binders) is recommended. Do **not** use granulated salt, as it will fall through the platform screen.

Rock salt is not normally recommended. Most rock salt contains sludge-forming insoluble that collect on the platform and prevents proper salt-water contact.

Only salt containing 0.5% or less of insolubles will provide continued satisfactory operation. If, salt with more insolubles is used, the brine maker will require periodic cleaning.

BRINE TANK INSTALLATION



1. The brine tank is placed as shown on the installation drawing, on a smooth level surface. If not, the tank(s) should be placed on a smooth piece of exterior plywood and leveled by placing shims beneath the plywood.

1. Load the two (2) layers of gravel, 3/4 x 1/2, then 1/4 x 1/8 and level. Make sure the brine draw pipe located in the tank is as vertical as possible

2. Load the brine tank with the recommended amount of salt. See *Specification Table* on page 1-2 for the maximum amount. Do **not** fill the tank past half way with salt.

3. Check the *Specification Table* on page 1-2 for the float setting for your particular system. (Units are shipped with the float set for maximum salting). If incorrect, adjust the stop collars to the proper setting.

4. Connect the brine valve to the brine injector. Make sure the pipe size matches the size of the transfer valve (i.e.1 inch valve use 1 inch pipe).

5. Open the injector's feed water valve and allow the brine tank to fill with water. The tank will continue to fill until the float rises and shuts off the flow.

6. Adjust the counter weight to insure that the brine valve arm rides up and down.

Note: In the process of making brine for the first regeneration, the solution volume will increase (one gallon of water will be 1.2 gallons of brine), and the final level of the liquid will be several inches above the brine valve float.

7. Place the cover back on the brine tank (if supplied).

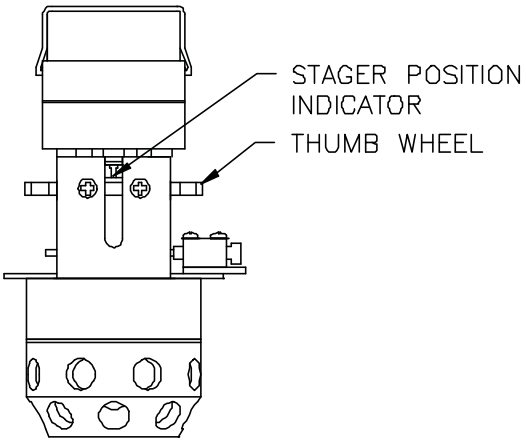
START-UP INSTRUCTIONS

Before proceeding to start-up:

- ✓ Make sure the unit is properly installed with all piping complete
- ✓ All of the required media has been properly loaded in the tank
- ✓ Read the controls section located in this manual
- ✓ Make sure that P17 is programmed as “6” User Defined Cycle Times
- ✓ Do not fill Brine Tank with salt

With all piping and installation completed, and with the mineral in the tank, proceed as follows:

1. Slowly open the manual bypass valve. The manual inlet and outlet valves are to remain closed.
2. With power off to the controller open the controller door and manually rotate the thumb wheel on stager to the #1 (unit 1 backwash) position.



3. Slowly open the manual inlet supply valve of the left unit (1). Do not open fully. Water will enter from the bottom of the mineral tank as air is expelled from the top to the drain. Full flow of water could cause loss of mineral. Continue to fill slowly until all air is expelled and only water flows to the drain. Caution: Full flow of water in the backwash position without relieving air first could cause loss of resin. Slowly fill the mineral tank until all air has escaped and there is a full flow of water at the drain.
4. When only water flows to the drain, open the inlet valve fully and backwash the unit until the water looks clean when caught in a container.
5. Now manually the rotate stager to the #2 (unit 1 brine draw) position.
6. While the unit is in the brine/rinse position, check the level in the brine tank. The level should be dropping at a slow rate (approximately 2” per minute). Allow the level to drop until it is below the salt platform.

START-UP INSTRUCTIONS – (Cont'd)

7. Manually the rotate stager to the #3 (unit 1 fast flush) position. Allow the water to flow to the drain until clear. During this time, the brine tank will fill until the float closes the brine tank valve. Check that all brine fittings are tight and that the water level in the brine tank is according to the conditioner specifications.
8. Manually rotate the stager to the #4 (unit 1 standby/unit 2 service position)
9. Manually rotate the stager to the #5 (unit 2 backwash) position
10. Slowly open the manual inlet valve to unit 2. Water will enter from the bottom of the tank. Air will be expelled through the backwash outlet #3 valve as water enters the bottom of the tank.
11. When a full flow of water is present at the drain and no air is present open the inlet isolation valve until fully open. Remain in this backwash position until the water at the drain looks clean when caught in a container. Verify that large amounts of resin are not present at the drain. If large amounts of resin are coming out of the backwash then stop the water and consult the factory. Only a small amount of resin fines should be present at the drain.
12. Manually rotate the stager to the #6 (unit 2 brine draw position). The level in the brine tank should be falling.
13. Manually rotate the stager to the #7 (unit 2 fast flush position). Allow the unit to fast rinse for about 5 minutes or until the water at the drain is clear. During this time the brine tank should be refilling. The float on the brine tank should stop the refill back into the brine tank.
14. Manually rotate the stager to the #0 (unit 1 service/unit 2 standby position)
15. Fill the brine tank with the proper amount and type of salt recommended for use with the system.
16. Close the manual bypass valve and open all isolation valves fully open. The system is now in service.
17. Connect electrical power to the stager controller as shown in the wiring diagram located on page 20.
18. Enter water hardness in grains per gallon into the 962 controller. See the 962 manual located in the back of this manual for instructions on entering data and programming the controller.

Note: The 962 controller indicates which unit is in service by a "1" or "2" in the left most display.

BATCH - CALCULATION

HOW TO CALCULATE SOFTENERS CAPACITY

"Batch size" is the term used for the amount of water passing through and being softened by the water softener between regenerations. This is a simple calculation provided two pieces of information are known:

- Size of the water softener in grains.
  (i.e. SMR-300 has 300,000 grains capacity per tank).
- Hardness of the raw water being treated by the water softener.

SAMPLE CALCULATION

Example:

SMR-600-2 – Total capacity available is 600,000 grains
Water hardness is 20 grains per gallon

BATCH SIZE

Batch size = Grain capacity of softener ÷ grains per gallon of hardness
Batch size = 600,000 grains ÷ 20 grains per gallon = 30,000
Batch size = 30,000 gallons of water available for treatment

For immediate regeneration type meter control, the meter setting would be at 30,000 gallons.

This value is commonly adjusted to a percentage (80-90%) of the calculated value (in this example 24-27,000 gallons) to provide a safety buffer to assure not over-running the softener due to the water chemistry or the softener regenerating at a delayed time once the meter counts down to zero.

Programming the Series 962 Stager Control

Special Features of the Series 962 Control

Manual Regeneration

- To initiate a manual regeneration, simply press and hold the **REGEN** button for 3 seconds.
- If an immediate second regeneration is desired, wait for at least **one minute** after the first regeneration begins and then press and hold the **REGEN** button for 3 seconds. A second regeneration will be performed immediately following the first. The display will freeze and only show the Regeneration Time Remaining as an indication that the second regeneration will be initiated. When the first regeneration is complete, the second regeneration will begin and the display will alternate between Flow Rate and Regeneration Time Remaining. The second regeneration will be performed on the offline tank in twin alternating applications.

Cancel Regeneration Function

- To cancel (abort) a regeneration, press and hold the left arrow (←) and **SET** keys for 3 seconds. The control will display an ERROR 3 and return the stager to the service (Home) position. Once in the service position, ERROR 3 will be cleared.

Advance Cycle Function

- While in a regeneration cycle, you can advance the stager to the next cycle by pressing and holding the left arrow key (←) for 3 seconds. The stager and controller will then advance to the next regeneration cycle.

Lock-Out Feature

- The lock-out feature may also be used to prevent regenerations when a signal is present at the lock-out terminals. Two or more 962 controls can be connected together (see Figure 2) to prevent one from regenerating while another is in regeneration. This signal can also come from external equipment that can provide a dry contact closure. (CONNECTION MUST BE A DRY CONTACT).

NOTE: When using the Relay Output Option the lockout feature cannot be used.

Flow Sensor Select Options

P19 is used to select the flow sensor type.

- Number 1 is for the Autotrol 1 inch flow sensor.
- Number 2 is for the Autotrol 2 inch flow sensor.
- Number 3 is for other flow sensors and entering the correct “K-factor” in P20.

The K-factor is defined as pulses per gallon for U.S. units or pulses per liter for metric units. The K-factor can be obtained from the flow sensor manufacturer. If a “4” is entered in P19 then the definition of the number in P20 becomes gallons or liters per pulse depending on the units of measure selected.

Programming the Series 962 Stager Control

Special Features of the Series 962 Control

- **Memory Retention** - During a power outage, critical operating information is stored in nonvolatile memory. This information includes the time of day, water usage, all programming data and the number of days since the last regeneration. When power is restored, the information is returned to the microprocessor and operation resumes as if an outage never occurred. The time of day will be late by the length of the power outage. The time of day should be reset after an extended power outage. No other reprogramming is necessary. An optional rechargeable backup battery will allow the control to keep track of time and water usage for up to 8 hours during a power outage. ***The control will not initiate a regeneration while on battery backup.***

- **Programmable Cycles** - The control is flexible in defining the appropriate cycles of operation.

- **Double Regeneration** - ***For single tank applications***, the control automatically calls for a second regeneration the following day if the current operation cycle exceeds the programmed capacity by 150% or more.

- **Capacity Setting Lockout** - The control can be programmed to lock the capacity so it cannot be altered after installation.

- **Selectable Reserve Options** - To meet the application requirements, the control allows selection of one of two reserve types:
  - ✓ **Fixed Reserve** - The reserve is fixed at a programmable percentage (30% factory preset) of the total capacity.
  - ✓ **Variable Reserve** - The controller monitors the daily water usage and at the programmed time of regeneration, calculates the average water used for each day of the week. The reserve capacity is set to 120% of the average water usage for the next day.

