Owners Manual

Canature™ WaterGroup

Commercial/Industrial Engineering Division

FHF Series High Flow Softeners

F60/3150

Installation, Operation & Service Instructions

- Please read carefully all instructions before proceeding with the installation. Systems must be properly installed, operated and maintained . Failure to do so voids the warranty.
- On fiberglass tanks, due to slight expansion and contraction of the tanks, flexible connectors must have been properly installed between the tank openings and rigid piping. Also a vacuum breaker(s) must have been properly installed to protect the tank from vacuum under all conditions. Failure to install flex connectors and/or vacuum breaker(s), or improper installation will void tank warranty .
- The systems must be protected from freezing temperatures and avoid installing in direct sunlight.
- Do not use the system with water that is microbiologically unsafe or of unknown quality without adequate disinfection before or after the system.
- Test the water periodically to verify that the system is operating satisfactorily. A regular preventative maintenance inspection by a water professional is recommended
- Handle all components with care. Do not drop, drag or turn components upside down.
- Check all local plumbing and electrical codes. The installation must conform to them.
- It is recommended to wait until they entire system is fully pressurized , confirmed to be operating properly, and recheck for leaks before leaving the site.

FHF Series

High Flow Softeners

Canature™ WaterGroup

Commercial/Industrial Engineering Division

Model _____

Options _____

Order _____

PO# _____

Customer _____

Date Ordered_____

Date Installed _____

Installed By _____

_____

_____

Date Commissioned _____

Commissioned By_____

_____

_____

Notes _____

_____

_____

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SAFETY GUIDELINES

Follow the instructions carefully. Failure to install the system properly voids the warranty

Before beginning the installation, read this entire manual. As well, obtain all required all materials and tools required to complete the installation.

The installation must conform to all local plumbing and electrical codes.

Use only lead free solder and flux for all sweat—solder connections as require by all provincial, state and federal codes.

Do not locate the system where freezing temperatures occur. Do not attempt to treat water over 100^0F. **Freezing or hot water damage voids the warranty.**

Avoid installing in direct sunlight. **Excessive sun damage may cause distortion or other damage** to non-metallic parts which will void the warranty.

The minimum water inlet pressure is 30 psi. The **MAXIMUM ALLOWABLE inlet water pressure is 100 PSI**. If daytime pressure is over 80 psi, night time pressure may exceed the maximum. Use a pressure reducing valve if necessary. (Adding a pressure reducing valve may reduce the flow.)

The system operates on 24 volt—60 hz electrical power only. Be sure to use the included transformer.

This system is not intended to be used for treating water that is microbiologically unsafe or of unknown quality without adequate disinfection before and after the system.

Receiving Section 1.1

RECEIVING AND INSPECTION

Be sure that the entire shipment listed on the packing slip has been received.

Check the entire shipment for any shipping damage. Note any damage to shipping cartons. All skids are fully shrink wrapped at the factory. Note if any skids are missing shrink wrap. If damage is present or missing pieces, notify the transport company immediately. The manufacturer is not responsible for damage or loss in transit.

Note: Do not discard any small parts. To avoid loss of small parts, keep them in the parts bag until you are ready to use them. Thoroughly check all boxes & cartons to ensure there are no small parts tucked inside.

Major Components Section 1.2

Note: all external piping, drain lines, isolation valves, sample points, pressure gauges, etc., are not included.

This manual covers all single, duplex, triplex, and quadplex softener systems. Quantities for each system size are listed below.

FHF 660 to 1740 (42"- 63" dia tanks)	Single Unit	Duplex System	Triplex System	Quadraplex System
Mineral Tank	1	2	3	4
Upper Distribution	1	2	3	4
Lower Distribution (May be installed in mineral tank)	1	2	3	4
Diaphragm Valves	2	4	6	8
Media Beds (see section 5)	1	2	3	4
Brine Tank Assemblies	1	2	3	4
Side Mounted Control Valve c/w Brass Side Mount Adapter, SS Meter & 2" Plug	1	2	3	4
Control Valve Stands 17407ST	1	2	3	4
SVO (installed on control valve)	1	2	3	4
Three port solenoid (may be installed on valve)	1	2	3	4
Diaphragm tubing kit(s)	1	2	3	4
PVC Manifold Assembly	1	2	3	4
Box Misc parts (bolts, gaskets,etc)	1	1	1	1
See section 10 unless otherwise noted for more details.				fhf-mvs.xlsx

Standard Components

Section 1.3

Below are some of the main standard components that are included with the standard unit (media bed not shown).

Side mounted control valve

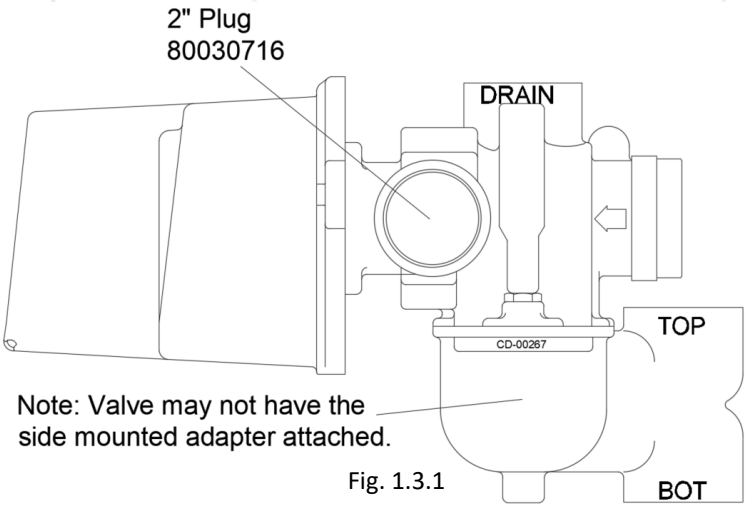


Fig. 1.3.1

Diaphragm valves c/w flange adapters

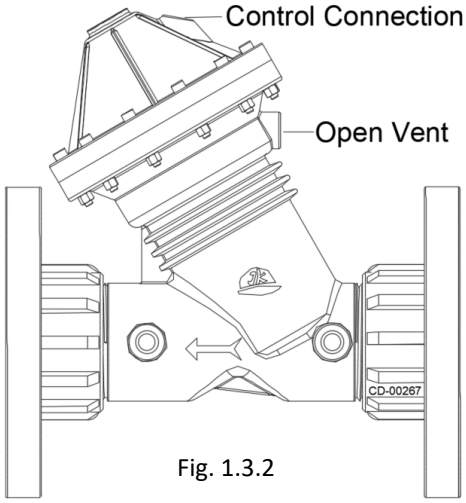
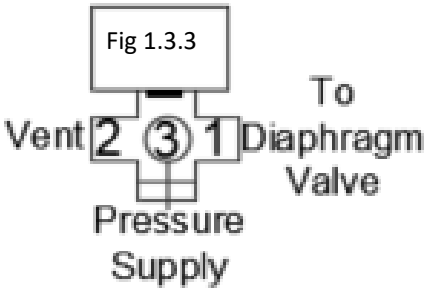


Fig. 1.3.2

Solenoid valve

May be mounted on control valve (Fig. 1.3.1))



Brine tank assembly

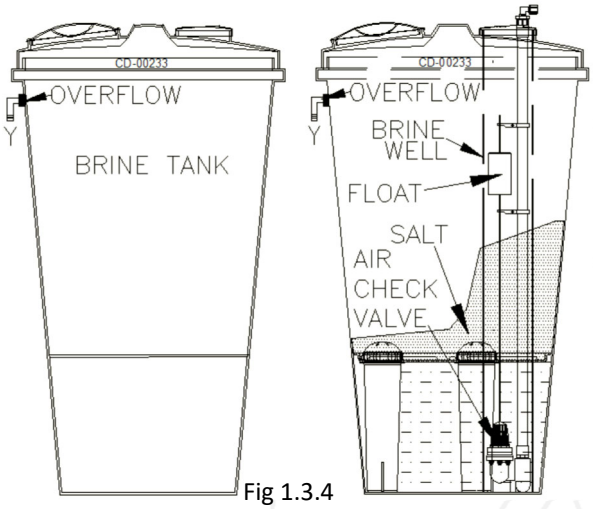


Fig 1.3.4

Mineral tank & distribution

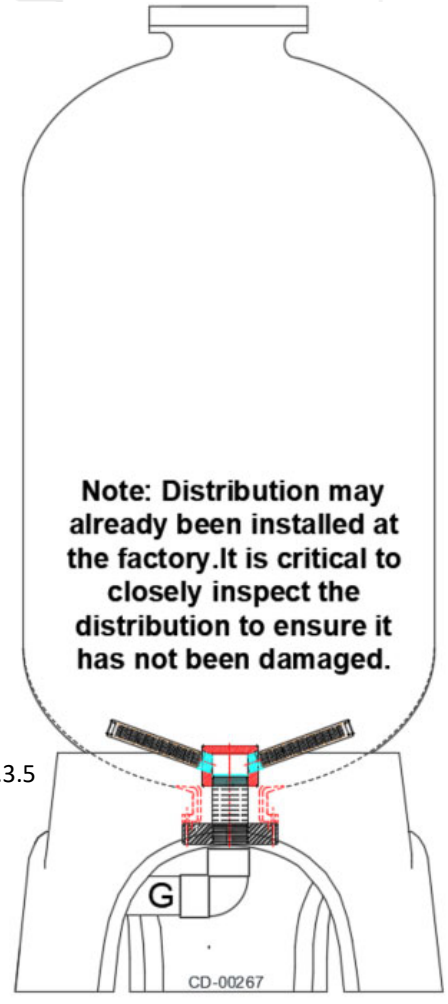


Fig 1.3.5

Tripod base to be secured to floor.

Standard Components

Section 1.3

Manifold Assembly

Manifold parts are listed in the table below and are labeled as shown.

Some items may already be installed on the control valve or on a manifold assembly.

Fig 1.3.6 and Fig 1.3.7 indicates orientation .

Note: A vacuum breaker is built into the manifold. An air release (if required) is not included.

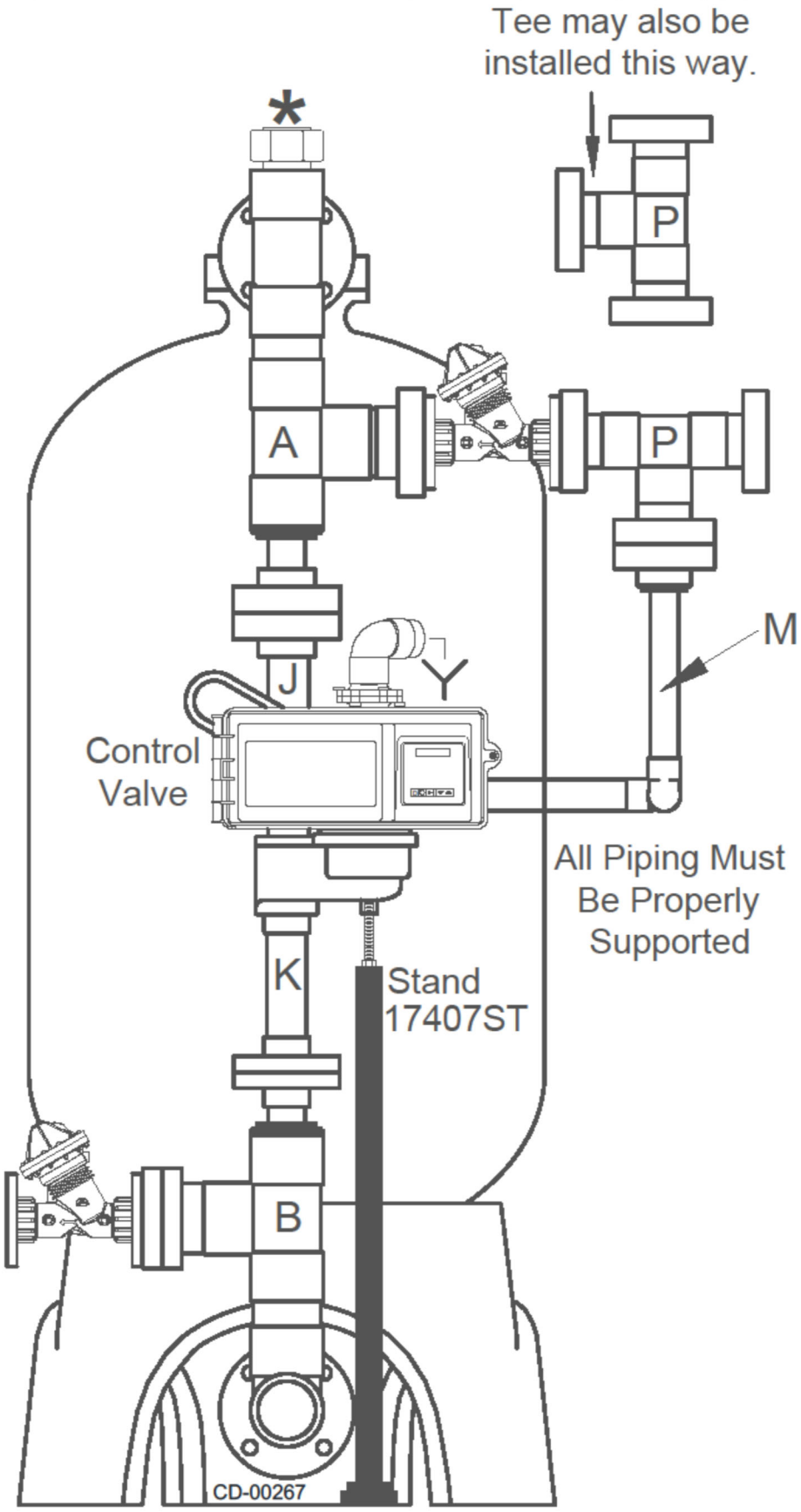
F60 Manifold Assembly	Label
FHF Top Front	A
FHF Bottom Front	B
FHF/MVS Top Tee	F
FHF/MVS Bottom Elbow (may be installed in the tank)	G
FHF Flange To MNPT Top Side Adapter Piping	J
FHF Flange To MNPT Lower Adapter Piping (adjusted)	K
FHF Flange To Half Union Lower Piping	L
FHF Flange To Flange Valve Inlet Piping	M
FHF Flange To MNPT Side Adapter Piping	N
FHF Flanged Inlet Tee	P
FHF Flange To Flange Top Piping	T
Control Valve Stand 17407ST	
Brass Side Mount Adapter Top Inlet / Bottom Outlet	
2" MNPT Plug (For Valve Outlet) Installed On Valve	
See Section 10 For More Details.	fhf-mvs.xlsx

Fig 1.1

Standard Components

Section 1.3

Manifold Assembly– Front View



Standard Components **Section 1.3**

Manifold Assembly—Side View

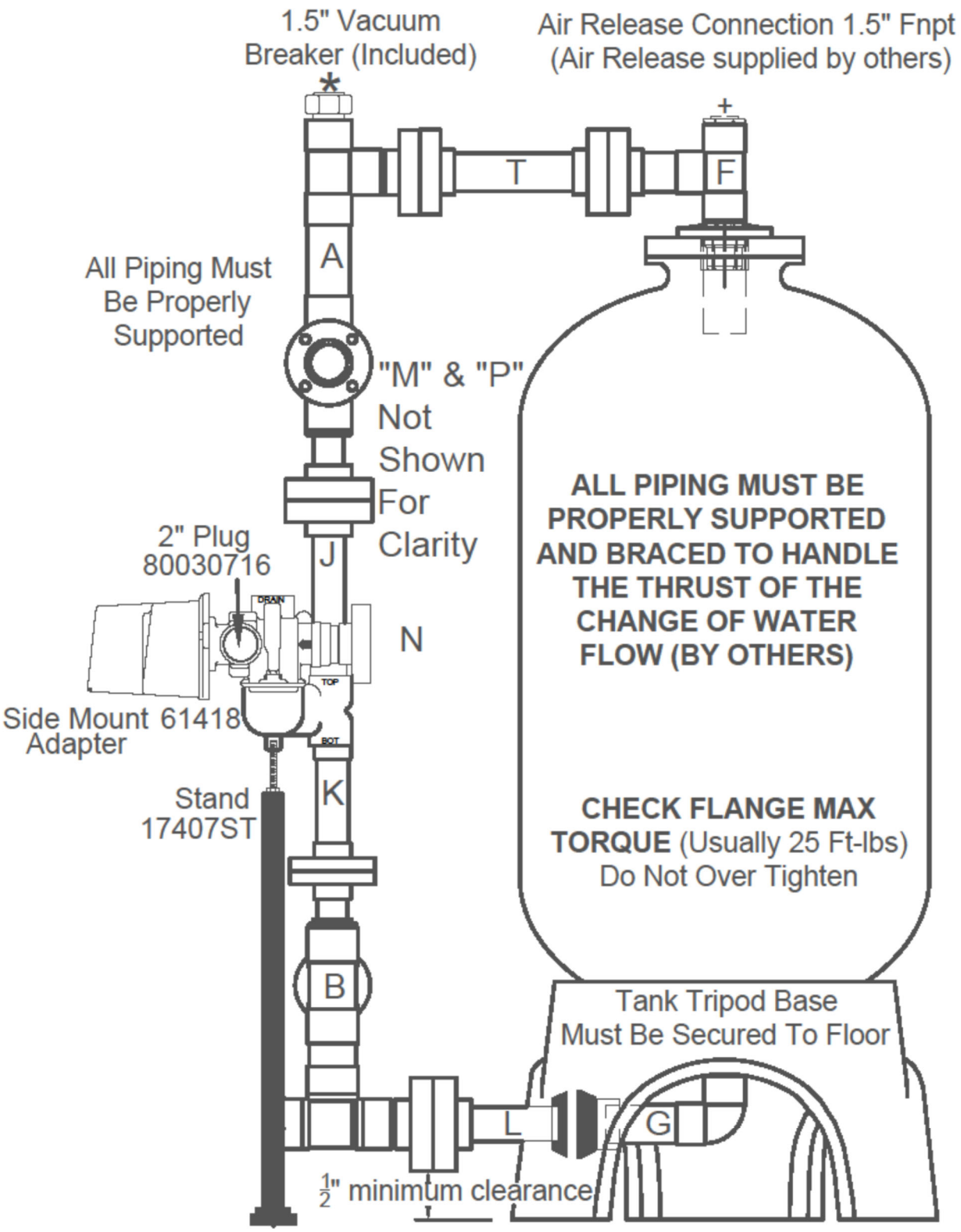


Fig. 1.3.7

Specifications Section 2.0

- Recommended system operating pressure 30 to 100 psi (2 to 6.9 bar).
- Operating temperature 39^0 to 100^0 F (4^0 to 38^0 C).
  - High flow 3” diaphragm valves on a sch 80 PVC manifold.

  - Electronic side mounted regeneration control valve
    - Maximum operating pressure of 125 psi (8.6 bar).
    - Electrical rating 120 V / 60Hz input- 24V / 60Hz output.
    - Class 2 transformer.

  - Mineral tanks. Corrosion resistant fiberglass reinforced polyethylene.
    - 30” diameter and above are NSF/ ANSI 61.
    - Maximum vacuum : 127 Hg.
    - Maximum operating pressure 150 psi (10.3 bar).

  -Ion exchange resin. High capacity IAPMO certified 8% Canature resin.
  -Internal hub and lateral distribution.
  -Brine tank. High density polyethylene c/w salt grid, brine well, safety float & overflow.

Model Legend Section 2.1

FHF 1740-3 Duplex Demand Softener
Model: FHF 1740-3BD8000

FHF	1740-	3B	T	8	0 0 0
Series	Softener Capacity*	Valve Size	# Of Tanks	System Type	Options 3 digits Order follows alphabet then number
FHF -HighFlow Diaphragm Valve System (c/w Side Mount Regeneration Valve)	360 390 450 570 600 660 720 780 900 1020 1080 1740	3A* 3B* 3C* 4" *A,B&C-FHF units only indicates regeneration valve type.	S-Single D-Duplex T-Triplex Q-Quadplex P-Pentaplex H-Hexaplex E-Septaplex O-Octaplex (P,H,E,O with NXT2 only)	4-Single meter initiated 5-Parallel flow-meter on each unit 7-Duplex alternating -one system meter. 8-Responsive Flow-one meter per unit 9-Alternating-one meter per unit	0- Standard B-Single brine tank L-Lockout contact (eg for RO) R-Non-standard resin T-Treated water regeneration X-Non standard option CD-00220

*Grain capacity of single tank x 1000 @ 15 lbs salt setting

Softener Injector & Cycle Settings Section 2.2

Model	DLFC	BLFC	Injector	Backwash	Brine Draw	Fast Rinse	Refill
	gpm	gpm		Min	Min	Min	Min
FHF 360-3C"	25	4	4C	10	78	10	11
FHF 390-3C"	25	4	5C	10	64	10	12
FHF 450-3C"	25	4	5C	10	64	10	14
FHF 570-3C"	35	4	6C	10	78	10	17
FHF 600-3C"	35	4	6C	10	80	10	18
FHF 660-3B"	45	5	6 White	10	82	10	16
FHF 720-3B"	45	5	6 White	10	66	10	17
FHF 780-3B"	45	5	6 White	10	74	10	18
FHF 900-3B"	60	5	7 Blue	10	86	10	22
FHF 1020-3B"	60	5	7 Blue	10	90	10	24
FHF 1080-3B"	60	5	7 Blue	10	90	10	25
FHF 1740-3B"	95	10	8 Yellow	10	70	10	20

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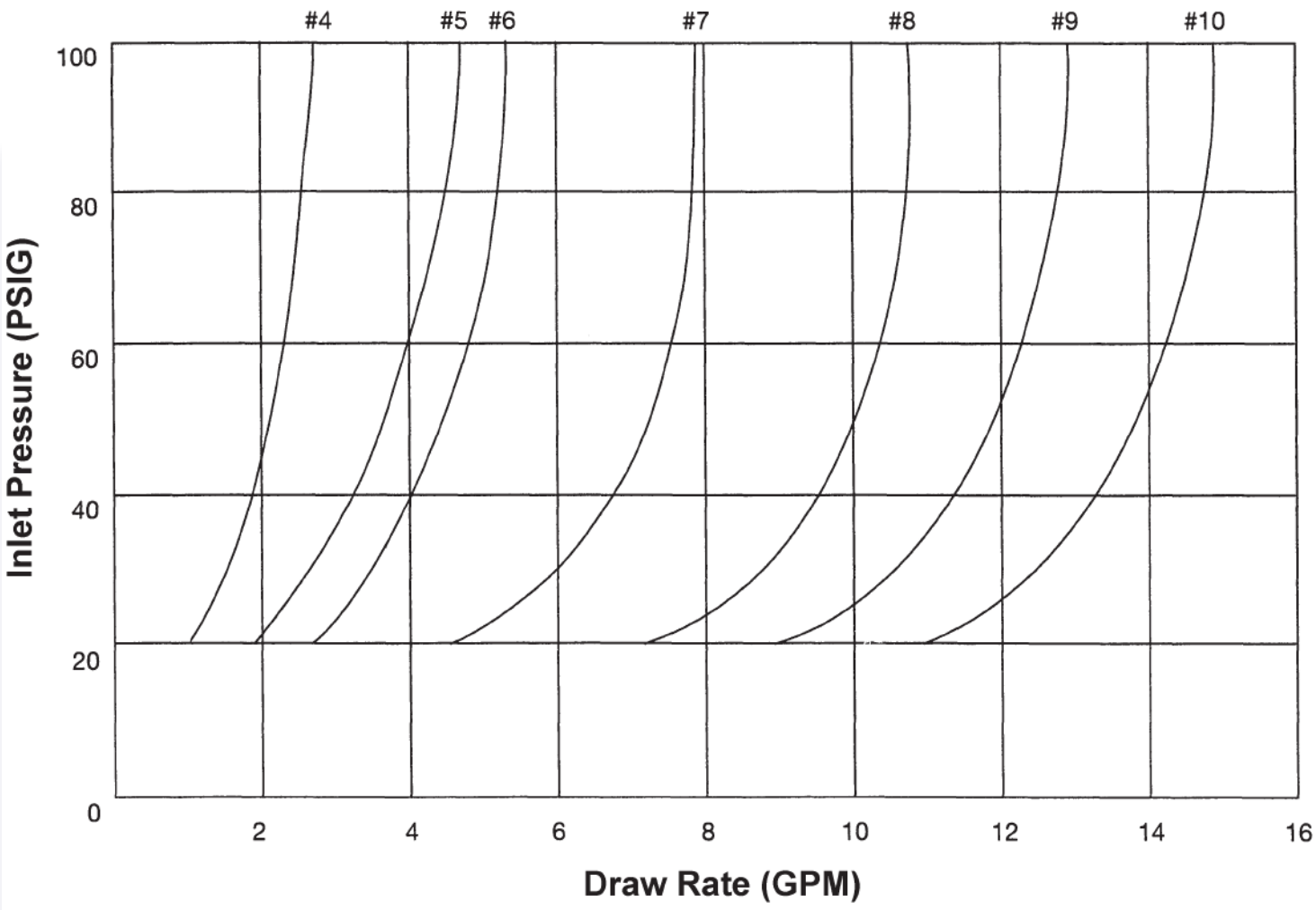
Softener Injector Flow Data

Section 2.2

For FHF 660 to FHF 1740



Installation Space Required

Section 2.3

Model	Dimensions		Installation			Duplex	Triplex	Quadplex
	Mineral Tank	Brine Tank	Height	Depth	width	width	width	width
	in	in	in	in	in	in	in	in
	mm	mm	mm	mm	mm	mm	mm	mm
FHF 360-3C"	30 x 72 762 x 1829	33 x 53 840 x 1335	105 2667	70 1778	77 1955.8	154 3911.6	231 5867.4	308 7823.2
FHF 390-3C"	30 x 72 762 x 1829	38 x 55 965 x 1397	105 2667	70 1778	82 2082.8	164 4165.6	246 6248.4	328 8331.2
FHF 450-3C"	30 x 72 762 x 1829	38 x 55 965 x 1397	105 2667	70 1778	82 2082.8	164 4165.6	246 6248.4	328 8331.2
FHF 570-3C"	36 x 72 915 x 1829	36 x 48 914 x 1220	105 2667	76 1930.4	86 2184.4	172 4368.8	258 6553.2	344 8737.6
FHF 600-3C"	36 x 72 915 x 1829	42 x 48 1067 x 1219	105 2667	76 1930.4	92 2336.8	184 4673.6	276 7010.4	368 9347.2
FHF 660-3B"	42 x 72 1067 x 1829	42 x 48 1067 x 1219	113 2870	82 2082.8	98 2489.2	196 4978.4	294 7467.6	392 9,957
FHF 720-3B"	42 x 72 1067 x 1829	42 x 48 1067 x 1219	113 2870	82 2082.8	98 2489.2	196 4978.4	294 7467.6	392 9,957
FHF 780-3B"	42 x 72 1067 x 1829	42 x 48 1067 x 1219	113 2870	82 2082.8	98 2489.2	196 4978.4	294 7467.6	392 9,957
FHF 900-3B"	48 x 72 1220 x 1829	48 x 48 1219 x 1219	115 2921	88 2235.2	110 2794	220 5588	330 8382	440 11,176
FHF 1020-3B"	48 x 72 1220 x 1829	48 x 48 1219 x 1219	115 2921	88 2235.2	110 2794	220 5588	330 8382	440 11,176
FHF 1080-3B"	48 x 72 1220 x 1829	48 x 48 1219 x 1219	115 2921	88 2235.2	110 2794	220 5588	330 8382	440 11,176
FHF 1740-3B"	63 x 86 1600 x 2184	70 x 58 1778 x 1473	118 2997	103 2616.2	147 3733.8	294 7467.6	441 11201.4	588 14,935

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General Specifications Dimensions & Flowrates Section 2.4

Model Single	Capacity	Resin	Salt Usage		Critical	3"		Max	Dimensions	
	@6 lbs/ ft3	ft3	@6 lbs/ ft3	@10 lbs/ ft3	Flow	@ 15 PSI	@ 25 PSI	To Drain	Mineral Tank	Brine Tank
	@10 lbs/ ft3	m3	lbs	lbs	USGPM	USGPM	USGPM	USGPM	in	in
			kg	kg	l/s	l/s	l/s	l/s	mm	mm
FHF 360-3C"	308,000 324,000	14 0.34	84 38.11	140 63.52	60 3.79	156 9.84	215 13.56	25 1.58	30 x 72 762 x 1829	33 x 53 840 x 1335
FHF 390-3C"	286,000 351,000	13 0.37	78 35.39	130 58.98	65 4.1	152 9.59	210 13.25	25 1.58	30 x 72 762 x 1829	38 x 55 965 x 1397
FHF 450-3C"	330,000 405,000	15 0.42	90 40.83	150 68.06	75 4.73	142 8.96	200 12.62	25 1.58	30 x 72 762 x 1829	38 x 55 965 x 1397
FHF 510-3C"	374,000 459,000	17 0.48	102 46.28	170 77.13	85 5.36	138 8.71	190 11.99	25 1.58	30 x 72 762 x 1829	36 x 48 914 x 1220
FHF 570-3C"	418,000 513,000	19 0.54	114 51.72	190 86.21	95 5.99	180 11.36	247 15.58	35 2.21	36 x 72 915 x 1829	36 x 48 914 x 1220
FHF 600-3C"	440,000 540,000	20 0.57	120 54.45	200 90.74	100 6.31	177 11.17	245 15.46	35 2.21	36 x 72 915 x 1829	42 x 48 1067 x 1219
FHF 660-3B"	484,000 594,000	22 0.62	132 59.89	220 99.82	110 6.94	202 12.74	273 17.22	45 2.84	42 x 72 1067 x 1829	42 x 48 1067 x 1219
FHF 720-3B"	528,000 648,000	24 0.68	144 65.34	240 108.89	120 7.57	201 12.68	269 16.97	45 2.84	42 x 72 1067 x 1829	42 x 48 1067 x 1219
FHF 780-3B"	572,000 702,000	26 0.74	156 70.78	260 117.97	130 8.2	197 12.43	266 16.78	45 2.84	42 x 72 1067 x 1829	42 x 48 1067 x 1219
FHF 900-3B"	660,000 810,000	30 0.85	180 81.67	300 136.12	150 9.46	213 13.44	284 17.92	60 3.79	48 x 72 1220 x 1829	48 x 48 1219 x 1219
FHF 1020-3B"	748,000 918,000	34 0.96	204 92.56	340 154.26	170 10.73	208 13.12	280 17.67	60 3.79	48 x 72 1220 x 1829	48 x 48 1219 x 1219
FHF 1080-3B"	792,000 972,000	36 1.02	216 98.00	360 163.34	180 11.36	205 12.93	276 17.41	60 3.79	48 x 72 1220 x 1829	48 x 48 1219 x 1219
FHF 1740-3B"	1,276,00 1,566,00 0	58 1.64	348 157.89	580 263.16	220 13.88	220 13.88	295 18.61	108 6.81	63 x 86 1600 x 2184	70 x 58 1778 x 1473
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General Specifications Weights Section 2.4

Model Single	Resin	Dimensions		Shipping Weight	Operating Weight
	ft3	Mineral Tank	Brine Tank		
	m3	in	in	lbs	lbs
		mm	mm	kg	kg
FHF 360-3C"	14 0.34	30 x 72 762 x 1829	33 x 53 840 x 1335	1,270 577	4,670 2,123
FHF 390-3C"	13 0.37	30 x 72 762 x 1829	38 x 55 965 x 1397	1,339 517	5,639 2,468
FHF 450-3C"	15 0.42	30 x 72 762 x 1829	38 x 55 965 x 1397	1,445 657	5,745 2,611
FHF 510-3C"	17 0.48	30 x 72 762 x 1829	36 x 48 914 x 1220	1,551 705	5,851 2,660
FHF 570-3C"	19 0.54	36 x 72 915 x 1829	36 x 48 914 x 1220	1,727 785	6,427 2,921
FHF 600-3C"	20 0.57	36 x 72 915 x 1829	42 x 48 1067 x 1219	1,804 820	7,904 3,593
FHF 660-3B"	22 0.62	42 x 72 1067 x 1829	42 x 48 1067 x 1219	1,990 905	9,490 4,314
FHF 720-3B"	24 0.68	42 x 72 1067 x 1829	42 x 48 1067 x 1219	2,096 953	9,596 4,362
FHF 780-3B"	26 0.74	42 x 72 1067 x 1829	42 x 48 1067 x 1219	2,202 1,001	9,702 4,410
FHF 900-3B"	30 0.85	48 x 72 1220 x 1829	48 x 48 1219 x 1219	2,555 1,161	11,755 5,343
FHF 1020-3B"	34 0.96	48 x 72 1220 x 1829	48 x 48 1219 x 1219	2,767 1,258	11,967 5,440
FHF 1080-3B"	36 1.02	48 x 72 1220 x 1829	48 x 48 1219 x 1219	2,873 1,306	12,073 5,488
FHF 1740-3B"	58 1.64	63 x 86 1600 x 2184	70 x 58 1778 x 1473	4,589 2,086	22,689 10,313

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PLANS FOR LOCATION AND INSTALLATION DIAGRAMS OF SYSTEM Section 3.1

- WATER SUPPLY: The system requires a potable water supply that will provide continuous flow meeting regeneration flow specifications. A minimum pressure of 30 psi is required at the conditioner inlet. It is suggested that a Y type strainer be installed on the outlet of the system to prevent media getting into the system should a distribution be compromised.

