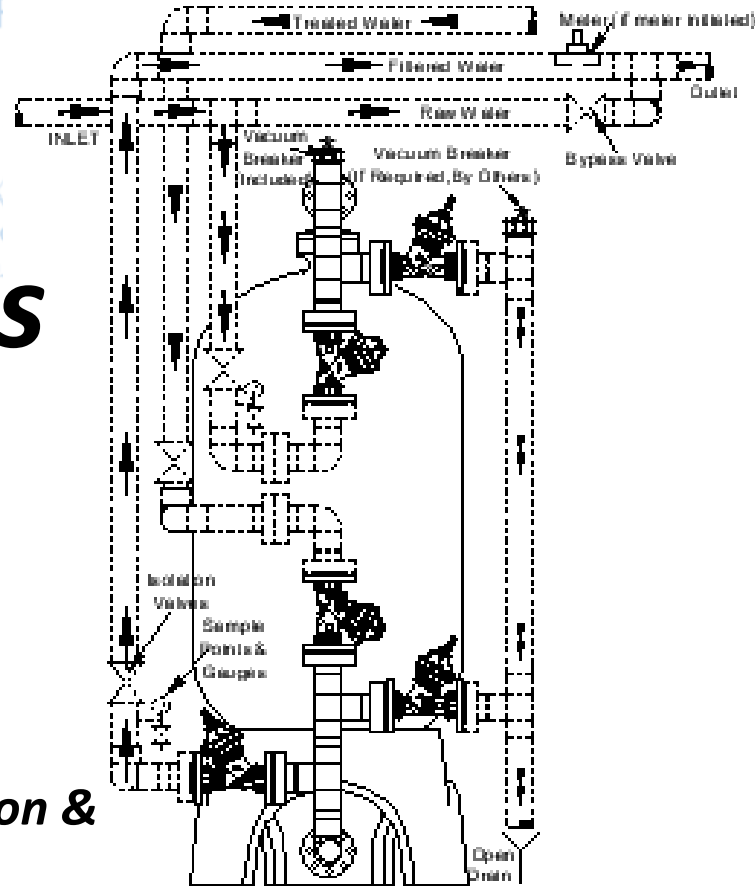




MVS Series Filters

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.

SAFETY GUIDES

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

Before you begin installation, read this entire manual. Then, obtain all the materials and tools you will need to make the installation.

Check local plumbing and electrical codes. The installation must conform to them.

Use only lead-free solder and flux for all sweat-solder connections, as required by state and federal codes.

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

Avoid installing in direct sunlight. **Excessive sun heat may cause distortion or other damage to non-metallic parts.**

The system requires a minimum water pressure of 30 psi at the inlet. **MAXIMUM ALLOWABLE Inlet water pressure is 100 psi.** If daytime pressure is over 80 psi, nighttime pressure may exceed the maximum. Use a pressure reducing valve if necessary. (Adding a pressure reducing valve may reduce the flow.)

The system works 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 or after the system.

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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, flexible connections, etc., are not included.

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

	Single Unit	Duplex System	Triplex System	Quadplex 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	5	10	15	20
Media Beds (See section 5)	1	2	3	4
Stager Controller	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
Additional Items For Different Filter Types				
Greensand Filters				
Standard chemical feed system includes one chemical pump and chemical tank.				
Chem Free Filters				
One standard hydrocharger bank per system (Optional for birm filters)				
Chem Free / Birm Filters Air Release Valve	1	2	3	4
See section 10 inless otherwise noted for more details.				fhh-mvs-sec1.xlsx

Table 1.2.1

Section 1.3

Standard Components

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

Stager controller

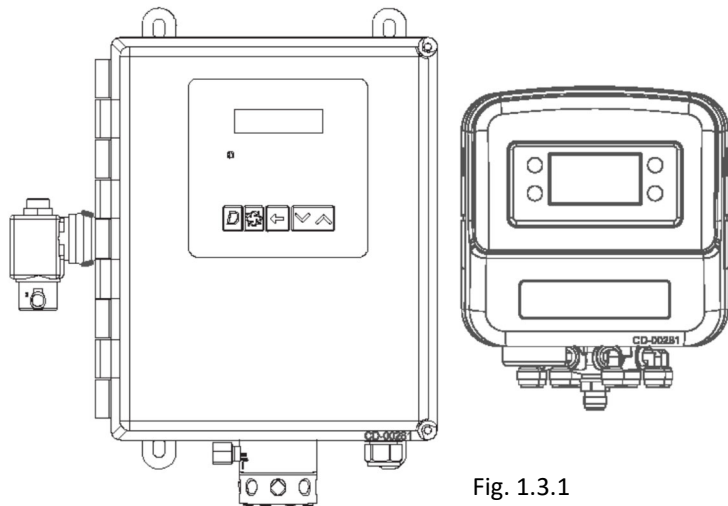


Fig. 1.3.1

Diaphragm valves

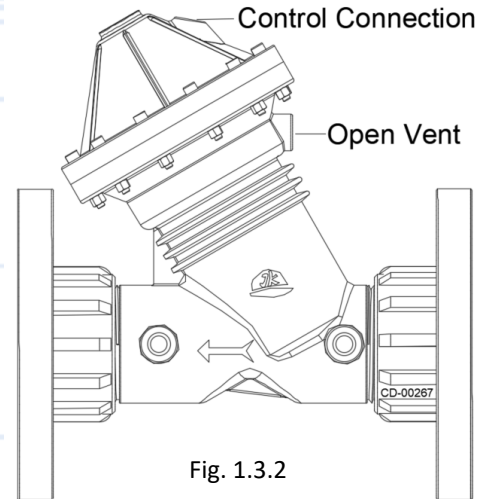


Fig. 1.3.2

Mineral tank & distribution

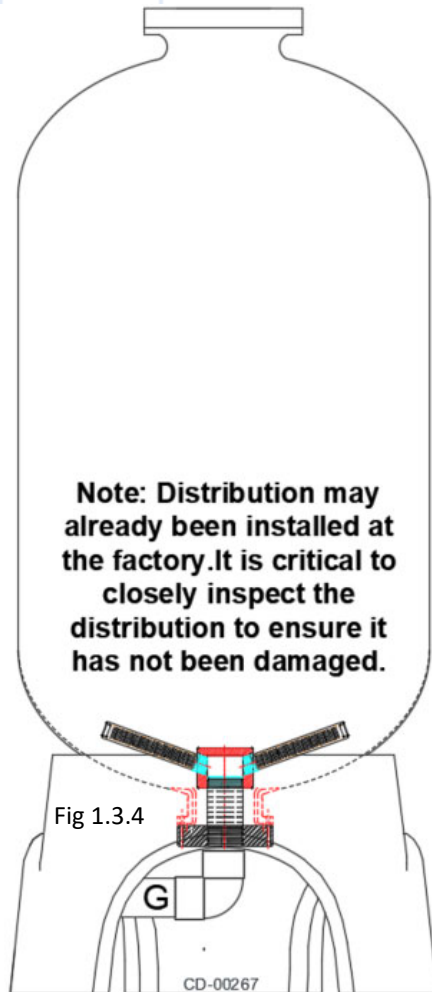


Fig 1.3.4

Tripod base to be secured to floor.

PVC filter manifold (see table 1.3.1)

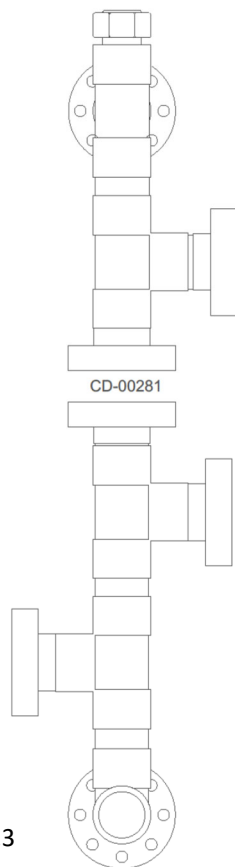


Fig 1.3.3

Standard Components

Manifold Assembly

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

Some items may already be installed on the tank.

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

Manifold Assembly	Label
FMVS Top Front	D
FMVS Lower Front	E
FMVS Tank Top Tee	F
	G
FMVS Tank Lower Elbow (May be installed on tank)	
FMVS Lower Pipe With Union	L
FMVS Top Pipe With Flanges	T
See section 10 for more details	
Table 1.3.1	fhf-mvs-sec1.xlsx

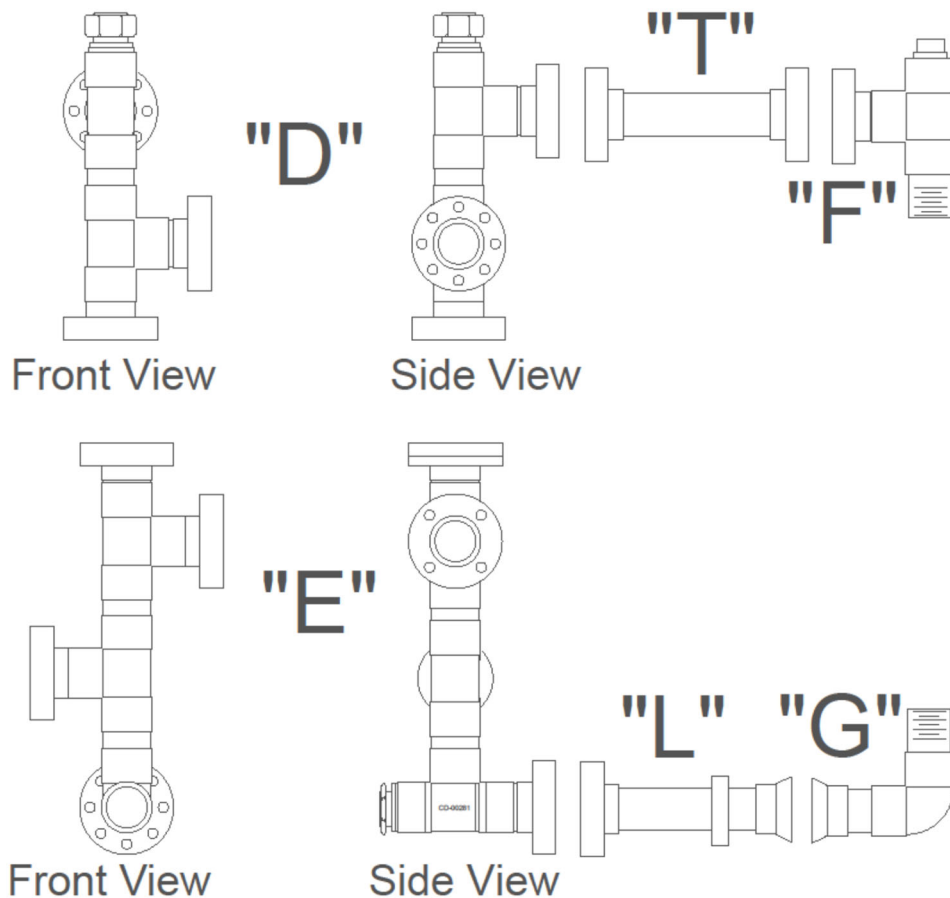


Fig 1.3.5

Standard Components

Section 1.3

-For a manganese greensand filter system, one basic chemical pump and tank are included as standard. Typical units shown below (fig 1.3.6).

