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

Control Operation

942F Mechanical Clock Timer - 7 Day or 12 Day

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

962F Microprocessor Demand

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

962 FTC Electronic Time Clock

Bac vas . . . . . 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

Not in Bypass

Inspect unit carefully for carrier damage before signing. Report any damage to the carrier immediately.

Location Selection

1. The distance between unit and air intake duct assembly must not exceed 60 feet (18 m).
2. If it is necessary to suspend equipment from above, make sure the ceiling is strong enough to support the weight of the unit and any additional components.
3. Since access must be provided for servicing the blower assembly, do not block access to the blower assembly.
4. Do not install unit closer than 10 feet (3 m) from piping between the outside condensing unit and the inside heat exchanger. Water from the condensing unit must be directed away from the building.

   Do not install unit closer than 10-feet (3-m) from piping, ductwork, etc. This is a recommended distance between the condensing unit and the building to prevent the building from affecting the condensing unit, in the event of natural disaster, such as hurricane, flood, fire, earthquake, etc.

4. Wh r th rain Xn is Xvat but mpti s int a rain b X vth Xv X fth c nt Xva Y , f rm a V-inb (1 -cm) X p ath far n fh Xn s h at h b tt m fh X p is Xv X vh h rain Xn c nn cti n. Th is vi Xpr vi an a uat sip n trap.

5. Wh r th rain mpti s int an v lm a s v r Xn , a sin -t p trap must b us .

IMPORTANT: N v r ins rt rain Xn int a rain, s v r Xn r trap. Xva s a X v an air gap b t v nh rain Xn an h vast vat r t pr v nth p ssibi Xt f s va b in bac -sip n int c n iti n r.

igur 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( )2T 62681n o

1.3 Placing Performa Cv Conditioner/Filter into Operation

ft r a X or vi us s t ps h av b n c mp X t ,h unit is r a t b p Xac int p rati n. X vh s st ps car fu X.

1. R m v c nt s X vaX c v r b first pr ssin h p Xstic cXos fr mh fr nt fh c v r. u X fr nt f c v r up.

   Note Ti t X vin s t ps viXr uir turnin h c cX in icat r t vari us p siti ns. Manua X s tat h cam aft **COUNTERCLOCKWISE**, nX untiX c cX in icat r p int s t ir p siti n. (S manuaXr a n rati n s cti ns f r ab c nt s X manuaX p rati n.)

2. R tat c cX in icat r **COUNTERCLOCKWISE** untiXit p int s ir ctX t h v r **BACKWASH**.

3. iXm ia tan vh vat r.

   a. Wh vat r suppX ff, pXac h b pass vaX (s) int h s rvic p siti n.

   b. Op n vat r suppX vaX v r sX vX t appr imat X h 1/4 p n p siti n.

IMPORTANT: If p n t rapi X rt far, m ia ma b X st. Inh 1/4 p n p siti n, u s uXh ar air scapin sX vX fr mh rain Xn .

Conditioner

   a. Wh n aX fh ain as b n pur fr mh tan (vat r b ins t fX v st a iX fr mh rain), p nh main suppX vaX aXa va .

   b. X v vat r t run t rain untiXc X ar.

   c. Turn ff vat r suppX an X th unit stan f r ab ut fiv minut s. Ti is viXaX v aXtrapp air t scap fr mh tan .

4. vat r t brin tan (initiaXfiX.

   Wh a buc t h n , a appr imat X 4 naX ns (15 Xt rs) f vat r t brin tan . Ifh tan h as a saX pXatf rm ab v h b tt m fh tan , a vat r untiXh X v Xis appr imat X 1 inb (25 mm) ab v h pXatf rm.

5. Xc h c nitin r int p rati n.

   a. Wh h vat r suppX vaX c mpX t X p n, car fuX a vanc h c cX in icat r **COUNTERCLOCKWISE** t h c nt r fh **BRINE REFILL** p siti n. X ath is p siti n untiX vat r starts t fX vh s uh h brin Xn int h brin tan . n t run f r m r h an t minut s.

   b. vanc h c cX in icat r **COUNTERCLOCKWISE** untiXit p int s t h c nt r fh **BRINE/SLOW RINSE** p siti n.

   c. Wh h c nitin r inh is p siti n, b c t s if vat r is b in ra vn fr mh brin tan . Ti vat rXv Xnh brin tan viXr c v r sX vX. Obs rv vat rXv X r at Xasth r minut s. Ifh vat rXv X s n tr c , r if it a s up, r f r nc h **Troubleshooting** s cti n.

   . vanc h c cX in icat r **COUNTERCLOCKWISE** t h **REGENERATION COMPLETE** p siti n an run vat r fr m a n arb fauc t untiXh vat r is cXar an s ft.

Filter

XfiX r m ias , c pt carb n

   a. ft rh ain as b n pur fr mh tan (vat r b ins t fX v st a iX fr mh rain) p nh main suppX aXa va . Bac vash m ia f r a minimum f 15 minut s. r X n r if n c ssar . Wat r runnin at h rain s u X b cXar.
   Carb n m ia s u X b aX v t s a f r a minimum f 12h urs t aX v air bubbX s t scap pri r t bac vash ina.

   b. ft rh bac vash is c mpX t pXa in c nt s X an aX v it t a vanc t **BACKWASH COMPLETE**.

Electrical Connection

100 VAC, 115 VAC, and 230 VAC units: R m v t vist ti fr mh p v r r an t n c r t its fuXX nh . Ma sur p v r s urc matb sh ratin print n h c nt s XB c rtain a vaXs vitb s n t c nt s Xh ut Xt.

12 VAC: C nn cth pXa fh transf rm r (suppX) s c n ar cabX t h matin s c t ath r ar r b tt m fh tim h usin. B c rtainh transf rm r is s cur an is pXa in t int a p v r s urc f c rr ct v Xa h at is n t c nt s X b a vaXs vitb .

1.4 Disinfection of Water Conditioners

Th mat ria s f c nstructi n fh m rn vat r c n iti n r vi n t supp rt bact ria , n r vi h s mat ria s c ntaminat a vat r supp . v v r, h n rma c n iti ns , istin urin a ippin , st ra an ins ta ati n in icat h a vis abi t f isinf ctin a c n iti n r aft r ins ta ati n, b f r h c n iti n r is us t tr at p tab vat r. In a iti n, urin n rma us , a c n iti n r ma b c m f u vh r anic matt r r in s m cas s vh bact ria f mh vat r supp .

Th us v r c n iti n r s u b isinf ct aft r ins ta ati n, s m vi r uir p ri ic isinf cti n urin h ir n rma , an in a f v cas s isinf cti n vh v r r a n rati n u b r c mm n .

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

Sodium or Calcium Hypochlorite

Appli mtion

Th s mat ria s ar satisfact r f r us vh p st r n r sins, s rh tic a t , or nsan an b nt nit s.

5.25% Sodium Hypochlorite

Th s s ti ns ar avai abl un r tra nam s sub as C . B ab *. If st h n r s ti ns ar us , sub ash s s f r c mm rcia un ri s, a just h a acc r in .

1. a
   a. st r n r sin 1.2 f unc s p r cubic f t.
   b. N n-r sin us b ana r 0. f unc p r cubic f t.
2. Brin tan c n iti n rs
   a. Bac va h c n iti n r an a h r uir am unt fh p b rit s ti n t h brin v f h brin tan . (Th brin tan s u h av va t r in it t p rmith s ti 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 programming aspects of the 962 controller.