- BOTH HOT AND COLD WATER CONDITIONING: Connect the system to the water supply pipe, immediately *after* (downstream) the municipal supply water meter or well supply pressure tank. To provide *unconditioned* water to isolated faucets, run separate pipes from the water supply before the conditioner.

- CONDITIONING HOT WATER ONLY: Connect the system to the water supply pipe *before* (upstream) the water heater.

***CAUTIONS**:*

- Do not install the conditioner **after**, or downstream from **the water heater**. ***Hot water will damage*** inner parts of the system, and may cause the loss of the water conditioner mineral bed. This will void the system warranty.

- To reduce the risk of hot water backing-up into the conditioner, piping between the conditioner and water heater should be as long as possible. A backflow preventer or check valve is also recommended between the conditioner and the hot water heater.

- DRAIN: An open drain is needed nearby the conditioner, capable of carrying away backwash water at the rate of flow listed in the specifications. An open floor drain is preferred. Other approved open drain points are acceptable, if they do not cause a back-pressure on the conditioner drain pipe or hose. An open floor drain is also required for the overflow on the salt tank. All drain connections MUST have a proper air gap.

- ELECTRICAL: The system works on **24 volts AC only.** A direct plug-in transformer is included to reduce 120 V-60 Hz electrical power to 24 volts. An approved, grounded outlet is needed within 5’ of the conditioner controller. The conditioner includes a 5’ power cable to connect between the transformer and the controller. Surge protectors are recommended.

- SPACE REQUIREMENTS: Be sure to allow sufficient area around the media tanks and brine tanks for refilling with salt and other service that may be required. Minimum floor space and other dimensions are shown in section 2.

Planning Location For Installation. **Section 3.2**

MATERIALS YOU MAY NEED

- Use the drawings in section 3.3 as a guide for the installation. The drawings show the materials required and the typical piping diagrams. All interconnecting piping, isolation & bypass valves, sample points, pressure gauges etc. are not supplied with the unit.

-Note: Due to slight expansion and contraction of the media tanks, the piping must be designed to allow some movement as well as protection from vacuum, Failure to install protections correctly will void the warranty. See below.

- If the interconnecting piping is rigid, flex connectors will be required on all connections to the media tank as some movement is required. A flex connection may also be required on the drain line as well. The standard systems do not include flex connectors but they can be supplied as optional items with the system.

- One vacuum breaker is installed in each PVC manifold. Additional vacuum breakers may be required on the drain line or if the service outlet is filling an unpressurized tank, these can be supplied as optional

- There is an existing 1.5” NPT location (currently plugged) on the top of the manifold that can be used to install an air release valve if required, they must be purchased separately.

- Install unit isolation and system bypass valves. These valves allow the control of water to individual units in the system for servicing. The full-line bypass will allow water to service if the entire system is taken offline for service.

- Inlet and outlet sample points and pressure gauges are required to confirm proper operation of the system.

- The conditioner valve drain must meet requirements for **minimum inside diameter**. The recommended size is 2” pipe.

- Brine tank overflow piping is also required.

- On units up to and including FHF 450 softeners, six feet of 1/2” brine line is included. Larger units require 3/4” or 1” PVC brine line which is not included. Maximum recommended overall length of brine line is six feet. Brine tanks can be positioned beside or in front of the softeners.

Typical Softener Piping Layout Detail. **Section 3.3**

- It is recommended that the meters be located within six feet of the control valve so the cable will reach. Control valves should also be within six feet of each other to ensure the communication cables are long enough.

- All individual softener units are no raw water bypass during regeneration. This means that the softener will not allow raw water to bypass during the regeneration cycle.

- All standard softener systems use raw water for regeneration.

- The diagram shows the typical piping for a single softener unit. Please note that the location for flex connectors (if required) is marked with a "#"

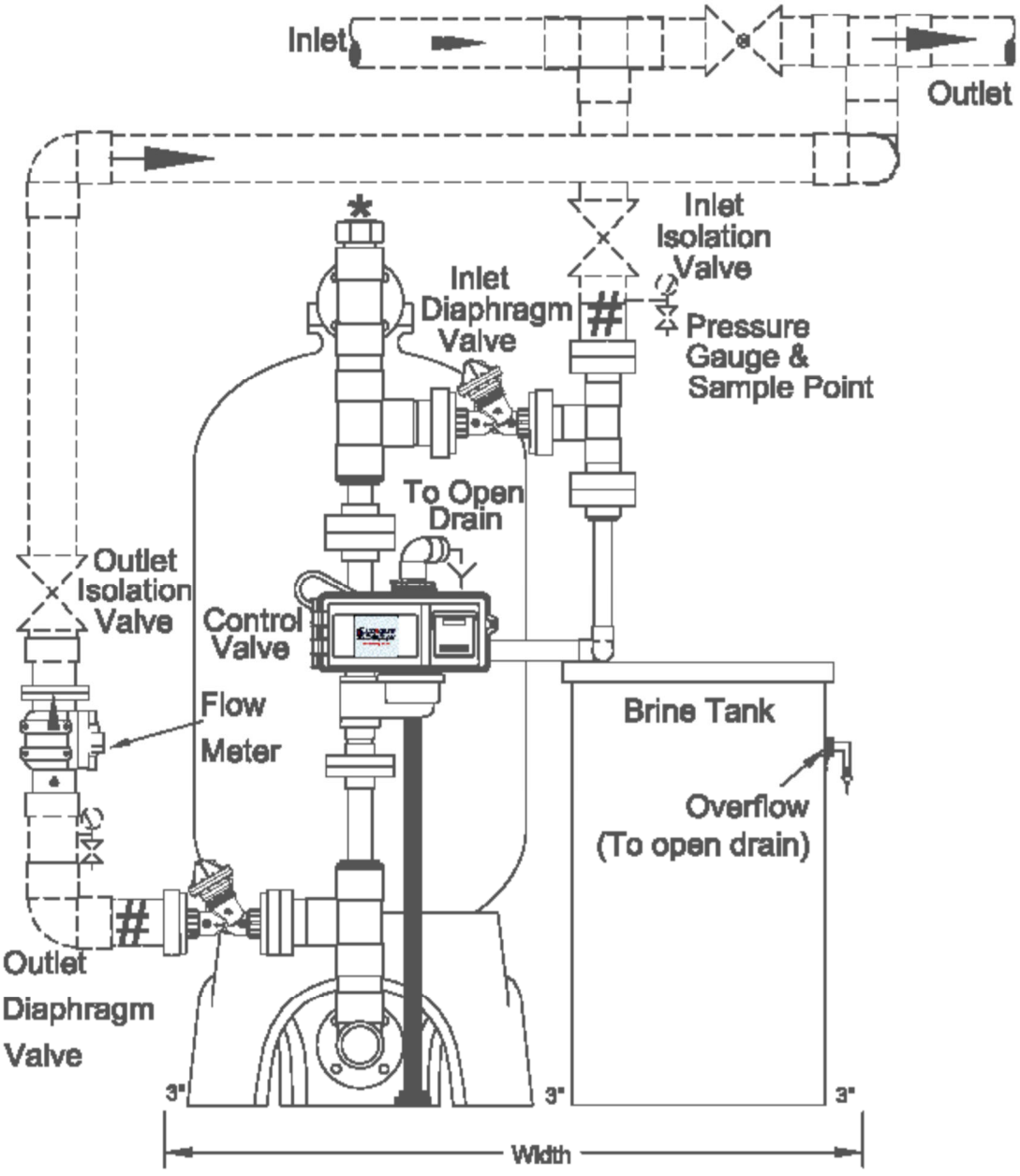


Fig. 3.3.1

Typical Duplex Softener Piping Layout Detail. Section 3.3

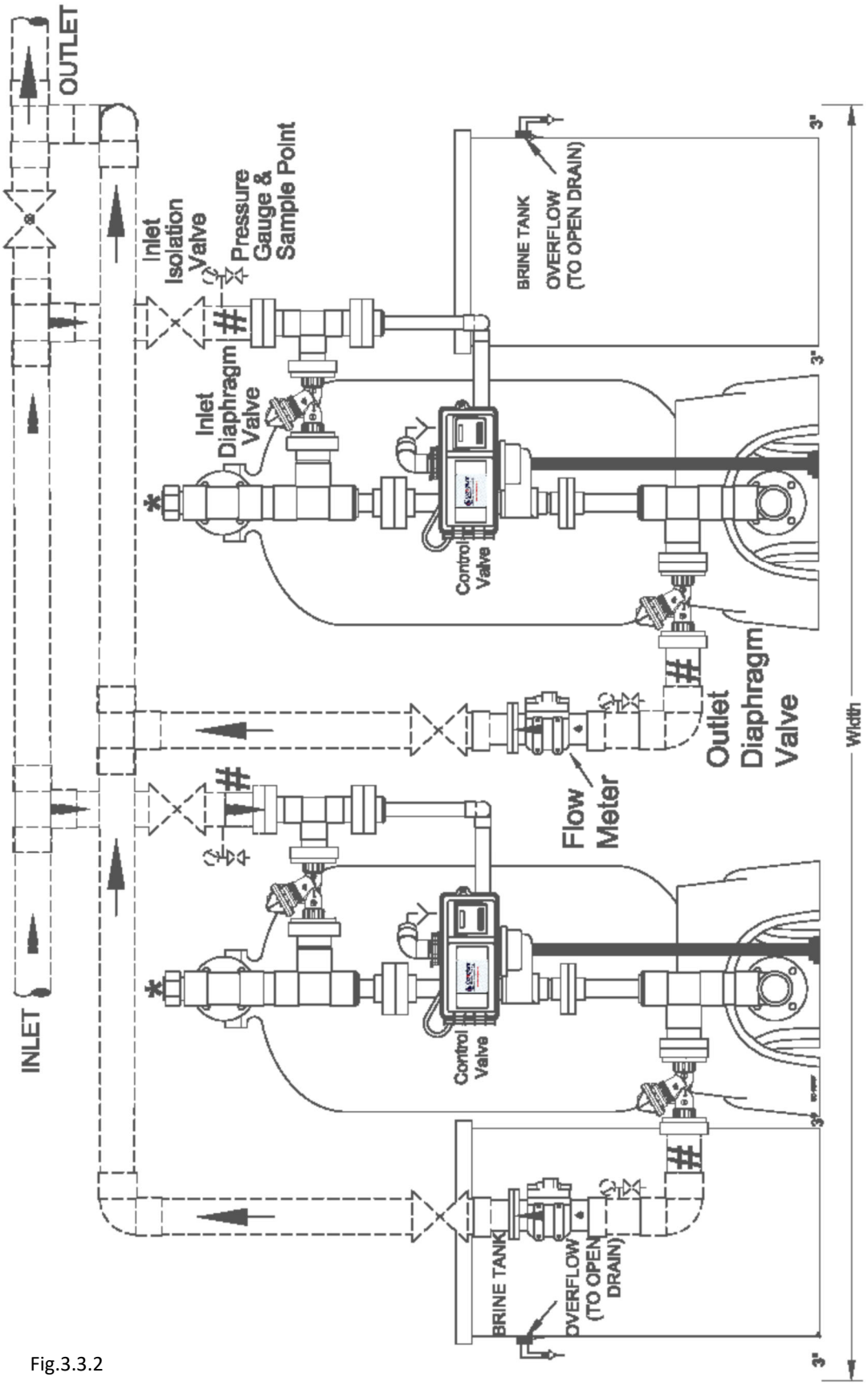


Fig.3.3.2

Typical Triplex Softener Piping Layout Detail. Section 3.3

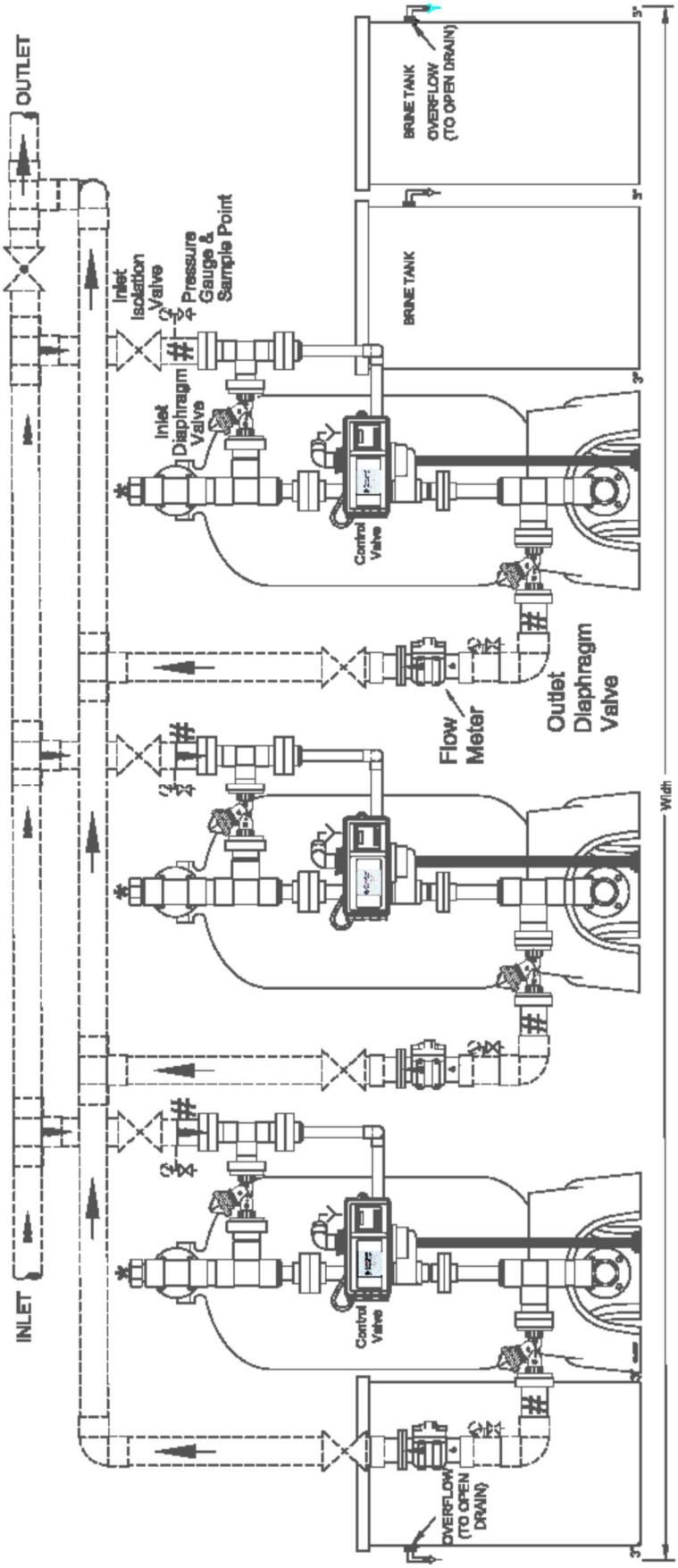


Fig. 3.3.3

Typical Quadplex Softener Piping Layout Detail. Section 3.3

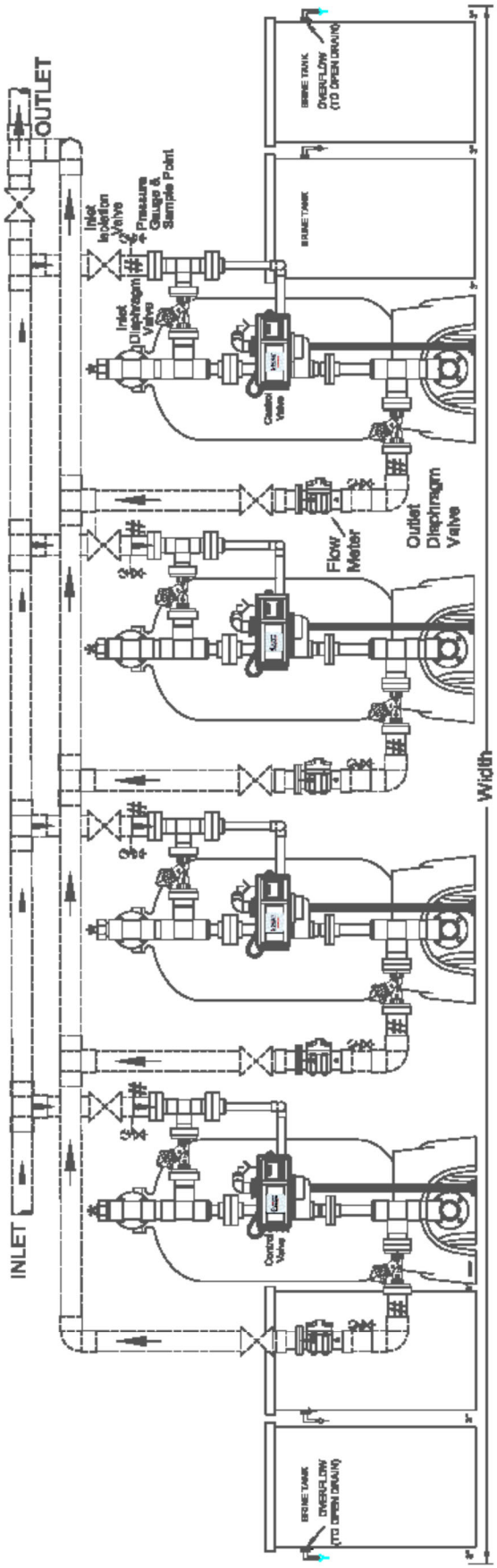


Fig 3.3.4

General installation Guide Section 4.0

-Section 2 outlines the space required. Section 3.1 outlines the location parameters that must be considered before starting the installation. General installation diagrams are also located in section 3.

Tank Positioning / Manifold Assembly Section 4.1

- Select the site for the installation (See section 3). The tanks should be located on a level support pad with adequate space on all sides. The system must be close to a drain that is capable of handling the maximum regeneration flow rate. Units should be within 6 feet of one another for the communication cables.

- Position the tanks as shown on the system drawings (see section 3). Check tank orientation to ensure the piping will properly line up. Tanks with tripod bases or separate legs, must be securely fastened to the floor or platform. Typical when securing to a floor, six 3/8" lag bolts with washers (2 per leg) are required (not included).

-The tanks must be installed allowing at least a 1/2" clearance between the bottom piping & the floor (see figure 4.1.2). The tank legs can be shimmed if required. Care must be taken when moving the tank so the distribution will not be damaged.

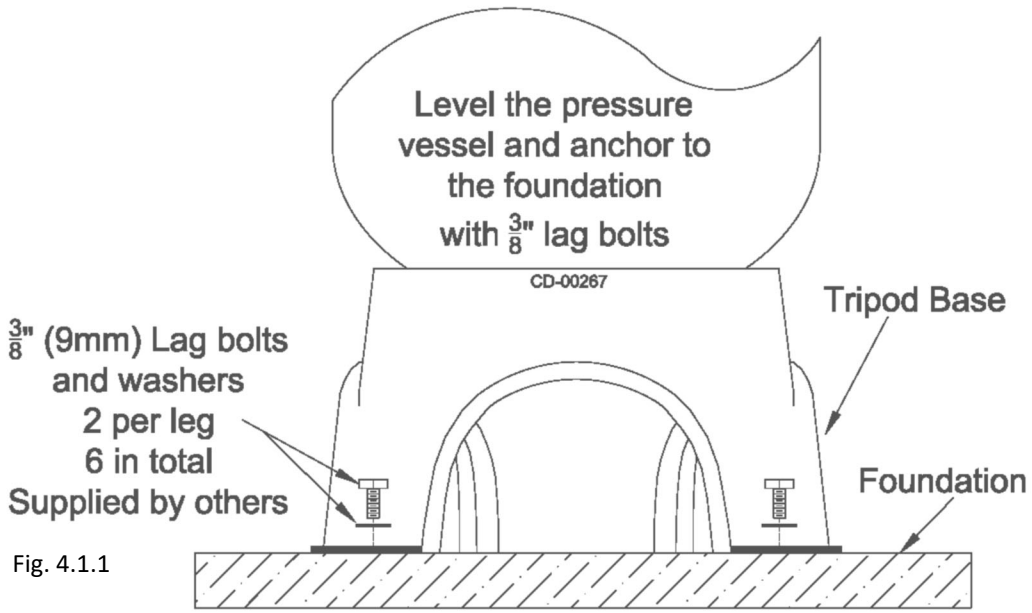


Fig. 4.1.1

Tank Positioning / Manifold Assembly Section 4.1

- All manifold assemblies are marked with letters as shown in figure 4.1.2. Between each flange, a flange gasket must be used. Care must be taken when tightening the flange bolts. The bolts are tightened evenly to a maximum torque of 25 ft/lbs (see section 4.2) Overtightening them may cause them to fail. Note that the inlet tee (P) can be installed horizontally or vertically as required.

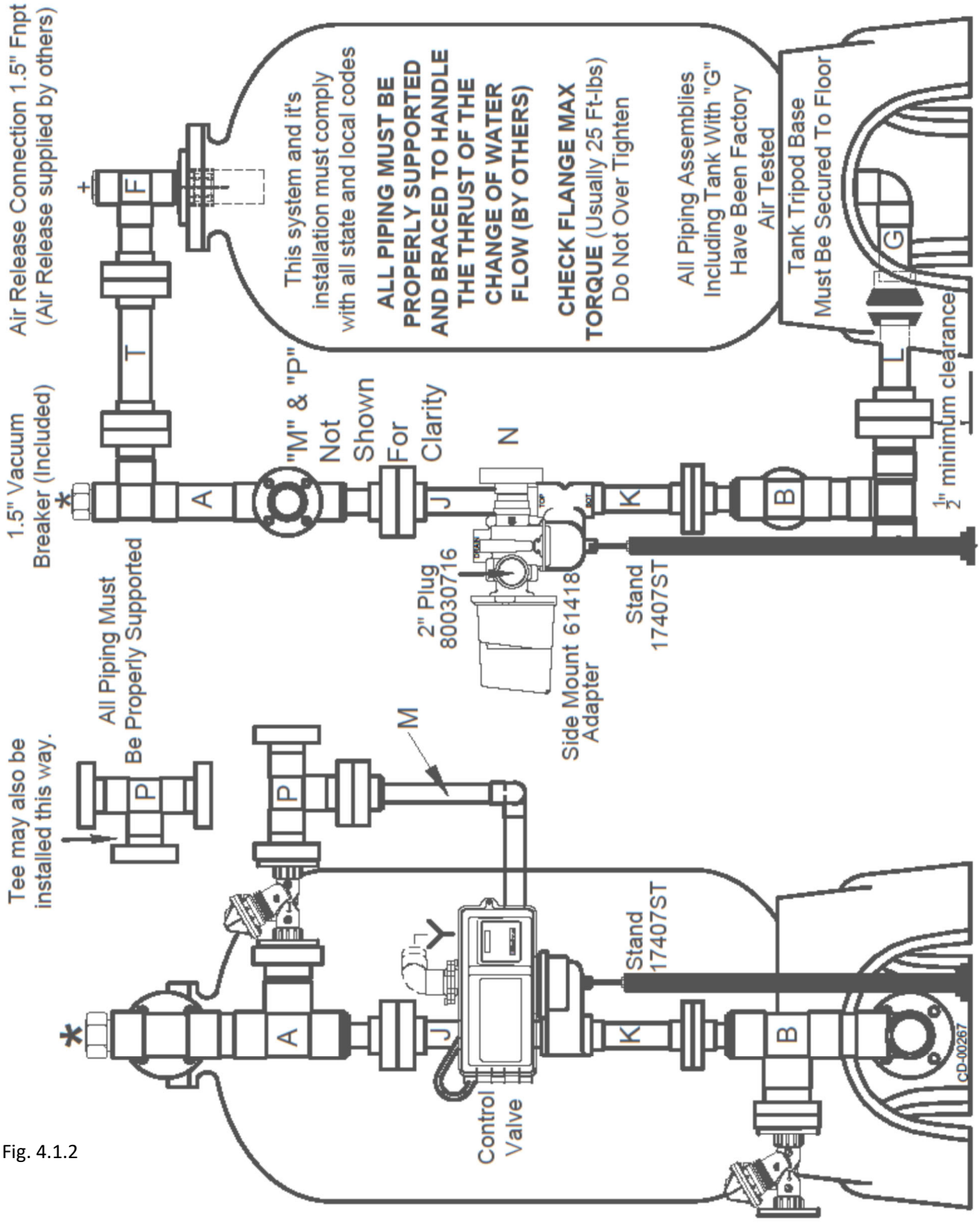


Fig. 4.1.2

Tank Positioning Section 4.1

- If the internal distribution was previously installed, (figure 4.1.3) check the distribution for any damage that may of have occurred in shipping. This inspection is critical because if the distribution is broken, media will be flushed into the service lines.

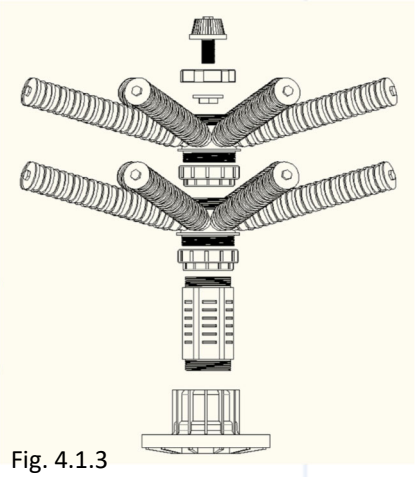


Fig. 4.1.3

- On units of this size, the media is normally loaded after some of the piping has been completed as some water is required in the tanks during media loading. **See section 5** for the media loading procedure.

Piping Section 4.2

- Install piping in accordance with state, federal, provincial and local codes. All government codes and regulations governing the installation of these devices must be observed.

-ALL PIPING MUST BE PROPERLY SUPPORTED AND BRACED TO HANDLE THE THRUST OF THE CHANGE OF WATER FLOW.

- Due to slight expansion and contraction of the mineral tanks, piping must allow some movement.