- **U.S. or Metric Units of Measure** - To meet your display and programming requirements, the 962 Stager uses grains per gallon of hardness and kilograins of capacity for U.S. units; or parts per million of hardness and kilograms of capacity as gallons or cubic meters.

- **Calendar Override** - If the volume of water used has not caused a regeneration, the 962 Stager can be set to regenerate every one to thirty days.

- **Manual Regeneration** - A separate **REGEN** button is provided for manual regenerations. A double manual regeneration feature is included that allows back-to-back regenerations.

- **Operating Histories** - Important operating data is stored in memory and is retrievable upon demand. The historical data includes peak flow data as well as average daily water usage for each day of the week

Programming the Series 962 Stager Control

Special Features of the Series 962 Control

- **Remote Regeneration** - A set of input terminals with a programmable delay are provided as a standard feature of the 962 Stager that allows regeneration to be initiated from a remote location. This feature can be used to facilitate remote manual regeneration requirements or assist in further automating the control system such as the use of a differential pressure switch.

- **Selectable Automatic Regenerations** - There are four automatic regeneration methods:
    1. **Delayed only** - System starts an automatic regeneration at a predetermined time of day when the capacity remaining is below a defined reserve. The reserve capacity may be fixed or variable. The variable reserve is determined by past usage history.
    2. **Delayed with immediate override** – System starts an automatic regeneration **immediately** when the capacity remaining is reduced to zero regardless of day and time regeneration settings.
    3. **Day of week** – Timeclock - System starts an automatic regeneration based on the day of the week at a user specified time of day.
    4. **Calendar override** - System starts an automatic regeneration after programmable number of days since the last regeneration regardless of capacity settings

- **Optional Battery Backup** – An optional backup battery can be provided so that the Time of Day and water usage will be maintained for up to 8 hours during a power outage. All 962 Stager controls are provided as “Battery Backup Capable”. Batteries can be purchased separately. The control has a trickle charge circuit that will recharge the battery in the event it is depleted by a power outage. If the optional battery backup is provided with the Series 962, make sure that it is properly connected. **Caution:** A standard 9V alkaline battery may be used as a substitute, but it will not be rechargeable.

- **Flow Rate Display -** In the normal operating mode the series 962 Stager control will alternate between **Capacity Remaining** (gallons or m^3) and **Flow Rate** (gallons per minute or m^3/hr). In the event of power loss, (including battery power) the display will alternate between **Time of Day** and **Capacity Remaining** once power has been restored. The control will remain in this display mode until the Time of Day is reset or until any button is pressed. The flow rate display is indicated by a small L.E.D. in the top left corner of the display. When P19 is set to “4” (user defined pulse equivalent) flow rate will not be displayed.

Programming the 962 Controller

Level I

Programming Access Code – None Required

Level I Programming –
Level I Program “P” values are identified by the legend on the faceplate of the control. A green LED is illuminated when a Level I "P” value is displayed. Following are the Level I “P” values:

- **P1 – Time of Day**
- **P2 – Time of Regeneration**
- **P3 – Hardness**
- **P4 – N/A**
- **P5 – Capacity**

Setting Time of Day
Press the **SET** button. The display will show the time of day with the minutes digit blinking. Press the UP (↑) arrow button to increase the number or the DOWN (↓) arrow button to decrease the number. To skip the number without changing, press the LEFT (←) arrow button. The first digit will stop flashing and the next digit will start flashing. When the far left digit is reached, pressing the LEFT (←) arrow button returns the flashing to the far right digit. Continue changing numbers until the desired Time of Day is obtained. Press the **SET** button to enter the value. The PM indicator will toggle when the “tens digit” of the hours is increased. The far left digit is used to indicate the day of week. Number 1 being Sunday and Number 7 being Saturday.

The Time of Regeneration, Hardness, and Capacity are set in a similar manner.

	Parameter		Range of Values	Minimum Increments	Factory Setting	Units of measure	Notes
	Name	Description					
LEVEL 1	P1	Day of week and time of day	(1-7) 1:00 -12:59	(1 day)	By Customer	Hour or minute	Range depends on value selected for P13.
			AM or PM	1 minutes			For day of week,
							SUN=1 MON=2 TUE=3 WED=4
			(1-7) 0:00 - 23:59				THU=5 FRI=6 SAT=7
	P2	Time of day to start regeneration	1:00 -12:59	1 minute	By Customer	Hour or minute	Range depends on value selected for P13.
			AM or PM				
			0:00 - 23:59				Use only if P15=1
	P3	Hardness of water	3-250	1	By Customer	grains/gallon	Unit of measure depends on value selected for P12
			30-2500	10		ppm	
	P4	Not Used or Displayed in menus selection screen			N/A	Not Used	
	P5	Capacity of unit	Jan-00	1	By Customer	kilograins *	Unit of measure depends on value selected for P12
			.1-510.0	0.1		kilograms *	

Level II

Programming Access Code – Press and hold the (↑) and (↓) arrow buttons simultaneously for 3 seconds

The control will automatically enter Level II programming if P19 or P20 have not been set. The display will show the letter "P" in the far left display digit. The parameter "P-number" is displayed in the far right display digit.

Changing a Program "P" Value

Once the P value you want to change is displayed, press the (←) arrow button to display the current entry for that value.

To change or modify the value, press the **SET** button. The digit on the right hand side of the display will begin to flash. Use the (↑) or (↓) arrow buttons to select the desired entry.

Once the desired entry is obtained, press the (←) button to move to the next digit and change as needed.

Once you have completed the appropriate changes, press the **SET** button. When you press the **SET** button the new entry is stored and the control automatically scrolls to the next P value.

This unit has a pre-rinse feature. P17 must be set to 6 (User Defined Cycle Times) in order for the unit to operate properly.

If a beep sounds, the entry was not accepted.

	Parameter		Range of Values	Minimum Increments	Factory Setting	Units of measure	Notes
	Name	Description					
LEVEL 2	P6 – P8	Not Used or Displayed in menus selection screen			N/A		Not Used
	P9	Backwash time	1-30	1	**10**	minutes	**Make sure P17 =4**
	P10	Rinse/Draw time	1-125	1	**12**	minutes	**Make sure P17 =4**
	P11	Rinse time	1-19	1	**60**	minutes	**Make sure P17 =4**
	P12	Units of measure	0-1	1	0		**0** = US, **1** = Metric
	P13	Clock mode	0-1	1	0		**0** = 12 hour clock
							1 = 24 hour clock
	P14	Calendar override	0-30	1	0	days	**0** = no calendar override
	P15	Reserve Type	0-3	1	3		**0** = Variable reserve
							1 = Fixed reserve
							2 = Variable reserve with immediate regeneration
							3 = Fixed reserve with immediate regeneration.
	P16	Initial average usage or fixed reserve	0-70	1	10	% of capacity	Description depends on value entered for P15
	P17	Operation type ** **P17 is set to (4) for single softners**	3-9	1	4		**3** = 3 cycle filter
							4 = 4 cycle softener,
							5 = 4 cycle butterfly config
							6 = User defined cycle times
							9 = User defined (58 -TB only).
	P18	Capacity change lock-out	0-1	1	0		**0** = None,
							1 = Capacity change locked-out
	P19	Flow sensor select	1-4	1	3		**1** = 1.0" Autotrol turbine,
							2 = 2.0" Autotrol turbine,
							3 = User defined K-factor (PPG),
							4 = User defined pulse equivalent (GRP)
	P20	K-factor or pulse equivalent	0.01-255.00	0.01	**See Table**		Number used for meter K-factor or pulse equivalent
	P21	Remote regeneration switch delay	1-254	1		seconds	Time remote switch must be active to start a regeneration

Level III

Programming Access Code – Press and hold the (←) and (↑) arrow buttons simultaneously for 3 seconds to enter the programming mode.

The display will show the letter “L” in the far left display digit. The parameter “L-number” is displayed in the far right display digit. The **SET** button is inactive except for L4.

If **SET** is pressed when L4 is displayed, Peak Flow is reset to zero.

If **SET** is pressed when any other location is displayed the control will beep.

Level III History Data

Location	Range	Description
L 1	1-7	Day of week (Sun=1, Sat=7)
L 2	0-255	Days since last regeneration
L 3	1:00-12:59/0:00-23:59	Time that peak flow occurred
L4	0-200/0-50.0	Peak flow gallons per minute/cubic meters (M^3) per hour since location reset
L 5	0-655360/0-6553.6	Water used today in gallons/M^3 since time of regeneration
L 6	0-655360/0-6553.6	Water used since last regeneration in gallons/M^3
L 7	0-655360/0-6553.6	Average water usage for Sunday in gallons/M^3
L 8	0-655360/0-6553.6	Average water usage for Monday in gallons/M^3
L 9	0-655360/0-6553.6	Average water usage for Tuesday in gallons/M^3
L 10	0-655360/0-6553.6	Average water usage for Wednesday in gallons/M^3
L 11	0-655360/0-6553.6	Average water usage for Thursday in gallons/M^3
L 12	0-655360/0-6553.6	Average water usage for Friday in gallons/M^3
L 13	0-655360/0-6553.6	Average water usage for Saturday in gallons/M^3
L 14	0-999990/0-99999.9	Total water used since NOVRAM test in gallons/M^3 (LSD)
L 15	0-167/0-16	Total water used since NOVRAM test in gallons/M^3 x 10^6 (MSD)

Level IV

Access Code – Press and hold the (←) and (↓) arrow buttons for 3 seconds to enter programming mode.

Level IV programming is used to enter the User Defined Cycle Times and Day of Week regeneration. All controllers have default settings for 4 cycle softener or 3 cycle filter operation.

The operation type is determined by the value that is programmed in "P17". Make sure that in Level II Programming, P17 is programmed as "6" (User Defined Cycle Times). Failure to do so will cause the softener to function improperly.

