PENTAIR

FLECK 9100TS UPFLOW
SERVICE MANUAL

TABLE OF CONTENTS

JOB SPECIFICATION SHEET

Job No: _____

Model No: _____

Water Test: _____

Capacity Per Unit: _____

Mineral Tank

Size: _____ Diameter: _____ Height: _____

Brine Tank Size and Salt Setting per Regeneration: _____

9100TS Control Valve Specifications:

1. Regeneration Program Setting:
   a. Brine and Slow Rinse: _____ Minutes
   b. Backwash: _____ Minutes
   c. Rapid Rinse: _____ Minutes
   d. Brine Tank Refill: _____ Minutes
2. Drain Line Flow Control: _____ gpm
3. Brine Refill Rate: _____ gpm
4. Injector Size: _____

HOW TO USE THIS MANUAL

This installation manual is designed to guide the installer through the process of installing and starting water conditioning systems featuring the 9100TS controller.

This manual is a reference and will not include every system installation situation. The person installing this equipment should have:

- Training in the 9100TS control and the 9000/9100 valve.
- Knowledge of water conditioning and how to determine proper control settings.
- Adequate plumbing skills.

EQUIPMENT CONFIGURATION

9100TS Configuration

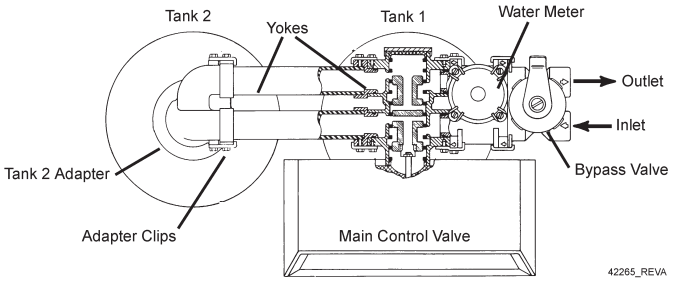


Figure 1

CALIFORNIA PROPOSITION 65 WARNING

⚠ WARNING: This product contains chemicals known to the State of California to cause cancer or birth defects or other reproductive harm.

SAFETY INFORMATION

General Warnings And Safety Information Electrical

- There are no user-serviceable parts in the AC adapter, motor, or controller. In the event of a failure, these items should be completely replaced.
- All electrical connections must be completed according to local codes.
- Use only the power transformer supplied with this water conditioning system.
- The power outlet must be grounded and always on.
- To disconnect power, unplug the AC adapter from its power source.

Mechanical

- Do not use petroleum based lubricants such as Vaseline, oils, or hydrocarbon based lubricants. Use only 100% silicone lubricants.
- All plastic connections should be hand tightened. PTFE tape may be used on connections that do not use an O-ring seal. Do not use pliers or pipe wrenches.
- All plumbing must be completed according to local codes.
- Use only lead-free solder and flux, as required by federal and state codes, when installing soldered copper plumbing.
- The drain line must be a minimum of 1/2-inch diameter. Use 3/4-inch pipe if the pipe length is greater than 20 feet (6 m).
- Do not support the weight of the system on the control valve fittings, plumbing, or the bypass.

General

- Observe all warnings that appear in this manual.
- This system is not intended to be used for treating water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.
- Keep the unit in the upright position. Do not turn on side, upside down, or drop. Turning the tank upside down will cause media to enter the valve.
- Operating water temperature is between 35°F (1°F) and 100°F (38°C).
- Operating water pressure range : 20 to 125 psi (1.38 to 8.27 bar).
- Use only salts designed for water softening. Acceptable salt type is sodium chloride pellet salt.
- Follow state and local codes for water testing.
- When filling media tank, do not open water valve completely. Fill tank slowly to prevent media from exiting the tank.
- Always make modifications to house plumbing first. Connect to valve last.
- Plastic parts and O-rings may be damaged by heat and solvents. When constructing plumbing connections allow heated parts to cool and protect parts from solvents.

Location Selection

Location of a water treatment system is important. The following conditions are required:

- Level platform or floor.
- Ambient temperatures over 35°F (1°C) and below 120°F (49°C).
- Constant electrical supply to operate the controller.
- Total minimum pipe run to water heater of ten feet (three meters) to prevent backup of hot water into system.
- Local drain or tub for discharge as close as possible.
- Water line connections with shutoff or bypass valves.
- Must meet any local and state codes for site of installation.
- Valve is designed for minor plumbing misalignments. Do not support weight of system on the plumbing.
- Room to access equipment for maintenance and adding salt.

INSTALLATION INSTRUCTIONS

Things You Need to Know

- When the controller is first plugged in, it may display a flashing hourglass and the message Err 3, this means that the controller is rotating to the home position.

Grounding the Plumbing

It is important that the plumbing system be electrically grounded. When a water softener is installed, a non-metallic bypass valve may interrupt the grounding. To maintain continuity, a grounding strap can be purchased at a hardware store (Figure 2). When it is installed the strap will connect the plumbing into the softener to the plumbing out of the softener.

If you have other water treating equipment such as a chlorinator, sediment filter, neutralizer, iron filter, or taste and odor filter they should be installed upstream of the water softener.

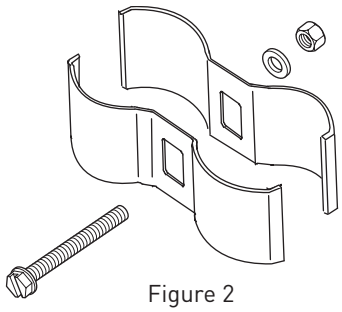


Figure 2

INSTALLATION INSTRUCTIONS *continued*

Bypass Valve

A bypass valve system should be installed on all water conditioning systems. Bypass valves isolate the conditioner from the water system and allow unconditioned water to be used. Service or routine maintenance procedures may also require that the system is bypassed. Figures 3 and 4 show the two common bypass methods.

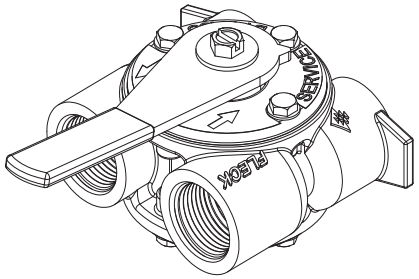


Figure 3 Bypass Valve

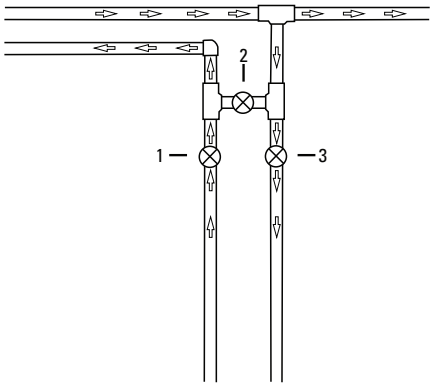


Figure 4 Manual Bypass

If this unit includes a bypass valve (Figure 3), it can be used by itself or with a manual bypass (Figure 4).

Manual Bypass In Service Position

- Valves 1 and 3 open
- Valve 2 closed

Bypassed Position

- Valve 2 open
- Valves 1 and 3 closed

Drain Line Connection

NOTE: Standard commercial practices are expressed here. Local codes may require changes to the following suggestions. Check with local authorities before installing a system.

1. The unit should be above and not more than 20 feet (6.1 m) from the drain. Use an appropriate adapter fitting to connect plastic tubing to the drain line connection of the control valve.
2. The drain line may be elevated up to 6 feet (1.8 m) providing the run does not exceed 15 feet (4.6 m) and water pressure at the softener is not less than 40 psi (2.76 bar). Elevation can increase by 2 feet (61 cm) for each additional 10 psi (.69 bar) of water pressure at the drain connector.
3. Where the drain line is elevated but empties into a drain below the level of the control valve, form a 7-inch (18-cm) loop at the far end of the line so that the bottom of the loop is level with the drain line connection. This will provide an adequate siphon trap. Where the drain empties into an overhead sewer line, a sink-type trap must be used. Secure the end of the drain line to prevent it from moving.

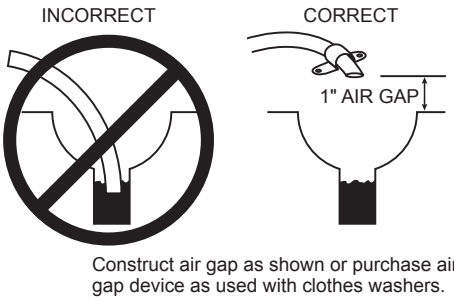


Figure 5 Drain Line Connection

NOTE: Waste connections or drain outlets should be designed and constructed to provide for connection to the sanitary waste system through an air gap of two pipe diameters or one inch (22 mm) whichever is larger.

⚠ WARNING: Never insert drain line directly into a drain, sewer line, or trap (Figure 5 Drain Line Connection). Always allow an air gap between the drain line and the wastewater to prevent the possibility of sewage being back-siphoned into the softener.

General Installation Notes

1. Place the softener tanks where you want to install the unit.
   NOTE: Be sure the tanks are level and on a firm base.
2. During cold weather it is recommended that the installer warm the valve to room temperature before operating.
3. Perform all plumbing according to local plumbing codes. — Use a 1/2" minimum pipe size for the drain.
4. Lubricate the distributor O-ring seal and tank O-ring seal. Place the main control valve on one tank and the tank adapter on the second tank.
   NOTE: If required, solder copper tubing for tank interconnection before assembling on the main control valve and tank adapter. Maintain a minimum of 1" distance between tanks on final assembly.
5. Solder joints near the drain must be done before connecting the Drain Line Flow Control fitting (DLFC).Leave at least 6" (152 mm) between the DLFC and solder joints when soldering pipes that are connected on the DLFC. Failure to do this could cause interior damage to DLFC.
6. Use only plumber tape on the drain fitting.
7. Be sure the floor under the salt storage tank is clean and level.
8. Place approximately 1" (25 mm) of water above the grid plate of the salt storage tank before filling with salt. Add salt to brine tank so that salt level is above the brine well air check.
9. Make all electrical connections according to codes. Plug the valve into an approved power source.
10. Tank one has control valve and tank two has adapter.
11. Look on the right side of the control valve, it has indicators showing which position the control valve is in during Regeneration and which tank is In Service.

Brine Line Connection

The brine line from the brine tube connects to the valve. Make certain the connections are hand tightened. Be sure that the salt line is secure and free from air leaks. Even a small leak may cause the salt line to drain out, and the softener will not draw salt from the tank. This may also introduce air into the valve causing problems with valve operation.
To install the brine line:

1. Inside the salt tank, remove the cap from the large cylinder to gain access to the connection.
2. Be sure the brass insert is in the end of the brine tubing. Insert the tubing through the opening in the tank.
3. Push the tubing into the plastic nut. Slowly unscrew the nut until the tubing moves into the connection. The tubing will hit bottom.

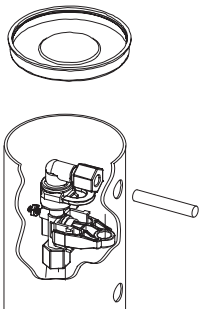


Figure 6

NOTE: Once the tubing has been pushed into the nut it cannot be pulled out. The nut will need to be removed. See Figure 6 for correct assembly.

4. Hand tighten the nut until the connection is tight.
5. Make compression fitting connection between brine line and valve (Figure 7).

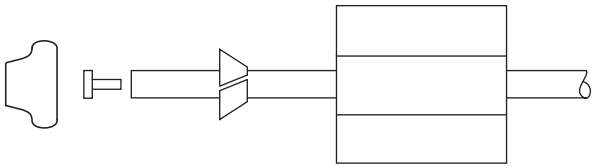


Figure 7

Electrical Connection

⚠ WARNING: This valve and control are for dry location use only unless used with a Listed Class 2 power supply suitable for outdoor use.

The controller operates on 24-volt alternating current power supply. This requires use of the supplied AC adapter included with your system.

AC Adapter

Make sure power source matches the rating printed on the AC adapter.

NOTE: The power source should be constant. Be certain the AC adapter is not on a switched outlet. Power interruptions longer than 8 hours may cause the controller to lose the time setting. When power is restored, the time setting must then be re-entered.

9100TS Control Operation

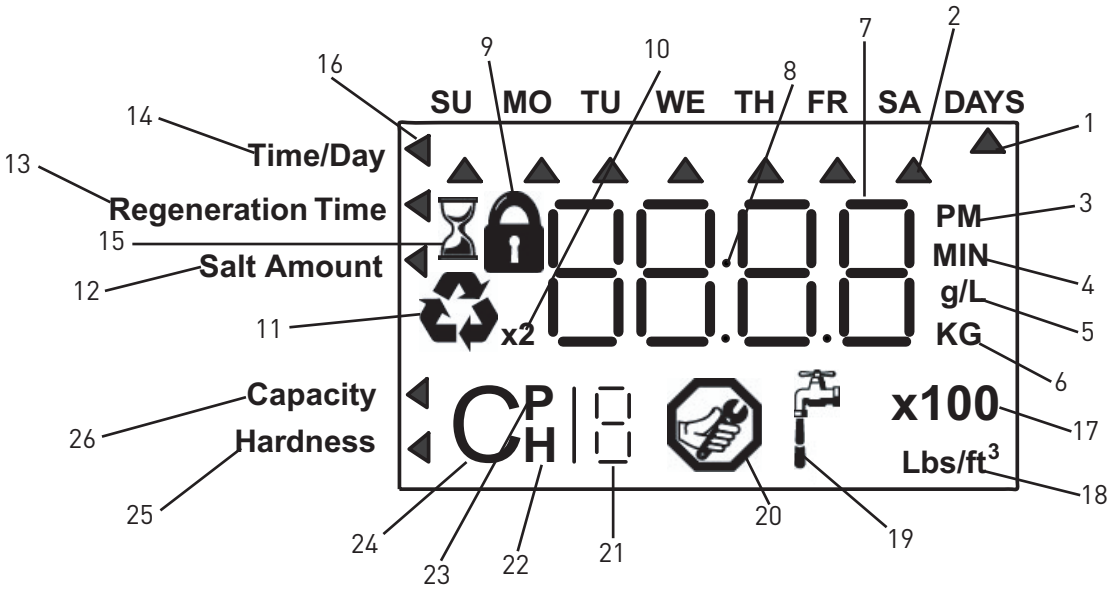
Power Loss Memory Retention

The 9100TS control features battery-free Time of Day and Day of Week retention during temporary loss of power. A super capacitor is designed to keep time for 8 to 24 hours depending on the installation. If the super capacitor is exhausted the 9100TS control will display four dashes (- - : - -) immediately upon power up. The Time of Day and Day of Week must be reset.