-If rigid piping is used, flex connectors must be used between the hard piping and unit connections as well as any other connections to the tank. An adequate vacuum breaker must also be used to protect the tank from any vacuum condition that could occur. Failure to install or improperly install flex connectors and vacuum breakers where required may void the warranty.

- Each unit requires inlet and outlet isolation valves as well as a full system bypass valve. Sample points and pressure gauges are required on the inlet & outlet of each unit. An air release (not included) should be also installed at the highest point on each unit.
- Flanges or unions must be installed close to the control valves and manifolds. This will allow piping to be removed for servicing of any of the system components.

Piping

Section 4.2

Flanges

-Recommended flange bolt torque is shown in table 4.2.1. Threads must be clean and well lubricated. Actual site conditions may require variations in these recommendations . **CAUTION : UNNECESSARY OVER TORQUING WILL DAMAGE THE FLANGE.**

PVC Flange Size (in.)	Recommended Torque (ft. lbs.)
1/2" to 1.5"	12
2" to 4"	25

Table 4.2.1 fhf-mvs.xlsx

-The torque sequence is shown in figure 4.2.1

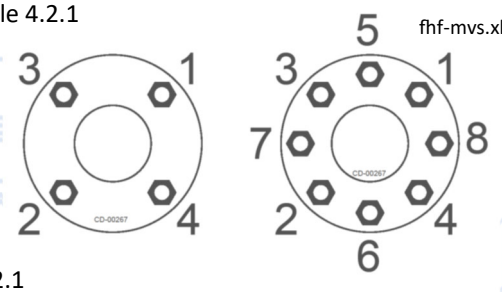


Fig.4.2.1

-Gaskets full faced 1/8” thick elastomer with a shore “A” durometer of approximately 70.

Flange Make-up

Once a flange is joined to pipe, the method for joining two flanges is as follows:

1. Piping runs joined to the flanges must be installed in a straight line position to the flange to avoid stress at the flange due to misalignment. Piping must also be secured and supported to prevent lateral movement which can create stress and damage the flange.

2. With gasket in place, align the bolt holes of the mating flanges by rotating the ring into position.

3. Insert all bolts, washers (two standard flat washers per bolt), and nuts.

4. Make sure the faces of the mating surfaces are flush against gasket prior to bolting down the flanges.

5. Tighten the nuts by hand until they are snug. Establish uniform pressure over the flange face by tightening the bolts in 5 ft.-lbs. increments according to the sequence shown in figure 4.2.1 following a 180° opposing sequence.

6. Care must be taken to avoid “bending” the flange when joining a flange to a “raised face” flange, or a wafer-style valve.

Do not use bolts to bring together improperly mated flanges.

Piping

Section 4.2

-The drain lines should be as short as possible and piped to an open drain. Access to the drain and air gap are necessary for visual inspection and testing of the drain water. The air gap prevents sewage backing up into the unit. If the drain travels a long distance or through a substantial elevation change, an additional vacuum breaker is recommended on the drain line (see fig 4.2.2). The drain line size must be sized to easily handle the maximum regeneration flow rate with minimal pressure drop (2-4 psi). Minimum recommended drain pipe size is 2".

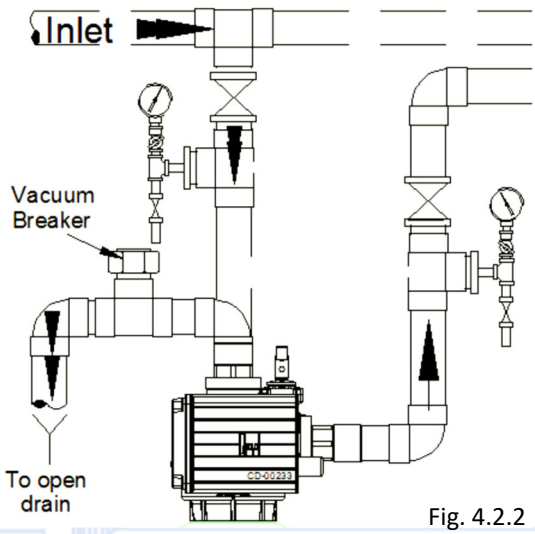


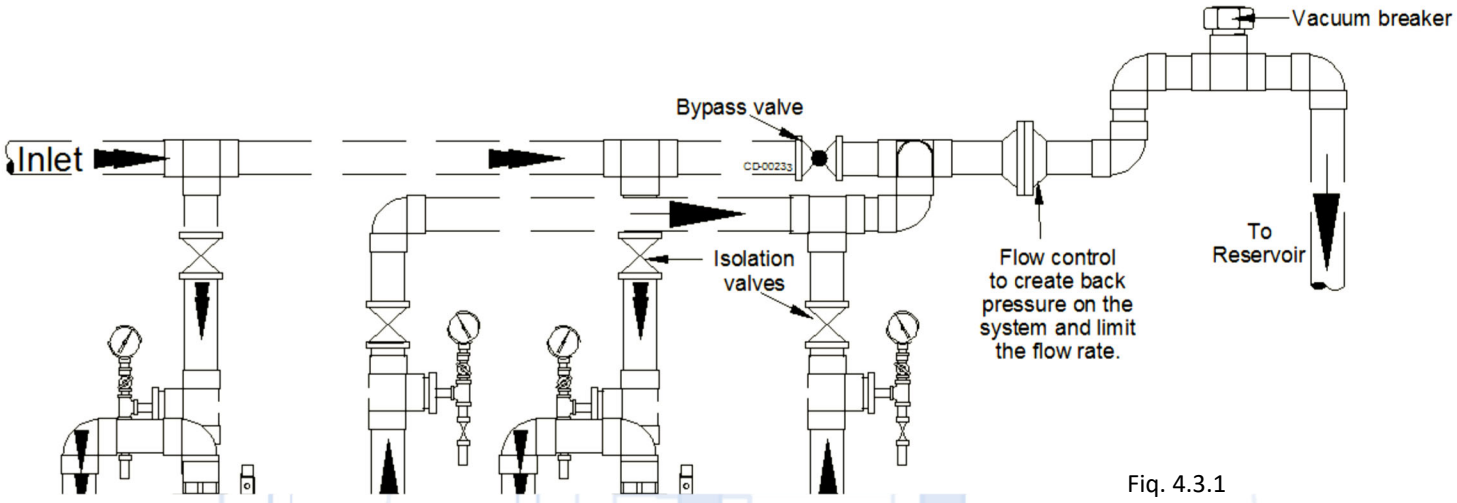
Fig. 4.2.2

- On multiple tank systems, the overall piping to each unit should be as identical as possible to promote equal water flow through each unit. Use the same pipe lengths and fittings on connections to each unit. Installation diagrams are in section 3.

Special Piping Applications

Section 4.3

- If the treated water is flowing into a open reservoir, it is recommended that a loop with a vacuum breaker is installed on the outlet line. This eliminates the chance of causing a vacuum condition on the tanks when water is flowing into the reservoir as well as prevents the water in the units from siphoning out when not in operation, leading to operational issues for the system.



Fiq. 4.3.1

Installing Regeneration Control Valve Overview Section 4.4

Note: Depending on how the system was purchased, some of these procedures may of already been completed at the factory. Before the regeneration control valve can be installed, the manifold piping must be secure, and the side mount adapter stand has been installed. The adapter stand has an adjustable 1/2" threaded rod on the top and has a floor flange on the bottom. The threaded rod screws directly into the bottom of the brass side mount adapter. The threaded rod is adjusted to height required and is locked in place with a nut (see fig 4.4.2). Once this has been completed, the floor flange on the bottom of the stand is secured to the floor. The stand will help support the weight of the regeneration control valve. The side mount adapter has two 1/4" FNPT connections (figure 4.1.1). The bottom hole is plugged (with plug 121497). The top hole will have a 3/8" quick connect stem (PP051222W) as this port is used to supply pressure to operate the diaphragm valves (see section 4.6). The regeneration control valve can now be attached to the side mount adapter. There is a seal that is required between the adapter and the control valve. As well, the 2" outlet of the regeneration control valve is to be plugged.

Side mount adapter 61418

Fig. 4.4.1

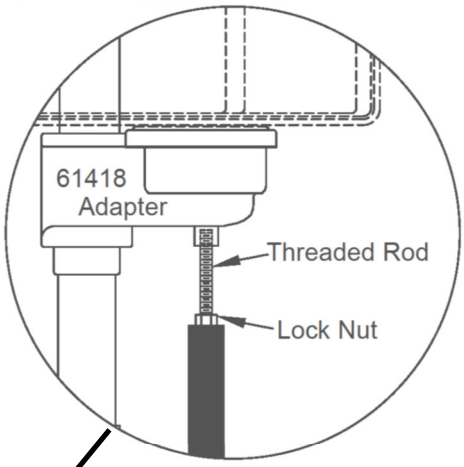


Fig. 4.4.2

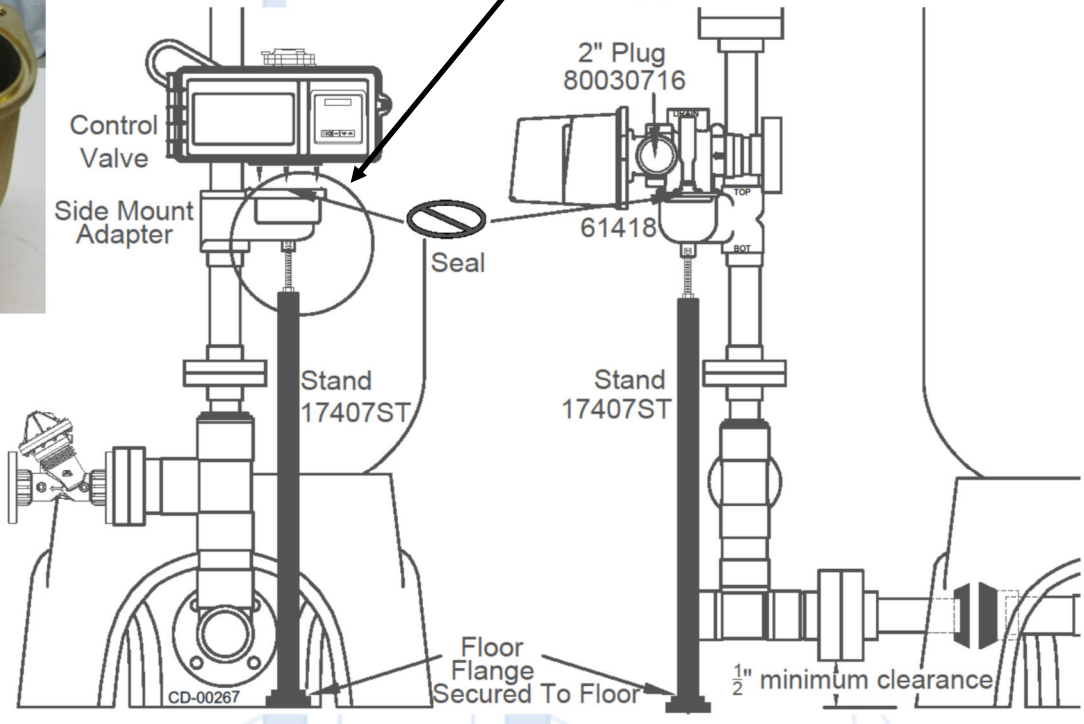


Fig. 4.4.3

Regeneration Control Valve Connections Section 4.5

- When a complete system is ordered, the regeneration control valve should already set up for the system with the proper backwash flow controls, injectors, etc. Standard injectors sizes , drain line flow rates, and brine line refill flowrates are listed in section 2.2

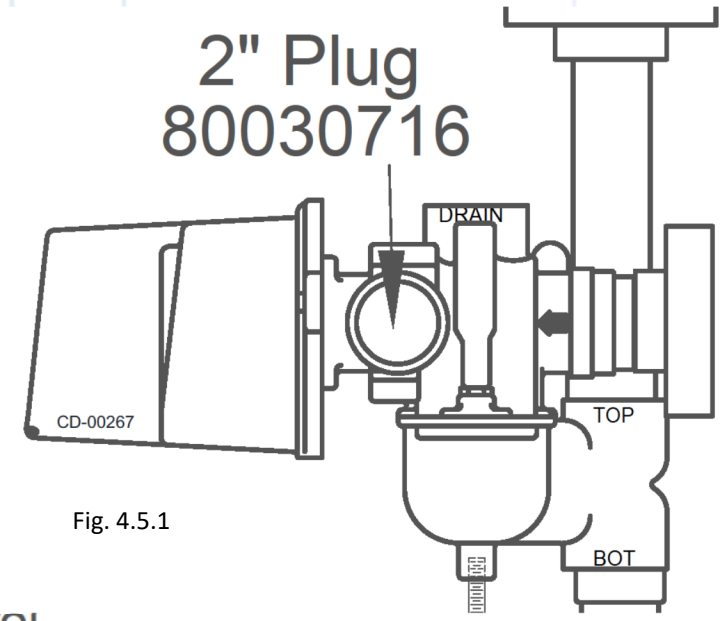


Fig. 4.5.1

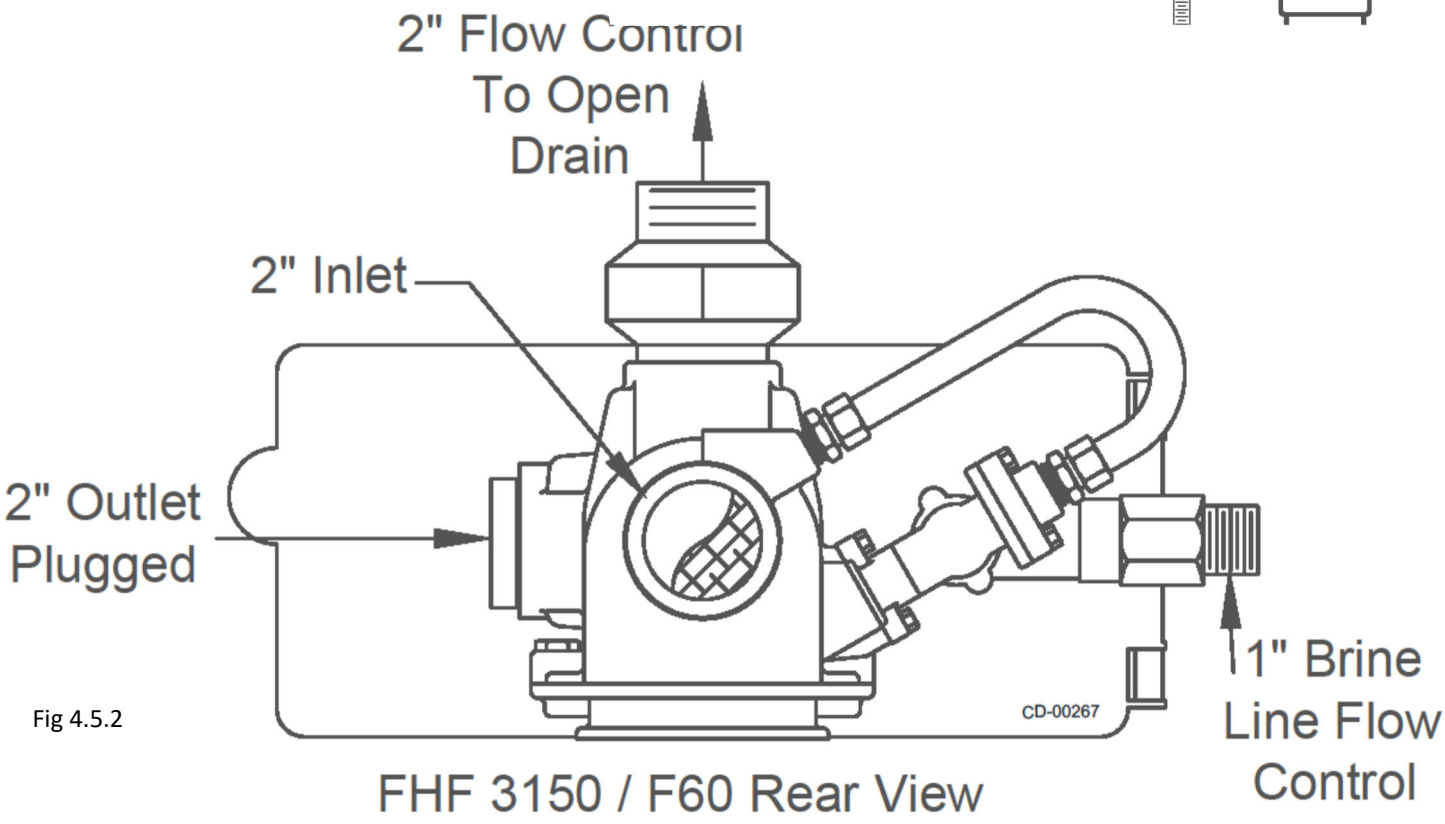


Fig 4.5.2

Regeneration Control Valve Connections Section 4.5

- Once the control valve is mounted, the communication cables can be connected. Use a CAT 5 or better communication cable. For more information see the NXT & NXT2 manuals

NXT Timers

-The NXT communication ports may be port sensitive. Connect the communication cables as shown in figure 4.5.3

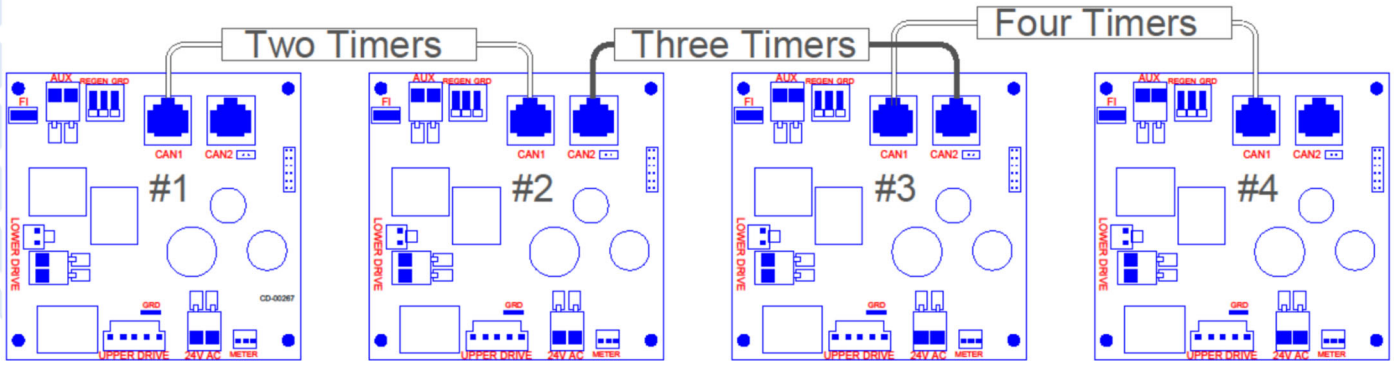
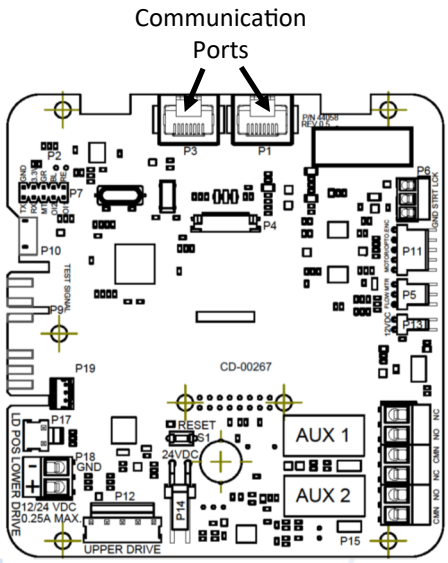


Fig. 4.5.3

NXT2 Timers

- Connect all timers in series from one communication port to the next communication port on the next circuit board (do not form a loop). With the NXT2 timers, it does not matter which communication port goes to the next communication port.



Diaphragm Valve, SVO And Solenoid Tubing Connections Section 4.6

-The diaphragm valve tubing connection is on the top cap of the valve. On the main valve body there is a open vent hole that needs to be left open. Don't over tighten the tubing connection fitting as it can crack the diaphragm valve cap.

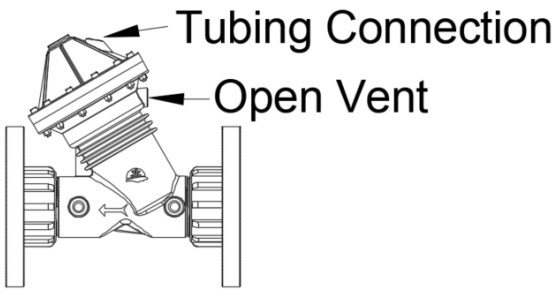


Fig. 4.6.1

-There are four tubing connections required (if ordered as a complete system). The connections are labeled as show below in figure 4.6.2.

Required Field Connections

L - To Lower Outlet Diaphragm Valve (1/4" Tubing).

T - To Top Inlet Diaphragm Valve (1/4" Tubing).

P - To Pressure Source Connection On Side Mount Adapter Stem (3/8" Tubing). The tubing elbow slides onto the "stem" mounted on the side mount adapter (see figure 4.4.1).

Y - To Open Drain (1/4" Tubing).

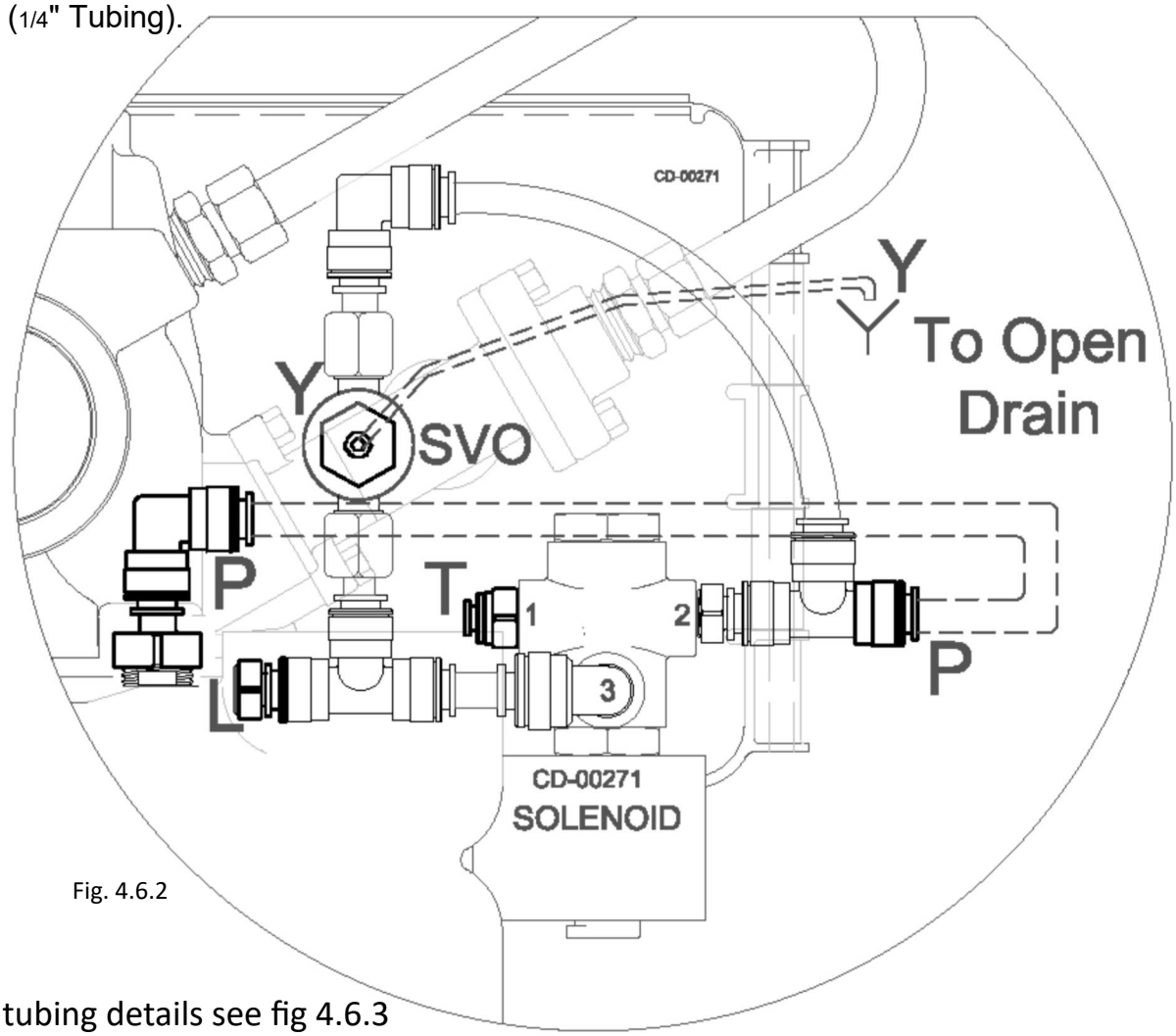


Fig. 4.6.2

For complete tubing details see fig 4.6.3

Diaphragm Valve, SVO And Solenoid Tubing Connections Section 4.6

-The SVO (service valve operator) is mounted on the backplate of the regeneration valve and is mechanically operated by a rotating cam. The three way solenoid valves are electrically operated and depending upon the system, may also be mounted on the regeneration control valve. Connections are shown in figures 4.6.2 and 4.6.3. The pressure supply source must be equal to or higher that the maximum supply water pressure. On the 3150 / F60 versions the supply pressure connection can be on the side mount adapter itself.

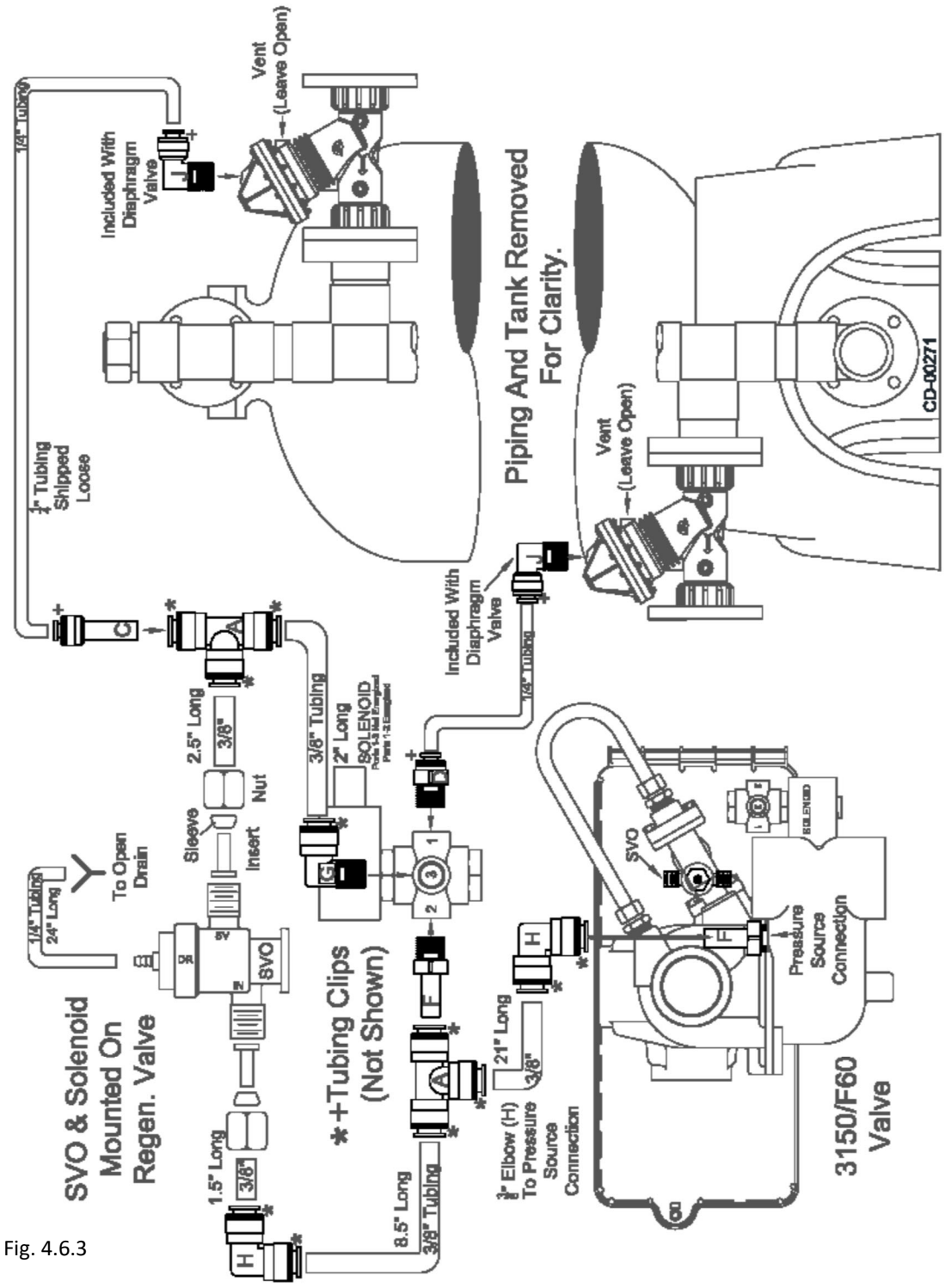


Fig. 4.6.3

Solenoid Electrical Connections

Section 4.7

NXT Timer

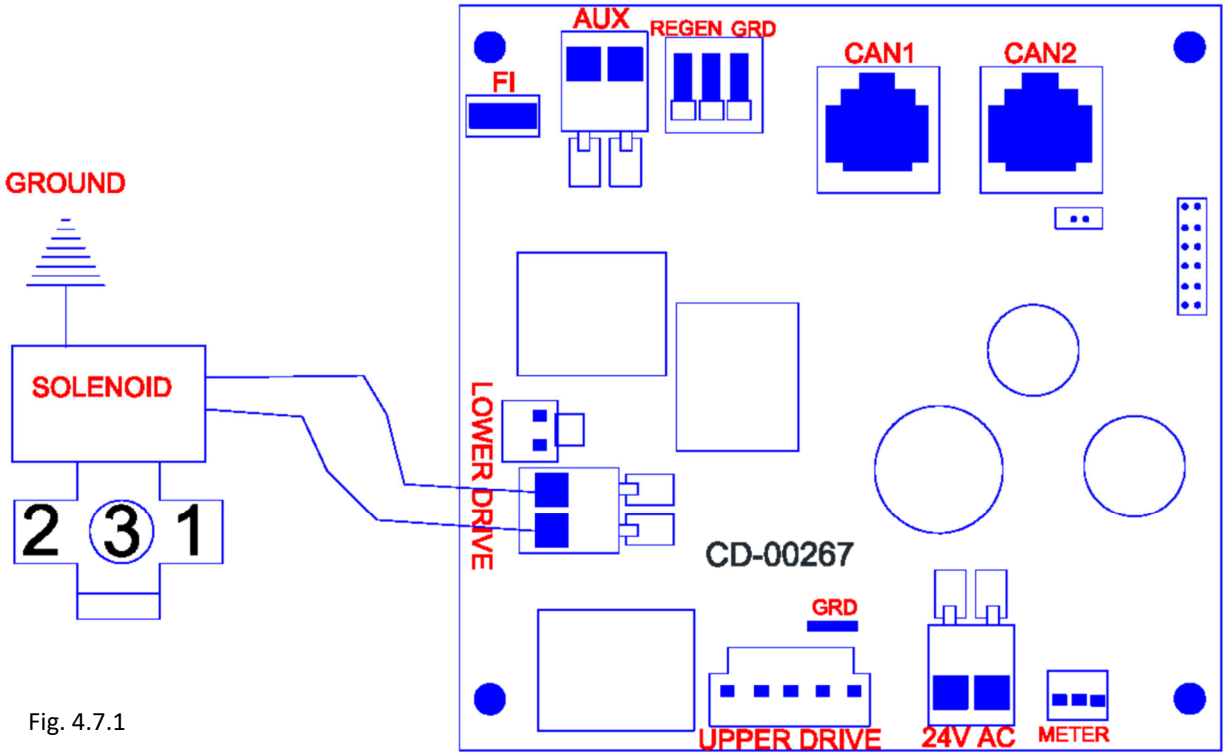


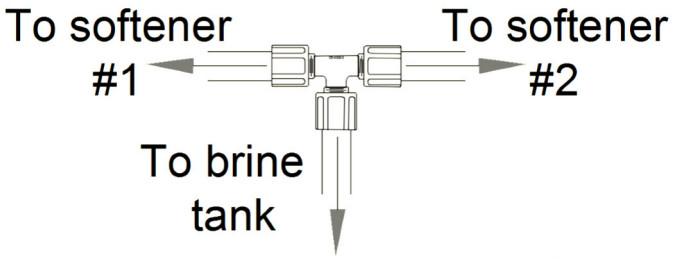
Fig. 4.7.1

Brine Tank Connections — Section 4.8

- The brine tank must be on a smooth surface, uneven surfaces or protrusions can cause the brine tank to puncture or break.