Entering "C" Values

"C" values are used to define a specific number of cycles to meet the application needs and are accessible through Level IV programming mode. This system provided has 4 cycles of operation

C1=10 Minutes RINSE DOWN
C2=12 Minutes BACKWASH
C3=60 Minutes BRINE DRAW/RINSE
C4= 6 Minutes FAST RINSE

Example: If the control is used in a system that has a total of 10 cycles of operation, select 6 for P17 in Level II programming. Program C1-C10 for the amount of time desired for each cycle (up to 255 minutes). Each "C" value represents 1 position of the rotary pilot stager that is being used. A maximum of 15 cycles may be used, each programmable from 0-255 minutes. While the controller is in regeneration the display will show a "C" value in the far left display and the time remaining (in minutes) for that "C" value.

Example: [C1 15] = 15 min remaining in C1.

Entering "d" Values (Regeneration Days)

"d" values are used to start a regeneration on a certain day of the week. There are seven "d" values numbered from 1 to 7, with 1 representing Sunday and 7 representing Saturday. Set a 1 in "d7" to initiate an automatic regeneration every Saturday at the Time of Regeneration (P2). The automatic regenerations will occur at the time set in P2 regardless of the capacity remaining in the system. A value of "0" indicates no regeneration on that day. The default value is "0" for all "d" values.

Level IV - Cont'd

	#	Description	Range of Values	Minimum Increment	Factory Setting	Notes
LEVEL 4	C1	Position 1 Cycle Time	0-255 min	1 Min	**10**	**Pre Rinse Setting**
	C2	Position 2 Cycle Time	0-255 min	1 Min	**12**	**Backwash**
	C3	Position 3 Cycle Time	0-255 min	1 Min	**60**	**Brine Draw/Rinse**
	C4	Position 4 Cycle Time	0-255 min	1 Min	**6**	**Fast Rinse**
	C5	Position 5 Cycle Time	0-255 min	1 Min	**0**	Not Used
	C6	Position 6 Cycle Time	0-255 min	1 Min	**0**	Not Used
	C7	Position 7 Cycle Time	0-255 min	1 Min	**0**	Not Used
	C8	Position 8 Cycle Time	0-255 min	1 Min	**0**	Not Used
	C9	Position 9 Cycle Time	0-255 min	1 Min	**0**	Not Used
	C10	Position 10 Cycle Time	0-255 min	1 Min	**0**	Not Used
	C11	Position 11 Cycle Time	0-255 min	1 Min	**0**	Not Used
	C12	Position 12 Cycle Time	0-255 min	1 Min	**0**	Not Used
	C13	Position 13 Cycle Time	0-255 min	1 Min	**0**	Not Used
	C14	Position 14 Cycle Time	0-255 min	1 Min	**0**	Not Used
	C15	Position 15 Cycle Time	0-255 min	1 Min	**0**	Not Used
	d1	Sunday	0-1	1	**0**	The unit is factory programmed for metered immediate regeneration. Can be programmed for regeration on a specific day of the week.
	d2	Monday	0-1	1	**0**	
	d3	Tuesday	0-1	1	**0**	
	d4	Wednesday	0-1	1	**0**	
	d5	Thursday	0-1	1	**0**	
	d6	Friday	0-1	1	**0**	
	d7	Saturday	0-1	1	**0**	

***Timeclock Option**
Set a "1" in "d1-d7" to initiate an automatic regeneration any day of the week at the Time of Regeneration programmed in **(P2)**. A value of "0" indicates no regeneration on that day.
The default values are "1" for d3 – (Tuesday) and d5 – (Thursday) if the unit is set up as a Timeclock only.

If every other day regeneration or any other multiple is required, then the calendar override feature **(P14)** will have to be set to initiate regenerations every 1-30 days. The unit will regenerate at the Time of Regeneration programmed in **(P2)**
The automatic regenerations will occur at the time set in P2 regardless of the capacity remaining in the system.

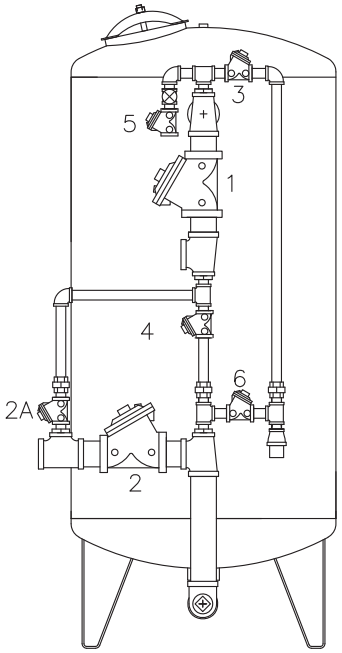
Viewing a Program Value
Programmed values may be viewed at any time. Program values may not be changed during a regeneration.

Level I - To locate and display a P value in Level I press the (↑) or (↓) arrow button until the desired value is displayed. Level I parameters are indicated by the legend on the face plate of the control.

Level II - To locate and display a P value in Level II, simultaneously press the (↑) and (↓) arrow buttons for 3 seconds to gain access. Press the (↑) or (↓) arrow buttons until the desired location is displayed. Press (←) to display the value in the P location.

Level III - To locate and display an L value in Level III, simultaneously press the (←) and (↑) arrow buttons for 3 seconds to gain access an then press the (↑) or (↓) arrow buttons until the desired location is displayed. Press (←) to display the value in the L location.

Level IV - To locate and display a "d" value in Level IV, simultaneously press the (←) and (↓) arrow buttons for 3 seconds to gain access and then press the (↑) or (↓) arrow buttons until the desired location is displayed. Press (←) to display the value in the "d" location.



Replacement Valve Table

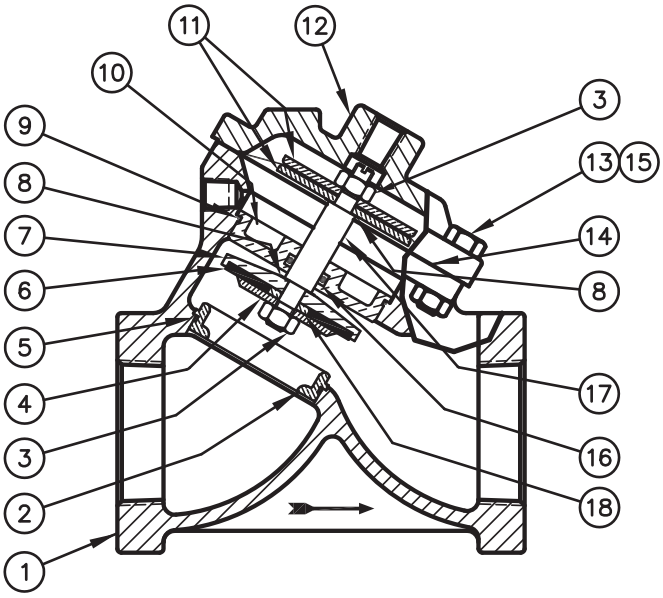
Location#	Function	Position
1	Service Inlet	**NORMALLY OPEN**
2	Service Outlet	**NORMALLY OPEN**
2A	Bypass Valve - Single Systems Only	**NORMALLY CLOSED**
3	Backwash Outlet	**NORMALLY OPEN**
4	Backwash Inlet	**NORMALLY OPEN**
5	Brine Inlet	**NORMALLY OPEN** SPRING ASSIST OPEN
6	Brine/Flush Outlet	**NORMALLY OPEN** SPRING ASSIST OPEN

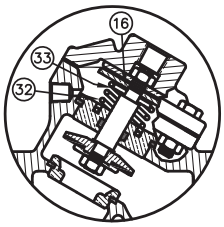
Valve 2A - Is Used on Single Systems Only

SMR Model	Pipe Size	Valve 1	Valve 2	Valve 2A	Valve 3	Valve 4	Valve 5	Valve 6
150	1.5	B2010104B	B2010204B	A2009001B	A2010001B	B2010201B	A2007001B	A2007001B
	2	B2010105B	B2010205B	A2009001B	A2010001B	B2010201B	A2007001B	A2007001B
210	1.5	B2010104B	B2010204B	A2009001B	A2010001B	B2010201B	A2007001B	A2007001B
	2	B2010105B	B2010205B	A2009001B	A2010001B	B2010201B	A2007001B	A2007001B
300	2	B2010105B	B2010205B	A2009001B	A2010001B	B2010201B	A2007001B	A2007001B
	3	B2010108B	B2010208B	A2009001B	A2010001B	B2010201B	A2007001B	A2007001B
450	2	B2010105B	B2010205B	A2009001B	A2010001B	B2010201B	A2007001B	A2007001B
	3	B2010108B	B2010208B	A2009001B	A2010001B	B2010201B	A2007001B	A2007001B
600	2	B2010105B	B2010205B	A2009002B	A2010002B	B2010202B	A2007002B	A2007002B
	3	B2010108B	B2010208B	A2009002B	A2010002B	B2010202B	A2007002B	A2007002B
750	2	B2010105B	B2010205B	A2009002B	A2010002B	B2010202B	A2007002B	A2007002B
	3	B2010108B	B2010208B	A2009002B	A20100002B	B2010202B	A2007002B	A2007002B
900	2	B2010105B	B2010205B	A2009002B	A2010003B	B2010203B	A2007002B	A2007003B
	3	B2010108B	B2010208B	A2009002B	A2010003B	B2010203B	A2007002B	A2007003B
1050	2	B2010105B	B2010205B	A2009002B	A2010003B	B2010203B	A2007002B	A2007003B
	3	B2010108B	B2010208B	A2009002B	A2010003B	B2010203B	A2007002B	A2007003B
1200	3	B2010108B	B2010208B	A2009003B	A2010004B	B2010204B	A2007004B	A2007004B
	4	B2010110B	B2010210B	A2009003B	A2010004B	B2010204B	A2007004B	A2007004B
1500	3	B2010108B	B2010208B	A2009003B	A2010004B	B2010204B	A2007004B	A2007004B
	4	B2010110B	B2010210B	A2009003B	A2010004B	B2010204B	A2007004B	A2007004B

