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

1.1.2 Performa Cv Filter Specifications

Flow Rates (Valve Only)

S rvic @ 15 psi (1.03 bar) p . . . . . 25.0 pm (5.7 m³/h)
Bac ash (iX r) @ 25 psi (1.72 bar) p . . . . . 25.0 pm (4.5 m³/h)
S rvic . . . . . Cv = 6.5 (v = 5.5)
Bac ash iX r . . . . . Cv = 5.0 (v = 5.7)

Control Operation

942F Mechanical Clock Timer - 7 Day or 12 Day

Bac ash . . . . . -30 minut s
i ast Rins . . . . . minut s

962F Microprocessor Demand

Bac ash . . . . . 4 to 60 minut s
ast Rins . . . . . 2 to 1 minut s

962 FTC Electronic Time Clock

Bac ash . . . . . 4 to 60 minut s
ast Rins . . . . . 2 to 1 minut s

Interval Regeneration . . . . . a fh W R n rati n

Valve Connections/Dimensions

Tan Th r a . . . . . 2-1/2 inb s - , maX
InX t/OutX t . . . . . 1-3/4 inb s - 12 N C-2 , maX
rain in . . . . . .

1.2 Installation

Xobumbinq an" Xctricaxq nn cti ns must q nf rm t
xcaxq " s.

Insp ct unit car fuX f r carri r s rtaq r s ippinq
"amaq .

Location Selection

1. Th "istanc b t nht unit an" a"rain sq uX b
   as sq rt as p ssibX.
2. If it is X XIt at suppXm ntar at r tr atm nt
   "uipm nt ixXb r "uir ", ma c rtain a" "uat
   a"iti naXspac is avaiXabX.
3. Sinc saX must b a" " p ri "icaXX t Ih br
   tan ,Ih XcatiXn sq uX b asiX acc
4. n t instaXan unit cXs r t a
   a t taXrunq f 10 f t (3 m) f
   utXt fIh q n"iti n
   Wat n at rs ca
   t nthI
   pip int

)0nq f at

4. Wh r th rain Xn is Xvat but mpti s int a rain b X th X v X fth c nt Xva Y , f rm a -inb (1 -cm) X p ath far n fth Xn s th at th b tt m fth X p is Xv X th th rain Xn c nn cti n. Th is iXpr vi an a uat sip n trap.
5. Wh r th rain mpti s int an v m a s r Xn , a sin -t p trap must b us .

IMPORTANT: N v r ins rt rain Xn int a rain, s r Xn r trap. X a s aXX an air ap b t nth rain Xn an th ast at r t pr v nth p ssibiXt f s a b in bac -sip n int th c n iti n r.

i ur 1.3

Note.7(an ov)-6.592681n ov ba0.6(l)8.1( )prac-6.6(t)15.3(e)-16.3(lc-6.6(e)0.6(l)17.9( )ha)-6.6(enbeien-23.8( )2TJ62681n o

1.3 Placing Performa Cv Conditioner/Filter into Operation

After you have completed the installation, the unit is ready to be placed in operation.

1. Remove any remaining protective packaging from the plastic cover and the front of the cover. Close the front cover.

   Note The following instructions require turning the clockwise indicator to various positions. Manually rotate the camshaft **COUNTERCLOCKWISE** until the clockwise indicator points to the desired position. (See manual operations section for additional manual operation.)

2. Rotate the clockwise indicator **COUNTERCLOCKWISE** until it points to the **BACKWASH**.

3. Fill the tank with water.

   a. When water begins to flow, press the bypass valve (3) into the service position.

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

IMPORTANT: If open too rapidly or too far, media may be lost. In the 1/4 open position, you will hear air escaping as the tank fills with water.

Conditioner

   a. When you see the air bubbles from the tank (after the brine/slow rinse), open the main supply valve all the way.

   b. Let water run to drain until clear.

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

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

   While a bucket is filling, approximately 4 gallons (15 liters). If the tank has a safety float above the bottom of the tank, water will rise approximately 1 inch (25 mm) above the float.

5. Check the regeneration interval.

   a. When the water supply valve completes its cycle, car fully advance the clockwise indicator **COUNTERCLOCKWISE** to the center **BRINE REFILL** position. Leave in this position until water starts to flow from the drain into the brine tank. Let run for 3 minutes.

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

   c. While in regeneration, check the brine tank. If water is above the brine tank, see **Troubleshooting** section.

   d. Advance the clockwise indicator **COUNTERCLOCKWISE** to the **REGENERATION COMPLETE** position and run water from an open faucet until water is soft.

Filter

Verify correct backwash rate

   a. After water begins to flow from the drain (after brine is first drawn from the brine tank) open the main supply valve all the way. Backwash for minimum of 15 minutes or longer if necessary. Water running to the drain will be clear.
   Carbon media should be backwashed for minimum of 12 hours to allow air bubbles to escape from media.

   b. After backwash is complete, open water valve to advance to **BACKWASH COMPLETE**.

Electrical Connection

100 VAC, 115 VAC, and 230 VAC units: Remove the protective cover from the transformer and connect the cord to a grounded outlet. Make sure the rating plate on the control matches your power supply. Certain areas require the control to be connected to a dedicated circuit.

12 VAC: Connect the transformer (supply) cord to the control valve cable. Route the cable through the opening in the bottom of the cabinet. Be careful not to pinch the cable when closing the cabinet door. Be sure that the control valve is not connected to a switched receptacle.

1.4 Disinfection of Water Conditioners

Th mat ria s f c nstructi n fth m rn at r c n iti n r ix n t supp rt bact ria Xa , th , n r ix th s mat ria s c ntaminat a at r suppX. v r, th n rmaXc n iti ns istin urin a ippin , st ra an ins taXati n in icat th a vis abiXt f isinf ctin a c n iti n r aft r insta Xati n, b f r th c n iti n r is us t tr at p tabX at r. In a iti n, urin n rmaX us , a c n iti n r ma b c m f uX th r anic matt r, r in s m cas s th bact ria f s mth at r suppX.

Th us v r c n iti n r s uX b isinf ct aft r insta Xati n, s m ix r uir p ri ic isinf cti n urin th ir n rmaXt , an in a f cas s isinf cti n th v r r a n rati n uX b r c mm n .

p n ina up nth c n iti ns f us , th st X f c n iti n r, th t p f i n b ana r, an th isinf ctant avai Xab X, a b ic can b ma am n th f X in m th s.

Sodium or Calcium Hypochlorite

Appli mtion

Th s mat ria s ar satisfact r f r us th p Xst r n r sins, s rth tic a X Xt , or nsan an b nt nit s.

5.25% Sodium Hypochlorite

Th s s Xti ns ar avai Xab X un r tra nam s sub as C X BXab *. If st n r s Xti ns ar us , sub ash s s X f r c mm rcia Xaun ri s, a just th a ina acc r in X.

1. a
   a. X st r n r sin 1.2 fXu unc s p r cubic f t.
   b. N n-r sin us b ana r 0. fXu unc p r cubic f t.
2. Brin tan c n iti n rs
   a. Bac ab th c n iti n r an a th r uir am unt fh p b Xrit s Xti n t th brin fth brin tan . (Th brin tan s u h av at r in it t p rmith s Xti n t b carri int h (b (i)-u5.3(s n)-23.-16.(c24.0053 Tc6i) (r p)-16.(c)-

csir5

foot.

2

a. Bacl

2.2 Programming and Application

This section covers aspects of programming the 262 controller.

