Autotrol Performa™ Cv

Conditioner/Filter

Water Control System

Installation, Operation and Maintenance Manual

This s stem installed b :

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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 . . . . . Electronicall calculated
Slo W rinse . . . . . 7 to 125 minutes
Fast rinse . . . . . 2 to 19 minutes
E ternal 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 m^3/h)
Back Wash (Filter) @ 25 psi (1.72 bar) drop . . . . . 25.0 gpm (4.5 m^3/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
Fi ed 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 . . . . . Da 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 Bod . . . . . .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 H , 230V 50/60 H
100V 50/60 H
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

B pass Valve, Model 1265 . . . . . 1-3/4 inches - 12 UNC - 2A male
B pass Inlet/Outlet Fitting Kits:
Copper, Sweat 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 drawings.

1.2 Installation

All plumbing and electrical connections must conform to local codes.

Inspect unit carefull for carrier shortage or shipping damage.

Location Selection

1. The distance bet veen the unit and a drain should be as short as possible.
2. If it is likel that supplementar vater treatment equipment vill be required, make certain adequate additional space is available.
3. Since salt must be added periodicall to the brine tank, the location should be easil accessible.
4. Do not install an unit closer to a vater heater than a total run of 10 feet (3 m) of piping bet veen the outlet of the conditioner and the inlet to the heater. Water heaters can sometimes overheat to the e tent the vill transmit heat back do vn the cold pipe into the unit control valve.

   Hot vater can severel damage the conditioner. A 10-foot (3-m) total pipe run, including bends, elbo vs, etc., is a reasonable distance to help prevent this possibilit . A positive va to prevent hot vater flo ving from heat source to the conditioner, in the event of a negative pressure situation, is to install a check valve in the soft vater 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 vhere it or its connections (including the drain and overflo v lines) vill 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 b pass valve s stem is recommended to provide for occasions vhen the vater conditioner must be b passed for hard vater or for servicing.

The most common b pass s stems are the Autotrol Series 1265 b pass valve (Figure 1.1) and plumbed-in globe valves (Figure 1.2). Though both are similar in function, the Autotrol Series 1265 b pass offers simplicit and ease of operation.

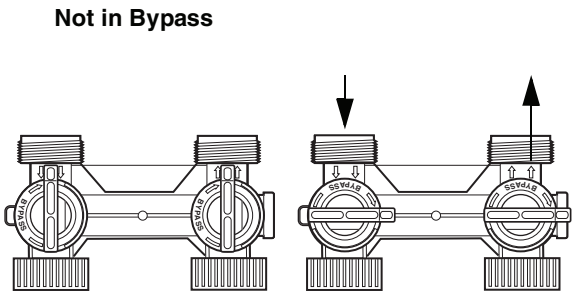


Figure 1.1 - Autotrol Series 1265 B pass Valve

Figure 1.2 - T pical Globe Valve B pass S stem

Drain Line Connection

Note: Standard commercial practices are e pressed here. Local codes ma require changes to the follo ving suggestions.

1. Ideall located, the unit vill 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 back vash flo v rate e ceeds 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 vhere the drain line must be elevated, ou ma elevate the line up to 6 feet (1.8 m) providing the run does not e ceed 15 feet (4.6 m) and vater pressure at conditioner is not less than 40 psi (2.76 bar). You ma elevate an additional 2 feet (61 cm) for each additional 10 psi (0.69 bar).

4. Where the drain line is elevated but empties into a drain belo\v 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 \vith the drain line connection. This \vill provide an adequate siphon trap.
5. Where the drain empties into an overhead se\ver line, a sink-t pe trap must be used.

IMPORTANT: Never insert drain line into a drain, se\ver line or trap. Al\va s allo\v an air gap bet\veen the drain line and the \vaste\vater to prevent the possibilit of se\vage being back-siphoned into the conditioner.

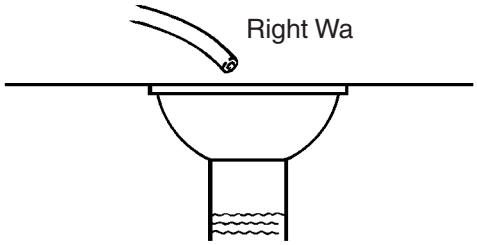


Figure 1.3

Note: Standard commercial practices have been e pressed here. Local codes ma require changes to these suggestions.

Brine Line Connection

It \vill be necessar to install the brine line for a Performa Cv conditioner to the brine fitting on the valve (3/8-inch NPT).

Be sure all fittings and connections are tight.

Overflow Line Connection

In the absence of a safet overflo\v and in the event of a malfunction, the BRINE TANK OVERFLOW \vill direct overflo\v to the drain instead of spilling on the floor \vhere it could cause considerable damage. This fitting should be on the side of the cabinet or brine tank.

To connect overflo\v, locate hole on side of brine tank. Insert overflo\v fitting (not supplied) into tank and tighten \vith plastic thumb nut and gasket as sho\vn (Figure 1.4). Attach length of 1/2-inch (1.3-cm) I.D. tubing (not supplied) to fitting and run to drain. Do not elevate overflo\v line higher than 3 inches (7.6 cm) belo\v bottom of overflo\v fitting. Do not tie into drain line of control unit. Overflo\v line must be a direct, separate line from overflo\v fitting to drain, se\ver or tub. Allo\v an air gap as per drain line instructions (Figure 1.3).

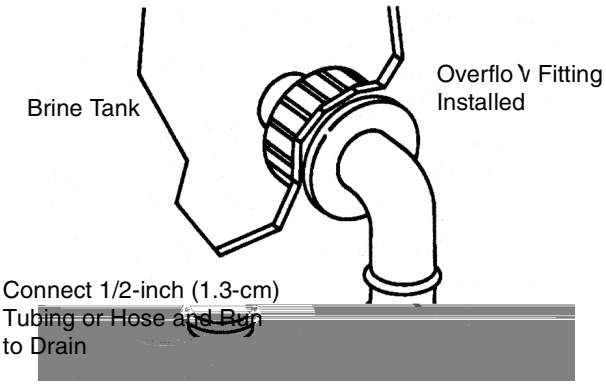


Figure 1.4

Battery Back-Up

All 962 famil controls are batter backup capable. A 9-volt rechargeable batter is available from Osmonics, P/N 1075768. The batter is a VARTA, TYPE V7/8H (AccuPlus Nickle H dride Ni-mh 9v 150 mAH, No. 5522). A standard non-rechargeable batter is an option for backup but needs to be replaced periodicall , Figure 1.5.

Figure 1.5

1.3 Placing Performa Cv Conditioner/Filter into Operation

After all previous steps have been completed, the unit is read to be placed into operation. Follo\v these steps carefull .

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

   Note: The follo\ving steps \vill require turning the c cle indicator to various positions. Manuall rotate the camshaft **COUNTERCLOCKWISE** onl until c cle indicator points to desired position. (See manual regeneration sections for each control's manual operation.)

2. Rotate c cle indicator **COUNTERCLOCKWISE** until it points directl to the \vord **BACKWASH**.

3. Fill media tank \vith \vater.

   a. With \vater suppl off, place the b pass valve(s) into the ¸service'=position.

   b. Open \vater suppl valve ver slo\vl to appro imatel the 1/4 open position.

IMPORTANT: If opened too rapidl or too far, media ma be lost. In the 1/4 open position, ou should hear air escaping slo\vl from the drain line.

Conditioner

   a. When all of the air has been purged from the tank (\vater begins to flo\v steadil from the drain), open the main suppl valve all the \va .

   b. Allo\v \vater to run to drain until clear.

   c. Turn off \vater suppl and let the unit stand for about five minutes. This \vill allo\v all trapped air to escape from the tank.

4. Add \vater to brine tank (initial fill).

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

5. Place the conditioner into operation.

   a. With the \vater suppl valve completel open, carefull advance the c cle indicator **COUNTERCLOCKWISE** to the center of the **BRINE REFILL** position. Hold at this position until \vater starts to flo\v through the brine line into the brine tank. Do not run for more than t\vo minutes.

   b. Advance the c cle 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 \vater is being dra\vn from the brine tank. The \vater level in the brine tank \vill recede ver slo\vl . Observe \vater level for at least three minutes. If the \vater level does not recede, or if it goes up, reference the **Troubleshooting** section.

   d. Advance the c cle indicator **COUNTERCLOCKWISE** to the **REGENERATION COMPLETE** position and run \vater from a nearb faucet until the \vater is clear and soft.

Filter

All filter medias e cept carbon:

   a. After the air has been purged from the tank (\vater begins to flo\v steadil from the drain) open the main suppl all the \va . Back\vash media for a minimum of 15 minutes or longer if necessar . Water running to the drain should be clear.
   Carbon media should be allo\ved to soak for a minimum of 12 hours to allo\v air bubbles to escape prior to back\vashing.

   b. After the back\vash is complete plug in control and allo\v it to advance to **BACKWASH COMPLETE**.

Electrical Connection

100 VAC, 115 VAC, and 230 VAC units: Remove t\vist tie from the po\ver cord and e tend cord to its full length. Make sure po\ver source matches the rating printed on the control. Be certain a \vall s\vitch does not control the outlet.

12 VAC: Connect the plug of the transformer (supplied) secondar 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 po\ver source of correct voltage that is not controlled b a \vall s\vitch.