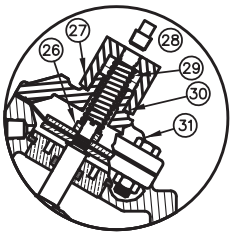
Valve 1 is Drilled and Tapped with 1/4" Female Thread on Boss #1
Valve 2 and 4 are Drilled and Tapped with 1/4" Female Thread on Boss #2

AQUAMATIC REPAIR KITS





SPRING ASSIST OPEN

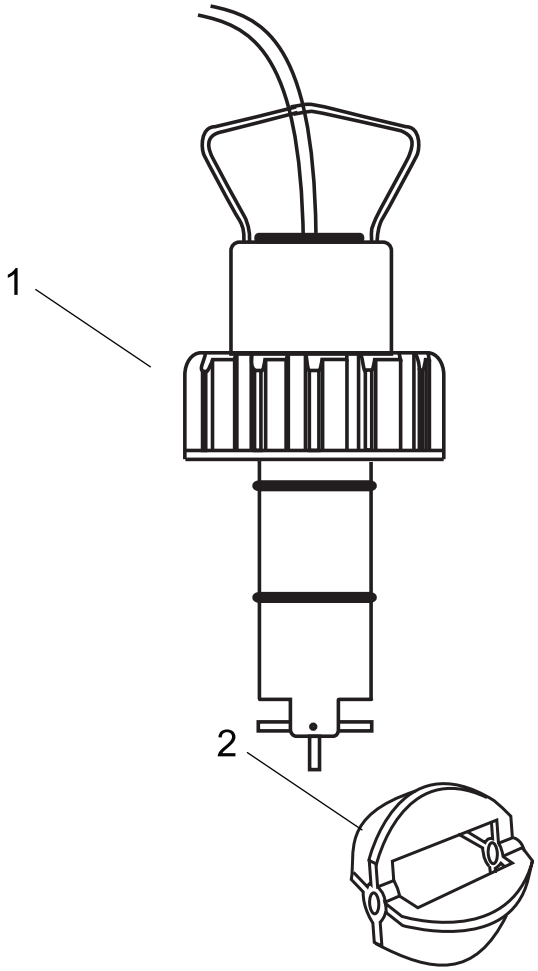


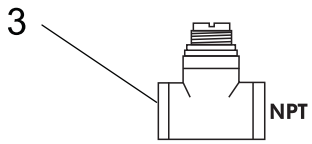
SPRING ASSIST CLOSED

RA - Diaphragm & Seal Kits - Includes Buna N Seals and Diaphragm (Items 3(2),5,6,8(2),9,14&16)
RF - Metal Parts Kit (Normally Open) - (Items 4,7,10,11(2), 17)
RG - Metal Parts Kit (Normally Closed) - (Items 4,7,10,11(2), 23)
SC - Repair Kit (Spring Assist Closed) - (Items 24,27,28)
SO - Repair Kit (Spring Assist Open) - (Items 8,31,32)
GT - Tool - To Install & Remove O-Ring Retainer (Not Shown)

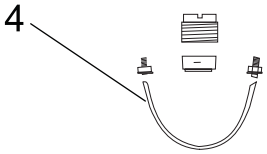
VALVES		REPAIR KITS						SHAFTS	
VALVE SIZE	CASTING #	RA	RF	RG	SC	SO	GT	NO	NC
¾"	421	A2089028	A2089071	A2089078	A2089085	A2089092	A2089098	A2137001	A2137008
1"	421	A2089028	A2089071	A2089078	A2089085	A2089092	A2089098	A2137001	A2137008
1¼	424	A2089029	A2089072	A2089079	A2089086	A2089093	A2089099	A2137002	A2137009
1½	424	A2089029	A2089072	A2089079	A2089086	A2089093	A2089099	A2137002	A2137009
2	425	A2089030	A2089073	A2089080	A2089087	A2089094	N/A	A2137003	A2137010
2½	426	A2089031	A2089074	A2089081	A2089088	A2089095	N/A	A2137004	A2137011
3"	427	A2089032	A2089075	A2089082	A2089089	A2089096	N/A	A2137005	A2137012
3" FLGD	427	A2089032	A2089075	A2089082	A2089089	A2089096	N/A	A2137005	A2137012
4" FLGD	428	A2089033	A2089076	A2089083	A2089090	A2089097	N/A	A2137006	A2137013
6" FLGD	429	A2089034	A2089077	A2089084	A2089091	N/A	N/A	A2137007	A2137014

2536 Standard Mount Sensor





Galvanized Iron Threaded Tee with NPT Threads PVDF Insert



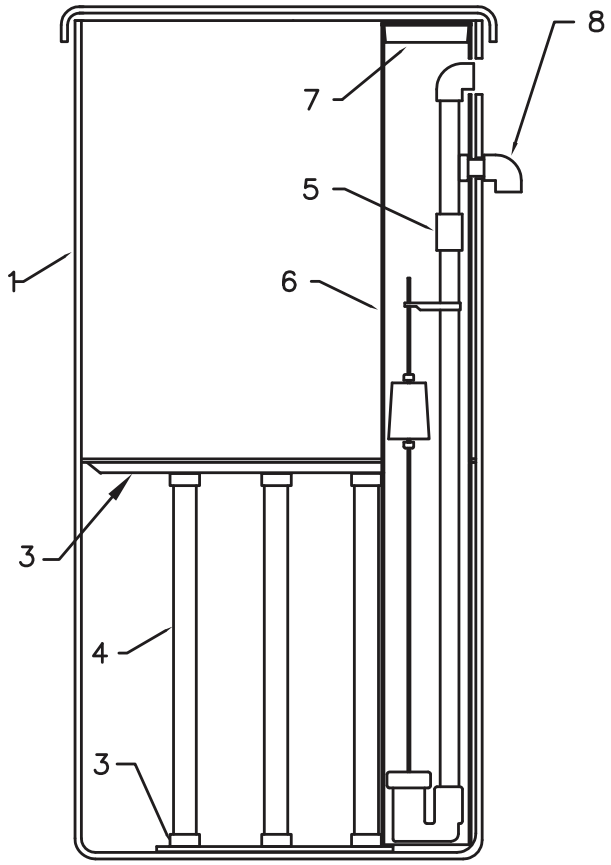
Iron Strap-on Saddle with PVDF Insert

K- Factor Table

Pipe Size Inches	(Pulses per Gallon)	
	Tee Galvanized	Saddle Iron
1	213	
1-1/4	128	
1-1/2	94	
2	59	54
2-1/2		38
3		**23**

Item Number	Part Number	Description
1	A2296001	FLOW SENSOR
2	A2456004	ROTOR/PADDLE
3	A2294012	TEE INSTALL 1 GALV
	A2294002	TEE INSTALL 1-1/4 GALV
	A2294003	TEE INSTALL 1-1/2 GALV
	A2294004	TEE INSTALL 2 GALV
4	A2295001	SADDLE 2-1/2 IRON
	A2295002	SADDLE 3 IRON

BRINE SYSTEM FOR SMR 150-450

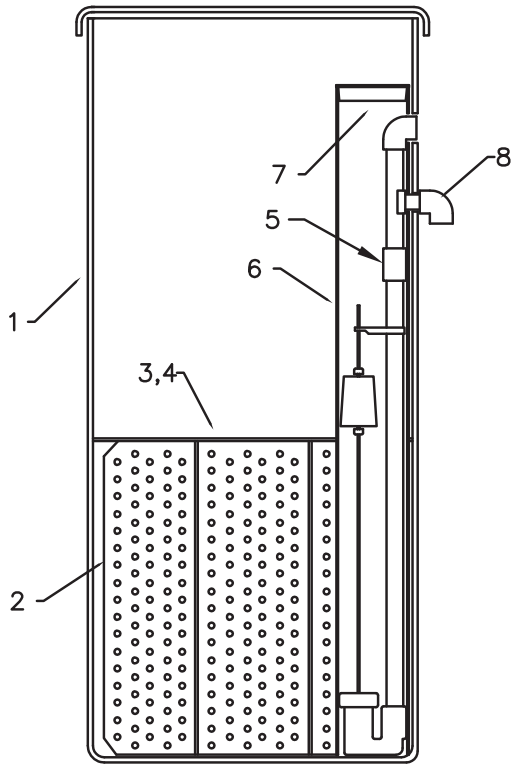


Models	Part Number	Shelf Height
SMR 150	B1039001	15"
SMR 210	B1039002	22"
SMR 300	B1039003	29"
SMR 450	B1039009	29"

Item Number	Part Number	Item Description
1	B1002007	BRINE TANK W/HOLES 24x50-**SMR 150-210**
	B1002008	BRINE TANK W/HOLES 24x60-**SMR 300**
	B1002009	BRINE TANK W/HOLES 39x60-**SMR 450**
3	A2284007	GRID PLATE PLASTIC 24DIA 5"BW
	A2284010	GRID PLATE PLASTIC 30DIA 5"BW
4	A2275007	PIPE 1-1/2 SDR OR SCH40 DWV
5	B1042001	BRINE VALVE ASSEMBLY**-SMR 150**
	B1042002	BRINE VALVE ASSEMBLY**-SMR 210**
	B1042003	BRINE VALVE ASSEMBLY**-SMR 300-450**
6	B1015008	BRINE WELL 5x46 DRILLED
7	A2072001	CAP PLUG RED 5 INCH
8	A21200002	ELBOW OVERFLOW 1/2" W/NUT