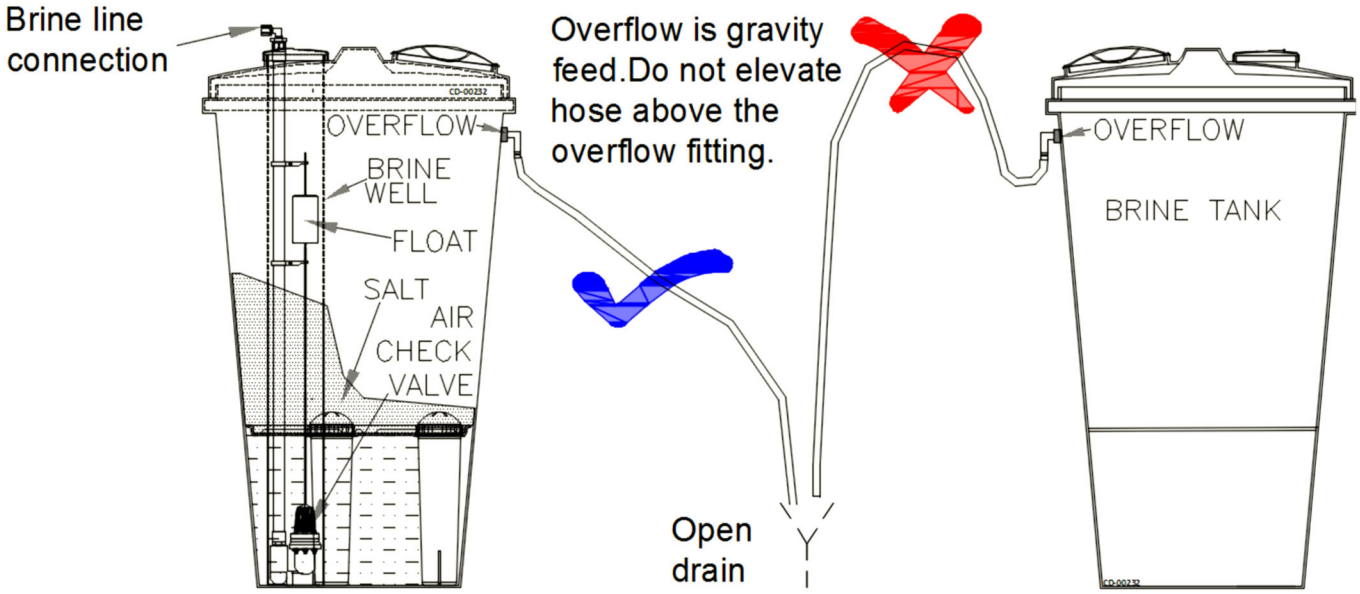
- Keep the brine line as short as possible. The brine line should not be more than 6 feet long.

- Units with 15 cubic feet of resin per mineral tank or less (FHF 450 and smaller) can use 1/2" brine line (1/2" tubing included). For units larger than this, the brine line is to be hard piped (not included) in 3/4" or 1 "pvc pipe. On hard piped lines, use unions to allow for removal for maintenance.



- If multiple softeners are using the same brine tank (only recommended for alternating units), the brine line is teed off to the two units.

- The brine tank overflow is piped to an open drain (by the installer). The overflow is gravity feed so the hose must not rise above the height of the overflow fitting.



- Once the brine tank has been placed in the proper location and the brine line connected, fill the brine tank until the water level is 3 or 4 inches above the grid. A few bags of salt can now be added. In operation, it is important to keep the salt above the level of the brine to ensure it is fully saturated.

Media Loading **Section 5.0**

***On units of this size, the media is normally loaded after some of the piping has been completed as some water is required in the tanks to help cushion the media and prevent the internal distribution from being damaged. ***

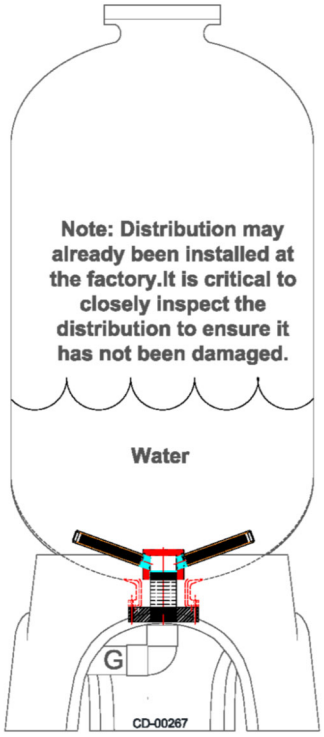
– Before you start to load the media, check all of the following:

- Check the media list and confirm you have all the media required (see following tables). A large neck funnel will make the media loading easier. **Optional #99004**

- Before the media is loaded, the bottom distribution must be closely inspected to ensure it was not damaged in shipping. If the distribution is cracked or broken, it must be repaired before proceeding.

- If there are any riser pipes or any open distribution connections inside of the tank, ensure these connections are properly plugged so no media can enter them.

- Check the location and orientation of the tank (see section 4). Ensure the tank is in the proper location so the unit connections line up correctly with the piping. If required, test fit the valves & manifolds. If the unit has a side mounted manifold, tank shims are occasionally required between the tank and the floor to ensure the piping and manifold have a minimum 1/2” of clearance. If required, install shims and make sure the tank is properly installed (tripod base tanks should be secured to the floor) before starting to load the tank. It is very difficult to move a tank once the media has been loaded and may damage the tank.



- Fill the tank approximately 1/3 full of water. This will help protect the laterals from the media being poured in.

- Check the media list and start from the bottom up. Ensure the proper amount of each type of media before moving on to the next media. It is common to have additional partial bags to add up to the required quantity of each media.

Media Loading Section 5.0

- The support bed media is first (coarse gravel first, then medium gravel followed by fine gravel etc.). Pour the gravel so it is evenly spread out in the tank (use a circular pouring pattern). The gravel must be manually levelled. To check the level, drain the water down until the media can be seen through the water surface. The fine gravel on the top of the support bed is the most important layer to be level as the gravel will not move during backwash. If, the gravel is unevenly distributed, the unit will not have even flow distribution and will not perform as intended.

- Once all the media has been loaded, unless there are special instructions not to, the media tanks should be filled with water to allow the media time to soak. If possible allow the media to soak for several hours, preferably over night.

Media Description Section 5.0.1

Aquafine AQ100-Na Cation Resin.

This product has been tested and certified to meet the material requirements of NSF/ANSI Standard 44.

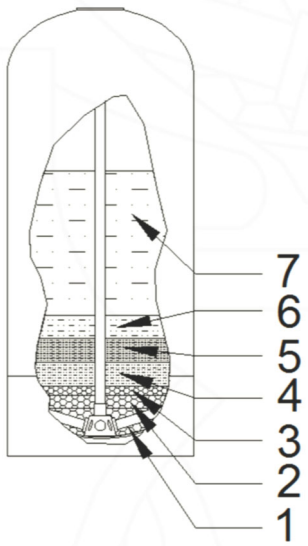
C USA

Physical & Chemical Characteristics	
Polymer Matrix Structure	Polystyrene 8% cross-linked with Divinylbenzene
Physical Appearance	Amber spherical beads
Whole Bead Count	90% minimum
US Standard Mesh Size	16 - 50
Ionic Form as shipped	Sodium (Na+)
Approximate Shipping Weight	53 lb / cubic foot (850 grams / litre)
Total Capacity in the Sodium Form	1.9 meq / ml
pH Range, Stability in the Sodium Form	0 - 14

Media	Description	Density (lb/ft^3)
Cation Resin	AQUAFINE AQ100-Na is a premium high capacity gel polystyrene strong acid cation exchange resin supplied regenerated in the sodium form. This resin has been certified to the meet the requirements of NSF/ ANSI Standard 44.	53
Fine Gravel	1/8" x 1/16" graded and washed quartz (50 lb bags)	100
Medium Gravel	1/4" x 1/8" graded and washed quartz (50 lb bags)	100
Coarse Gravel	1/2" x 1/4" graded and washed quartz (50 lb bags)	100

Media Beds Quantities Section 5.2

Special Media Loading, (Optional) Section 5.2.1



Layer	Media	Quantity
1 Bottom Layer		
2		
3		
4		
5		
6		
7		
Top Layer		

Media Beds

Section 5.2.2

Softener (FT³)							
Softener Size	Part Number	Coarse Gravel	Medium Gravel	Fine Gravel	Ft^3 Resin	Weight LBS	KG
		#1	#2	#3	#4		
360	410012	0.4	0.35	0.35	12	774	352
390	410013	0.4	0.35	0.35	13	826	375
450	410015	0.4	0.35	0.35	15	930	423
570	410019	0.7	0.5	0.5	19	1198	545
600	410020	0.7	0.5	0.5	20	1250	568
660	410022	2.2	1.5	1.5	22	1704	775
720	410024	2.2	1.5	1.5	24	1808	822
780	410026	2.2	1.5	1.5	26	1912	869
900	410030	2.2	2	2	30	2220	1009
1020	410034	2.2	2	2	34	2428	1104
1080	410036	2.2	2	2	36	2532	1151
1740	410058	7	8	8	58	5356	2435

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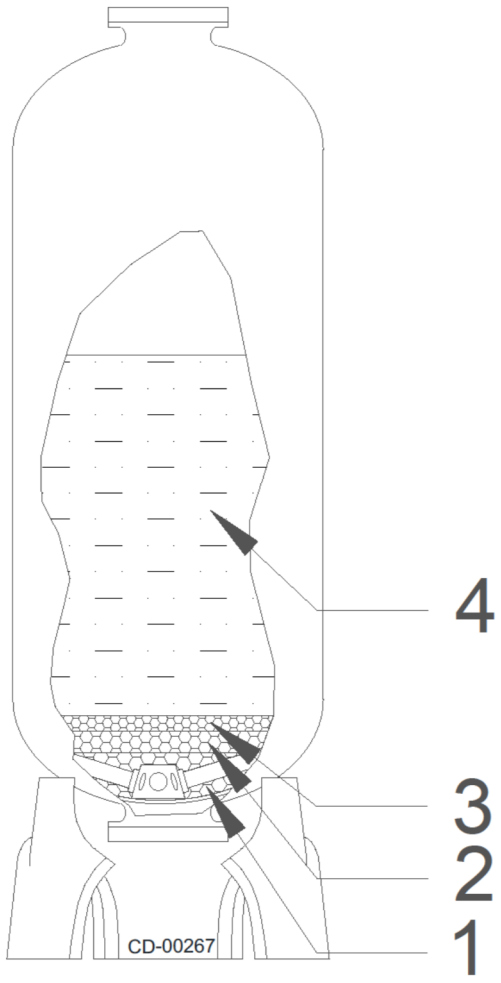


Controller Programming Required For Start-up Section 6.0

NOTE: It is important to follow the startup instructions. Improper start up may result in unsatisfactory softener operation or possible damage to the softener.

Required information required to start up the softener.

-The raw water analysis is required to start up the softener. Concentrations of total hardness (in grains) as well as iron (in ppm) and manganese (in ppm). The total compensated hardness is needed to enter into the programming.

- If the softener was ordered as a complete system, the regeneration steps of the control valves are already programmed with a couple of exceptions (parameters). These are shown in section 6.1.

- The rest of the parameters are pre-programmed, but should be reviewed to confirm they are set as intended (see programming sheet—supplied separately). These settings may also be modified on site if required to better suit a particular application.

- The complete programming guide is in section 8. It is recommended to “dry cycle” (with the water pressure off) the control valve to familiarize yourself with it’s operation.

Start-up Programming Parameters Section 6.1

- The first parameter set on site is the time of day. See section 8 for programming.

- The second step is the calculation of the total compensated water hardness. This is site specific and totally dependent upon the raw water conditions. This parameter is added into the program on site.

Calculate the total compensated water hardness.

-To accomplish this, following are the raw water parameters required. The **total hardness** (in grains), **iron**(in ppm or mg/l), and **manganese** (in ppm or mg/l). With these, the total compensated hardness is calculated.

- Note: If the any of the levels fluctuate , use the highest level of each component in the calculations.

- The total compensated hardness is calculated as follows:

Total water hardness (in grains per gallon (gpg))

+ Iron (in ppm or mg/l) x4

+ (Manganese (in ppm or mg/l) x 8

Equals the total compensated hardness (in gpg)

An example of this calculation is below: and is based on the following raw water conditions.
- Total harness—10 gpg, iron—0.1 ppm, manganese—0.2 ppm.

10 gpg of total hardness	10
+0.1 ppm of iron (0.1 x 4) =	0.4
+0.2 ppm of manganese (0.2 x 8) =	1.6

Equals a **total compensated hardness** of **12 gpg**.

Note: The total water hardness may be in ppm. To convert to grains, divide by 17.1.

Example of this is : 171 ppm total water hardness / 17.1 = 10 gpg.

- The softener grain capacities for each size of softener are listed in section 2.4. The capacity will be pre programmed into the controls if it was bought as a complete system. Grain capacity of the resin changes depending upon the quantity of salt used per cubic foot of resin when regenerating. The salting capacities listed are at 6 lbs/ft^3, 10 lbs/ft^3, and 15 lbs/ft^3. Each of the three salting levels shown have their own advantages.

- Salting at the lower level (6 lbs) provides greatest salt usage efficiency. At this level the capacity is lower and will require more frequent regeneration resulting in somewhat less efficient water usage. The hardness leakage in service is also higher than at the higher salting levels.

- Salting at the middle level (10 lbs) is less efficient in salt usage than the 6 lbs setting. However with a higher capacity, the water usage will be a little better than at the 6 lb setting as the unit is regenerating less frequently.

- Salting at the highest level (15 lbs) is the least efficient in salt usage. At this setting the unit will use more than twice the salt of the 6lbs setting. However, the hardness leakage in service is the lowest and water efficiency is the best.

- The model number of the system will indicate the size of unit. The model legend is in section 2.1. Once the softener size is determined, the programming sheet can be checked to determine what salting level the unit was factory programmed for.

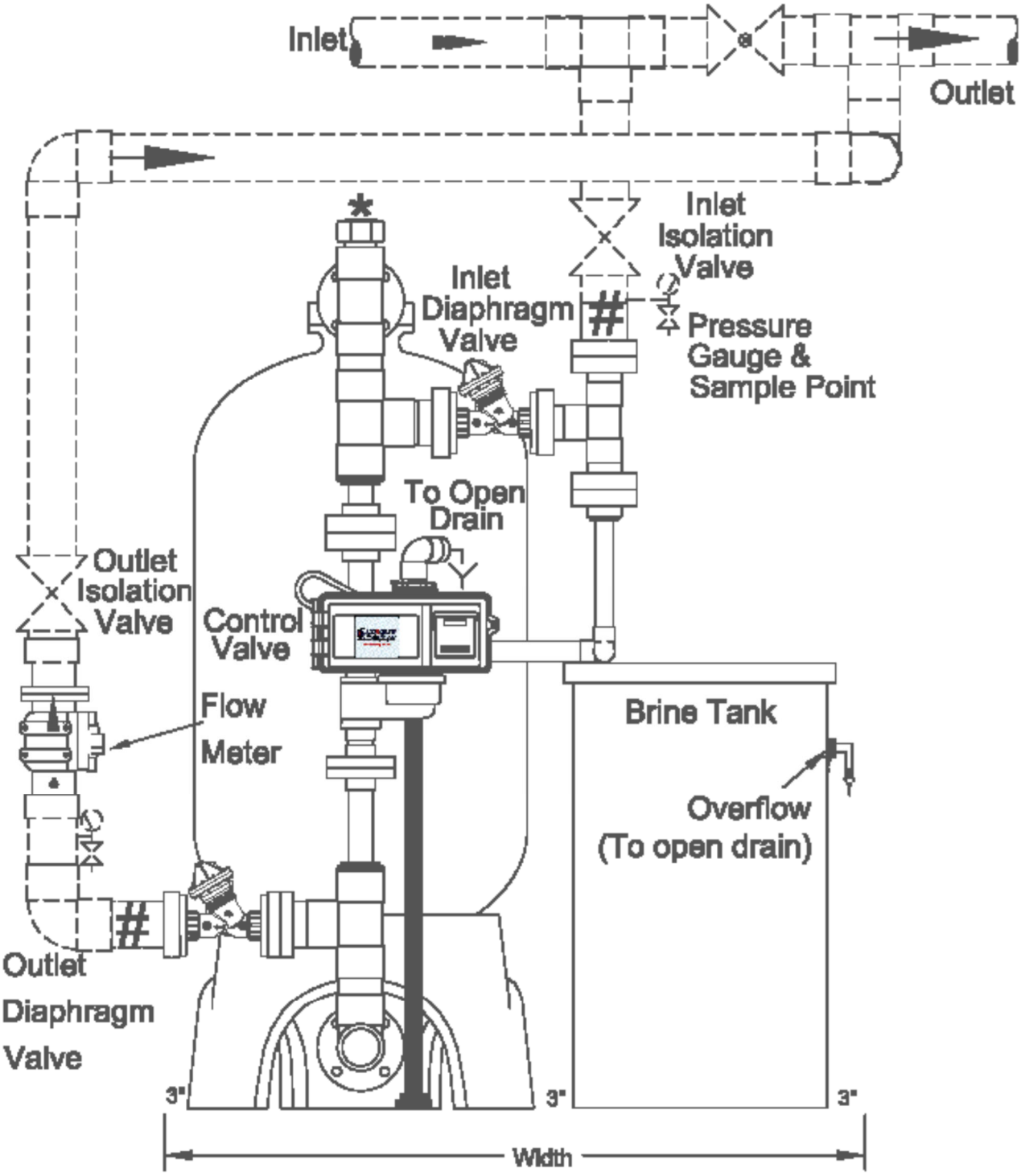


Fig. 6.1.1

Piping Inspection / Soaking Media Beds — Section 6.3

Before starting up the system check and confirm the following:

-Ensure system piping is correct (inlet to the valve inlet, outlet to the valve outlet, etc.) and all connections are complete, (see installation drawings in section 4). Sampling points are required before and after each unit to confirm the units are operating as intended.

- When piping is rigid, confirm that flex connections are between the control valve and the piping and that there are vacuum breakers to protect the mineral tanks.

- Ensure that all of the **manual isolation and by-pass valves are closed** prior to start up

- Control valve has the correct drain line flow control and the drain line has a proper air gap.

- The brine line is connected to the softener and water is in the brine tank (al least 2“ above the salt grid plate). Confirm the brine tank over flow is piped properly to drain.

- Confirm the meter cable is correctly in the meter slot on the outlet pipe adapter.

- Check all electrical connections and ensure that they are correct and complete. Check all control tubing connections and confirm they are correct.

- Once inspection is complete, manually advance the valve into backwash position. To do this, push the extra cycle button on the control valve.
- Once the control valve moves into the backwash position, unplug the control valve. This ensures the valve will stay in the backwash position, allowing slow filling of the tank from the bottom up.

- Partially open the inlet isolation valve. This will allow the unit to **SLOWLY** fill with water.

- When the unit is full, water will begin to trickle out through the drain***. If the unit is filled too quickly, the media could be blown out, and may damage the internal distribution of the unit.*** Once full, plug in the control valve and advance the regeneration control valve to service. Then close the inlet isolation valve. The control valve is advanced by pushing the extra cycle button.

- Allow the unit to stand for 1-2 hours once the tank is full to fully saturate the media bed with water. The tanks may have been filled with water when the media was first loaded (see section 5) and if so, the media should already be fully saturated.

- Once the media is fully saturated, the actual unit regeneration can occur. Return the unit to the backwash position and slowly start opening the inlet isolation valve. If the unit has any air inside, it will sputter out. Constantly check the drain water and ensure only resin fines, (not complete resin beads) from the media bed is being backwashed out. If the drain water contains more than just resin fines, reduce the backwash flowrate by throttling the inlet isolation valve. Any traces of air in the media bed can cause the media to wash out. If this is occurring, close the inlet isolation valve and allow the media to soak a little longer. After wating an additional hour or two more, repeat the above process. Once it has been confirmed only resin fines are coming out, gradually fully open the inlet isolation valve. The backwash flow controller will limit the flow to drain. Allow the unit to backwash until the waste water clears up and there is no colour or fines still being removed. This process may take 20 minutes or more. Once completed, close the inlet isolation valve.

- With the inlet still closed, plug the unit back in. The valve may cycle back to the home position. If so initiate a regeneration by pressing the extra cycle button on the control valve.

- Check all steps in the regeneration cycles and confirm the system is operating as intended.

- Ensure that in the brine draw cycle, brine is being drawn from the brine tank. If you continually see air bubbles in the brine line, recheck the brine tank connections and ensure they are properly sealed. Confirm the brine tank safety float is not restricted from moving .

- In the brine tank refill position, confirm the brine tank is being refilled properly. Confirm the brine tank safety float is not restricted from moving and operating properly.

- Upon completion of the steps above, the unit outlet isolation valves are **slowly** opened.
-The system bypass valve should then be closed. The system and piping should now be properly flushed. After this the system is now ready for normal service operation.

- Test the service water and confirm the system is operating properly.

Operating Conditions Section 7.0

For correct operation of the softener system, the minimum water pressure recommended is 30 psig, (206 kPa), in order for valve to operate effectively.

***Caution: Water pressure is not to exceed 100 psig, (690 kPa), water temperature is not to exceed 100 °F, (38 °C), and the unit can not be subjected to freezing conditions.**

When the unit is in operation, the manual bypass valve must always be closed and the manual inlet and outlet isolation valves open. The only time when they may be closed is during maintenance of the equipment.

Cycle Operation Section 7.1

The current position of the control valve can be confirmed by the dial on the drive motor (see fig. 7.1.1). Each cycle is indicated on the dial.

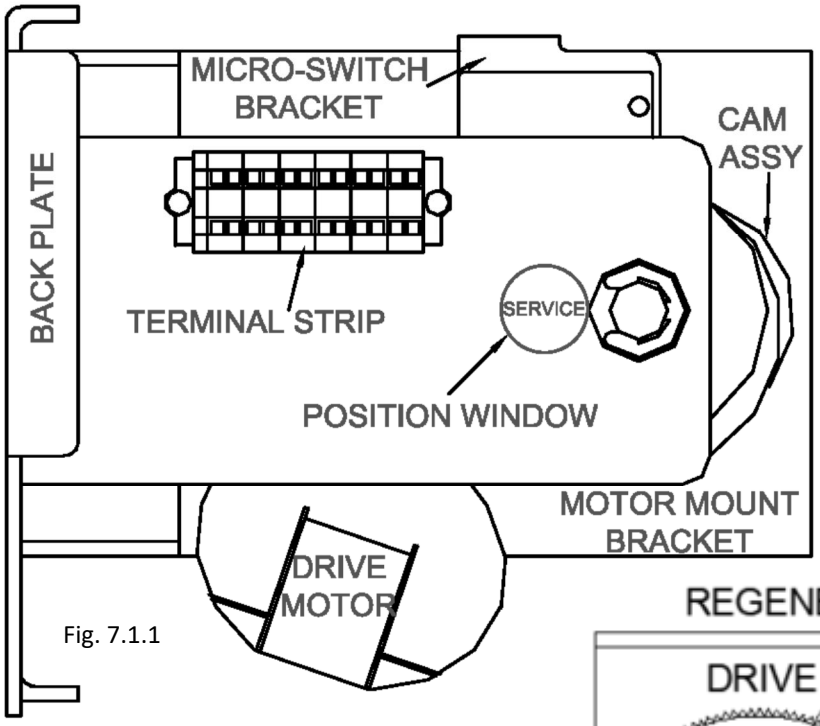


Fig. 7.1.1

-The drive gears move the drive link & piston rod / piston to the different regeneration positions. Figure 7.1.2 is in the service position.

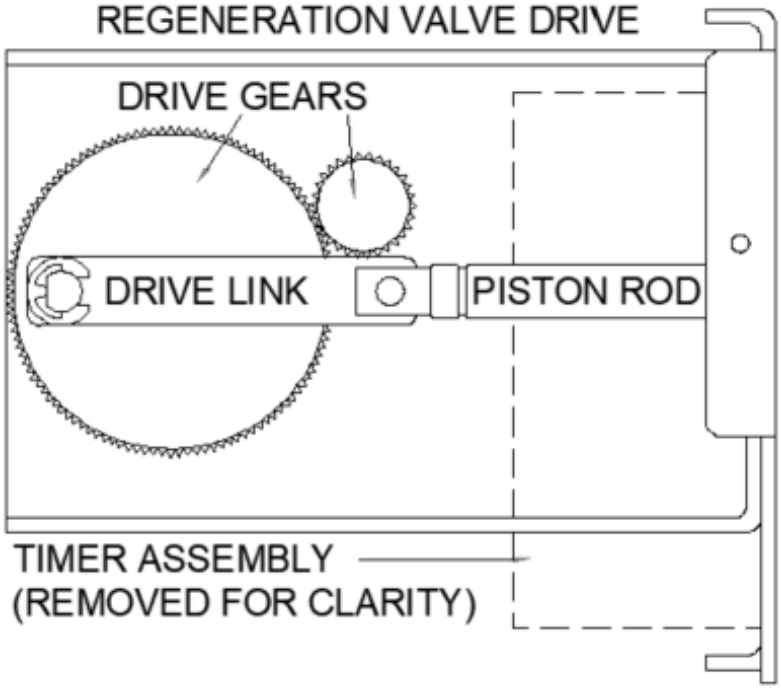


Fig. 7.1.2

Service Position Section 7.2

- During service, water flows into the inlet (top) diaphragm valve and is then directed into the top of the tank. The water flows downward through the resin media bed, through the support bed, into the distribution, and through the outlet (bottom) diaphragm valve out to service. As the water flows through the softener media, dissolved calcium and magnesium ions (hardness minerals) are exchanged with sodium (or potassium) at the exchange sites on the resin beads. As the duration of the service run increases, the softening resin slowly depletes, losing its ion exchange capacity, until the softening resin can no longer remove the hardness minerals. It is at this time that regeneration of the softener is required in order to replenish the softening capacity. During regeneration, the hardness (calcium and magnesium) that accumulated during the previous service run is replaced on the resin by sodium (or potassium). A brine solution rinsed down through the bed is the source of the replenishing sodium (or potassium).