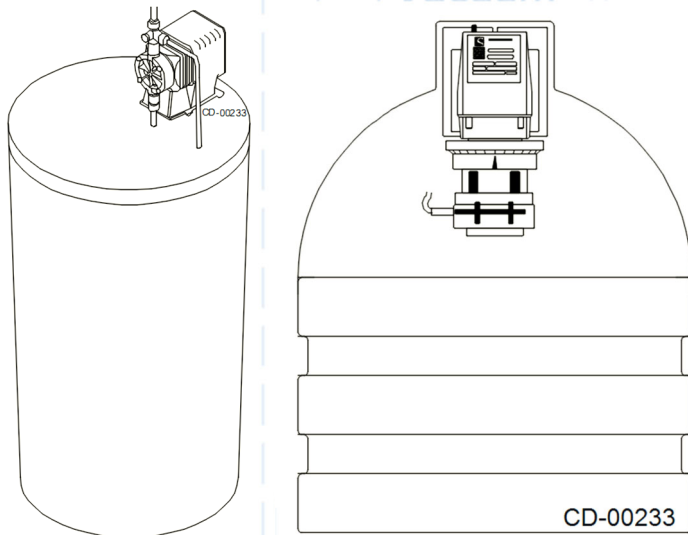


Fig 1.3.6

For a chem free filter system, one hydro-charger assembly (fig 1.3.7) is included. These are optional on birm systems Also included with both chem free and birm filters is an air release valve (fig. 1.3.8) to be installed on tank top tee. Typical units shown below.

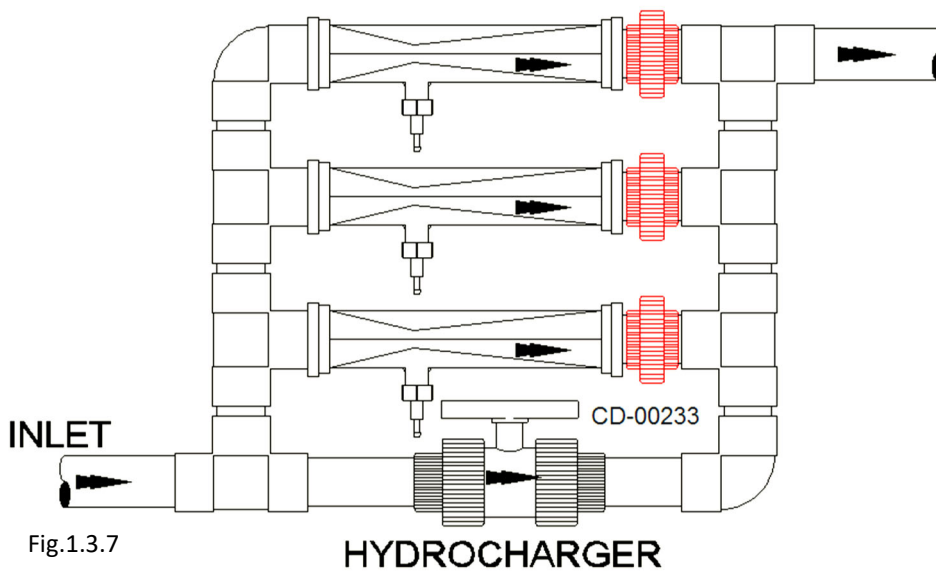


Fig.1.3.7

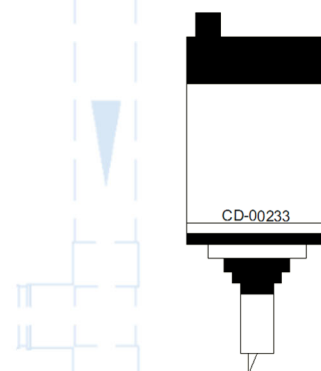


Fig.1.3.8

Optional Components

-Additional vacuum breakers. These may be required to be installed on drain lines or service lines if filling an unpressurized tank. One vacuum breaker is installed in the FMVS manifold.

-Flex connectors attach to the inlet and outlet valves of the manifold to allow some tank movement if piping is rigid.

-Flow paced chemical feed systems of all capacities are available. A flow paced system may also include a contacting meter, and a PCM chemical pump controller. Another option is a calibration column (fig. 1.4.4).

Section 1.4

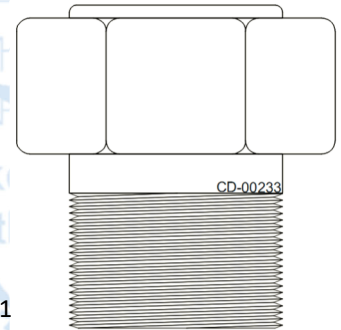


Fig. 1.4.1

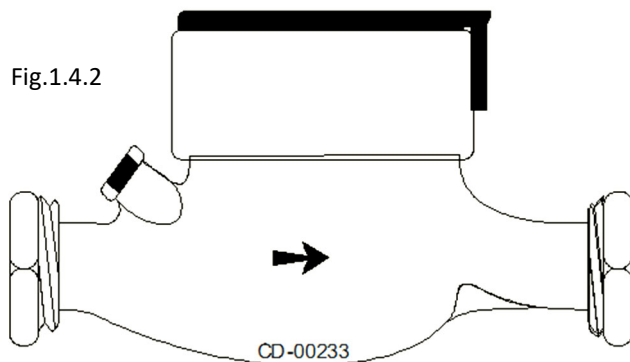


Fig.1.4.2

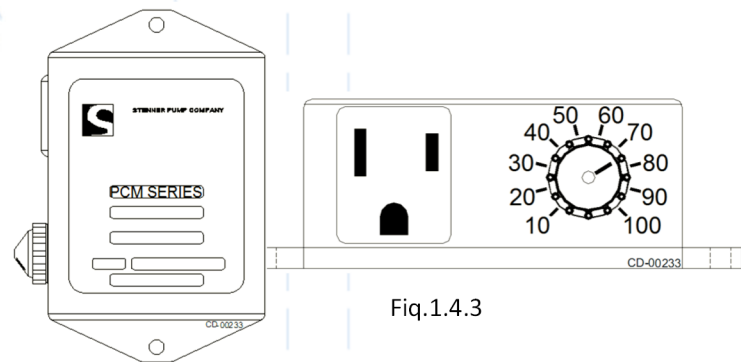


Fig.1.4.3

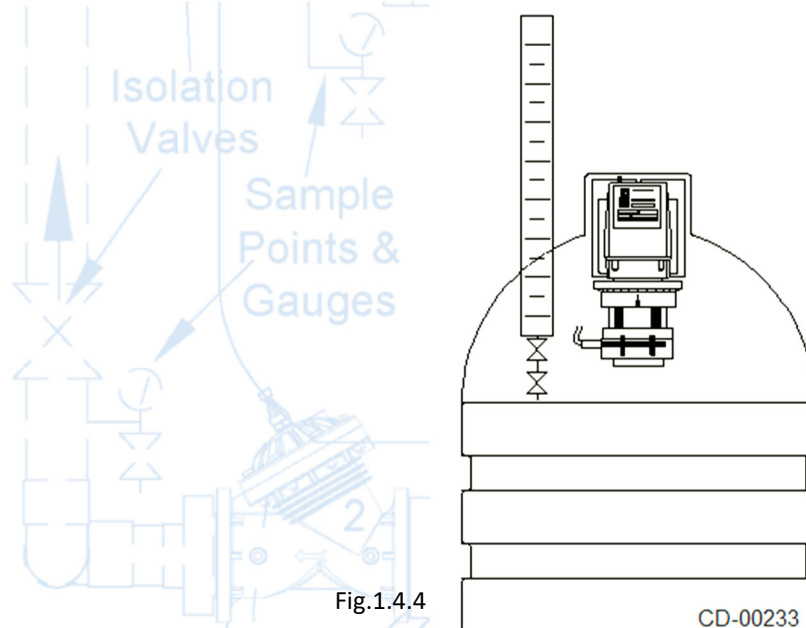


Fig.1.4.4

Specifications

Section 2.0

Unit Parameters

- Recommended system operating pressure 30 to 100 psi (2 to 6.9 bar).
- Operating temperature 35⁰ to 100⁰ F (2⁰ to 38⁰ C).
- Manifold material. Sch. 80 PVC.
- Diaphragm valve material. Plastic PPO (Noryl).
 - Maximum operating pressure 125 psi (8.6 bar).
 - 2", 3 or 4" valve pipe connections (Unit size depended).
 - Electrical rating 120 V / 60Hz input- 24V / 60Hz output.
 - Class 2 transformer.
- Electronic stager controller.
- 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).
- Internal hub and lateral distribution.
- NSF approved media.

Model Legend

Section 2.1

Model DAC 42 - 3 D C 000					
Filter Type	Tank Diameter	Valve Size	# Of Tanks	System Type	Options 3 Digits
DAC-Activated Carbon	30	2"	S-Single	C-Clock	0-Standard
DBF -Birm	36	3"	D-Duplex	4-Single MI	L-Lockout Contact
DCF -Chem Free	42	4"	T-Triplex	6-Multi-tank Series	X-Non Standard Option
DMG- Manganese Greensand	48		Q-Quadplex	Regeneration	
DMM - Multi Media	63		P-Pentaplex		
DNX - Nextsand					

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Table 2.1.1

Specifications

Section 2.2

Carbon Filters													
DAC Series Single Model	Typical	RO Pre-treat	Max Flow To Drain	PIPE SIZE		Media	Mineral Tank		Installation			Shipping Weight	Operating Weight
	Service Flow Rate			Service	Drain		Diameter	Height	Height	Depth	Width		
	USPGM	USPGM	USPGM			In						In	CF
	(L/S)	(L/S)	(L/S)	(mm)	(mm)	(M3)	(mm)	(mm)	(mm)	(mm)	(mm)	(Kg)	(Kg)
DAC 30-2"	29.0	12.0	50.0	2"	2"	12.5	30	72	104	45	36	1,200	2,800
	1.8	0.8	3.2	50	50	0.35	762	1,829	2,642	1,143	914	544	1,270
DAC 36-2"	42.0	18.0	70.0	2"	2"	17.6	36	72	105	51	42	1,600	3,600
	2.6	1.1	4.4	50	50	0.50	914	1,829	2,667	1,295	1,067	726	1,633
DAC 42-3'	58.0	28.0	95.0	3"	3"	24.0	42	72	113	65	48	2,100	5,500
	3.7	1.8	6.0	75	75	0.68	1,067	1,829	2,870	1,651	1,219	953	2,495
DAC 48-3"	75.0	37.0	125.0	3"	3"	31.0	48	72	115	71	54	2,700	7,000
	4.7	2.3	7.9	75	75	0.88	1,219	1,829	2,921	1,803	1,372	1,225	3,176
DAC 63-4"	130.0	64.0	215.0	3"	4"	54.0	63	86	118	86	69	5,000	12,200
	8.2	4.0	13.5	75	100	1.53	1,600	2,184	2,997	2,184	1,753	2,269	5,535