BRINE SYSTEM FOR SMR 600-1050

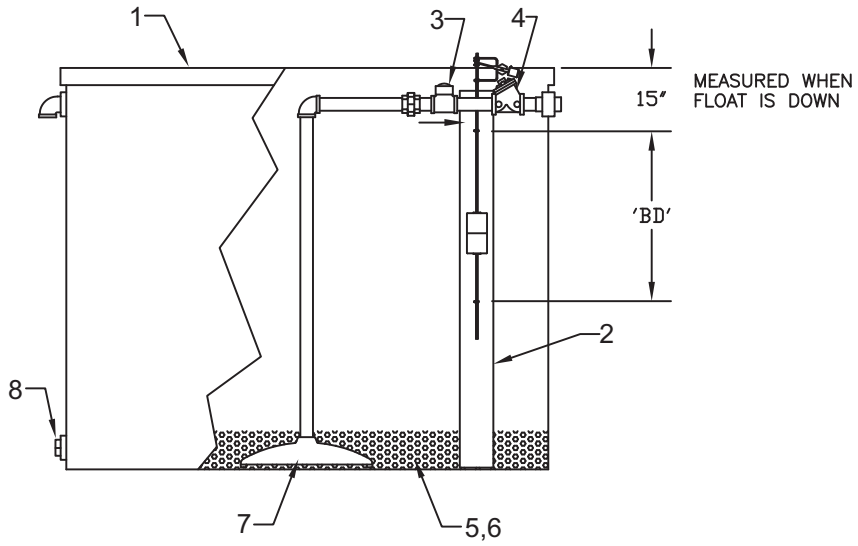
Models	Part Number	Shelf Height
SMR 600	B1039005	22"
SMR 750	B1039005	22"
SMR 900	B1039007	29"
SMR 1050	B1039008	22"



Item Number	Part Number	Item Description
1	B1002010	BRINE TANK W/HOLES 39x60 **– SMR 600–750**
	B1002011	BRINE TANK W/HOLES 42x60 – S**MR 900**
	B1002012	BRINE TANK W/HOLES 50x60 – S**MR 1050**
2	B1043010	GRID SUPPORT SET 39" DIA, 22" HT **– SMR 600–750**
	B1043011	GRID SUPPORT SET 42" DIA, 29" HT **– SMR 900**
	B1043014	GRID SUPPORT SET 50" DIA, 22" HT **– SMR 1050**
3	B1041003	SALT SHELF 38-1/8" DIA – **SMR 600–750**
	B1041004	SALT SHELF 41-1/4" DIA **– SMR 900**
	B1041005	SALT SHELF 49" DIA **– SMR 1050**
4	B1040003	SALT SCREEN 39" DIA. **– SMR 600–750**
	B1040004	SALT SCREEN 42" DIA. **– SMR 900**
	B1040005	SALT SCREEN 50" DIA. **– SMR 1050**
5	B1042002	BRINE VALVE ASSY 22" GRID – S**MR 600,750,1050**
	B1042003	BRINE VALVE ASSY 29" GRID – **SMR 900**
6	B1015008	BRINE WELL 5x46 DRILLED
7	A2250003	ELBOW OVERFLOW 1/2" W/NUT
8	A2072001	CAP PLUG RED 5"

BRINE SYSTEM FOR MHC 1200-1500

Models	Part Number	BD Distance	Gravel	
			A2123002 ¼" x ⅛" FLINT	**A2123004** ¾ "x ½" FLINT
MHC 1200	B1112101	28"	250 LBS	250 LBS
MHC 1500	B1112102	23"	400 LBS	400 LBS



Item Number	Part Number	Item Description
1	A2225047	TANK POLY 52X60 W/COVER **- MHC 1200**
	A2225057	TANK POLY 66X46 W/COVER **- MHC 1500**
2	A2071002	BRINE WELL 5 X 60 SLOTTED
3	A2209007	VALVE CHECK SWING 1-1/2 BRONZE
4	A2005028	VALVE BRINE 1-1/2 BRONZE W/54 FLOAT
5	A2123004	GRAVEL – ¾ "x ½" FLINT
6	A2123002	GRAVEL – ¼" x ⅛" FLINT
7	A2210006	SATURATOR BRINE 20 EPOXY COATED 2IN
8	A2448003	PLUG 3/4 PVC SCH 80 THRD

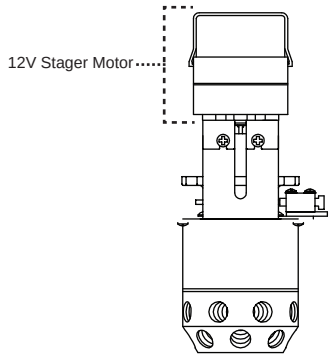
962 CONTROLLER

Description	Part Number
962 Controller w/ Rinse Down	B1047133

962 CONTROL PANEL

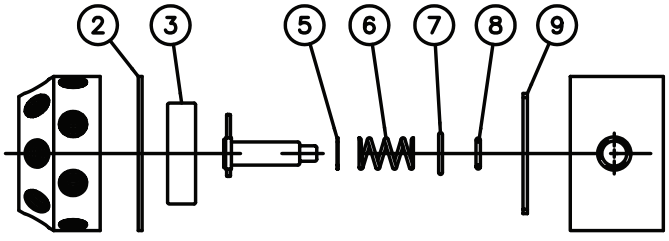
Description	Part Number
Membrane Keypad	A2586017
962 Circuit Board and Keypad	A2341025

962 STAGER ASSEMBLY



Description	Part Number
962 Stager Assembly w/ Rinse Down	A2155107
962 12V Stager Motor	A2085067

STAGER ASSEMBLY REBUILD KIT



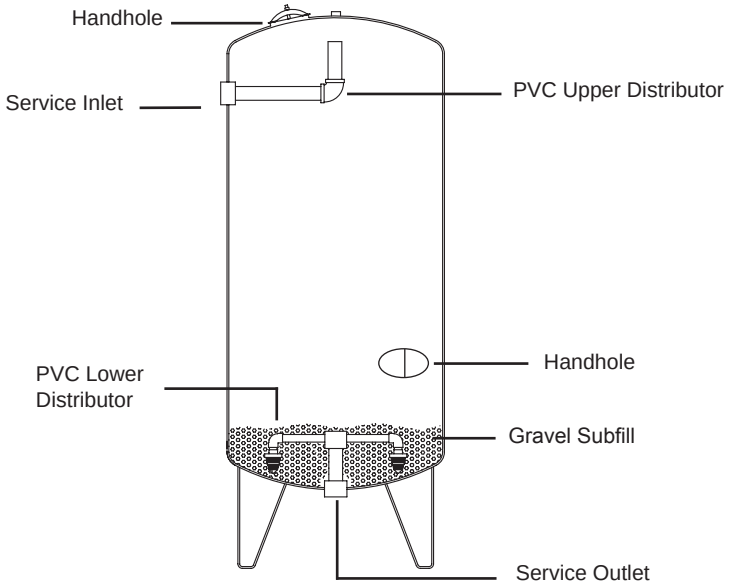
Description	Part Number
Stager Rebuild Kit	A2089326

NOTE
Includes:
2. Backplate Gasket
3. Stemplate
5. Washer
6. Spring
7. Insert
8. O-Ring
9. O-Ring

SMR 150M-1500M 962 TWIN ALT

STEEL REPLACEMENT PRESSURE VESSELS

Size: 20" - 30" Dia.
Construction: Non-Code
Pressure Rating: 100 PSI Working Pressure
Temperature Rating: 120°F Max.



Pipe Size	Gravel Quantity	Tank Size Diameter x Sideshell	Part Number Epoxy Lined
1"	100 lbs.	20 x 54	B2472024
1-1/4"			B1031002B
1-1/2"			B1031003B
2"			B1031004B
1-1/4"	200 lbs.	24 x 54	B1031005B
1-1/2"			B1031006B
2"			B1031007B
2-1/2"			B1031008B
1-1/2"	300 lbs	30 x 54	B1031009B
2"			B1031010B
2-1/2"			B1031011B
3"			B1031012B
1-1/2"	300 lbs	30 x 60	B1031013B
2"			B1031014B
2-1/2"			B1031015B
3"			B1031016B
NOTE: Contact factory for current pricing on ASME option.			

INCLUDES

1. PVC upper internal distributor.
2. PVC lower internal distributor.
3. Gravel subfill.
4. Manhole access in upper head of 36” - 42” diameter vessels.

TANK LINING NOTES

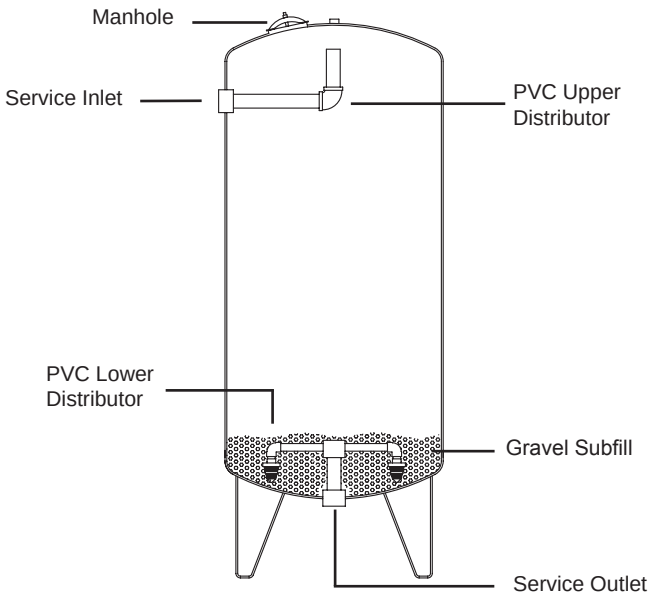
~~Galvanizing~~ - **GALVANIZED TANKS ARE NO LONGER AVAILABLE.**

Epoxy Lining - Epoxy and polymaid type resins applied to a sand blasted surface. Sprayed application to a dry film thickness of 8-10 mils. Exterior is Safety Blue finish.

