Autotrol Performa™ Cv

Conditioner/Filter

Water Control System

Installation, Operation and Maintenance Manual

This system installed by:

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1.0 Performa Cv System

1.1 Specifications

1.1.1 Performa Cv Conditioner

Flow Rates (Valve Only)

Service @ 15 psi (1.03 bar) . . . . 25.0 gpm (5.7 m^3/h)

Back Wash (Conditioner) @ 25 psi (1.72 bar) drop . . . . 20.0 gpm (4.5 m^3/h)

Service . . . . Cv = 6.5 (Kv = 5.58)

Back Wash Conditioner . . . . Cv = 4.0 (Kv = 3.46)

Control Configurations

962 Microprocessor Demand System and 962 Electronic Timeclock

Back Wash . . . . 4 to 60 minutes

Brine . . . . Electronically calculated

Slo W rinse . . . . 7 to 125 minutes

Fast rinse . . . . 2 to 19 minutes

External Brine Valve Required - Timed Fill

Valve Connections/Dimensions

Tank Thread . . . . 2-1/2 inches - 8, male

Inlet/Outlet. . . . .

1.1.2 Performa Cv Filter Specifications

Flow Rates (Valve Only)

Service @ 15 psi (1.03 bar) drop . . . . 25.0 gpm (5.7 m³/h)

Back Wash (Filter) @ 25 psi (1.72 bar) drop . . . . 25.0 gpm (4.5 m³/h)

Service . . . . Cv = 6.5 (Kv = 5.58)

Back Wash Filter . . . . Cv = 5.0 (Kv = 5.78)

Control Operation

942F Mechanical Clock Timer - 7 Day or 12 Day

Back Wash . . . . 8-30 minutes

Fixed Fast Rinse . . . . .9 minutes

962F Microprocessor Demand

Back Wash . . . . 4 to 60 minutes

Fast Rinse . . . . 2 to 19 minutes

962 FTC Electronic Time Clock

Back Wash . . . . 4 to 60 minutes

Fast Rinse . . . . 2 to 19 minutes

Interval Regeneration. . . . . Day of the Week Regeneration

Valve Connections/Dimensions

Tank Thread . . . . 2-1/2 inches - 8, male

Inlet/Outlet . . . . 1-3/4 inches - 12 UNC-2A, male

Drain Line . . . . 3/4-inch NPT, male

Brine Line . . . . 3/8-inch NPT, male

Distributor Tube O.D. . . . . 1.050 inches (27 mm)

Distributor Tube Length . . . . 1/2 ± 1/2 inches (13 mm ± 13 mm) above top of tank

Operating

Valve Body . . . . .Glass-filled Plastic

Rubber Components . . . . Compounded for cold Water

Weight (Valve With Control) . . . . .4.5 lbs (2.0 kg)

Transformer Output . . . . 12VAC 400 mA (4.6 vA)

Transformer Input . . . . .115V 50/60 Hz, 230V 50/60 Hz

100V 50/60 Hz

Operating Pressure . . . . 10 to 120 psi (1.37 to 8.27 bar)

Canada: 20 to 100 psi (1.37 to 6.89 bar)

Water Temperature. . . . . 34° to 100°F (1° to 38°C)

Options

Bypass Valve, Model 1265 . . . . 1-3/4 inches - 12 UNC - 2A male

Bypass Inlet/Outlet Fitting Kits:

Copper, S Weat Tube Adapter 1-1/4-inch, 1-inch, 3/4-inch, 28-mm, 22-mm

CPVC, Solvent Weld Tube Adapter 1-inch, 3/4-inch, 25-mm

Plastic NPT or BSPT Pipe Adapter . . . . 1-inch male, 3/4-inch male

Brass NPT or BSPT Pipe Adapter . . . . 1-inch male, 3/4-inch male

Flow Meter 962 Control . . . . 1-inch Autotrol Turbine

See Section 4.1 for specification dra Wings.

1.2 Installation

All plumbing and electrical connections must conform to local codes.

Inspect unit carefully for carrier shortage or shipping damage.

Location Selection

1. The distance between the unit and a drain should be as short as possible.

2. If it is likely that supplementary water treatment equipment will be required, make certain adequate additional space is available.

3. Since salt must be added periodically to the brine tank, the location should be easily accessible.

4. Do not install any unit closer to a water heater than a total run of 10 feet (3 m) of piping between the outlet of the conditioner and the inlet to the heater. Water heaters can sometimes overheat to the extent they will transmit heat back down the cold pipe into the unit control valve.

   Hot water can severely damage the conditioner. A 10-foot (3-m) total pipe run, including bends, elbows, etc., is a reasonable distance to help prevent this possibility. A positive way to prevent hot water flowing from heat source to the conditioner, in the event of a negative pressure situation, is to install a check valve in the soft water piping from the conditioner. **If a check valve is installed, make certain the water heating unit is equipped with a properly rated temperature and pressure safety relief valve. Also, be certain that local codes are not violated.**

5. Do not locate unit where it or its connections (including the drain and overflow lines) will ever be subjected to room temperatures under 34°F (1°C) or over 120°F (49°C).

6. Do not install unit near acid or acid fumes.

7. The use of resin cleaners in an unvented enclosure is not recommended.

Water Line Connection

The installation of a bypass valve system is recommended to provide for occasions when the water conditioner must be bypassed for hard water or for servicing.

The most common bypass systems are the Autotrol Series 1265 bypass valve (Figure 1.1) and plumbed-in globe valves (Figure 1.2). Though both are similar in function, the Autotrol Series 1265 bypass offers simplicity and ease of operation.

Not in Bypass
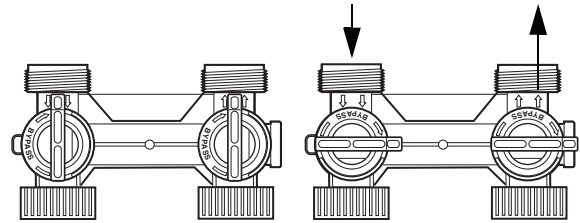
Figure 1.1 - Autotrol Series 1265 Bypass Valve

Figure 1.2 - Typical Globe Valve Bypass System

Drain Line Connection

Note: Standard commercial practices are expressed here. Local codes may require changes to the following suggestions.

1. Ideally located, the unit will be above and not more than 20 feet (6.1 m) from the drain. For such installations, using an appropriate adapter fitting, connect 1/2-inch (1.3-cm) plastic tubing to the drain line connection of the control valve.

2. If the backwash flow rate exceeds 5 gpm (22.7 Lpm) or if the unit is located more than 20 feet (6.1 m) from drain, use 3/4-inch (1.9-cm) tubing for runs up to 40 feet (12.2 m). Also, purchase appropriate fitting to connect the 3/4-inch tubing to the 3/4-inch NPT drain connection.

3. If the unit is located where the drain line must be elevated, you may elevate the line up to 6 feet (1.8 m) providing the run does not exceed 15 feet (4.6 m) and water pressure at conditioner is not less than 40 psi (2.76 bar). You may elevate an additional 2 feet (61 cm) for each additional 10 psi (0.69 bar).

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1.3 Placing Performa Cv Conditioner/Filter into Operation

After all previous steps have been completed, the unit is ready to be placed into operation. Follow these steps carefully.

1. Remove control valve cover by first depressing the plastic clips from the front of the cover. Pull front of cover up.

   Note: The following steps will require turning the cycle indicator to various positions. Manually rotate the camshaft **COUNTERCLOCKWISE** only until cycle indicator points to desired position. (See manual regeneration sections for each control's manual operation.)

2. Rotate cycle indicator **COUNTERCLOCKWISE** until it points directly to the word **BACKWASH**.

3. Fill media tank with water.

   a. With water supply off, place the bypass valve(s) into the "service" position.

   b. Open water supply valve very slowly to approximately the 1/4 open position.

IMPORTANT: If opened too rapidly or too far, media may be lost. In the 1/4 open position, you should hear air escaping slowly from the drain line.

Conditioner

   a. When all of the air has been purged from the tank (water begins to flow steadily from the drain), open the main supply valve all the way.

   b. Allow water to run to drain until clear.

   c. Turn off water supply and let the unit stand for about five minutes. This will allow all trapped air to escape from the tank.

4. Add water to brine tank (initial fill).

   With a bucket or hose, add approximately 4 gallons (15 liters) of water to brine tank. If the tank has a salt platform above the bottom of the tank, add water until the level is approximately 1 inch (25 mm) above the platform.

5. Place the conditioner into operation.

   a. With the water supply valve completely open, carefully advance the cycle indicator **COUNTERCLOCKWISE** to the center of the **BRINE REFILL** position. Hold at this position until water starts to flow through the brine line into the brine tank. Do not run for more than two minutes.

   b. Advance the cycle indicator **COUNTERCLOCKWISE** until it points to the center of the **BRINE/SLOW RINSE** position.

   c. With the conditioner in this position, check to see if water is being drawn from the brine tank. The water level in the brine tank will recede very slowly. Observe water level for at least three minutes. If the water level does not recede, or if it goes up, reference the **Troubleshooting** section.

   d. Advance the cycle indicator **COUNTERCLOCKWISE** to the **REGENERATION COMPLETE** position and run water from a nearby faucet until the water is clear and soft.

Filter

All filter medias except carbon:

   a. After the air has been purged from the tank (water begins to flow steadily from the drain) open the main supply all the way. Back wash media for a minimum of 15 minutes or longer if necessary. Water running to the drain should be clear.
   Carbon media should be allowed to soak for a minimum of 12 hours to allow air bubbles to escape prior to back washing.

   b. After the back wash is complete plug in control and allow it to advance to **BACKWASH COMPLETE**.

Electrical Connection

100 VAC, 115 VAC, and 230 VAC units: Remove twist tie from the power cord and extend cord to its full length. Make sure power source matches the rating printed on the control. Be certain a wall switch does not control the outlet.

12 VAC: Connect the plug of the transformer (supplied) secondary cable to the mating socket at the rear or bottom of the timer housing. Be certain the transformer is secure and is plugged into a power source of correct voltage that is not controlled by a wall switch.

1.4 Disinfection of Water Conditioners

The materials of construction of the modern water conditioner will not support bacterial growth, nor will these materials contaminate a water supply. However, the normal conditions existing during shipping, storage and installation indicate the advisability of disinfecting a conditioner after installation, before the conditioner is used to treat potable water. In addition, during normal use, a conditioner may become fouled with organic matter or in some cases with bacteria from the water supply.

Thus every conditioner should be disinfected after installation, some will require periodic disinfection during their normal life, and in a few cases disinfection with every regeneration would be recommended.

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

Application

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

5.25% Sodium Hypochlorite

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

1. Dosage
   a. Polystyrene resin: 1.2 fluid ounces per cubic foot.
   b. Non-resinous exchangers: 0.8 fluid ounce per cubic foot.
2. Brine tank conditioners
   a. Back wash the conditioner and add the required amount of hypochlorite solution to the brine well of the brine tank. (The brine 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) per cubic foot.
2. Brine tank conditioners
   a. Back wash the conditioner and add the required amount of hypochlorite to the brine well of the brine tank. (The brine tank should have water in it to permit the chlorine solution to be carried into the conditioner.)
   b. Proceed with the normal regeneration.

*Clorox Bleach is a trademark of the Clorox Company.

2.2 Programming and Application

This section covers all aspects of programming the 962 control.