Typical service based on 6 usgpm/ft², RO pretreat based on 2.5 usgpm/ft²

Table 2.2.1

Multi Media Filters													
DMM Series Single Model	Typical	RO	Max Flow To Drain	PIPE SIZE		Media	Mineral Tank		Installation			Shipping Weight	Operating Weight
	Service Flow Rate			Service	Drain		Diameter	Height	Height	Depth	Width		
	USPGM	USPGM	USPGM			In						In	CF
	(L/S)	(L/S)	(L/S)	(mm)	(mm)	(M3)	(mm)	(mm)	(mm)	(mm)	(mm)	(Kg)	(Kg)
DMM 30-2"	48.0	39.0	60.0	2"	2"	12.5	30	72	104	45	36	1,800	3,400
	3.0	2.5	3.8	50	50	0.35	762	1,829	2,642	1,143	914	817	1,543
DMM 36-2"	69.0	57.0	85.0	2"	2"	17.6	36	72	105	51	42	2,500	4,500
	4.3	3.6	5.4	50	50	0.50	914	1,829	2,667	1,295	1,067	1,134	2,042
DMM 42-3"	96.0	77.0	120.0	3"	3"	24.0	42	72	113	65	48	3,400	6,800
	6.0	4.9	7.6	75	75	0.68	1,067	1,829	2,870	1,651	1,219	1,543	3,085
DMM 48-3"	126.0	100.0	160.0	3"	3"	31.0	48	72	115	71	54	4,300	8,600
	7.9	6.3	10.1	75	75	0.88	1,219	1,829	2,921	1,803	1,372	1,951	3,902
DMM 63-4"	216.0	173.0	270.0	3"	4"	54.0	63	86	118	86	69	7,900	15,100
	13.6	10.9	17.0	75	100	1.53	1,600	2,184	2,997	2,184	1,753	3,584	6,851

Service based on 10 usgpm/ft² RO based on 8 usgpm/ft²

Table 2.2.2

Next Sand Filters														
DNX Series Single Model	Typical	Peak	RO	Max Flow To Drain	PIPE SIZE		Media	Mineral Tank		Installation			Shipping Weight	Operating Weight
	Max.Recommended Flow Rates				Service	Drain		Diameter	Height	Height	Depth	Width		
	USPGM	USPGM	USPGM	USPGM			In						In	CF
	(L/S)	(L/S)	(L/S)	(L/S)	(mm)	(mm)	(M3)	(mm)	(mm)	(mm)	(mm)	(mm)	(Kg)	(Kg)
DNX 30-2"	48.0	73	39.0	60.0	2"	2"	12.5	30	72	104	45	36	1,600	3,200
	3.0	4.6	2.5	3.8	50	50	0.35	762	1,829	2,642	1,143	914	726	1,452
DNX 36-3"	69.0	105	57.0	85.0	3"	3"	17.6	36	72	105	51	42	2,100	4,100
	4.3	6.6	3.6	5.4	75	75	0.50	914	1,829	2,667	1,295	1,067	953	1,860
DNX 42-3'	96.0	144	77.0	120.0	3"	3"	24.0	42	72	113	65	48	2,800	6,200
	6.0	9.1	4.9	7.6	75	75	0.68	1,067	1,829	2,870	1,651	1,219	1,270	2,813
DNX 48-4"	126.0	188	100.0	160.0	4"	4"	31.0	48	72	115	71	54	3,578	7,878
	7.9	11.8	6.3	10.1	100	100	0.88	1,219	1,829	2,921	1,803	1,372	1,623	3,574

Typical service based on 10 usgpm/ft² Peak based on 15 usgpm/ft² Flowrates may change depending upon actual feed water quality water conditions

Backwash flowrates based on cold water. If regeneration feed water is above 45 °F, The backwash flow rate will have to be increased.

Table 2.2.3

Specifications

Section 2.2

Manganese Greensand Filters														
DMG Series Single Model	0-3 PPM	3-8 PPM	8-15 PPM	Max Flow To Drain	PIPE SIZE		Media	Mineral Tank		Installation			Shipping Weight	Operating Weight
	Max Service Flow Rate				Service	Drain		Diameter	Height	Height	Depth	Width		
	USPGM	USPGM	USPGM	USPGM	In	In	CF	In	In	In	In	In	Lbs	Lbs
	(L/S)	(L/S)	(L/S)	(L/S)	(mm)	(mm)	(M3)	(mm)	(mm)	(mm)	(mm)	(mm)	(Kg)	(Kg)
DMG 30-2"	25.0	15.0	10.0	50.0	2"	2"	12.5	30	72	104	45	36	2,000	3,600
	1.6	0.9	0.6	3.2	50	50	0.35	762	1,829	2,642	1,143	914	907	1,633
DMG 36-2"	35.0	21.0	14.0	70.0	2"	2"	17.6	36	72	105	51	42	2,600	4,600
	2.2	1.3	0.9	4.4	50	50	0.50	914	1,829	2,667	1,295	1,067	1,180	2,087
DMG 42-3'	48.0	29.0	19.0	95.0	3"	3"	24.0	42	72	113	65	65	3,400	6,800
	3.0	1.8	1.2	6.0	75	75	0.68	1,067	1,829	2,870	1,651	1,651	1,543	3,085
DMG 48-3"	63.0	38.0	25.0	125.0	3"	3"	31.0	48	72	115	71	71	4,400	8,700
	4.0	2.4	1.6	7.9	75	75	0.88	1,219	1,829	2,921	1,803	1,803	1,996	3,947
DMG 63-4"	108.0	65.0	42.0	215.0	3"	4"	54.0	63	86	118	86	86	7,900	15,100
	6.8	4.1	2.6	13.5	75	100	1.53	1,600	2,184	2,997	2,184	2,184	3,584	6,851

System has basic chemical pump for continuous feed. For varying flowrates flow pace chemical feed is required (optional)

Table 2.2.4

Chem Free Filters														
DCF Series Single Model	Service	Peak	Max Flow To Drain	PIPE SIZE		Media	Mineral Tank		Installation			Shipping Weight	Operating Weight	
	Flow Rate			Service	Drain		Diameter	Height	Height	Depth	Width			
	USPGM	USPGM	USPGM	In	In	CF	In	In	In	In	In	Lbs	Lbs	
	(L/S)	(L/S)	(L/S)	(mm)	(mm)	(M3)	(mm)	(mm)	(mm)	(mm)	(mm)	(Kg)	(Kg)	
DCF 30-2"	15	25	50	2"	2"	12.5	30	72	104	45	36	2,000	3,600	
	0.9	1.6	3.2	50	50	0.35	762	1,829	2,642	1,143	914	907	1,633	
DCF 36-2"	21	35	70	2"	2"	17.6	36	72	105	51	42	2,600	4,600	
	1.3	2.2	4.4	50	50	0.50	914	1,829	2,667	1,295	1,067	1,180	2,087	
DCF 42-3"	29	48	95	3"	3"	24.0	42	72	113	65	48	3,700	7,100	
	1.8	3.0	6.0	75	75	0.68	1,067	1,829	2,870	1,651	1,219	1,679	3,221	
DCF 48-3"	38	63	125	3"	3"	31.0	48	72	115	71	54	4,700	9,000	
	2.4	4.0	7.9	75	75	0.88	1,219	1,829	2,921	1,803	1,372	2,132	4,083	
DCF 63-4"	65	108	215	3"	4"	54.0	63	86	118	86	69	8,400	15,600	
	4.1	6.8	13.5	75	100	1.53	1,600	2,184	2,997	2,184	1,753	3,811	7,078	

Service based on 3 usgpm/h², Peak based on 5 usgpm/h². System must be designed to draw air continuously.

Table 2.2.5

Birm Filters														
DBF Series Model Single	Max Service	Max Flow	PIPE SIZE		Media	Mineral Tank		Installation			Shipping Weight	Operating Weight		
	Flow Rate	To Drain	Service	Drain		Diameter	Height	Height	Depth	Width				
	USPGM	USPGM	In	In	CF	In	In	In	In	In	Lbs	Lbs		
	(L/S)	(L/S)	(mm)	(mm)	(M3)	(mm)	(mm)	(mm)	(mm)	(mm)	(Kg)	(Kg)		
DBF 30-2"	25	50	2"	2"	12.5	30	72	104	45	36	1,400	3,000		
	1.6	3.2	50	50	0.35	762	1,829	2,642	1,143	914	635	1,361		
DBF 36-2"	35	70	2"	2"	17.6	36	72	105	51	42	1,900	3,900		
	2.2	4.4	50	50	0.50	914	1,829	2,667	1,295	1,067	862	1,770		
DBF 42-3"	48	95	3"	3"	24.0	42	72	113	65	48	2,500	5,900		
	3.0	6.0	75	75	0.68	1,067	1,829	2,870	1,651	1,219	1,134	2,677		
DBF 48-3"	63	125	3"	3"	31.0	48	72	115	71	54	3,100	7,400		
	4.0	7.9	75	75	0.88	1,219	1,829	2,921	1,803	1,372	1,407	3,358		
DBF 63-4"	108	215	3"	4"	54.0	63	86	118	86	69	5,800	13,000		
	6.8	13.5	75	100	1.53	1,600	2,184	2,997	2,184	1,753	2,632	5,898		

Service flow rate based on 5 usgpm/h² Hydrocharger (air induction) system if required sold separately.

Table 2.2.6

PLANS FOR LOCATION AND INSTALLATION DIAGRAMS OF SYSTEM**Section 3.1**

- Select the site for the installation. 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 flowrate. Units should be within 6 feet of one another for the communication cables.
- **WATER SUPPLY:** The system requires a potable water supply that will provide a continuous flow to meet 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 out 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, if desired, 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 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. All drain connections **MUST** have a proper air gap.
- **ELECTRICAL:** The system works on **24 AC volts 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.

Planning Location For Installation.