All other programmed parameters are stored in the static memory and are retained.

CONTROLLER FEATURES

Display Icons & Cursors



NOTE: In normal operation and during programming, only a few of the icons are actually displayed.

1. This cursor is displayed when the days between regeneration are being programmed (used with .5 to 30 day regeneration programming).
2. One of these cursors is displayed to indicate which day will be programmed into the controller.
3. "PM" indicates that the time displayed is between 12:00 noon and 12:00 midnight (there is no AM indicator). PM indicator is not used if clock mode is set to 24-hour.
4. When "MIN" is displayed, the value entered is in minute increments.
5. When g/L is displayed, the value for regenerant amount entered is in grams/Liter of resin.
6. When "Kg" is displayed, the value entered is in kilograms or kilograins.
7. Four digits used to display the time or program value. Also used for error codes.
8. Colon used as part of the time display.
9. Locked/unlocked indicator. In Level I Programming this is displayed when the current parameter is locked-out. It is also used in Level II Programming to indicate if the displayed parameter is locked (icon flashes) when controller is in Level I.
10. When "x2" is displayed, a second regeneration has been called for.
11. The recycle sign is displayed (flashing) when a regeneration at the next time of regeneration has been called for. Also displayed (continuous) when in regeneration.
12. The display cursor is next to "SALT AMOUNT" when programming the amount of regenerant.
13. The display cursor is next to "REGENERATION TIME" when programming the time of regeneration and the days of regeneration.
14. The display cursor is next to "TIME/DAY" when programming the current time and day.
15. The hourglass is displayed when the motor is running. The piston should be moving.
16. These cursors appear next to the item that is currently displayed.
17. X100 multiplier for large values.
18. When Lbs/ft^3 is displayed the value for regenerant amount entered is in pounds/cubic foot of resin.
19. Faucet is displayed when the current flow rate is displayed. Control may show the faucet and "0", indicating no flow.
20. Maintenance interval display turns on if the months in service exceed the value programmed in P11.
21. Displays the tank in service during normal operating mode. Used with #22, #23 and #24 in programming mode or regeneration.
22. History Values (H). The number displayed by #21 identifies which history value is currently displayed.
23. Parameter (P). Displayed only in Level II Programming. The number displayed by #21 identifies which parameter is currently displayed.
24. Cycle (C). The number displayed by #21 is the current cycle in the regeneration sequence.
25. Hardness setting.
26. Capacity display—shows estimated system capacity.

CONTROLLER FEATURES *continued*

Keypad - Buttons

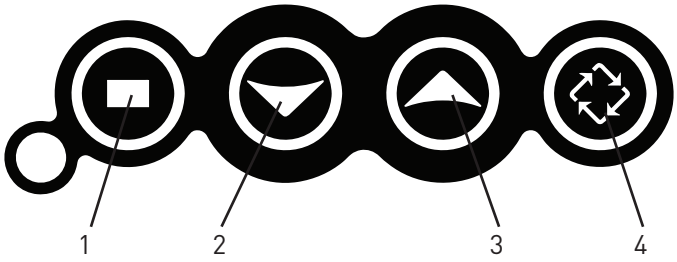


Figure 8

1. SET. Used to accept a setting that normally becomes stored in memory. Also used together with the arrow buttons.
2. DOWN arrow. Generally used to scroll down or decrement through a group of choices.
3. UP arrow. Generally used to scroll up or increment through a group of choices.
4. REGENERATE. Used to command the controller to regenerate. Also used to change the lock mode.

NOTE: If a button is not pushed for thirty seconds, the controller returns to normal operation mode. Pushing the Regenerate button immediately returns the controller to normal operation except when the controller is in regeneration mode or Level II Programming mode.

INITIAL STARTUP INSTRUCTIONS

After you have performed the installation steps, the conditioner will need to be placed into operation for the first time.

NOTE: The controller will be shipped in the service (treated water) position. Do not move the piston before performing the following steps.

The incoming supply water should be turned off.

Power-up The Control

1. Plug the transformer into a non-switched outlet. The display will show 9100. If this is the first time the control is powered up the display will show "_.__".

NOTE: err3 will be displayed if the control does not detect the valve at the home position and that the motor is turned on. As soon as it detects the valve at the home position, the motor will be turned off and error will disappear. The piston will move to service if not already in service. These movements may take up to five minutes.

Program the Controller

2. Program the Controller for initial operation using the User Programming Guide (See Quick Start on page 8 or Step-by-Step Instructions on pages 9-10).

Remove Air From Tank 1

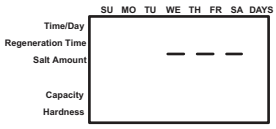
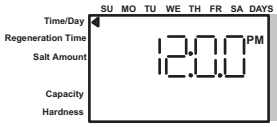
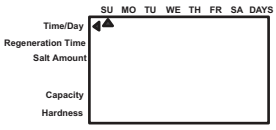
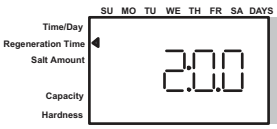
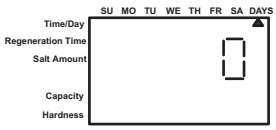
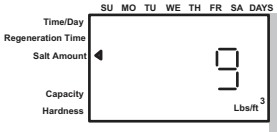
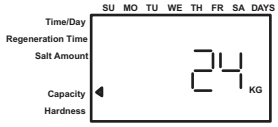
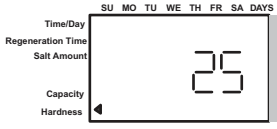
3. Press and hold the REGEN button for three seconds. The controller will enter regeneration mode.
4. Press both SET and UP buttons to advance to backwash (Cycle 2).
5. Open the incoming water supply valve slowly to the quarter open position.
6. Allow water to run down the drain until air exits the tank. When water flows steady from the drain, open inlet valve fully. Allow to run until water is clear in drain.
7. Hold SET and UP buttons for three seconds to cancel regeneration.

Remove Air From Tank 2

8. Close inlet water supply valve.
9. Press and hold the REGEN button for three seconds. The controller will enter regeneration mode.
10. Press both SET and UP buttons to advance to backwash (Cycle 2).
11. Repeat steps 5 and 6 above.
12. Allow the controller to finish regeneration on its own. This will fill the brine tank.

USER PROGRAMMING

Level I Programming - 9100TS

Screen	Buttons to Press		Description		Range
	*then* ▼ or ▲ *press* ■		P0	Resin Volume Select correct resin volume. Default is 1 cubic foot/30 liters.	Cubic Feet: 0.75 to 2.00 Liters: 20 to 60
	*press* ■ *then* ▼ or ▲ *press* ■		P1	Time of Day (12 hr) Set to time of day. Note: Setting includes PM indicator.	
	*press* ■ *then* ▼ or ▲ *press* ■		P2	Day of Week Set to actual day of the week.	
	*press* ■ *then* ▼ or ▲ *press* ■		P3	Time of Regeneration Set to desired time of regeneration.	
	*press* ■ *then* ▼ or ▲ *press* ■		P4	Days Override Leave at 0 to disable or Set to desired days between regeneration. Default is 0 days.	Days: 0 (Disable) 0.5 to 30
	*press* ■ *then* ▼ or ▲ *press* ■		P6	Salt Dosage Set to desired dosage lbs per cubic feet of resin Default is 9 lbs/ft^3 / 110 gm/l.	Lbs/ft^3: 3 to 15 gm/l: 50 to 200
	*press* ▼ *to override press* ■ *then* ▼ or ▲ *press* ■		P7	Capacity Capacity calculated by control Use to OVERRIDE calculated capacity.	
	*press* ■ *then* ▼ or ▲ *press* ■		P8	Hardness Set to actual water hardness in grains per gallon / ppm.	

Control programming is complete

NOTE: The regen icon may begin flashing after the control displays err3 **or after the time is reset following a power outage. This indicates that a regeneration will occur at the next scheduled regeneration based on metered water usage during the error condition or power outage.**

Step-by-Step Instructions

Step 1: Program System Size

This step may have been performed by your system's OEM manufacturer. In this case, proceed to step 2.

NOTE: Capacity is the result of the amount of media in the tank and the salt setting. The default capacity will be changed by selecting a different regenerant setting.

- Input system size – media volume – in cubic feet (liters).
- Use UP and DOWN buttons to scroll through resin volume choices.
- Choose the nearest volume to your actual system size.
- Press SET to accept the system size you've selected.

NOTE: If the controller was incorrectly set to the wrong size, press the DOWN button and SET button for five seconds to display resin volume in "HO". Press and hold the SET button for five seconds to reset the controller. Use the UP or DOWN buttons to increment the display to the correct resin volume. Press SET.

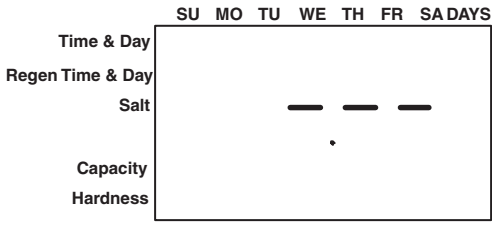


Figure 9

Step 2: Program Time of Day

- While "12:00" is blinking, set the correct time of day.
- Use the UP and DOWN buttons to scroll to the correct time of day.
- "PM" is indicated, "AM" is not indicated.
- Press SET to accept the correct time of day and advance to the next parameter.

Figure 10

Step 3: Set Day of Week

- Press SET to make the arrow under "SU" flash.
- Use the UP and DOWN buttons to advance the arrow until it is under the correct day of week.
- Press SET to accept and advance to the next parameter.

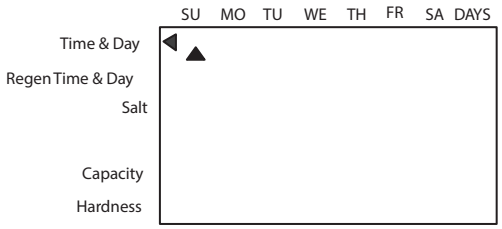


Figure 11

Step 4: Set Regen Time

- 2:00 (AM) is the default time of regeneration. To accept this time, press the DOWN button to move to step 5.
- To change the regen time, press SET – causing "2:00" to flash.
- Use the UP and DOWN buttons to advance to the desired regen time.
- Press SET to accept the time and advance to the next parameter.

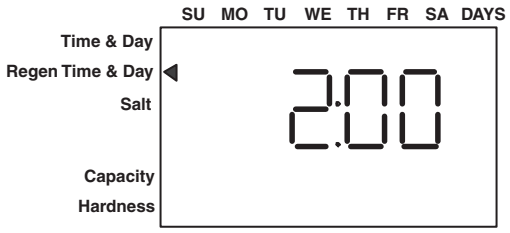


Figure 12

Step 5: Set Calendar Override

- Set number of days for calendar override.
- "0" days (disabled) is the default for calendar override.
- Days can be adjusted from ½ (.5) to 30 days.
- To change, press SET to make the "0" flash.
- Use the UP and DOWN buttons to change to the number of days desired. Press SET to accept the regen frequency, and advance to the next cycle.

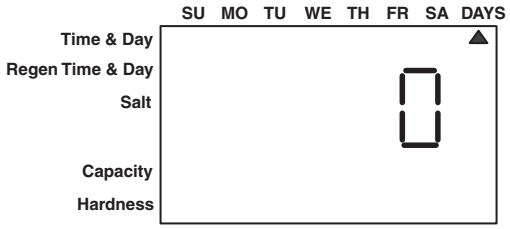


Figure 13

Step 6: Amount of Regenerant used per Regeneration

- Set desired regenerant amount.
- Default setting is 9 lbs/cubic feet (120 gm/l).
- To change salt setting, press the SET button and use the UP and DOWN buttons to change to the desired setting.
- Press SET to accept the setting and advance to the next parameter.

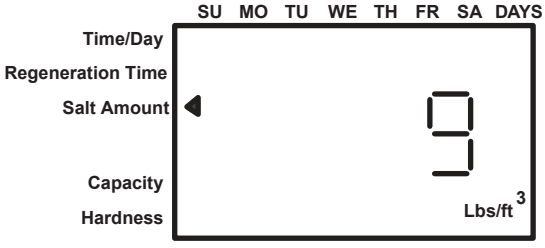


Figure 14

Step 7: Estimated Capacity

- System capacity is displayed in total kilograins or kilograms of hardness removed before a regeneration is necessary.