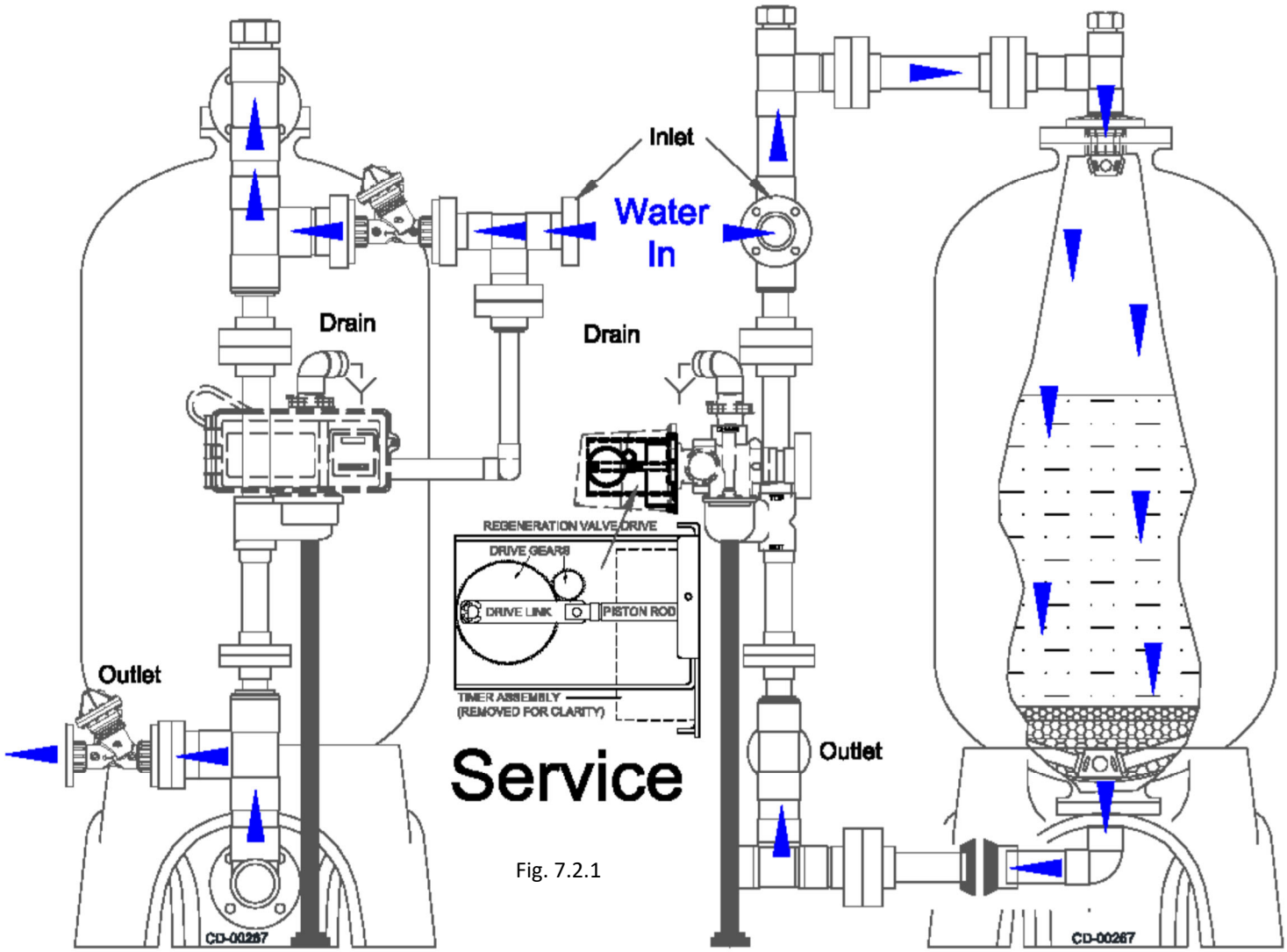


Fig. 7.2.1

Regeneration Section 7.3

The regeneration procedure is performed automatically by the softener after the cycle controller is started. Each regeneration cycle consists of four steps. For down flow regeneration the cycles are: #1 backwash, #2 brine draw / slow rinse, #3 fast rinse, and #4 brine tank refill. The regeneration is accomplished with the side mounted control valve. During regeneration, the inlet and outlet diaphragm valves are closed and the regeneration supply water enters the inlet (back connection) of the side mounted control valve.

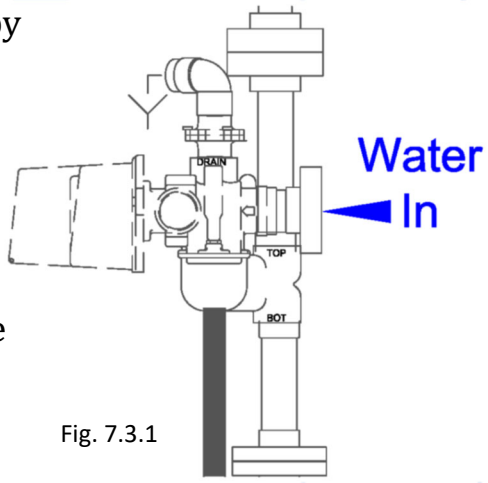


Fig. 7.3.1

Backwash Position Section 7.4

During backwash, water flows into the back of the regeneration control valve, down the manifold into the bottom of the mineral tank, and up through media bed expanding it. The water then flows out the top of the tank, down through the manifold to the regeneration control valve and out to drain. This expands the media bed, releasing any trapped particles and cleaning it thoroughly. The standard backwash cycle is usually factory pre-set to take place for 10 minutes.

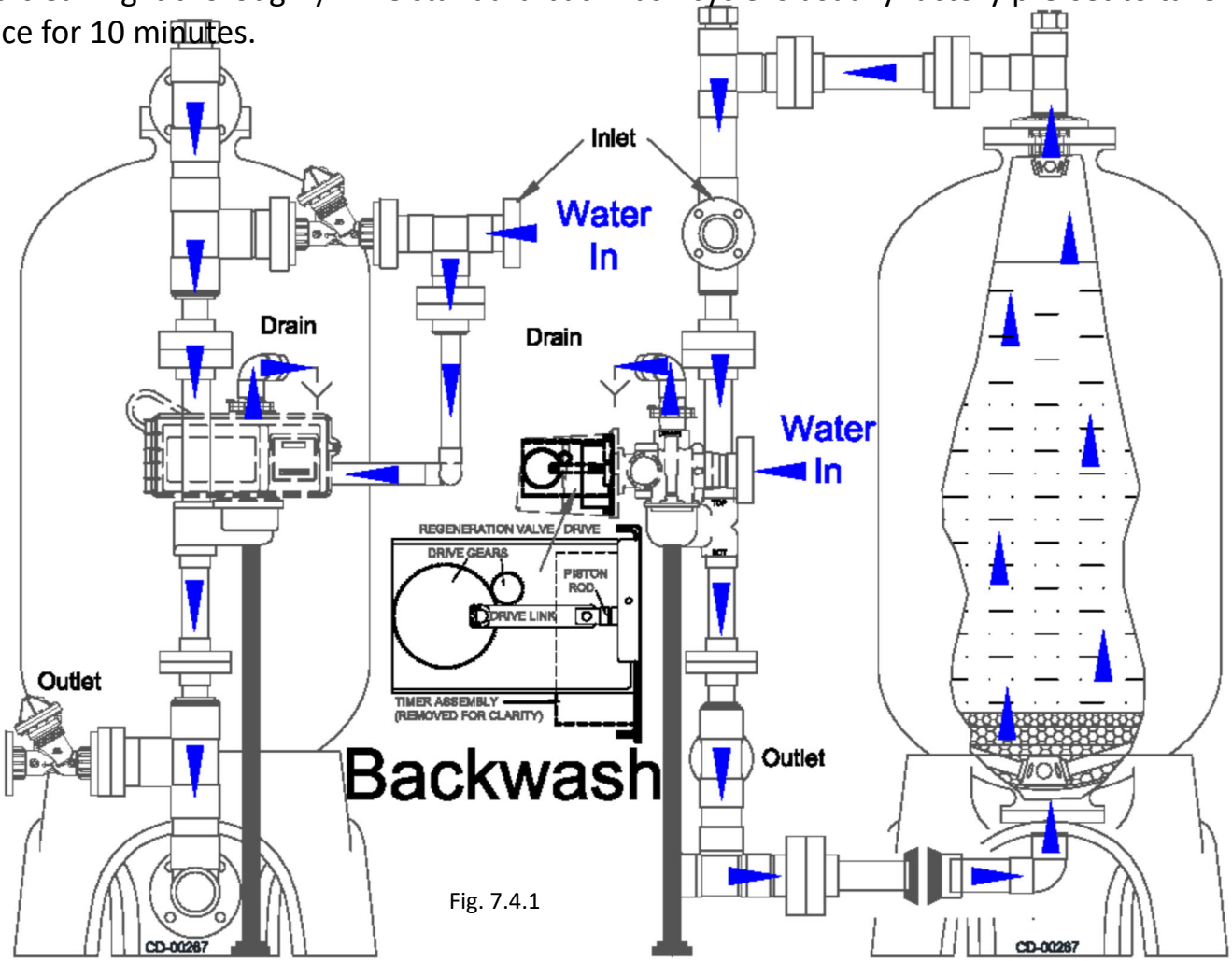
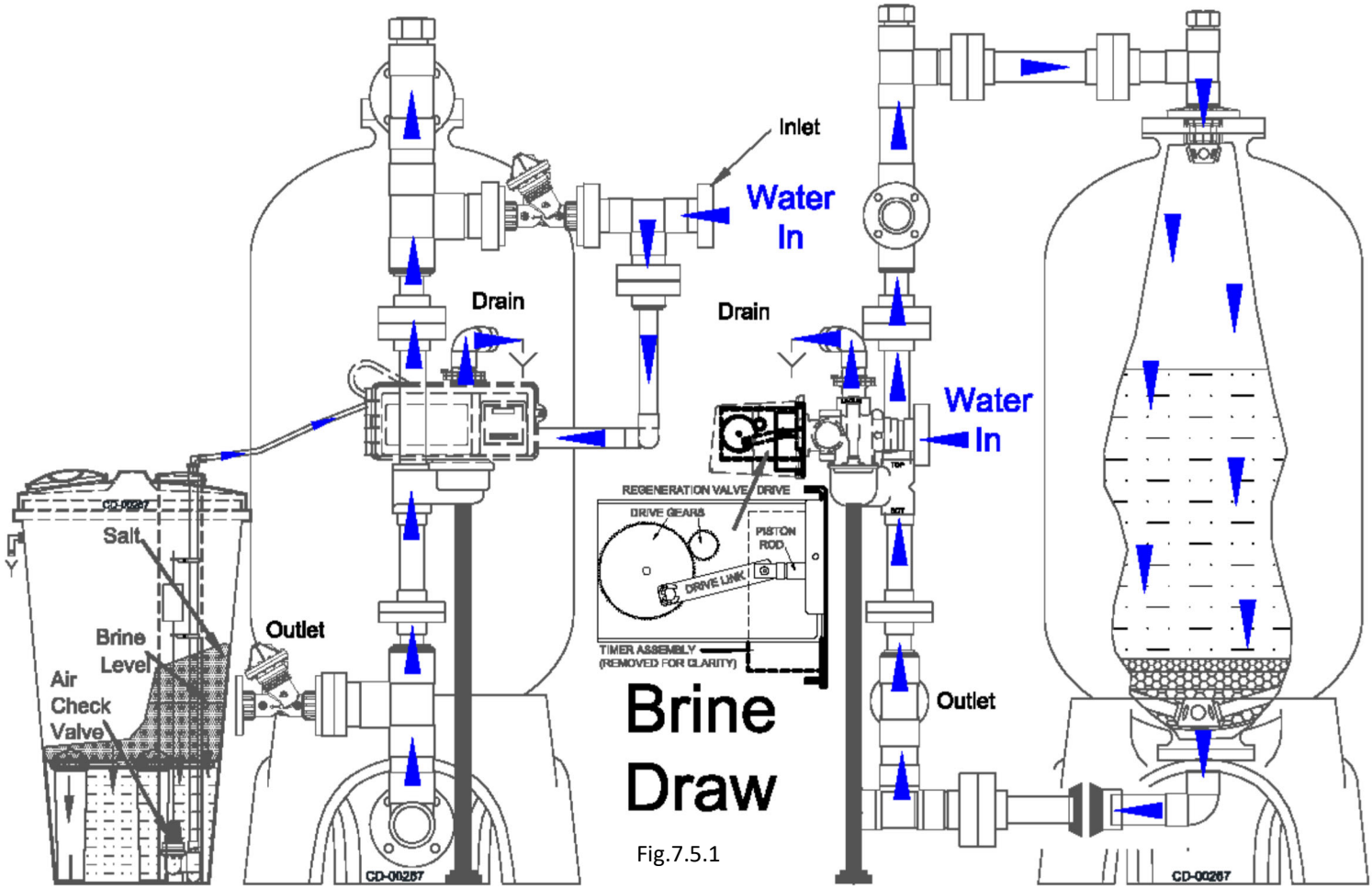


Fig. 7.4.1

Brine Draw / Slow Rinse Position Section 7.5

The brine draw / slow rinse is actually two cycles that occur even though the control valve piston does not move. The brine valve is open during these cycles.

The first part of the cycle is the brine draw. Water flows into the regeneration control valve then through the injector, (or aspirator), assembly. This water flow creates a vacuum which draws brine solution from the brine tank (see Fig. 7.5.2) This mixed water and brine solution then flows into the top of the mineral tank and down through the media bed. It is then directed back to the bottom of the control valve and out to drain.



Brine Draw

Fig.7.5.1

- The softener will continue to draw brine until the brine supply is depleted. On most systems, the brine flow is stopped by the air check.

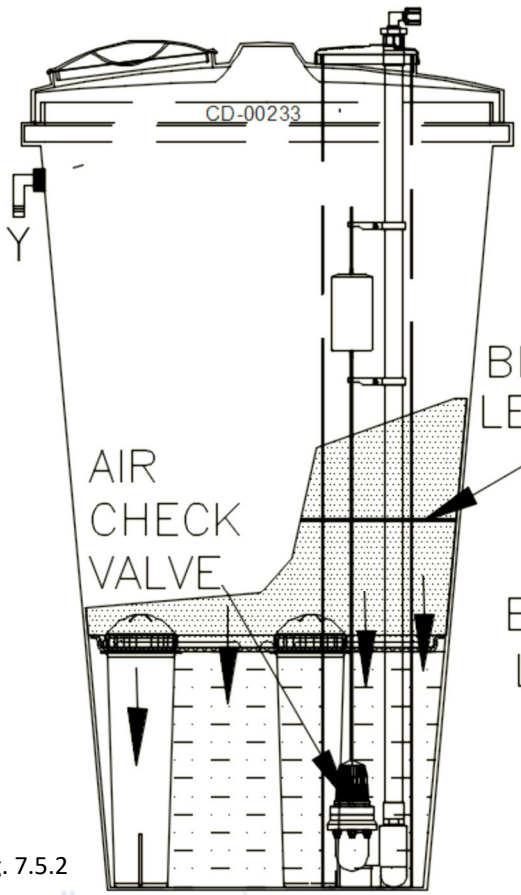


Fig. 7.5.2

Control valve drawing brine from the brine tank in brine draw cycle.

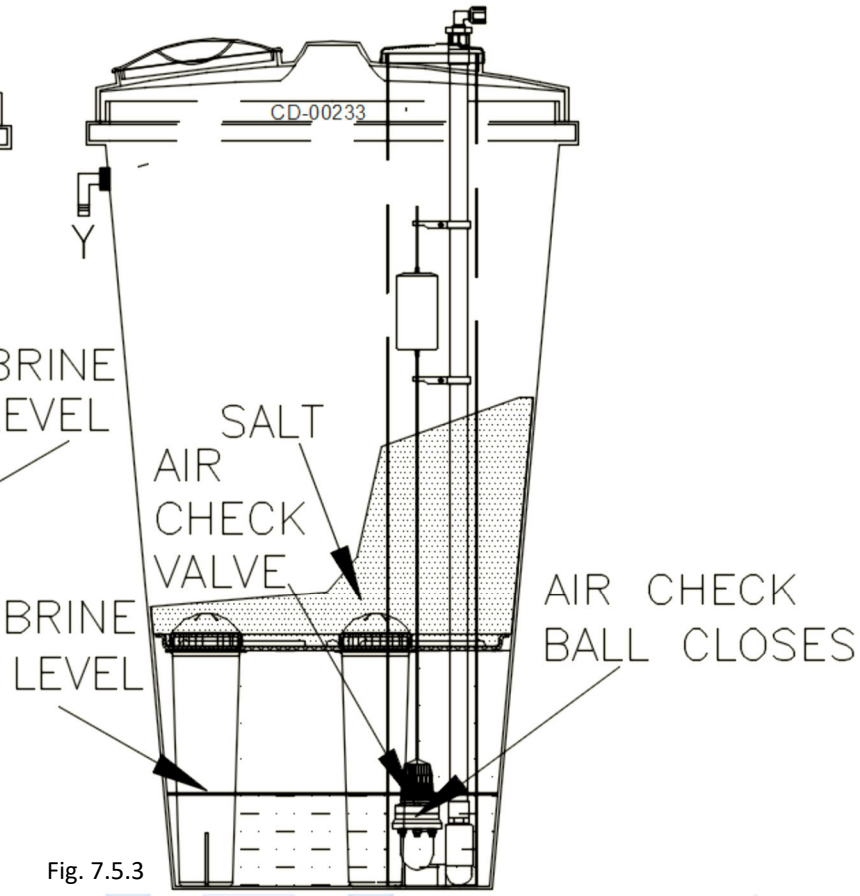


Fig. 7.5.3

The level of the brine drops until the ball of the air check stops the flow of brine .

- When the flow of brine is stopped by the air check (see Fig. 7.5.3), the brine draw cycle ends and the slow rinse cycle begins. The control valve piston does not move. There is now a low flow rate that will slowly push the brine through the media, and continue replenish the resin bed.

Slow Rinse Position Section 7.5

During slow rinse, the water follows the same path as brine draw except the air check has stopped the flow of brine. The regeneration control valve has not moved positions.

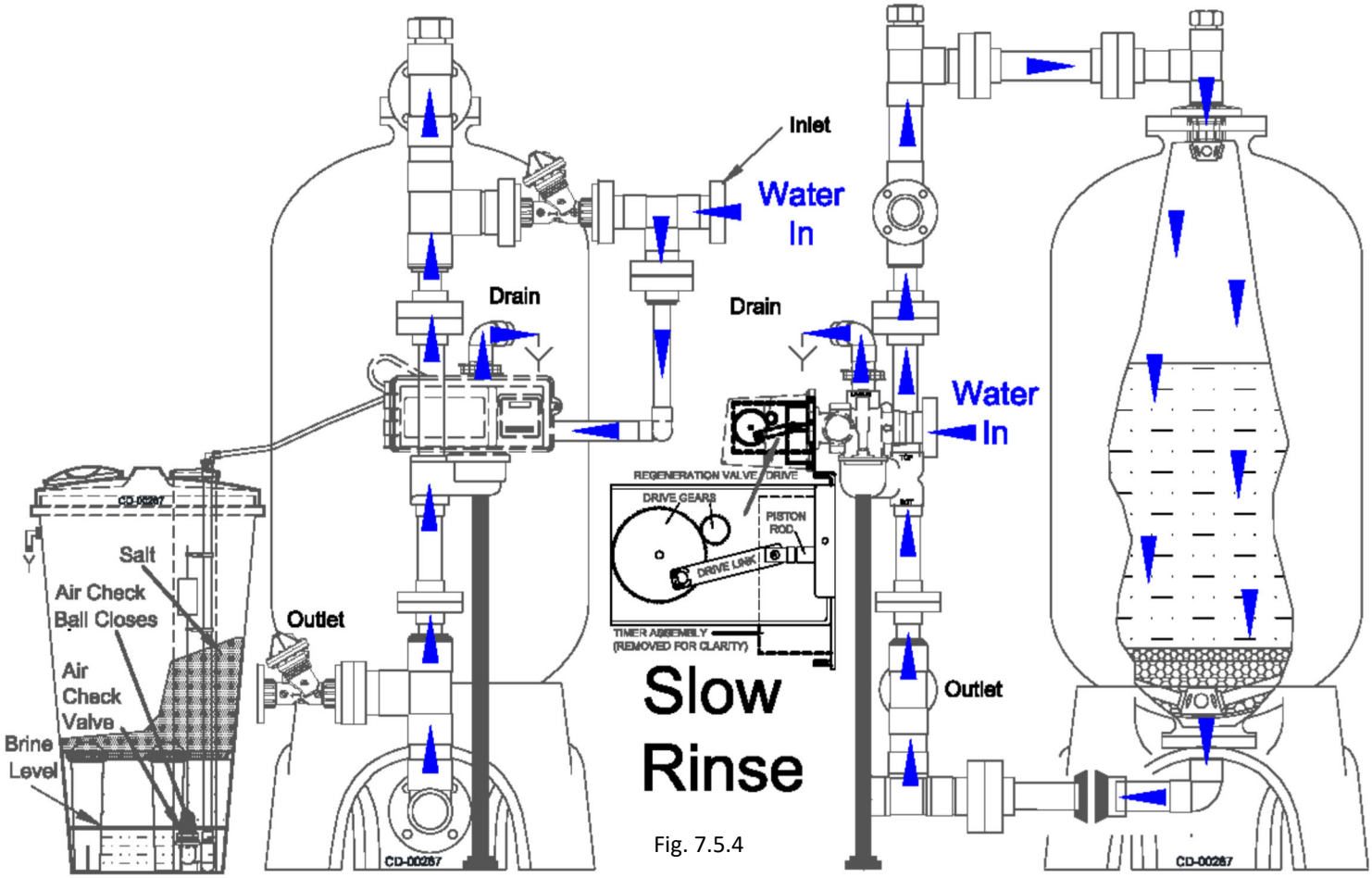


Fig. 7.5.4

Fast Rinse Position Section 7.6

Water flows into the regeneration control valve then into the top of the mineral tank and down through the media bed. It then directed back to the bottom of the control valve and out to drain.

This reconsolidates the media bed and rinses any remaining brine in the media bed to drain. The flow rate is controlled by the drain line flow controller.

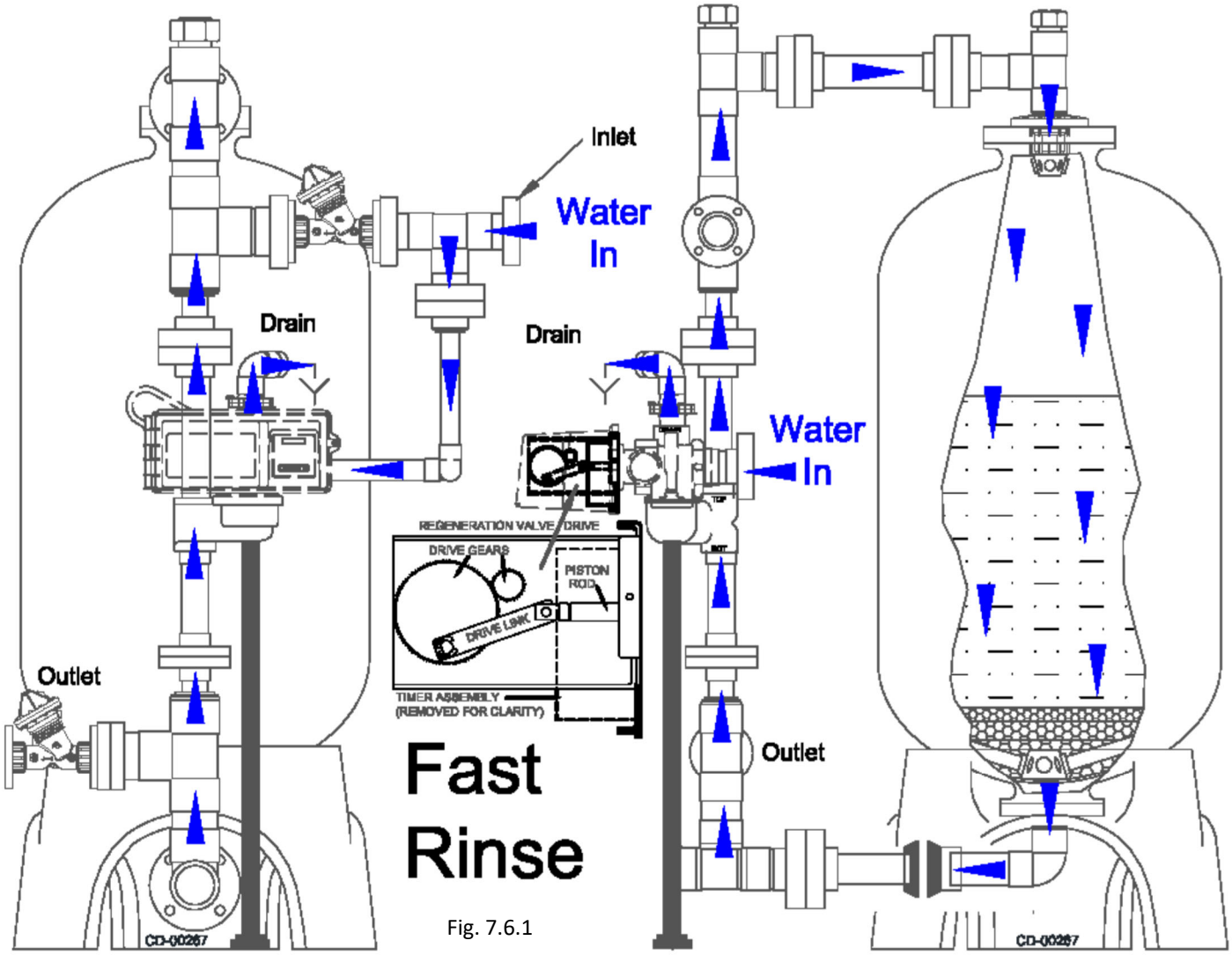


Fig. 7.6.1

Brine Tank Refill Section 7.7

The brine tank refill cycle will direct a predetermined amount of water back into the brine tank for the next regeneration cycle. The refill water flows into the regeneration control valve, through the injector, (aspirator), through the brine valve and out to the brine tank. The flow rate to the brine tank is regulated by a flow control orifice. By adjusting the refill time, the volume of water to the brine tank is controlled for each refill.