Note that some parameters have units of measure option such as Run Time which is in minutes. Other parameters have units such as Sample Time which is in 1/4 seconds. The units that can be programmed in Level I parameters. This section covers the programming and application notes of Table 2.1 and Table 2.4. It is for reference and other parameters that uses the units are active. For example, parameter 12 (Table 2.4) selects U.S. units if it is set to **"0"** and (c)hic if it is set to **"1."**

Level I Parameters (Table 2.1)

Salt Amount

Sax m unt ish n t vaxu ispx . Th fax
vaxu f r Sax m unt is 6 p un s (2.7 ix rams). f

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

P5 Capacity Setting iX grains (iX grams)	R sin V. Xm p r Tan (Xt rs)				
	3 ft^3 (5)	4 ft^3 (113)	5 ft^3 (142)	6 ft^3 (1V0)	V ft^3 (1J)
	P4 Salt Setting: . un*s (a). f SaX				
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 inb tan = **74 (.74 gpm)** 16 inb ht ru 21 inb tan s = **130 (1.39 gpm)**					
P7 Brine Draw Setting. XvaXu s ar bas *. n 50 psi (3.5 bar) inXt pr ssur . r pr ssur ht an 50 psi r f r t brin *ra b arts in S cti n 4.0.					
Tan iam t r	Inj ct r	arN umb r	**P7 equals**	C. Xr	
14 in (35.5 cm)	M	1055V3V	**60**	B n	
16 in (40.6 cm)	Q	1035V3J	**80**	urpX	
1 in (45.V cm)	Q	1035V3J	**80**	urpX	
21 in (53.3 cm)	R	1035 4	**83**	ar r	

Level II Parameters (Table 2.4)

Th v XII aram t rs ar 6h r uh 22 in TabX 2.4. T acc ss v XII aram t rs, simuXan u sX pr ss an h X h **DOWN ARROW** (↓) an **UP ARROW** (↑) butt ns f rh r s c n s. Mhumb r iX isp Xa .

R f r t TabX 2.4 t fin h param t r ass ciat h ab Mhumb r. s h **UP ARROW** (↑) butt n rh **DOWN ARROW** (↓) butt n t m v f m n param t r t h n t. Th isp Xa c cX sh r uh h Mhumb rs a n in TabX 2.1 an TabX 2.4. Wh n u r ab 22, h n t numb r iX bac t 1.

Wh nh param t r numb r u ant t b an isp n h isp Xa , pr ssh **LEFT** (←) butt n t isp Xa h ata ass in t h at param t r. r ssh **SET** butt n an h far rih t numb r nh isp Xa starts fXah in. If (←) u ant t b an h (t)15./ 2. RRO12Tj053 Tc1J 56 -1.2h 2 .J(h)-1s

aram t r 22. Sp ciaXc ar nt r ath fact r t p aram aXX fth p rtin nt Xcati ns f r sp cific c nt Xt; M tric f r ampX. Th is param t r is uX n v r b b an b th n us r.

Electronic Time Clock Operation

 arammin aut matic r n rati n fr u nc

Th EXct nic Tim CXc h as t r n rati n pti ns Int rvaXR n rati n an a f W R n rati n.

T initiat an aut matic r n rati n n r b th fth pti ns must b b n. Th s st m ma aX b r n rat manuaXX b pr ssin th R n rati n butt n f r th r c n s.

Interval Regeneration Th EXct nic Tim CXc ma b p aramm t r n rat in int rvaX f up t 30 a . Th is f atur is aram t r 14 CaXn ar Ov rri (s TabX 2.4). E ampX If 5 is p aramm int 14th nth s st m iXX r n rat v r fiv a s ath tim p aramm int 2.

Day of Week Regeneration Th EXct nic Tim CXc ma b p aramm t r n rat n a sp cific a r n sp cific a s fth . Th instructi ns f r th is pti n ar f un in TabX 2.3 n pa 15.

Application

Th rf rma Cv J62 C n iti n r an th rf rma Cv J62 iX r ma b p rat as a sinaX, uaX r tripX s st m.

Dual and Triplex Conditioners and Filters

Th uaXan tripX s st ms r uir a iff r nt cam th anth camth at is us inth sinaX unit s st ms. Th aX r uir an int rc nn ctinaXc ut cabX. Th is aXX sth unitth at is in r n rati n r bac as t siaanaXth th r units an pr v ntsth m fr m startina a r n rati n r bac as untiXth first unit is finis .

uaXan tripX units u b pXmb in paraXX th ab th r. In a muXi-unit s st m th bac as at r is supp X b th th r unit r units inth s st m. In a uaXfiX r s st m c nsi rati n must b aiv nth ath unit in s rvic is abX t satisf s rvic r uir m nts an b abX t supp X suffici nt bac as at r t th th r fiX r h iX it is inth bac as c cX. Th r is a s XctiaunX, TabX 4.6, in Sc cti n 4.0 t assist in uaXf inath b ic f a uaX r tripX s st m. Th is s XctiaunX is bas n m ia bac as r uir m nts an tan iam t r.

paraXX it must b purb as f r muXi-unit p rati n. Th it numb r s ar

uaX araXXC n iti n r	N	1035J23
TripX araXXC n iti n r	N	1035J25
uaX araXX iX r	N	1035J24
TripX araXX iX r	N	1035J26

its inc X paraXX p rati n cams an th p s p r int rc nn ct cabX.

Manual Start Regeneration

T f rc th c nts X p rf rm a r n rati n, pr ss th **REGEN** butt n. Th is butt n is Xcat nth f nt fth c nts XWh n u pr ss th **REGEN** butt n,th c nts X p rf rms a fuXr n rati n fth c n iti n r.

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. Th isp a iXfr an nX s th R n Tim R mainin as an in icati nth ath s c n r n rati n iXb p rf rm . Wh nth first r n rati n is c mpXt ,th s c n n iXb ain an th isp a iXaXrnat b t n X an R n Tim R mainin.

Automatic Regeneration

Programming Day of the Week Regeneration/ Backwash

Enter a day of the week regeneration/backwash programming by pressing the **LEFT ARROW** (←) button and the **DOWN ARROW** (↓) button simultaneously for 3 seconds. The day bar begins with "1, "2, "3, etc., and the display will show the day of the regeneration/backwash cycle. Select activate at a, by changing the 0 to a 1. The programming may be bypassed if no water pressure for 30 seconds. If this feature is used in conjunction with a normally closed timer bypass switch on the regeneration/backwash.

Table 2.3 - Day of Week Regeneration/Backwash

#	Description of Parameter

Reserve Options

The reserve type for reserve options is constant fixed reserve and smart reserve (historical water usage pattern). The arrow selects the parameter 15.

Fixed Reserve

When a fixed reserve is selected, the constant multiplied by the maximum set system capacity by the percentage set in parameter 16 and used as the reserve.

Smart Reserve (water usage pattern)

The smart reserve option automatically adjusts the reserve based upon the historical water usage pattern of the system. The controller tracks the water usage for each hour and uses that data to create average usage multiplied by 1.2 as the reserve for that hour. Every regeneration, the controller recalculates the average water usage. If less than 10% of a day's average water usage is used, the controller will change the day's average water usage. If more than the day's average water usage is used, the controller will use the actual water usage in the reserve calculation.

Since an installation has no history of water usage, the controller multiplies the percentage of capacity value set in parameter 16 by the total system capacity to determine starting average for each hour.

The factory set value for 16 is 30 which means that 30% of the total system capacity is used for the starting average for each hour.

Program parameter 15 is also used to select the reserve option with the arrow. Time of Regeneration set in parameter 2 to start a regeneration, if the controller has used up its reserve capacity before the next regeneration immediately begins, maintaining service water.

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
6	R fi Xo nt. Xr	2-200	1	**Selected from Table 2.2**		Ti is numb r t Xeh c nt. Xr h rat . f r fi Xbas ' . nh r fi Xo nt. X insta X '. R fi X' Xtim is ca Xu Xat ' t r fi Xh p. p r am. unt. f at r int. brin tan .
V	Brin 'ra rat	2-200	1	**Selected from Table 2.2**		Ti is numb r t Xeh c nt. Xr h 'ra rat bas ' . nh inj ct r si . Ti ' Xtim inh 'ra p. siti n is h n ca Xu Xat '.
J	Bac ash tim	4-60	1	**14***	Minut s	*Ma b a' just ' t r app Xcati n
10	S X	Ri Tc-0.0243 T3(t)-4Tc-0.-30				

t S cti n 3.2 f r ' tai X ' p Xnati n. fh p. ogrammin a param t rs. nh is pa a .

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

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

3.1 Programming and Application

This section contains programming instructions for the Performa Cv 962F Three Cycle Filter.