- Value is derived from the system's resin volume input and salt amount input.
- To override capacity on the control, press SET to make the default capacity flash. Use the UP and DOWN buttons to increment to the desired capacity.
- Press SET to accept the setting and advance to the next parameter.

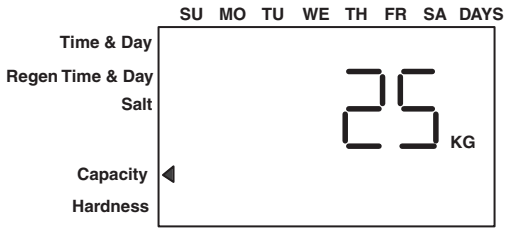


Figure 15

Step 8: Enter Hardness

- Enter inlet water hardness at installation site.
- Default hardness setting is 10 grains (170 ppm).
- To change hardness, press SET to make the setting flash. Use the UP and DOWN buttons to scroll to the desired hardness.
- Press SET to accept the entered hardness value.
- The control will return you to the normal operation mode.

Initial programming is now complete. The control will return to normal operation mode if a button is not pushed for 30 seconds.

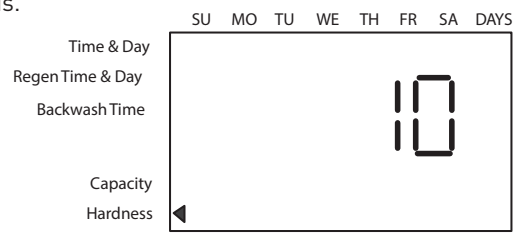


Figure 16

In Service Display

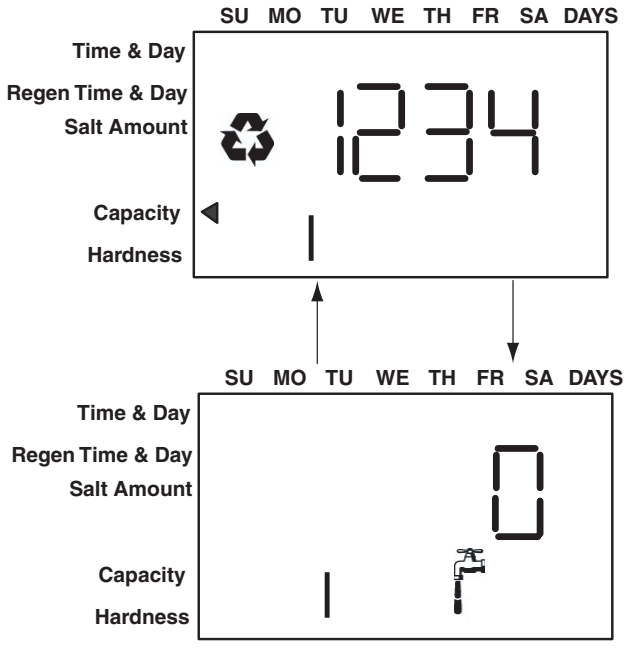


Figure 17

The display shows the number of the tank in service (small digit next to CPH position). The display also alternates between Capacity Remaining and Flow Rate (faucet icon) for the tank in service.

NOTE: The Regen icon is steady on when in regeneration.

NOTE: The faucet icon is displayed when there is flow. The display will show the faucet icon when the flow rate is displayed, even if the flow rate is zero. The faucet icon will turn off when the capacity is displayed.

PROGRAMMING MODE

Programming Overview

The 9100TS control includes multiple program levels that allow water treatment professionals to customize the system for many water conditions. Additionally, historical data can be viewed allowing quick and easy troubleshooting. In most cases Level I Programming is all that is required to set up the water conditioning system for proper operation. A brief description of each program level is listed below.

Level I - Used to program control for normal applications.

Level II (P-Values) - Allows the installer to customize programming for non-standard applications including parameters that are also programmable in Level I.

Level III (C-Values) - Allows the installer to adjust length of select cycles for non-standard applications.

Level IV History (H-Values) - Allows access to historical information for troubleshooting the system.

NOTE: If a button is not pushed for thirty seconds, the control returns to normal operation mode.

Level I Programming

The 9100TS control can be quickly programmed by following the sequential procedure in the section "Placing Water Conditioning System Into Operation". Level I Program parameters are those that can be accessed by pressing the UP or DOWN buttons. Step-by-step instructions are shown on previous page.

- Resin Volume Setting: Set to match the volume (cubic feet) of resin in the mineral tank.
- Time of Day: Includes PM indicator. Can be set to display as a 24-hour clock. See Level II programming.
- Day of Week: Set to actual day of the week.
- Time of Regeneration: Fully adjustable. Default is 2:00 AM.
- Days Override: Range 0.5 to 30 days. Leave at 0 to disable.
- Salt Dosage: Set at pounds of salt per cubic foot of resin in the conditioner tank.

NOTE: When the control is set up for a twelve-hour clock a PM indicator will illuminate when the displayed time is in the PM hours. There is no AM indicator.

Programming the Lockout Feature

All Level I parameters can be locked out when the control is in Level II Programming. Simply press the REGEN button during Level II Programming and a lock icon will appear indicating that the specific setting has been locked out. When locked out, the setting cannot be adjusted in Level I Programming. To disable the Lock Out feature, press the REGEN button when in Level II. The lock icon will not be displayed.

Injector and Brine Line Flow Control Sizing

Tank Diameter (inches)	Resin Volume		Injector	BLFC
	US	Metric		
8	0.75	20	#000	0.125
9	1.00	30	#000	0.125
9	1.25	35	#000	0.125
10	1.50	45	#000	0.125
12	2.00	60	#00	0.5

Salt Setting

The default P6 salt setting is set at 9 lbs/cu ft (110 g/l). Under normal circumstances this setting will provide the correct system capacity. The exchange capacity setting P7 will automatically change when the salt setting P6 is changed.

Salt Setting lbs/cu ft	Exchange Capacity grains/cu ft	Salt Setting grams/liter	Exchange Capacity grams/liter
3	14631	50	34.4
4	17799	60	38.9
5	20682	70	43.2
6	23279	80	47.3
7	25592	90	51.1
8	27619	100*	54.6
9*	29361	110	57.9
10	30818	120	60.9
11	31990	130	63.7
12	32877	140	66.2
13	33478	150	68.5
14	33795	170	72.2
15	33826	200	76.0

*Default Setting.

PROGRAMMING MODE *continued*

Level II Programming - P Values

Level II Programming parameters can be adjusted to fine-tune the conditioner's operation. The parameters are accessible by pressing and holding the UP and DOWN buttons until the control displays a "P" value.

NOTE: The control must be in the home position to change settings. See Table for Level II parameters. Typically the Level II parameters will not need to be adjusted as the default settings accommodate most applications. Contact your water treatment professional before attempting any programming.

	Description	Range	Minimum Increments	Default	Units	Notes
P9	Units of Measure	0-1	1	(2)		0 = US 1 = Metric
P10	Clock Mode	0-3	1	(2)		0 = 12 hour clock: flow rate displayed 1 = 24 hour clock: flow rate displayed 2 = 12 hour clock; Time of Day displayed 3 = 24 hour clock; Time of Day displayed
P11	Service Interval	0-99	1	0	Months	0 = Dissabled. Number of days per month is fixed at 30.
P12*	Resin Tank Sensor Placement	60-01	1	20	% of Capacity	Expressed as a percentage of resin bed capacity remaining after lowest set of pins.
P13	Disable Resin Tank Sensors	0-1	1	0		0 = Resin Tank Sensors Enabled 1 = Resin Tank Sensors Disabled
P14	Refill Rate	1-700	1	(1)	gpm x 100	Used with salt amount to calculate refill time.
P15	Draw Rate	1-700	1	(1)	gpm x 100	Used with salt amount to calculate draw time.
P16	Flow sensor select	1-4	1	4		1 = 1" Autotrol turbine 2 = 2" Autotrol turbine 3 = User defined K-factor 4 = Fleck 3/4" Paddle 5 = Fleck 3/4" Turbine 6 = Fleck 1" Paddle 7 = Fleck 1"/1-1/2" Turbine 8 = Fleck 1-1/2" Paddle 9 = Meter Factor
P17	K-factor or Pulse equivalent	0.01-99.99	0.01	0.01		K-factor P16 = 3; Pulse Equivalent P16 = 9
P18	Tank in Service	1-2	1	1		Select the Tank in Service.
P19	Cleaning Cycle Interval	0-100	1	6		Number of standard regeneration cycles between cleaning regeneration cycles.

*The control will automatically adjust the Hardness Setting P8 when the sensors in the resin tank detect a hardness front passing. This automatic adjustment to the hardness setting may result in the system passing hard water near the end of the service cycle if the resin tank sensor placement setting P12 is wrong. The sensor placement setting P12 must be reduced to eliminate the problem. Reducing the Capacity Setting P7 or increasing the Hardness setting P8 will only produce a temporary solution.

NOTE: (1) Default selected with initial setting value.
(2) Facotry Default is "0" for North America units and "1" for World units.

PROGRAMMING MODE *continued*

Level III Cycle Programming - C Values

Several Level III program parameters can be adjusted to fine-tune valve operation for non-standard applications. Typically these parameters will not need to be adjusted as the default settings accommodate most applications. Contact your Water Treatment Professional before attempting any programming. The parameters are accessible by pressing and holding the UP and SET buttons until the display shows a "C" value.

NOTE: The control must be in the treated water position to change settings.

C#	Description	Range	Minimum Increments	Default Setting	Notes
C1*	Brine Draw	0-200	1 Min	See Notes	Automatically calculated from resin volume and salt dosage settings and draw rate.
C2	Slow Rinse	0-200		See Notes	Initial time automatically calculated to provide two bed volumes of rinse.
C3	Standard Backwash	0-20		7	Flow rate dictated by size of drain line flow controller.
C4	Standard Fast Rinse	0-200		3	Rinses residual regenerant from tank.
C5*	Refill	0-200		See Notes	Automatically calculated from resin volume and salt dosage settings and refill rate.
C13	Cleaning Backwash	0-200		14	Control uses C13 in place of C3 when the number of standard regenerations is equal to the cleaning cycle interval P19.
C14	Cleaning Fast Rinse	0-200		6	Control uses C14 in place of C4 when the number of standard regenerations is equal to the cleaning cycle interval P19.

*Cannot be changed in Level III Cycle Programming.

Adjust P15 or P14 to change the brine draw or refill times respectively.

PROGRAMMING MODE *continued*

Level IV Viewing History - H Values

Historical information can be viewed by pressing the SET and DOWN buttons simultaneously, with the 9100TS control in the home position. Release both buttons when the control displays an "H" value. Press the UP or DOWN buttons to navigate to each setting.

H#	Description	Range	Notes
H0*	Initial Setting Value	Cubic Feet or Liters	Resin Volume, Holding SET for 3 seconds will reset control to factory defaults
H1	Days since last regeneration	0-255	
H2	Current Flow Rate	Depends on turbine used	
H3	Water used today in gallons or m^3 since Time of Regeneration	0-131,070 gallons or 0-1,310.7 m^3	
H4	Water used since last regeneration in gallons or m^3	0-131,070 gallons or 0-1,310.7 m^3	
H5*	Total water used since reset in 100s	0-999900 gallons or 0-9999m^3	Holding SET key for 3 seconds will reset H5 and H6 to zero.
H6*	Total water used since reset in 1,000,000	4,294 x 10^6 gallons or 4,264 x 10^4 m^3	Holding SET key for 3 seconds will reset H5 and H6 to zero.
H7	Average usage for Sunday in gallons or m^3	0-131,070 gallons or 0-1,310.70 m^3	
H8	Average usage for Monday in gallons or m^3	0-131,070 gallons or 0-1,310.70 m^3	
H9	Average usage for Tuesday in gallons or m^3	0-131,070 gallons or 0-1,310.70 m^3	
H10	Average usage for Wednesday in gallons or m^3	0-131,070 gallons or 0-1,310.70 m^3	
H11	Average usage for Thursday in gallons or m^3	0-131,070 gallons or 0-1,310.70 m^3	
H12	Average usage for Friday in gallons or m^3	0-131,070 gallons or 0-1,310.70 m^3	
H13	Average usage for Saturday in gallons or m^3	0-131,070 gallons or 0-1,310.70 m^3	
H14	Average service cycle	0-255 days	Last 4 Regens
H15*	Peak Flow Rate	0-200 gpm or 1000Lpm	Holding SET key for 3 seconds will reset H15 to zero.
H16	Day and Time of Peak Flow Rate	Time and day that peak flow occurred	
H17*	Months since service	0-2184 months	Holding SET key for 3 seconds will reset H17, H18 and H19 to zero.
H18	Number of Low Salt Alarms	0-65536	
H19	Number of Reduced Capacity Alarms	0-65536	
H r	Number of regenerations since last serviced	0-65536	Holding Set key for 3 seconds will reset Hr to zero.

*H0, H5, H6, H15, H17 values can be reset by pressing and holding ⏺ for 3 seconds while the value is being displayed.

PROGRAMMING MODE *continued*

Program Reset

The 9100TS control can be reset to original factory parameters when viewing the H0 parameter. Press and hold the SET button for three seconds while H0 is displayed. Release the button. All settings except for Time of Day and Day of Week will be reset. The 9100TS control will now display the resin volume. Refer to Level I Programming.

NOTE: After a program reset all programmed values will reset to default settings.

Manual Regeneration Options

The 9100TS control features several options that offer additional flexibility for manually regenerating the softener. On twin tank systems the tank in standby will move to service. Then the tank that was in service will be regenerated..