Note that some parameters have a single unit of measure option such as the Rinse Time which is only entered in minutes. Other parameters have dual units such as Salt Amount which can be entered in pounds or kilograms. To select which units are active, look for a comment in the NOTES column of Table 2.1 and Table 2.4. It will reference another parameter that selects which units are active. For example, Parameter P12 (Table 2.4) selects U.S. units if it is set to **"0"** and metric if it is set to **"1."**

Level I Parameters (Table 2.1)

Level I Parameters are identified as those that have an LED indicator on the front panel. The green indicator illuminates next to the name of the active control setting. The end user has access to all of these parameters. In general, pressing the **DOWN ARROW** (↓) button displays the Level I Parameters in the following order:

- Time of Day
- Time of Regeneration
- Hardness
- Salt Amount
- Capacity

If you continue to press the **DOWN ARROW** (↓) button, the parameters start over with Time of Day. Pressing the **UP ARROW** (↑) button displays the parameters in reverse order. Refer to Table 2.1 for a description of these parameters and the available ranges for each parameter.

Press the **SET** button and the far right number on the display starts flashing. If you want to change this number, 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. When you reach the far left digit, pressing the **LEFT ARROW** (←) button will return you to the far right digit.

Note: If you press and hold either the **UP ARROW** (↑) button or the **DOWN ARROW** (↓) button for more than one second, the flashing number will increment or decrement at the rate of 10 counts per second.

When the number is correct, press the **LEFT ARROW** (←) button. The first number stops flashing and the next number starts flashing. You can only change the flashing number. Continue changing numbers until you reach the desired setting. Press the **SET** button. The numbers stop flashing and the control accepts the new setting. After approximately 30 seconds, the control starts alternating the display between Time of Day and Capacity.

Note: If a beep sounds, the new setting is not accepted because it was outside the allowable range. The old value will be displayed.

Day of Week/Time of Day

Press the **SET** button. The display will show the Time of Day with the minutes digit blinking. If you want to change this number, 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.

Salt Amount

Salt Amount is the next value displayed. The default value for Salt Amount is 6 pounds (2.7 kilograms) of salt; refer to Table 2.2 for suggested salt settings.

Note: This is the total amount of salt used for a regeneration, not pounds per cubic foot. If 6 pounds is not acceptable, press the **SET** button and change the numbers. If 6 pounds is acceptable, press the **DOWN ARROW** (↓) button.

Capacity

Capacity is the next value displayed and is expressed in kilograins (kilograms). Refer to Table 2.2 for the

Table 2.2 - Suggested Settings for P4, P5, P6, P7

P5 Capacity Setting Kilograins (Kilograms)	Resin Volume per Tank (liters)				
	3 ft^3 (85)	4 ft^3 (113)	5 ft^3 (142)	6 ft^3 (170)	7 ft^3 (198)
	P4 Salt Setting: Pounds (kg) of Salt				
60 (3.9)	**18 (8.2)**	-	-	-	-
80 (5.2)	-	**24 (10.9)**	-	-	-
84 (5.4)	**30 (13.6)**	-	-	-	-
90 (5.8)	**45 (20.4)**	-	-	-	-
100 (6.4)	-	-	**30 (27.2)**	-	-
112 (7.2)	-	**40 (18.1)**	-	-	-
120 (7.7)	-	**60 (27.2)**	-	**36 (16.3)**	-
140 (9.0)	-	-	**50 (22.7)**	-	**42 (19)**
150 (9.7)	-	-	**75 (34)**	-	-
168 (10.8)	-	-	-	**60 (27.2)**	-
180 (11.6)	-	-	-	**90 (40.8)**	-
196 (12.7)	-	-	-	-	**70 (31.8)**
210 (13.6)	-	-	-	-	**105 (47.6)**
P6 Refill Setting: 14 inch tank = **74 (.74 gpm)** 16 inch thru 21 inch tanks = **130 (1.39 gpm)**					
P7 Brine Draw Setting. All values are based on 50 psi (3.5 bar) inlet pressure. For pressure other than 50 psi refer to brine dra⩔ charts in Section 4.0.					

Tank Diameter	Injector	Part Number	**P7 equals**	Color	
14 in (35.5 cm)	M	1055737	**60**	Bro⩔n	
16 in (40.6 cm)	Q	1035739	**80**	Purple	
18 in (45.7 cm)	Q	1035739	**80**	Purple	
21 in (53.3 cm)	R	1035884	**83**	Dark Grey	

Level II Parameters (Table 2.4)

The Level II Parameters are P6 through P22 in Table 2.4. To access Level II Parameters, simultaneously press and hold the **DOWN ARROW** (↓) and **UP ARROW** (↑) buttons for three seconds. A "P" number will display.

Refer to Table 2.4 to find the parameter associated with each "P" number. Use the **UP ARROW** (↑) button or the **DOWN ARROW** (↓) button to move from one parameter to the next. The display cycles through the "P" numbers shown in Table 2.1 and Table 2.4. When you reach P22, the next P number will go back to P1.

When the parameter number you want to change is on the display, press the **LEFT ARROW** (←) button to display the data assigned to that parameter. Press the **SET** button and the far right number on the display starts flashing. If you want to change this number, press the **UP ARROW** (↑) button or the **DOWN ARROW** (↓) button. To skip the number without changing, press the **LEFT ARROW** (←) button. When the number is correct, press the **SET** button. The numbers stop flashing and the control accepts the new setting. If a beep sounds, the new setting was not accepted. Refer to Table 2.4 for allowable values for that parameter.

To change or view other parameters, press the **LEFT ARROW** (←) button to have the display show "P" numbers. Now use the **UP ARROW** (↑) button or the down arrow (↓) button to move to the parameter number you wish to change.

To exit the Level II programming mode, simultaneously press and hold the **DOWN ARROW** (↓) and **UP ARROW** (↑) buttons for three seconds, or wait 30 seconds without pressing a button. The control starts alternating the display between Tank in Service, Flow Rate and Capacity.

Settings for all parameters can be written on the label provided with the control. The label has an adhesive backing so it can be attached to the inside rear cover of this manual for future service reference.

Level II Programming

- Parameter P6 is used by the control to calculate the Refill Time. Press **SET** button and enter a new value. Refer to Table 2.2 for the correct value.

- Parameter P7 is used by the control to calculate the brine draw time. Press the **SET** button and enter a new value. Refer to Table 2.2 for the correct value. The control calculates the brine draw time using this value and the salt amount. The brine draw time is added to the Rinse Time (P10) to determine the total Brine Draw/Slow Rinse Time.

- This control does not use Parameter P8. No entry is needed for this parameter.

- Parameter P12 selects the units of measure. Be sure that this is set to the correct value before entering any data for Parameters P3, P4 or P5.

- Parameter P13 selects the clock display mode. If the 12-hour mode is selected, a PM indicator is used. If the 24-hour mode is selected, the PM indicator is not used.

- Parameter P15 has four allowable values. Values 0 or 1 will cause the control to wait for Parameter P2, time of day of regeneration, to begin the regeneration. Values 2 or 3 will cause the control to start the regeneration as soon as the capacity is exhausted.

- When Parameter P15 selects a smart reserve type, 0 or 2, Parameter P16 is used to calculate the initial seven average daily water usage values. The control multiplies the total capacity by the percentage entered for Parameter P16 and uses that value as the initial average daily usage for each day of the week until water usage establishes new averages, refer to Reserve Options, page 15.

- Parameter 17 must be programmed following the appropriate programming table. Improper regenerations will occur if P17 is set to any other number.

- Parameter P18 allows the installer to lock the Salt Amount and Capacity values so they cannot be changed. When Parameter 18 is set to 1, those two settings can only be viewed when the control is in the Level II mode. The settings will be skipped when the control is in the Level I mode. When Parameter 18 is set to zero, the Salt Amount and Capacity can be viewed and changed in either Level I or Level II.

- Parameter P19 selects the flow sensor that is to be used with the system. The factory preset value is 1 for a 1-inch turbine. The range is 1 - 4. 1 = Autotrol 1-inch turbine, 2 = Autotrol 2-inch turbine, 3 = user programmable K-factor, 4 = user programmable pulse equivalent. The K-factors or pulse equivalents for individual meters should be supplied by the respective meter manufacturer.

- Parameter P20 is programmed only if P19 = 3 or 4. P20 is where the factory supplied K-factor or pulse equivalent number is programmed.

- Parameter P21 allows the user to tell the control how long a signal must be present at the remote

- Parameter P22. Special codes are entered at the factory to program all of the pertinent P locations for specific controls; Metric for example. This parameter should never be changed by the end user.

Electronic Time Clock Operation

Programming automatic regeneration frequency:

The Electronic Time Clock has two regeneration options: Interval Regeneration and Day of Week Regeneration.

To initiate an automatic regeneration one or both of the options must be chosen. The system may also be regenerated manually by pressing the Regeneration button for three seconds.

Interval Regeneration — The Electronic Time Clock may be programmed to regenerate in intervals of up to 30 days. This feature is Parameter P14 Calendar Override (see Table 2.4). Example: If 5 is programmed into P14 then the system will regenerate every five days at the time programmed into P2.

Day of Week Regeneration — The Electronic Time Clock may be programmed to regenerate on a specific day or on specific days of the week. The instructions for this option are found in Table 2.3 on page 15.

Application

The Performa Cv 962 Conditioner and the Performa Cv 962F Filter may be operated as a single, dual, or triplex system.

Dual and Triplex Conditioners and Filters

The dual and triplex systems require a different cam than the cam that is used in the single unit systems. They also require an interconnecting lock out cable. This allows the unit that is in regeneration or back wash to signal the other units and prevents them from starting a regeneration or back wash until the first unit is finished. Dual and triplex units should be plumbed in parallel with each other. In a multi-unit system the back wash water is supplied by the other unit or units in the system. In a dual filter system consideration must be given that the unit in service is able to satisfy service requirements and be able to supply sufficient back wash water to the other filter while it is in the back wash cycle. There is a selection guide, Table 4.6, in Section 4.0 to assist in qualifying the choice of a dual or triplex system. This selection guide is based on media back wash requirements and tank diameter.

A parallel kit must be purchased for multi-unit operation. The kit numbers are:

- Dual Parallel Conditioner   P/N 1035923
- Triplex Parallel Conditioner   P/N 1035925
- Dual Parallel Filter   P/N 1035924
- Triplex Parallel Filter   P/N 1035926

Kits include parallel operation cams and the proper interconnect cable.

Manual Start Regeneration

To force the control to perform a regeneration, press the **REGEN** button. This button is located on the front of the control. When you press the **REGEN** button, the control performs a full regeneration of the conditioner.

If you press this button again more than one minute after regeneration begins, but before the regeneration is complete, a second regeneration will start when the first regeneration is finished. The display will freeze and only show the Regen Time Remaining as an indication that the second regeneration will be performed. When the first regeneration is complete, the second one will begin and the display will alternate between Flow and Regen Time Remaining.

Automatic Regeneration

Programming Day of the Week Regeneration/ Backwash

Enter Day of the Week Regeneration/back wash programming by depressing the **LEFT ARROW** (←) button and the **DOWN ARROW** (↓) button simultaneously for 3 seconds. The days are sho wn as d1, d2, d3, etc., on the display. Select the days of the week regeneration/back wash should occur. To activate that day, change the 0 to a 1. The programming mode will be exited if no keys are pressed for 30 seconds. If this feature is used in conjunction with calendar override the calender override timer will be reset at the end of this regeneration/back wash.