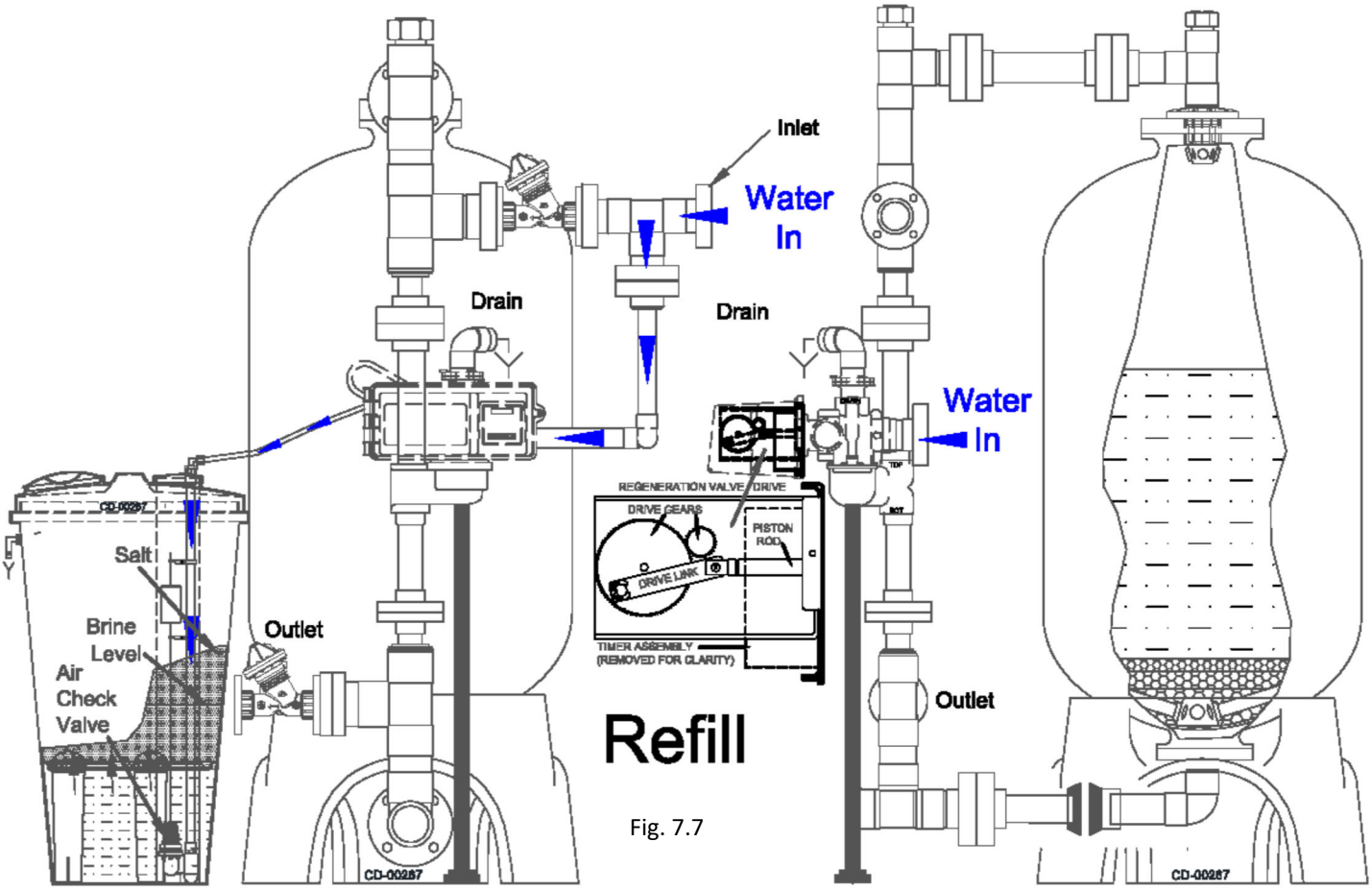
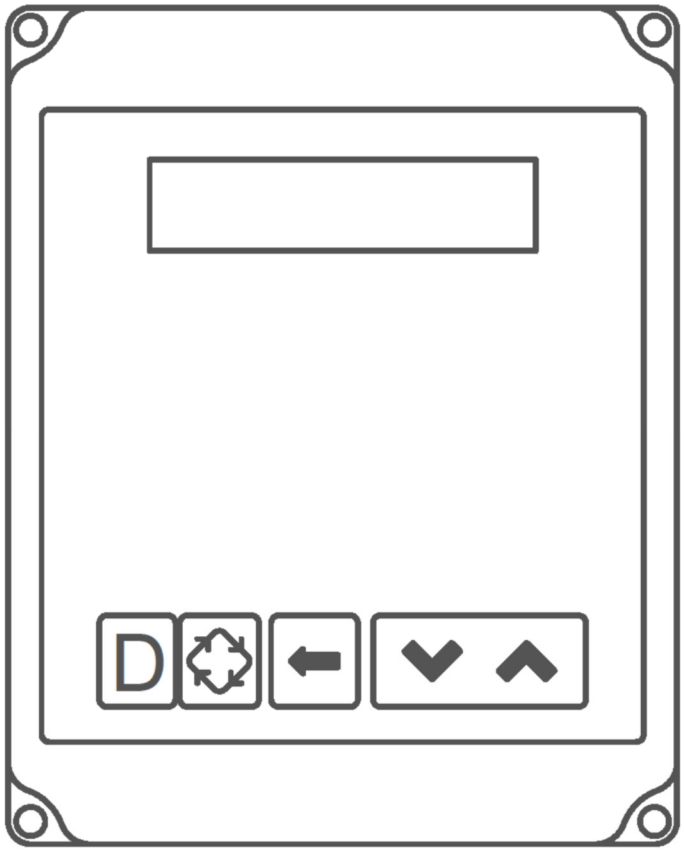


Fig. 7.7

Controller Overview **Section 8.0**

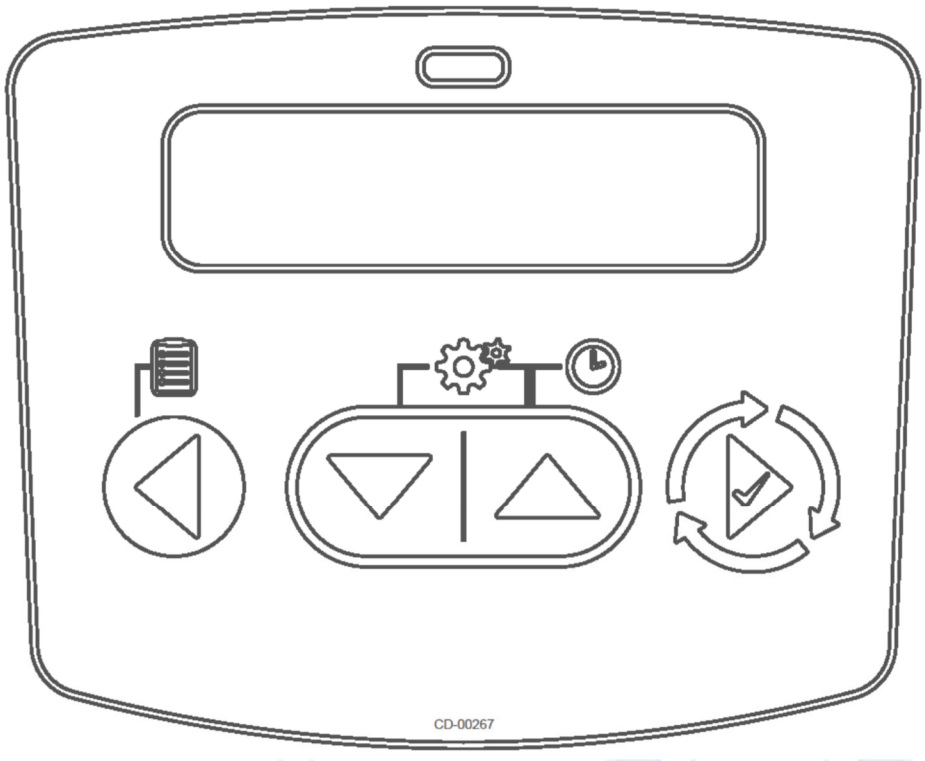
There are two controllers that may be used on the FHF systems. They are the NXT and the NXT2.

The NXT version is fig 8.0.1 and the NXT2 version is fig 8.0.2. The programming on the NXT is slightly different than the NXT2.



NXT Timer 24VAC

Fig. 8.0.1



NXT2 Timer 24VDC

Fig. 8.0.2

NXT Controller

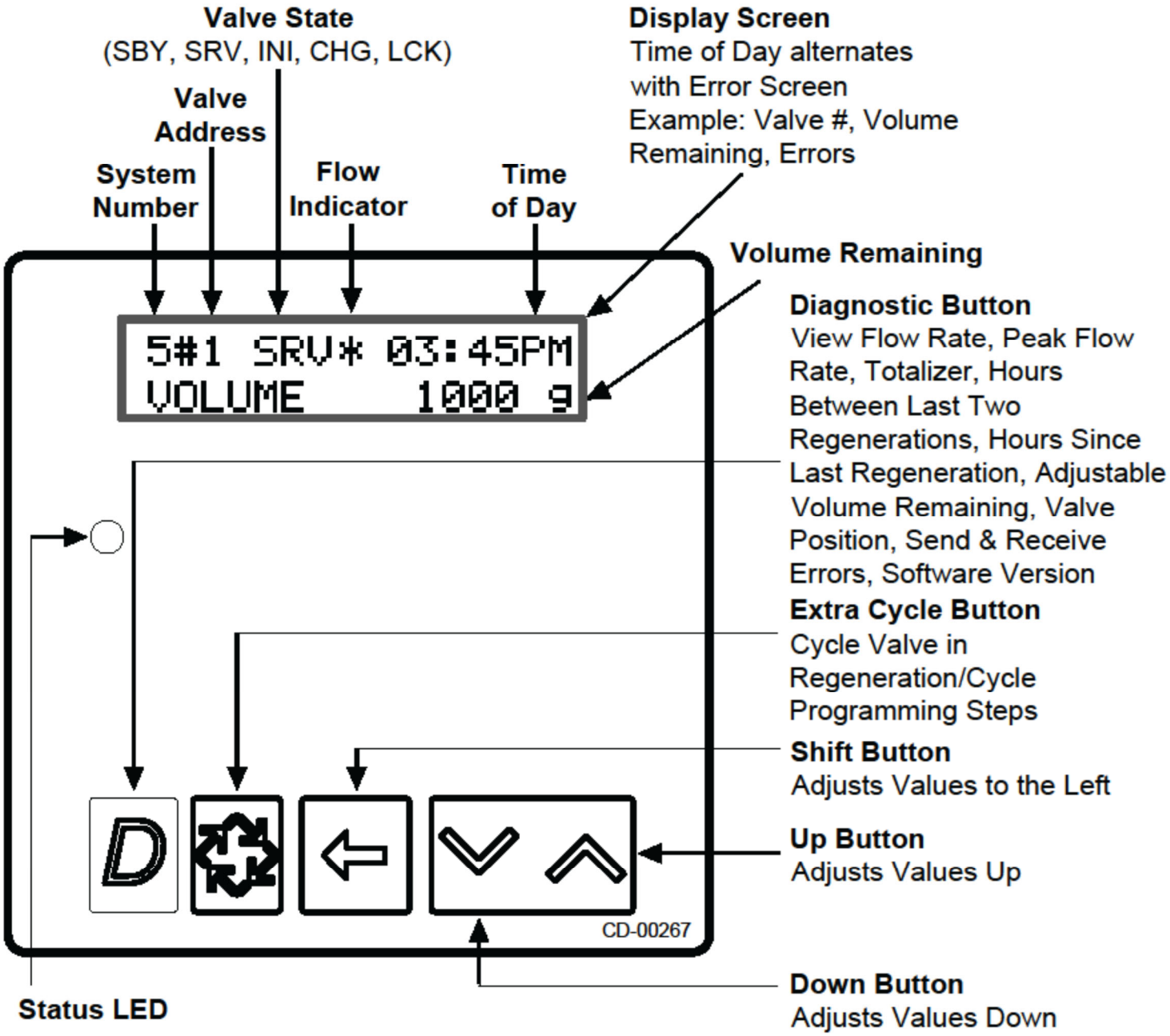


Fig. 8.1.1.1

NXT2 Controller

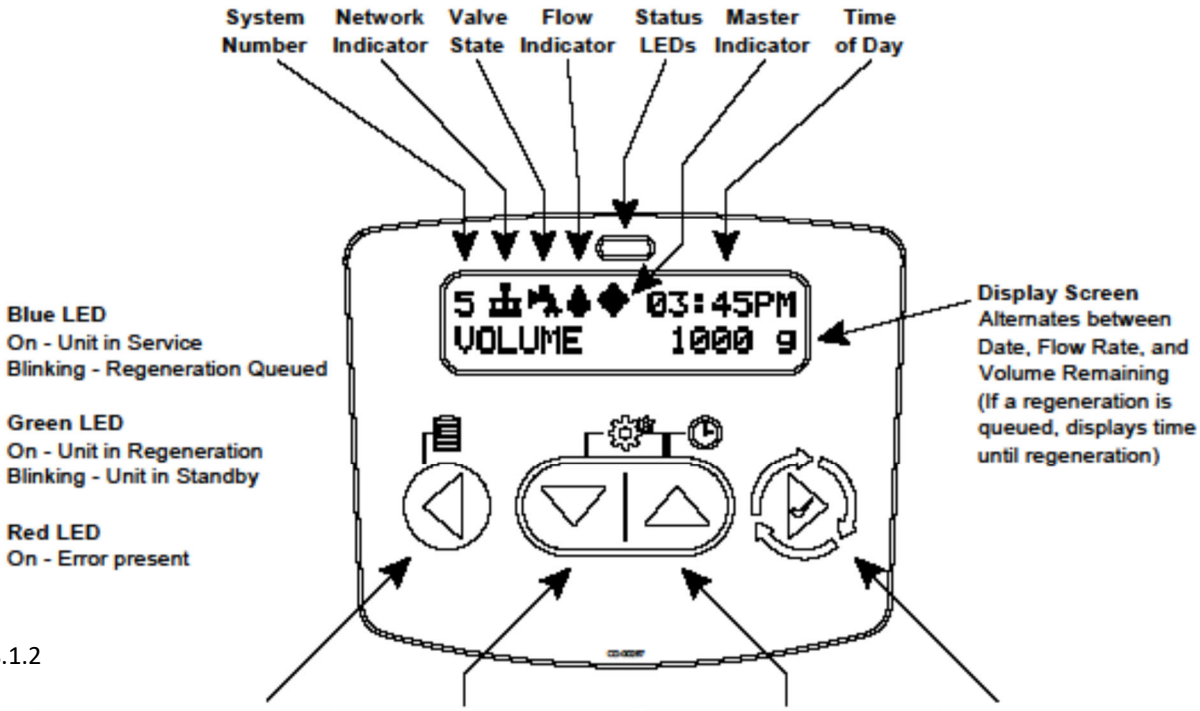


Fig . 8.1.2

Left Button
Press:
Navigate to previous menu option

Press and Hold:
Enter Diagnostic menu

Down Button
Press:
Adjust menu value down

Press and Hold:
Enter Time of Day menu

Up Button
Press:
Adjust menu value up

Press and Hold:
Enter Time of Day menu

Extra Cycle Button
Press:
Navigate to next menu option

Press and Hold:
Initiate a regeneration

Left Button + Down Button
Press and Hold -
Enter Master Programming

Down Button + Up Button
Press and Hold -
Enter User Programming

Display Icons

- Valve State: Service
- Valve State: Standby
- Flow Indicator (flashing)
- Regeneration
- Master Unit (auto-assigned)
- Network Indicator - Connected
- Network Indicator - Disconnected
- Network Indicator - Unit Missing
- USB Connected (Field Programmer)
- Error Condition Present
- Remote Lock
- Lock Window
- Initializing
- Upper Drive Movement
- Lower Drive Movement
- Remote Regeneration
- Master Programming
- User Programming
- Diagnostics
- Time of Day Programming

Resets Section 8.2

NXT Controller

-Soft Reset: Press and hold the Up and Down buttons for 25 seconds until 12:00PM (or 12:00HR) appears. This resets all parameters except for the flow meter totalizer volume.

-Master Reset: Hold the Extra Cycle button while powering up the unit. This resets all of the parameters in the unit. Check and verify the choices selected in Master Programming Mode.

NOTE: If the "D" button is pressed while in master programming, no changes will be saved.

NXT2 Controller

Reset to Factory Defaults

While powering up the unit, when the Pentair logo appears, press and hold the extra cycle button to access the reset menu then select RESET TO FACTORY DEFAULTS. Press the extra cycle button to confirm your selection and to advance to the service screen. Furthermore, you may select RESET TO NON-FACTORY DEFAULTS to save a set of unique control parameters.

Important Items To Note: Section 8.2.1

-Each control valve in the system must have a unique number. The valves must be labelled 1, 2, 3, and 4.

-Only one unit is allowed to go into regeneration at a time.

-With the exception of a single FHF unit, all standard, multi tank FHF units will be programmed as a responsive flow system. This is system 14 in the programming. With responsive flow (also called demand recall), the controller monitors the total system flow rate. Based on this flowrate, the controller will automatically adjust the number of units online to match the required flow demand.

Programming Section 8.3

NXT Controller -Entering Master Programming Mode.

-Press and hold the **Shift** and **U**p buttons for 5 seconds. 

-Press the **Extra Cycle** button  once per display until all displays are viewed and normal display is resumed.

-Option setting displays may be changed as required by pressing either **Up** or **Down** button. 

-Use the **Shift** button to move one space to the left. 

-Depending on current valve programming, certain displays may not be viewed or set.

NOTE: If the "D" button is pressed while in master programming, no changes will be saved.

NXT Controller -Exiting Master Programming Mode.

-Press the Extra Cycle button once per display until all are viewed. Master Programming Mode is exited and the normal display screen appears.

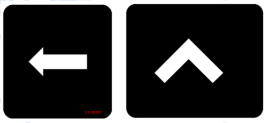
-To exit the Master Programming Mode without saving changes, press the Diagnostic button.

-NOTE: If no keypad activity is made for 5 minutes while in the Master Programming Mode, or if there is a power failure, no changes will be saved, and the unit will go back to the main display screen.

Also see NXT programming manual.

Entering Master Programming Mode

Typical standard programming had been highlighted.



SELECT LANGUAGE:
ENGLISH

Options: English; Espanol; Portugues; Deutsch; Francais

SYSTEM TYPE: 14
DEMAND RECALL

Options: System 4 (single unit); System 5 (2-4 units); Parallel Interlock System 6 (2-4 units); Parallel Series Regeneration System 7 (2 units); Alternating System 9 (2-4 units); Alternating System 14 (2-4 units); **Demand Recall**

Programming NXT Section 8.3

VALVE ADDRESS:
#2

Note: This screen will not display for single system 4

Options: Valve Address #1 (First Control Valve) Valve Address #2 (Second Control Valve) **(Default)** Valve Address #3 (Third Control Valve) Valve Address #4 (Fourth Control Valve)

SYSTEM SIZE:
2 VALVES

Note: This screen will not display for single system 4

Options: 2 Valves in the System **(Default)** 3 Valves in the System 4 Valves in the System**Example:**2 Valves in the System **(Default)Range:** 2 to 4 Valves in the System

REGEN TYPE:
METER IMMEDIATE

Options: Time Clock Delayed (System 4 Only) **(Default)** **Meter Immediate** (All System Types) **Meter Delayed Fixed Reserve (Systems 4** & 6 Only)

VALVE TYPE:
3150

Options: 2750 **(Default) 2850** 2900 **3150** 3900 Stager - Notch Cam

REGENERANT FLOW:
DOWNFLOW

Options: Up Flow; UF Fill First; **DOWNFLOW**

REMOTE SIGNAL:
START 00:06:00

Note: This screen will not display for single system 4

Options: 00:06:00 **(**Default)Range:
1second to 99 minutes (1 hour, 39 minutes)

Programming NXT Section 8.3

DISPLAY FORMAT:
US-GALLONS

Options: U.S. - Gallons (Default) Metric - Liters (Metric)

NOTE: In European Units - Liters (Metric) mode, the display will be in 24-hour time.

NOTE: In U.S. - Gallons mode, the display will be in 12-hour time

UNIT CAPACITY:
00000000 GRAINS

See section 2.4 for capacity settings

Options: Grains (in U.S. format); Grams (in Metric format)

Note: Use the shift button to move to the left.

CAPACITY SAFETY FACTOR:
00%

Options: 0 TO 50%

FEED WATER HARDNESS:
15 GPG

Options: 1 TO 199 Grains/gallon (U.S. format); 20 to 1,999 miligrams $CaCO_3$/L

See section 6.1 on calculating the total compensated water hardness.

Trip Points 1, 2, and 3 (System 14 only)

-This program step selects up to three **trip points** programmed on the master timer only (Valve Address #1). The actual required number of trip points in a system is one less than the number of valves in the system. Trip point 1 represents the system flow rate at which a second valve will be brought in service or standby. Trip point 2 represents the system flow rate at which a third valve will be brought in service or standby. Trip point 3 represents the system flow rate at which a fourth valve will be brought in service or standby.

Trip Point 1	Trip Point 2	Trip Point 3
Range: 1 – 997 GPM	U.S.: Value of Trip Point 1 plus 1 to 998	U.S.: Trip Point 2 plus 1 to 999
Range: 0.01 – 9.97 M^3/M	Metric: Value of Trip Point 1 plus .01 to 9.98	Metric: Trip Point 2 plus 0.01 to 9.99

Trip Delays 1, 2, and 3 (System 14 only)

-This program step selects each trip delay time that is addressed with each trip point and will be programmed on the **master timer only** (Valve Address #1). The trip delay time represents a minimum amount of time the system flow rate is required to be equal or greater than the trip points to bring a unit in service. It also is the minimum amount of time the system flow rate is required to be less than the trip points to remove a unit from in service to standby.

Trip Delay 1	Trip Delay 2	Trip Delay 3
Default: 30 Seconds		
Range: 30 - 99 Seconds	Range: 30 - 99 Seconds	Range: 30 - 99 Seconds

TRIP POINT 1:
000 GPM

Note: This screen will only appear on the #1 (master) unit and only with system type 14.

-This trip point is the flowrate at which the second unit is brought on line. The standard trip point will be the flow rate calculated by 5 usgpm multiplied by the cubic feet of resin in one tank OR a the flow rate at a 15 psi pressure drop (which ever is lower). The trip points are in 5 gpm increments only. All trip points are rounded down to match. See section 2.4 for resin volume.

TRIP DELAY 1:
30 SECONDS

Note: This screen will only appear on the #1 (master) unit and only with system type 14.

-Trip delay until the second unit is brought on line.

TRIP POINT 2:
000 GPM

Note: This screen will only appear on the #1 (master) unit and only with system type 14.

-This trip point is the flowrate at which the third unit is brought on line. The standard trip point is normally double the flow rate of trip point 1.

TRIP DELAY 2:
30 SECONDS

Note: This screen will only appear on the #1 (master) unit and only with system type 14.

-Trip delay until the third unit is brought on line.

TRIP POINT 3:
000 GPM

Note: This screen will only appear on the #1 (master) unit and only with system type 14.

-This trip point is the flowrate at which the fourth unit is brought on line. The standard trip point is normally triple the flow rate of trip point 1.

TRIP DELAY 3:
30 SECONDS

Note: This screen will only appear on the #1 (master) unit and only with system type 14.

-Trip delay until the fourth unit is brought on line.

REGENERATION DAY OVERRIDE: **OFF**

Options: OFF or 1 to 99 days.

REGENERATION TIME:
02:00 AM

Note: This screen will not display if day over ride is OFF.

Options: AM/PM (U.S. format); 24 (Metric format)

Regeneration Cycles

The standard regeneration cycles are

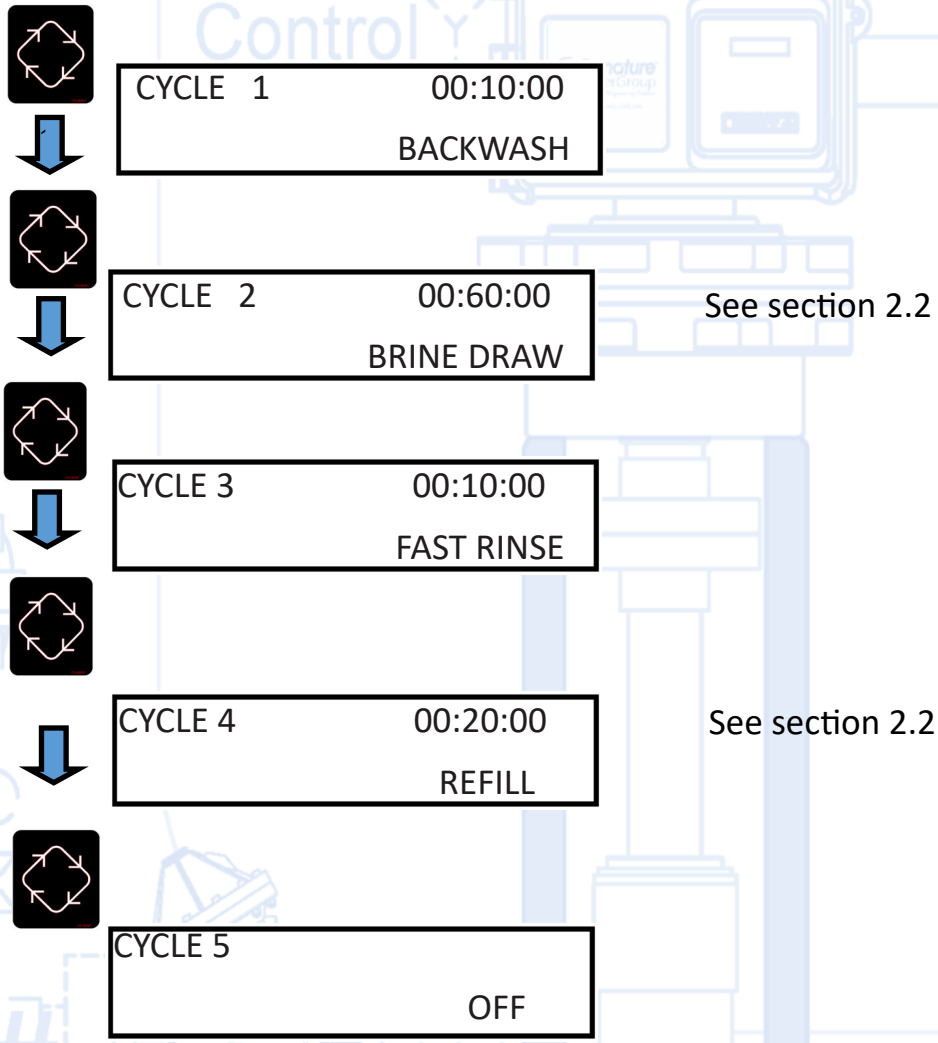
#1 -Backwash (standard time 10 minutes)

#2 -Brine draw / slow rinse (see section 2.2)

#3 -Fast rinse (standard time is 10 minutes)

#4 -Brine tank refill (see section 2.2)

#5 –Pause (standard time is off)



Programming NXT Section 8.3

AUXILIARY RELAY:
DISABLED

-Options: Disabled; Enabled; The auxiliary relay may be used for special options such as timed brine draw. The auxiliary relay will always turn off at the end of cycle 5.

AUX RELAY OUTPUT:
START 1 00:00:00

Note: This screen will only appear if auxiliary relay is enabled.

-Range is from the beginning of regeneration to the end of regeneration. The output contact will close at the time set for start 1.

AUX RELAY OUTPUT:
END 1 00:00:00

Note: This screen will only appear if auxiliary relay is enabled.

-The range is after START 1 time to the end of cycle 5. The contact will open at END 1 time or the end of cycle 5.

AUX RELAY OUTPUT:
START 2 00:00:00

Note: This screen will only appear if auxiliary relay is enabled.

-Range is from after END 1 timer of to the end of regeneration. The output contact will close at the time set for start 2.

AUX RELAY OUTPUT:
END 2 00:00:00

Note: This screen will only appear if auxiliary relay is enabled.

-The range is after START 2 time to the end of cycle 5. The contact will open at END 1 time or the end of cycle 5.

Programming NXT Section 8.3

CHEMICAL PUMP:
DISABLED

Options: Disabled; Enabled;

CPO AUX RELAY:
VOLUME 000 GAL

Note: This screen will only appear if chemical pump is enabled.

-Range is 1 to 999 gallons in U.S. format: 1 to 9,999 L in metric format.

CPO AUX RELAY:
TIME 00:00:00

Note: This screen will only appear if chemical

-Range is 00:00:00 to 02:00:00 seconds

FLOW METER:
3" PADDLE

-**Options:** 1.0 Paddle (Fleck) 1.0 Turbine (Fleck) 1.5 Paddle (Fleck) 1.5 Turbine (Fleck) 2.0 Paddle (Fleck) **3.0 Paddle** (Fleck) Generic (Non-Fleck)

MAXIMUM FLOW RATE:
0000 GPM

Note: This screen will only appear if **Generic** has been chosen.

Options: 20 to 2,000 gpm (U.S. format); 20-200.0 L (Metric format)

ADD **01** GALLONS
EVERY **001** PULSES

Note: This screen will only appear if **Generic** has been chosen.

OPTIONS: Volume- Gallons (U.S. format); Liters (Metric format)
Pulses- 1 to 255

PROGRAMMING UNIT
PLEASE WAIT . . .

Exiting master programming mode.

General Maintenance *Section 9.0*

***Caution:** To prevent personal injury, or damage to the system, properly relieve the system pressure before doing any servicing on the control valve, piping or on the media tank.*

1. Turn off the water supply on both the inlet and the outlet piping to the unit.

2. Step the control valve through a complete regeneration cycle once to relieve the pressure inside. To facilitate this, push and hold the extra cycle button on the valve keypad. Once the valve moves into regeneration, the valve can be advanced through the regeneration cycles one at a time by pushing the extra cycle button. Make sure the valve is back in the service position when done.

3. Once the unit is back to the service position, unplug the electrical power to the unit.

4. Depending upon what servicing is to be done, **it may be necessary to drain the unit down.** With units with side mounted manifolds, this can be accomplished by removing the bottom drain plug on the manifold.

5. For any individual part identification, see section 10.

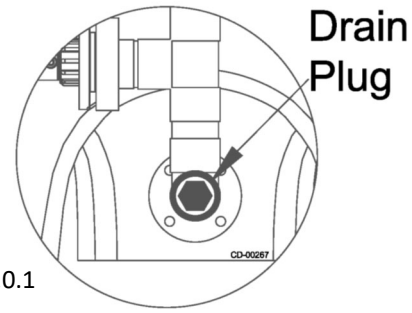


Fig 9.0.1

General Tools Recommended

Tools recommended to perform basic service on the 3150 control valve are:

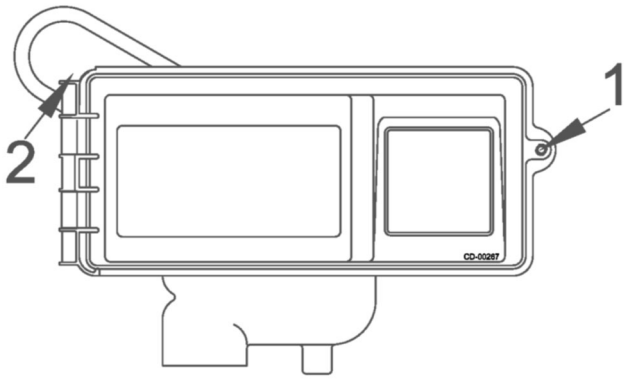
- Seal stuffer (#12683)& puller (#12682).
- Silicone grease, (1014081-8 oz tube).
- Anti seize compound (for Stainless to stainless bolt connections).
- #2 Phillips screw driver.
- 2.4 mm (0.1”) wide flat screw driver.
- Nut Driver set
- Large flat screw driver.
- Needle nose, channel lock & snap ring plyers.
- Wire hook or dental pick hook.
- Chain or strap wrench.
- If changing media, a wide mouth funnel #99004 and a media extractor kit #50040050 are recommended.


#99004

#50040050

Note: If the piston is pulled out or removed, the unit must be drained down (see section 9.0)

-Remove cover by unscrewing #1 and removing pin #2.



-The timer can now be accessed. Turn off the water using the inlet and outlet isolation valves.
-Cycle the control valve to relieve pressure on the unit (see section 9.0).