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. Backwash 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. Backwash 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 \vhich is onl entered in minutes. Other parameters have dual units such as Salt Amount \vhich can be entered in pounds or kilograms. To select \vhich units are active, look for a comment in the NOTES column of Table 2.1 and Table 2.4. It \vill reference another parameter that selects \vhich units are active. For e ample, 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 ne t 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 displa s the Level I Parameters in the follo \ing order:

Time of Da
Time of Regeneration
Hardness
Salt Amount
Capacit

If ou continue to press the **DOWN ARROW** (↓) button, the parameters start over \vith Time of Da . Pressing the **UP ARROW** (↑) button displa s 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 displa starts flashing. If ou \vant 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 \vithout changing, press the **LEFT ARROW** (←) button. When ou reach the far left digit, pressing the **LEFT ARROW** (←) button \vill return ou to the far right digit.

Note: If ou press and hold either the **UP ARROW** (↑) button or the **DOWN ARROW** (↓) button for more than one second, the flashing number \vill 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 ne t number starts flashing. You can onl change the flashing number. Continue changing numbers until ou reach the desired setting. Press the **SET** button. The numbers stop flashing and the control accepts the ne \ setting. After appro imatel 30 seconds, the control starts alternating the displa bet \veen Time of Da and Capacit .

Note: If a beep sounds, the ne \ setting is not accepted because it \vas outside the allo \vable range. The old value \vill be displa ed.

Day of Week/Time of Day

Press the **SET** button. The displa \vill sho \ the Time of Da \vith the minutes digit blinking. If ou \vant 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 \vithout changing, press the **LEFT ARROW** (←) button.

Salt Amount

Salt Amount is the ne t value displa ed. 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

Capacit is the ne t value displa ed and is e pressed in kilograins (kilograms). Refer to Table 2.2 for the capacit .7(a)24.=.4(t)4)2 f t hot o punds.7(a)oto t e presed el altarn(T)6.2(ue def)-9.7(aul)7.5(t)-9.7( )24.4vsal is Pr-13.4e(s)-7.2(ekilogr(i)7.8n(

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 draw charts in Section 4.0.					
Tank Diameter	Injector	Part Number	**P7 equals**	Color	
14 in (35.5 cm)	M	1055737	**60**	Brown	
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 Gre	

Level II Parameters (Table 2.4)

The Level II Parameters are P6 through P22 in Table 2.4. To access Level II Parameters, simultaneousl press and hold the **DOWN ARROW** (↓) and **UP ARROW** (↑) buttons for three seconds. A ¡P'=number ∖ill displa .

Refer to Table 2.4 to find the parameter associated ∖ith each ¡P'=number. Use the **UP ARROW** (↑) button or the **DOWN ARROW** (↓) button to move from one parameter to the ne t. The displa c cles through the ¡P'=numbers sho ∖n in Table 2.1 and Table 2.4. When ou reach P22, the ne t P number ∖ill go back to P1.

When the parameter number ou ∖ant to change is on the displa , press the **LEFT ARROW** (←) button to displa the data assigned to that parameter. Press the **SET** button and the far right number on the displa starts flashing. If ou ∖ant to change this number, press the **UP ARROW** (↑) button or the **DOWN ARROW** (↓) button. To skip the number ∖ithout changing, press the **LEFT ARROW** (←) button. When the number is correct, press the **SET** button. The numbers stop flashing and the control accepts the ne ∖ setting. If a beep sounds, the ne ∖ setting ∖as not accepted. Refer to Table 2.4 for allo ∖able values for that parameter.

To change or vie ∖ other parameters, press the **LEFT ARROW** (←) button to have the displa sho ∖ ¡P'= numbers. No ∖ use the **UP ARROW** (↑) button or the do ∖n arro ∖ (↓) button to move to the parameter number ou ∖ish to change.

To e it the Level II programming mode, simultaneousl press and hold the **DOWN ARROW** (↓) and **UP ARROW** (↑) buttons for three seconds, or ∖ait 30 seconds ∖ithout pressing a button. The control starts alternating the displa bet ∖een Tank in Service, Flo ∖ Rate and Capacit .

Settings for all parameters can be ∖ritten on the label provided ∖ith 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 b the control to calculate the Refill Time. Press **SET** button and enter a ne ∖ value. Refer to Table 2.2 for the correct value.

Parameter P7 is used b the control to calculate the brine dra ∖ time. Press the **SET** button and enter a ne ∖ value. Refer to Table 2.2 for the correct value. The control calculates the brine dra ∖ time using this value and the salt amount. The brine dra ∖ time is added to the Rinse Time (P10) to determine the total Brine Dra ∖/Slo ∖ Rinse Time.

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

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

Parameter P13 selects the clock displa 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 allo ∖able values. Values 0 or 1 ∖ill cause the control to ∖ait for Parameter P2, time of da of regeneration, to begin the regeneration. Values 2 or 3 ∖ill cause the control to start the regeneration as soon as the capacit is e hausted.

When Parameter P15 selects a smart reserve t pe, 0 or 2, Parameter P16 is used to calculate the initial seven average dail ∖ater usage values. The control multiplies the total capacit b the percentage entered for Parameter P16 and uses that value as the initial average dail usage for each da of the ∖eek until ∖ater usage establishes ne ∖ averages, refer to Reserve Options, page 15.

Parameter 17 must be programmed follo ∖ing the appropriate programming table. Improper regenerations ∖ill occur if P17 is set to an other number.

Parameter P18 allo ∖s the installer to lock the Salt Amount and Capacit values so the cannot be changed. When Parameter 18 is set to 1, those t ∖o settings can onl be vie ∖ed ∖hen the control is in the Level II mode. The settings ∖ill be skipped ∖hen the control is in the Level I mode. When Parameter 18 is set to ero, the Salt Amount and Capacit can be vie ∖ed and changed in either Level I or Level II.

Parameter P19 selects the flo ∖ sensor that is to be used ∖ith the s stem. The factor 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 b the respective meter manufacturer.

Parameter P20 is programmed onl if P19 = 3 or 4. P20 is ∖here the factor supplied K-factor or pulse equivalent number is programmed.

Parameter P21 allo ∖s the user to tell the control ho ∖ long a signal must be present at the remote

Parameter P22. Special codes are entered at the factor to program all of the pertinent P locations for specific controls; Metric for e ample. This parameter should never be changed b the end user.

Electronic Time Clock Operation

Programming automatic regeneration frequenc :

The Electronic Time Clock has t \o regeneration options: Interval Regeneration and Da of Week Regeneration.

To initiate an automatic regeneration one or both of the options must be chosen. The s stem ma also be regenerated manuall b pressing the Regeneration button for three seconds.

Interval Regeneration The Electronic Time Clock ma be programmed to regenerate in intervals of up to 30 da s. This feature is Parameter P14 Calendar Override (see Table 2.4). E ample: If 5 is programmed into P14 then the s stem \ill regenerate ever five da s at the time programmed into P2.

Day of Week Regeneration The Electronic Time Clock ma be programmed to regenerate on a specific da or on specific da s of the \eek. 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 ma be operated as a single, dual, or triple s stem.

Dual and Triplex Conditioners and Filters

The dual and triple s stems require a different cam than the cam that is used in the single unit s stems. The also require an interconnecting lock out cable. This allo \s the unit that is in regeneration or back \ash to signal the other units and prevents them from starting a regeneration or back \ash until the first unit is finished. Dual and triple units should be plumbed in parallel \ith each other. In a multi-unit s stem the back \ash \ater is supplied b the other unit or units in the s stem. In a dual filter s stem consideration must be given that the unit in service is able to satisf service requirements and be able to suppl sufficient back \ash \ater to the other filter \hile it is in the back \ash c cle. There is a selection guide, Table 4.6, in Section 4.0 to assist in qualif ing the choice of a dual or triple s stem. This selection guide is based on media back \ash requirements and tank diameter.

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

Dual Parallel Conditioner	P/N 1035923
Triple Parallel Conditioner	P/N 1035925
Dual Parallel Filter	P/N 1035924
Triple 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 ou 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 displa \ill free e and onl sho \ the Regen Time Remaining as an indication that the second regeneration \ill be performed. When the first regeneration is complete, the second one \ill begin and the displa \ill alternate bet \een Flo \ and Regen Time Remaining.

Automatic Regeneration

Programming Day of the Week Regeneration/ Backwash

Enter Da of the Week Regeneration/back Vash programming b depressing the **LEFT ARROW** (←) button and the **DOWN ARROW** (↓) button simultaneousl for 3 seconds. The da s are sho Vn as d1, d2, d3, etc., on the displa . Select the da s of the Veek regeneration/back Vash should occur. To activate that da , change the 0 to a 1. The programming mode Vill be e ited if no ke s are pressed for 30 seconds. If this feature is used in conjunction Vith calendar override the calender override timer Vill be reset at the end of this regeneration/back Vash.

Table 2.3 - Day of Week Regeneration/Backwash

#	Description of Parameter	Set as required 0 = No - 1 = yes	Notes
d1	Sunda	As required	0 = no da of Veek regeneration 1 = back Vash this da
d2	Monda	As required	0 = no da of Veek regeneration 1 = back Vash this da
d3	Tuesda	As required	0 = no da of Veek regeneration 1 = back Vash this da
d4	Wednesda	As required	0 = no da of Veek regeneration 1 = back Vash this da
d5	Thursda	As required	0 = no da of Veek regeneration 1 = back Vash this da
d6	Frida	As required	0 = no da of Veek regeneration 1 = back Vash this da
d7	Saturda	As required	0 = no da of Veek regeneration 1 = back Vash this da

Reserve Options

There are t Vo t pes of reserve options for this control: fi ed reserve and smart reserve (historical Vater usage pattern). The are selected Vith Parameter P15.

Fixed Reserve

When fi ed reserve is selected, the control multiplies the ma imum s stem capacit b the percent value set in Parameter P16 and uses the result as a reserve.