SMR 150M-1500M 962 TWIN ALT

STEEL REPLACEMENT PRESSURE VESSELS

Size: 36" - 48" Dia.
Construction: Non-Code
Pressure Rating: 100 PSI Working Pressure
Temperature Rating: 120°F Max.



Pipe Size	Gravel Quantity	Tank Size Diameter x Sideshell	Part Number Epoxy Lined
1-1/2"	400 lbs.	36 x 60	B1031017B
2"			B1031018B
2-1/2"			B1031019B
3"			B1031020B
1-1/2"	400 lbs.	36 x 72	B1031021B
2"			B1031022B
2-1/2"			B1031023B
3"			B1031024B
2"	600 lbs.	42 x 60	B1031025B
2-1/2"			B1031026B
3"			B1031027B
2"	600 lbs.	42 x 72	B1031028B
2-1/2"			B1031029B
3"			B1031030B
2"	700 lbs.	48 x 72	B1031033B
NOTE: Contact factory for current pricing on ASME option.			

INCLUDES

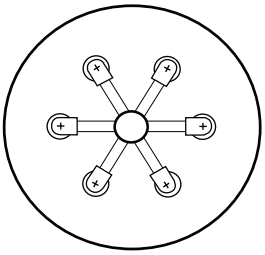
1. PVC upper internal distributor.
2. PVC lower internal distributor.
3. Gravel subfill.
4. Manhole access in upper head of 36" - 42" diameter vessels.

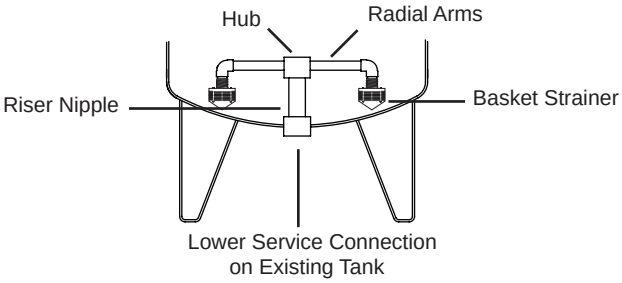
TANK LINING NOTES

~~Galvanizing~~ **GALVANIZED TANKS ARE NO LONGER AVAILABLE.**

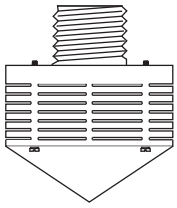
Epoxy Lining - Epoxy and polymaid type resins applied to a sand blasted surface. Sprayed application to a dry film thickness of 8-10 mils. Exterior is Safety Blue finish.

LOWER INTERNAL DISTRIBUTION SYSTEMS





Plastic Basket Strainer
3/4" MPT Connection
Part Number A2048045



316 Stainless Steel Basket Strainer
3/4" MPT Connection
Part Number A2439001

Service Pipe Size	Number of Strainers	Tank Diameter	Part Number PVC	Part Number 304 Stainless Steel
1-1/4"	4	20"	B1006010	B1006028
1-1/2"	6		B1006011	B1006029
2"	8		B1006012	B1006030
1-1/4"	4	24"	B1006013	B1006031
1-1/2"	6		B1006014	B1006032
2"	8		B1006015	B1006033
2-1/2"	12		B1006016	B1006034
1-1/2"	6	30"	B1006017	B1006035
2"	8		B1006018	B1006036
2-1/2"	12		B1006019	B1006037
3"	16		B1006020	B1006038
1-1/2"	6	36"	B1006021	B1006039
2"	8		B1006022	B1006040
2-1/2"	12		B1006023	B1006041
3"	16		B1006024	B1006042
2"	8	42"	B1006025	B1006043
2-1/2"	12		B1006026	B1006044
3"	16		B1006027	B1006045

COMPLETE PVC LOWER DISTRIBUTOR INCLUDES
1. PVC hub and riser nipple.
2. PVC radial arms.
3. Fine slotted Plastic ABS basket strainers.

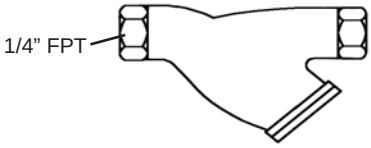
COMPLETE 304 STAINLESS STEEL LOWER DISTRIBUTOR INCLUDES
1. Stainless Steel hub and riser nipple.
2. Stainless Steel radial arms.
3. Fine slotted Stainless Steel basket strainers.

PLEASE NOTE
316 Stainless Steel Lower Internal Distrubutor Systems are available. Please contact factory for pricing.

PRESSURE GAUGE/SAMPLE COCK PACKAGE

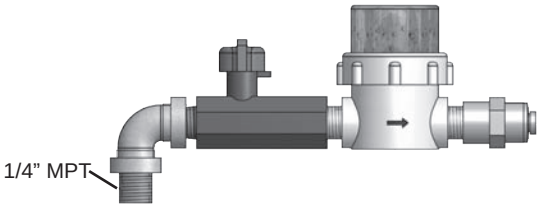
Description	Part Number
PVC Fittings	B1038009
Galvanized Fittings	B1038016
304 Stainless Steel Fittings	B1038021
0-100 PSI Pressure Guage Only	A2141037
NOTE: Used to monitor the operating pressure on inlet or outlet and to obtain water samples from water treatment equipment piping.	

Y-STRAINERS - BRASS



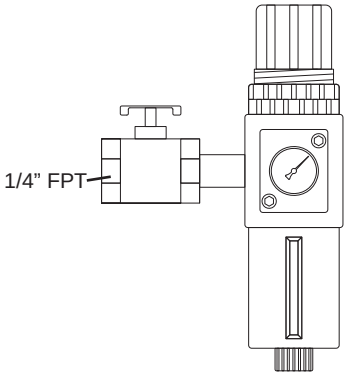
Description	Part Number	Assembly Part Number
Brass Y-Strainer	A2472030	B1038017

STRAINERS - PLASTIC



Description	Part Number
Plastic Fittings	B1038024
Galvanized Fittings	B1038023
Strainer Only	A2472028
NOTE: Used for air or water pilot operated systems.	

AIR REGULATOR ASSEMBLY

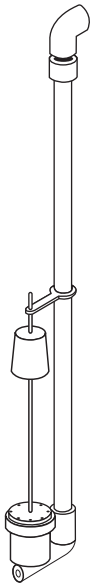


Description	Part Number
Air Regulator Assembly	B1038013
Air Regulator Only	A2141011
Mounting Bracket	A2328028
NOTE: Used for air pilot operated systems.	

CLIPPARD VALVE

Description	Part Number
Clippard Valve w/ Fittings	B1123006
Clippard Valve	A2221006

UNIVERSAL BRINE VALVE ASSEMBLY



Part Number B1042004

Features - 3/4" FPT connection.
- Fits in 5" Dia. brinewell.
- Fully adjustable float height for precise volumetric refill control
- Integral air check.
- Up to 10 GPM draw rate.
- All plastic construction.

Includes - 48" lg. riser pipe complete with male adapter and elbow (riser pipe is cut to fit existing brine tank in field and male adapter is glued onto end by installer).

HIGH FLOW UNIVERSAL BRINE VALVE ASSEMBLY

Part Number B1042014

BRINE VALVE ONLY

Part Number A2005001

BRINE VALVE ONLY - HIGH FLOW

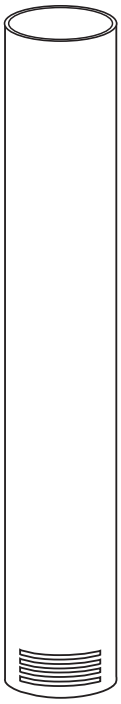
Part Number A2005012

BRINEWELL CAPS

Features - Press fit without the need for solvents or glues.

Size	Part Number
4" Dia.	A2072003
5" Dia.	A2072001

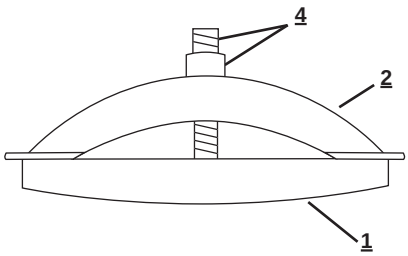
BRINEWELLS



Features - High impact styrene construction.
- Slots on one end.

Size	Part Number
4” Dia. x 36” Lg	A2071003
4” Dia. x 46” Lg.	A2071004
5” Dia. x 48” Lg.	A2071009
5” Dia. x 60” Lg	A2071002

HANDHOLE & MANHOLE CLOSURE ASSEMBLY

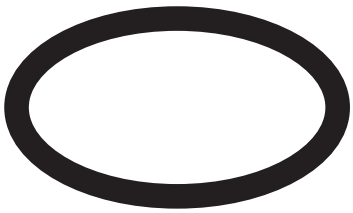


	Description	Size	Part Number
No longer available	~~Handhole, Galvanized~~	~~4" x 6"~~	~~A2291001~~
	Handhole, Epoxy Lined	4" x 6"	A2291002
No longer available	~~Manhole, Galvanized~~	~~11" x 15"~~	~~A2292002~~
	Manhole, Epoxy Lined	11" x 15"	A2292002
	Manhole, Epoxy Lined	12" x 16"	A2561002
	Manhole, Epoxy Lined w/Gasket	14" x 18"	A2561001

Assembly Includes:
1. Lid - Specify galvanized or epoxy lined
2. Yoke
3. Gasket - Shown below.
4. Nut and/or Bolt

NOTE: Provide name of steel tank manufacturer to assure proper assembly is provided

HANDHOLE & MANHOLE GASKET

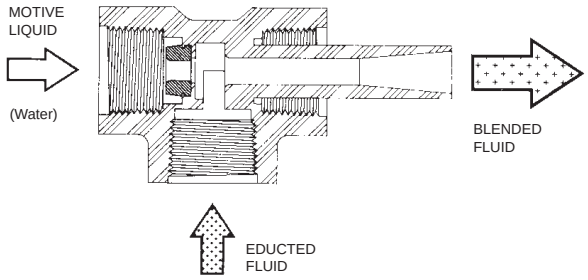


Description	Size	Part Number
Handhole	4" x 6"	A2086004
Handhole	6" x 8"	A2086012
Manhole	11" x 15"	A2086005
Manhole	12" x 16"	A2193014
Manhole	14" x 18"	A2193013

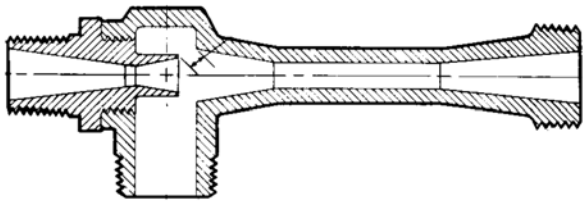
NOTE: Elastometer seal used between handhole/manhole cover and steel tank flange ring.
Maximum temperature - 140° F

AUTOMATIC WATER JET INJECTOR

PVC INJECTOR



BRASS INJECTOR



* FLEXIBLE FLOW CONTROL ORIFICE AUTOMATICALLY MAINTAINS A CONSTANT LIQUID FLOW REGARDLESS OF VARIATIONS IN INLET WATER PRESSURE.