Section 3.2

MATERIALS YOU MAY NEED

- Use the drawings in section 3.3 as a guide for the materials required for the installation. The drawings show typical piping diagrams. All interconnecting piping, isolation & bypass valves, sample points / pressure gauges, etc. is not supplied with the unit.
- 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 if the piping is rigid. The standard systems do not include flex connectors but can be supplied as optional items with the system.
- A vacuum breaker is built into the FMVS manifold. If the drain line has some changes in elevation (more than 8 ft) and / or the drain goes to the floor below, etc. a vacuum breaker is advised for the drain line as well. This is not included in the standard system but is an option that can be supplied with the system.
- **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. Flex connectors and additional vacuum breakers may be required. Failure to install or improperly install them will void the warranty. See drawings.**
- Install unit isolation and system bypass valves. These valves allow you to turn off water to individual units in the system, for servicing. The full-line bypass will allow water to service if the system is taken offline for service.
- Inlet and outlet sample points and pressure gauges are required to confirm proper operation of the system.
- **Minimum inside diameter** hose or pipe is required for the conditioner valve drain. The drain should be the same size as the largest drain valve connection.
- A flow meter or other method to measure flowrate is required on the regeneration water. Diaphragm valves usually control the regeneration flowrates by adjusting the travel stops.

Typical Single Filter Piping Layout Detail.**Section 3.3**

-All filter systems are no raw water bypass during regeneration.

-Figure 3.3.1 shown shows the typical single filter unit. The filter is shown with the standard supplied manifold. All additional piping is not included.

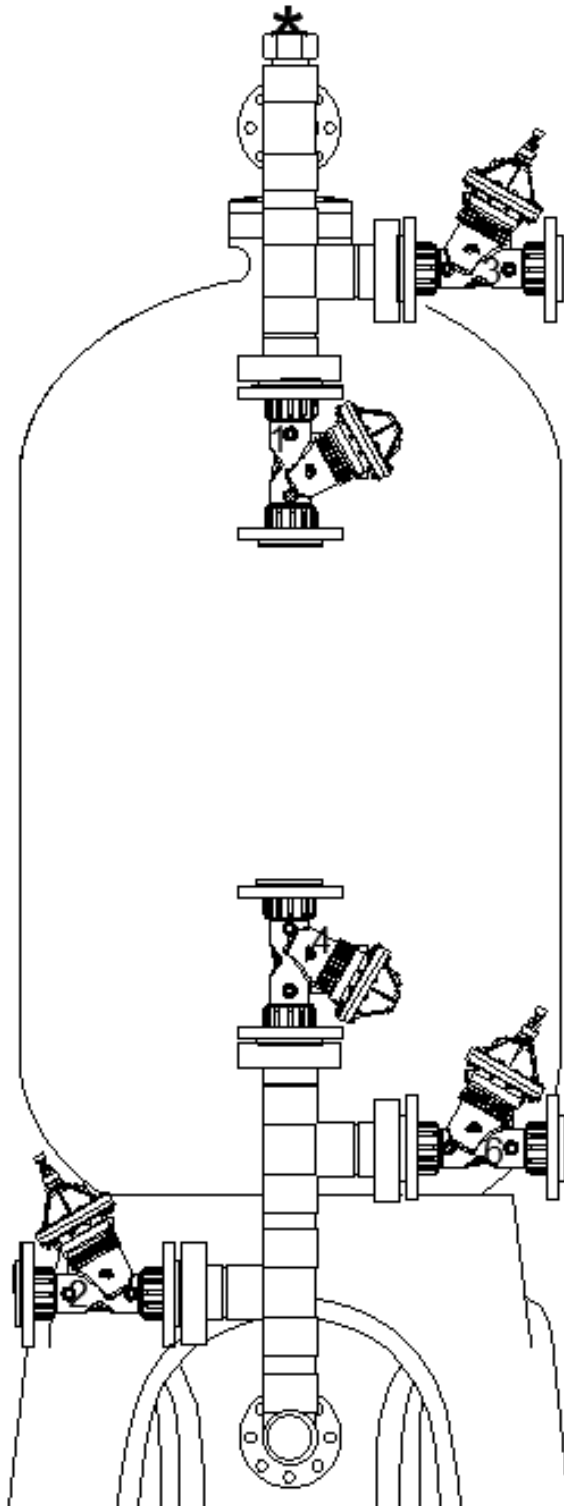


Fig. 3.3.1

ASSEMBLED FILTER WITH STANDARD SUPPLIED PVC MANIFOLD

Typical Single Filter Piping Layout Detail.

Section 3.3

-All filter systems are no raw water bypass during regeneration.

-Figure 3.3.2 shown shows the typical treated water backwash piping for a single filter unit. Please note all standard FMVS filter systems can be piped for raw water (see fig. 3.3.3) or treated water backwash simply by supplying a separate backwash water source.

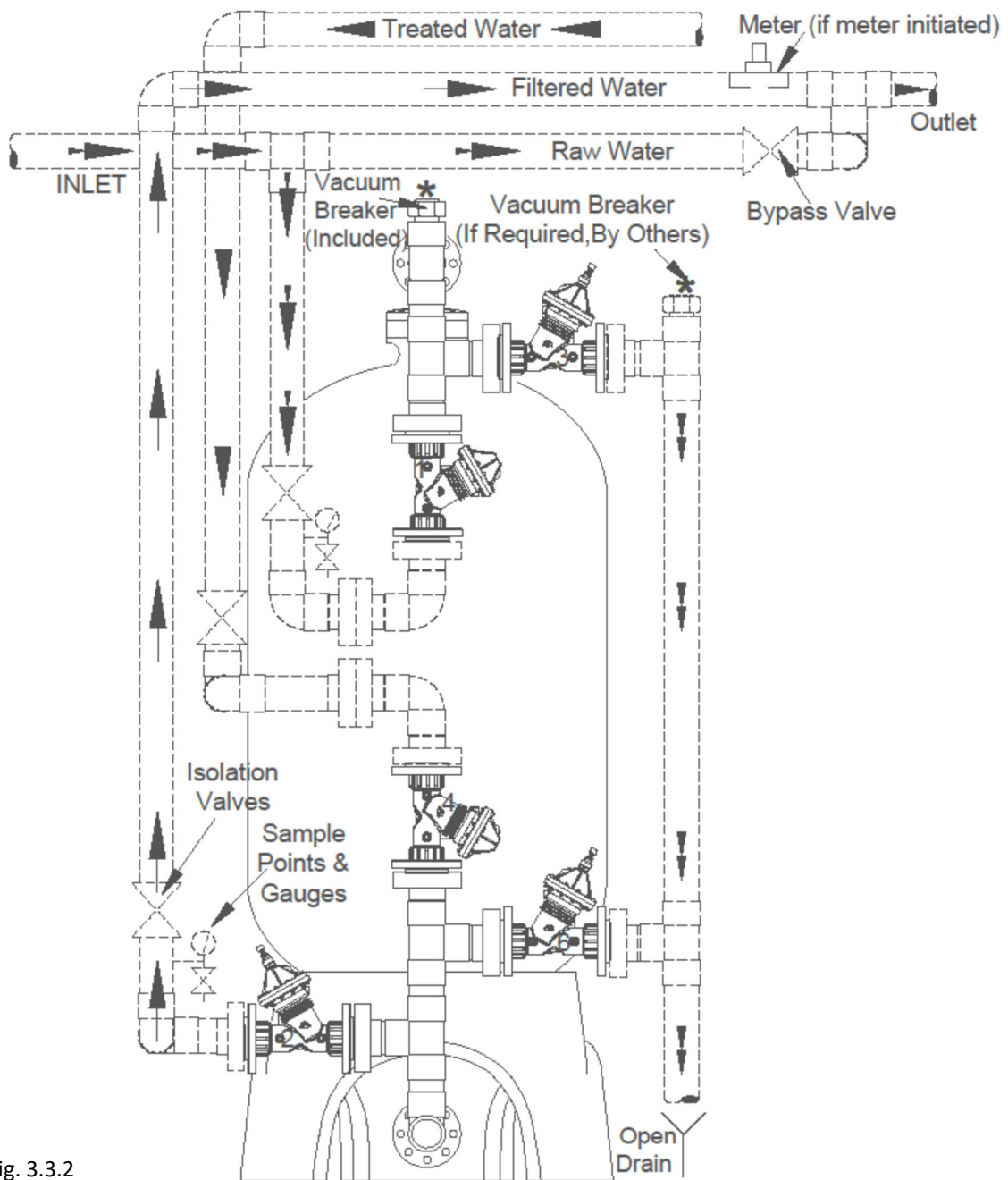


Fig. 3.3.2

TREATED BACKWASH WATER REGENERATION PIPING

Typical Single Filter Piping Layout Detail.

Section 3.3

-All filter systems are no raw water bypass during regeneration.

-Figure 3.3.3 shown shows the typical piping for a raw water regeneration single filter unit.

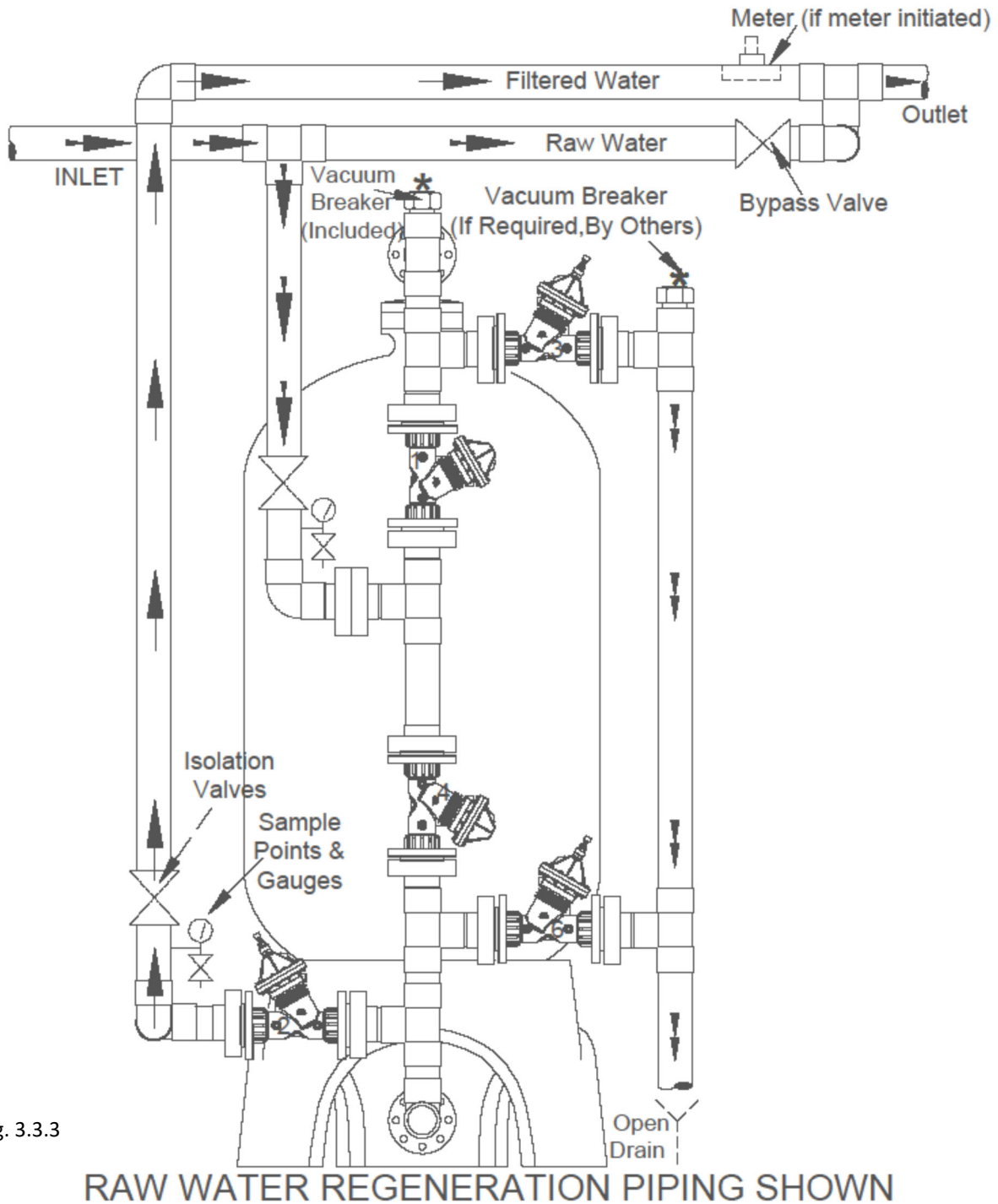


Fig. 3.3.3

Typical Duplex Filter Piping Layout Detail.