Table 2.3 - Day of Week Regeneration/Backwash

#	Description of Parameter	Set as required 0 = No - 1 = yes	Notes
d1	Sunday	As required	0 = no day of week regeneration 1 = back wash this day
d2	Monday	As required	0 = no day of week regeneration 1 = back wash this day
d3	Tuesday	As required	0 = no day of week regeneration 1 = back wash this day
d4	Wednesday	As required	0 = no day of week regeneration 1 = back wash this day
d5	Thursday	As required	0 = no day of week regeneration 1 = back wash this day
d6	Friday	As required	0 = no day of week regeneration 1 = back wash this day
d7	Saturday	As required	0 = no day of week regeneration 1 = back wash this day

Reserve Options

There are t wo types of reserve options for this control: fixed reserve and smart reserve (historical water usage pattern). They are selected with Parameter P15.

Fixed Reserve

When fixed reserve is selected, the control multiplies the maximum system capacity by the percent value set in Parameter P16 and uses the result as a reserve.

Smart Reserve (water usage pattern)

The other reserve option allo ws the control to adjust the reserve based upon the historical water usage pattern of the system. The control keeps track of the water usage for each day of the week and uses that day's average usage multiplied by 1.2 as the reserve for that day. Every day at the Time of Regeneration, the control recalculates the day's average water usage. If less than 10% of a day's average water usage is used, the control will not change the day's average. If more than t wice the day's average is used, the control uses the actual usage in the reserve calculation.

Since a ne w installation has no history of water usage, the control multiplies the percent of capacity value set in Parameter P16 by the total system capacity to determine starting average for each day of the week.

The factory set value for P16 is 30 which means that 30% of the total system capacity is used for the starting average for each day.

Program Parameter P15 is also used to select whether the control waits until the Time of Regeneration set in Parameter P2 to start a regeneration, or if the control should begin a regeneration immediately when the capacity remaining is less than the reserve.

2.3 Conditioner Programming Tables

Table 2.4 - Level II Programming Performa Cv 962 Parallel Multi Tank or Single Tank Conditioner

Parameter	Description	Range of Values	Minimum Increment	Recommended Program Value	Units of Measure	Notes
P6	Refill controller	2-200	1	**Selected from Table 2.2**		This number tells the controller the rate of refill based on the refill control installed. Refill dwell time is calculated to refill the proper amount of water into brine tank.
P7	Brine draw rate	2-200	1	**Selected from Table 2.2**		This number tells the controller the draw rate based on the injector size. The dwell time in the draw position is then calculated.
P9	Backwash time	4-60	1	**14***	Minutes	*May be adjusted for application
P10	Slow Ri1RiT.8(w 30.1(lM8t6(t)35i16[(221.91e)-85.3468aw)-716[(T)-)514.5(0)-2216[(T)526.93 14					

Go to Section 3.2 for detailed explanation of the programming parameters on this page.

Table 2.5 - Programming Performa Cv 962TC Electronic Time Clock Conditioner

Parameter	Description	Range of Values	Minimum Increment	Recommended Program Value	Units of Measure	Notes
P1	Day of Week and Time of Day	(1-7) 1:00-12:59 AM or PM Metric (1-7) 0:00-23:59	(1 day) 1 Minute	**Current Day and Time**	Hour Minute	Range depends on value selected for P13. For day of week SUN=1, MON=2, TUE=3, WED=4, THU=5, FRI=6, SAT=7,. THIS IS THE LEFT MOST DIGIT ON THE DISPLAY
P2	Time of day to start regeneration	1:00-12:59 AM or PM 00:00-23:59		**As required**	Hour Minute	Range depends on value selected for P13
P3	As recommended			**10**		
P4	Salt amount	.5-125.0 .2-50.0	.5 .2	**Selected from Table 2.2**	Pounds Kilograms	
P5	Program as Recommended			**10**		
P6	Refill controller	2-200	1	**Selected from Table 2.2**		This number tells the controller the rate of refill based on the refill control installed. Refill dwell time is calculated to refill the proper amount of water into brine tank.
P7	Brine draw rate	2-200	1	**Selected from Table 2.2**		This number tells the controller the draw rate based on the injector size. The swell time in the draw position is then calculated.
P9	Backwash time	4-60	1	**14***	Minutes	*May be adjusted for application
P10	Slow Rinse time	7-125	1	**40***	Minutes	*May be adjusted for application. This time does not include the calculated brine draw time.
P11	Fast Rinse time	2-60	1	**4***	Minutes	*May be adjusted for application
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	Interval Regeneration Calendar override	0-30	1	**0**	Days between regeneration	0 = no interval chosen - *May be adjusted for application.
P15	Does not apply for Timeclock operation			**0**		
P16	Does not apply for Timeclock operation			**30**		
P17	Operation type	3-4	1	**6**		6 = Single 962TC
P18	Salt Change Lock out	0-1	1	**0**		0 = none, 1 = Salt/Capacity change locked out
P19	Does not apply for Timeclock operation					
P20	Does not apply for Timeclock operation					
P21	Remote Regeneration Switch Delay	0-254	1	**60**	Seconds	Time remote switch must be active to start a regeneration
P22	Factory Use Only - DO NOT CHANGE			**99**		

Go to Section 3.2 for detailed explanation of the programming parameters on this page.

3.0 Performa Cv Filter Valve and Controls, 962F, 962FTC, 942F

3.1 Programming and Application

This section covers all aspects of programming the control.

Table 3.1 - Programming Performa Cv 962F <u>Three Cycle Filter</u>

Parameter	Description	Range of Values	Minimum Increment	Recommended Program Value	Units of Measure	Notes
P1	Day of week and time of day	(1-7) 1:00-12:59 AM or PM Metric (1-7) 0:00-23:59	(1 day) 1 Minute	**Current Day and Time**	Hour Minute	Range depends on value selected for P13. For day of week SUN=1, MON=2, TUE=3, WED=4, THU=5, FRI=6, SAT=7,. THIS IS THE LEFT MOST DIGIT ON THE DISPLAY
P2	Time of day to start back wash	1:00-12:59 AM or PM 00:00-23:59		**As required**	Hour Minute	Range depends on value selected for P13
P3	Program as recommended			**10** **100**	U.S. Metric	
P4	Program as recommended			**0.5**		
P5	Filter capacity			**As required**	U.S. Metric	Divide the volumetric capacity (gallons) of the filter by 100 and enter this number into P5. Divide the volumetric capacity (cubic meters) by 10 and enter this number into P5.
P6	Program as recommended			**200**		
P7	Program as recommended			**200**		
P9	Back wash time	7-60	1	**14***	Minutes	*May be adjusted for application.
P10	Program as recommended			**8**		
P11	Fast Rinse time	9-60	1	**9***	Minutes	*May be adjusted for application.
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	Interval Regeneration	0-30	1	**0**	Days	0 = no interval chosen - *May be adjusted for application
P15	Reserve Type	0-3	1	**0**	For a detailed explanation go to "Explanation of Parameter Values" P2 on page 24.	0 = Smart Reserve, 1 = Fixed Reserve, 2 = Smart Reserve with Immediate Regeneration, 3 = Fixed Reserve with Immediate Regeneration.
P16	Fixed reserve percentage	0-70	1	**30**		This number is used to establish initial Daily Average.
P17	Operation type	0-7	1	**4**		4 = Filter Performa Cv
P18	Salt Change Lock out	0-1	1	**0**		0 = none, 1 = Salt/Capacity change locked out
P19	Flo w Sensor Select	1-4	1	**1**		1 = 1" Autotrol Turbine, 3 = User Defined K-factor, 2 = 2" Autotrol Turbine, 4 = User Defined Pulse Equivalent
P20	K-factor or Pulse Equivalent	0.01-255.0	0.01	**0.01**		Number used for Meter K-factor or Pulse Equivalent.
P21	Remote Regeneration S witch Delay	0-254	1	**60**	Seconds	Time remote s witch must be active to start a back wash
P22	Factory Use Only - <u>DO</u> <u>NOT CHANGE</u>			**99**		

Go to Section 2.2 for detailed explanation of the programming parameters on this page.

Table 3.2 - Programming Performa Cv 962F <u>Five Cycle Filter</u>

Parameter	Description	Range of Values	Minimum Increment	Recommended Program Value	Units of

Go to Section 2.2 for detailed explanation of the programming parameters on this page.

Table 3.3 - Programming Performa Cv 962 TC <u>Electronic Time Clock Filter</u>

Parameter	Description	Range of Values	Minimum Increment	Recommended Program Value	Units of Measure	Notes
P1	Day of week and time of day	(1-7) 1:00-12:59 AM or PM Metric (1-7) 0:00-23:59	(1 day) 1 Minute	**Current Day and Time**	Hour Minute	Range depends on value selected for P13. For day of week SUN=1, MON=2, TUE=3,

Go to Section 2.2 for detailed explanation of the programming parameters on this page.

Electronic Time Clock Operation

To initiate an automatic back wash one or both of the following options must be chosen. The system may be back washed manually by pressing the Back wash button for three seconds.

Programming automatic regeneration frequency:

The Electronic Time Clock has two regeneration options: Interval Regeneration and Day of Week Back wash.

Interval Backwash — The Electronic Time Clock may be programmed to regenerate at intervals up to 30 days. This feature is also known as Calendar Override. It is located at P14. Example: If 5 is programmed into P14 then the system will back wash every five days at the time programmed into P2.

Day of Week Backwash — The Electronic Time Clock may be programmed to back wash on a specific day or specific days of the week. The instruction for this option is found in Table 2.3 on page 17.

Application

The Performa Cv 962 Conditioner and the Performa Cv 962F Filter may be operated as a single, dual, or triplex system.

Dual and Triplex Conditioners and Filters

The dual and triplex systems require a different cam than the cam that is used in the single unit systems. They also require an interconnecting lock out cable. This allows the unit that is in regeneration or back wash to signal the other units and prevents them from starting a regeneration or back wash until the first unit is finished. Dual and triplex units should be plumbed in parallel with each other. In a multi-unit system the back wash water is supplied by the other unit or units in the system. In a

3.2 Mechanical

Series 942F Mechanical Control
The Series 942F mechanical control provides mechanical timeclock function for filter applications.
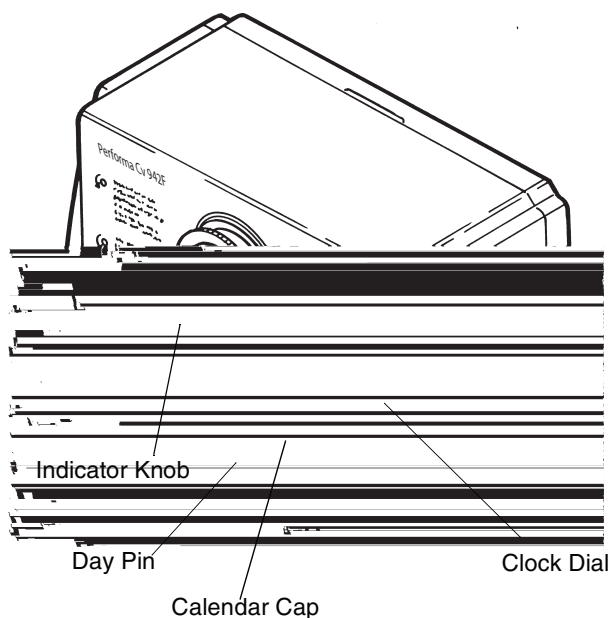
Figure 3.1

3.2.1 Settings

Setting the Time of Day, the Days of Back wash and performing manual back washing with the 942F controls.