Smart Reserve (water usage pattern)

The other reserve option allo Vs the control to adjust the reserve based upon the historical Vater usage pattern of the s stem. The control keeps track of the Vater usage for each da of the Veek and uses that da 's average usage multiplied b 1.2 as the reserve for that da . Ever da at the Time of Regeneration, the control recalculates the da 's average Vater usage. If less than 10% of a da 's average Vater usage is used, the control Vill not change the da 's average. If more than t Vice the da 's average is used, the control uses the actual usage in the reserve calculation.

Since a ne V installation has no histor of Vater usage, the control multiplies the percent of capacit value set in Parameter P16 b the total s stem capacit to determine starting average for each da of the Veek.

The factor set value for P16 is 30 Vhich means that 30% of the total s stem capacit is used for the starting average for each da .

Program Parameter P15 is also used to select Vhether the control Vaits until the Time of Regeneration set in Parameter P2 to start a regeneration, or if the control should begin a regeneration immediatel Vhen the capacit 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 d\vell time is calculated to refill the proper amount of \vater into brine tank.
P7	Brine dra\v rate	2-200	1	**Selected from Table 2.2**		This number tells the controller the dra\v rate based on the injector si e. The d\vell time in the dra\v position is then calculated.
P9	Back\vash time	4-60	1	**14***	Minutes	*Ma be adjusted for application

Go to Section 3.2 for detailed e planation 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	Da of Week and Time of Da	(1-7) 1:00-12:59 AM or PM Metric (1-7) 0:00-23:59	(1 da) 1 Minute	**Current Day and Time**	Hour Minute	Range depends on value selected for P13. For da of \veek 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 da 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 d\vell time is calculated to refill the proper amount of \vater into brine tank.
P7	Brine dra\v rate	2-200	1	**Selected from Table 2.2**		This number tells the controller the dra\v rate based on the injector si e. The s\vell time in the dra\v position is then calculated.
P9	Back\vash time	4-60	1	**14***	Minutes	*Ma be adjusted for application
P10	Slo\v Rinse time	7-125	1	**40***	Minutes	*Ma be adjusted for application. This time does not include the calculated brine dra\v time.
P11	Fast Rinse time	2-60	1	**4***	Minutes	*Ma 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**	Da s bet\veen regeneration	0 = no interval chosen - *Ma be adjusted for application.
P15	Does not appl for Timeclock operation			**0**		
P16	Does not appl for Timeclock operation			**30**		
P17	Operation t pe	3-4	1	**6**		6 = Single 962TC
P18	Salt Change Lock out	0-1	1	**0**		0 = none, 1 = Salt/Capacit change locked out
P19	Does not appl for Timeclock operation					
P20	Does not appl for Timeclock operation					
P21	Remote Regeneration S\vitch Dela	0-254	1	**60**	Seconds	Time remote s\vitch must be active to start a regeneration
P22	Factor Use Onl - DO NOT CHANGE			**99**		

Go to Section 3.2 for detailed e planation 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 Three Cycle Filter

Parameter	Description	Range of Values	Minimum Increment	Recommended Program Value	Units of Measure	Notes
P1	Da of Veek and time of da	(1-7) 1:00-12:59 AM or PM Metric (1-7) 0:00-23:59	(1 da) 1 Minute	**Current Day and Time**	Hour Minute	Range depends on value selected for P13. For da of Veek 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 da to start back Vash	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 capacit			**As required**	U.S. Metric	Divide the volumetric capacit (gallons) of the filter b 100 and enter this number into P5. Divide the volumetric capacit (cubic meters) b 10 and enter this number into P5.
P6	Program as recommended			**200**		
P7	Program as recommended			**200**		
P9	Back Vash time	7-60	1	**14***	Minutes	*Ma be adjusted for application.
P10	Program as recommended			**8**		
P11	Fast Rinse time	9-60	1	**9***	Minutes	*Ma 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**	Da s	0 = no interval chosen - *Ma be adjusted for application
P15	Reserve T pe	0-3	1	**0**	For a detailed e planation go to ,E planation of Parameter Values'= P2 on page 24.	0 = Smart Reserve, 1 = Fi ed Reserve, 2 = Smart Reserve Vith Immediate Regeneration, 3 = Fi ed Reserve Vith Immediate Regeneration.
P16	Fi ed reserve percentage	0-70	1	**30**		This number is used to establish initial Dail Average.
P17	Operation t pe	0-7	1	**4**		4 = Filter Performa Cv
P18	Salt Change Lock out	0-1	1	**0**		0 = none, 1 = Salt/Capacit change locked out
P19	Flo V 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 Vitch Dela	0-254	1	**60**	Seconds	Time remote s Vitch must be active to start a back Vash
P22	Factor Use Onl - DO NOT CHANGE			**99**		

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

Table 3.2 - Programming Performa Cv 962F Five Cycle Filter

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

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

Table 3.3 - Programming Performa Cv 962 TC Electronic Time Clock Filter

Parameter	Description	Range of Values	Minimum Increment	Recommended Program Value	Units of Measure	Notes
P1	Da of \veek and time of da	(1-7) 1:00-12:59 AM or PM Metric (1-7) 0:00-23:59	(1 da) 1 Minute	**Current Day and Time**	Hour Minute	Range depends on value selected for P13. For da of \veek SUN=1, MON=2, TUE=3, H D Da .8(r)-25( )1-30.3(dPro7 TD6.5758 -15a7 TD6.m81 7 TD

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

Electronic Time Clock Operation

To initiate an automatic back \vash one or both of the follo \ving options must be chosen. The s stem ma be back \vashed manuall b pressing the Back \vash button for three seconds.

Programming automatic regeneration frequenc :

The Electronic Time Clock has t \vo regeneration options: Interval Regeneration and Da of Week Back \vash.

Interval Backwash The Electronic Time Clock ma be programmed to regenerate at intervals up to 30 da s. This feature is also kno \vn as Calendar Override. It is located at P14. E ample: If 5 is programmed into P14 then the s stem \vill back \vash ever five da s at the time programmed into P2.

Day of Week Backwash The Electronic Time Clock ma be programmed to back \vash on a specific da or specific da s of the \veek. 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 ma be operated as a single, dual, or triple s stem.

Dual and Triplex Conditioners and Filters

The dual and triple s stems require a different cam than the cam that is used in the single unit s stems. The also require an interconnecting lock out cable. This allo \vs the unit that is in regeneration or back \vash to signal the other units and prevents them from starting a regeneration or back \vash until the first unit is finished. Dual and triple units should be plumbed in parallel \vith each other. In a multi-unit s stem the back \vash \vater is supplied b the other unit or units in the s stem. In a Dutd(er)ET orm 19i412 53Jtrm-9.4(her un.7(i4u)-4.99(i)7.7b-6.9(t)e

3.2 Mechanical

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

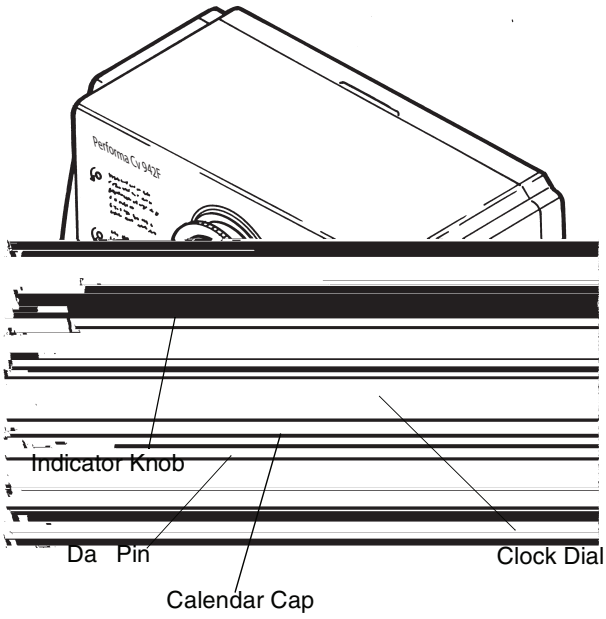


Figure 3.1

3.2.1 Settings

Setting the Time of Da , the Da s of Back ash and performing manual back ashing ith the 942F controls.

Setting the Time of Day
Rotate the Clock Dial **clockwise** until the pointer indicates the correct time of da . With the time of da set, the conditioner ill back ash at appro imatel 2:00 a.m. If it is desired to have the unit back ash at an earlier or later time, simpl offset the current time of da accordingl . For e ample, to have the unit back ash at 4:00 a.m., set the Clock Dial 2 hours later than the actual current time of da .

Note: Do not rotate the Calendar Cap by hand. The Clock Dial inde es the Calendar Cap dail . To manuall inde the Calendar Cap, rotate the Clock Dial **clockwise** one complete turn for ever da to be inde ed. Da pins should be in the out ard position during Clock Dial rotation to prevent an undesired back ash. Reset da pins hen completed.

Setting the Days of Backwash
Setting the da s that the conditioner ill back ash is accomplished in t o simple steps:

1. Pull all of the da pins out ard.
2. Push in the da pin(s) for the da (s) on hich a back ash is desired.

NOTE: The NEXT DAY pin is noted on the control face. Pushing this pin ill insure a back ash the ne t da at appro imatel 2:00 a.m. since the Calendar Cap progresses in a clock ise direction, pushing the da pin immediatel follo ing the NEXT DAY pin counterclock ise ill insure a back ash occurs the follo ing da at appro imatel 2:00 a.m. This progression is noted on the control face as ¡FUTURE DAYS'=

Manual Backwash
E cessive ater usage or other service related issues ma create the need to manuall back ash the filter. This function is performed b rotating the Indicator Knob **COUNTERCLOCKWISE** to the ¡START'=position. Once in this position, the filter ill begin a back ash ithin a fe minutes. The normal schedule, established ith the pushed in da pins, ill not be disrupted b a manual back ash.