Delayed Manual Regeneration

Press and release the REGEN button to start a delayed manual regeneration. The Regeneration icon on the display will flash indicating a regeneration will start when the time of day reaches the programmed time of regeneration. Pressing the REGEN button again will turn off the regeneration icon and cancel the delayed regeneration.

Immediate Manual Regeneration

Pressing and holding the REGEN button for three seconds starts an immediate manual regeneration. A solid regeneration icon will be displayed. The control will immediately begin a regeneration on the tank in service.

Delayed Second Regeneration

Pressing and releasing the REGEN button while the control is in regeneration will program the control for a delayed second regeneration. A flashing x2 icon next to the regeneration icon will appear indicating a second regeneration will start when the time of day reaches the programmed time of regeneration. The delayed second regeneration will be performed on the new tank in service.

Double Immediate Manual Regeneration

Back-to-Back manual regenerations are initiated by pressing and holding the REGEN button for three seconds while the control is in the regenerating mode. A solid x2 icon next to the regeneration icon will appear indicating a second manual regeneration will start immediately after current regeneration is complete.

AUTOMATIC CLEANING CYCLE

This system is programmed by default to run an extended cleaning cycle every seventh regeneration, which allows the regular regeneration cycle to be twice as fast and use half as much water as a normal cycle.

Cleaning cycle interval can be edited in Level II programming P19; cleaning backwash and fast rinse can be edited in Level III programming C13 and C14. See "Level III Cycle Programming - C Values" on page 13.

DISINFECTION OF WATER CONDITIONING SYSTEMS

The materials of construction in the modern water conditioning system will not support bacterial growth, nor will these materials contaminate a water supply. During normal use, a conditioner may become fouled with organic matter, or in some cases with bacteria from the water supply. This may result in an off-taste or odor in the water.

Some conditioners may need to be disinfected after installation and some conditioners will require periodic disinfection during their normal life.

Depending upon the conditions of use, the style of conditioner, the type of ion exchanger, and the disinfectant available, a choice can be made among the following methods.

Sodium or Calcium Hypochlorite

These materials are satisfactory for use with polystyrene resins, synthetic gel zeolite, and bentonites.

5.25% Sodium Hypochlorite

These solutions are available under trade names such as Clorox. If stronger solutions are used, such as those sold for commercial laundries, adjust the dosage accordingly.

1. Dosage
   - Polystyrene resin; 1.2 fluid ounce (35.5 mL) per cubic foot.
   - Non-resinous exchangers; 0.8 fluid ounce (23.7 mL) per cubic foot.
2. Regenerant tank conditioners
   A. Backwash the conditioner and add the required amount of hypochlorite solution to the well of the regenerant tank. The regenerant tank should have water in it to permit the solution to be carried into the conditioner.
   B. Proceed with the normal regeneration.

Calcium Hypochlorite

Calcium hypochlorite, 70% available chlorine, is available in several forms including tablets and granules. These solid materials may be used directly without dissolving before use.

1. Dosage
   A. Two grains (approximately 0.1 ounce (3 mL) per cubic foot.
2. Regenerant tank conditioners
   A. Backwash the conditioner and add the required amount of hypochlorite to the well of the regenerant tank. The regenerant tank should have water in it to permit the chlorine solution to be carried into the conditioner.
   B. Proceed with the normal regeneration.

WIRING DIAGRAMS

Connecting the 9100TS Twin Alternating Controls

The twin sensor and extension cables are used for twin unit parallel and alternating applications. Four standard connections are required for operation; the power transformer, the flow sensor, motor/optical sensor, and the connection between tank 1 and tank 2 controls. Figure 18 outlines these standard features.

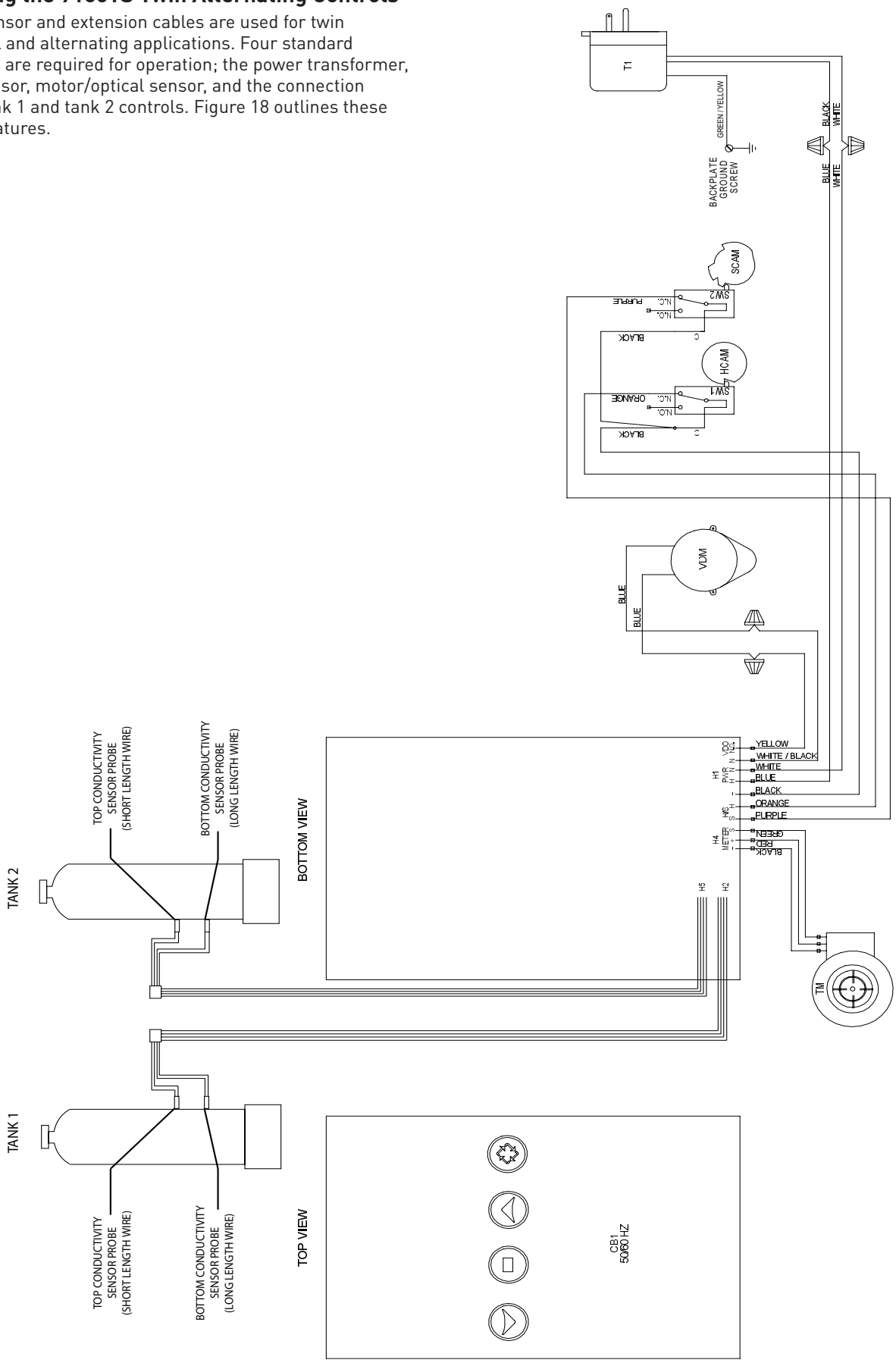
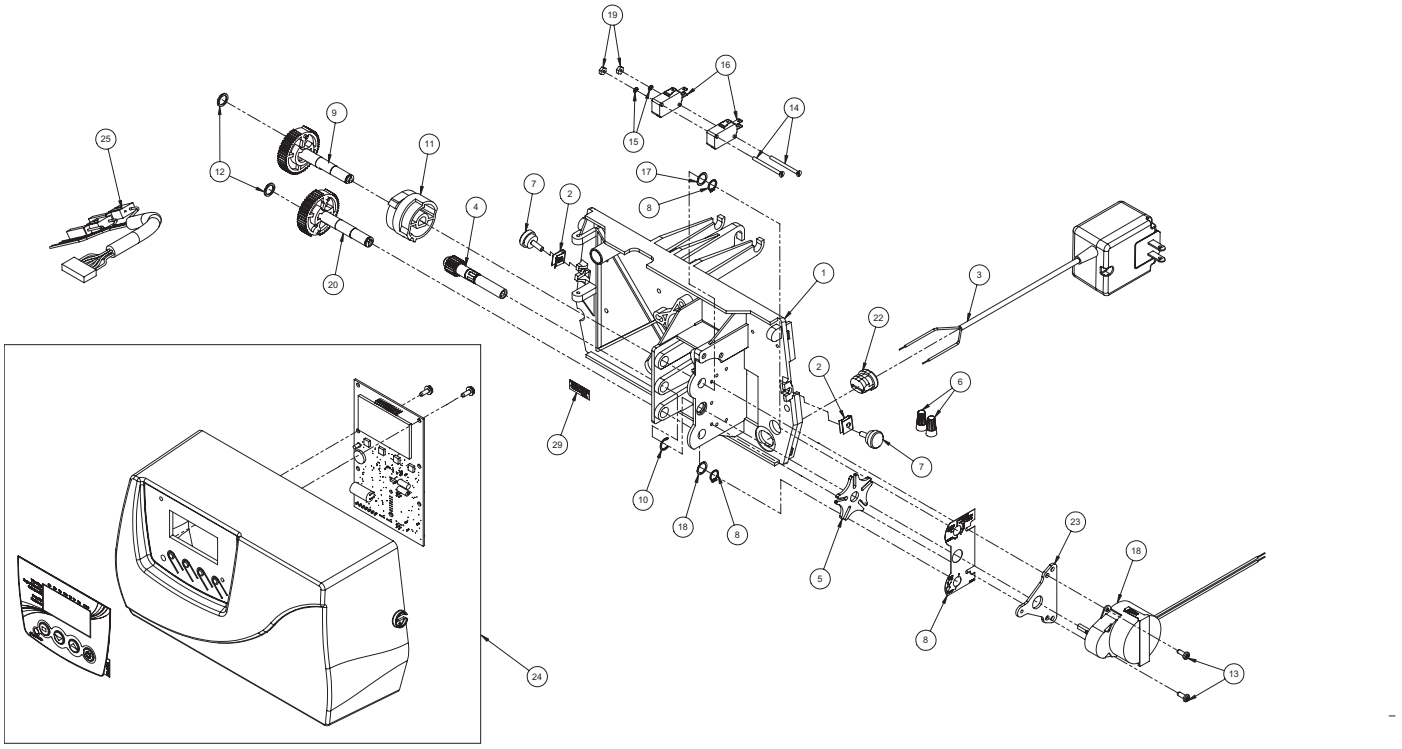


Figure 18

POWERHEAD ASSEMBLY

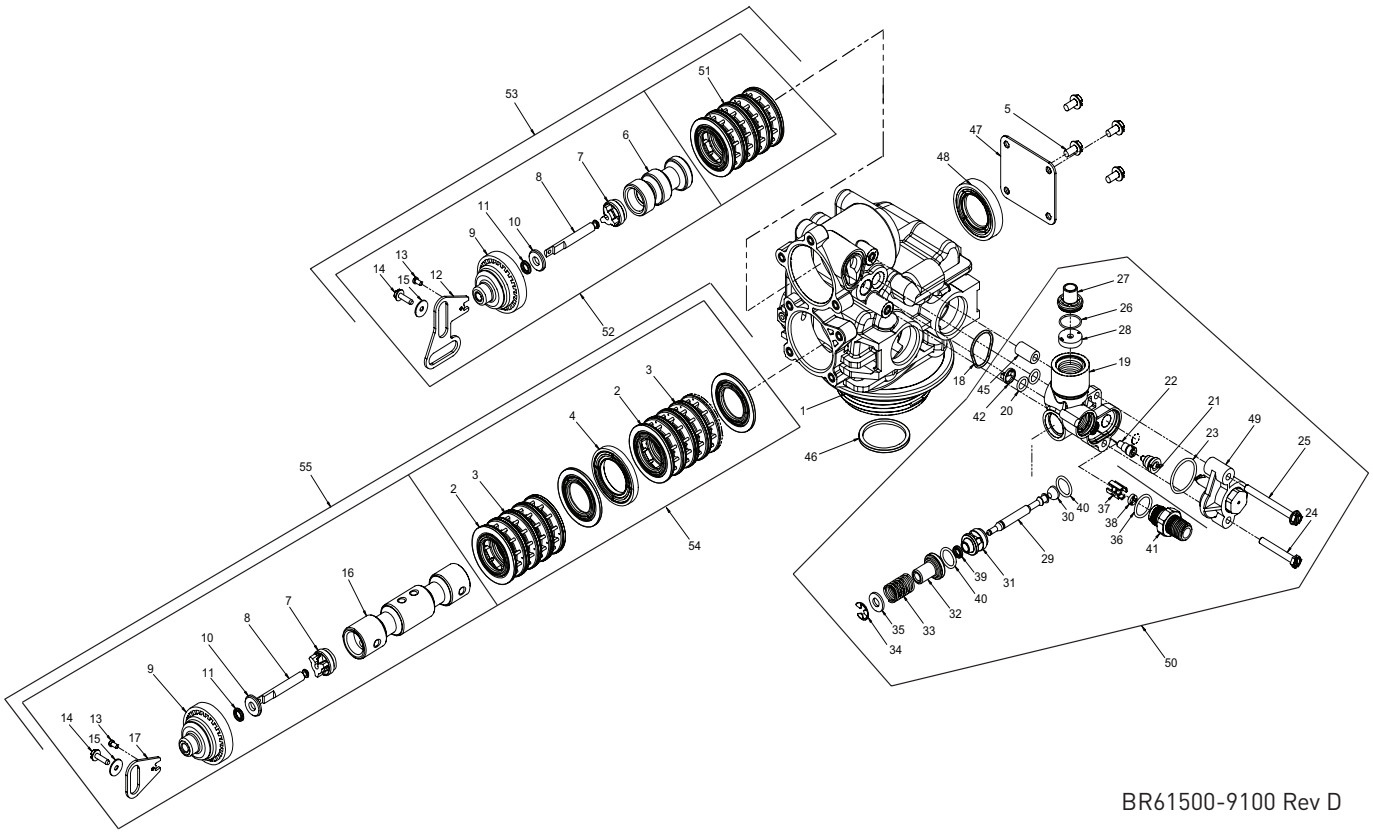


BR61501-9100TS Rev D

Item No.	QTY	Part No.	Description
1	1	15131	Backplate, 9000
2	2	18728	Nut, Clip, #8-32
3	1	19674	Transformer, US 24V 9.6VA
4	1	15135	Gear, Drive
5	1	14896	Wheel, Geneva
6	2	40422	Nut, Wire, Tan
7	2	19367	Screw, Designer Cover, Thumb
8	2	14917	Retaining Ring, External
9	1	15133	Drive Gear Assembly - Upper
10	1	15810	Retaining Ring
11	1	43091	Cam, Triple 9100TS
12	2	15372	Washer, Thrust
13	2	19160	Screw, #6-32 x 3/8 Pan Head
14	2	15172	Scrw, Flat Head
15	2	10340	Washer, Lock #4, Zinc
16	2	16433	Switch, Micro Low DB