* CORROSION RESISTANT MATERIALS OF CONSTRUCTION:
  EDUCTOR BODY: SCHEDULE 80 POLYVINYLCHLORIDE P.V.C. TYPE 1, GRADE 1
  FLOW CONTROL INSERT: PRECISION MOLDED BUNA (N)

* WIDE OPERATING PRESSURE RANGE: 30-120 P.S.I.G.
  MAXIMUM OPERATING TEMPERATURE: 100°FAHRENHEIT

* STANDARD MODELS AVAILABLE FROM STOCK.
  CUSTOM CONFIGURATIONS AVAILABLE ON REQUEST.

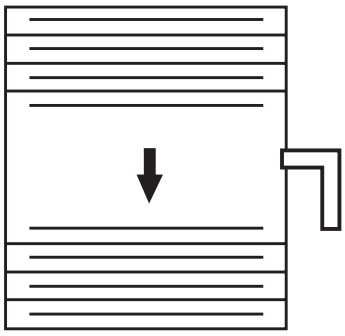
Pipe Size	Tank Diameter	Resin Volume Min. / Max.	Rinse Rate	Part Number Brass Injector
1/2"	12"	1.6/3.1 cu. ft.	0.9 GPM	CALL
	14"	2.1/4.3 cu. ft.	1.2 GPM	CALL
	16"	2.8/5.6 cu. ft.	1.4 GPM	CALL
	18"	3.5/7.1 cu. ft.	2 GPM	CALL
3/4"	20"	4.4/8.7 cu. ft.	2.5 GPM	A2128019
	24"	6.3/12.6 cu. ft.	3.5 GPM	A2128022
	30"	9.8/19.6 cu. ft.	5 GPM	A2128024
1"	36"	14.1/28.3 cu. ft.	7 GPM	A2128021
	42"	19.2/38.5 cu. ft.	10 GPM	A2128014
1-1/2"	48"	25.1/50.3 cu. ft.	12 GPM	A2128007
	54"	31.8/63.3 cu. ft.	15 GPM	A2128007
	60"	39.3/78.5 cu. ft.	20 GPM	A2128012
	66"	47/96 cu. ft.	24 GPM	A2128012
	72"	56/110 cu. ft.	30 GPM	A2128012

IMPORTANT APPLICATION NOTES:
These injectors are designed for operation with water as the operating medium. All applications should be carefully tested both for flow characteristics and compatibility of the motive liquid and educted chemicals to insure desired results. Swelling of the flow control insert in certain liquids will result in loss of flow rate accuracy.

1. Select your tank diameter.
2. Select your media type and read corresponding flow rate.
3. Take needed flow rate and read part number from bottom chart.

SUGGESTED BACKWASH RATE (GPM)					
Tank Diameter	Water Softener	Carbon Filter	Greensand Filter	Sand Filter	Multilayer Filter
12”	3.5	8	8	10	10
14”	5	10	10	12	15
16”	6	15	12	15	20
20”	10	17	17	25	30
24”	15	25	25	35	45
30”	20	40	40	60	75
36”	30	60	60	85	105
42”	45	80	80	115	150
48”	55	100	100	150	180
54”	70	130	130	190	240
60”	90	160	160	230	300
72”	130	270	270	330	420

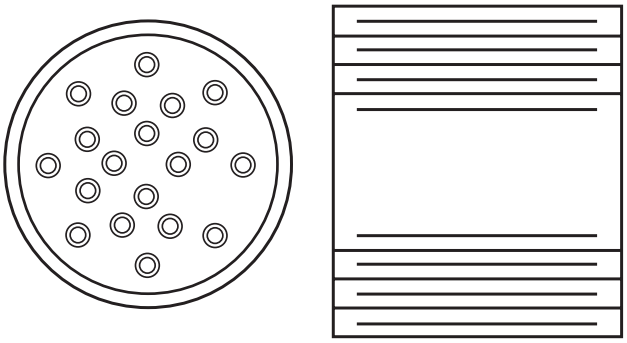
COMPLETE DRAIN LINE ASSEMBLY WITH 1/4” DRAIN ELBOW FOR STAGERS



Size	GPM	Part Number
3/4”	3.5	B1037004
1”	5	B1037009
1”	6	B1037010
1”	8	B1037011
1”	12	B1037012
1”	15	B1037014
1”	17	B1037015
1”	20	B1037016
1 1/2”	30	B1037024
2”	45	B1037029
2”	55	B1037031
2”	70	B1037034
2 1/2”	90	B1037044
3	110	B1037053
3	130	B1037057
NOTE: For flow rates or pipe sizes not listed, contact the factory.		

SMR 150M-1500M 962 TWIN ALT

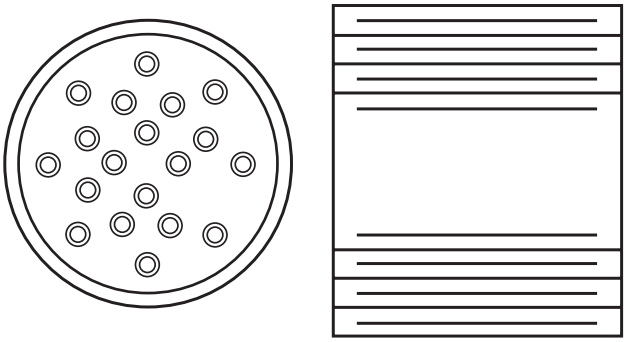
3/4”-3” FLOW CONTROLS - GALVANIZED NIPPLE



Pipe Size	GPM	Part Number
3/4”	1.2	A2138001
	2	A2138002
	2.4	A2138003
	3.5	A2138004
	5	A2138005
	6	A2138006
	8	A2138007
	10	A2138008
1”	5	A2138009
	6	A2138122
	8	A2138011
	10	A2138118
	12	A2138013
	15	A2138014
	15	A2138014
	20	A2138114
1-1/4”	10	A2138017
	12	A2138018
	15	A2138019
	17	A2138020
	20	A2138021
1-1/2”	20	A2138022
	25	A2138023
	30	A2138024
	35	A2138025
	40	A2138026

Pipe Size	GPM	Part Number
2”	35	A2138027
	40	A2138028
	45	A2138029
	50	A2138030
	55	A2138031
	60	A2138032
	65	A2138033
	70	A2138034
2-1/2”	45	A2138035
	50	A2138036
	55	A2138037
	60	A2138038
	65	A2138039
	70	A2138040
	75	A2138041
	80	A2138042
	85	A2138043
	90	A2138044
3”	70	A2138045
	75	A2138046
	80	A2138047
	85	A2138048
	90	A2138049
	95	A2138050
	100	A2138051
	105	A2138052
	110	A2138053
	115	A2138054
	120	A2138055
	125	A2138056
	130	A2138057
	135	A2138058
	140	A2138059

4”-6” FLOW CONTROLS - GALVANIZED NIPPLE

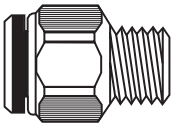
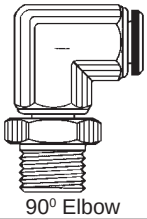
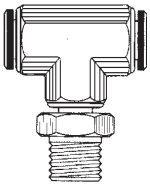
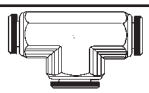


Pipe Size	GPM	Part Number
4”	125	A2138060
	130	A2138061
	135	A2138062
	140	A2138063
	145	A2138064
	150	A2138065
	155	A2138066
	160	A2138067
	165	A2138068
	170	A2138169
	175	A2138070
	180	A2138071
	185	A2138072
	190	A2138073
	195	A2138074
	200	A2138175
	205	A2138076
	210	A2138077
	215	A2138078
	220	A2138079
	225	A2138080
	230	A2138081
	235	A2138082
	240	A2138083
	245	A2138084
	250	A2138085

Pipe Size	GPM	Part Number
6”	270	A2138086
	280	A2138087
	290	A2138088
	300	A2138089
	310	A2138090
	320	A2138091
	330	A2138092
	340	A2138093
	350	A2138094
	360	A2138195
	370	A2138096
	380	A2138097
	390	A2138098
	400	A2138099
	410	A2138100
	420	A2138101
	430	A2138102
	440	A2138103
	450	A2138104
	460	A2138105
	470	A2138106
	480	A2138107
	490	A2138108
	500	A2138109
	510	A2138110
	520	A2138111
	530	A2138112
	540	A2138113

TUBING & TUBE FITTINGS

PLASTIC TUBING		
Description	Size	Part Number
Tubing, Control	1/4" O.D.	A2165022
Tubing, Brine	1/2" O.D.	A2165002
Tubing, Brine	3/8" O.D.	A2165007

TUBE FITTINGS			
Description	Size	Part Number Brass (Nickel Plated)	Part Number Plastic
 Male Connector	1/4T x 1/8MPT	A2130001	A2129001
	1/4T x 1/4MPT	A2130002	A2129002
	1/4T x 3/8MPT	A2130003	A2129009
	3/8T x 1/8MPT	A2130004	---
	3/8T x 1/4MPT	A2130005	---
	3/8T x 3/8MPT	A2130006	A2129006
 90⁰ Elbow	1/4T x 1/8MPT	A2130007	A2129007
	1/4T x 1/4MPT	A2130008	A2129008
	1/4T x 3/8MPT	A2130009	N/A
	3/8T x 1/8MPT	A2130010	A2129010
	3/8T x 1/4MPT	A2130011	A2129011
	3/8T x 3/8MPT	A2130012	A2129012
 Branch Tee	1/4T x 1/8MPT	A2130013	A2129013
	1/4T x 1/4MPT	A2130014	A2129014
	1/4T x 3/8MPT	A2130015	---
	3/8T x 1/8MPT	A2477005	A2129016
	3/8T x 1/4MPT	A2477003	A2129017
	3/8T x 3/8MPT	A2130018	A2129018
 Union Tee	1/4T	A2130019	A2129019
	3/8T	A2130020	A2129053
	1/2T	---	A2129020

NOTES:
1. Tube fittings have push and release tubing connectors.
2. Plastic tubing is 100 PSI rated and is black in color.