Table 3.1 - Programming Performa Cv 962F Three Cycle Filter

Parameter	Description	Range of Values	Minimum Increment	Recommended Program Value	Units of Measure	Notes
1	Day of week and time of day	(1-7) 1:00-12:59 AM or PM	(1 day) 1 Minute	**Current Day and Time**	Hour Minute	Range of programmable values for correct time. Day of week SUN=1, MON=2, TUE=3, WED=4, THU=5, FRI=6, SAT=7. THIS IS THE CORRECT TIME OF DAY
2	Time of day to start backwash	(1-7) 0:00-23:59 1:00-12:59 AM or PM 00:00-23:59		**As required**	Hour Minute	Range of programmable values for correct time
3	Program assembly number			**10** **100**	LBS. Metric	
4	Program assembly number			**0.5**	LBS.	Five pounds of medium capacity (gallons) of the first filter bed. Enter a.1(n)30. ( ) TJ0 -1
5	Filter capacity			**As required**	Metric	Five pounds of medium capacity uMho (20(p3)(s))12c)-Ti (Mi)--1. ()-3-3 ()-

Refer to Section 2.2 for explanations of the programming parameters listed above.

Table 3.2 - Programming Performa Cv 962F Five Cycle Filter

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

t S cti n 2.2 f r taiX pXanati n fh pr ogrammin param t rs nh is pa .

Electronic Time Clock Operation

To initiate an automatic backwash sequence the following conditions must be present. The system must be in backwash manual or by pressing the Backwash button for the correct system.

Programming automatic regeneration frequency

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

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 necessary that at 14. Example If 5 is programmed into the 14th position of the system it will backwash every fifth day at the time programmed into position 2.

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

Application

The information contained in this manual is intended for use with information contained in this manual is intended for use by qualified, trained operators or service technicians.

Dual and Triplex Conditioners and Filters

The dual and triplex systems require a different cam

This is i

3.2 Mechanical

Series 942F Mechanical Control

The Series 942 mechanical controls provide mechanical time functions for fixed or programmable applications.

Figure 3.1

3.2.1 Settings

Setting the Time of Day, Setting the Calendar Cap, and Manual Backup and Initializing the 942 Control.

Setting the Time of Day

Rotate the Clock Gear **clockwise** until the pointer indicates the correct time of day. When the time of day is set, the control initializes and backs up at approximately 2:00 a.m. If it is necessary to change the unit back up at an earlier or later time, simply offset the current time of day accordingly. For example, to have the unit back up at 4:00 a.m., set the Clock Gear to one hour later than the actual current time of day.

Note: Do not rotate the Calendar Cap by hand. The Clock Gear drives the Calendar Cap. To manually initialize the Calendar Cap, rotate the Clock Gear **clockwise**

Adjusting the Backwash Setting

Th Bac ash iaX (igur 3.2) c nt s Xth bac ash tim . Wh n th In ic at r n b inth B C W S COM ETE p siti n, r tat th Bac ash iaX c unt rcXc is at X ast n fuXturn t canc X uth curr nt s ttin . Xh t cXc in s un iXb r pXac b ach avi r cXc in s un h nh pr v us s ttin is canc XX . Onc th h avi r cXc in ish ar ,th n s ttin ma b s t b t tatin th Bac ash iaX, th sir s ttin . Th numb rs nth Bac ash iaX r pr s nt MN TES f bac ash tim .

igur 3.2 Bac ash C mpXt

Table 3.4 - Cycle Times for 942F Control

Cycle	Time (Minutes)
Bac ash	- 30
ur	

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

This section contains a tabular explanation of the programming parameters in the 962 Electronic Control

Number	Description of Program Values	Explanation

5
pa 12

1	Sa[/capacit [/c ut	[[e f rh [/c ut f 4 an 5 e h at N O unauth ri b ana e t h pr ramm va[u e can b ma .
1J	[S ns r S [/ct	Th ie param t r ie u t e [/cth f[e ns rh at ie t b u h h e et m. Th fact r -pr e t va[u ie 1 r a 1-inb turbin . Th rana ie 1 -4 1 = ut t [1-inb turbin , 2 = ut t [2-inb turbin , 3 = ut r pr ramm ab[/ -fact r, 4 = u r pr ramm ab[pu [uiva[nt. Th r ep ctiv m t r manufactur r a u [upp[h -fact r r pu [uiva[nt f r in ivi ua[m t r .
20	-fact r r pu [uiva[nt	

1 fvin( )b3( )-0.2(J(u i)3J.1 e)-0.2(a)2 .1(j5.1(e [2 (25.5(vi)-J (ne [2 (0.0(121 .2([-J(nv
pr 5r[e)0([( )4.1(v)25.4(v)15. h)1.2162 T 0.012 TTc-0.013Tr pum.( )1.211TJ35

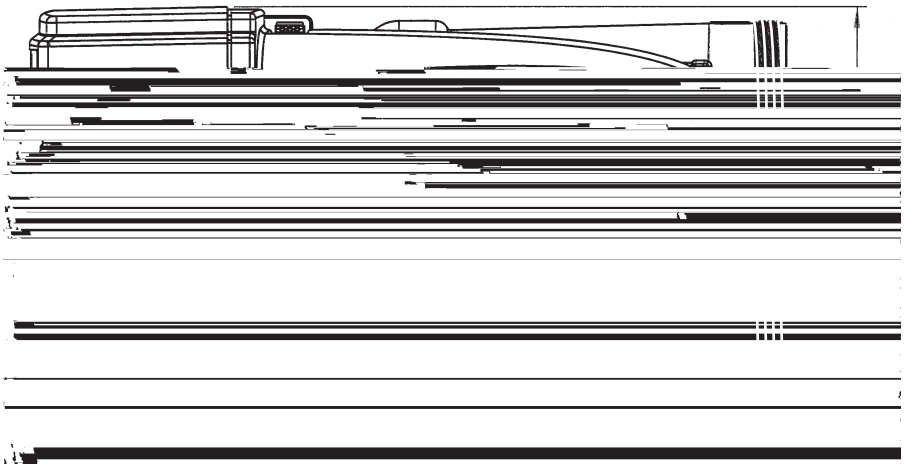
* Th J62 c nt [/r functi ne in h r a 12h ur r 24h ur c[/c m . ramminc 13 (c[/c m) b f r 1 r 2 i[/ [/minat an c nfuei n h n e ttinch e param t r .

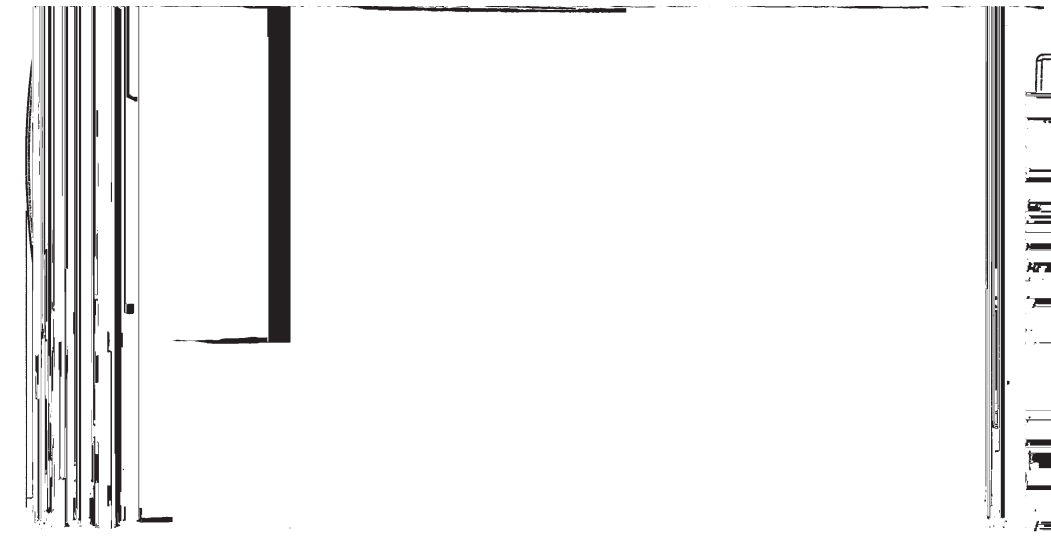
** Th J62 c nt [/r functi ne in h r .S. r m tric unit . ramminc 12 (unit f m a ur) b f r 3 r 4 i[/ [/minat an c nfuei n h n e ttinch e param t r .