-Cycle the control valve back to service and unplug the unit

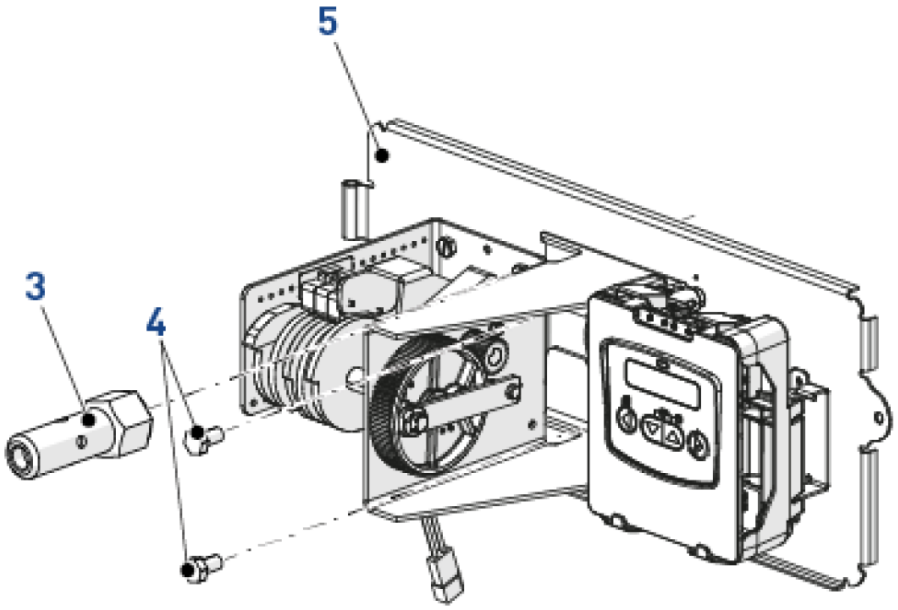


Fig 9.1.2

-Disconnect the piston rod by removing the piston rod drive clip and pin.

-Disconnect the brine valve (and the svo if required) from the backplate by removing the brine valve stem guide assembly #3.

-Remove bolts #4 that attach the powerhead to the valve body.

-The powerhead assembly #5 can now be removed .

-To replace the seals and spacers and the piston assembly, the powerhead assembly must first be removed (see section 9.1)

-The unit must also be drained down (see section 9.0)

-The piston assembly is removed by pulling straight out.

-The seals and spacers are removed by using the puller and a small hook. *Note the order in which they are removed. See fig 9.2.1*

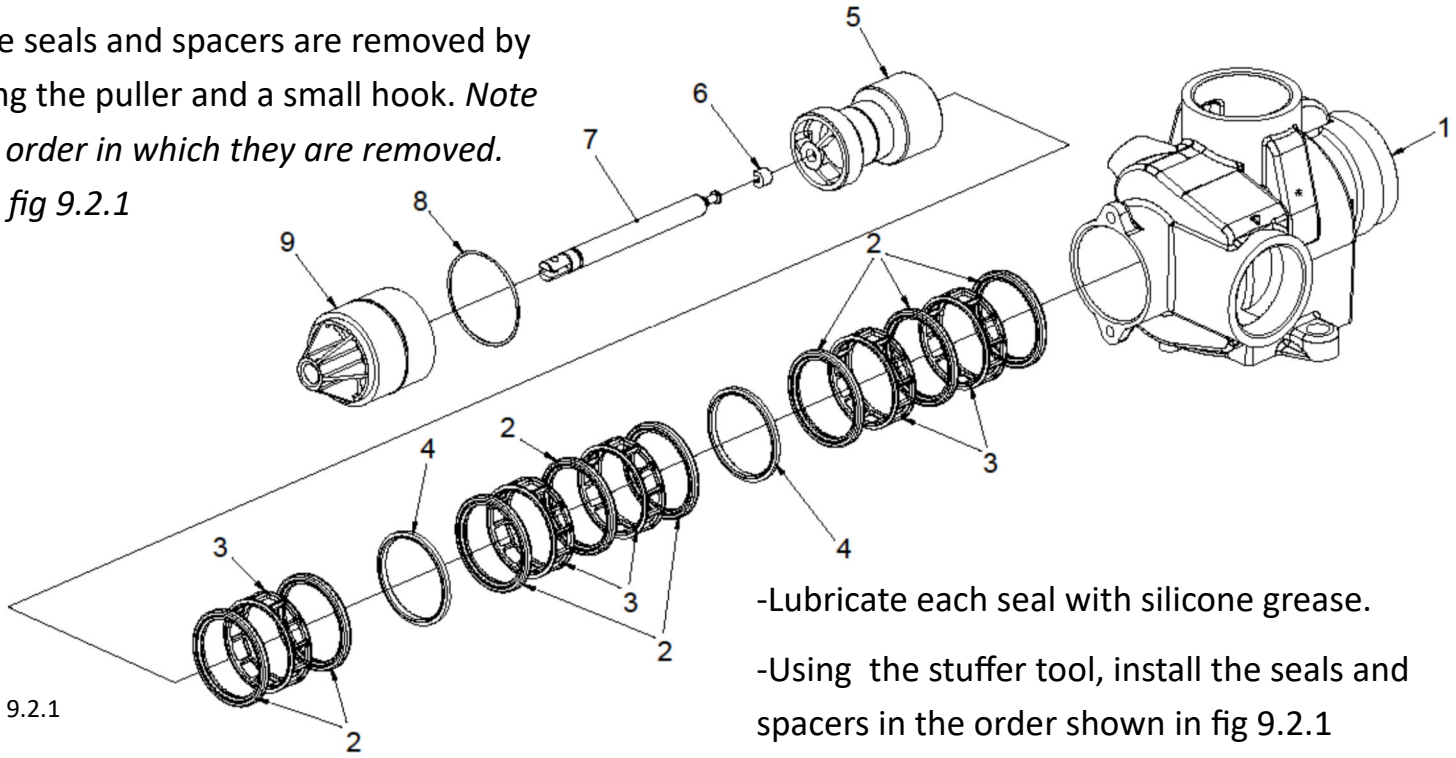


Fig. 9.2.1

-Lubricate each seal with silicone grease.

-Using the stuffer tool, install the seals and spacers in the order shown in fig 9.2.1

-Lubricate the piston assembly with silicone grease, and install into the body.

-Replace the powerhead.

-**SLOWLY,** refill the unit with water and purge all air from the unit.

No.	Description	Quantity
1	Valve body 3150	1
Seal & spacer assembly kit 60131		Includes Items 2,3 & 4
2	Seal, piston	8
3	Spacer	5
4	Narrow spacer	2
Piston assembly RWB 60106-00		Includes Items 5,6,7,8 & 9
Piston assembly NRWB 60113-01		Includes Items 5A,6,7,8 & 9A
5	Piston, 3150 standard	1
5A	Piston, 3150 NRWB	1
6	Snap ring, piston rod	1
7	Piston rod	1
8	O-ring 035	1
9	End plug assembly white	1
9A	End plug assembly black	1
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Cleaning / Replace Injectors / Brine Valve. *Section 9.3*

-See section 9.0 to relieve pressure and prepare the unit for maintenance.

-To access the injectors, first remove the brine tube #16.

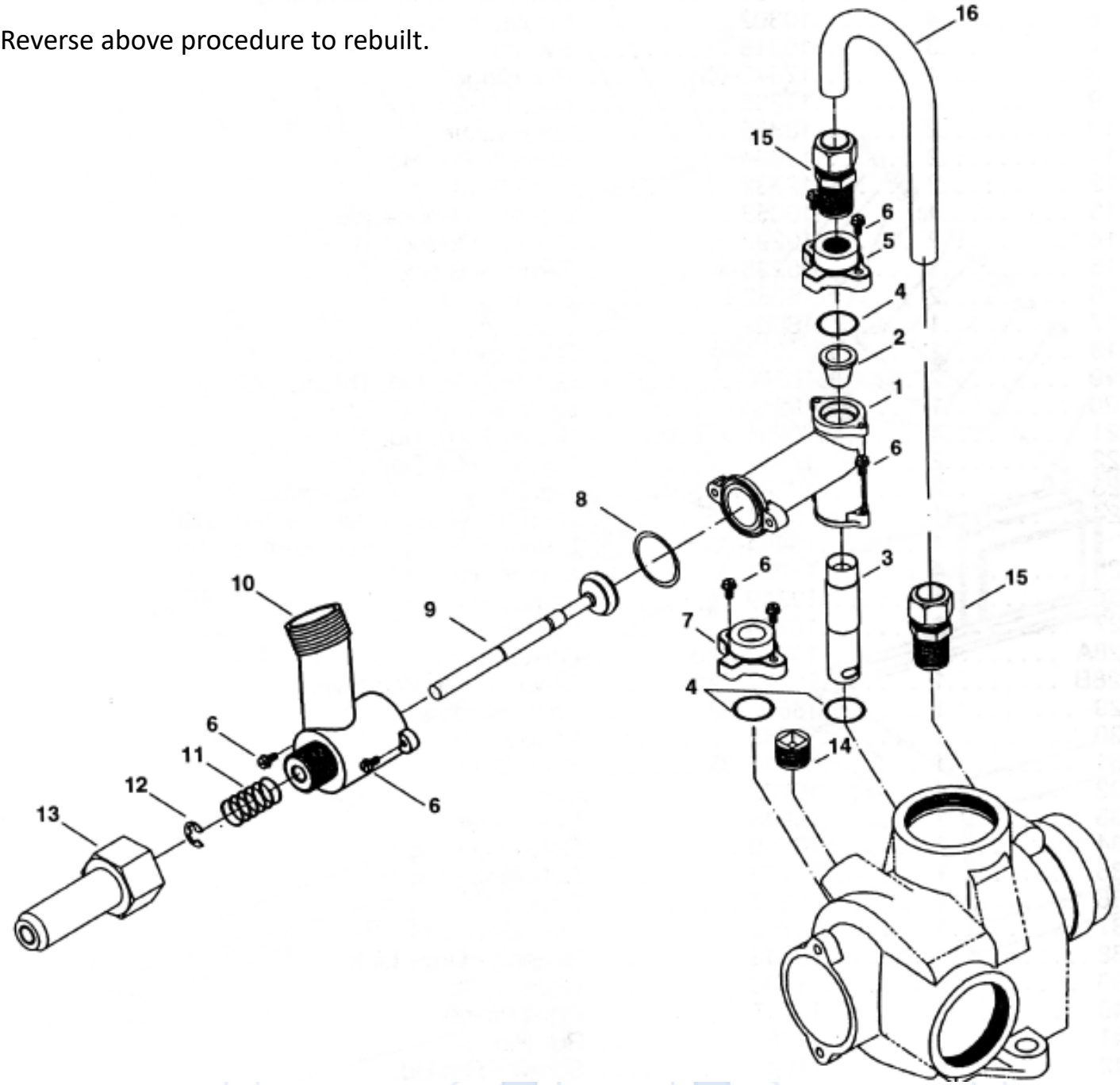
-To remove the injector body #6, the screws holding the injector assembly on are removed from the main valve body and the brine valve #10)

-The injectors can now be cleaned or replaced as required.

-The brine valve can now be removed by removing the brine valve stem guide #13.

-Lubricate all O-rings with silicone grease.

-Reverse above procedure to rebuilt.



Installing O-rings ***Section 9.4***

If any O-ring is not installed properly, there is a good chance the connection will leak. The way to install an O-ring depends upon the actual connection itself.

There are two main types of O-ring connections:

#1- Connections that do NOT have a O-ring groove on the part connections.

#2- Connections that have an actual groove for the O-ring on part connections.

When installing the O-rings on connections that do NOT have an O-ring groove (#1), the procedure is as follows:

-Inspect the O-ring for any nicks or cuts. If any are found, replace the O-ring.

-Use food grade silicone grease to lightly coat the O-ring and all surfaces the O-ring will contact (both the male & female surfaces).

-Install the O-ring on the MALE connection & ensure that the O-ring is not twisted.

-Install all other required parts and slide the connection together.

Pictured below is a diagram reflecting example #1.

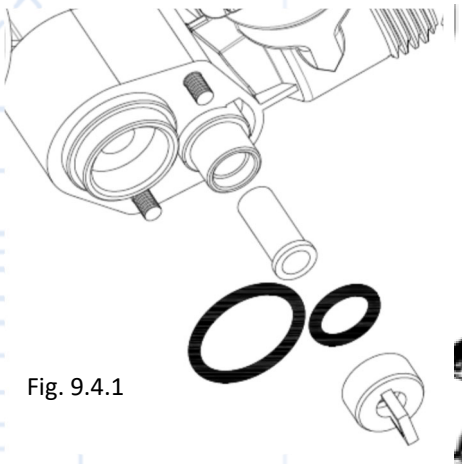
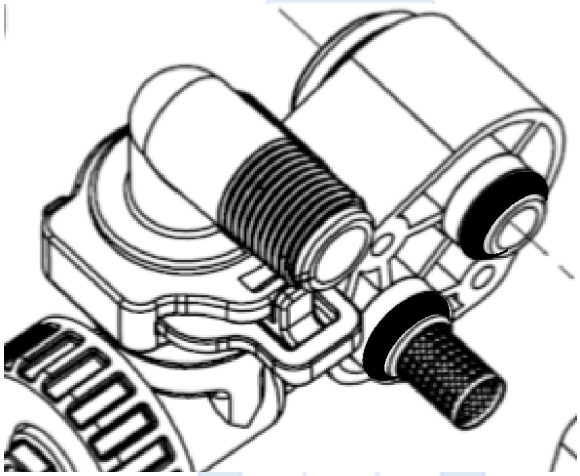


Fig. 9.4.1



O-rings installed on male connections

Pictured below and to the right is a diagram reflecting example #2.

In this situation, there is a groove designed into the connection for the O-ring to be seated into place.

Installation procedure is as follows:

-Inspect the O-ring for any nicks or cuts. If any are found, replace the O-ring.

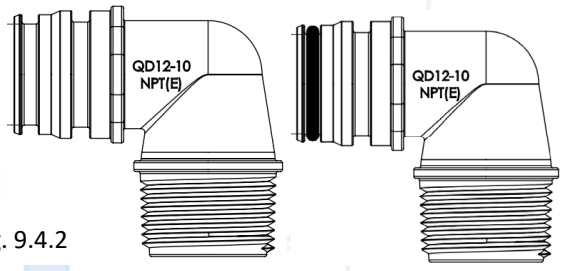


Fig. 9.4.2

-Use food grade silicone grease to lightly coat the O-ring and all surfaces O-ring will contact (both the male & female surfaces).

-Install the O-ring into the appropriate groove on the connection.

-Ensuring the O-ring is not twisted, slide the connection together.

Repair Parts

Section 10

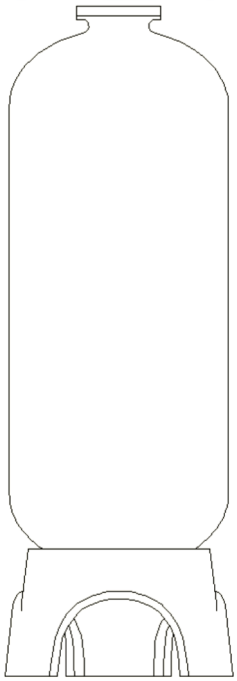


Fig. 10.1.1

Section 10.1 MINERAL TANKS	Part Number
30" Diameter x 72" 6" top & bottom flanged tripod base	25030033
36" Diameter x 72" 6" top & bottom flanged tripod base	25030043
42" Diameter x 72" 6" top & bottom flanged tripod base	25030053
48" Diameter x 72" 6" top & bottom flanged tripod base	25030063
63" Diameter x 86" 6" top & bottom flanged tripod base	25030073

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Table 10.1.1

Section 10.2 DISTRIBUTION	Part Number
30" DIAMETER TANKS	
3" Top inlet distribution	50040301
3" Bottom outlet hub & lateral distribution	50040307
36" DIAMETER TANKS	
3" Top inlet distribution	50040301
3" Bottom outlet hub & lateral distribution	50040309
3"MNPT x 2" FNPT bushing sch 80 pvc	80030961
42" DIAMTER TANKS	
3" Top inlet distribution	50040301
3" Bottom outlet hub & lateral distribution	50040311
4" Top inlet distribution	50040302
4" Bottom hub and lateral distribution	50040320
4"MNPT x 3"FNPT Adapter sch 80 (if required)	80030963
48" DIAMTER TANKS	
3" Top inlet distribution	50040301
3" Bottom outlet hub & lateral distribution	50040314
4" Top inlet distribution	50040302
4" Bottom hub and lateral distribution	50040321
63"DIAMETER TANKS	
3" Top inlet distribution	50040301
3" Bottom outlet hub & lateral distribution	50040318
4" Top inlet distribution	50040302
4" Bottom hub and lateral distribution	50040322
OR	
4" top & bottom distribution Sch 80 pvc	50040069

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Table 10.2.1

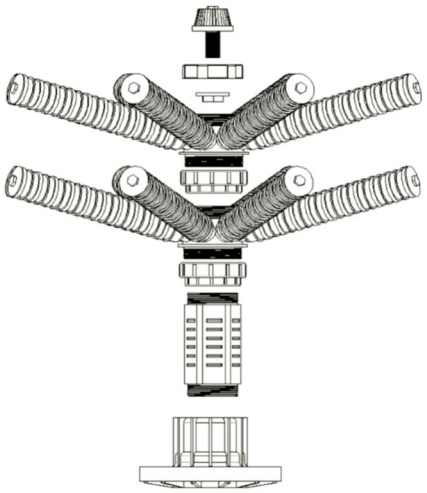

Fig. 10.2.1

Repair Parts - Valves Section 10 .3 .1

Diaphragm Valves

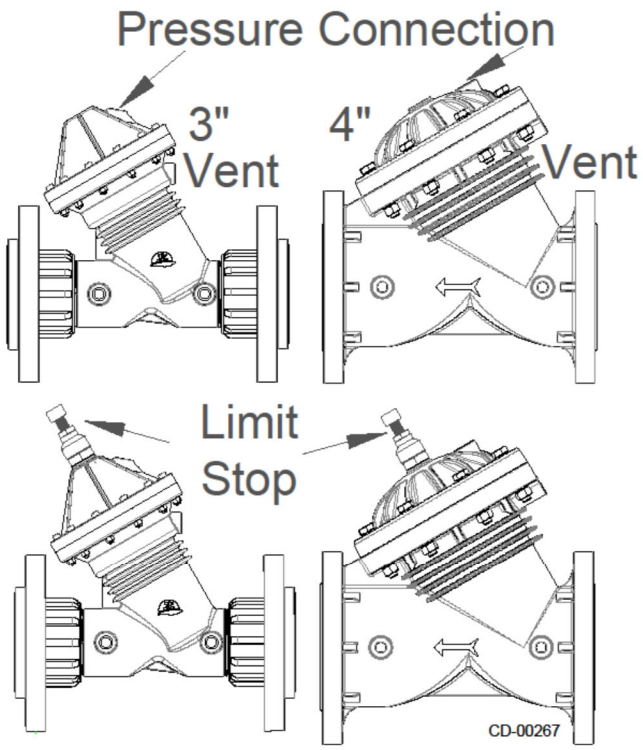

Fig. 10.3.1.1

All N/O (Normally Open) Diaphragm Valves

Section 10.3.1 DIAPHRAGM VALVES (noryl)	Part Number
2" / 1.5" N/O (normally open) diaphragm valve - no end connectors	24555471
2" / 1.5" N/O diaphragm valve c/w limit stop - no end connectors	24555473
2" Union end connector kit c/w o-rings Set of 2	24555454
2" Female socket end connector kit c/w o-rings Set of 2	24555455
3" / 2.5" N/O (normally open) diaphragm valve - no end connectors	24555491
3" / 2.5" N/O diaphragm valve c/w limit stop - no end connectors	24555493
3" Flange end connector kit c/w orings Set of 2	24555459
4" Flanged N/O(normally open)diaphragm valve	24555591
4" Flanged N/O c/w limit stop diaphragm valve	24555593

Table 10.3.1.1 fhf-mvs -xlsx

Repair Parts - Regeneration Control Valve Section 10 .3.2

10.3.2 REGENERATION CONTROL VALVE 3150/F60 Common parts and assemblies		Part Number
Drawing	Discription	
Fig 10.3.2.3 #2	SVO (service valve operator)	13921
Fig 10.3.2.4	NXT Electronic timer	42466-11
Fig 10.3.2.5	NXT2 Electronic timer	62115
	NXT2 Electronic timer kit	62121-01
	Drive motor 24V	42581
Fig 10.3.2.1 #1	Piston assembly RWB **	60106-00
Fig 10.3.2.1 #1	Piston assembly NRWB **	60113-01
	*** RWB or NRWB piston assembly can be used*	
Fig 10.3.2.1 #2	Seal & spacer kit	60131
	2" Seal & spacer puller tool 2900/3150	12682
	2" Seal & spacer tool 2900/3150	12683
Fig 10.3.2.2 #1	Brine valve assembly 1800	60036-02
	Nozzle, #4 green	15128-04
	Nozzle, #5 red	15128-05
	Nozzle, #6 white	15128-06
	Nozzle, #7 blue	15128-07
	Nozzle, #8 yellow	15128-08
	Nozzle, #9 violet	15128-09
	Nozzle, #10 black	15128-10
	Throat,#4 green	15127-04
	Throat,#5 red	15127-05
	Throat,#6 white	15127-06
	Throat,#7 blue	15127-07
	Throat,#8 yellow	15127-08
	Throat,#9 violet	15127-09
	Throat,#10 black	15127-10
Fig 10.3.2.3 #1	2" MNPT DLFC Flow control housing only Holds up to four flow washers (below)	60711-01
	10 gpm flow washer	16529
	12 gpm flow washer	16735
	15 gpm flow washer	16736
	20 gpm flow washer	16528
	25 gpm flow washer	16737
	4 GPM BLFC 1"FNPTx1"MNPT flow control assembly	60710-04
	5 GPM BLFC 1"FNPTx1"MNPT flow control assembly	60710-05
	10 GPM BLFC 1"FNPTx1"MNPT flow control assembly	60710-10
Fig 10.3.2.1 #3	2" Side mount adapter for 3150 / F60	61418
	1/4" MNPT plug (for side mount adapter)	121497
Fig 10.3.2.0 #4	Seal- valve to side mount adapter 3150 / F60	15112

Table 10.3.2.1

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Repair Parts - Regeneration Control Valve Section 10 .3.2

Standard 3150/F60 Regeneration Control Valves/Kits	Section 10.3.2
Base regeneration control valve 3150	M315028
OR	
Base regeneration control valve F60	60501012
Plug,2",PVC,Sch 80 MNPT (Installs in regeneration valve outlet)	80030716
FHF 660 45/5/6 White	P436801
FHF 720 45/5/6 White	P437201
FHF 780 45/5/6 White	P437601
FHF 900 60/10/7 Blue	P438001
FHF 1020 60/10/7 Blue	P438401
FHF 1080 60/10/7 Blue	P438601
FHF 1740 95/10/8 Yellow	P439001

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Table 10.3.2.2

Repair Parts - Regeneration Control Valve Section 10 .3.2

-For complete parts breakdown see regeneration control valve manual.

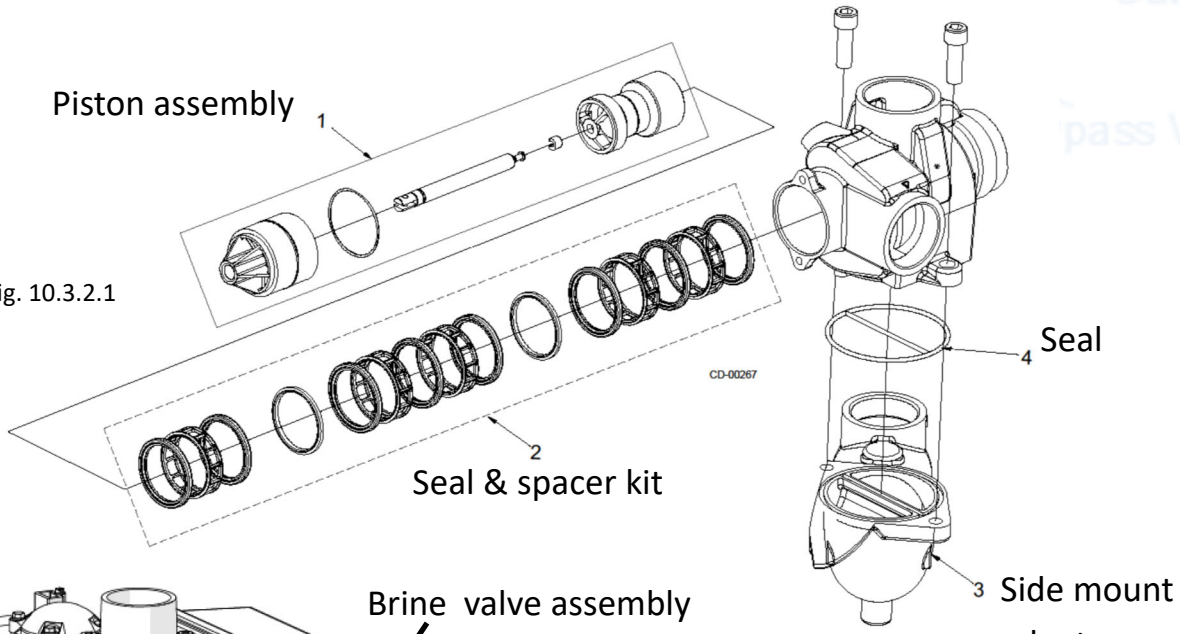

Fig. 10.3.2.1

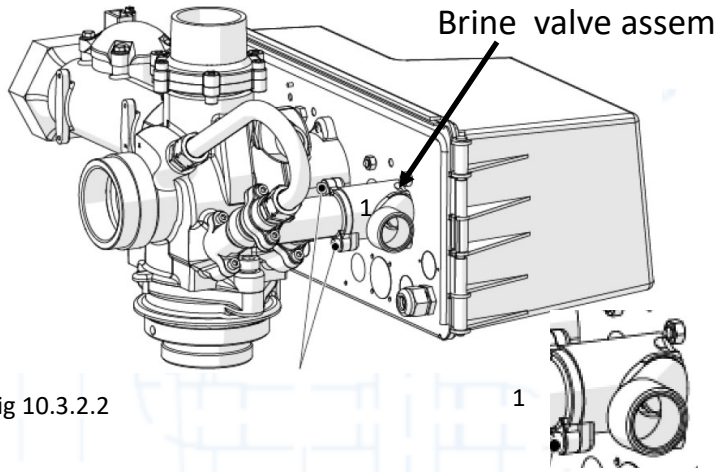

Fig 10.3.2.2

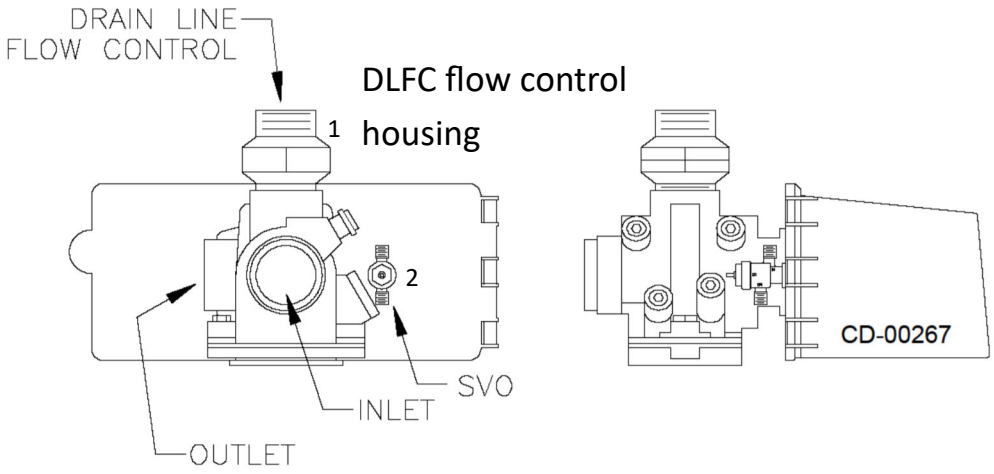

Fig 10.3.2.3

Repair Parts - Regeneration Control Valve Section 10.3.2

-Also see timer manual

NXT Circuit board

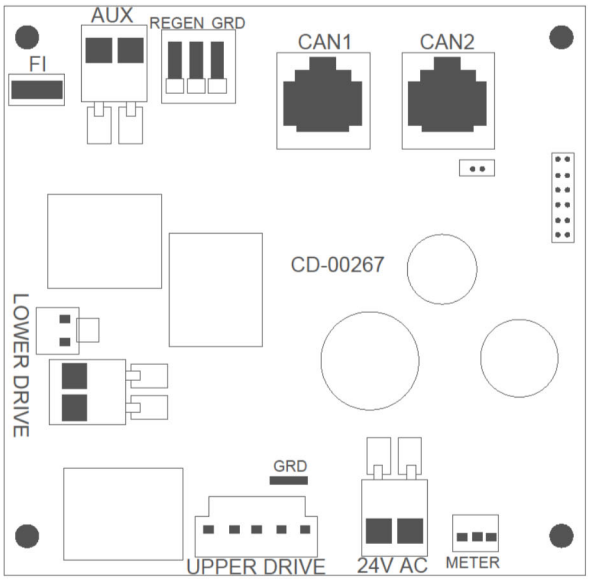

Fig. 10.3.2.4

NXT2 Circuit board

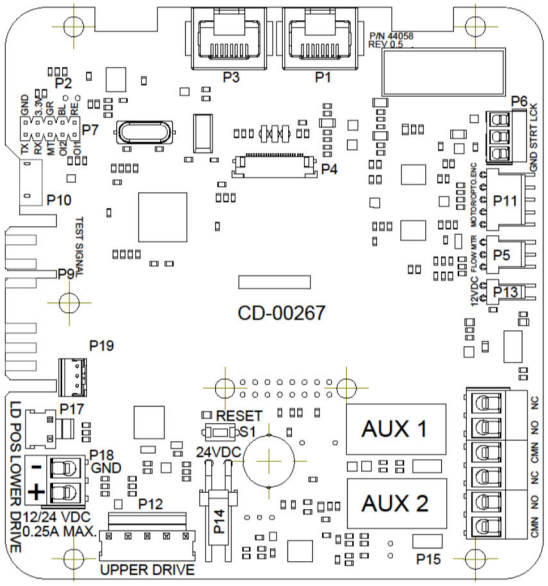

Fig. 10.3.2.5

Media Beds

Section 10.4

- Replacement media bed part numbers c/w gravel support.
- For media break down and media loading, see section 5.