Setting the Time of Day
Rotate the Clock Dial **clockwise** until the pointer indicates the correct time of day. With the time of day set, the conditioner will back wash at approximately 2:00 a.m. If it is desired to have the unit back wash at an earlier or later time, simply offset the current time of day accordingly. For example, to have the unit back wash at 4:00 a.m., set the Clock Dial 2 hours later than the actual current time of day.

Note: Do not rotate the Calendar Cap by hand. The Clock Dial indexes the Calendar Cap daily. To manually index the Calendar Cap, rotate the Clock Dial **clockwise** one complete turn for every day to be indexed. Day pins should be in the out ward position during Clock Dial rotation to prevent an undesired back wash. Reset day pins when completed.

Setting the Days of Backwash
Setting the days that the conditioner will back wash is accomplished in t wo simple steps:

1. Pull all of the day pins out ward.

2. Push in the day pin(s) for the day(s) on which a back wash is desired.

NOTE: The NEXT DAY pin is noted on the control face. Pushing this pin will insure a back wash the next day at approximately 2:00 a.m. since the Calendar Cap progresses in a clock wise direction, pushing the day pin immediately follo wing the NEXT DAY pin counterclock wise will insure a back wash occurs the follo wing day at approximately 2:00 a.m. This progression is noted on the control face as "FUTURE DAYS".

Manual Backwash
Excessive water usage or other service related issues may create the need to manually back wash the filter. This function is performed by rotating the Indicator Knob **COUNTERCLOCKWISE** to the "START" position. Once in this position, the filter will begin a back wash within a fe w minutes. The normal schedule, established with the pushed in day pins, will not be disrupted by a manual back wash.

24 Hour Clock
The Performa Cv Series 942F control utilizes a 24 hour clock dial. This is typically referred to as "Military Time". The hours of the day bet ween 12:00 a.m. (midnight) and 12:00 p.m. (noon) are designated on the clock dial by the numbers 1 through 12, with 1 being 1:00 a.m. The hours of the day bet ween 12:00 p.m. (noon) and 12:00 a.m. (midnight) are designated on the clock dial by the numbers 13 through 24, with 13 being 1:00 p.m. Be sure to set the correct time of day accordingly.

Adjusting the Backwash Setting

The Back wash Dial (Figure 3.2) controls the back wash time. With the Indicator Knob in the BACKWASH COMPLETE position, rotate the Back wash Dial counterclock wise at least one full turn to cancel out the current setting. A light clicking sound will be replaced by a heavier clicking sound when the previous setting is cancelled. Once the heavier clicking is heard, the ne w setting may be set by rotating the Back wash Dial to the desired setting. The numbers on the Back wash Dial represent "MINUTES" of back wash time.
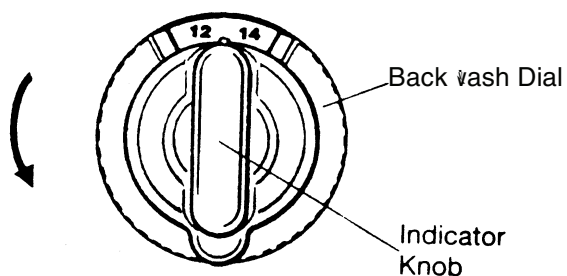
Figure 3.2 Back wash Complete

Table 3.4 - Cycle Times for 942F Control

Cycle	Time (Minutes)
Back wash	8 - 30
Purge	9

3.3 Explanation of Parameter Values for the 962 Single and Parallel Tank Controls

This section contains a detailed explanation of the programming parameters in the 962 electronic control.

Number	Description of Program Values	Explanation

Number	Description of Program Values	Explanation
P5 page 12	Capacity of unit	Enter the capacity of the unit here, in kilograins (kilograms). For example, a 3 ft^3 unit with a resin capacity of 25,000 grains (1620 grams) per ft^3, enter 75 here. (25,000 grains/ ft^3) x (3 ft^3) = 75,000 grains = 75 kilograins. [(1620 grams/ ft^3) x (3 ft^3) = 4860 grams = 4.86 kilograms]. Note: 15 lb/cu ft salting yields 30,000 grains/cu ft resin 10 lb/cu ft salting yields 25, 000 grains/cu ft resin 6 lb/cu ft salting yields 20,000 grains/cu ft resin Reduced salting yields a reduced capacity 1 kilograin (1000 grains) = 0.0648 kilograms (64.8 grams)
P6 page 12	Refill control	Enter value from Table 2.1 - Suggested Settings on page 12 of manual. This value is the refill flow rate times 100, rounded to the next whole number. For example, on a 16-inch tank, the refill control has a flow rate of 1.3 gpm. Enter 130 (1.3 gpm x 100 = 130).
P7 page 12	Brine draw rate	Enter value from Table 2.1 - Suggested Settings on page 12 of manual. This is the injector draw rate times 100, rounded to the next whole number. For example, on a 16-inch tank, the injector has a draw rate of 0.8 gpm. Enter 80 (0.8 gpm x 100 = 80).
P8	Not used	P8 is reserved for future use.
P9	Backwash time	Self explanatory. Generally, 5 to 15 minutes or until water runs clear or specific water conservation needs are met.
P10	Slow rinse	Time, in minutes, to achieve adequate slow rinse volume for resin type used. Resin manufacturers recommend one to two and one half bed volumes of slow rinse water. The required amount of time is calculated using the injector performance curves provided in Section 4.0 of this manual. For example, assuming 4 cubic feet of resin and two bed volumes of slow rinse water for a 16 x 65, 50 psi inlet pressure, program 43 minutes in Parameter P10. (4 cubic feet) x (7.5 gallons/cubic foot) x 2 (bed volumes) = 60 gallons of slow rinse water. A "Q" injector is recommended for a 16-inch tank. From the "Q" injector performance chart the nominal slow rinse rate is 1.4 gpm. 60 gallons divided by 1.4 gallons per minute equals 42.8 minutes. Round up to 43 minutes and enter in P10.
P11	Fast rinse	Time, in minutes, to achieve adequate fast rinse volume for resin type used. For example, for standard softening resin (Ionac C-249), fast rinse at 30 gallons (0.11 m^3) per cubic foot of resin. A unit with 3 ft^3 of resin will require 90 gallons (0.34 m^3) of water to obtain the resin manufacturer's recommended fast rinse. (30 gal/ ft^3 x 3 ft^3) = 90 gallons. (0.11 m^3/ ft^3 x 3 ft^3 = 0.34 m^3). The fast rinse flow rate is controlled by the drain line flow control. For this example, assume a 5 gpm (1.14 m^3/hr) drain line flow control. Enter 18 minutes in P10. (90 gallons/5 gpm) = 18 minutes (0.34 m^3/1.14 m^3 /hr = 0.3 hr/ x 60 min = 18 minutes).
P12	Units of measure	Self explanatory. Enter 0 for U.S., enter 1 for metric.
P13	Clock mode	Self explanatory. Enter 0 for 12-hour clock, enter 1 for 24-hour clock.
P14	Calendar override	0 = No calendar override. 1 - 30 = Maximum number of days between regeneration/backwash.
P15	Reserve type Immediate or delay regeneration	See P2. Not used in Alternating mode.
P16 ***	Fixed Reserve capacity	If P15 is set at 1 or 3, enter the fixed reserve capacity (in gallons) (m^3) that the unit will look for as explained in sections P2 and P15 above. Not used in Alternating mode.
P17	Operation type	Self explanatory. 3 = Single or parallel Conditioner or Tank; 4 = Single or Parallel Filter.

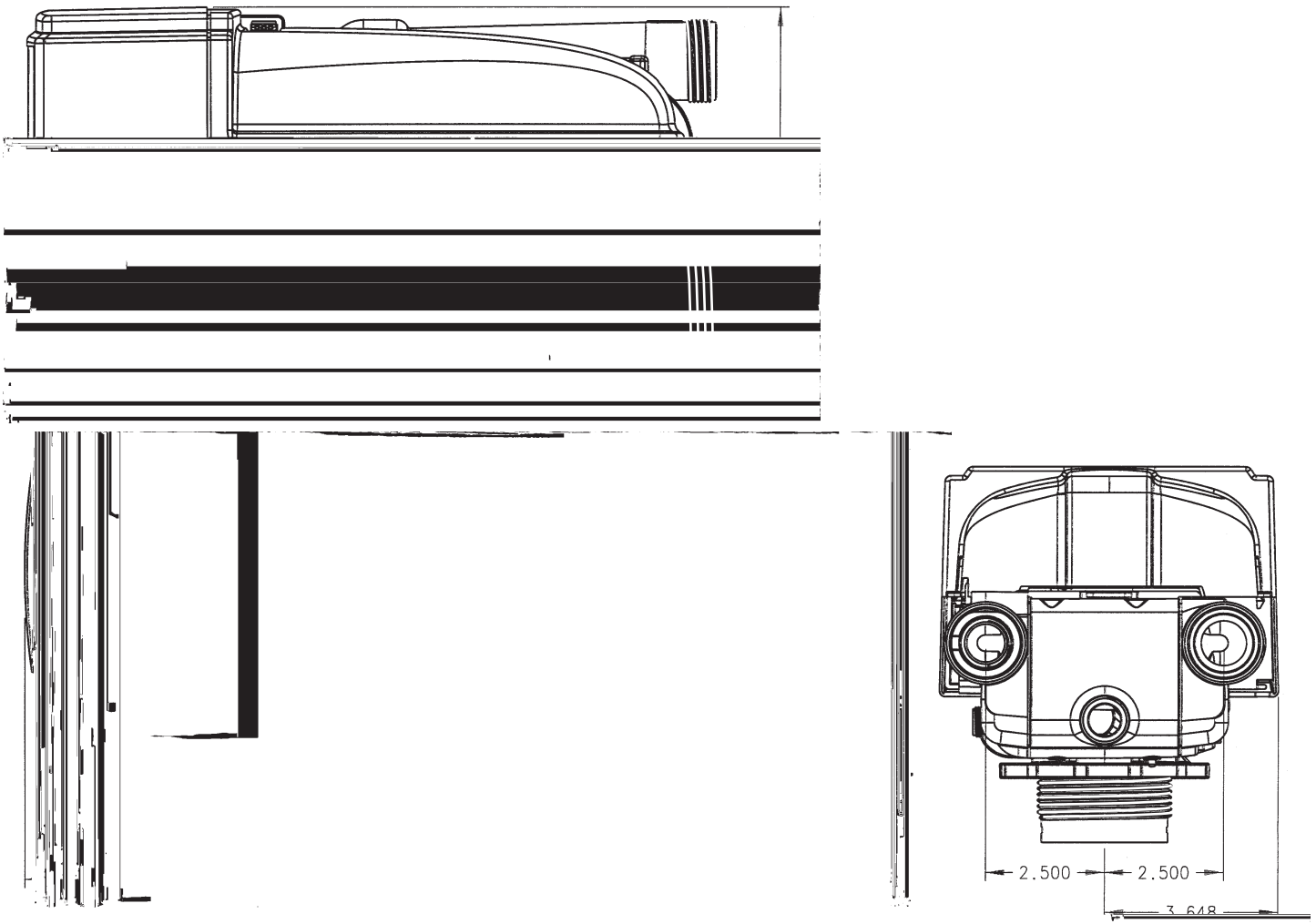| Number	Description of Program Values	Explanation
P18	Salt/capacity lockout	Allows for the lock out of P4 and P5 so that NO unauthorized changes to the programmed values can be made.
P19	Flow Sensor Select	This parameter is used to select the flow sensor that is to be used with the system. The factory-preset value is 1 for a 1-inch turbine. The range is 1 - 4. 1 = Autotrol 1-inch turbine, 2 = Autotrol 2-inch turbine, 3 = user programmable K-factor, 4 = user programmable pulse equivalent. The respective meter manufacturer should supply the K-factors or pulse equivalents for individual meters.
P20	K-factor or pulse equivalent	The range is 000.01 to 255.00 in 0.01 steps. How this number is used is defined by the values stored in P12 (units of measure) and P19 (flow sensor select). P12 is used to define gallons or liters (0 = gallons, 1 = liters). P19 is used to define K-factor or pulse equivalent (3 = K-factor, 4 = pulse equivalent). K-factor is defined as pulses per gallon or pulses per liter. Signet and Sea-Flow are two flow sensor manufacturers that publish a K-factor. The control can now use any flow sensor as long as the programmed K-factor is correct. The pulse equivalent is defined as gallons or liters per pulse. The control will register 5 gallons of flow for every pulse if P12 = 0, P19 = 4 and P20 = 5.00. Badger Meter is one manufacturer that uses a pulse equivalent. The control will not show flow rate if P19 = 4 (pulse equivalent). This is because pulses are accumulated over 10 seconds and flow rate is displayed in gallons per minute. The control will alternate between time of day and capacity remaining or regeneration time remaining during normal operation.
P21	Remote regeneration/ back wash switch delay	This parameter is used to program the length of signal time required to initiate a regeneration/back wash using a differential pressure switch or remote start button/contact. The range is 1 to 254 seconds in 1-second steps. The default is 60 seconds. A counter starts when there is a closed dry contact (no voltage) to this input. A regeneration/back wash will start when the contacts remain closed for the programmed time. The counter will reset to zero when the contacts open for at least 0.02 seconds. The remote regeneration input cannot be used to perform a double manual regeneration. The remote regeneration input is ignored during a regeneration/back wash.
P22	Factory use only	**DO NOT CHANGE**