24 Hour Clock
The Performa Cv Series 942F control utili es a 24 hour clock dial. This is t picall referred to as ¡Militar Time'= The hours of the da bet een 12:00 a.m. (midnight) and 12:00 p.m. (noon) are designated on the clock dial b the numbers 1 through 12, ith 1 being 1:00 a.m. The hours of the da bet een 12:00 p.m. (noon) and 12:00 a.m. (midnight) are designated on the clock dial b the numbers 13 through 24, ith 13 being 1:00 p.m. Be sure to set the correct time of da accordingl .

Adjusting the Backwash Setting

The Back Vash Dial (Figure 3.2) controls the back Vash time. With the Indicator Knob in the BACKWASH COMPLETE position, rotate the Back Vash Dial counterclock Vise at least one full turn to cancel out the current setting. A light clicking sound Vill be replaced b a heavier clicking sound Vhen the previous setting is cancelled. Once the heavier clicking is heard, the ne V setting ma be set b rotating the Back Vash Dial to the desired setting. The numbers on the Back Vash Dial represent MINUTES=of back Vash time.

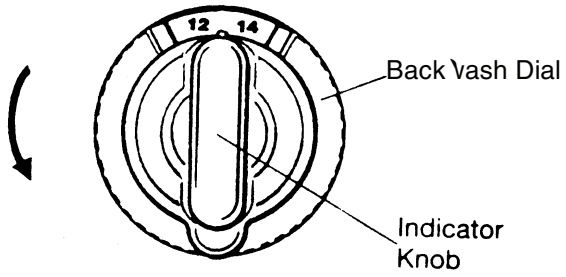


Figure 3.2 Back Vash Complete

Table 3.4 - Cycle Times for 942F Control

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

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

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

Number	Description of Program Values	Explanation

Number	Description of Program Values	Explanation
P5 page 12	Capacit of unit	Enter the capacit of the unit here, in kilograins (kilograms). For e ample, a 3 ft^3 unit \ith a resin capacit of 25,000 grains (1620 grams) per ft^3, enter 75 here. (25,000 grains/ ft^3) (3 ft^3) = 75,000 grains = 75 kilograins. [(1620 grams/ ft^3) (3 ft^3) = 4860 grams = 4.86 kilograms]. Note: 15 lb/cu ft salting ields 30,000 grains/cu ft resin 10 lb/cu ft salting ields 25, 000 grains/cu ft resin 6 lb/cu ft salting ields 20,000 grains/cu ft resin Reduced salting ields a reduced capacit 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 flo \ rate times 100, rounded to the ne t \hole number. For e ample, on a 16-inch tank, the refill control has a flo \ rate of 1.3 gpm. Enter 130 (1.3 gpm 100 = 130).
P7 page 12	Brine dra \ rate	Enter value from Table 2.1 - Suggested Settings on page 12 of manual. This is the injector dra \ rate times 100, rounded to the ne t \hole number. For e ample, on a 16-inch tank, the injector has a dra \ rate of 0.8 gpm. Enter 80 (0.8 gpm 100 = 80).
P8	Not used	P8 is reserved for future use.
P9	Back \ash time	Self e planator . Generall , 5 to 15 minutes or until \ater runs clear or specific \ater conservation needs are met.
P10	Slo \ rinse	Time, in minutes, to achieve adequate slo \ rinse volume for resin t pe used. Resin manufacturers recommend one to t \o and one half bed volumes of slo \ rinse \ater. The required amount of time is calculated using the injector performance curves provided in Section 4.0 of this manual. For e ample, assuming 4 cubic feet of resin and t \o bed volumes of slo \ rinse \ater for a 16 65, 50 psi inlet pressure, program 43 minutes in Parameter P10. (4 cubic feet) (7.5 gallons/cubic foot) 2 (bed volumes) = 60 gallons of slo \ rinse \ater. A ¸Q'=injector is recommended for a 16-inch tank. From the ¸Q'=injector performance chart the nominal slo \ rinse rate is 1.4 gpm. 60 gallons divided b 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 t pe used. For e ample, for standard softening resin (Ionac C-249), fast rinse at 30 gallons (0.11 m^3) per cubic foot of resin. A unit \ith 3 ft^3 of resin \ill require 90 gallons (0.34 m^3) of \ater to obtain the resin manufacturer's recommended fast rinse. (30 gal/ ft^3 3 ft^3) = 90 gallons. (0.11 m^3/ ft^3 3 ft^3 = 0.34 m^3). The fast rinse flo \ rate is controlled b the drain line flo \ control. For this e ample, assume a 5 gpm (1.14 m^3/hr) drain line flo \ control. Enter 18 minutes in P10. (90 gallons/5 gpm) = 18 minutes (0.34 m^3/1.14 m^3 /hr = 0.3 hr/ 60 min = 18 minutes).
P12	Units of measure	Self e planator . Enter 0 for U.S., enter 1 for metric.
P13	Clock mode	Self e planator . Enter 0 for 12-hour clock, enter 1 for 24-hour clock.
P14	Calendar override	0 = No calendar override. 1 - 30 = Ma imum number of da s bet \een regeneration/back \ash.
P15	Reserve t pe Immediate or dela regeneration	See P2. Not used in Alternating mode.
P16 ***	Fi ed Reserve capacit	If P15 is set at 1 or 3, enter the fi ed reserve capacit (in gallons) (m^3) that the unit \ill look for as e plained in sections P2 and P15 above. Not used in Alternating mode.
P17	Operation t pe	Self e planator . 3 = Single or parallel Conditioner or Tank; 4 = Single or Parallel Filter.

Number	Description of Program Values	Explanation
P18	Salt/capacit lockout	Allo \s for the lock out of P4 and P5 so that NO unauthori ed changes to the programmed values can be made.
P19	Flo \ Sensor Select	This parameter is used to select the flo \ sensor that is to be used \ith the s stem. The factor -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 suppl 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. Ho \ this number is used is defined b the values stored in P12 (units of measure) and P19 (flo \ 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-Flo \ are t \o flo \ sensor manufacturers that publish a K-factor. The control can no \ use an flo \ sensor as long as the programmed K-factor is correct. The pulse equivalent is defined as gallons or liters per pulse. The control \ill register 5 gallons of flo \ for ever pulse if P12 = 0, P19 = 4 and P20 = 5.00. Badger Meter is one manufacturer that uses a pulse equivalent. The control \ill not sho \ flo \ rate if P19 = 4 (pulse equivalent). This is because pulses are accumulated over 10 seconds and flo \ rate is displa ed in gallons per minute. The control \ill alternate bet \een time of da and capacit remaining or regeneration time remaining during normal operation.
P21	Remote regeneration/ back \ash s \itch dela	This parameter is used to program the length of signal time required to initiate a regeneration/back \ash using a differential pressure s \itch or remote start button/contact. The range is 1 to 254 seconds in 1-second steps. The default is 60 seconds. A counter starts \hen there is a closed dr contact (no voltage) to this input. A regeneration/back \ash \ill start \hen the contacts remain closed for the programmed time. The counter \ill reset to ero \hen 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 \ash.
P22	Factor use onl	**DO NOT CHANGE**

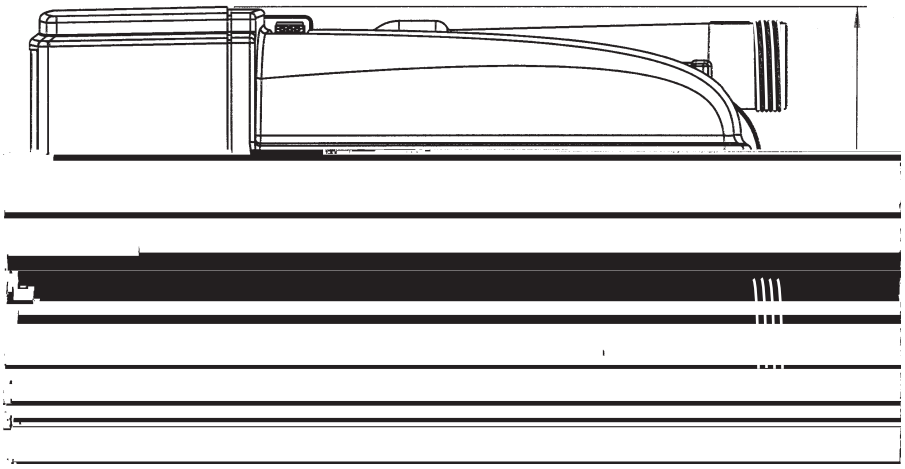
* The 962 controller functions in either a 12-hour or 24-hour clock mode. Programming P13 (clock mode) before P1 or P2 \ill eliminate an confusion \hen setting these parameters.

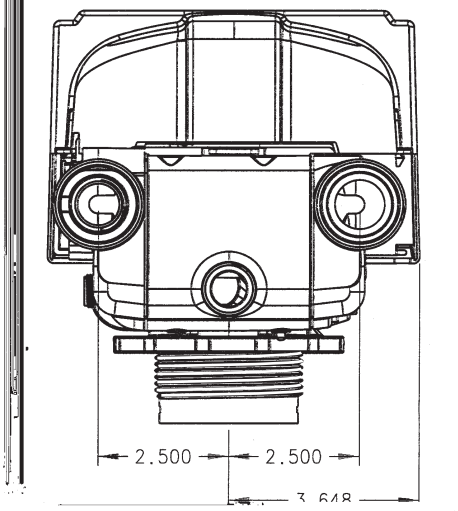
** The 962 controller functions in either U.S. or metric units. Programming P12 (units of measure) before P3 or P4 \ill eliminate an confusion \hen setting these parameters.