Section 3.3

-Figure 3.3.4 shown shows the typical treated water backwash piping for a duplex filter unit. Please note all standard FMVS filter systems can be piped for raw water (see fig. 3.3.2) or treated water backwash simply by supplying a separate backwash water source.

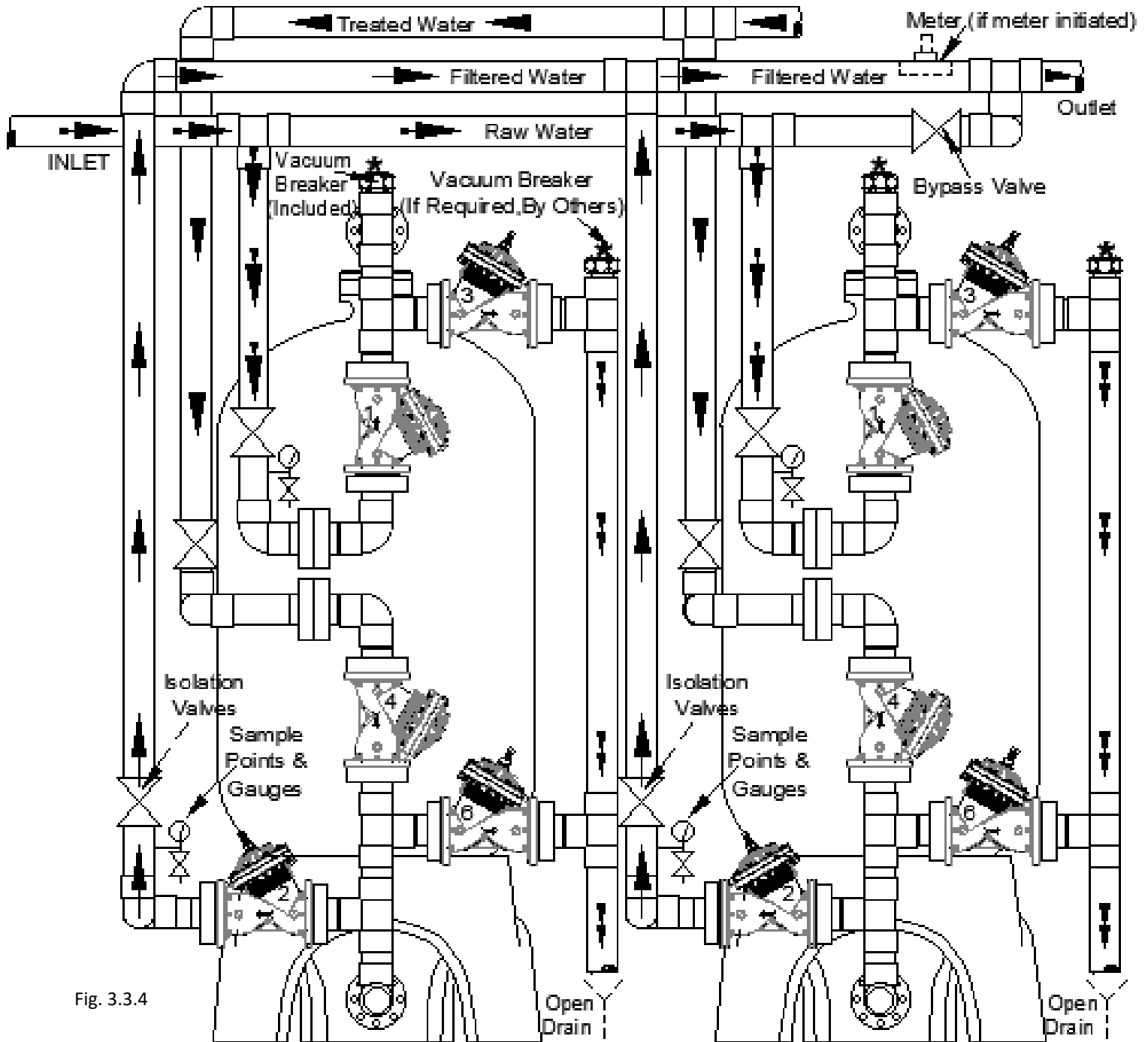


Fig. 3.3.4

TREATED WATER BACKWASH REGENERATION PIPING SHOWN

Typical Triplex Filter Piping Layout Detail.

Section 3.3

-Figure 3.3.5 shown shows the typical treated water backwash piping for a triplex filter unit. Please note all standard FMVS filter systems can be piped for raw water (see fig. 3.3.2) or treated water backwash simply by supplying a separate backwash water source.

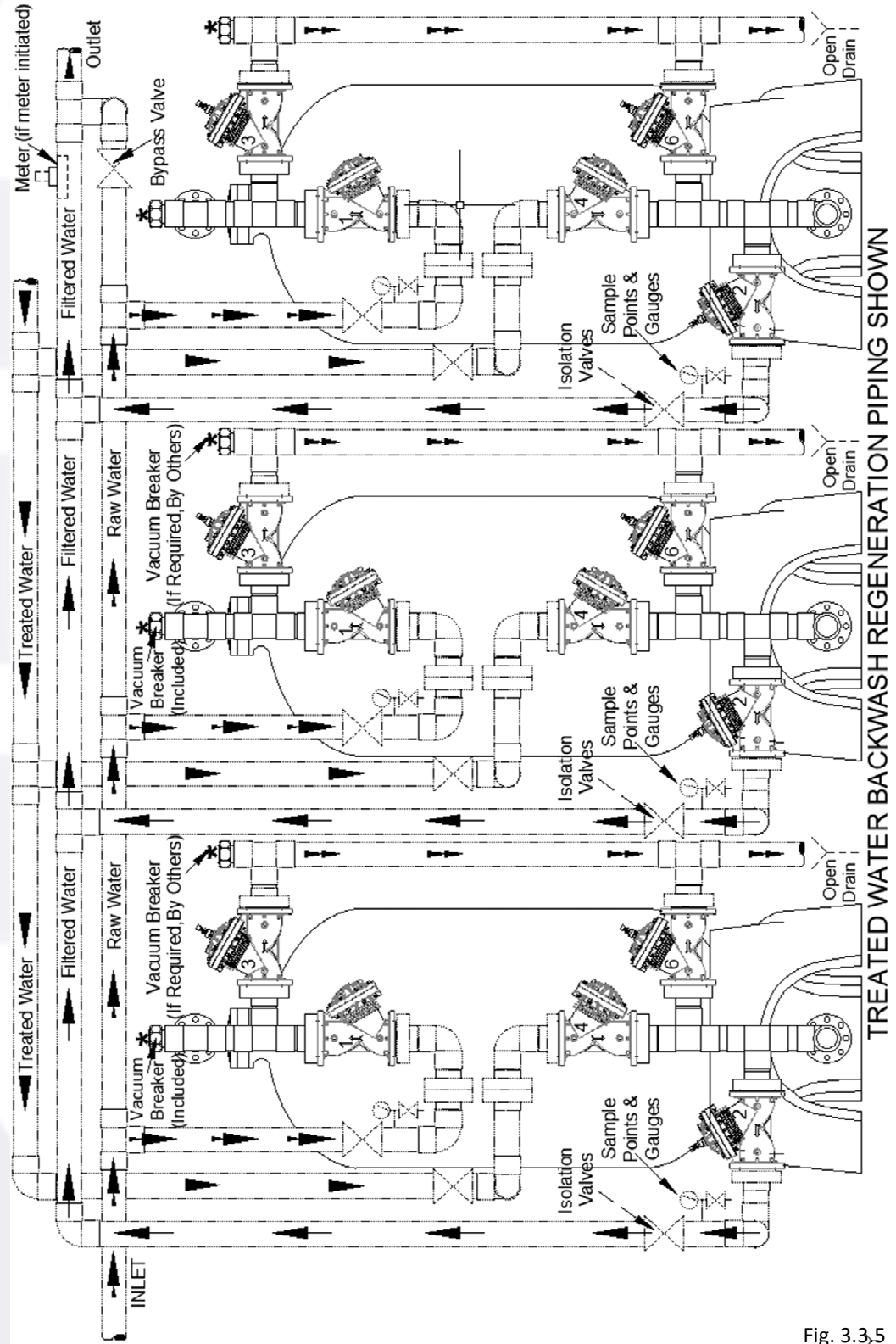
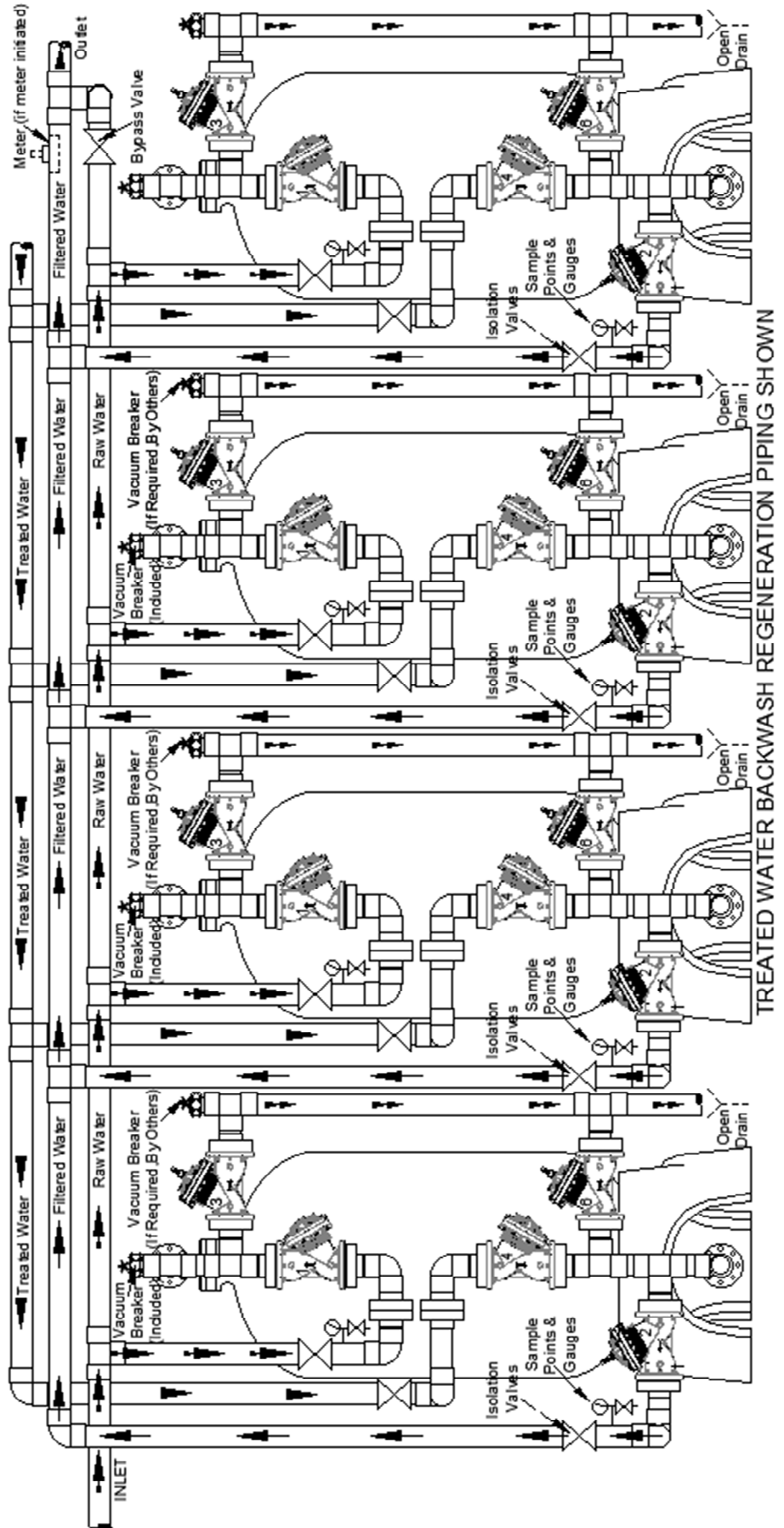