* The 962 controller functions in either a 12-hour or 24-hour clock mode. Programming P13 (clock mode) before P1 or P2 will eliminate any confusion when setting these parameters.

** The 962 controller functions in either U.S. or metric units. Programming P12 (units of measure) before P3 or P4 will eliminate any confusion when setting these parameters.

*** The calculated gallon amount loaded into the daily registers (L7 through L13) at START-UP, uses this percentage of capacity. Example: 90,000 grains in P5 ñ 10 grains in P3, 90,000 / 10 = 9,000 gallon capacity, 9,000 x .3 (30% in P16) = 2700 gallons, which is loaded into L7 through L13, the daily averages. For this example, the smart reserve at START-UP, would be 2700 gallon x 1.2 (120% of the daily average) = 3240 gallon. This daily average will change as actual water usage information is gathered.

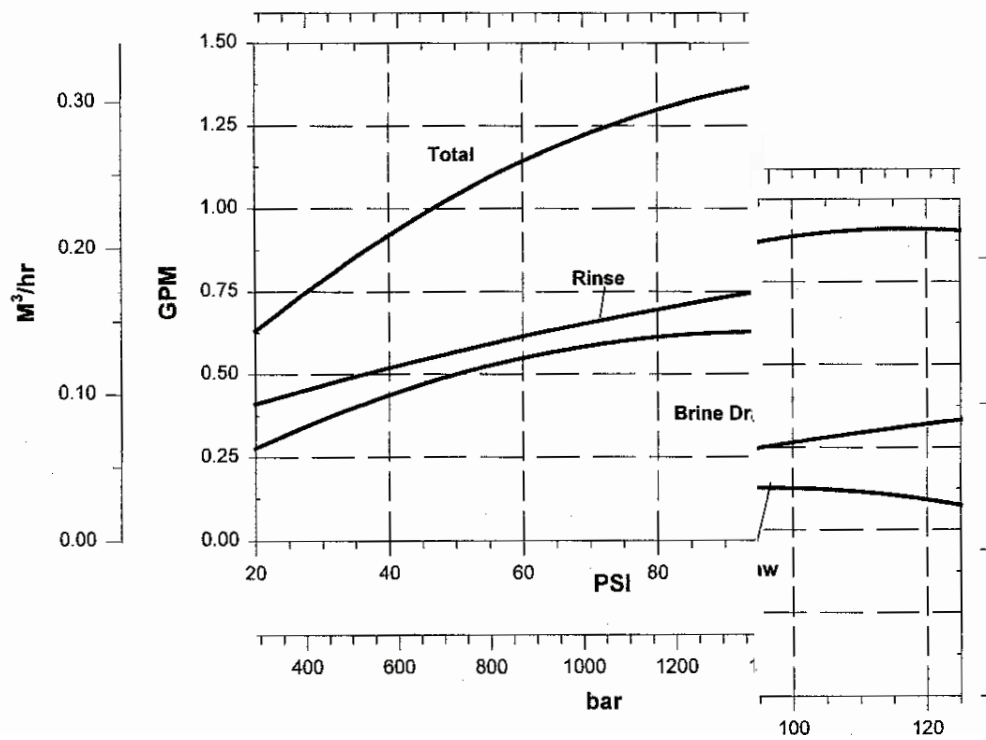# 4.0 Performa Cv Performance Charts and Graphs