Item No.	QTY	Part No.	Description
17	2	15692	Washer, Plain, 3/8"
18	1	18737	Drive Motor -24V, 50-60 Hz
19	2	10339	Nut, Hex, 4-40 Zinc Plated
20	1	15134	Drive Gear Assembly - Lower
22	1	13547	Strain Relief, Cord
23	1	42296	Plate, Ground, 9000/9500
24	1	61787	Cover and PCB Assy, 9100TS
25	1	19474	Harness, Power, 5600SE, Elect

9100 CONTROL VALVE ASSEMBLY

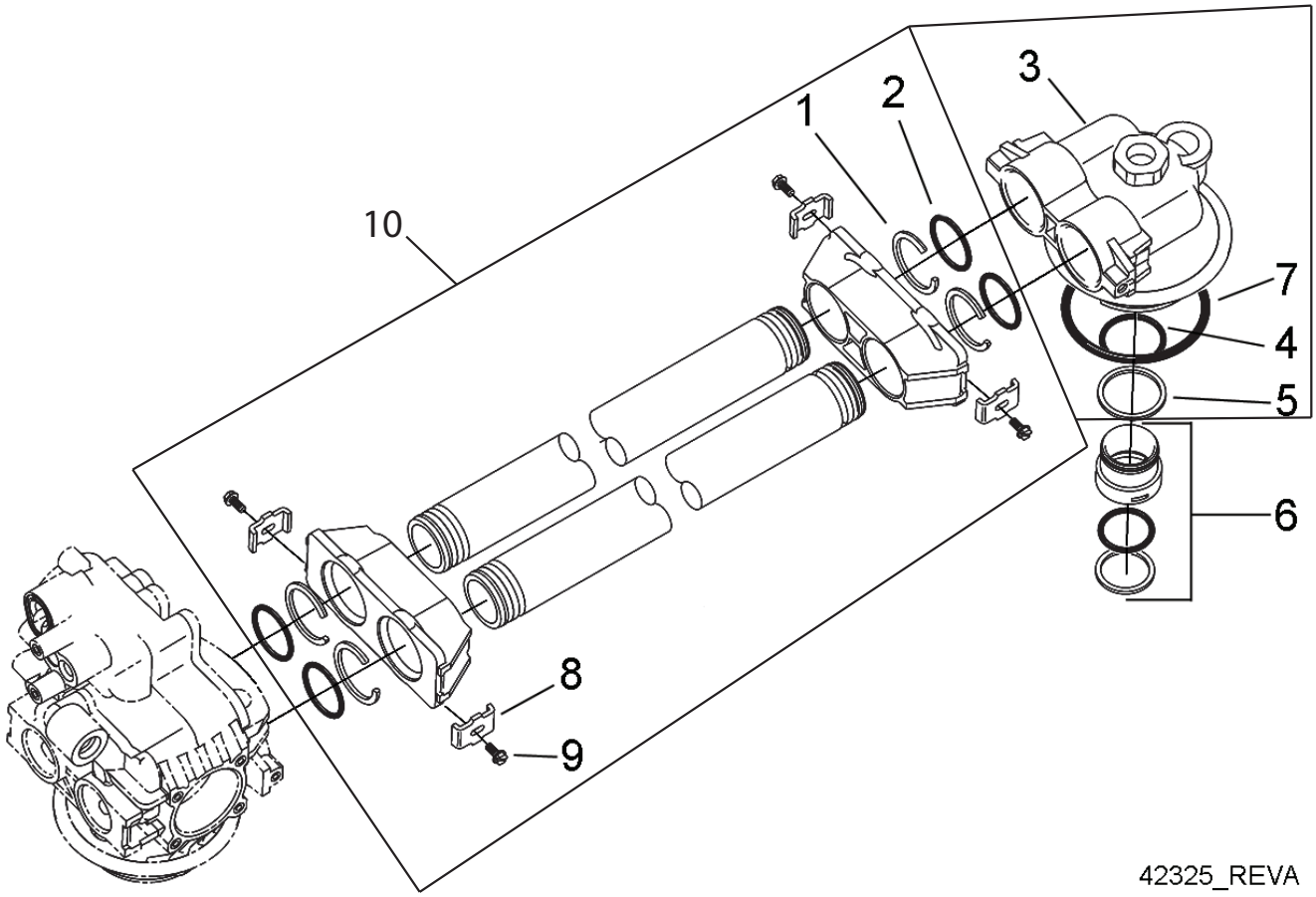


BR61500-9100 Rev D

Item No.	QTY	Part No.	Description
1	1	40688	Valve Body Assy
2	16	13242-02	Seal
3	12	14241	Spacer
4	1	16595	Spacer
5	4	15137	Screw, Hex Washer Head
6	1	14914	Piston, Upper
7	2	14309	Retainer, Piston Rod
8	2	14919	Piston, Rod, Upper
9	2	13243	Plug, End
10	2	13008	Retainer, End Plug Seal
11	2	10209	Quad Ring, -010
12	1	14921	Link, Piston Rod
13	2	11335	Screw, #4-40
14	2	13296	Screw, STL. Hex WSH, 6-20 x 3/8
15	2	13363	Washer, Hague Drive
16	1	61796	Piston Lower
17	1	15019	Link, Piston Rod
18	1	41500	O-ring, Drain
19	1	15215	Body, Injector
20	2	13301	O-ring, -011
21	1	10913-000	Nozzle, Injector, #000, Brown
22	1	10914-000	Throat, Injector, #000, Brown
23	1	13303	O-ring, -021
24	1	13387	Screw, Hex, Slotted
25	1	43068	Screw, Hex WSH HD
26	1	15348	O-ring, -563
27	1	13173	Retainer, DLFC Button
28	1	12087	Washer, Flow, 2.0 gpm
29	1	14925	Brine Valve Stem
30	1	12626	Seat, Brine Valve
31	1	13167	Spacer, Brine Valve
32	1	13165	Cap, Brine Valve
33	1	11973	Spring, Brine Valve

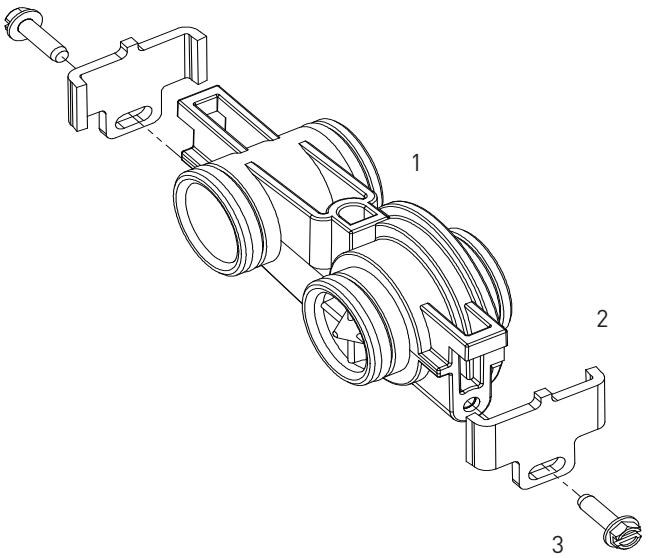
Item No.	QTY	Part No.	Description
34	1	11981-03	Ring, Retaining, Copper
35	1	16098	Washer, Nylon Brine
36	1	12977	O-ring, -015
37	1	13245	Retainer, BLFC
38	1	17307	Washer, Flow Control, .12 gpm
39	1	12550	Quad Ring, -009
40	2	13302	O-ring, -014
41	1	13244	Adapter, BLFC
42	1	13497	Air Disperser, Injector
43	1	13333	Label, Injector
44	1	19654	Label, .125 gpm
45	1	13361	Spacer
46	1	40538	Retainer, 32 mm, O-ring Dist
47	1	14906	Plate, End
48	1	14928	Plug, End Stub
49	1	60285-01	Injector Cap Assy
50	1	61794-0624	Injector Drain, 9100TS, .125 BLFC, #000 Inj, 1.5 DLFC
		61794-0634	Injector Drain, 9100TS, .125 BLFC, #000 Inj, 2.0 DLFC
		61794-0644	Injector Drain, 9100TS, .125 BLFC, #000 Inj, 2.4 DLFC
		61794-0562	Injector Drain, 9100TS, .125 BLFC, #000 Inj, 2.4 DLFC
51	1	60125	Seal & Spacer Kit, Top
52	1	60400	Piston Assy, Top
53	1	61785	9100 Upper Piston Kit w/Seal Kit
54	1	60421	Seal & Spacer Kit, Bottom
55	1	61786	9100 Lower Piston Kit w/Seal Kit
Not Shown:			
	1	19054	O-ring, 32mm, -124, EPDM
	1	18569	Retainer, Tank Seal (included with Item 1)
	1	18303	O-ring, Top of Tank, -336, (included with iItem 1)

9100 SECOND TANK ASSEMBLY



Item No.	QTY	Part No.	Description
1	4	40678	Ring, 9100, Yoke Retainer
2	4	13287	O-ring, -123
3	1	14865	Adapter Assy, 2nd Tank, 9100 (Includes Items 4, 5, and 7)
4	1	19054	O-ring, -124
5	1	40538	Retainer, 32mm, O-ring Dist, 7000
6	1	61419	Kit, 1.05" Distributor, Adapter
7	1	18303	O-ring, -336
8	4	13255	Clip, Mounting
9	4	14202-01	Screw, Hex Wsh Mach, 8-32 x 5/16
10	1	60425-7	Tube Assy, 9100, 7" Tank
		60425-9	Tube Assy, 9100, 8-9" Tank
		60425-12	Tube Assy, 9100, 6-12" Tank
		60425-16	Tube Assy, 9100, 13-16" Tank
Not Shown:			
	1	18569	Retainer, Tank Seal (Included with Item 3)

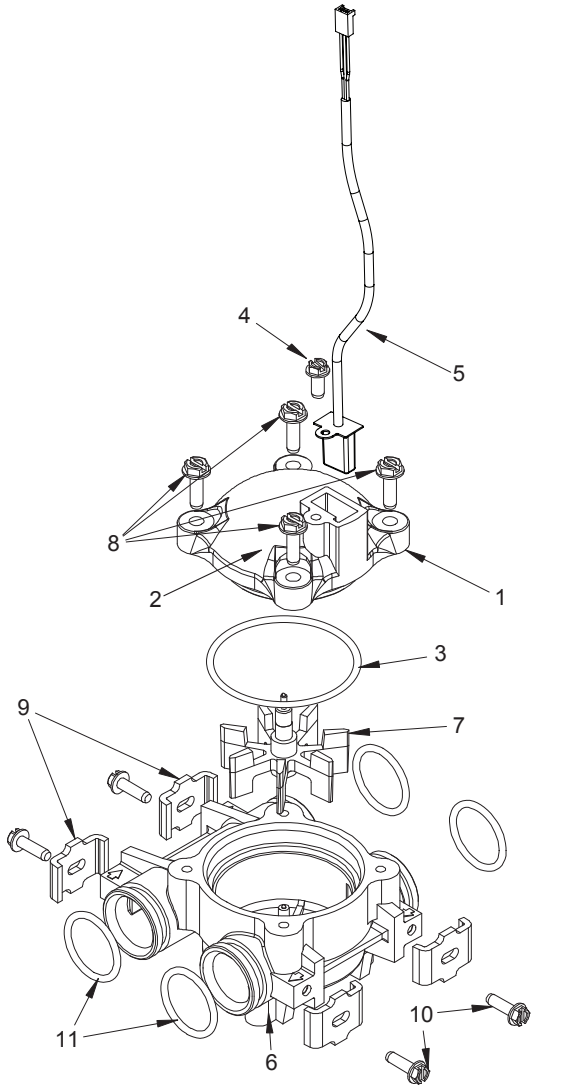
TURBINE METER ASSEMBLY - P/N 60626



BR60626

Item No.	QTY	Part No.	Description
1	1	19797	Meter Assy, 3/4" Dual Port, SLP
2	2	19569	Clip, Flow Meter
3	2	13314	Screw, Slot Ind Hex, 8-18 x 0.60
Not Shown:			
		14613	Flow Straightener
		19791-01	Meter Cable Assy, Turbine/SE