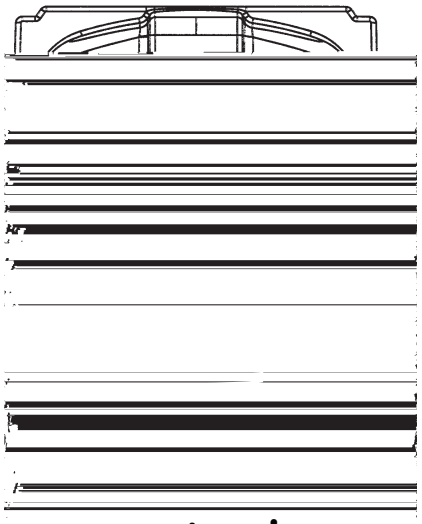
*** Th ca[uat ma[/n am unt [/a int h ai[/ r ai t r (h ramuh 13) at ST RT- , u e h ie p rc ntac f capacit . E amp[J0,000 rain in 5 10 rain in 3, J0,000 / 10 = J,000 ma[/n capacit , J,000 .3 (30% in 16) = 2 00 ma[/n , h ib i[/a int h ramuh 13, h ai[/ av rac e. rh ie amp[, h e mart r e rv at ST RT- , u b 2 00 ma[/n 1.2 (120% fh ai[/ av rac) = 3240 ma[/n. Th ie ai[/ av rac i[/b ana a e actua[/ at r ua[/ac int rmati n i ach r .