4.1 General Specification


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|← 2.500 →|← 2.500 →|
         3.648
```

Hydrostatic Test Pressure . . . . 300 psi (20.69 bar)
Working Pressure . . . . 20-120 psi (1.38 - 8.27 bar)
Standard Electrical Rating . . . . 962: series wall transformer 12V 60 Hz, 12V 50 Hz
         942F: 7 day or 12 day/24 hour 50 Hz 12 V transformer, 60 Hz 120 Vac or 12 V transformer
Electrical Cord (standard rating) . . . . .60-inch (1.5-m) 3- wire with plug
Pressure Tank Thread . . . . 2-1/2-inch—8 male
Riser Pipe Diameter Required. . . . . 1.050-inch OD (26.7-mm)
Riser Pipe Length . . . . .1/2 inch ±1/2 inch (13 mm ± 13 mm) higher than the top of tank
Standard Connection. . . . . 1-inch (25.4-mm) copper tube adapters
Optional Connections . . . . .1-1/4-inch, 3/4-inch, 22-mm, and 28-mm copper tube adapters
         3/4-inch BSPT, 1-inch BSPT, 1-inch NPT brass pipe adapters
         3/4-inch, 1-inch, 1-1/4-inch, 25-mm CPVC tube adapters
Brine Line Connection . . . . 3/8-inch NPT male
Drain Line Connection . . . . 3/4-inch NPT male
Optional Bypass Valve. . . . . Rotating handles, full 1-inch porting, reinforced Plastic
Control Module, Tank Adapter . . . . Reinforced Plastic
Rubber Goods . . . . Compounded for cold water service
Program Clock (Timer)   942F: Available in 7- to 12-day English, German, French, Italian, Spanish, Japanese
        962, 962F, 962TC, 962FTC: Available in English, German, French, Italian, Spanish, Japanese
Brine Refill Control. . . . . .0.74 and 1.3 GPM
External Back wash Controllers . . . . .5, 7, 10, 12, 15, 20 GPM. Beyond 20 GPM must be outside sourced.

4.2 Injector Curves
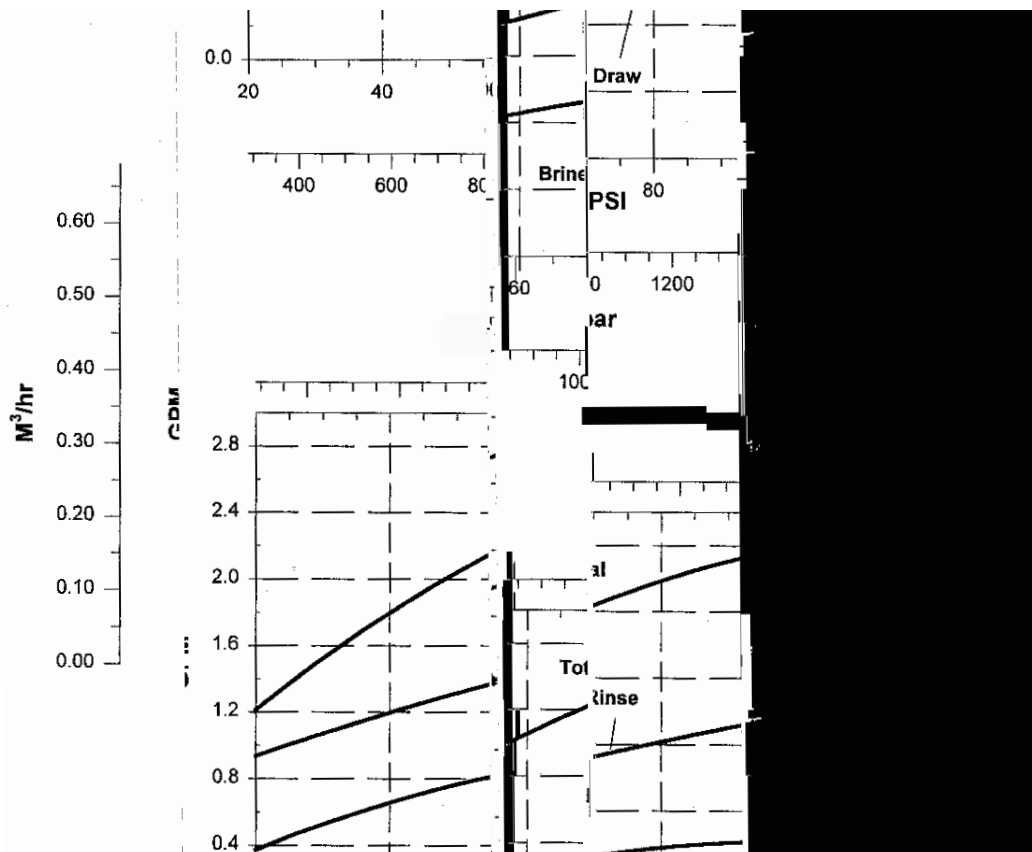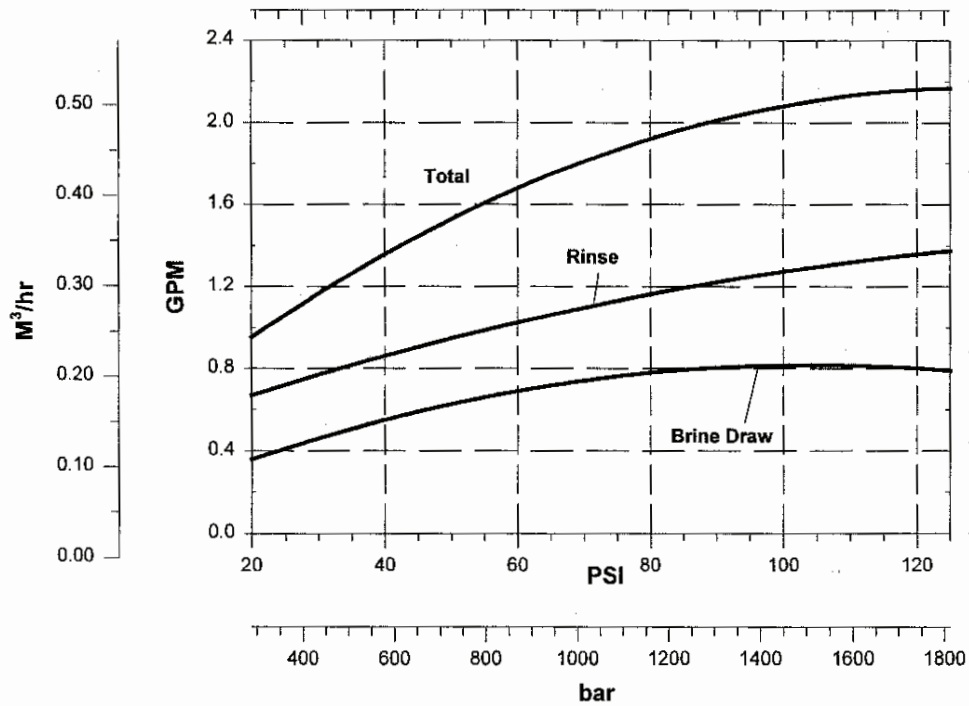
Injector "L" in a Performa Cv Valve

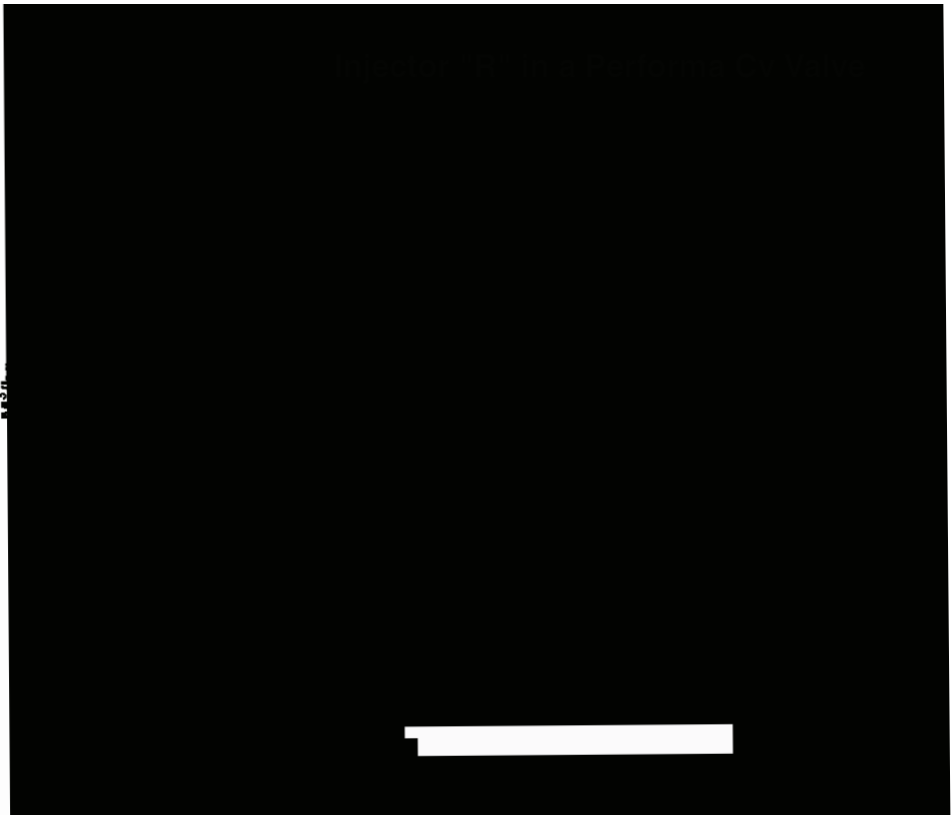### Injector "M" in a Performa Cv Valve

28
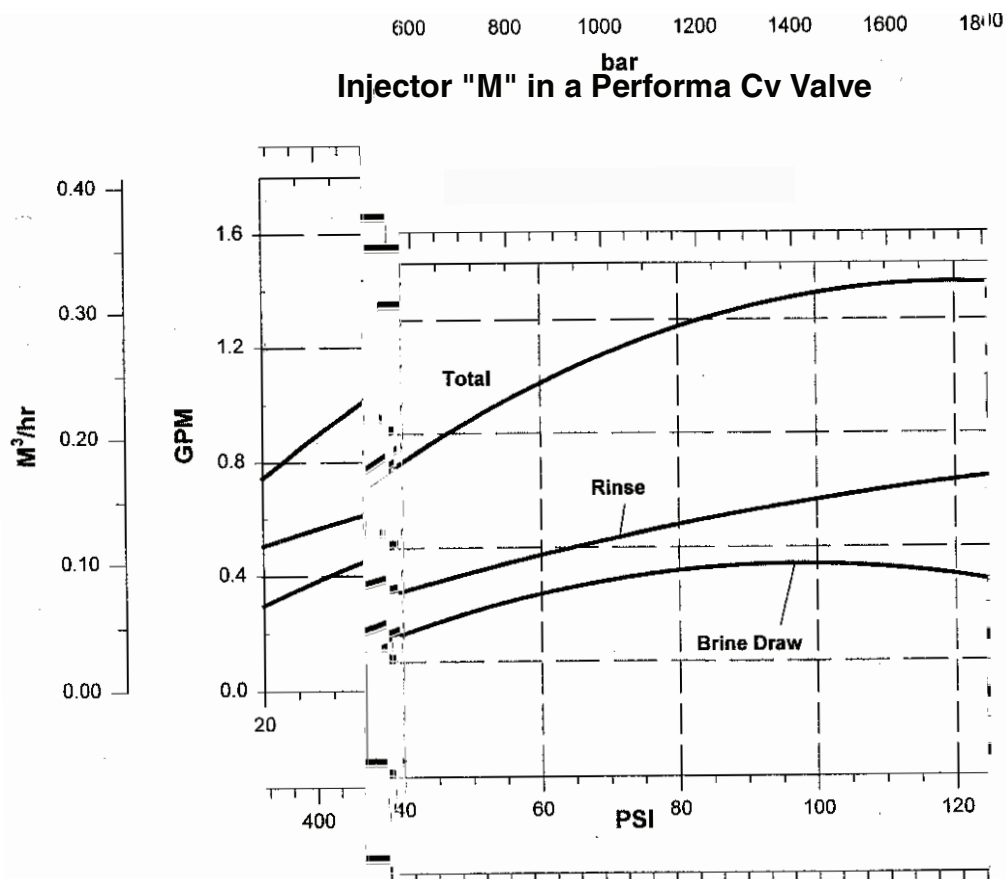
Injector "N" in a Performa Cv Valve

Injector "R" in a Perform Cv Valve

4.3 Performa Cv Conditioner Performance Data

Table 4.1 - Performa Cv Injector Performance Chart

Injectors L - R Flow Rate Charts (gpm)										
PSI	L		M		N		Q		R	
	Draw	Rinse	Draw	Rinse	Draw	Rinse	Draw	Rinse	Draw	Rinse
20	0.26	0.4	0.3	0.5	0.4	0.65	0.4	0.9	0.45	1.2
30	0.3	0.45	0.4	0.55	0.45	0.75	0.5	0.95	0.5	1.3
60	0.5	0.6	0.6	0.8	0.75	1	0.82	1.4	0.9	1.75
80	0.6	0.65	0.7	0.85	0.8	1.1	0.9	1.6	1	2
100	0.6	0.76	0.7	0.9	0.8	1.6	0.95	1.8	1.1	2.2
Injectors L - R Flow Rate Charts (Lpm)										
Bar	L		M		N		Q		R	
	Draw	Rinse	Draw	Rinse	Draw	Rinse	Draw	Rinse	Draw	Rinse
1.4	0.98	1.5	1.1	1.9	1.5	2.5	1.5	3.4	1.7	4.5
2.1	1.1	1.7	1.5	2.1	1.7	2.8	1.9	3.6	1.9	4.9
4.2	1.9	2.3	2.3	6	2.8	3.8	3.1	5.3	3.4	6.6
5.6	2.3	2.5	2.6	3.2	3	4.2	3.4	6	3.8	7.6
7	2.3	2.9	2.6	3.4	3	4.9	3.6	6.8	4.2	8.3

Table 4.2 - Service and Backwash Flow Performance Data

Flow vs Pressure Drop (gpm)			Flow vs Pressure Drop (Lpm)		
PSI	Service (Cv 6.5)	Backwash (Cv 4.0)	Bar	Service (Cv 6.5)	Backwash Cv 4.0)
5	15	9	0.35	56	34
10	20	13	0.7	76	49
15	25	16	1	95	61
20	29	18	1.4	109	68
25	32	20	1.7	121	76
30	35	22	2.1	132	83

Table 4.3 - Recommended Drain Flow Controls (Backwash Anion and Cation Resin @ 55°F (12.7°C) Water Temperature

Tank Diameter Inches (mm)	Bed Area sq. ft.	Anion Resin @ 3 gpm/sq ft (m^3h/sq ft)	Cation Resin @ 5 gpm/ sq ft (m^3h/sq ft)
14 (35.6)	1.02	3 (.7)	5 (1.1)
16 (40.6)	1.38	4 (.9)	7 (1.5)
18 (45.7)	1.76	5 (1.1)	8 (1.8)
21 (53.3)	2.4	7 (1.5)	12 (2.7)

Table 4.4 - Performa Filter

PSI	Service (Cv 6.5)	Backwash (Cv 5.0)
Pressure Loss vs Flow (gpm)		
5	15	11
10	20	16
15	25	19
20	29	22
25	32	25
30	35	27
Bar	**Service (Kv 5.6)**	**Backwash (Kv 5.8)**
0.35	56	42
0.7	76	61
1	95	72
1.4	109	83
1.7	121	95
2.1	132	102

Table 4.5 - Typical Backwash Flow Requirements for Various Filter Medias (based on 55°F (12.7°C) water temperature)

Tank Dia. inches (mm)	Bed Area sq. ft.	8 gpm/sq ft (Lpm/sq ft) GAC/CARBON FILTER-AG, CALCITE	10 gpm/sq ft (Lpm/sq ft) GREENSAND	12 gpm/sq ft (Lpm/sq ft) BIRM	15 gpm/sq ft (Lpm/sq ft) SAND, MULTI-MEDIA
14 (35.6)	1.02	8 (30)	10 (38)	12 (45)	15 (57)
16 (40.6)	1.38	11 (42)	13 (49)	16 (61)	20 (76)
18 (45.7)	1.76	14 (53)	17 (64)	21 (79)	*26 (98)
21 (53.3)	2.4	19 (72)	24 (91)	*29 (98)	
24 (60.9)	3.14	25 (95)			

*May exceed 25 psi or 1.72 bar pressure drop.

Table 4.6 - Performa Cv Filter Sizing Selection Guide for Dual Unit Filters.

Typical backwash flow requirements for various filter medias (based on 55°F (12.7°C) water temperature.					
		GAC/CARBON FILTER-AG, CALCITE			
		GREENSAND			
			BIRM		
				SAND, MULTI-MEDIA	
Tank Dia. inches (mm)	Bed Area sq. ft.	8 gpm/sq ft (Lpm/sq ft)	10 gpm/sq ft (Lpm/sq ft)	12 gpm/sq ft (Lpm/sq ft)	15 gpm/sq ft (Lpm/sq ft)
14 (35.6)	1.02	8 (30)	10 (38)	12 (45)	NR
16 (40.6)	1.38	11 (42)	13 (49)	NR	NR
18 (45.7)	1.76	*14 (53)	NR	NR	NR
21 (53.3)	2.4	NR	NR	NR	NR

* May exceed 25 psi or 1.72 bar pressure drop during back wash of second unit.

NR = Not Recommended. A flo w control on the service outlet of each valve may be required to insure proper back wash volume to back washing unit.

...tenance

...ce used ...ith the 962 Cv demand ...quire simple maintenance. In rare ...e turbine ...heel of the ...ater meter can ...all particles of oxidized iron, eventually ...ing the ...heel from turning.

Shut off the ...ater supply or put the bypass v... into the bypass position.

2. Relieve pressure by opening the Bac... Valve (the seventh back from the ... scre...driver.

3. Loosen and remove the pip... bypass from the inlet an...

4. Using a needle-nose... from the outlet ho...
   ...ter gla...

...M...i...ce

...and ...

...ine ta... ...reen filter on en... ...ce a...y... ...en sediment ...m of t... ...ank.

...n and ... ...nce a year: ...moun... ...ner. ...upply ...pass valve...

3 ...res... ...en...ng val... ...o. 7 ...cre...

...ver, ...nje...tor screen and ...ire...

5. ...ng a... ...sh... sh u ...se...o... i... tor... F ...re... rec... v ...h...ugh t... re

C ...th

L... O-rin... ...jector, i an ...creen... **...e lubr...**

...e...injecto... ...ap an... ...

...t ov... ...pl... ...siti... ...ten ...c... ...ir...

...si... ...ni...

F...

5.3 Removing the Valve Assembly for Servicing

1. Unplug the power cord.