*** The calculated gallon amount loaded into the dail registers (L7 through L13) at START-UP, uses this percentage of capacit . E ample: 90,000 grains in P5 , 10 grains in P3, 90,000 / 10 = 9,000 gallon capacit , 9,000 .3 (30% in P16) = 2700 gallons, \hich is loaded into L7 through L13, the dail averages. For this e ample, the smart reserve at START-UP, \ould be 2700 gallon 1.2 (120% of the dail average) = 3240 gallon. This dail average \ill change as actual \ater usage information is gathered.

4.0 Performa Cv Performance Charts and Graphs

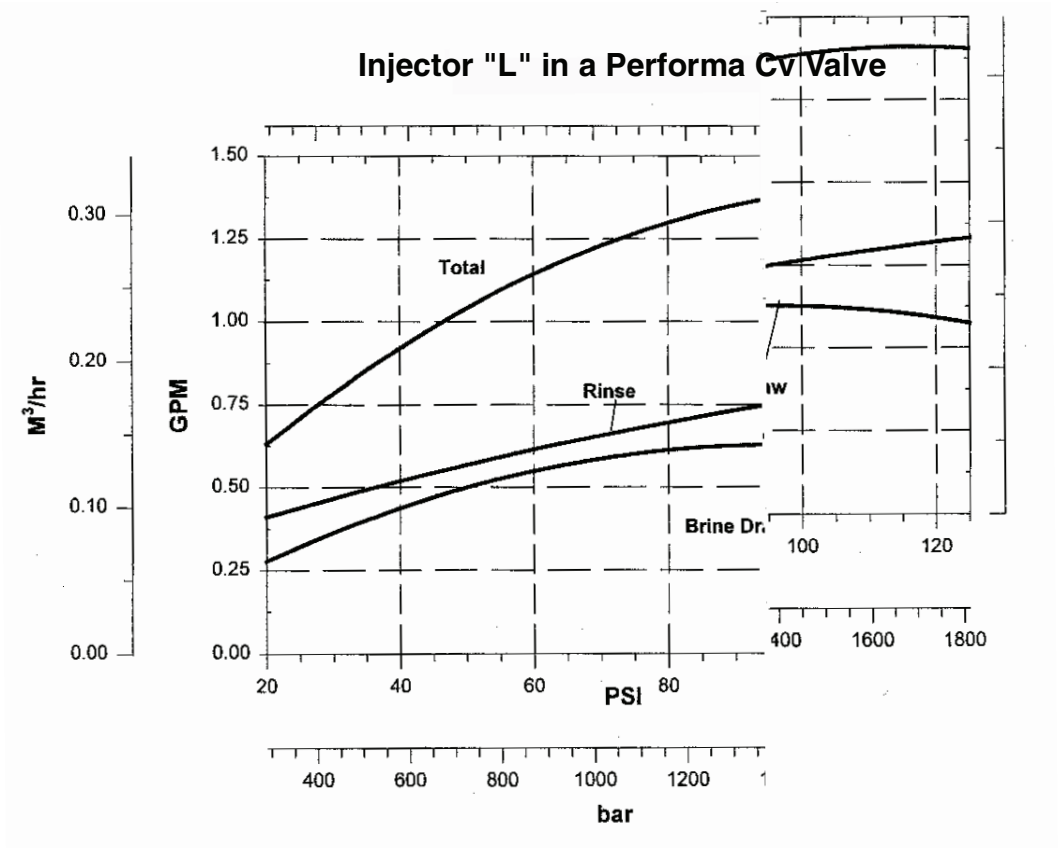
4.1 General Specification

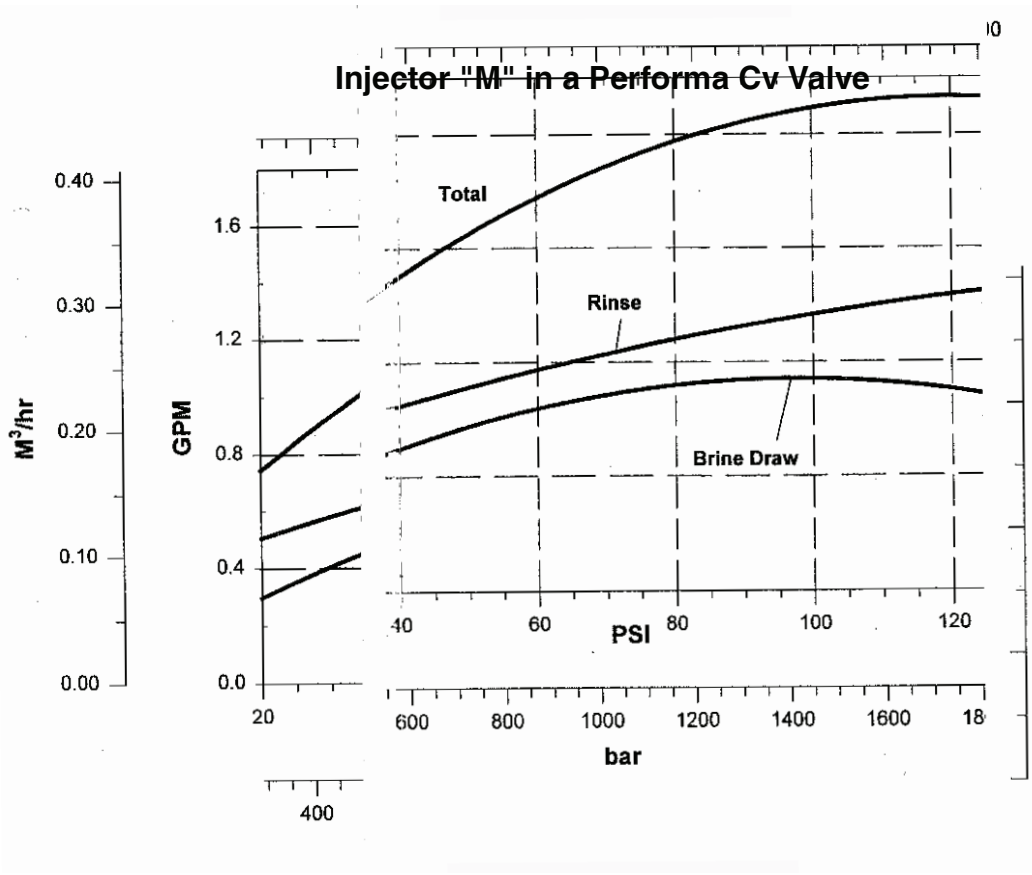


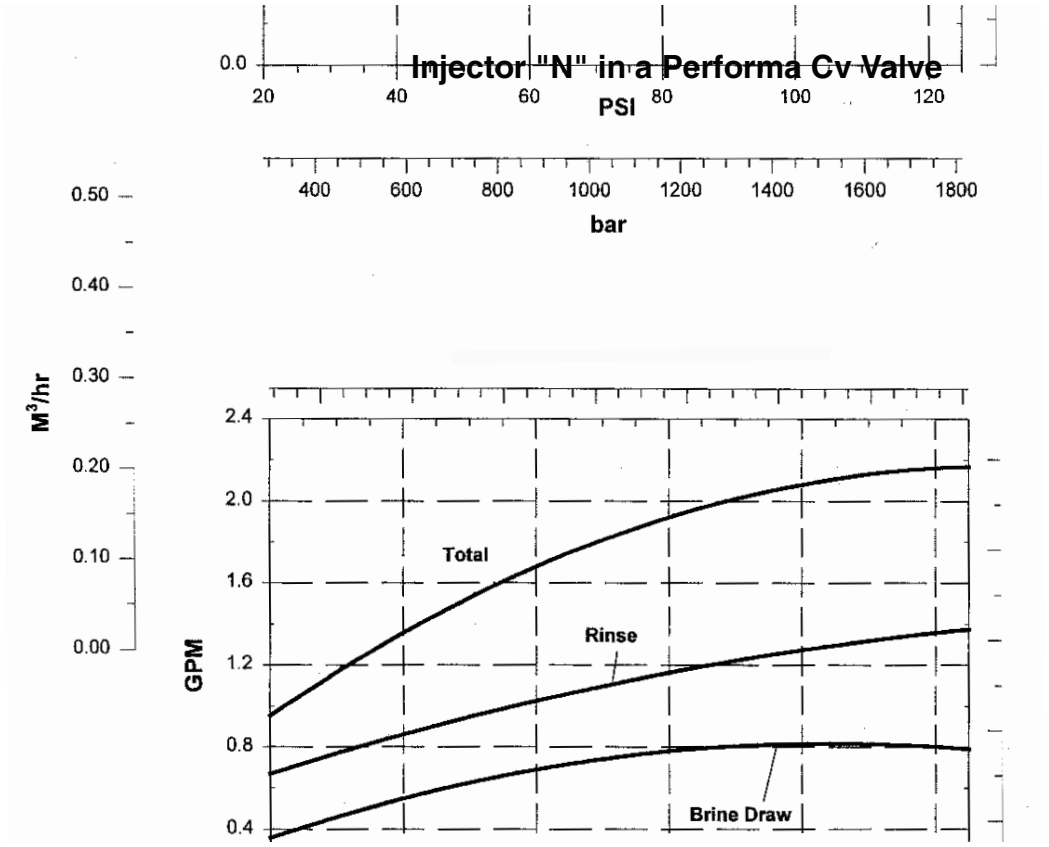


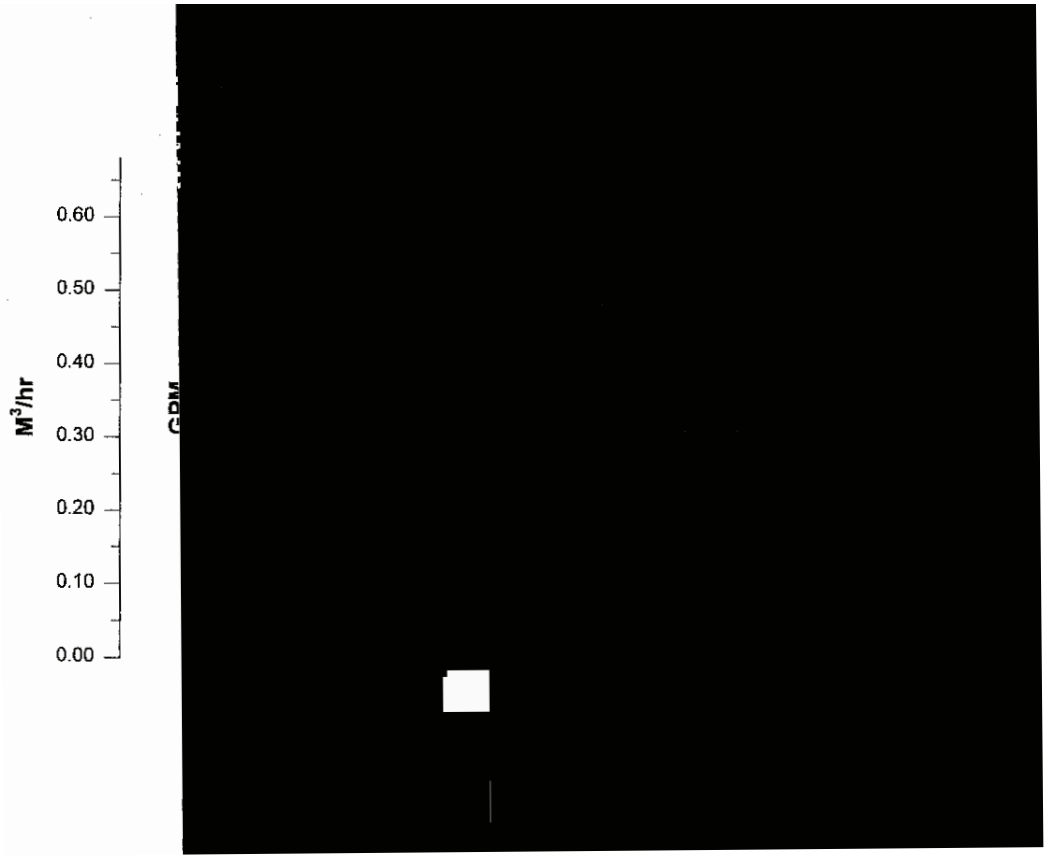
H drostatic Test Pressure . . . . . 300 psi (20.69 bar)
Working Pressure . . . . . 20-120 psi (1.38 - 8.27 bar)
Standard Electrical Rating . . . . . 962: series Vall transformer 12V 60 H , 12V 50 H
942F: 7 da or 12 da /24 hour 50 H 12 V transformer, 60 H 120 Vac or 12 V transformer
Electrical Cord (standard rating) . . . . . .60-inch (1.5-m) 3-Vire Vith 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 B pass Valve . . . . . Rotating handles, full 1-inch porting, reinforced Plastic
Control Module, Tank Adapter . . . . . .Reinforced Plastic
Rubber Goods . . . . . Compounded for cold Vater service
Program Clock (Timer) 942F: Available in 7- to 12-da 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
E ternal Back Vash Controllers . . . . . 5, 7, 10, 12, 15, 20 GPM. Be ond 20 GPM must be outside sourced.

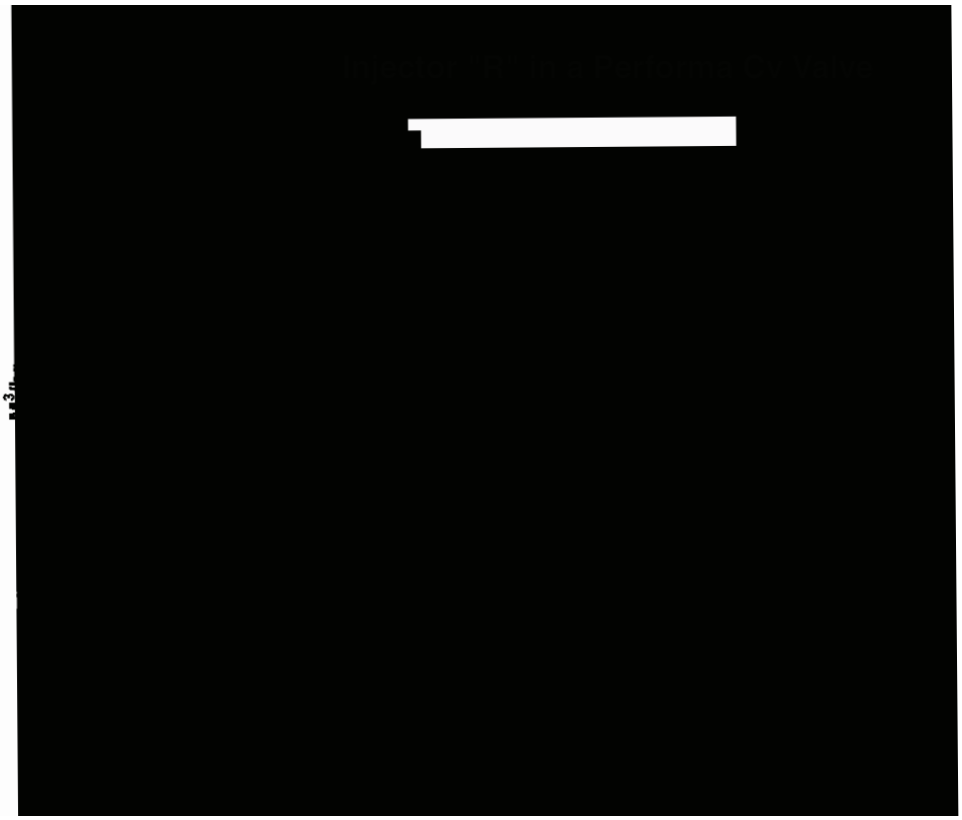
4.2 Injector Curves






Injector "N" in a Performa Cv Valve
0.0
20
40
60
80
100
120
PSI
400
600
800
1000
1200
1400
1600
1800
bar
0.50
0.40
0.30
0.20
0.10
0.00
M³/hr
2.4
2.0
1.6
1.2
0.8
0.4
GPM
Total
Rinse
Brine Draw


0.60
0.50
0.40
0.30
0.20
0.10
0.00
M³/hr



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

Pressure Loss vs Flow (gpm)		
PSI	**Service (Cv 6.5)**	**Backwash (Cv 5.0)**
5	15	11
10	20	16
15	25	19
20	29	22
25	32	25
30	35	27
Pressure Loss vs Flow (Lpm)		