4.0 Performa Cv Performance Charts and Graphs

4.1 General Specification

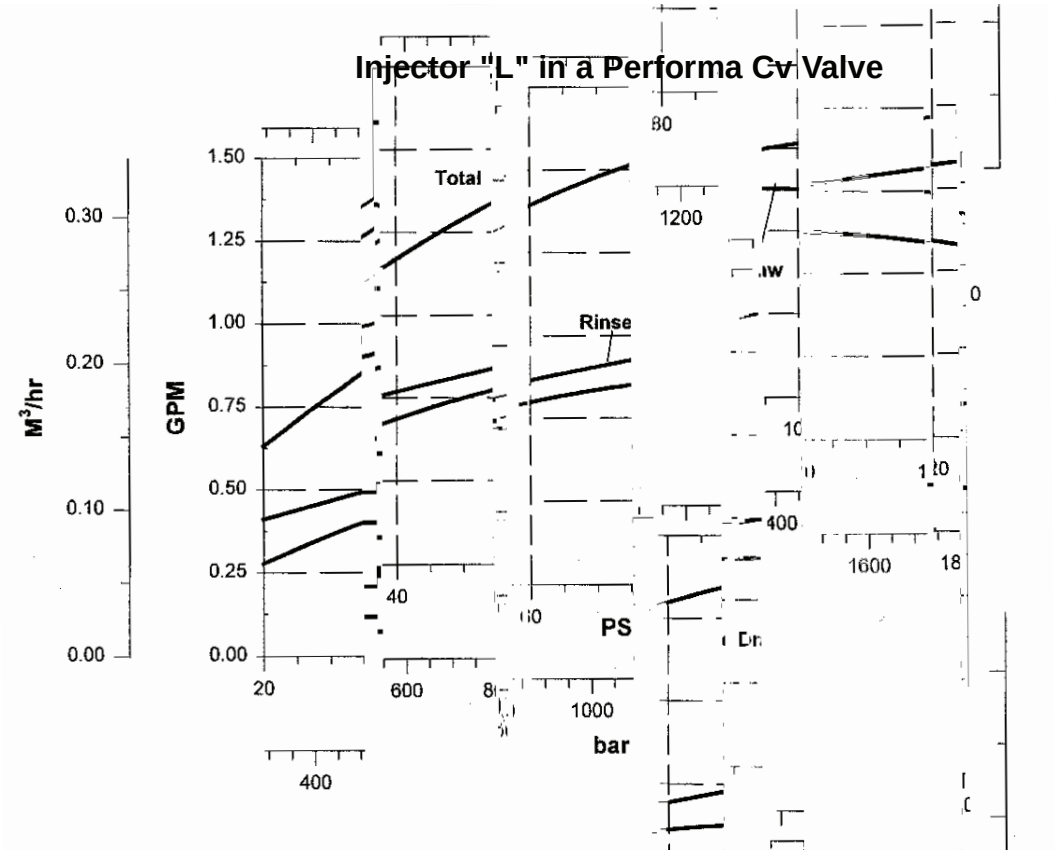


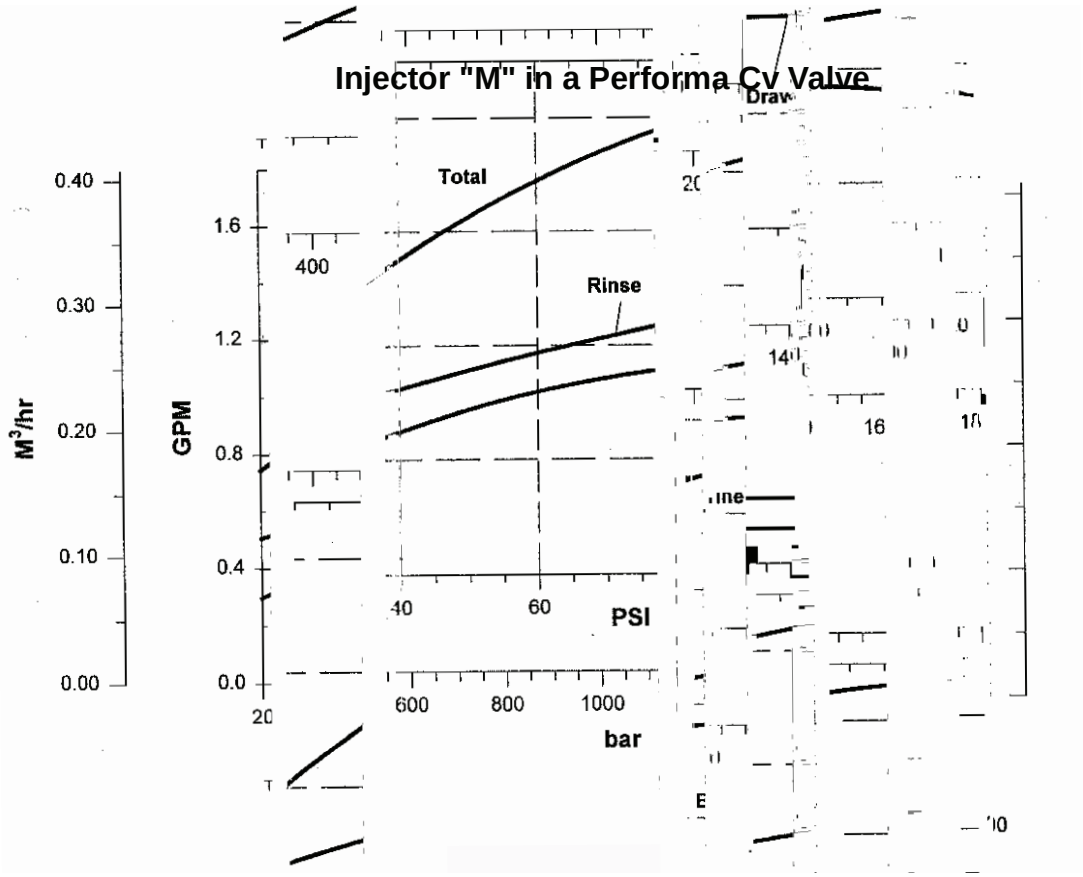




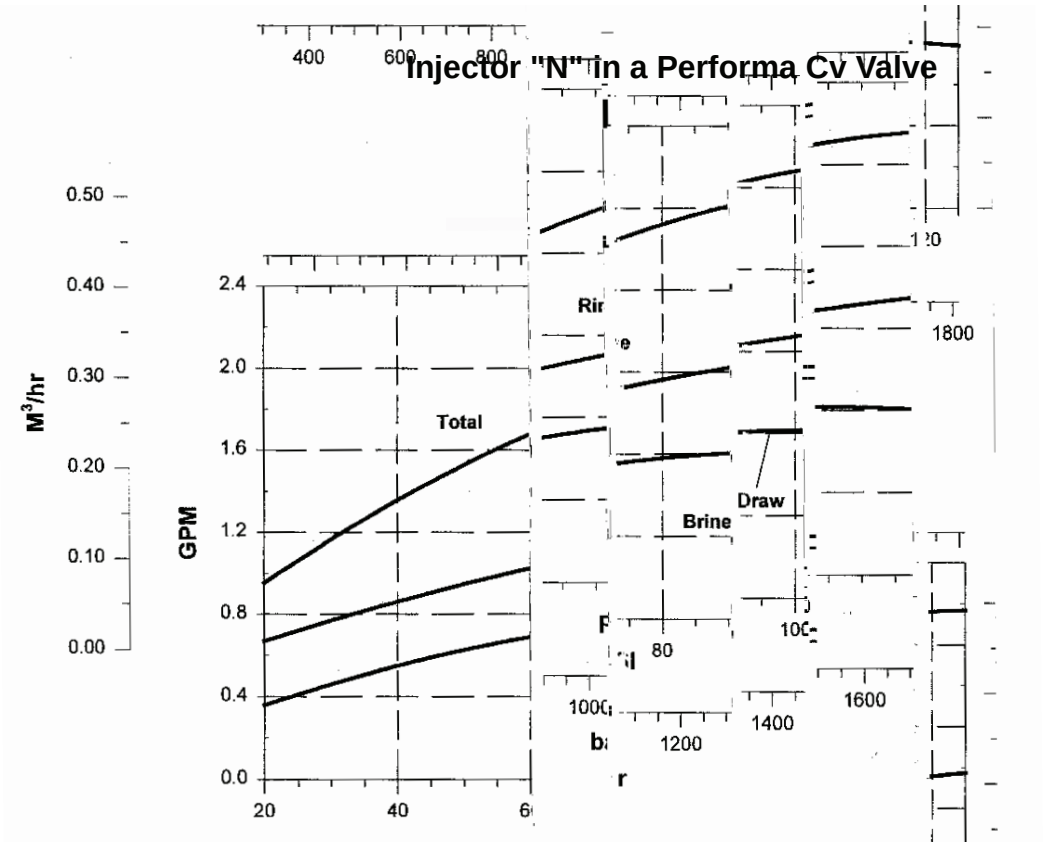
Maximum static Test Pressure	300 psi (20.6 bar)
Working Pressure	20-120 psi (1.3 - 8.2 bar)
Standard Electrical Rating	3642 Series Transformer 12V 60 , 12V 50
	3642 Valve or 12 Valve /24 Volt 50 12 V transformer, 60 120 Vac or 12 V transformer
Electrical Cord (standard rating)	60-inch (1.5-m) 3- wire light duty
Pressure Tank Thread	2-1/2-inch max
Riser pipe diameter Required	1.050-inch OD (26.7-mm)
Riser pipe length	1/2 inch - 1/2 inch (13 mm - 13 mm) inch right angle to pump
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 BSP T, 1-inch BSP T, 1-inch NPT brass pipe adapters
	3/4-inch, 1-inch, 1-1/4-inch, 25-mm CPVC tube adapters
Brine in Connection	3/8-inch NPT max
Brine in Connection	3/4-inch NPT max
Optional Bypass Valve	Rotating handle, full 1-inch port, reinforced plastic
Control Mounting	Reinforced plastic
Rubber Grommets	Compression ring Style
Program Cycle (Time)	3642 valve in 7- to 12-day English, German, Dutch, Italian, Spanish, Japanese
	3642, 3642 , 3642TC, 3642 TC valve in English, German, Dutch, Italian, Spanish, Japanese
Brine Refill Control	0.74 and 1.3 GPM
External Back up Control	5, 7, 10, 12, 15, 20 GPM. Bypass 20 GPM must be used.