Fig. 3.3.5

Typical Quadplex Filter Piping Layout Detail.

Section 3.3

-Figure 3.3.6 shown shows the typical treated water backwash piping for a quadplex filter unit. Please note all standard FMVS filter systems can be piped for raw water (see fig. 3.3.2) or treated water backwash simply by suppling a separate backwash water source.



General installation Guide

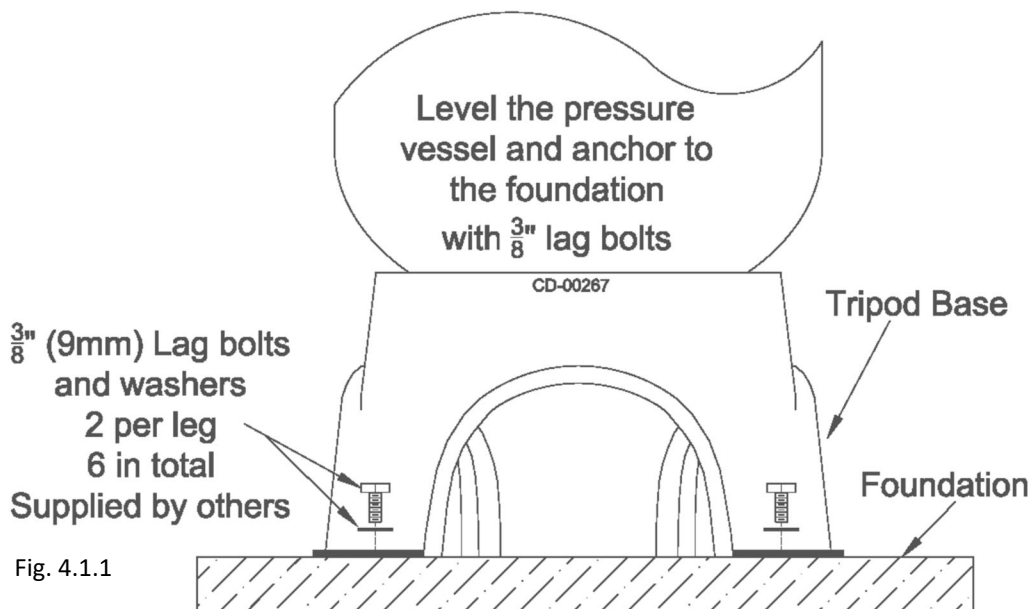
Section 4.0

-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

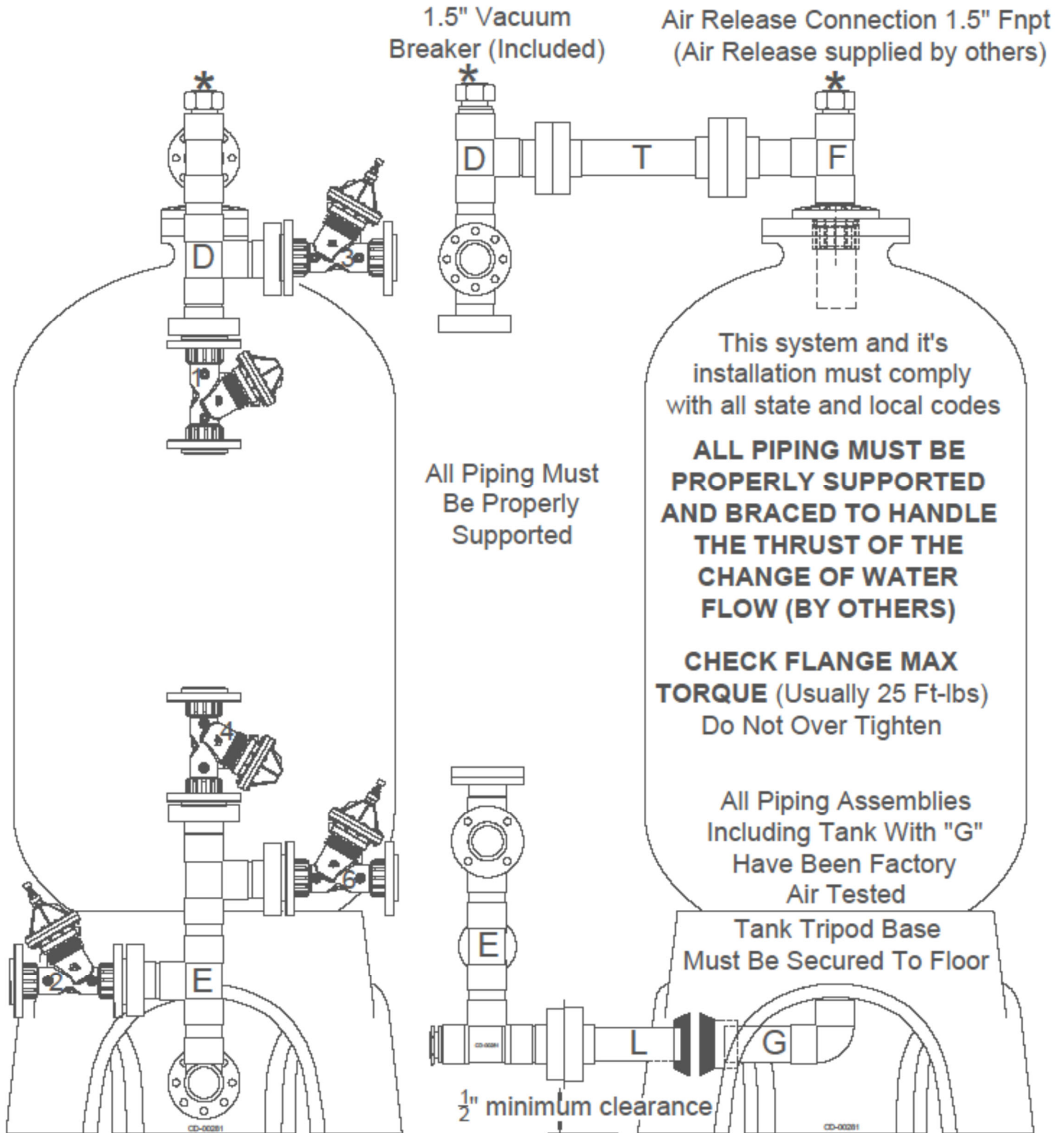
- Select the site for the installation (See section 3). The tanks should be located on a level support pad with adequate space on all sides. The system must be close to a drain that is capable of handling the maximum regeneration flow rate. Units should be within 6 feet of one another for the communication 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 (see fig. 4.1.2) between the bottom piping & the floor. The tank legs can be shimmed if required. Care must be taken when moving the tank so the distribution will not be damaged.



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.



Installation Tank Positioning

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

- 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.

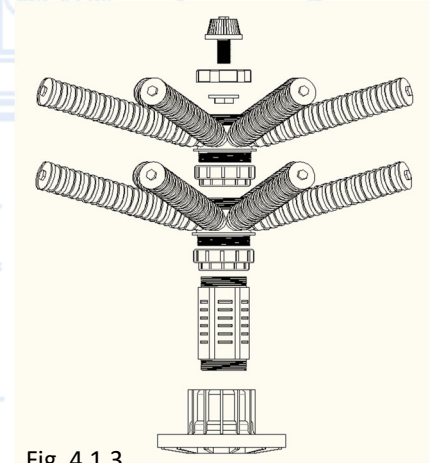


Fig. 4.1.3

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.

- On diaphragm valve units, the backwash and fast rinse regeneration flowrates are controlled by adjusting the travel stops on the backwash outlet (valve #3) and on the fast rinse outlet (valve #6). **A flowmeter (not included) or other method of measuring these flowrates is required for start up. The adjustment of the backwash flowrate is critical as too high of a flowrate will backwash out the media and too low will not clean the bed properly which can lead to operational and performance issues.**

Section 4.2

Installation

Piping

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

-The torque sequence is shown in figure 4.2.1

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

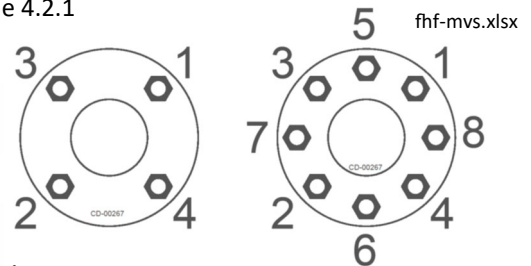


Fig.4.2.1

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

Installing 3" Flange Bolts with a 4" connection.