Note that all parameter values are displayed in units of measure as programmed in Rinse Time Minutes. Other parameter values are displayed in minutes. Some parameters can be entered in percentages. These parameters are active for a command. See Columns of Table 2.1 and Table 2.4. If irrigation parameters are active, 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)

h(var4(rif)0r2. .Va(c)4.3(a)0.5(ra)-13.2(ut)-3.5(e)-3.2(ap)2.5(a)-6.3(2)-24.4(32)-28.1(62)4(4)-4(3)(1(i)36(3)0(47n(t)-3.2(f)0(0)0.5(2)-16n

Salt Amount

Sa m unt is n t va u isp a . Th fau va u f r Sa m unt is 6 p un s (2.7 i rams). f

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

P5 Capacity Setting (kilograins (kilograms))	Resin Volume per Tank (liters)				
	3 ft³ (85)	4 ft³ (113)	5 ft³ (142)	6 ft³ (170)	7 ft³ (198)
	P4 Salt Setting: pounds (kg) per Cycle				
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 through 21 inch tank = **130 (1.39 gpm)**					
P7 Brine Draw Setting. Average based on 50 psi (3.5 bar) inlet pressure. For pressure higher than 50 psi refer to brine draw parts 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	1035744	**83**	Gray	

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. numb r vi X isp Xa .

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

Wh nh param t r numb r u vant t b an isp n h isp Xa , pr ssh **LEFT** (←) butt n t isp Xa h ata ass ign t h at param t r. r ssh **SET** butt n an h far rih t numb r nh isp Xa start fXah in. If (←) u vant 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 pr 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 s uX n v r b b an b th n us r.

Electronic Time Clock Operation

gramming aut matic r n rati n fr unc

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 rb th pti ns must b b gin. Th s st m ma aX b r n rat manuaXX b pr ssin th R n rati n butt n f rth r s c n s.

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

Day of Week Regeneration Th EXct nic Tim CXc ma b pr aramm t r n rat n a sp cific a r n sp cific a s fth v . 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 r nn ctinaXc ut cabX. Th is aX vsh unitth at is in r n rati n r bac vas t sinaXth h r units an pr v ntsh m fr m startina r n rati n r bac vas untiXth first unit is finis . uaXan tripX units a uX b pXmb in paraXXvh ab h r. In a muXi-unit s st mth bac vas vat r is suppX b h h 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 suppX suffici nt bac vas vat r t h h r fiX r m iX it is inth bac vas c cX. Th r is a s Xcti n aui , TabX 4.6, in S cti n 4.0 t assist in uaXf inath b ic f a uaX r tripX s st m. Th is s Xcti n aui is bas n m ia bac vas 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 rs 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 paraXX p rati n cams an th p r int r nn ct cabX.

Manual Start Regeneration

T f rc th c nts Xt pr rm a r n rati n, pr ssth **REGEN** butt n. Th is butt n is Xcat n th f nt fth c nts XWm n u pr ssth **REGEN** butt n,ht c nts X p r 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 viXfr z an nX s vh R n Tim R mainin as an in icati nth ath s c n r n rati n viXb pr rm . Wm nth first r n rati n is c mpXt ,th s c n n viXb ain an th isp a viXaXrnat b t v n X v 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 display will show 1, 2, 3, etc., and the display will start flashing. Select the day of the week Regeneration/backwash will occur. To activate that day, change the 0 to a 1. The programming may be skipped if it is not pressed for 30 seconds. If the feature is used in conjunction with capacity reserve, the capacity reserve regeneration/backwash.

Table 2.3 - Day of Week Regeneration/Backwash

#	Description of Parameter

Reserve Options

The reserve type selects the reserve option (constant fixed reserve and smart reserve (historical water usage pattern). The default setting is parameter 15.

Fixed Reserve

When a fixed reserve is selected, the constant percentage of the maximum set capacity between the present value set in parameter 16 and 100% is reserved.

Smart Reserve (water usage pattern)

The smart reserve option allows the constant to be adjusted based upon the historical water usage pattern of the last seven days. The control keeps track of water usage for each of the 7 days and uses that data to calculate a 1.2 average for the reserve for that day. Every regeneration, the control recalculates the average water usage. If less than 10% of a day's average water usage is used, the control will add to the average. If more than 10% of the day's average water usage is used, the control will subtract from the reserve calculation.

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

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

If parameter 15 is set to 1 the reserve will continue until Time of Regeneration is reached. parameter 2 to start a regeneration, if the control has used a portion of the reserve capacity remaining is less than the reserve.

2.3 Conditioner Programming Tables

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

Parameter	Description	Range of Values	Minimum Increment	Recommended Program Value	Units of Measure	Notes
6	R fi Xo nt Xr	2-200	1	**Selected from Table 2.2**		Ti is numb r t Xh c nt Xrh rat f r fi Xbas nh r fi Xo nt X insta X . R fi v Xtim is ca Xu at t r fi h p p r am unt f vat r int brin tan .
▼	Brin ra v rat	2-200	1	**Selected from Table 2.2**		Ti is numb r t Xh c nt Xrh ra v rat bas nh inj ct r si . Ti v Xtim inh ra v p siti n ish n ca Xu at .
J	Bac vas tim	4-60	1	**14***	Minut s	*Ma b a just t r app Xcati n

t S cti n 3.2 f r tai X . p Xnati n fh p ogrammin param t rs nh is pa .

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 covers various 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
1	Day of week and time of day	(1-7) 1:00-12:59 AM or PM	(1 hour) 1 Minute	**Current Day and Time**	hour Minute	Range depends on value selected for item 13. 1=SUN, MON=2, TUE=3, WED=4, THU=5, FRI=6, SAT=7. THIS IS THE CURRENT MONITOR TIME
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 depends on value selected for item 13
3	Program assembly number			**10** **100**	lbs. Metric	
4	Program assembly number			**0.5**	lbs.	Divide the valve maximum capacity (gallons) of the filter by 6.7 Min a.1(n)30 hour. ( ) TJ0 -
5	Filter capacity			**As required**	Metric	Divide the valve maximum capacity uMT (20(p3)(s))12c)-Ti (Mi)--1. ()-3-3 ()-

See Section 2.2 for explanation of programming parameters in this page.

Table 3.2 - Programming Performa Cv 962F Five Cycle Filter

Parameter	Description	Range of Values	Minimum Increment	Recommended Program Value	Units of 5278795i0(m)-18.8(e)1(1(s)254.-75( )8()77 Tc10.4(co1(n)-5.6(c)30.3

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

Electronic Time Clock Operation

To initiat an auto matic bac vash e n e r b h e fh f XX vin e pti ns must b b e s n. Th s s t m ma b bac vash " manuaXX b pr ssinh Bac vash butt n f rh r s c n "s.

e ramminm aut matic r a n rati n fr "u nc

Th EXct nic Tim CXc h as t v r a n rati n e pti ns Int rvaXR a n rati n an" a e f W Bac vash .

Interval Backwash Th EXct nic Tim CXc ma b pr ramm " t r a n rat at int rvaX up t 30 "a s. Th is f atur is axX n vn as CaX n"ar Ov rri" . It is Xcat " at 14. E ampX If 5 is pr ramm " int 14h nh s s t m viXbac vash v r fiv "a s at h tim pr ramm " int 2.