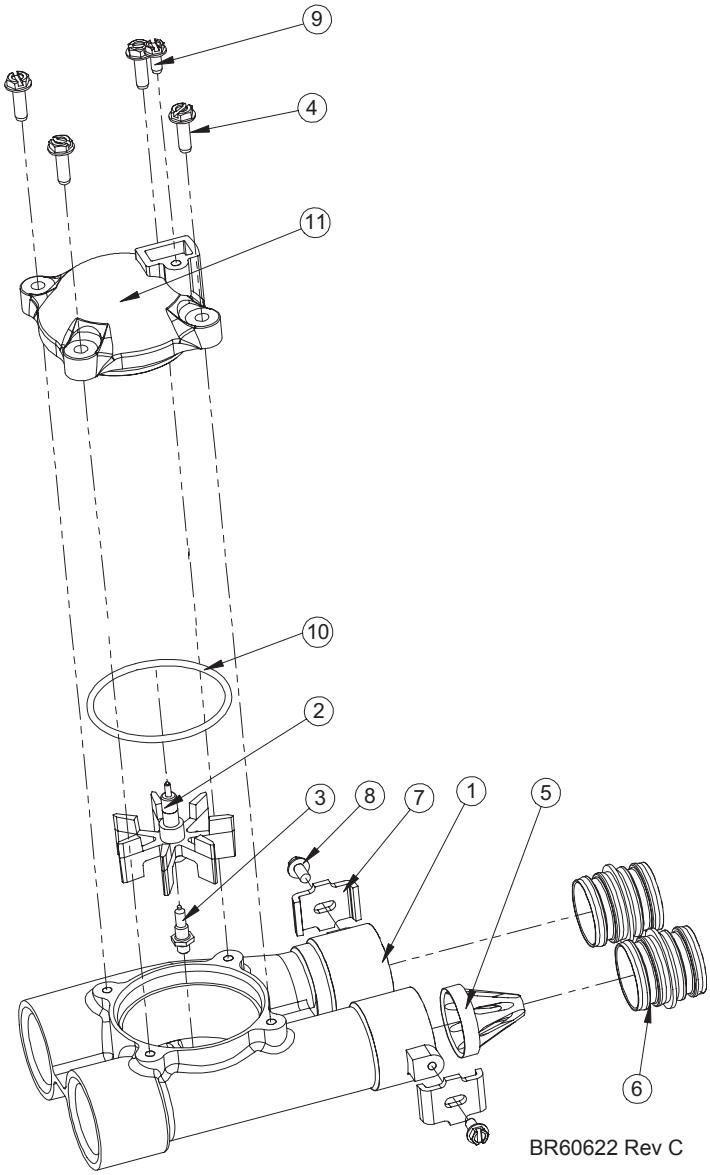
PADDLE METER ASSEMBLY - P/N 60086-50



BR60086 Rev E

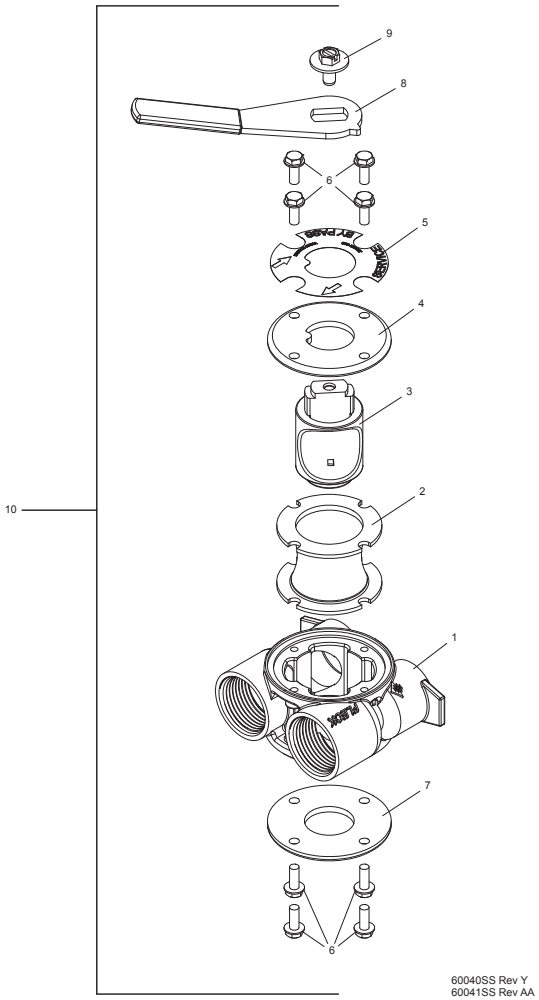
Item No.	QTY	Part No.	Description
1	1	14716	Meter Cap Assy, NT (includes items 2, 3, and 4)
2	1	13874	Cap, Meter, Electronic
3	1	13847	O-ring, -137, Std, Meter
4	1	17798	Screw, Slot Hex Washer Head
5	1	19791-01	Meter Cable Assy, Turbine/SE (not included in P/N 60086-50)
6	1	13821	Body, Meter, 5600
7	1	13509	Impeller, Meter
8	4	12473	Screw, Hex Wsh, 10-24 x 5/8
9	4	13255	Clip, Mounting
10	4	13314	Screw, Slot Ind Hex, 8-18 x 0.60
11	4	13305	O-ring, -119
12	1	14613	Flow Straightener

1" METER ASSEMBLY - P/N 60622



Item No.	QTY	Part No.	Description
1	1	15043	Body, Meter, 9000 1"
2	1	13509-01	Impeller, Meter, Celcon
3	1	13882	Post, Meter Impeller
4	4	12473	Screw, Hex Wsh, 10-24 x 5/8
5	1	14960	Flow Straightener, 1"
6	2	15078-01	Adapter Assy, 1" Coupling
		15078	Adapter, 1" Coupling
7	2	13255	Clip, Mounting
8	2	14202-01	Screw, Hex Washer #8-32 x 5/16
9	1	17798	Screw, Slot Hex Wsh HD
10	1	13847	O-Ring, -137
11	1	14716	Cap, Meter Electronic

BYPASS VALVE ASSEMBLY (METAL)

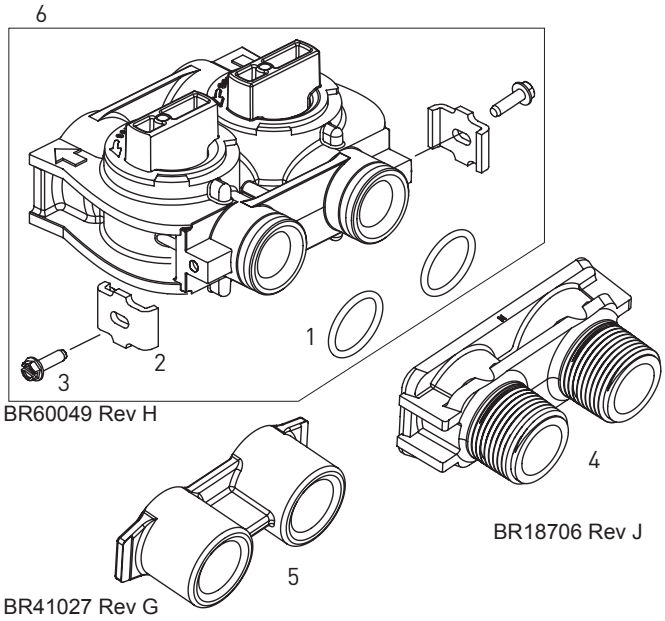


Item No.	QTY	Part No.	Description
1	1	40614	Bypass Body, 3/4"
		40634	Bypass Body, 1", SS
2	1	14105	Seal, Bypass, 560CD
3	1	11972	Plug, Bypass
4	1	11978	Side Cover
5	1	13604-01	Label
6	8	15727	Screw, 10-24 x 0.5"
7	1	11986	Side Cover
8	1	11979	Lever, Bypass
9	1	11989	Screw, Hex Head, 1/4-14 x 1.5"
10	1	60040SS	Bypass Valve, 5600, 3/4" NPT Black Grip Lever, SS
		60041SS	Bypass Valve, 5600, 1" NPT Black Grip Lever, Stainless Steel

Not Shown:

	2	19228-01	Adapter Assy, Coupling, w/O-rings

BYPASS VALVE ASSEMBLY (PLASTIC)

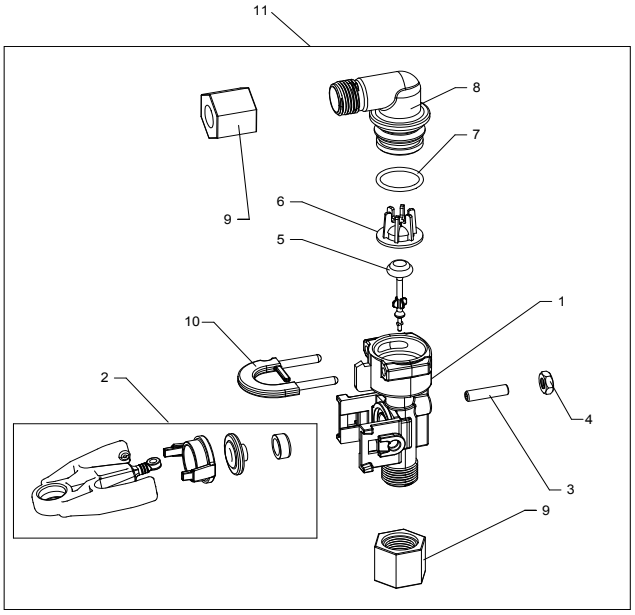


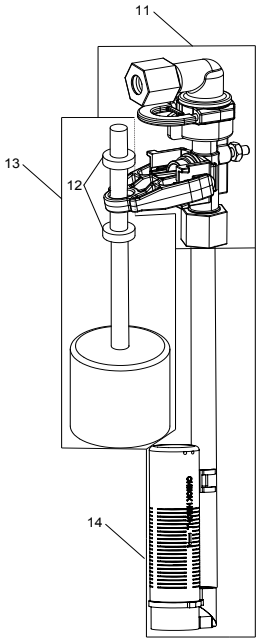
Item No.	QTY	Part No.	Description
1	2	13305	O-ring, -119
2	2	13255	Clip, Mounting
3	2	13314	Screw, Slot Ind Hex, 8-18 x 0.60
4	1	18706	Yoke, 1", NPT, Plastic
		18706-02	Yoke, 3/4", NPT, Plastic
5	1	13708-40	Yoke, 1", Sweat
		13708-45	Yoke, 3/4", Sweat
		19275	Yoke, Angle 90 Deg, 3/4", NPT
		19275-45	Yoke, Angle 90 Deg, 3/4", Sweat
		19620-01	Yoke, Assy, 3/4", R/Angle 90 Deg, w/O-rings, Clips & Screws
		40636	Yoke, 1-1/4", NPT
		40636-49	Yoke, 1-1/4", Sweat
		41027-01	Yoke, 3/4", NPT, Cast, Machined
		41026-01	Yoke, 1", NPT, Cast, Machined, SS
		41026-02	Yoke, 1", BSP, Cast, Machined, SS
		18706-10	Yoke, 1", BSP, Plastic
		41027-02	Yoke, 3/4", BSP, Cast, Machined
		18706-12	Yoke, 3/4", BSP, Plastic
		19620-01	Yoke Assy, 3/4", R/Angle, 90 Deg
6	1	60049	Bypass Plastic

Not Shown:

	2	19228-01	Adapter Assy, Coupling, w/O-rings

SAFETY BRINE VALVE

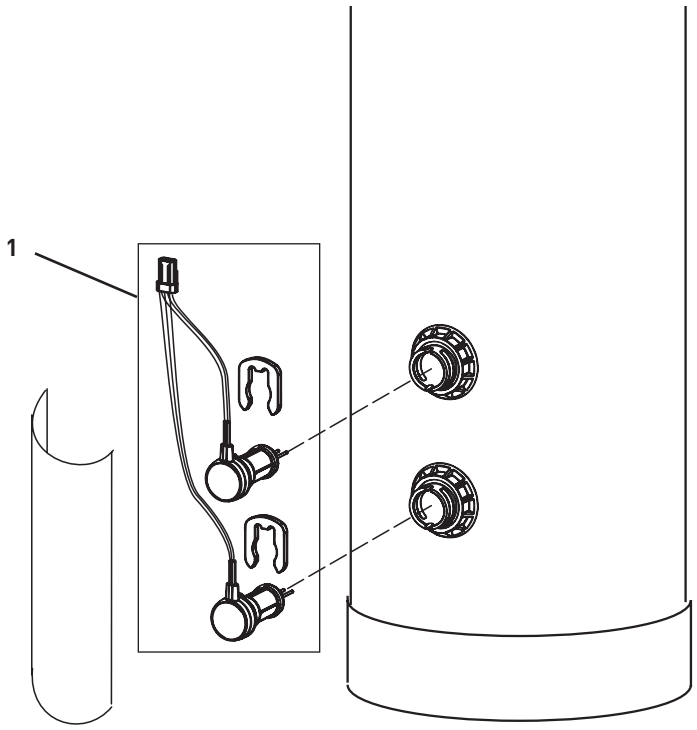




42112 Rev A

Item No.	QTY	Part No.	Description
1	1	19645	Body, Safety Brine Valve, 2310
2	1	19803	Safety Brine Valve Assy
3	1	19804	Screw, Sckt Hd, Set, 10-24 x 0.75
4	1	19805	Nut, Hex, 10-24, Nylon Black
5	1	19652-01	Poppet Assy, SBV w/O-ring
6	1	19649	Flow Dispenser
7	1	11183	O-ring, -017
8	1	19647	Elbow, Safety Brine Valve
9	2	19625	Nut Assy, 3/8" Plastic
10	1	18312	Retainer, Drain
11	1	60014	Safety Brine Valve Assy, 2310
12	2	10150	Grommet, 0.30 Dia
13	1	60068-10.5	Float Assy, 2310, w/10.5" Rod
		60068-11.5	Float Assy, 2310, w/11.5" Rod
		60068-20	Float Assy, 2310, w/20" Rod
		60068-30	Float Assy, 2310, w/30" Rod
14	1	60002-11.38	Air Check, #500, 11.38" Long
		60002-27	Air Check, #500, 27" Long
		60002-32	Air Check, #500, 32" Long
		60002-34	Air Check, #500, 34" Long
		60002-36	Air Check, #500, 36" Long
		60002-48	Air Check, #500, 48" Long
		60002-26.25	Air Check, #500, 26.25" Long
		60002-33.25	Air Check, #500, 33.25" Long