Installing bolts on to a PVC 3" spigot Vanstone flange coming off a 4" connection can be difficult. You do not have to start grinding the bolt heads. If the bolt is pushed right up to the face of the flange, it is difficult to rotate the flange after the first bolt is installed. We recommend the following procedure to alleviate this.

Step 1

Place washer close to the flange and partially insert the bolt.



Step 2



Step 3

Rotate flange and add another washer & bolt. The flange can be rotated as long as the bolt is not pushed up to the flange face.

Repeat until all four bolts are in.



Step 4

Position the flange in the desired orientation and push the bolts in. Remember the flange bolt maximum torque is approx. 25 ft-lbs.



Piping

-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).

- 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.

Section 4.2

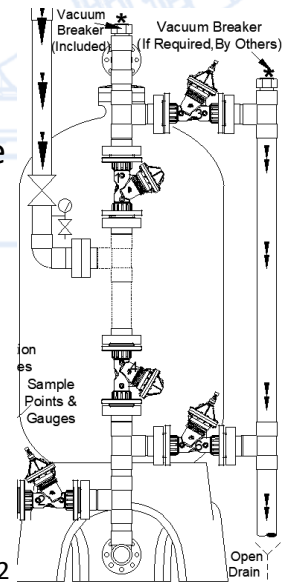


Fig. 4.2.2

Special Piping Applications

- 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.

Section 4.3

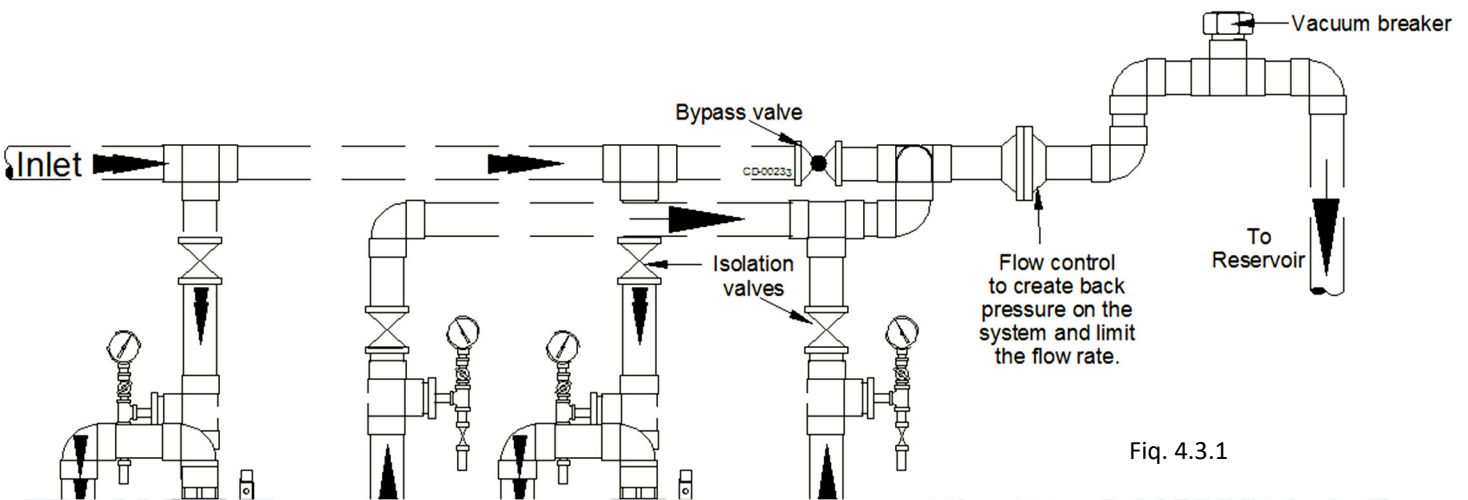


Fig. 4.3.1

Installing Diaphragm Valves

Section 4.4

-Each unit has five diaphragm valves, three of which have limit (travel) stops that have specific locations. The travel stops are on the backwash outlet (valve #3), fast rinse outlet (valve # 6) and service outlet (valve #2). See figure 4.4.2. Also note the arrow on the valve show the direction of flow.

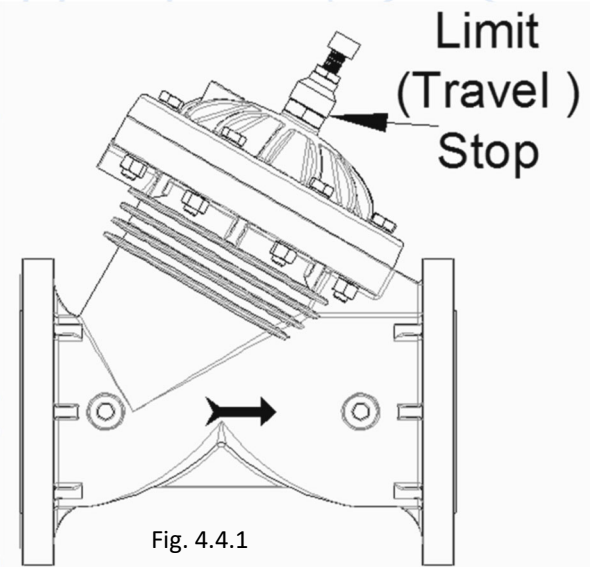


Fig. 4.4.1

-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.

-Tubing connects the diaphragm valves to the stagers (see section 4.5). The stager uses pressurized air or water to properly sequence the diaphragms.