Day of Week Backwash Th EXct nic Tim CXc ma b pr ramm " t bac vash n a sp cific "a r sp cific "a s fh v . Th instructi n f rh is pti n is f un" in TabX 2.3 n pa 17.

Application

Th rf rma Cv J62 C n"iti n r an"h rf rma Cv J62 iX r ma b p rat " as a sinX, "uaX r tripX s s t m.

Dual and Triplex Conditioners and Filters

Th "uaXan" tripX s s t ms r "uir a "iff r nt cam h anh camh at is us " inh sinX unit s s t ms. Th axX r "uir an int ro nn ctinX c ut cabX. Th is axX vsh unith at is in r a n rati n r bac vash t sinaXh h r units an" pr v ntsh m fr m startin a r a n rati n r bac vash untiXh first unit is finih ". uaXan" tripX units a uX b pXmb " in paraXXvh ab h r. In a muXi-unit s s t mh bac vash vat r is suppX " b h h r unit r units inh s s t m. In a

3.2 Mechanical

Series 942F Mechanical Control
Th Se ri s 942 m h anica c nt ls or vi s
m h anica tim c c funct n f r fi r app cati ns.

i ur 3.1

3.2.1 Settings

S ttin th Tim f a ,th a s f Bac va an
p rf rmin manua bac va in vh th 942
c nt l.

Setting the Time of Day
R tat th C c ia **clockwise** unti th p int r
in icat s th c rr ct tim f a . Wh n th tim f a
s t,th c n iti n r vi bac va at appr imat 2 00
a.m. If it is s ir t h av th unit bac va at an
ar r r at r tim , simp ffs th curr nt tim f a
acc r in . r amp , th av th unit bac va at
4 00 a.m., s th C c ia n urs at rth anth
actua curr nt tim f a .

Note: Do not rotate the Calendar Cap by hand. Th
C c ia n s th Ca n ar Cap ai . T manua
in th Ca n ar Cap, r tat th C c ia
clockwise

Adjusting the Backwash Setting

Th Bac vab ia X(iur 3.2) c nt, Xth bac vab tim . Wh th In"icat, r n, b inth B C W S COM ETE p, siti n, , tat th Bac vab ia X c unt rc X c vis at X ast, n fu Xturn t, canc X uth curr nt s ttin. Xh t cXc in s un" vi Xb r pXc " b ah avi r cXc in s un" th nh pr v, us s ttin is canc X". Onc th h avi r cXc in ish ar",h n v s ttin ma b s t b , tatin th Bac vab ia X, h " sir " s ttin. Th numb r, nh Bac vab ia X r pr s nt MN TES , f bac vab tim .



iur 3.2 Bac vab C, mpX t

Table 3.4 - Cycle Times for 942F Control

Cycle	Time (Minutes)
Bac vab	- 30
ur	j

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
1 *	Time of a	

5
pa 12

1	Sa[X/capacit [X/c • ut	[X] vi• t• rh [X/c • ut• f 4 an• 5 s• h atN O unauth• ri• • b ana• s• t h pr• ramm• • va[u• s can b ma• .
1J	[X] v S ns• r S [X/ct	Th is• param t r is• us• • t• s• [X/cth fX v• s ns• rh at is• t• b us• • vh h s• st m. Th fact• r -pr• s• t va[u is 1 t• r a 1-inb turbin . Th ran• is• 1• -4 1• = ut• t• X1-inb turbin „2 = ut• t• X2-inb „turbin „3 = us• r pr• ramm ab[V -fact• r„4 = us• r pr• ramm ab[X pu[• • uiva[X nt. Th r s• p ctiv m t r manufactur r s• u[• • supp[X h -fact• rs• r pu[• • uiva[X nts t• r in• ivi• ua[X m t rs.
20	-fact• r• r pu[• • uiva[X nt	

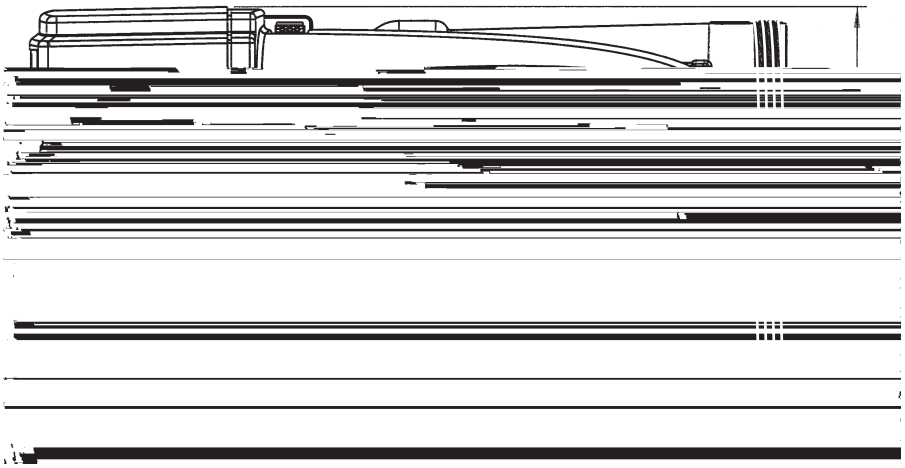
* Th J62 c• nt• [X/r functi• ns• in h r a 12h• ur• r 24h• ur c[X/c m• • . t• aramming 13 (c[X/c m• •) b t• r 1• r 2 vi[X/ [X/minat an c• nfusi• n fr m s• ttingth• s• param t rs.

** Th J62 c• nt• [X/r functi• ns• in h r ‡.S.• r m tric units. t• aramming 12 (units• f m as ur) b t• r 3• r 4 vi[X/ [X/minat an c• nfusi• n fr m s• ttingth• s• param t rs.

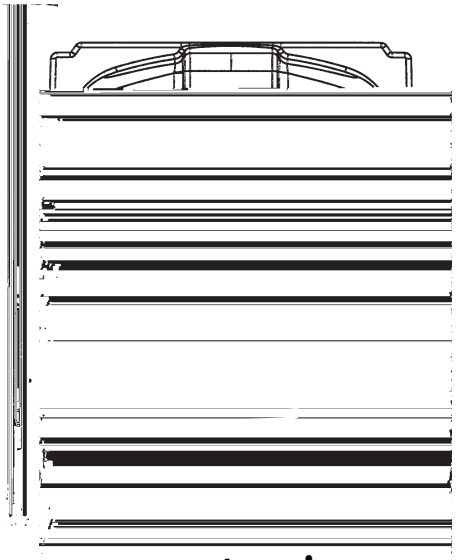
*** Th ca[X/u[X/at• • ma[X/n am• unt [X/a• • int• h • ai[X r ai•t rs• (Wh t• uh 13) at ST RT- ‡ , us• sh is p rc nta• • f capacit . E ampX J0,000 • rains• in 5-‡ 10 • rains• in 3, J0,000 / 10 = J,000 ma[X/n capacit , J,000 .3 (30% in 16) = 2700 ma[X/ns, fr m ib is [X/a• • int• Wh t• uh 13,h • ai[X av ra• • s. • rh is• . amp[X,h • smart r• s• rv at ST RT- ‡ , t• u[X b 2700 ma[X/n. 1.2 (120%• fh • ai[X av ra•) = 3240 ma[X/n. Th is• ai[X av ra• vi[X/b ana• as• actua[X/at r us• a• int• rmati• n is• ah r •.