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)

		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)	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)			

*Ma e ceed 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

* Ma e ceed 25 psi or 1.72 bar pressure drop during back \vash of second unit.

NR = Not Recommended. A flo \v control on the service outlet of each valve ma be required to insure proper back \vash volume to back \vashing unit.

5.2 Preventative Maintenance

Injector Screen and Injector

Inspect and clean brine tank and screen filter on end of brine pickup tube once a ear or \vhen sediment appears in the bottom of the brine tank.

Clean injector screen and injector once a ear:

1. Unplug the \vall-mount transformer.
2. Shut off \vater suppl or put b pass valve(s) into b pass position.
3. Relieve s stem pressure b opening valve No. 7 (at rear) \vith a scre \vdriver.
4. Using a scre \vdriver, remove injector screen and injector cap (Figure 5.1).
5. Clean screen using a fine brush. Flush until clean.
6. Using a needle-nose pliers, pull injector straight out.
7. Flush \vater into the injector screen recess of the valve bod to flush debris out through the injector recess.
8. Clean and flush the injector.
9. Lubricate the O-rings on the injector, injector cap and injector screen \vith **silicone lubricant only**!
10. Reinstall the injector, injector cap and injector screen.

IMPORTANT: Do not overtighten the plastic cap. Seat the cap lightl into position. Overtightening ma cause breakage of the plastic cap that ma not be immediatel evident.

11. Plug the \vall-mount transformer into outlet; reset clock if necessar .
12. Slo \vl open \vater suppl valve or return b pass valve(s) to the ¸service"=position.

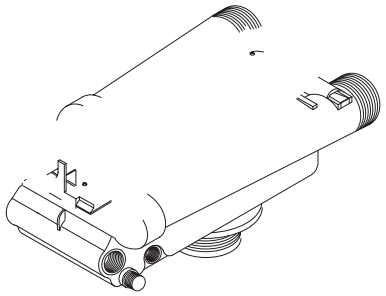


Figure 5.1

Water Meter Maintenance

The metering device used \vith the 962 Cv demand controls ma require simple maintenance. In rare instances, the turbine \vheel of the \vater meter can collect small particles of o idi ed iron, eventuall preventing the \vheel from turning.