2. Shut off water supply or put bypass valve(s) into bypass position.

3. Remove cover and with screwdriver, relieve tank pressure by pushing open valve No. 7 (rear flapper) on control as shown (Figure 5.2).
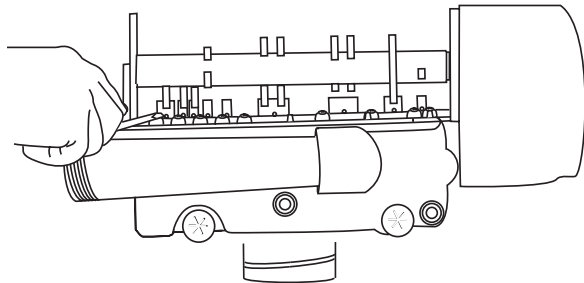
Figure 5.2

4. When used with a globe valve bypass, loosen and detach the inlet, outlet, brine and drain lines from the valve. If using the 1265 bypass, loosen and remove valve from bypass as well as loosening and removing the brine and drain lines.

5. Unscrew (counterclockwise) and remove valve from tank.

6. To replace the control valve, reverse the above procedure.

5.4 Removing the Control

Complete the following steps to remove the 960 ProSoft control for servicing:

1. Unplug the wall-mount transformer.

2. Shut off the water supply or put the bypass valve(s) into bypass position.

3. Remove the rear cover by depressing the two tabs provided on the cover, Figure 5.3. Lift the front of the cover and remove to expose the valve body.

Figure 5.3

4. Relieve system pressure by opening the Back wash Drain Valve (the seventh valve back from the control) with a screwdriver, Figure 5.4.

Figure 5.4

5. To remove the camshaft or to reinstall it, the arrow on the rear of the cam shaft must be pointing at the line on the rear "hoop" of the top plate. This occurs when the cycle indicator is rotated to the refill position. Press down on the back of the camshaft to disengage it from the rear "hoop" of the top plate, Figure 5.5.
Slide the camshaft back to disengage it from the timer, Figure 5.6.
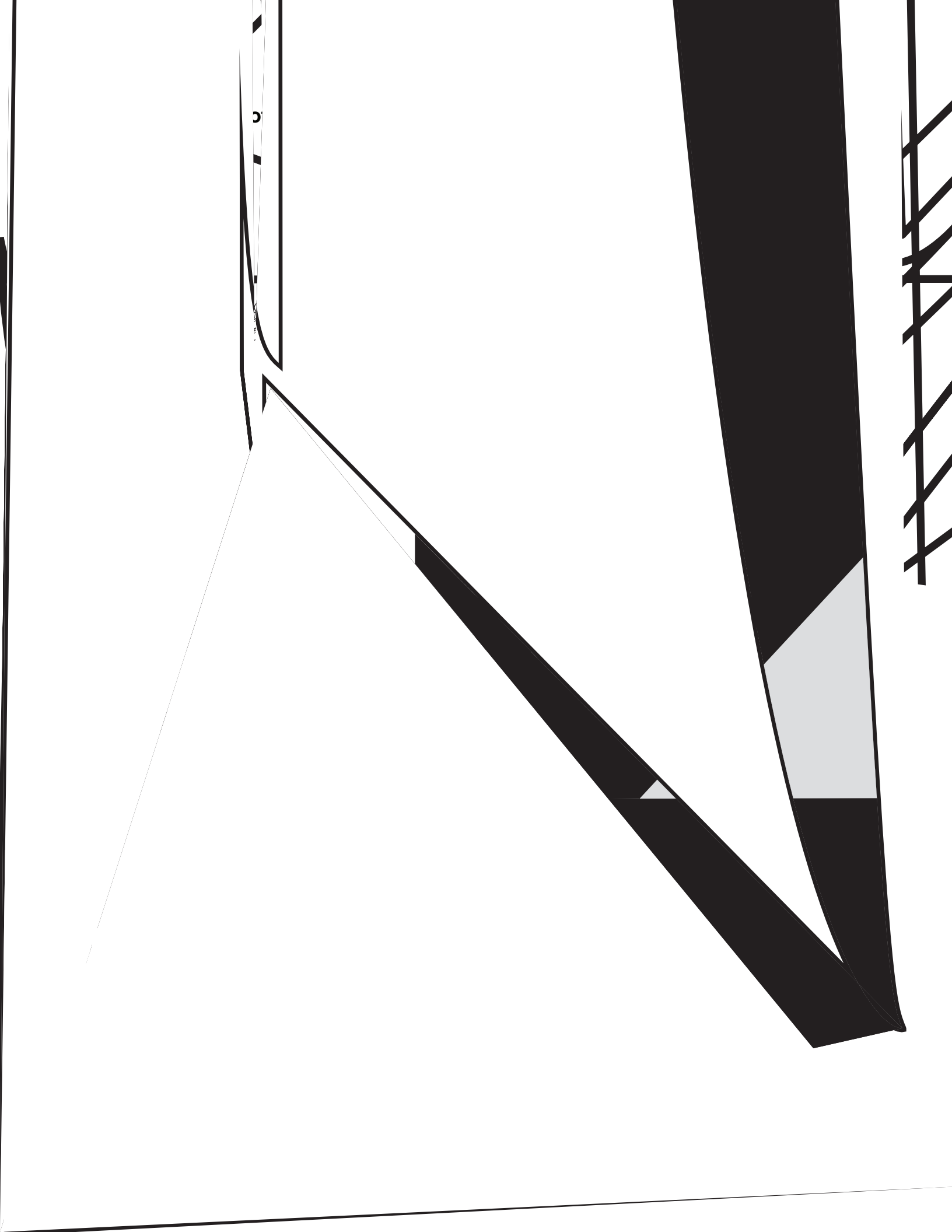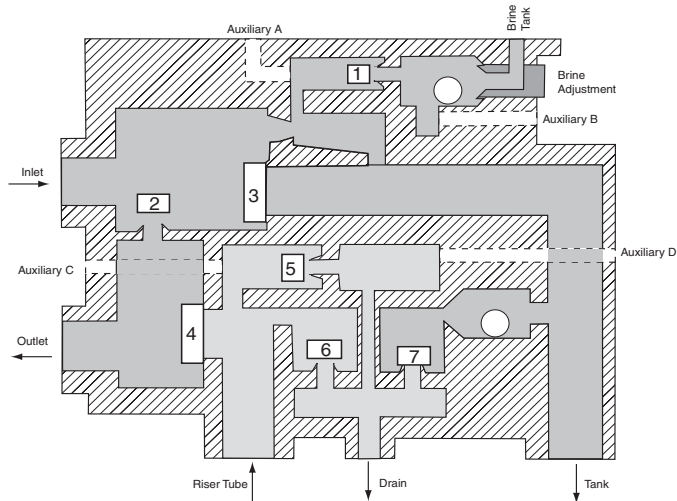
Figure 5.5

e 5.6
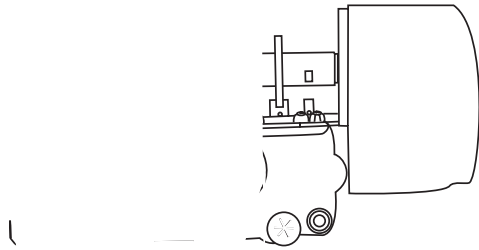
ə probe from the turbine

e valve, Figure 5.7. To replace
the above procedure. Note that
ıs to be positioned correctly
serted into the back of the control.
ıg arro ₩ on the camshaft. Position
ə top of the shaft and slide the
ıe control. Push up on the end of the
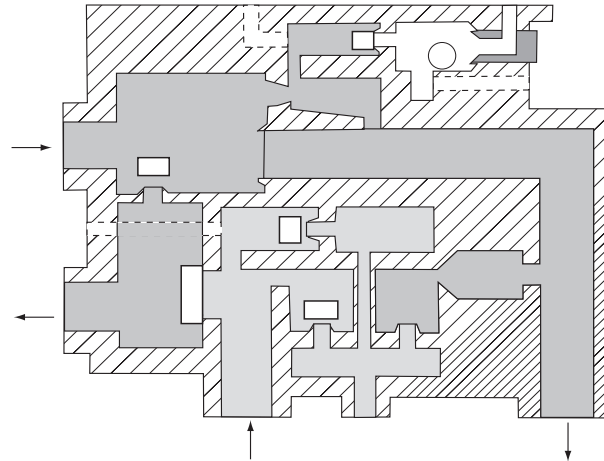ıest from the timer, snapping it into

Figure 5.7

3 Brine/Slow Rinse Position

Auxiliary A

Brine Tank

1

Brine Adjustment

Auxiliary B

Inlet

2

3

Auxiliary D

Auxiliary C

5

Outlet

4

6

7

Riser Tube

Drain

Tank

Name	Valve No.
Brine	1 - Open
By-Pass	2 - Open
Inlet	3 - Closed
Outlet	4 - Closed
2nd Tank Top	5 - Open
Purge	6 - Open
Backwash	7 - Closed

4 Fast Rinse Position

5.8 Performa Cv Filter Flow Diagrams

1 Backwash Position

Name	Valve No.
Brine	1 - Open
By-Pass	2 - Open
Inlet	3 - Closed
Outlet	4 - Open
2nd Tank Top	5 - Open
Purge	6 - Closed
Backwash	7 - Open
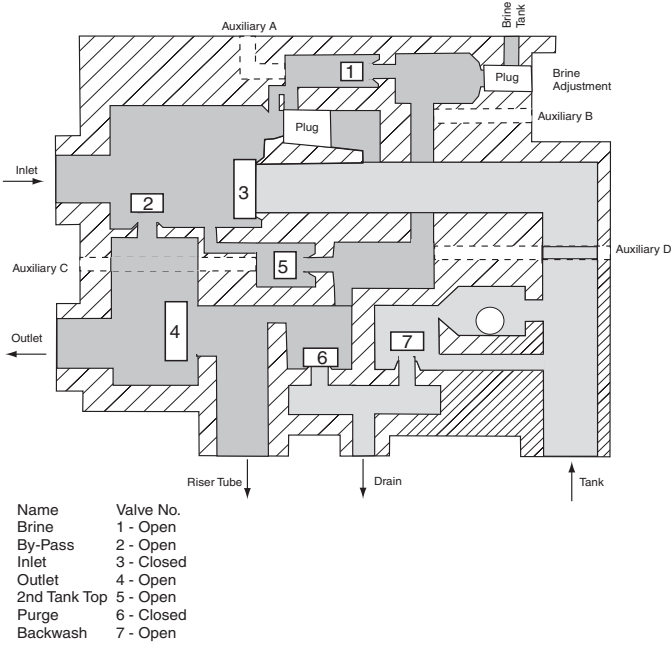
2 Fast Rinse Position
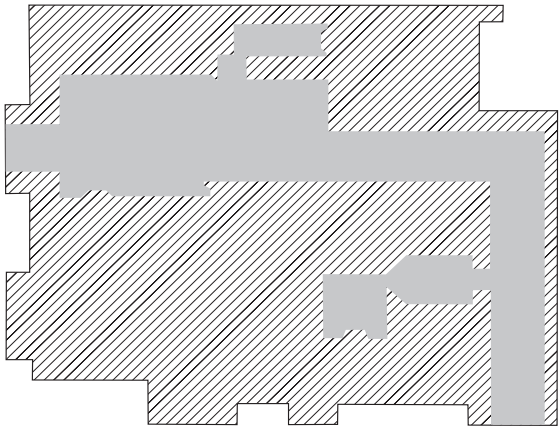
5.9 Troubleshooting

The technology upon which the Autotrol Performa control valve is based is well established and proven in service over many years. However, should a problem or question arise regarding the operation of the system, the control can be serviced easily. For parts mentioned, refer to exploded views in the **Replacement Parts** section of this manual.

IMPORTANT: Service procedures that require the water pressure to be removed from the system are marked with a **!** after the possible cause. To remove water pressure from the system, put the bypass valve or three-valve bypass into the bypass position and open the back wash drain valve (the seventh valve back from the control) with a screwdriver. Restore system water pressure when the service work is completed.

Valve Troubleshooting

Problem	Possible Cause	Solution
1. Control will not draw brine.	a. Low water pressure.	a. Set pump to maintain 30 psi at conditioner.
	b. Restricted drain line.	b. Remove restriction.
	c. Injector plugged **!**	c. Clean injector and screen.
	d. Injector defective **!**	d. Replace injector.
	e. Valve (2 and/or 4) not closed.	e. Remove foreign matter from disc and check disc for closing by pushing in on stem. Replace if needed.
	f. Damaged injector O-ring.	f. Replace injector O-ring.
2. Brine tank overflow.	a. Brine valve (1) being held open.	a. Manually operate valve stem to flush away obstruction.
	b. Uncontrolled brine refill flow rate **!**	b. Remove variable salt controller to clean.
	c. Valve (3 or 4) not closed during brine draw causing refill.	c. Flush out foreign matter by holding disc open and manually operating valve stem.
	d. Air leak in brine line.	d. Check all connections in brine line for leaks. Refer to instructions.
3. System using more or less salt than salt control is set for.	a. Inaccurate setting.	a. Correct setting.
	b. Foreign matter in controller causing incorrect flow rates **!**	b. Remove variable salt controller and flush out foreign matter. Manually position control to brine draw to clean controller (after so doing, position control to "purge" to remove brine from tank).
	c. Defective controller.	c. Replace controller.
4. Intermittent or irregular brine draw.	a. Low water pressure.	a. Set pump to maintain 30 psi at conditioner.
	b. Defective injector **!**	b. Replace both injector and injector cap.
5. No conditioned water after regeneration.	a. Unit did not regenerate.	a. Check for power.
	b. No salt in brine tank.	b. Add salt.
	c. Plugged injector **!**	c. Clean injector. Flush with water.
6. Control back washes at excessively low or high rate.	a. Incorrect back wash controller used.	a. Replace with correct size controller.
	b. Foreign matter affecting controller operation **!**	b. Remove controller and ball. Flush with water.
7. Flowing or dripping water at drain or brine line after regeneration.	a. Drain valve (6 or 7) or brine valve (1) held open by foreign matter or particle.	a. Manually operate valve stem to flush away obstruction.
	b. Valve stem return spring on top plate weak.	b. Replace spring.
8. Hard water leakage during		

962 Control Troubleshooting

Alarms

The Model 962 continuously monitors itself and sounds an alarm if it detects something wrong. The alarm is a beep that is on for one second and then off for nine seconds.