4.0 Performa Cv Performance Charts and Graphs

4.1 General Specification

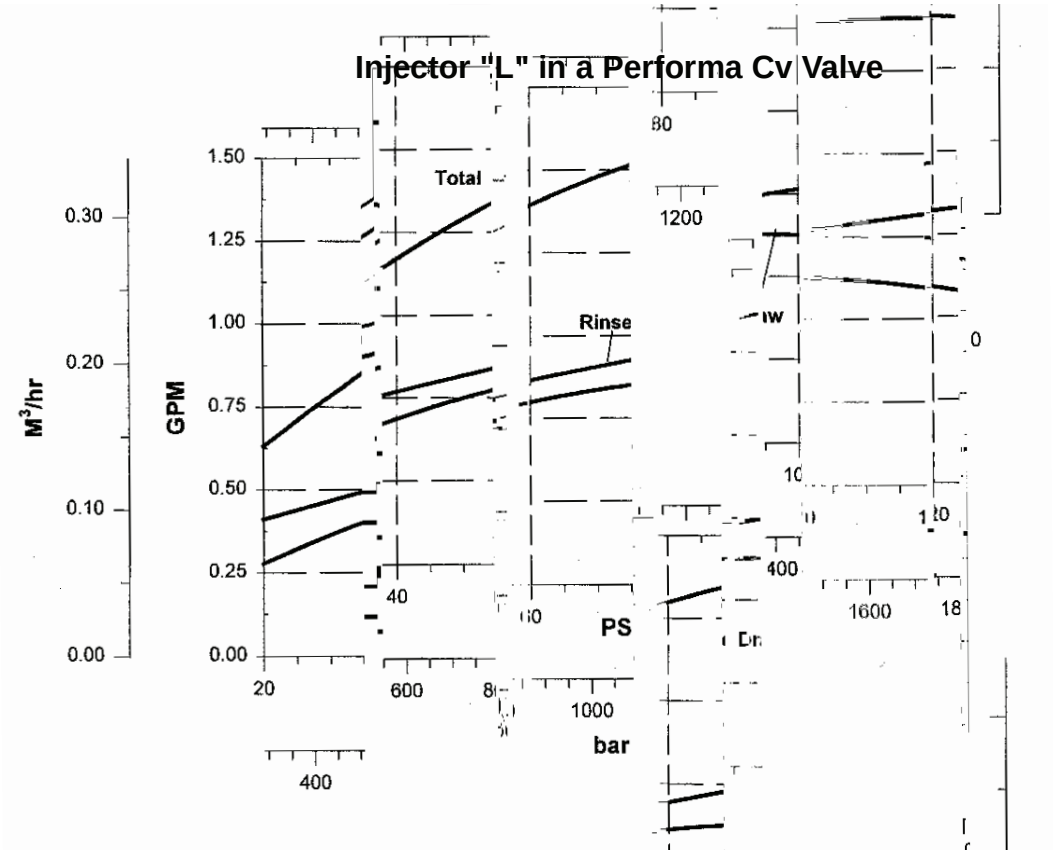


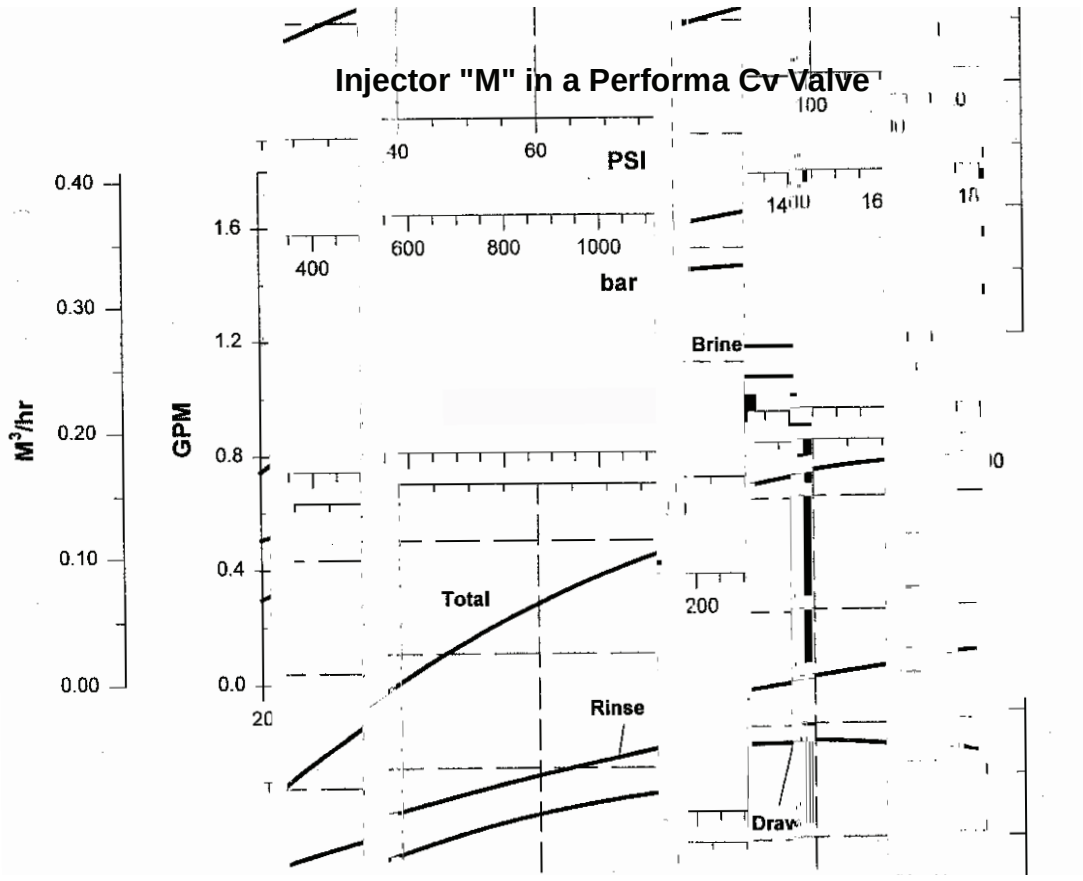




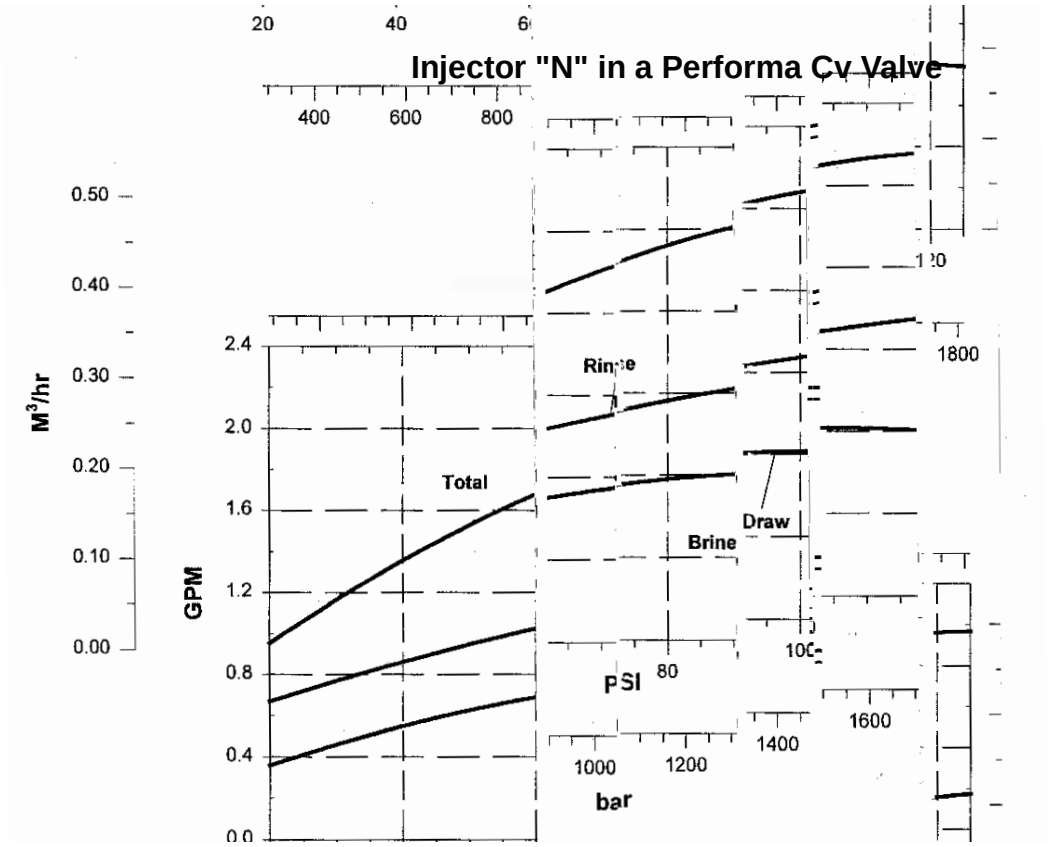
Max. static Test Pressure	300 psi (20.6 bar)
Working Pressure	20-120 psi (1.3 - 8.27 bar)
Standard Electrical Rating	3642 series valve transformer 12V 60 Hz, 12V 50 Hz
	3642 Marine 12 Volt/24 Hour 50 Hz 12 V transformer, 60 Hz 120 Vac or 12 V transformer
Electrical Cord (standard rating)	60-inch (1.5-m) 3-wire with plug
Pressure Tank Threads	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) 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 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, rigid plastic
Control Mounting	Rigid plastic
Rubber Seals	Compound treated for water service
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 Bac valve Controls	5, 7, 10, 12, 15, 20 GPM. Bypass 20 GPM must be used.

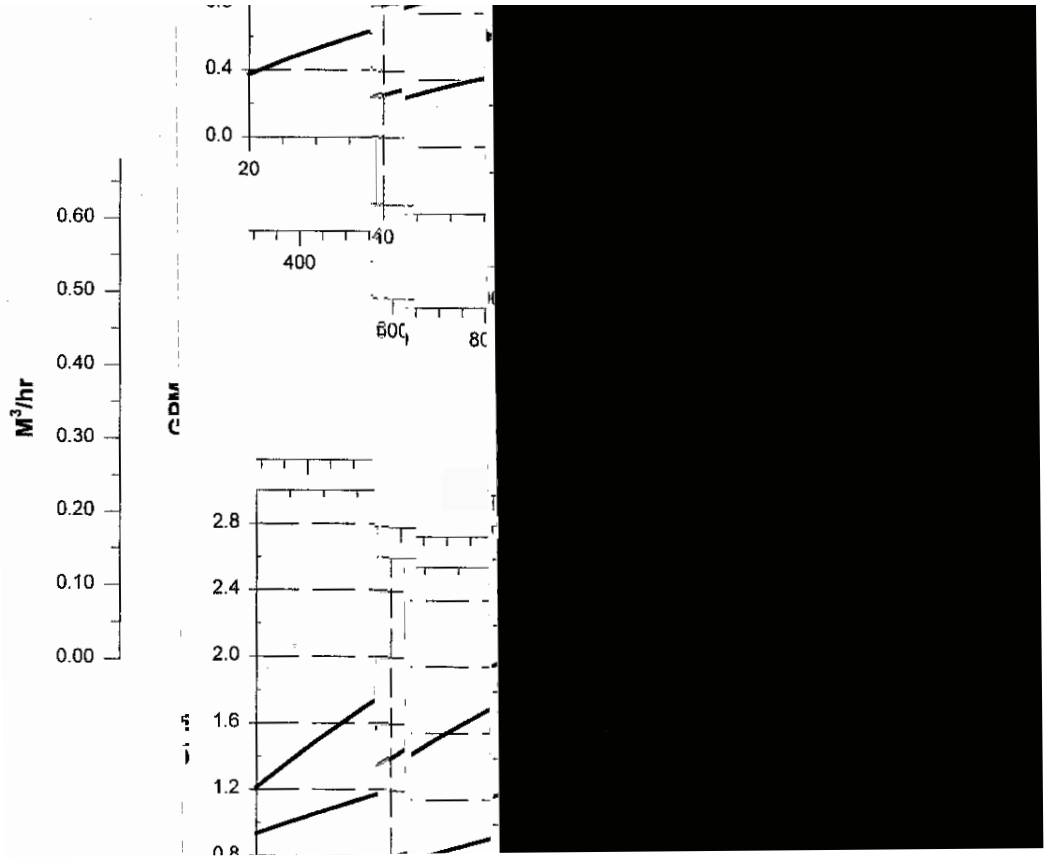
4.2 Injector Curves

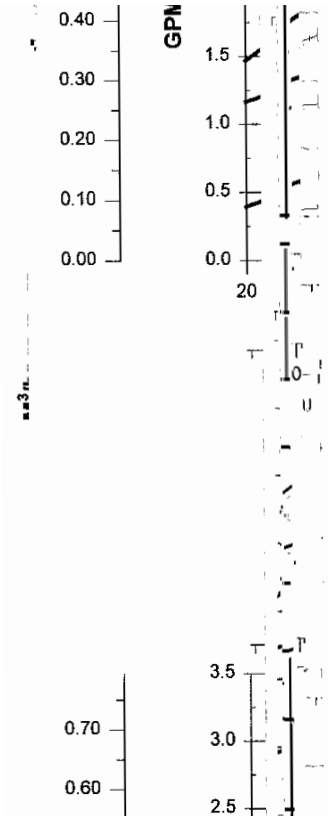




Injector "N" in a Performa Cv Valve







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]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 vash f s c n unit.

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

5.2 Preventative Maintenance

Injector Screen and Injector

Inspect and clean the injector screen and filter element if the engine performance appears to be affected.

Clean injector screen and injector

1. Unplug the vacuum transducer.
2. Shut off the water supply to the bypass valve (s) inlet bypass position.
3. Remove the bypass valve (s) from the vehicle (at rear) with a screwdriver.
4. Using a screwdriver, remove injector cap (figure 5.1).
5. Clean screen using a fine brush. Rinse until clean.
6. Using a non-corrosive pick, pull injector straight out.
7. Rinse the injector screen and flush the valve body to remove debris. Rinse with the injector removed.
8. Clean and flush the injector.
9. Lubricate the O-rings on the injector, injector cap and injector screen with the **silicone lubricant only**!
10. Reinstall injector, injector cap and injector screen.