Section 10.4 REPLACEMENT MEDIA BEDS					
Softener Size	Part Number	Tank Diameter	Cubic Feet Of Resin	Weight LBS	KG
360	410012	30	12	774	352
390	410013	30	13	826	375
450	410015	30	15	930	423
570	410019	36	19	1198	545
600	410020	36	20	1250	568
660	410022	42	22	1704	775
720	410024	42	24	1808	822
780	410026	42	26	1912	869
900	410030	48	30	2220	1009
1020	410034	48	34	2428	1104
1080	410036	48	36	2532	1151
1740	410058	63	58	5356	2435

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Table 10.4.1

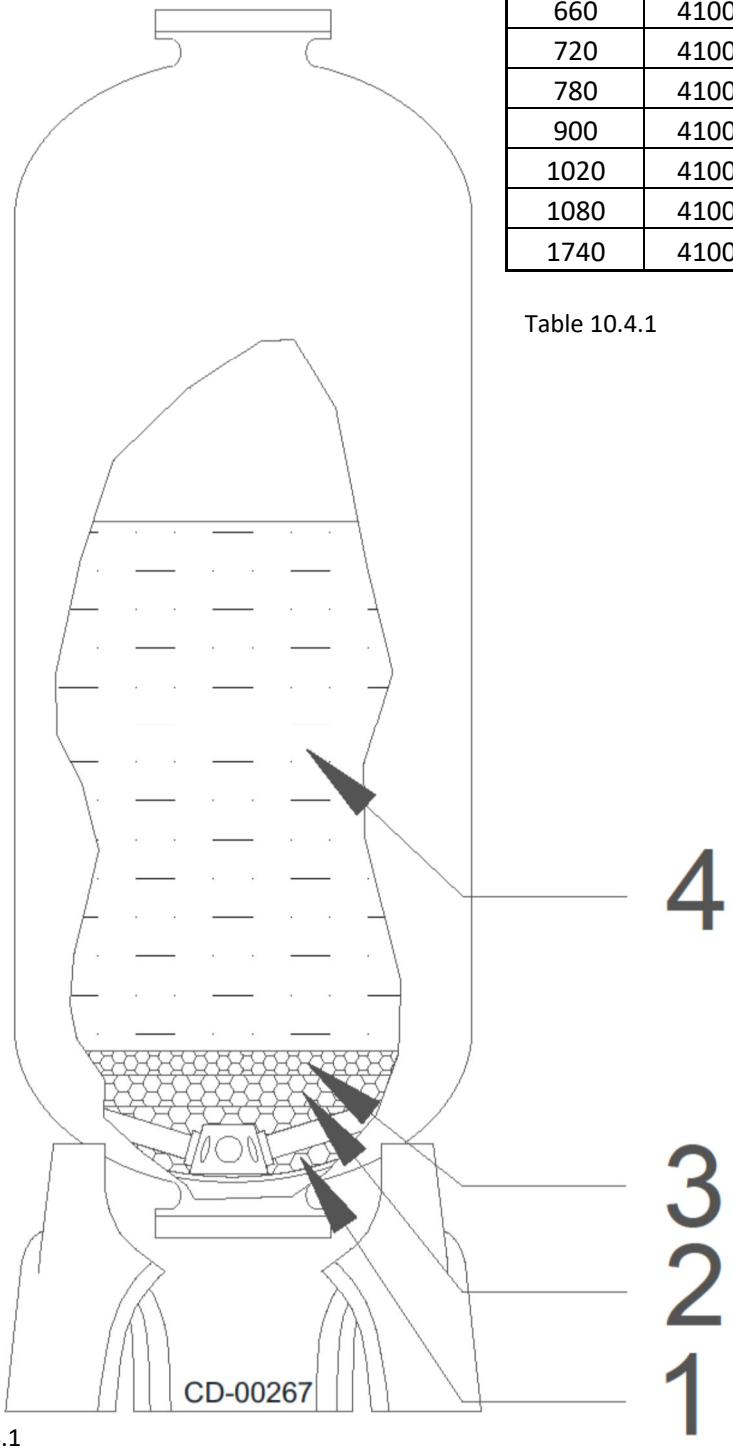

Fig. 10.4.1

Repair Parts - Manifold Section 10 .5 .1

3” - 3150/ F60 Manifold

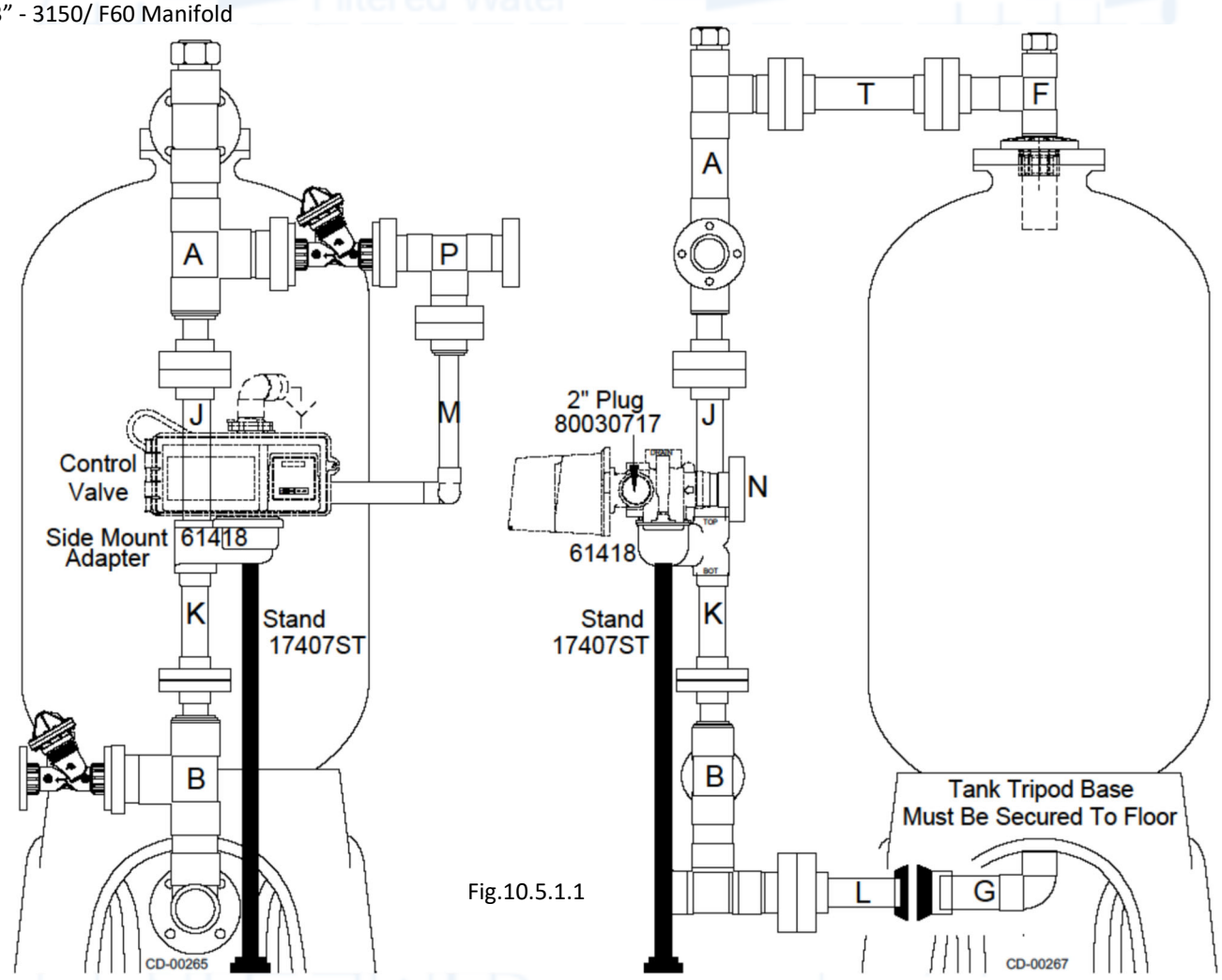

Fig.10.5.1.1

Section 10.5.1	3" / 3150/F60 Manifold	
17407ST	Stand,Side Mount 1" pipe	for 61415 &17407 adapter
24550020J	Piping,FHF,Top2"fng-2"M	Top 2"fng-2"MNPT 3150
24550020K	Piping,FHF2"flg to2"MNPT	Adjustable Not Glued
24550020N	Piping,FHF,2"flgto2"mnpt	2"mnpt 2815-3150
24550030A	Piping,FHF,Top Front	3"flg-2"flg
24550030B	Piping,FHF,Lower,Front3"	flg-2"flg
24550030F	Piping,FHF/MVS Tank Top	Top Tee 3" NPT
24550030G	Piping,FHF/MVSTankLower	Lower 90,3"MUnion-3NPT
24550030L	Piping,FHF/MVS,Lower3"	3"Flg-3"FUnion-not glued
24550030M	Piping,FHF,3"to 2"inlet	3"to 2" inlet 3150
24550030P	Piping,FHF,3"flgTeeAssy	
24550030T	Piping,FHF/MVS,Top 3"Fl	Top3"Flg-3"Flg-not glued
61418	ADAPTER,3150SIDEMNT,VERT	PIPE CONNECTION UP&DOWN
80030716	Plug,2",PVC,Sch 80 MNPT	fhf-mvs -xlsx

Table 10.5.1.1

Repair Parts - Manifold Section 10 .5

4” - 3150/ F60 Manifold

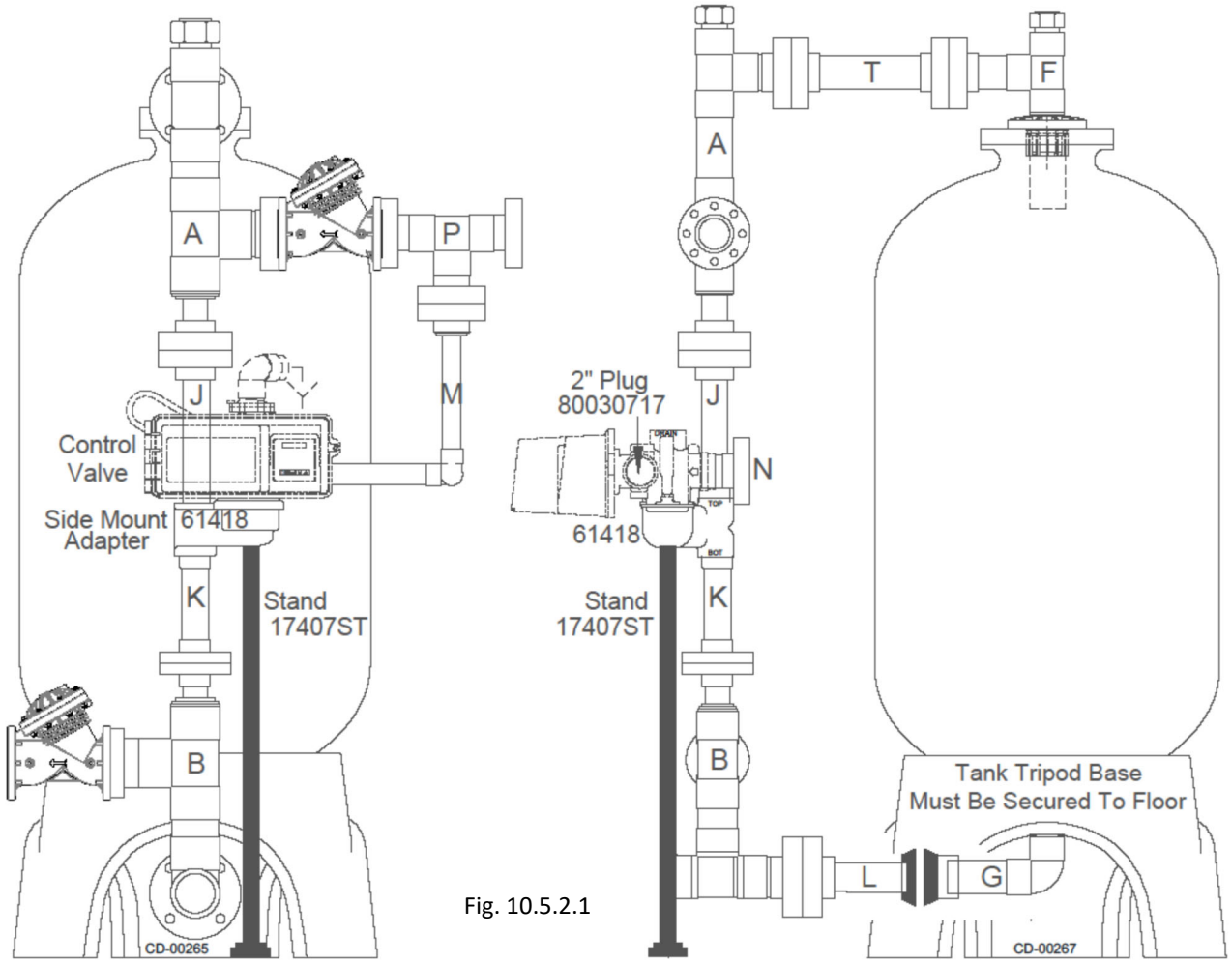

Fig. 10.5.2.1

Section 10.5.2	4"/3150 / F60	
17407ST	Stand,Side Mount 1" pipe	for 61415 &17407 adapter
24550020J	Piping,FHF,Top2"fng-2"M	Top 2"fng-2"MNPT 3150
24550020K	Piping,FHF2"flg to2"MNPT	Adjustable Not Glued
24550020N	Piping,FHF,2"flgto2"mnpt	2"mnpt 2815-3150
24550040A	Piping,FHF,Top Front,4"	flg-2"flg
24550040B	Piping,FHF,Lower,Front4"	flg-2"
24550040F	Piping,FHF/MVS Tank Top	Top Tee 4" NPT
24550040G	Piping,FHF/MVSTankLower	Lower 90,4"MUnion-4NPT
24550040L	Piping,FHF/MVS,Lower4"	4"Flg-4"FUnion-not glued
24550040M	Piping,FHF,4"to 2"inlet	4"to 2" inlet 3150
24550040P	Piping,FHF,4"flgTeeAssy	
24550040T	Piping,FHF/MVS,Top 4"Flg	Top4"Flg-4"Flg-not glued
61418	ADAPTER,3150SIDEMNT,VERT	PIPE CONNECTION UP&DOWN
80030716	Plug,2",PVC,Sch 80 MNPT	fhf-mvs -xlsx

Table 10.5.2.1

Repair Parts - Misc. Section 10 .6

FHF Series	Section 10.6 Misc.
Description	Part Number
Meter Cable 100" Electronic	19791-04
Meter,Module,3"Electonic SS	61935-10
Valve, Vacuum, 1 1/2" MNPT (PVC)	310527
Kit, Solenoid, Single, Three Way 24V c/w Tubing	P410394-24
Three Way 24V Solenoid Only	80308-24
Tubing, 3/8" Natural (500' Roll)	PE-12-EI-0500F-N
Connector, 3/8" tube x 1/8"NPT (Male)	PI011221S
Elbow, 3/8" Tube x 1/4"NPT (Male)	PI481222S
Union, Reducing ,3/8-1/4	pi201208s

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Table 10.6.1

FHF 660 to 1740 3150 - 3"	**Part Number**	**Quantity**
Bolt,Hex HD,5/8" x 3.5" zp	110631	44
Nut,Hex,5/8"-11 zp	115050	44
Washer,5/8" zp	116036	88
Washer, Lock,5/8" zp	116084	44
Gasket,Flange,2" RS2-2	80030738	3
Gasket,Flange,3" RS2-3	80030938	7
FHF 660 to 1740 3150 - 4"		
Bolt,Hex HD,5/8" x 3.5" zp	110631	72
Nut,Hex,5/8"-11 zp	115050	72
Washer,5/8" zp	116036	144
Washer, Lock,5/8" zp	116084	72
Gasket,Flange,2" RS2-2	80030738	3
Gasket,Flange,4" RS2-4	80030934	7

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Table 10.6.2

Repair Parts - Misc. Section 10 .6

Kit,Tubing, Only for FHF w/o SVO - Solenoid Fig. 10.6.1		#60021437	
Item	Description	Part #	Total Quan-tity
A	Tee,Union,3/8" QC	PP0212W	2
B	Conenctor,3/8" QC x 1/4" MNPT	PP011222W	1
C	Reducer, 3/8" Stem x 1/4" QC	PP221208W	1
D	Connector, 1/4" QC x 1/4"MNPT	PP010822W	1
E	Connector, 3/8" QC x 1/4" FNPT	PP451222W	2
F	Adapter, Stem 3/8" x 1/4" MNPT	PP051222W	2
G	Elbow, 3/8" AC x 1/4" MNPT	PP481222W	1
H	Elbow,Union 3/8" QC	PP0312W	2
J	Elbow, 1/4" QC x 1/4"MNPT	PP480822W	2
*	Clip, Lock 3/8"	PIC1812R	12
+	Clip, Lock 1/4"	PIC1808R	4
	Tubing, 3/8" Natural	PE-12-EI-0500F-N	0.03-15'
	Tubing, 1/4" Natural	PE-08-BI-0500F-N	0.044-22'
			CD-00271
	Solenoid, 3 Way 24VAC	80308-24	1
	3150 SVO Assy c/w inserts, sleeves & nuts	13921	1
	Insert 3/8"	10332	
	Sleeve 3/8" Delrin	10330	
	Nut	10329	
Table 10.6.3		fhf-mvs.xlsx	CD-00271

Repair Parts - Misc. Section 10 .6

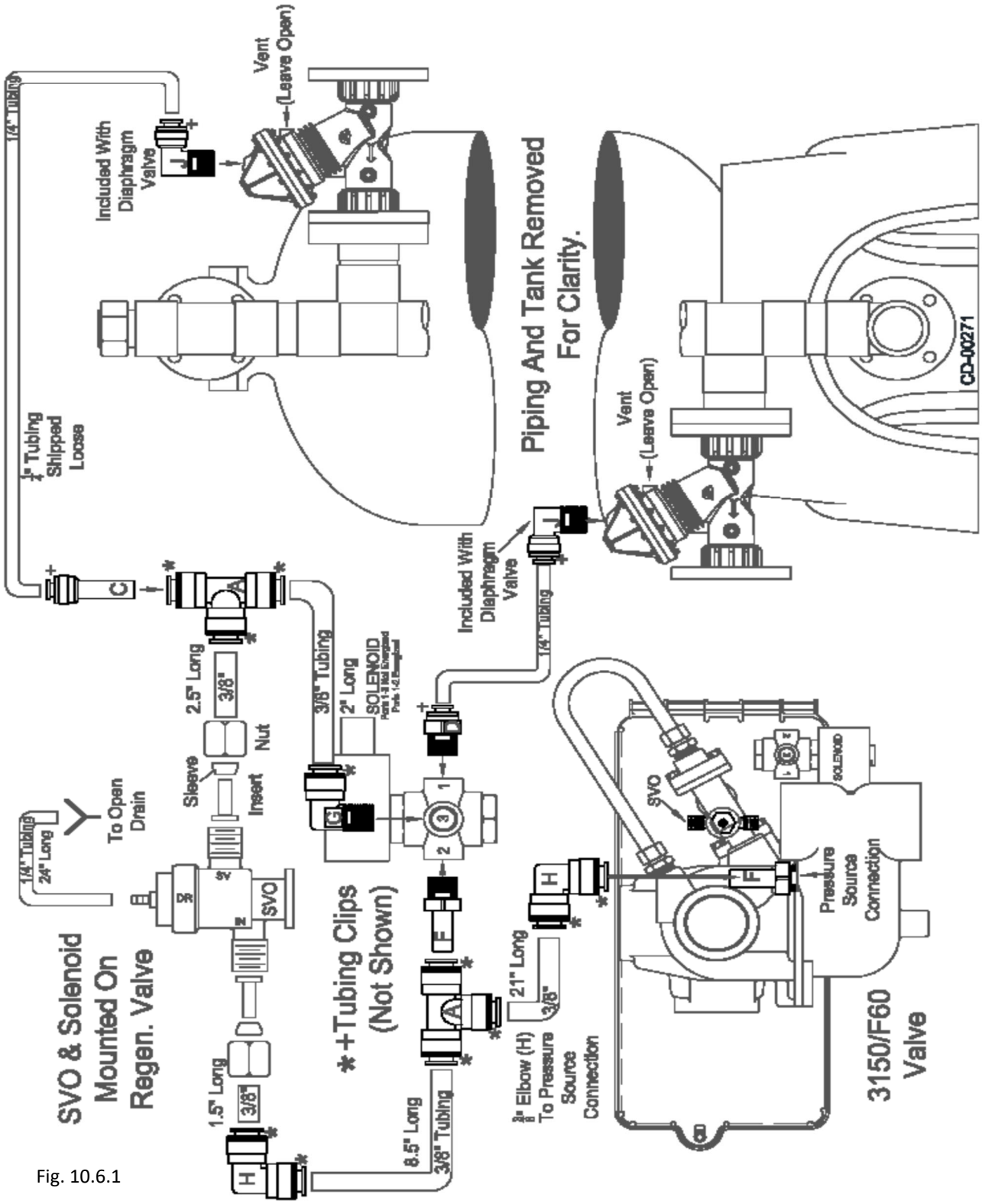

Fig. 10.6.1

Repair Parts Section 10.7

Brine Tank Assemblies

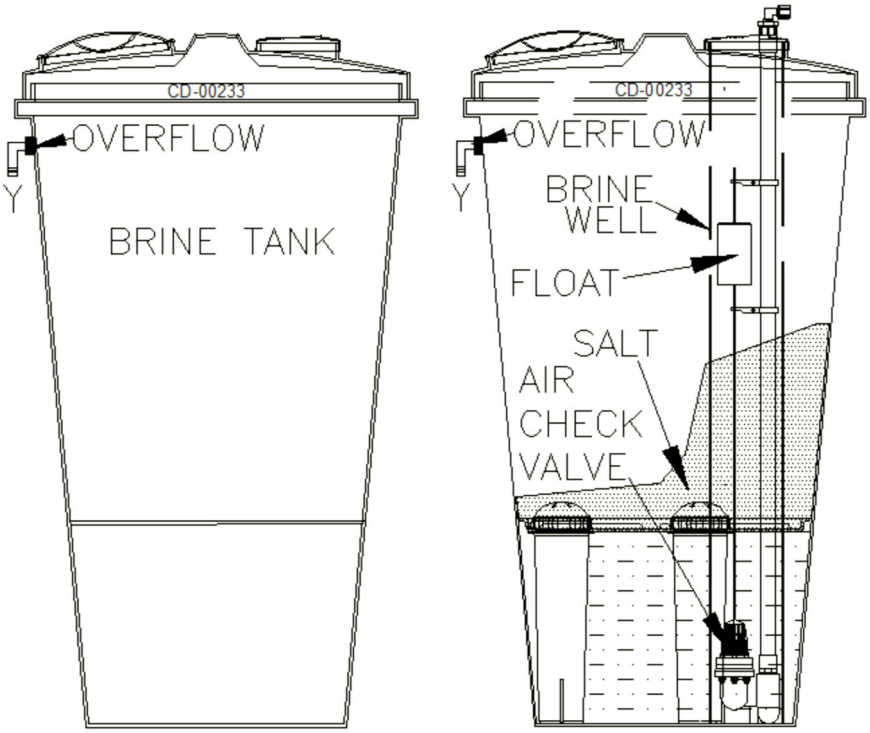

Fig. 10.7.1

Brine Tank Assemblies	
Brine tank assembly for FHF 360	P410412
Brine tank assembly for FHF 390	P410413
Brine tank assembly for FHF 450	P410415
Brine tank assembly for FHF 510	P410417
Brine tank assembly for FHF 570	P410418
Brine tank assembly for FHF 600	P410419
Brine tank assembly for FHF 630	P410420
Brine tank assembly for FHF 660	P410421
Brine tank assembly for FHF 720	P410422
Brine tank assembly for FHF 780	P410424
Brine tank assembly for FHF 900	P410430
Brine tank assembly for FHF 1020	P410434
Brine tank assembly for FHF 1080	P410436
Brine tank assembly for FHF 1740	P410456
Safety float assembly	30100007

Table 10.7.1

1. Unit fails to initiate a regeneration cycle.	A. No power supply. B. Meter cable defective or not inserted or meter stuck C. Defective circuit board.	A.Check electrical service, fuse, etc. B.Check and replace the impeller or the meter cable. C.Replace the circuit board.
2. Outlet water is untreated.	A. By-pass valve open. B. Leak between valve and central tube. C. Internal valve leak.	A. Close by-pass valve B. Check if central tube is cracked or O-ring is damaged. Replace faulty parts. C. Replace seals, spacers and piston assembly.
3. High pressure drop.	A. Iron or scale build up in raw water feed line. B. Unit not regenerating properly. C. Unit not regenerating frequent enough	A. Clean piping B. Check backwash flowrate to ensure unit backwashing at the correct rate. Check DLFC & measure flowrate. C. Increase regeneration frequency.
4. Media in the drain / drain line	A. Air in the system. B. Incorrect drain line flow control.	A. Check system for proper air release. B. Check for proper DFLC button.
5. Media in the service line.	A. Distribution tube not plugged when loading media. B. Broken or cracked internal distribution.	A. Clean or replace distribution. B. Replace distribution
6. Valve motor runs continuously.	A. Microswitch faulty. B. Defective circuit board.	A. Replace microswitch. B. Replace circuit board.
7. Water running to drain when in service.	A. Foreign matter in valve head . B. Internal leak. C. Drive gear of power head got stuck D. Defective circuit board	A. Remove piston assembly & remove foreign material. B. Replace seals, spacers and piston assembly. C. Check, clean or replace the drive gear assembly. D. Replace circuit board.

105 modified-troubleshooting.xlsx.

Commercial Softener & Filter Unit Warranty

Products manufactured by Canature WaterGroup™ are warranted to be free from defects in materials and workmanship where properly installed, operated and maintained. The length of the product warranties vary as per below

WARRANTY TABLE FOR ASSEMBLED UNITS

Fiberglass tanks 14”-63” in diameter or larger	**5Years****
Control Valves & Electronics	**5 Years***
Diaphragm Valves, Meters & Electric Ball Valves	**1 Year**
Brine Tanks And Internal Assemblies	**1 Year***
Media	**Limited to warranty provided by original manufacturer**
Vinylester / Hot Water Application* Max Temp 150F	**1 Year**
Steel Tanks (epoxy lined)	**1Year**
All other components +	**1 Year *****
***** Components not manufactured by Canature Watergroup are limited to the warranty given by the manufacturer of the component**	

*** Warranty on Control Valve and Parts**

Canature WaterGroup™ will replace any part (except for Wear and Tear Items – Media, Piston, Seals and Brine Valve) which fails within the time period specified in the chart above from date of manufacture, as indicated by the serial number, provided the failure is due to a defect in material or workmanship. The only exception shall be when proof of purchase or installation is provided and then the warranty period shall be from the date thereof.

****Warranty on Mineral Tanks and Brine Tanks:**

Canature WaterGroup™ will provide a replacement mineral tank or brine tank to any original equipment purchaser in possession of a tank that fails within the time outline in the chart above, provided that the system is at all times operated in accordance with specifications and not subject to freezing or vacuum.

**On fiberglass tanks 24" diameter or larger, due to slight expansion and contraction of the tanks, flexible connectors must have been properly installed between the tank openings and rigid piping. Also a vacuum breaker(s) must have been properly installed to protect the tank from vacuum under all conditions. Failure to install flex connectors and/or vacuum breaker(s), or improper installation the tank warranty will be void.

In addition, if the fiberglass tank has a tripod base, it must have been properly and securely attached to the floor. If not done or improperly installed, the tank warranty will be void.

General Provisions:

Damage to any part of this commercial system as a result of misuse, misapplication, neglect, alteration, accident, installation or operation contrary to our printed instructions, damage to ion exchange resin and seals caused by chlorine / chloramines in the water supply, damage to internal pistons and seals caused by wear and tear from iron, manganese, sediment and or silt, or damage caused by any force of nature is not covered in this warranty. We will repair or replace defective parts if our warranty department determines it to be defective under the terms of this warranty. Canature WaterGroup™ assumes no responsibility for consequential damage, labor or expense incurred as a result of a defect or failure. Media and Resin coverage is limited to the warranty provided by the original manufacturer.

Return of Goods:

An authorization number must be obtained before returning any merchandise. NOTE: All material returned to Canature WaterGroup™ must be returned freight prepaid. Upon inspection, if our warranty department determines the goods to be defective under the terms of this warranty, the warranty shall be limited to the defective parts to be repaired, replaced, or credited at Canature WaterGroup's™ discretion. You pay only freight to return defective parts to our factory and local dealer charges, including but not limited to labor charges, travel and transportation expenses, and handling fees.

Some State & Provincial jurisdictions do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. Similarly, some State & Provincial jurisdictions do not allow exclusion of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights, which vary from jurisdiction to jurisdiction. Consult your authorized Dealer for warranty and service information.