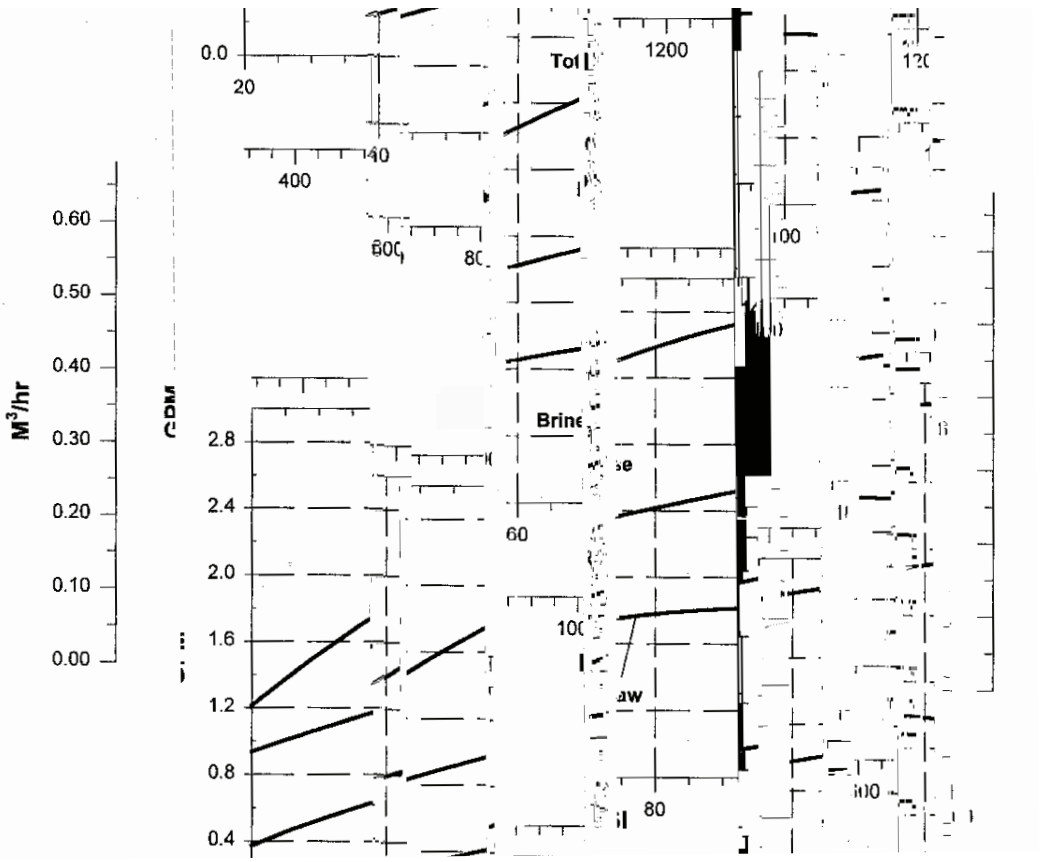
4.2 Injector Curves

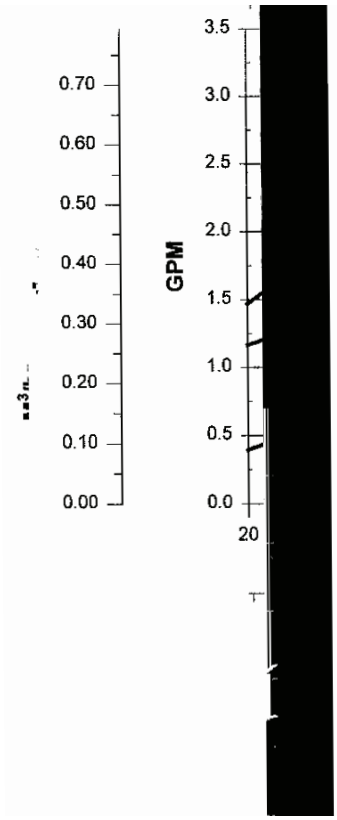




Injector "N" in a Performa Cv Valve







Injector "R" in a Performa 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.[illegible]	0.45	1.2
30	0.3	0.45	0.4	0.55	0.45	0.[illegible]5	0.5	0.[illegible]5	0.5	1.3
60	0.5	0.6	0.6	0.	0.[illegible]5	1	0. 2	1.4	0.[illegible]	1.[illegible]5
0	0.6	0.65	0.[illegible]	0. 5	0.	1.1	0.[illegible]	1.6	1	2
100	0.6	0.[illegible]6	0.[illegible]	0.[illegible]	0.	1.6	0.[illegible]5	1.	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.[illegible]	1.5	1.1	1.[illegible]	1.5	2.5	1.5	3.4	1.[illegible]	4.5
2.1	1.1	1.[illegible]	1.5	2.1	1.[illegible]	2.	1.[illegible]	3.6	1.[illegible]	4.[illegible]
4.2	1.[illegible]	2.3	2.3	6	2.	3.	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.	[illegible].6
[illegible]	2.3	2.[illegible]	2.6	3.4	3	4.[illegible]	3.6	6.	4.2	.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	[illegible]	0.35	56	34
10	20	13	0.[illegible]	[illegible]6	4[illegible]
15	25	16	1	[illegible]5	61
20	2[illegible]	1	1.4	10[illegible]	6
25	32	20	1.[illegible]	121	[illegible]6
30	35	22	2.1	132	3

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 ([illegible])	5 (1.1)
16 (40.6)	1.3	4 (.[illegible])	[illegible] (1.5)
1 (45.[illegible])	1.[illegible]6	5 (1.1)	(1.)
21 (53.3)	2.4	[illegible] (1.5)	12 (2.[illegible])

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	1[illegible]
20	2[illegible]	22
25	32	25
30	35	2[illegible]
Pressure Loss vs Flow (Lpm)		
Bar	**Service (Kv 5.6)**	**Backwash (Kv 5.8)**
0.35	56	42
0.[illegible]	[illegible]6	61
1	[illegible]5	[illegible]2
1.4	10[illegible]	3
1.[illegible]	121	[illegible]5
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	(30)	10 (3)	12 (45)	15 (5[illegible])
16 (40.6)	1.3	11 (42)	13 (4[illegible])	16 (61)	20 ([illegible]6)
1 (45.[illegible])	1.[illegible]6	14 (53)	1[illegible] (64)	21 ([illegible][illegible])	*26 ([illegible])
21 (53.3)	2.4	1[illegible] ([illegible]2)	24 ([illegible]1)	*2[illegible] ([illegible])	
24 (60.[illegible])	3.14	25 ([illegible]5)			

*Ma c [illegible] 25 psi[illegible] r 1.[illegible]2 bar pr [illegible][illegible]ur [illegible]e p.

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	(30)	10 (3)	12 (45)	N R
16 (40.6)	1.3	11 (42)	13 (4J)	N R	N R
1 (45.7)	1.76	*14 (53)	N R	N R	N R
21 (53.3)	2.4	N R	N R	N R	N R

* Ma c 25 psi r 1.72 bar pr ssur p urin bac as f s c n unit.

N R = N t R c mm n . f c nt X nh s rvic utX t f ab va ma b r uir t ins ur p p r bac as v Xim t bac as in unit.

5.3 Removing the Valve Assembly for Servicing

1. Unplug the power cord.
2. Shut off the water supply to the bypass valve (s) into bypass position.
3. Remove the screw holding the cover, using a Phillips screwdriver and remove the cover (Figure 5.2).

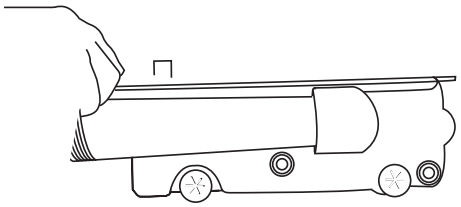


Figure 5.2

4. Using the bypass valve, relieve pressure and drain water from valve. If using the 1265 bypass, relieve pressure from bypass as instructed and drain water.
5. Disconnect (counterclockwise) and remove the valve from tank.
6. To prevent control valve, reverse the above procedure.

5.4 Removing the Control

Complete the following instructions to remove the 960 Soft control for servicing

1. Unplug the electrical transformer.
2. Shut off the water supply to the bypass valve (s) into bypass position.
3. Remove the orange cover by pressing tabs provided on the cover, Figure 5.3. Lift the front of the cover and remove by sliding.

Figure 5.3

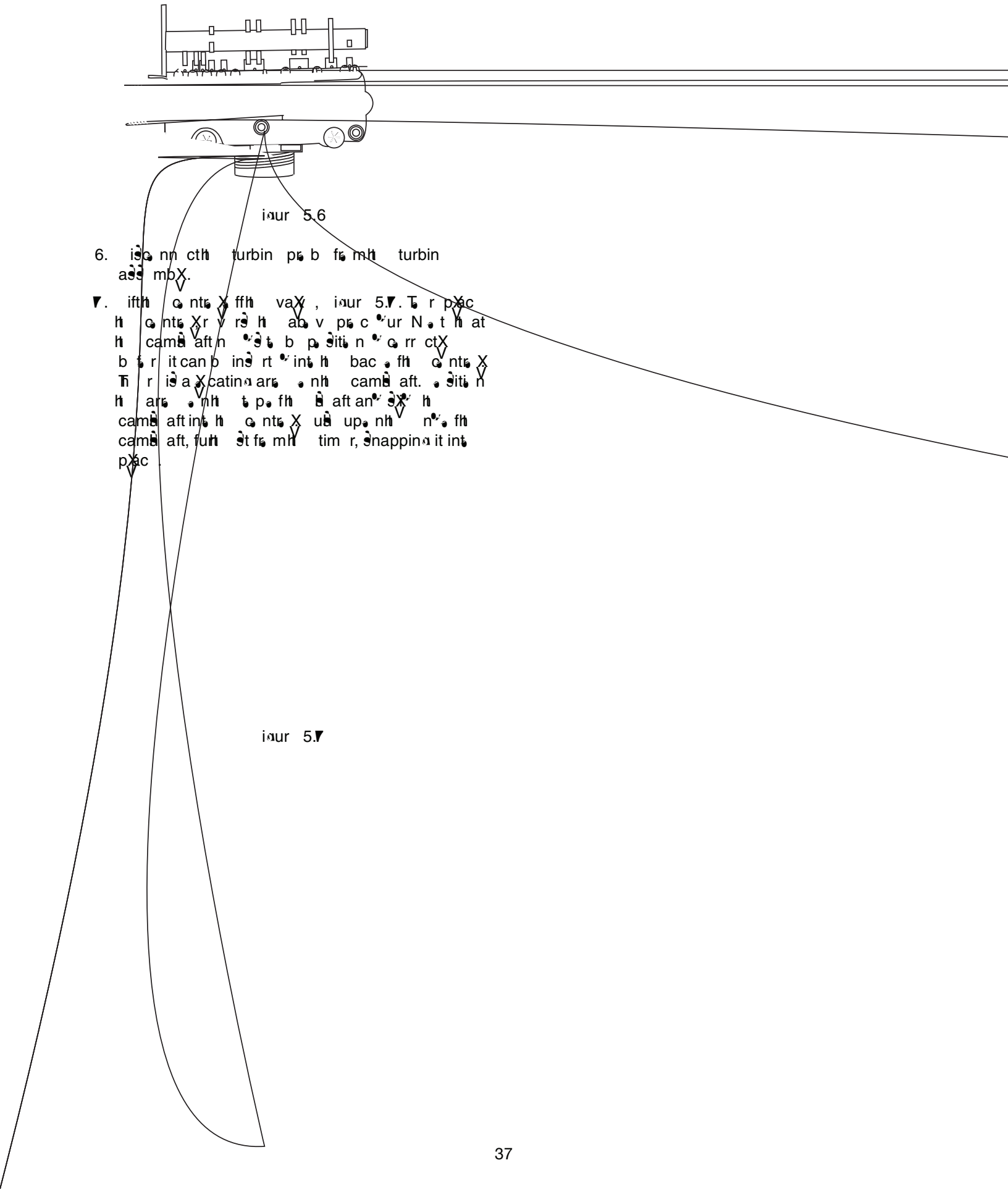
4. Using a small screwdriver, release the drain line clip and drain line from the control as shown in Figure 5.4.