IMPORTANT: Do not overtighten plastic cap. Seat the cap within two inches of position. Overtightening may cause brass adapter in the plastic cap that may not be immediately evident.

11. Unplug the vacuum transducer from the outlet; reset the clock if necessary.
12. Slowly open the water supply valve (s) to the service position.

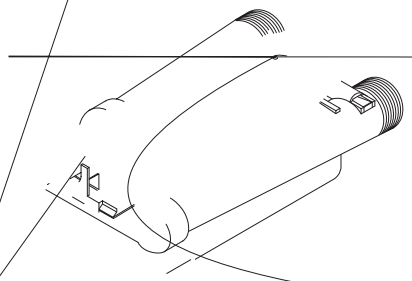


figure 5.1

Water Meter Maintenance

The meter is designed to require minimal maintenance. However, periodic maintenance may be required depending on water conditions.

1. Shut off the water supply to the bypass valve (s) inlet bypass position.
2. Relieve pressure by opening Backwash valve (s) to the service backwash position.
3. Remove the pipe/tube adapter (1265 bypass) from the inlet and outlet of the valve body.
4. Using a non-corrosive pick, remove the turbine from the outlet. Grasp the front of the turbine assembly and pull straight out. Remove the turbine assembly from the outlet of the valve (figure 5.1).
5. Carefully remove the turbine from the housing. Use a toothbrush to scrub the impeller and surface clean. Rinse with a mixture of vinegar (such as R.V.*) and water. Soak in the mixture for 30 minutes. Rinse with water.
6. Carefully install the turbine into the turbine cavity. Make sure that the shaft is aligned with the bearing cavity. Reassemble the turbine cavity and bracket. Reinstall the turbine assembly into the outlet of the valve.
7. Reinstall the pipe/tube adapter (1265 bypass) to the inlet and outlet of the valve.
8. Turn the water supply valve (s) into the service position and purge the air out of the system.

To be certified for participation, please observe the following instructions, which are necessary for efficient operation.

*R.V. is a trademark of Camco Chemical Company.

5.3 Removing the Valve Assembly for Servicing

1. Unplug the power cord.
2. Shut off the water supply and relieve pressure by pressing valve (s) into bypass position.
3. Remove the screw holding the valve cover, and pull the valve cover (rear flange) away from the control panel (figure 5.2).

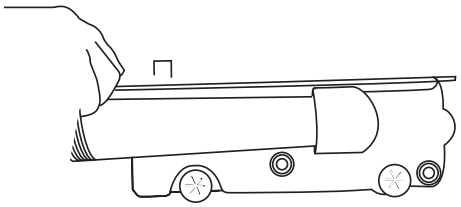


figure 5.2

Unscrew the hose clamps and disconnect the hoses from the valve. If using the 1265 bypass, unscrew and remove the valve from bypass assembly and remove the gasket.

Unscrew (counterclockwise) and remove the valve from tank.

To replace, reverse the above procedure.

5.4 Removing the Control

Complete the following steps to remove the 3360 series control for servicing

1. Unplug the washer from the power source.
2. Shut off the water supply and relieve pressure by pressing valve (s) into bypass position.
3. Remove the rear cover by pressing the tabs provided on the cover, figure 5.3. Lift the front of the cover and remove by pulling away from the washer.

figure 5.3

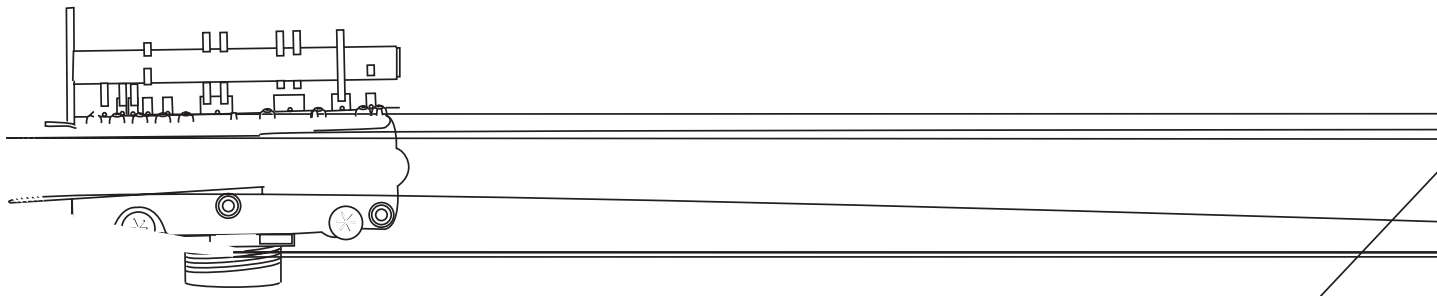
4. Remove the screw securing the Back Splash Valve Cover to the control panel, figure 5.4.

figure 5.4

5. To remove the cam shaft, rotate the cam shaft to the position where the cam shaft must be positioned when the control is replaced. This occurs when the cycle indicator is at the first position. Disengage the cam shaft from the position, figure 5.5.