PROBE KIT



Item No.	QTY	Part No.	Description
1	1	3021618	Probe/Cable/Clips Kit

TROUBLESHOOTING

Problem	Cause	Correction
1. Water conditioner fails to regenerate.	A. Electrical service to unit has been interrupted	A. Assure permanent electrical service (check fuse, plug, pull chain, or switch)
	B. Meter is not measuring flow.	B1. Check meter cable connection. B2. Clean or replace meter.
	C. Attempt manual regeneration.	C. Hold REGEN button for three seconds.
2. Hard water.	A. By-pass valve is open.	A. Close by-pass valve.
	B. No salt is in brine tank.	B. Add salt to brine tank and maintain salt level above water level.
	C. Injector screen plugged.	C. Clean injector screen.
	D. Insufficient water flowing into brine tank.	D. Check resin volume setting H0 and salt setting. Clean brine line flow control if plugged.
	E. Hot water tank hardness.	E. Repeated flushings of the hot water tank is required.
	F. Leak at distributor tube.	F. Make sure distributor tube is not cracked. Check O-ring and tube pilot.
	G. Meter is not measuring flow.	G. Check meter with meter checker.
	H. Internal valve leak.	H. Replace seals and spacers and/or piston.
3. Unit used too much salt.	A. Improper salt setting.	A. Check salt usage and salt setting.
	B. Excessive water in brine tank.	B1. See problem 7. B2. Improper resin volume. Check resin volume setting H0.
4. Loss of water pressure.	A. Iron buildup in line to water conditioner.	A. Clean line to water conditioner.
	B. Iron buildup in water conditioner.	B. Clean control and add mineral cleaner to brine tank. Increase frequency of regeneration.
	C. Inlet of control plugged due to foreign material broken loose from pipes by recent work done on plumbing system.	C. Remove piston and clean control.
5. Loss of mineral through drain line.	A. Air in water system.	A. Assure that well system has proper air eliminator control. Check for dry well condition.
	B. Improperly sized drain line flow control.	B. Check for proper drain rate.
6. Iron in conditioned water.	A. Fouled mineral bed.	A1. Check backwash, brine draw, and brine tank fill. Increase frequency of regeneration. Increase backwash time. A2. Add mineral cleaner to brine tank.
7. Excessive water in brine tank.	A. Plugged drain line flow control.	A. Clean flow control.
	B. Plugged injector system.	B. Clean injector and screen.
	C. Foreign material in brine valve.	C. Replace brine valve seat and clean valve.
	D. Foreign material in brine line flow control.	D. Clean brine line flow control.
8. Softener fails to draw brine.	A. Drain line flow control is plugged.	A. Clean drain line flow control.
	B. Injector is plugged.	B. Clean injector
	C. Injector screen plugged.	C. Clean screen.
	D. Line pressure is too low.	D. Increase line pressure to greater than 20 PSI.
	E. Internal control leak	E. Change seals, spacers, and piston assembly.
9. Control cycles continuously.	A. Misadjusted, broken, or shorted switch.	A. Determine if switch or timer is faulty and replace it, or replace complete power head.
10. Drain flows continuously.	A. Foreign material in control.	A. Remove power head assembly and inspect bore. Remove foreign material and check control in various regeneration positions.
	B. Valve is not programming correctly.	B. Check timer program and positioning of control. Replace power head assembly if not positioning properly.
	C. Internal control leak.	C. Replace seals and piston assembly.
	D. Misadjusted or broken switch.	D1. Confirm that cycle and homing switches are tightly in place and contacting cam. D2. Replace switches.

TROUBLESHOOTING *continued*

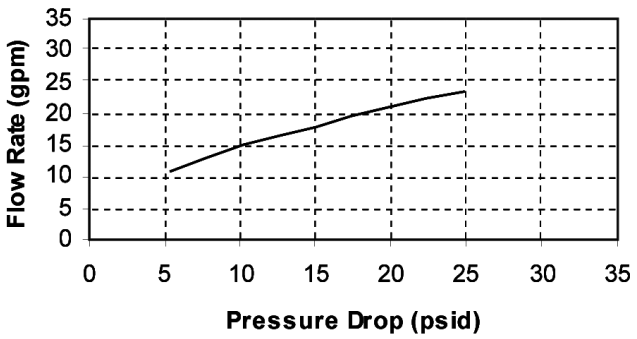
9100TS Controller

Problem	Cause	Solution
ERR 1 is displayed.	Program settings have been corrupted.	Press any key and reprogram Level I settings.
ERR 3 is displayed.	Controller does not know the position of the piston. Cam should be rotating to find Home position.	Wait five minutes for the controller to return to Home position. The hourglass should be flashing on the display indicating the motor is running.
	Cam is not turning during ERR 3 display.	Check that motor is connected. Verify that motor wire harness is connected to motor and controller module.
		Verify that Home switch is connected and in place.
		Verify that motor gear has engaged cam gear.
		If everything is connected, try replacing in this order: 1. Home Switch, Wire Harness, Motor 2. Controller
	Cam is turning more than five minutes to find Home position.	Verify that Home Switch is in place and connected to wire.
		If motor continues to rotate indefinitely, replace the following components in this order: 1. Home Switch, Wire Harness, Motor 2. Controller
	Regeneration starts but control shows Err3 before completing regeneration.	Check that motor is connected. Verify that motor wire harness is connected to motor and controller module.
		Verify that Home Switch sensor is connected and in place.
		Verify that motor gear has engaged cam gear.
		If everything is connected, try replacing in this order: 1. Home Switch, Wire Harness, Motor 2. Controller
ERR 4 is displayed.	Hardness front detected with no water flow.	Check that meter cable is connected and operational. Service meter. Check meter for debris and/or replace as necessary.
ERR 6 is displayed.	Conductivity sensors' reading out of range. Defective sensors or no sensors are connected.	Can program P13 = 1 to disable conductivity sensors. Check which tank is in service and check if the sensors have been connected properly. If already connected, replace conductivity sensor probes with new ones.
Check Salt Light is displayed - Press the regen button to turn off the check salt light.	No regenerant draw or insufficient regenerant detected during regeneration.	Ensure salt/regenerant is available.
		Check for regenerant draw.
		Inspect regeneration line for leaks.

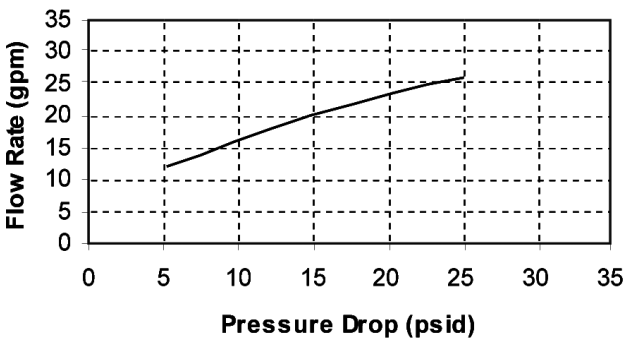
9000/9100 METER FLOW DATA

9100 Meter Flow Data

3/4" Mechanical Meter



1" Brass Meter



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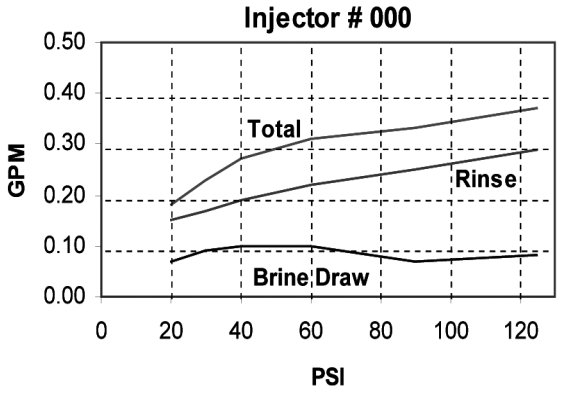
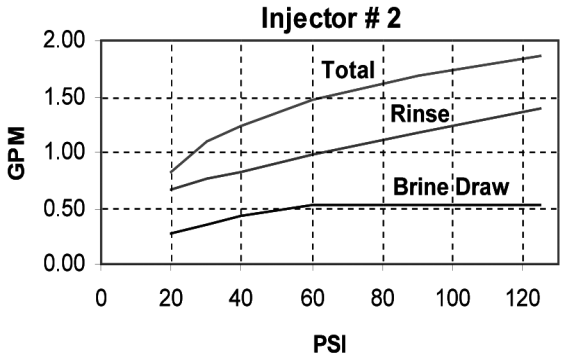
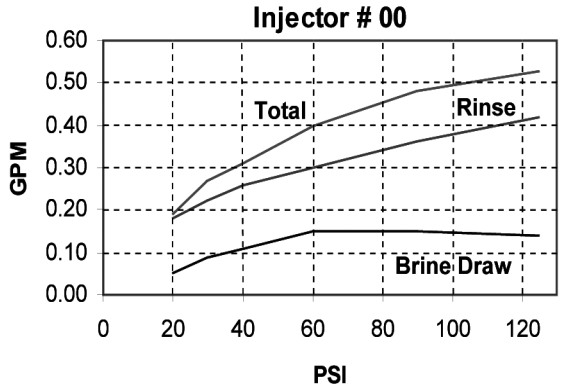
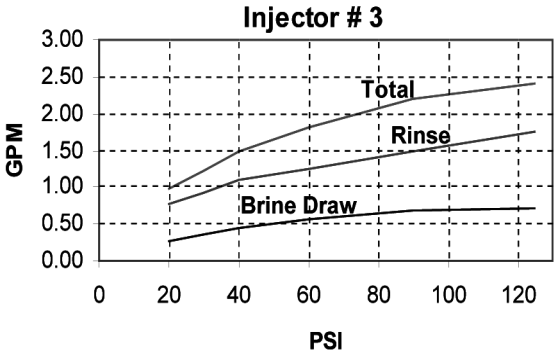
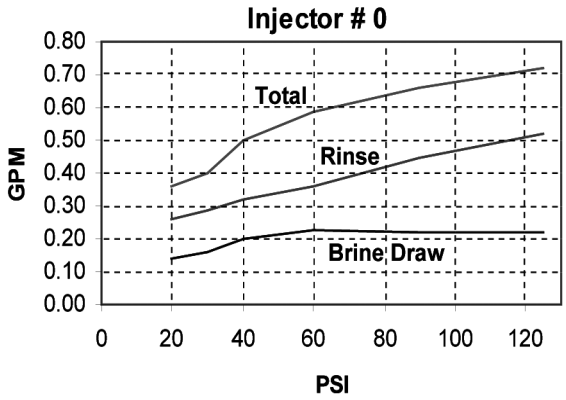
9000/9100 INJECTOR FLOW DATA (1600 SERIES INJECTORS)