1. Shut off the \vater suppl or put the b pass valve(s) into the b pass position.
2. Relieve pressure b opening the Back \vash Drain Valve (the seventh back from the control) \vith a scre \vdriver.
3. Loosen and remove the pipe/tube adapters or 1265 b pass from the inlet and outlet of the valve bod .
4. Using a needle-nose pliers, remove the turbine from the outlet housing. Grasp one of the four vanes of the outer gland and pull straight out to remove turbine assembl from the outlet of the valve (Figure 5.1).
5. Carefull remove the turbine \vheel from the housing. Use a toothbrush to lightl scrub the iron off the magnet. Iron buildup on the surfaces can be removed b soaking the \vheel in a mild sodium h drosulfite (such as RoVer*) solution for a fe \v minutes. Flush thoroughl \vith \vater.
6. Carefull reinstall the turbine \vheel into the turbine cage housing. Make sure that the shaft of the \vheel seats into the bearing of the cage. Reassemble the turbine cage and check that the \vheel rotates freel .
7. Reinstall the turbine cage into the outlet of the valve.
8. Reinstall the pipe/tube adapters or 1265 b pass to the inlet and outlet of the valve.
9. Turn on the \vater suppl or put the b pass valve(s) into the service position and purge the air out of the s stem.

To check for proper meter operation, open a do \vnstream faucet and observe the \vater flo \v indication, blinking colon, on the control displa .

**RoVer is a trademark of Hach Chemical Compan .*

5.3 Removing the Valve Assembly for Servicing

1. Unplug the po ver cord.
2. Shut off ater suppl or put b pass valve(s) into b pass position.
3. Remove cover and ith scre driver, relieve tank pressure b pushing open valve No. 7 (rear flapper) on control as sho n (Figure 5.2).

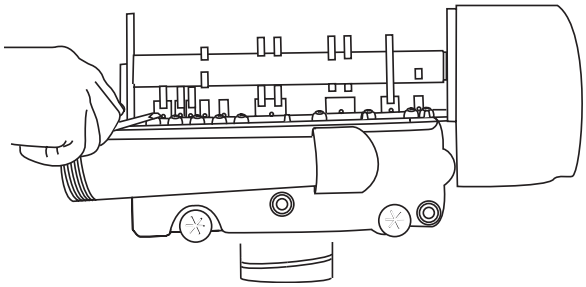


Figure 5.2

4. When used ith a globe valve b pass, loosen and detach the inlet, outlet, brine and drain lines from the valve. If using the 1265 b pass, loosen and remove valve from b pass as ell as loosening and removing the brine and drain lines.
5. Unscre (counterclock ise) and remove valve from tank.
6. To replace the control valve, reverse the above procedure.

5.4 Removing the Control

Complete the follo ing steps to remove the 960 ProSoft control for servicing:

1. Unplug the all-mount transformer.
2. Shut off the ater suppl or put the b pass valve(s) into b pass position.
3. Remove the rear cover b depressing the t o tabs provided on the cover, Figure 5.3. Lift the front of the cover and remove to e pose the valve bod .

Figure 5.3

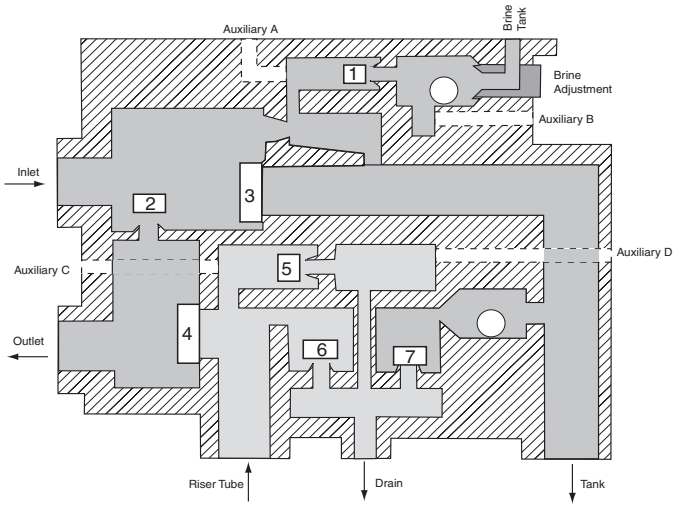
4. Relieve s stem pressure b opening the Back ash Drain alve (the seventh valve back from the control) ith a scre driver, Figure 5.4.

Figure 5.4

5. To remove the camshaft or to reinstall it, the arro on the rear of the cam shaft must be pointing at the line on the rear ¸ hoop'=of the top plate. This occurs hen the c cle indicator is rotated to the refill position. Press do n 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.

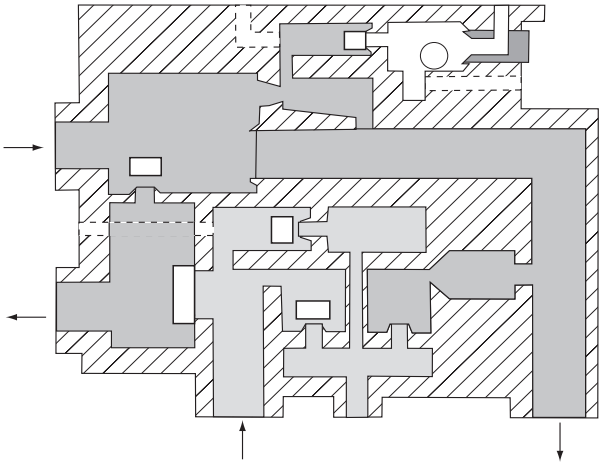
Figure 5.5

3 Brine/Slow Rinse Position



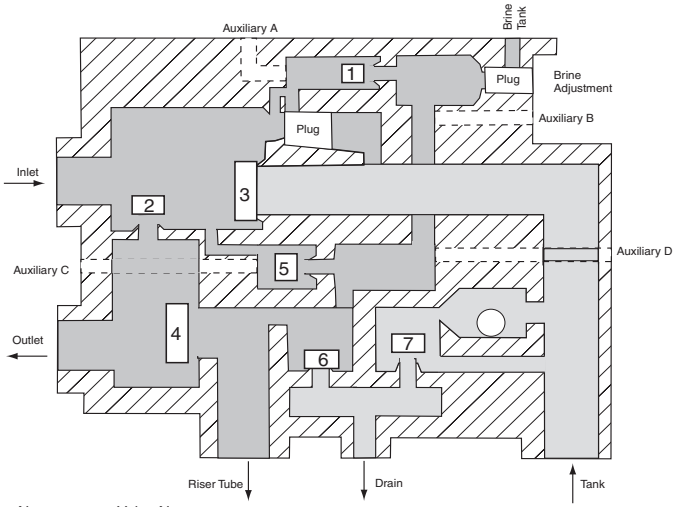
Name	Valve No.
Brine	1 - Open
By-Pass	2 - Open
Inlet	3 - Closed
Outlet	4 - Closed
2nd Tank Top	5 - Open
Purge	6 - Open
Backwash	7 - Closed

4 Fast Rinse Position



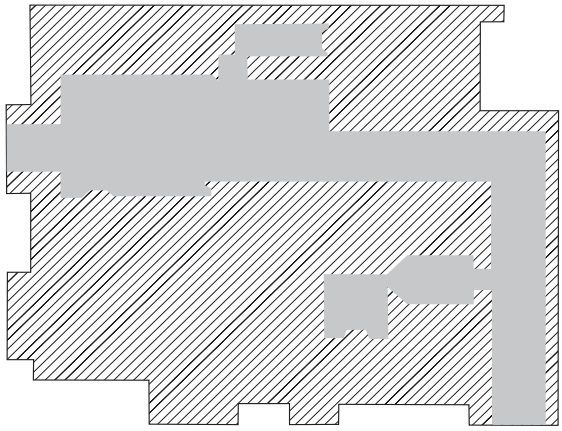
5.8 Performa Cv Filter Flow Diagrams

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 technolog upon \hich the Autotrol Performa control valve is based is \ell established and proven in service over man ears. Ho\ever, should a problem or question arise regarding the operation of the s stem, the control can be serviced easil . For parts mentioned, refer to e ploded vie\s in the **Replacement Parts** section of this manual.

IMPORTANT: Service procedures that require the \ater pressure to be removed from the s stem are marked \ith a **!** after the possible cause. To remove \ater pressure from the s stem, put the b pass valve or three-valve b pass into the b pass position and open the back\ash drain valve (the seventh valve back from the control) \ith a scre\driver. Restore s stem \ater pressure \hen the service \ork is completed.