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

figure 5.5



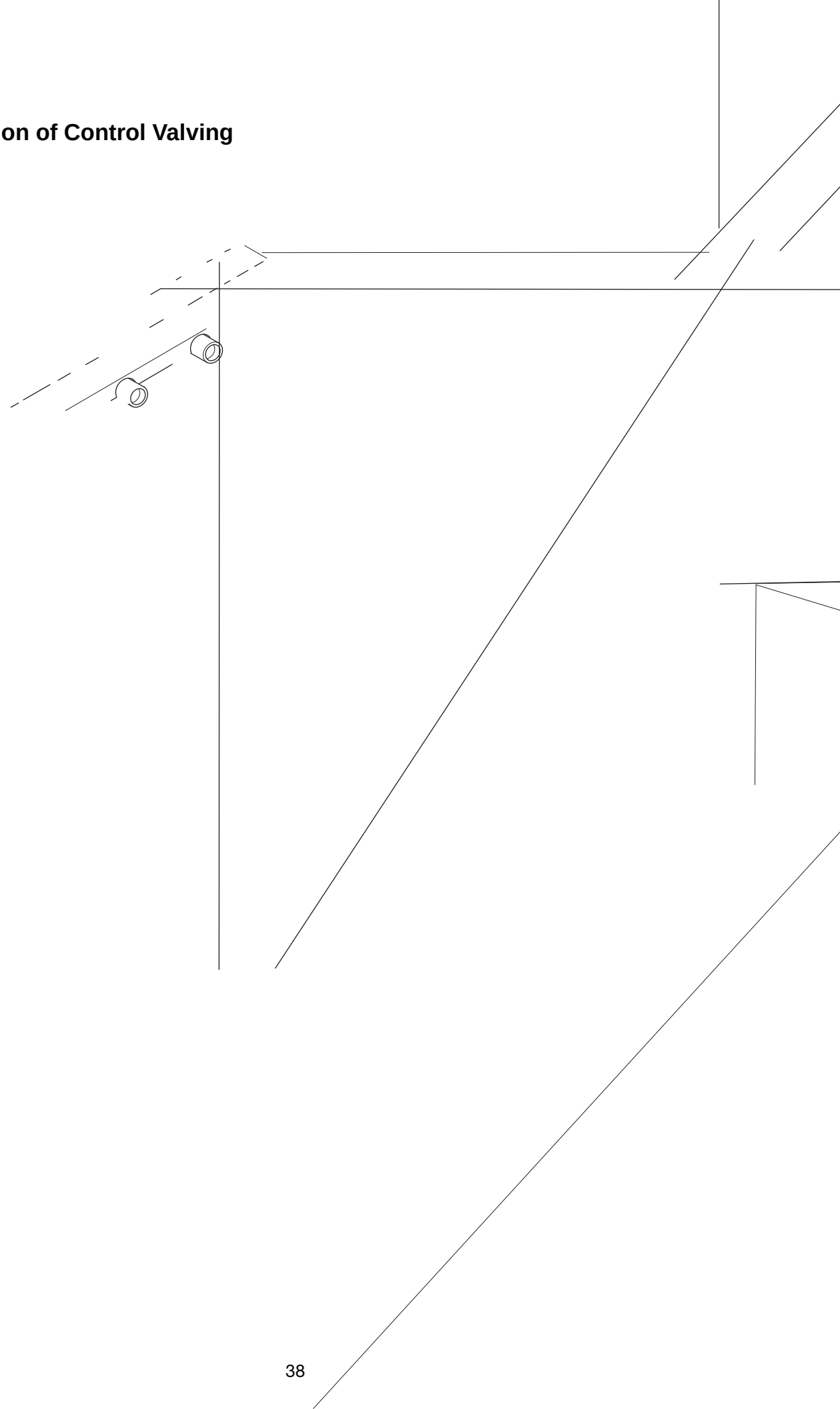
igur 5.6

6. isc nn ct th turbin pr b fr m th turbin
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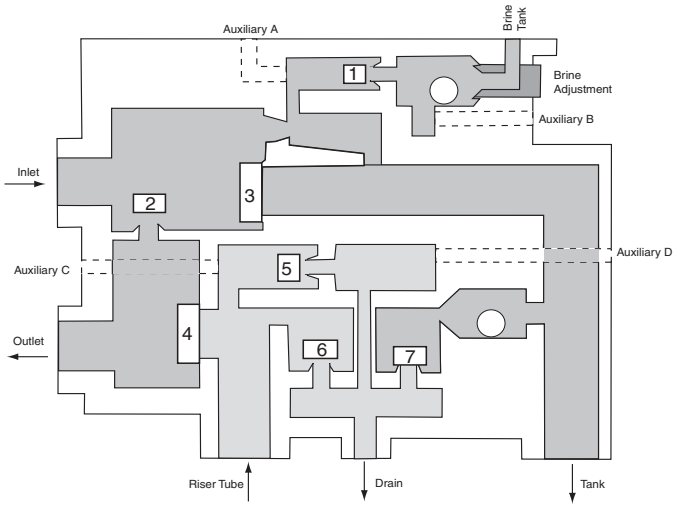
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5.5 Identification of Control Valving

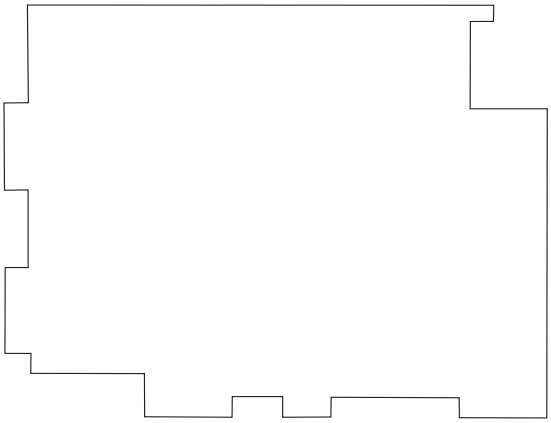


3 Brine/Slow Rinse Position



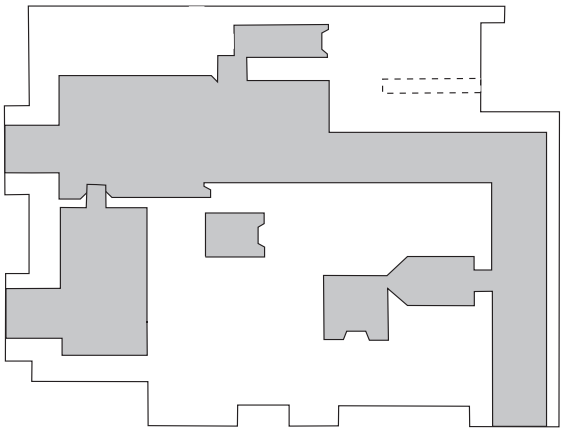
Name	Valve No.
Brine	1 - Open
By-Pass	2 - Open
Inlet	3 - Closed
Outlet	4 - Closed
2nd Tank Top	5 - Open
Purge	6 - Open
Backwash	7 - Closed

4 Fast Rinse Position



5.8 Performa Cv Filter Flow Diagrams

1 Backwash Position



2 Fast Rinse Position

5.9 Troubleshooting

This table lists some common problems that may occur during service or maintenance. If the problem persists after performing the recommended solutions, contact your service provider. For part numbers mentioned in the solutions, refer to the **Replacement Parts** section of this manual.

IMPORTANT: Service procedures require that all pressure be relieved from the system before removing any parts. To relieve pressure from the system, push the bypass valve to the bypass position and then push the button on the bypass valve to drain valve (if the system has a drain valve) or disconnect the discharge hose.

Valve Troubleshooting

Problem	Possible Cause	Solution
1. Continuous vibration.	a. Low water pressure.	a. Set pump to maintain 30 psi at control.
	b. Restricted drain.	b. Remove restriction.
	c. Injector plugged!	c. Clean injector and screen.
	d. Injector defective!	d. Replace injector.
	e. Valve (2 and 4) not closed.	e. Remove foreign matter from disc and body. Reinstall. Replace if needed.
	f. Damaged injector O-ring.	f. Replace injector O-ring.
2. Brine tank overfills.	a. Brine valve (1) blocked.	a. Manually operate valve to flush and destruct.
	b. Incoming brine flow rate!	b. Remove variable setting.
	c. Valve (3 and 4) not closed during brine draw	c. Refer to foreign matter or disc operation and manually operate valve.
	d. Air in brine line.	d. Check connections in brine line for air. Refer to instructions.
3. Set mushing more frequently than actual.	a. Inaccurate setting.	a. Correct setting.
	b. Foreign matter in control causing incorrect flow rate!	b. Remove variable setting and flush foreign matter. Manually position control to brine draw (after rinse, position control to purge to remove brine from tank).
	c. Defective control.	c. Replace control.
4. Intermittent or irregular brine draw.	a. Low water pressure.	a. Set pump to maintain 30 psi at control.
	b. Defective injector!	b. Replace both injector and injector cap.
5. No connection to water after regeneration.	a. Initial no flow rate.	a. Check for power.
	b. No salt in brine tank.	b. Add salt.
	c. Plugged injector!	c. Clean injector. Add both.
6. Control back valve set at incorrect time.	a. Incorrect back valve control used.	a. Replace with correct control.
	b. Foreign matter affecting control operation!	b. Remove control and flush.
7. Excessive pressure drop after regeneration.	a. Drain valve (6 or 7), brine valve (1) or valve (4) and foreign matter or particle.	a. Manually operate valve to flush and destruct.
	b. Valve set mark turn spring not popped up.	b. Replace spring.
8. Water always running		

962 Control Troubleshooting

Alarms

The Model 962 continuously monitors itself and will annunciate an alarm if it detects a malfunction. The alarm is a beep that is heard at the front panel and the word Error with a number from 1 to 4. The table below shows the Error numbers, a description of the error, the cause of the error, and the solutions. To silence the alarm, press any button on the control. If the error persists, the control will try to recover after 30 seconds.