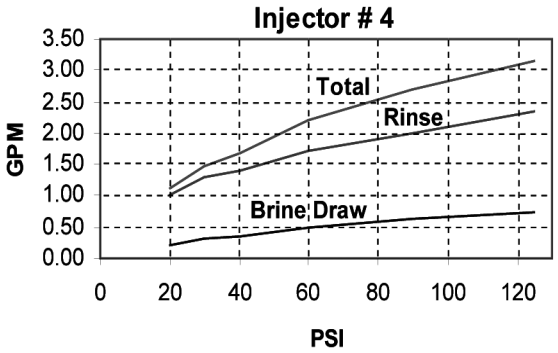


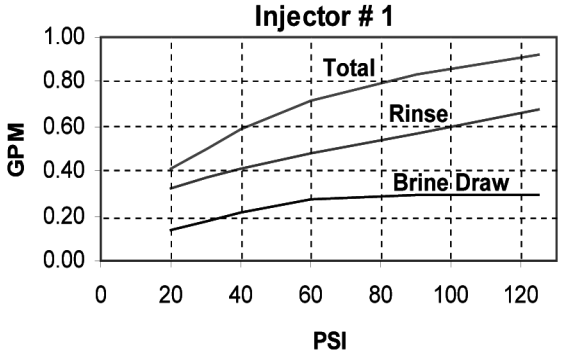












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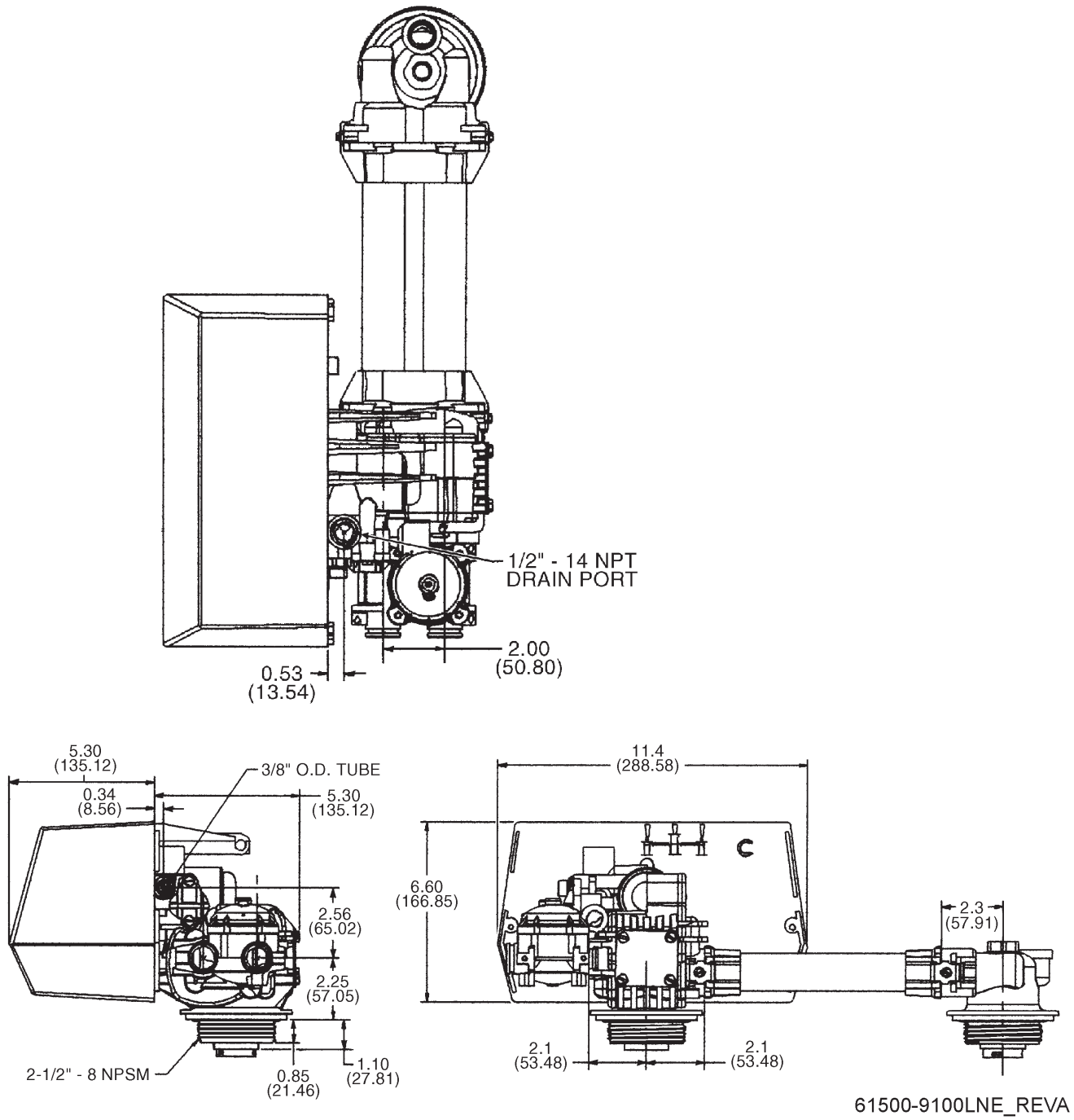
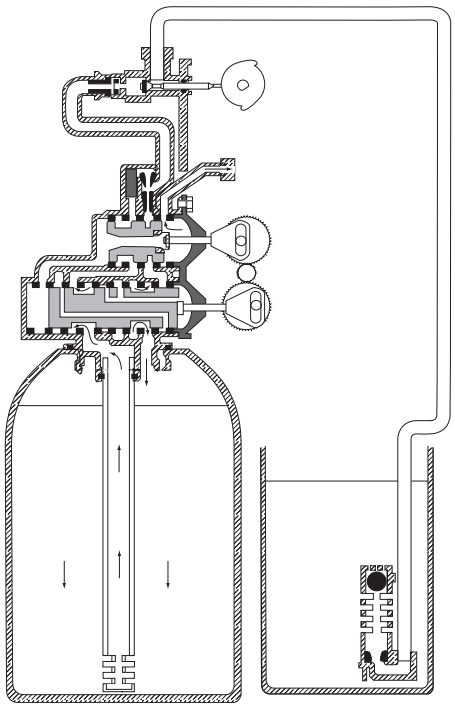
9100 CONTROL DIMENSIONS

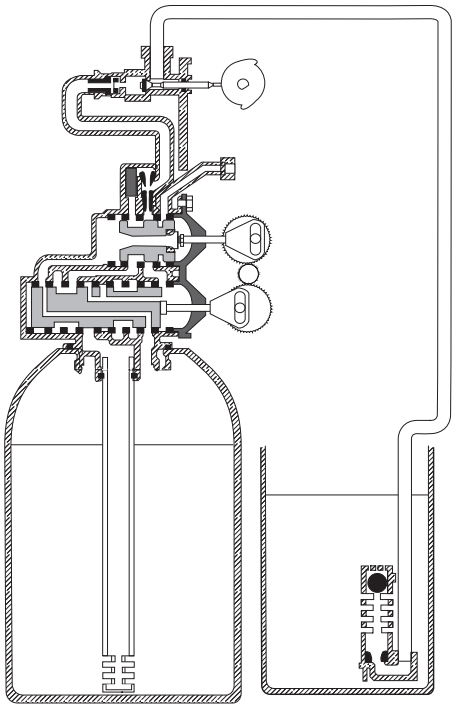


WATER CONDITIONER FLOW DIAGRAMS

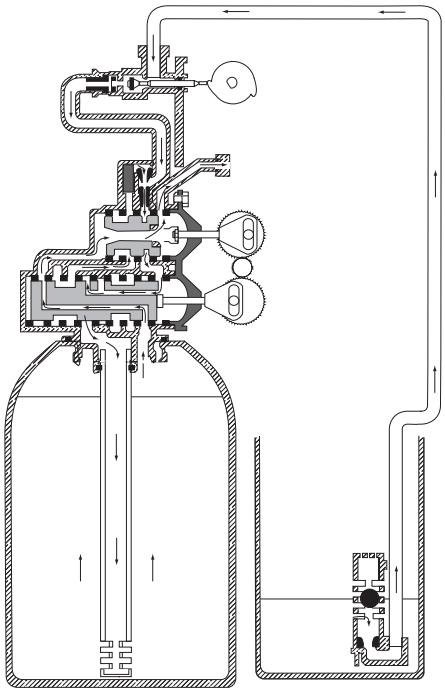
In Service Position (0)



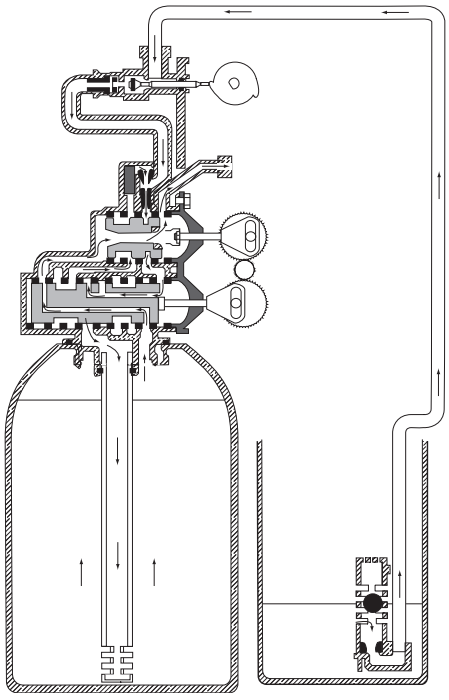
Tanks Switching Position
(Meter Initiated Regeneration) (1)



Brine Draw Position (2)

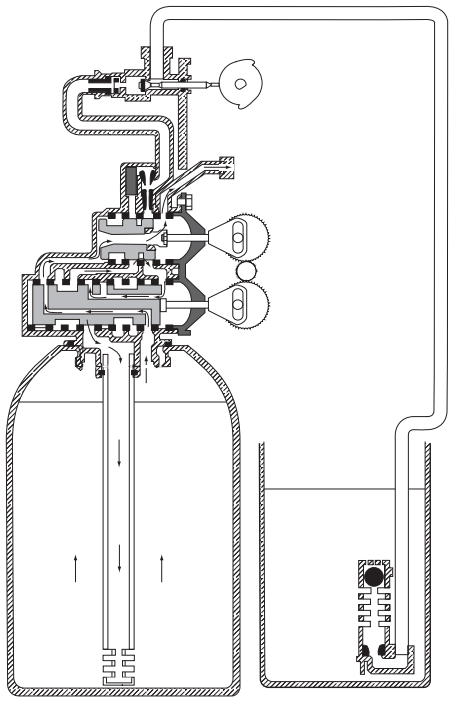


Slow Rinse Position (3)

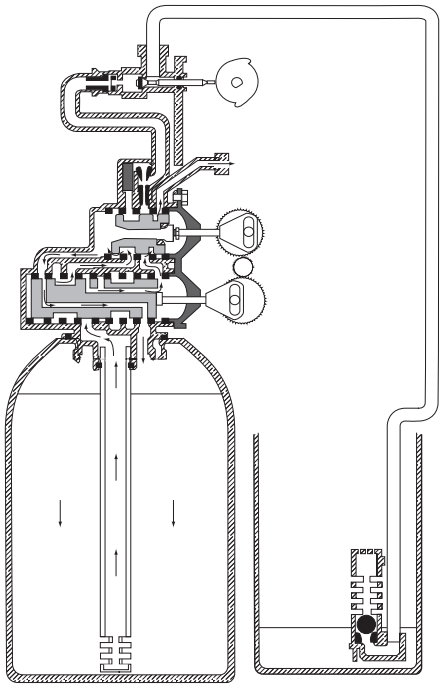


WATER CONDITIONER FLOW DIAGRAMS
continued

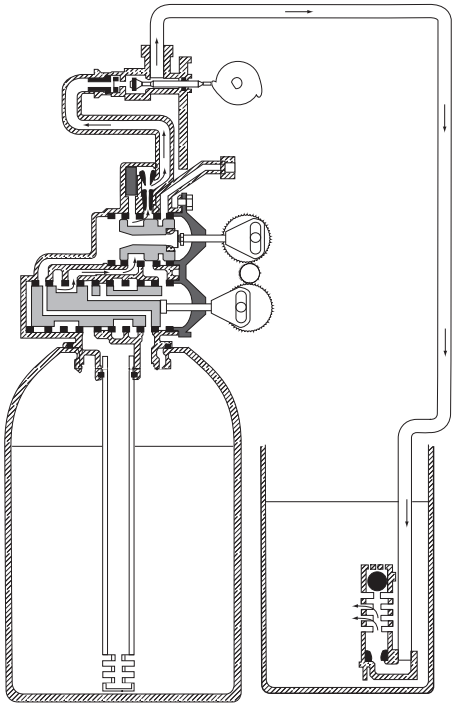
Backwash Position (4)



Rapid Rinse Position (5)



Brine Tank Fill Position (6)



SERVICE ASSEMBLIES

Brine Line Flow Controls (9000/9100):
60022-12 .....BLFC, .125 GPM, 5000/5600/9000/9100
60022-50 .....BLFC, .50 GPM, 5000/5600/9000/9100
60350.....Brine Valve Assy, 9000/9100

Bypass Assemblies:
60040SS.....Bypass Valve, 5600, 3/4" NPT
60041SS.....Bypass Valve, 5600, 1" NPT
60049.....Bypass Plastic Assy

Injector Assemblies (9000/9100):
61794-XXXX .....Injector Assembly
(specify size of injector)

	Tank Dia.	Injector	DLFC	BLFC
61794-0624	8"	Brown #000	1.5	0.125
61794-0634	9"	Brown #000	2.0	0.125
61794-0644	10"	Brown #000	2.4	0.125
61794-0562	12"	Violet #00	3.5	0.5

Meter Assemblies (9000/9100):
15078-01 .....Adapter, 1" Coupling
13509.....Impeller, Meter
60626.....Meter Assy, 3/4" Dual Port Electronic Plastic Turbine
60622.....Meter Assy, 1" Dual Port Electronic, Brass Body
60086-50 .....Meter Assy, 3/4" Dual Port Electronic Plastic Paddle

Piston, Seal & Spacer Kits:
61785.....9100TS Upper Piston Kit
61786.....9100TS Lower Piston Kit

Second Tank Assemblies (9100):
60425-12 .....Tube Assy, 9100, 6-12" Tanks
60425-16 .....Tube Assy, 9100, 13-16" Tanks
14865.....Adapter Assy, 2nd Tank, 9100
61419.....Kit, 1.05" Distributor Adapter

Tools:
12763.....Stuffer Tool Assy, 5600/9000
13061.....Puller Assy, Port Ring
13759.....Tool, DLFC Retainer

Valve Body Assembly (9100):
40688.....Valve Body Assy, 9100
18303.....O-ring, -336
18569.....Retainer, Tank Seal

Cover Assembly (9100TS):
61787.....Cover Assembly, 9100TS

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