When the alarm sounds, the display shows the letters "Err" with a number from 1 to 4. The table below lists the Err numbers, a description of each error, the cause of the error, and the solutions. To silence the alarm, press any button on the control. If the error still exists, the control will go back to the alarm condition after 30 seconds.

Model 960 Alarms

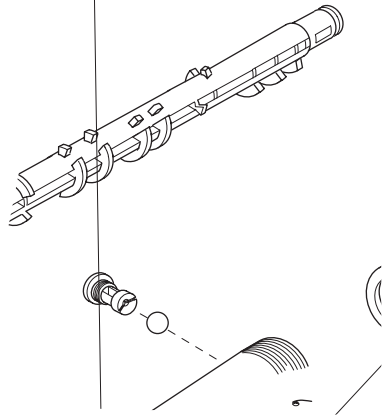| Indication	Description	Cause	Solution
Err1	Electronics Failure	Control settings need reprogramming.	Press any key to load default values. Refer to "Programming the Model 960 Control".
Err2	Improper start of regeneration (limit switch closed when it should be open).	Valve camshaft has been manually rotated during a regeneration. Valve camshaft has been manually rotated out of "regeneration complete" position. Faulty motor. Faulty motor drive. Faulty switch.	Press any key to silence the alarm. (Note: Alarm automatically clears at "TIME OF REGEN".) The control will turn the motor on and drive the camshaft to the proper location. Replace the control. Replace the control. Replace the control.
Err3	Improper finish of regeneration (limit switch open when it should be closed).	Valve camshaft has been manually rotated out of "regeneration complete" position. Faulty motor. Faulty motor drive. Faulty switch.	The control will turn the motor on and drive the camshaft to the proper location. Replace the control. Replace the control. Replace the control.
Err4	Improper control settings (one or more settings out of the allowable range).	One or more settings out of the allowable range.	Hardness: Adjust range: 3 to 250. Capacity: Adjust range: 0.1 to 140.0. Refill control: Adjust range: 1 to 99. Brine draw value: Adjust range per Table 4.1.

Problem	Possible Cause	Solution
1. Capacity display stays at 9999 even through there is water usage.	a. Total system capacity was calculated to be a value greater than 9999.	a. As the water usage continues, the remaining capacity will drop below 9999 and then other values will be shown.
2. Timer beeps when left arrow button is pressed.	a. Button is only active in the programming mode.	a. Refer to the Programming section.
3. Timer does not respond to REGEN button.	a. Button is not active in the programming mode.	a. Refer to the Regeneration section.
4. Timer does not display time of day.	a. Transformer is unplugged. b. No electric power at outlet. c. Defective transformer. d. Defective circuit board.	a. Connect power. b. Repair outlet or use working outlet. c. Replace transformer. d. Replace control.
5. Timer does not display correct time of day.	a. Outlet operated by a switch. b. Power outages.	a. Use outlet not controlled by switch. b. Reset Time of Day.

Problem	Possible Cause	Solution
6. No water flow display when water is flowing (colon does not blink).	a. Bypass valve in bypass position. b. Meter probe disconnected or not fully connected to meter housing. c. Restricted meter turbine rotation due to foreign material in meter ! d. Defective meter probe. e. Defective circuit board.	a. Shift bypass valve into service position. b. Fully insert probe into meter housing. c. Remove meter housing, free up turbine and flush with clean water. Turbine should spin freely. If not, refer to the Water Meter Maintenance section. d. Replace control. e. Replace control.
7. Control display is frozen at Regen Time Remaining.	a. Back to back regenerations were requested.	a. Refer to the Manual Regeneration section.
8. Control regenerates at the wrong time of day.	a. Power outages. b. Time of day set incorrectly. c. Time of regeneration set incorrectly.	a. Reset time of day to correct time of day. b. Reset time of day to correct time of day. c. Reset time of regeneration.
9. Timer stalled in regeneration cycle.	a. Motor not operating. b. Motor runs backwards. c. No electric power at outlet. d. Incorrect voltage or frequency (Hz). e. Broken gear. f. Defective switch. g. Air leak in brine connections (pressure locked flapper). h. Binding of camshaft. i. Water pressure greater than 125 psi during regeneration. j. Defective circuit board.	a. Replace control. b. Replace control. c. Repair outlet or use working outlet. d. Replace timer and/or transformer with one of correct voltage and frequency (Hz). e. Replace control. f. Replace control. g. Check all junction points and make appropriate corrections. h. Remove foreign object obstruction from valve discs or camshaft. i. Install pressure regulator to reduce pressure. j. Replace control.
10. Continuous regeneration. Camshaft does not stop at the end of regeneration.	a. Broken projection on drive gear. b. Defective switch.	a. Replace control. b. Replace control.
11. Control does not regenerate automatically or when REGEN button is depressed.	a. Transformer unplugged. b. No electric power at outlet. c. Defective motor. d. Broken gear. e. Binding in gear train. f. Defective switch.	a. Connect power. b. Repair outlet or use working outlet. c. Replace control. d. Replace control. e. Replace control. f. Replace control.
12. Control does not regenerate automatically but does regenerate when REGEN button is depressed.	a. If water flow display is not operative, refer to item 5 in this table. b. Incorrect hardness and capacity settings. c. Defective circuit board.	a. Refer to item 5 in this table. b. Set new control values. Refer to the Programming section. c. Replace control.
13. Run out of soft water between regenerations.	a. Improper regeneration. b. Fouled resin bed. c. Incorrect salt setting. d. Incorrect hardness or capacity settings. e. Water hardness has increased. f. Restricted meter turbine rotation due to foreign material in meter housing ! g. Excessive water usage below 1/5 gallon per minute.	a. Repeat regeneration making certain that correct salt dosage is used. b. Use resin cleaner. c. Set salt control to proper level. Refer to the Programming section in this manual. d. Set to correct values. Refer to the Programming section in this manual. e. Set to new value. Refer to the Programming section in this manual. f. Remove meter housing, free up turbine, and flush with clean water. Turbine should spin freely, if not, replace meter. g. Repair leaky plumbing and/or fixtures.

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6.3 Performa Cv Controls