Model 960 Alarms

Indication	Description	Cause	Solution
Err1	Electronic failure	Control settings in programming.	Press any key to clear fault value. Reprogram the Model 960 Control.
Err2	Improper start of regeneration (Permit switch cycled in within 2 sec).	Valve cam shaft assembly manually rotated during regeneration. Valve cam shaft assembly manually rotated to regeneration position. auxiliary motor. auxiliary motor drive. auxiliary switch.	Press any key to silence alarm. Put alarm automatically clears at TIME OF REGEN.) The control will return to service after the cam shaft to the proper position. Replace the control Replace the control Replace the control
Err3	Improper finish of regeneration (Permit switch open within 2 sec).	Valve cam shaft assembly manually rotated during regeneration. auxiliary motor. auxiliary motor drive. auxiliary switch.	The control will return to service after the cam shaft to the proper position. Replace the control Replace the control Replace the control
Err4	Improper control settings (one or more settings out of the available range).	One or more settings out of the available range.	Range 3 to 250. Capacity range 0.1 to 140.0. Regen time range 1 to 99. Bring value up proper range per Table 4.1.

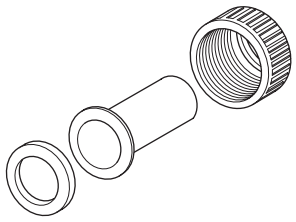
Problem	Possible Cause	Solution
1. Capacity display stays at 9999 when water is flowing.	a. Totalized capacity has calculated to be above 9999.	a. Check water usage control, or maximum capacity value is set to 9999 gallons.
2. Time of day flashes on and off.	a. Button is held in during programming mode.	a. Release the programming selection.
3. Time of day does not respond to REGEN button.	a. Button is not active in programming mode.	a. Refer to the Regeneration section.
4. Time of day is not displayed.	a. Transformer is unplugged. b. No electric power at outlet. c. defective transformer. d. defective circuit board.	a. Connect power. b. Repair outlet or use working outlet. c. Replace transformer. d. Replace control
5. Time of day is not correct time of day.	a. Output to power backup battery. b. power outage.	a. Set output to control battery. b. Reset Time of day.

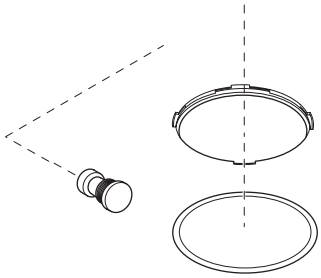
Problem	Possible Cause	Solution
6. N • ïvat r fX v ispXa fi n ïvat ris fX ïvin (c • X n • • n t bXn).	a. B pass vaX in b pass p siti n. b. M t r ps b isc nn ct r n t fuX c nn ct t m t h • usin . c. R strict m t r turbin • tati n u t r ian mat riaXn m t r !	a. Sh ift b pass vaX int • s rvic p siti n. b. uX ins rt ps b int m t h • usin . c. R m v m t h • usin , fr up turbin an fXib ïth cXan ïvat r. Turbin • • uX spin fr X. If n t, r f r t • h Wat r M t r Maint nanc • ct n.
. C nt • X ispXa is fr z n at R n Tim R mainin .	. f ctiv m t r ps b . . f ctiv circuit b ar .	. R pXac c nt • X . R pXac c nt • X
. C nt • Xr n rat • ath ïv • n tim • f a .	a. Bac t bac r n rati ns ïv r r u st . a. • ïv r uta • s. b. Tim • f a • t inc rr ctX. c. Tim • fr n rati n • t inc rr ctX.	a. R f r t h Manua R n rati n • ct n. 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(• fs0t)-31.1(i)-30.-25.4224.1( )-30.3

61-4TB.2(Ba)54(4(5anT (14(1s(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 , v/ X v C nt X	1
	100041	rf rma Cv iX r VaX ss , v/ X v C nt X	
2	1035611	362 C n"iti n r Cam ss , SinaX nit	1
	10303 7	362 C n"iti n r Cam ss , MuXi nit	
	10303 0	362 iX r Cam ss , SinaX nit	
	10303 4	362 iX r Cam ss , MuXi nit	
3		rain C nt X ss mbX	1
	1030355	C ss , 5 apm	
	1030356	C ss , 6 apm	
	103035	C ss , apm	
	103035	C ss , apm	
	103035	C ss , apm	
	1030360	C ss , 10 apm	
	1000406	C ss , 12 apm	
	100040	C ss , 15 apm	
	100040	C ss , 1 apm	
	100040	C ss , 20 apm	
	1000410	C ss , 25 apm	
4	1030502	BaXX X v C nt X	2
5		Inj ct r ss mbX (incX" s O-Rina)	1
	1035 36	Inj ct r - Orana	
	1035 3	M Inj ct r - Bv n	
	1035 3	N Inj ct r - r n	
	1035 3	Q Inj ct r - urpX	
	1035 4	R Inj ct r - ar r	
6	100026	Inj ct r Cap ss mbX (incX" s O-RIna)	1
		Brin R fiXC nt X	1
	1000224	4 apm	
	100051	1.3 apm	
	100244	rain ittina EX v (3/4 h s barb ")	1
	1000226	Scr n/Cap ss mbX	1
	1041042	O-Rina	1
11	1035622	Tan Rina	1
12		Xumbina "apt r its	1
	1001606	3/4-inb C pp r Tub "apt r it	
	100167 0	1-inb C pp r Tub "apt r it	
	1041210	1-1/4-inb C pp r Tub "apt r it	
	100160	22-mm C pp r Tub "apt r it	
	100160	2 -mm C pp r Tub "apt r it	
	1001613	3/4-inb C VC Tub "apt r it	
	1001614	1-inb C VC Tub "apt r it	
	1001615	25-mm C VC Tub "apt r it	
	1001 76	3/4-inb N T Xstic ip "apt r it	
	1001603	1-inb N T Xstic ip "apt r it	
	1001604	3/4-inb BS T Xstic ip "apt r it	
	1001605	1-inb BS T Xstic ip "apt r it	
	1001611	3/4-inb BS T Brass ip "apt r it	
	1001610	1-inb N T Brass ip "apt r it	
	1001612	1-inb BS T Brass ip "apt r it	
13	1033444	Turbin ss mbX	1
14	10015 0	Sprina, Xapp r VaX	
15	10303 2	C v r	1
*		VaX isc it	
	10411 4	Stan ar"	
	10411 5	S v r S rvic	
*	1034312	Int ro nn ct CabX , uaXOp rati n	
	10355 3	Int ro nn ct CabX , TripX Op rati n	
*	10 75 6	Batt r , -V XR b ara abX	
*		araX X its, MuXi-unit Op rati n	
*	1035 23	uaX araX XC n"iti n r it	
*	1035 25	TripX araX XC n"iti n r it	
*	1035 26	TripX araX X iX r	

"N t S v

6.3 Performa Cv Controls