Figure 5.4

5. To remove the cam shaft, insert a screwdriver between the cam shaft and the cam shaft must be pointing at the screwdriver pointing to the correct indicator is located in the center of the cam shaft, Figure 5.5.

Slide the cam shaft back to disengage from the timer, Figure 5.6.

Figure 5.5



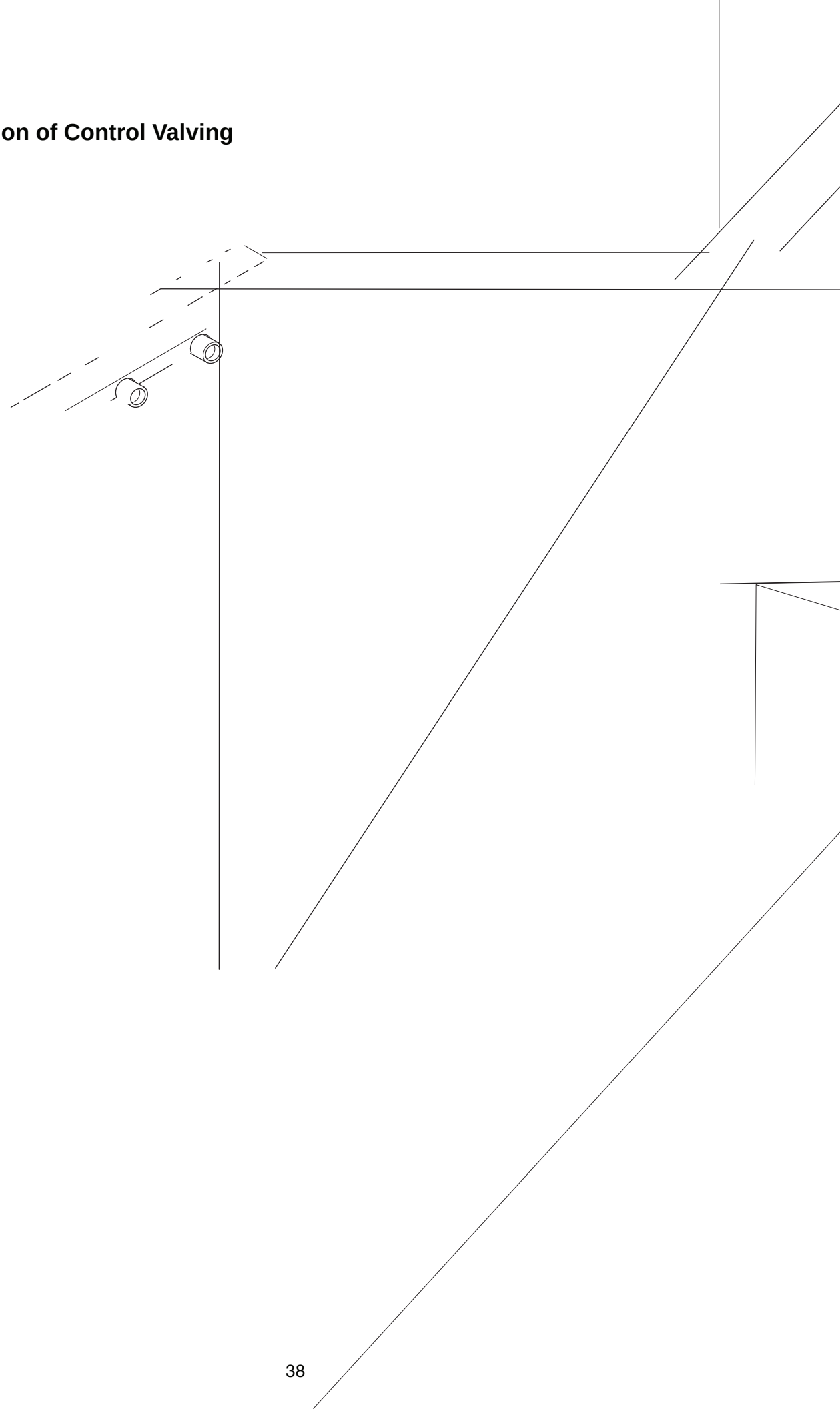
igur 5.6

6. isc nn ct turbin pr b fr mt turbin ass mbX.

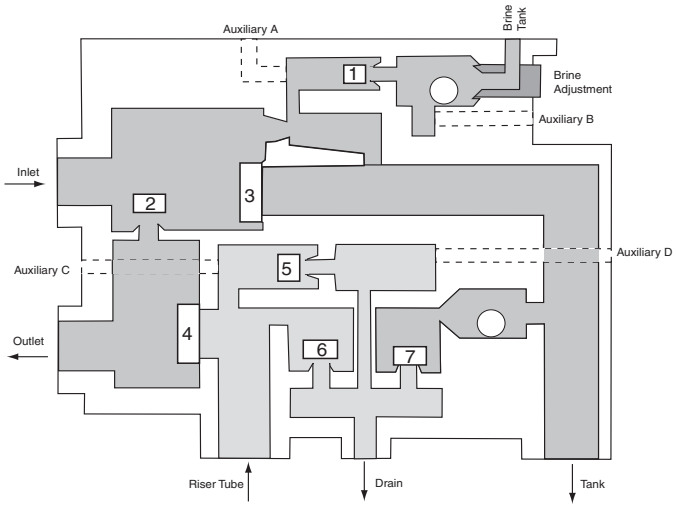
. ift c ntr X ff va , igur 5. . T r pXc c ntr Xr v rs ab v pr c ur N t at cam aft n s t b p siti n c rr ctX b f r it can b ins rt int bac f c ntr X Th r is a Xcatin ar f nt cam aft. siti n ar f nt t p f aft an X c ntr X us up nt n f cam aft, furth st fr mt tim r, napping it int pXac .

igur 5.

5.5 Identification of Control Valving

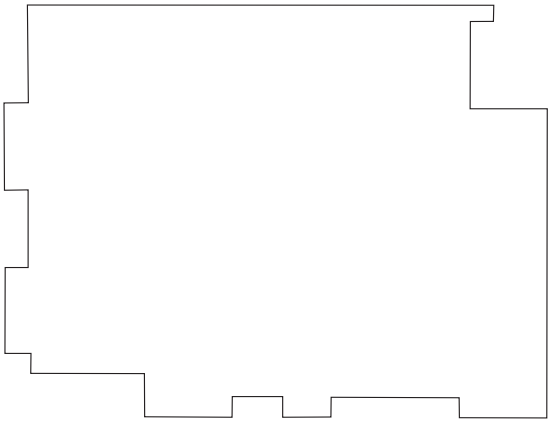


3 Brine/Slow Rinse Position



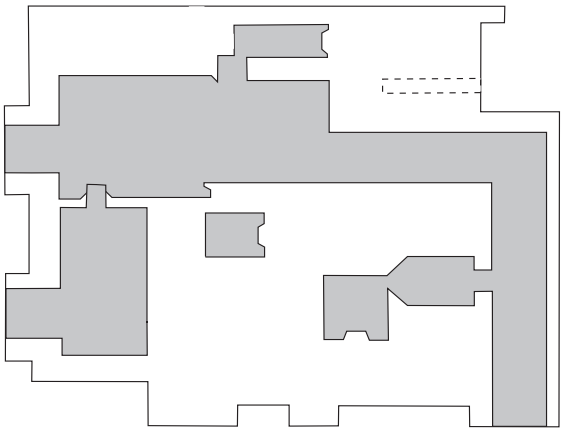
Name	Valve No.
Brine	1 - Open
By-Pass	2 - Open
Inlet	3 - Closed
Outlet	4 - Closed
2nd Tank Top	5 - Open
Purge	6 - Open
Backwash	7 - Closed

4 Fast Rinse Position



5.8 Performa Cv Filter Flow Diagrams

1 Backwash Position



2 Fast Rinse Position

5.9 Troubleshooting

The table on the following pages lists possible problems, causes and solutions. Contact your local service representative for assistance in servicing your equipment. Have the model number and serial number from your unit available when you call. Refer to the **Replacement Parts** section of this manual.