REPLACEMENT MEDIA, RESIN & GRAVEL

Media Type	Description	Lbs.	Part Number
Cation Resin	Resin Cation	52	A2121047
	Resin Cation 10%	52	A2121049
	Resin Cation Fine Mesh	52	A2121048
	HCR 8%	52	A2121012
	Resin Cation 267	52	A2121007
	Carbon 12x40 Mesh	52	A2122040
Filter Media	Media Birm Regular CF	44	A2122002
	Media Manganese Greensand CF	55	A2122003
	Media Corosex (2 Bags = 1 CF)	75	A2122004
	Media Calcite (2 Bags = 1 CF)	90	A2122005
	Media Filter AG CF	25	A2122006
	Media Filter Sand .35-.45mm CF	100	A2122007
	Media Garnet 30-40 Mesh (2 Bags = 1 CF)	140	A2122008
	Media Anthracite Type C CF	56	A2122009
	Media Garnet 8-12 (100 lb.)	140	A2122010
	Media Filter Sand .45-.55mm CF	100	A2122011
Gravel	Gravel 1/8 x 1/16 Flint #20 CF	100	A2123001
	Gravel 1/4x1/8 Flint CF	100	A2123002
	Gravel 1/2x1/4 Flint CF	100	A2123003
	Gravel 3/4x1/2 Flint CF	100	A2123004
	Gravel 1x3/4 CF	100	A2123005
Anion Resin	Anion-A-23P Type 1		A2121008
	Anion ASB-2	45	A2121004
	Anion ASB-1 OH Form	44	A2121005
	Anion ASB-1P Chloride Form	44	A2121022
	Anion M-500 OH Form	43.8	A2121028
	Anion A-33 PUH - Hydroxide		A2121046
	Anion Type-2 Strong base		A2121050
	Anion SBG-2 Chloride form	42	A2121058
Tannin Removal	Macro-T Tannin Removal	46	A21210057

SERVICE CHART - STAGER CONTROLLER

SYMPTOM	PROBABLE CAUSE	HOW TO CORRECT
Softener does not regenerate.	1. No electrical power.	Check circuit. Start a regeneration with Manual Regeneration Lever.
	2. Frequency levers on Time Dial not set properly.	Refer to “How to Set Regeneration Cycle Program 3200 Series Mechanical Timer”.
	3. Faulty timer mechanism or defective timer motor.	Replace.
	4. Defective stager drive motor.	Replace
	5. Defective micro-switch in stager drive assembly.	Replace drive assembly.
Softener regenerates as wrong time.	6. Interrupted electrical power. Time dial set improperly	Reset Time to correct time. Refer to “How to Set Cycle Controller”.
Position dial does not rotate.	7. Stager drive motor burned out.	Replace.
	8. Loose Electrical connections.	Repair.
	9. Jammed stager valve.	Replace.
Softener Diaphragm Valves end regeneration cycle in wrong position.	10. Controller out of sequence due to: A. Turning position dial manually when time switch is not in “OFF” position or turning the cycle adjustment knob too quickly for stager to index.	With time switch mechanism in normally “OFF” position, (Red arrowhead pointing straight down), manually turn Position Dial clockwise to No. 4 "Service” position.
	B Temporary low voltage condition of poor electrical connection.	Check circuitry.
	C. Jammed Stager.	Replace.
	D. Defective time switch assembly.	Replace.
	E. Defective time switch assembly.	Replace.
	F. Defective drive motor.	Replace.
Leak to drain from stager valve during service.	11. Leaky or cut seal in stager valve.	Replace.
Hardness Leakage or Improper cycling or valves. Individual valves not being pressurized or vented correctly.	12. Faulty seal in stager valve.	Replace.
	13. Clogged stager strainer.	Clean strainer.
	14. Clogged or kinked stager tubing.	Replace tubing or clean.

SERVICE CHART - WATER SOFTENERS

IMPORTANT: Many softener complaints result from oversights (poor electric connections, out of salt, regenerating at wrong hour etc.) rather than from a mechanical failure. Troubleshooting guide for the MX controller is located in the back of this manual page 33.

PROBLEM OR SYMPTOM	CHECK PROCEDURE	CAUSE
Slight leak to drain.	1. Disconnect tubing at backwash control.	Flow from indicates leaky seal in stager valve.
	2. If stager is not leaking, use soap test kit and check hardness of water at drain.	If water tests soft, Valve #6 is leaking: If hard, Valve #3. See procedures 10, 11, 12 and 13.
High flow to drain during service	3. Check position dial.	If not in position #4, rotate clockwise to this position.
	4. If position dial is in position #4, check for water leakage from Valve #3 or #6 vent holes.	Leakage indicates: 1. Ruptured diaphragm. 2. Loose diaphragm nut.
	5. If vent hole is not leaking, use soap test kit and check hardness of water at drain.	If water tests soft, Valve #6 is open: If hard, Valve #3. See procedures 10, 12 and 13.
Failure to draw brine	6. Check that manual brine valve is open wide.	Valve must be open at all times, except when servicing.
	7. Check water pressure	Water pressure must be a least 30 psi during regeneration.
	8. Turn position dial clockwise to position #2. Break union in suction line to injector and feel for suction.	If there is suction, automatic brine valve may be clogged. No suction indicates: 1. Drain pipe to small or discharging at level too high above floor. 2. Plugged pilot strainer. 3. Plugged injection nozzle. 4. Valve #1, #4, or #2 not closing fully. See items 10, 11 and 13. 5. Plugged backwash controller. 6. Dirty mineral bed.
Slight leak from vent hole.	9. Turn position dial clockwise to a position, which relieves pressure on valve.	If leaking stops leak results from loose diaphragm nut, small Tear in diaphragm or special washer under diaphragm is missing. If leaking does not stop, shaft guide O-ring is damaged, shaft guide is not seated against gasket or shaft is damaged.
Diaphragm valve does not close.	10. Check that vent hole is not plugged.	If vent hole is plugged, air in space between diaphragm and shaft guide will compress and prevent valve from closing.
	11. Check for water leak at vent hole.	See Procedure 9.
	12. Loosen tubing nut at diaphragm cap.	If there is not flow, pilot strainer may be plugged.
	13. Turn off water pressure and dis-assemble diaphragm valve.	1. Seat washer may be dirty, worn or loose. 2. Seat may be eroded.

SERVICE CHART - WATER SOFTENERS continued

PROBLEM OR SYMPTOM	CHECK PROCEDURE	CAUSE
Diaphragm valve does not open.	14. Check that vent hole is not plugged.	If vent hole is plugged, a partial vacuum will be created in the space between the diaphragm and shaft guide, preventing valve from opening.
	15. Loosen tubing nut at diaphragm cap.	1. If there is flow, stager valve is leaking. 2. If there is no flow, tubing fitting may be plugged.
Hard water leakage into service lines.	16. Close inlet and outlet valves and inspect by-pass valve.	1. Seat washer may be loose or worn. 2. Seat may be rough. 3. Shaft orifice plugged. 4. Diaphragm ruptured.
	17. Check that valve #4 is seating.	See Procedures 9, 10, 12 and 13.
Restricted or not drain flow during backwash.	18. Either valve #1 or valve #2 is not opening fully. To determine which one: Turn position dial to position #1 and then to position #3. Compare flow at drain.	Flow should be the same for both positions. 1. If no difference is noted, valve #4 is not opening properly. 2. If backwash flow is higher, valve #1 is not opening properly. See procedures 14 and 15.
Restricted or no drain flow during backwash.	19. Turn position dial to position #1 and then position #3. Compare flow at drain.	Flow should be the same. If flow for position also is low. 1. Inlet water pressure may be low. 2. Backwash flow control may be plugged. If position #3 flow rate is higher, either valve #4 or valve #3 is not opening. See procedures 14 and 15.
Losses of softening resin (evidence of resin in drain lines).	20. Open vent in top of softener tank and check for air in tank.	1. If air is present, vent completely and recheck prior to next regeneration. 2. If recheck discloses a recurring build-up of air, check brine system(s) for possible leaks in suction line or brine valve not seating properly. 3. If brine system is functioning properly source of air may be the water supply to unit. Use of an automatic air relief vale is indicated in this situation (consult factory for recommendation).
	21. Check automatic backwash control valve for rate of flow in excess of listed flow (gpm).	Check for excessive inlet water supply pressures – reduce to rated pressure.
Losses of softening resin (evidence of resin and/or gravel in service lines.	22. Check for damage to softener under-drain system.	Investigation of damage to under-drain generally requires unloading of softener tank. Consult factory for recommended procedures before proceeding.

NOTES


CleaverBrooks®