Valve Troubleshooting

Problem	Possible Cause	Solution
1. Control \ill not dra\ brine.	a. Lo\ \ater 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 b pushing in on stem. Replace if needed.
	f. Damaged injector O-ring.	f. Replace injector O-ring.
2. Brine tank overflo\.	a. Brine valve (1) being held open.	a. Manuall operate valve stem to flush a\a obstruction.
	b. Uncontrolled brine refill flo\ rate **!**	b. Remove variable salt controller to clean.
	c. Valve (3 or 4) not closed during brine dra\ causing refill.	c. Flush out foreign matter b holding disc open and manuall operating valve stem.
	d. Air leak in brine line.	d. Check all connections in brine line for leaks. Refer to instructions.
3. S stem using more or less salt than salt control is set for.	a. Inaccurate setting.	a. Correct setting.
	b. Foreign matter in controller causing incorrect flo\ rates **!**	b. Remove variable salt controller and flush out foreign matter. Manuall position control to brine dra\ 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 dra\.	a. Lo\ \ater pressure.	a. Set pump to maintain 30 psi at conditioner.
	b. Defective injector **!**	b. Replace both injector and injector cap.
5. No conditioned \ater after regeneration.	a. Unit did not regenerate.	a. Check for po\er.
	b. No salt in brine tank.	b. Add salt.
	c. Plugged injector **!**	c. Clean injector. Flush \ith \ater.
6. Control back\ashes at e cessivel lo\ or high rate.	a. Incorrect back\ash controller used.	a. Replace \ith correct si e controller.
	b. Foreign matter affecting controller operation **!**	b. Remove controller and ball. Flush \ith \ater.
7. Flo\ing or dripping \ater at drain or brine line after regeneration.	a. Drain valve (6 or 7) or brine valve (1) held open b foreign matter or particle.	a. Manuall operate valve stem to flush a\a obstruction.
	b. Valve stem return spring on top plate \eak.	b. Replace spring.
8. Hard \ater leakage during		

962 Control Troubleshooting

Alarms

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

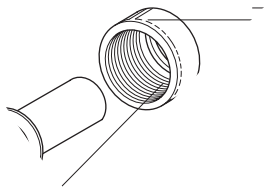
When the alarm sounds, the displa sho\s the letters ¡Err¢ \ith a number from 1 to 4. The table belo\ lists the Err numbers, a description of each error, the cause of the error, and the solutions. To silence the alarm, press an button on the control. If the error still e ists, the control \ill go back to the alarm condition after 30 seconds.

Model 960 Alarms

Indication	Description	Cause	Solution
Err1	Electronics Failure	Control settings need reprogramming.	Press an ke to load default values. Refer to ¡Programming the Model 960 Control¢
Err2	Improper start of regeneration (limit s\itch closed \hen it should be open).	Valve camshaft has been manuall rotated during a regeneration. Valve camshaft has been manuall rotated out of ¡regeneration complete¢ position. Fault motor. Fault motor drive. Fault s\itch.	Press an ke to silence the alarm. (Note: Alarm automaticall clears at ¡TIME OF REGEN¢) The control \ill 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 s\itch open \hen it should be closed).	Valve camshaft has been manuall rotated out of ¡regeneration complete¢ position. Fault motor. Fault motor drive. Fault s\itch.	The control \ill 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 allo\able range).	One or more settings out of the allo\able range.	Hardness: Adjust range: 3 to 250. Capacit : Adjust range: 0.1 to 140.0. Refill control: Adjust range: 1 to 99. Brine dra\ value: Adjust range per Table 4.1.

Problem	Possible Cause	Solution
1. Capacit displa sta s at 9999 even through there is \ater usage.	a. Total s stem capacit \as calculated to be a value greater than 9999.	a. As the \ater usage continues, the remaining capacit \ill drop belo\ 9999 and then other values \ill be sho\n.
2. Timer beeps \hen left arro\ button is pressed.	a. Button is onl 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 displa time of da .	a. Transformer is unplugged. b. No electric po\er at outlet. c. Defective transformer. d. Defective circuit board.	a. Connect po\er. b. Repair outlet or use \orking outlet. c. Replace transformer. d. Replace control.
5. Timer does not displa correct time of da .	a. Outlet operated b a s\itch. b. Po\er outages.	a. Use outlet not controlled b s\itch. b. Reset Time of Da .

Problem	Possible Cause	Solution
6. No \vater flo\v displa \vhen \vater is flo\ving (colon does not blink).	a. B pass valve in b pass position. b. Meter probe disconnected or not full 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 b pass valve into service position. b. Full insert probe into meter housing. c. Remove meter housing, free up turbine and flush \vith clean \vater. Turbine should spin freel . If not, refer to the Water Meter Maintenance section. d. Replace control. e. Replace control.
7. Control displa is fro en at Regen Time Remaining.	a. Back to back regenerations \vere requested.	a. Refer to the Manual Regeneration section.
8. Control regenerates at the \vrong time of da .	a. Po\ver outages. b. Time of da set incorrectl . c. Time of regeneration set incorrectl .	a. Reset time of da to correct time of da . b. Reset time of da to correct time of da . c. Reset time of regeneration.
9. Timer stalled in regeneration c cle.	a. Motor not operating. b. Motor runs back\vards. c. No electric po\ver at outlet. d. Incorrect voltage or frequenc (H). e. Broken gear. f. Defective s\vitch. 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 \vorking outlet. d. Replace timer and/or transformer \vith one of correct voltage and frequenc (H). 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 s\vitch.	a. Replace control. b. Replace control.
11. Control does not regenerate automaticall or \vhen REGEN button is depressed.	a. Transformer unplugged. b. No electric po\ver at outlet. c. Defective motor. d. Broken gear. e. Binding in gear train. f. Defective s\vitch.	a. Connect po\ver. b. Repair outlet or use \vorking outlet. c. Replace control. d. Replace control. e. Replace control. f. Replace control.
12. Control does not regenerate automaticall but does regenerate \vhen REGEN button is depressed.	a. If \vater flo\v displa is not operative, refer to item 5 in this table. b. Incorrect hardness and capacit settings. c. Defective circuit board.	a. Refer to item 5 in this table. b. Set ne\v control values. Refer to the Programming section. c. Replace control.
13. Run out of soft \vater bet\veen regenerations.	a. Improper regeneration. b. Fouled resin bed. c. Incorrect salt setting. d. Incorrect hardness or capacit settings. e. Water hardness has increased. f. Restricted meter turbine rotation due to foreign material in meter housing **!** g. E cessive \vater usage belo\v 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 ne\v value. Refer to the Programming section in this manual. f. Remove meter housing, free up turbine, and flush \vith clean \vater. Turbine should spin freel , if not, replace meter. g. Repair leak plumbing and/or fi tures.



6.2 Parts List

Code	Part No.	Description	Qty.
1	1000413	Performa Cv Conditioner Valve Ass , Ѵ/o	1
		Flo Ѵ Controls	
	1000418	Performa Cv Filter Valve Ass , Ѵ/o Flo Ѵ Control	
2	1035611	962 Conditioner Cam Ass , Single Unit	1
	1030377	962 Conditioner Cam Ass , Multi Unit	
	1030380	962F Filter Cam Ass , Single Unit	
	1030384	962F Filter Cam Ass , Multi Unit	
3		Drain Control Assembl :	1
	1030355	DLFC Ass , 5 gpm	
	1030356	DLFC Ass , 6 gpm	
	1030357	DLFC Ass , 7 gpm	
	1030358	DLFC Ass , 8 gpm	
	1030359	DLFC Ass , 9 gpm	
	1030360	DLFC Ass , 10 gpm	
	1000406	DLFC Ass , 12 gpm	
	1000407	DLFC Ass , 15 gpm	
	1000408	DLFC Ass , 17 gpm	
	1000409	DLFC Ass , 20 gpm	
	1000410	DLFC Ass , 25 gpm	
4	1030502	Ball, Flo Ѵ Control	2
5		Injector Assembl (includes O-Rings):	1
	1035736	' L'=Injector - Orange	
	1035737	' M'=Injector - Bro Ѵn	
	1035738	' N'=Injector - Green	
	1035739	' Q'=Injector - Purple	
	1035884	' R'=Injector - Dark Gre	
6	1000269	Injector Cap Assembl (includes O-RIngs):	1
7		Brine Refill Control	1
	1000224	.74 gpm	
	1000519	1.3 gpm	
8	1002449	Drain Fitting Elbo Ѵ (3/4'=hose barbed)	1
9	1000226	Screen/Cap Assembl	1

Code	Part No.	Description	Qty.
10	1010429	O-Ring	1
11	1035622	Tank Ring	1
12		Plumbing Adapter Kits:	1
	1001606	3/4-inch Copper Tube Adapter Kit	
	1001670	1-inch Copper Tube Adapter Kit	
	1041210	1-1/4-inch Copper Tube Adapter Kit	
	1001608	22-mm Copper Tube Adapter Kit	
	1001609	28-mm Copper Tube Adapter Kit	
	1001613	3/4-inch CPVC Tube Adapter Kit	
	1001614	1-inch CPVC Tube Adapter Kit	
	1001615	25-mm CPVC Tube Adapter Kit	
	1001769	3/4-inch NPT Plastic Pipe Adapter Kit	
	1001603	1-inch NPT Plastic Pipe Adapter Kit	
	1001604	3/4-inch BSPT Plastic Pipe Adapter Kit	
	1001605	1-inch BSPT Plastic Pipe Adapter Kit	
	1001611	3/4-inch BSPT Brass Pipe Adapter Kit	
	1001610	1-inch NPT Brass Pipe Adapter Kit	
	1001612	1-inch BSPT Brass Pipe Adapter Kit	
13	1033444	Turbine Assembl	1
14	1001580	Spring, Flapper Valve	
15	1030372	Cover	1
*		Valve Disc Kit:	
	1041174	Standard	
	1041175	Severe Service	
*	1034312	Interconnect Cable, Dual Operation	
	1035593	Interconnect Cable, Triple Operation	
*	1075768	Batter , 9-Volt Rechargable	
*		Parallel Kits, Multi-unit Operation	
*	1035923	Dual Parallel Conditioner Kit	
*	1035925	Triple Parallel Conditioner Kit	
*	1035926	Triple Parallel Filter	

* Not Sho Ѵn

6.3 Performa Cv Controls

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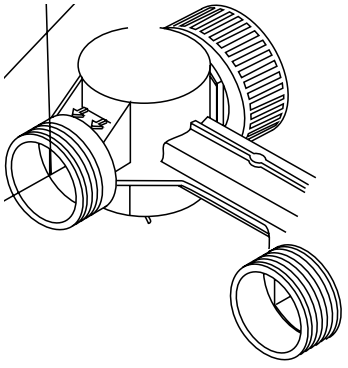

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