IMPORTANT: Service procedures required to maintain proper pressure to the regulator must be performed by trained service technicians. Failure to maintain proper pressure to the regulator may cause damage to the regulator and void the warranty. Contact your local service representative for assistance.

Valve Troubleshooting

Problem	Possible Cause	Solution
1. Continuous flow through drain.	a. Low water pressure.	a. Set pump to maintain 30 psi at regulator.
	b. Restricted drain line.	b. Remove restriction.
	c. Injector plugged!	c. Clean and inspect.
	d. Injector defective!	d. Replace injector.
	e. Valve (2 and 4) not closing.	e. Remove foreign matter from disc and body. Inspect disc for cuts or pinholes. Replace if necessary.
	f. Damaged injector O-ring.	f. Replace injector O-ring.
2. Brine tank overfills.	a. Brine valve (1) blocked open.	a. Manually operate valve several times to dislodge any debris.
	b. Incorrect brine refill rate!	b. Remove variable setting or correct.
	c. Valve (3 and 4) not closing during brine draw.	c. Visually inspect for foreign matter between disc and manually operate valve several times.
	d. Air in brine line.	d. Check connections in brine line for air leaks. Refer to instructions.
3. Set mustering more or less than actual contents setting.	a. Inaccurate setting.	a. Correct setting.
	b. Foreign matter in contents gear causing incorrect fast rate!	b. Remove variable setting contents gear and flush. Manually position contents gear to brine draw (cam follower in, position contents gear pure water from tank).
	c. Defective contents gear.	c. Replace contents gear.
4. Intermittent or irregular brine draw.	a. Low water pressure.	a. Set pump to maintain 30 psi at regulator.
	b. Defective injector!	b. Replace both injector and injector cap.
5. No regeneration or at after regeneration.	a. Initiating trigger.	a. Check for power.
	b. No gear in brine tank.	b. Add gear.
	c. Plugged injector!	c. Clean injector. Use at.
6. Contents back gear set at closed valve.	a. Incorrect back gear contents gear used.	a. Replace with correct gear.
	b. Foreign matter affecting contents gear operation!	b. Remove contents gear and backwash.
7. Valve rippering at rate drain brine gear after regeneration.	a. drain valve (6 gear) brine valve (1) open by foreign matter gear particle.	a. Manually operate valve several times to dislodge any debris.
	b. Valve set gear turn spring gear up apply at.	b. Replace spring.

. ar at gear a during service contact 15 -1.2 4 ( )-0. TJT*-0 Tc(r)1 .3 -1.2 40.2(X)-p2. (n 2. (nopi)2. (n)0.1)-30.2(r2. (n (n)0.1 p)n)0.1 ( )30.4()-15. (a)30.4i2. (non(r

962 Control Troubleshooting

Alarms

The Model 962 continuously monitors its own and the analyzer's functions and will activate an alarm if it detects a malfunction. The alarm is a beeping sound and flashing Err message on the display. The alarm will continue for 30 seconds or until the alarm condition is corrected.

When the alarm sounds, the display will show Err# where # is a number from 1 to 4. The table below lists the Err numbers, a description of the error, the cause of the error, and the solutions. To silence the alarm, press any button. If the error condition is not corrected, the alarm will sound again after 30 seconds.

Model 960 Alarms

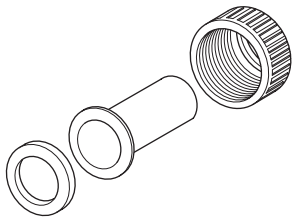
Indication	Description	Cause	Solution
Err1	Electronics failure	Configuration or programming.	Press any button to clear fault and reprogram Model 960 Contact Factory
Err2	Improper start of calibration (Transmitter with cover removed or button pressed).	Valve cam shaft assembly manually rotated during calibration.	Press any button to silence alarm. Note: Alarm automatically clears at TIME OUT RESET.
	Valve cam shaft assembly manually rotated out of calibration position.	The contact switch is turned by the previous cam shaft position.	
	auxiliary motor.	Replace the contact switch	
	auxiliary motor drive.	Replace the contact switch	
	auxiliary switch.	Replace the contact switch	
Err3	Improper finish of calibration (Transmitter with cover removed or button pressed).	Valve cam shaft assembly manually rotated out of calibration position.	The contact switch is turned by the previous cam shaft position.
	auxiliary motor.	Replace the contact switch	
	auxiliary motor drive.	Replace the contact switch	
	auxiliary switch.	Replace the contact switch	
Err4	Improper contact settings (one or more settings out of the available range).	One or more setting out of the available range.	any setting just range 3 to 250. Capacity just range 0.1 to 140.0.

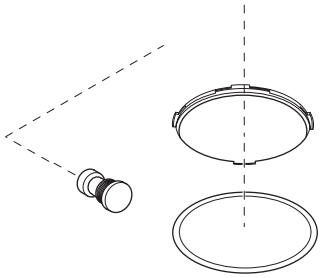
Problem	Possible Cause	Solution
6. N• at rfX •isp a h n at ris fX ino (c Xn • s n t bXn).	a. B pass vaX in b pass p siti n. b. M tr ps b •isc nn ct •• r n t fuX c nn ct • t m t h • usino. c. R strict • m t r turbin • tati n •u t r ian mat riaXn m t r !	a. Sh ift b pass vaX int • rvic p siti n. b. uX ins rt ps b int m t h • usino. c. R m v m t h • usino, fr up turbin an• fXib lh cXan at r. Turbin • u• spin fr X. If n t, r f r t h Wat r M t r Maint nanc • ct n.
•. C nt• X isp a is f• n at R n Tim R mainino. . C nt• Xr n rat • ath t n tim • f•a .	•. f ctiv m t r ps b . . f ctiv circuit b ar•.	•. R p Xac c nt• X . R p Xac c nt• X
	a. Bac t bac r n rati n• r r •u t •.	a. R f r t h Manua R n rati n • ct n.
	a. • r• uta n •. b. Tim • f•a • t ino rr ctX. c. Tim • f r n rati n • t ino rr ctX.	a. R • t tim • f•a t c rr ct tim • f•a . b. R • t tim • f•a t c rr ct tim • f•a . c. R • t tim X6(t)-30.2J.2(• f•0t)-31.1(i)-30.-25.4224.1( )-30.3

61-4TB.2(Ba)54(4(5anT (14(1•(n) ( )-0.J4(a)4.▼(Jan-2(54ac)3.4(0

6.0 Performa Cv Parts

6.1 Valve Component Exploded View





6.2 Parts List

Code	Part No.	Description	Qty.
1	1000413	rf rma Cv C n iti n r VaX ss , f X C nt s X	1
	100041	rf rma Cv iX r VaX ss , f X C nt s X	
2	1035611	J62 C n iti n r Cam ss , Sin X nit	1
	10303 7	J62 C n iti n r Cam ss , MuX nit	
	10303 0	J62 iX r Cam ss , Sin X nit	
	10303 4	J62 iX r Cam ss , MuX nit	
3		rain C nt s X ss mbX	1
	1030355	C ss , 5 pm	
	1030356	C ss , 6 pm	
	10303	C ss , pm	
	1030357	C ss , 7 pm	
	1030358	C ss , 8 pm	
	1030360	C ss , 10 pm	

Code	Part No.	Description	Qty.
10	101042	O-Rin	1
11	1035622	Tan Rin	1
12		Xmbin pt r its	1
	1001606	3/4-in C pp r Tub pt r it	
	10016 0	1-in C pp r Tub pt r it	
	1041210	1-1/4-in C pp r Tub pt r it	
	100160	22-mm C pp r Tub pt r it	
	100160	2 -mm C pp r Tub pt r it	
	1001613	3/4-in C VC Tub pt r it	
	1001614	1-in C VC Tub pt r it	
	1001615	25-mm C VC Tub pt r it	
	1001 6	3/4-in N T Xstic ip pt r it	
	1001603	1-in N T Xstic ip pt r it	
	1001604	3/4-in BS T Xstic ip pt r it	

N t S n

6.3 Performa Cv Controls