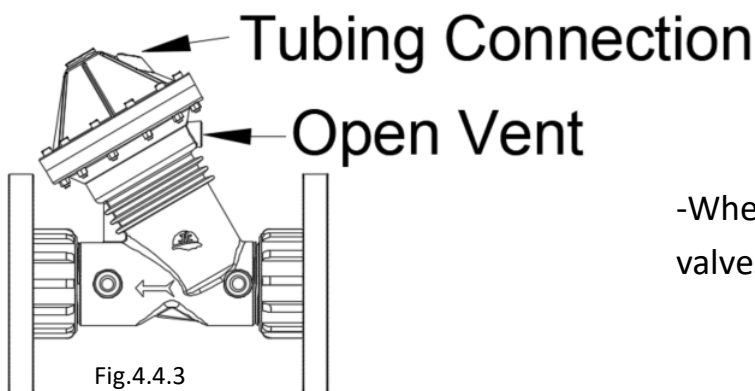


Fig.4.4.3

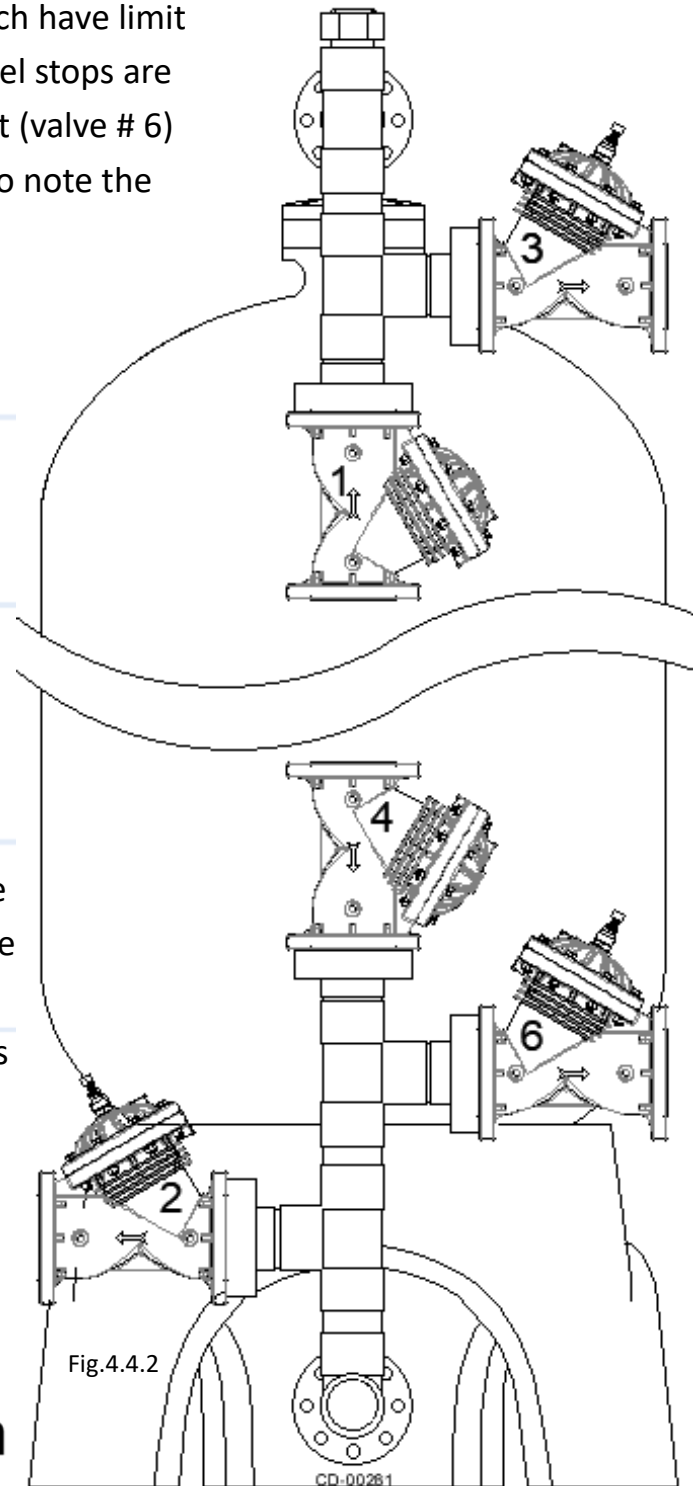


Fig.4.4.2

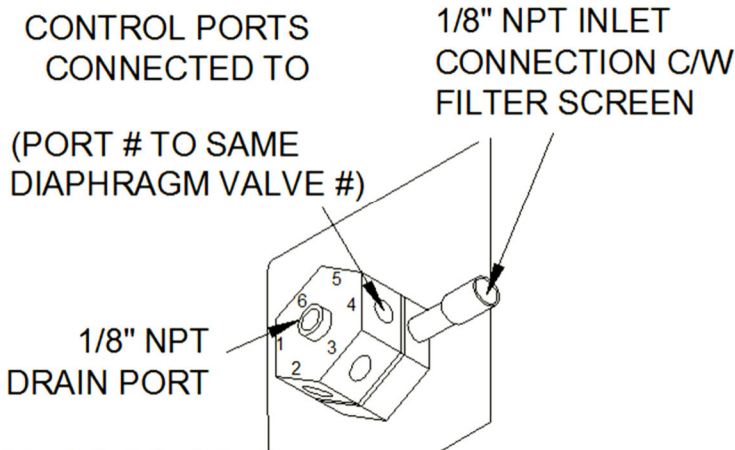
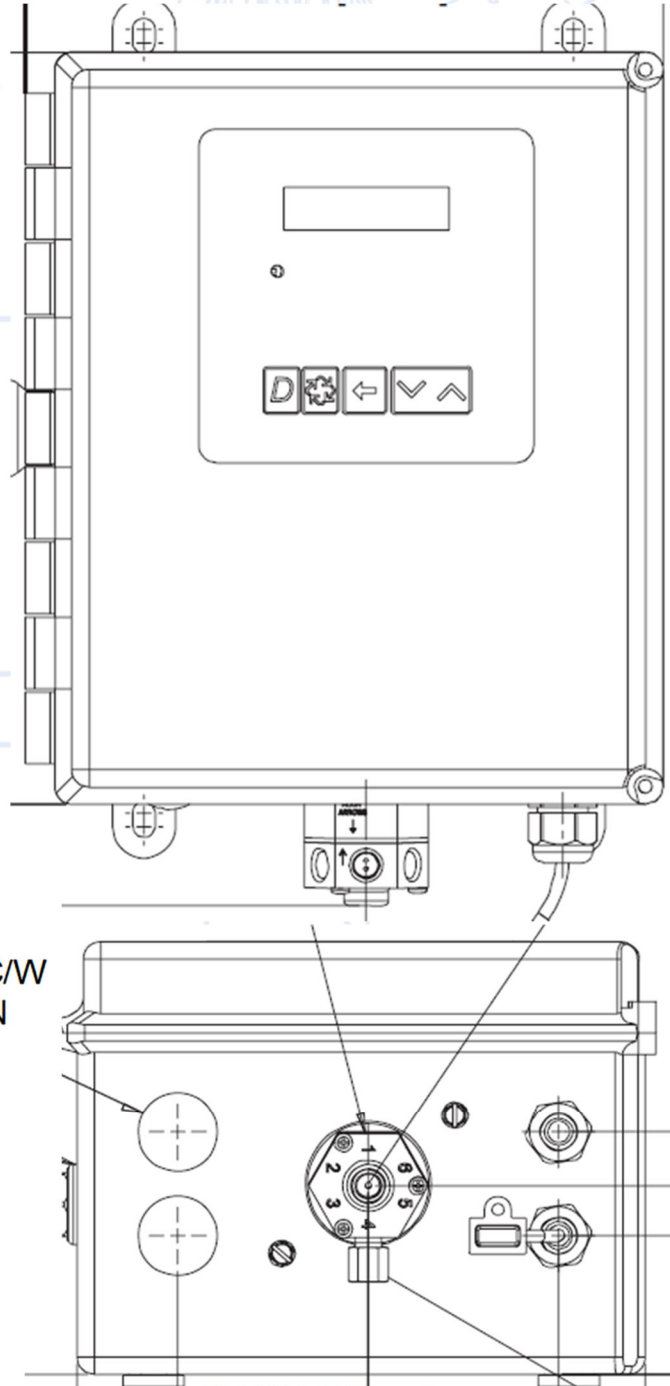
-When installing the manifold and diaphragm valves, ensure they are properly supported .

Installation

Diaphragm Valve Tubing

Section 4.5

-There is one stager controller for each manifold/tank unit. Each stager controller has a stager built into the bottom of the controller. The stager has eight ports. There is one port for the inlet supply pressure source. There is one other port for the exhaust. There are six other ports numbered one to six. These numbered ports are connected to the diaphragm valves using the 1/4" tubing. The diaphragm valves on the manifold drawings are also numbered one to six (see figure 4.4.2) Each port number goes to the diaphragm valve with the same number. On filters, there is no valve five. On the stager, port five is plugged (brass 1/8" npt plug supplied).



The supply pressure must be equal to or higher than the maximum water pressure the units will experience. The maximum pressure must not exceed 100 psi. Air or water can be used as the supply pressure. If water is used, the drain port must be piped to a drain. A supply pressure isolation valve is recommended to allow for servicing.

Inter Stager Connections

Section 4.6

- Once the stagers are 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 4.6.1

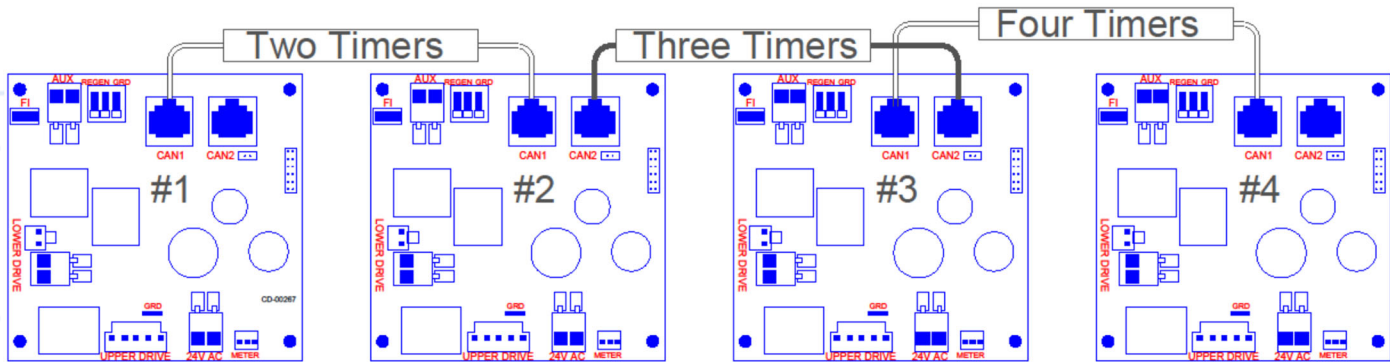
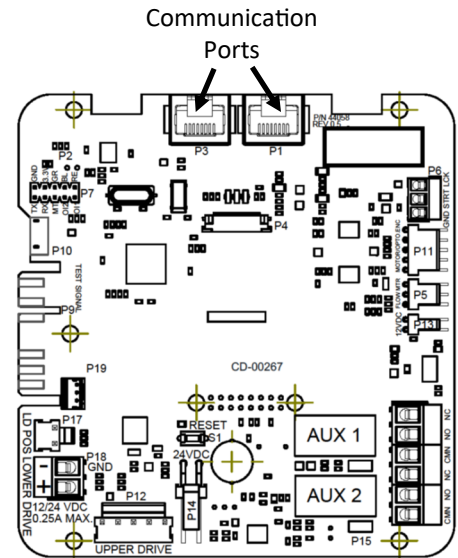


Fig. 4.6.1

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.



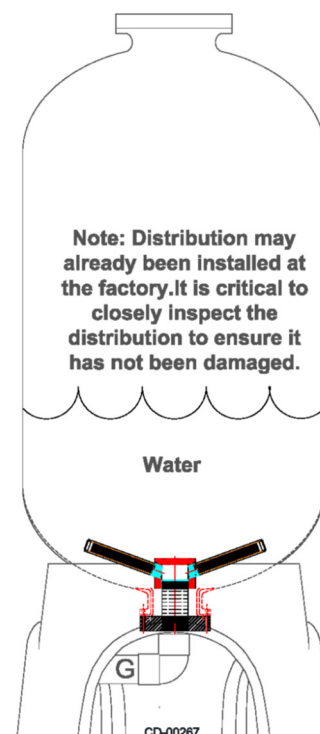
Media Loading

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. With filters, normally the support bed completely covers the laterals with a few inches of gravel.
- 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.

Manganese Greensand Filters Only—Chemical Soak

- The manganese greensand media is not fully regenerated when shipped. The greensand requires conditioning before placing the units into service. A chemical soak must be completed. Potassium permanganate is the most common chemical, but chlorine can be used as well.
- *Note: It is imperative that the manual isolation valve on the filter outlet be fully closed for the duration of the soaking process. Once the soaking process is complete, remember to fully backwash the media bed until the effluent running to the drain runs clear. It is critical that the filter be properly backwashed during start-up. Inadequate backwash of the filter may result in inferior operation of the filter during service.*

Potassium Permanganate (KMnO₄) Soak

- Use potable, clear water for the soak.
- Dissolve approx. 4 ounces of potassium permanganate per cu. ft. of greensand in a container of water. A recommended solution strength for the treatment soak is 4 ounces of potassium permanganate per 1 to 2 US gallon of dilution water. Check section 5, "Media Specifications", for the quantity of greensand in each filter size.
- *Note: It is important that the potassium permanganate be totally dissolved in water before being added to the filter. Any undissolved crystals will result in pink water continually bleeding out of the filter. Use cold water to dissolve the KMnO₄. If hot water is used, the KMnO₄ could fall out of the solution when it contacts the cold bed.*

Media Loading

Section 5.0

Introducing The KMnO₄ Into The Bed

- Fill the filter with water until the water is at the top of the media bed. Pour the KMnO₄ evenly over the top of the bed.
- Drain down the water out of the bottom outlet until pink appears in the drain water.
- Slowly refill water in the tank from the bottom (in backwash position), until the water rises to approximately 3" above the top of the media bed.
- Allow the bed to soak for at least 4 hours, preferably overnight. There is no time limit to how long to let the bed soak. Ideally, it is recommended the filter be left to soak until the filter is to be placed into service

Chlorine Soak

- Chlorine can also be used instead of potassium permanganate. Use 4 oz of chlorine (12%) per cubic foot of greensand.
- With chlorine, start with very little water in the filter.
- Pour the chlorine solution into the tank on top of the media.
- Slowly refill water in the tank from the bottom (in backwash position), until the water rises to approximately 3" above the top of the media bed. Allow the bed to soak for at least 4 hours, preferably overnight. There is no time limit to how long to let the bed soak. The longer the better.
- Allow the filter to stand for a minimum of 3 hours. Ideally, it is recommended the filter be left to soak until the filter is to be placed into service, at least overnight if possible.

Media Descriptions

Section 5.0.1

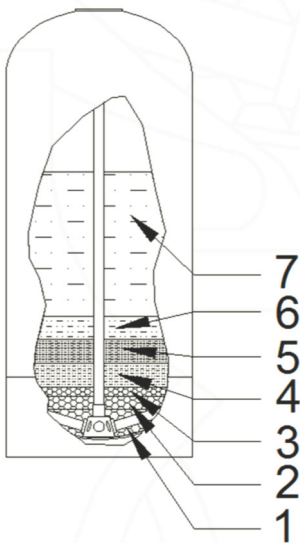
Media	Description	Density (lb/ft ³)
Anthrafilt	Graded anthracite coal aggregate. Black in color.	52
Fine Filter Sand	Finely crushed glacial deposit.	100
Fine Garnet	Almandine garnet crushed to an effective size of 0.37 mm. Red/violet in color.	125
Coarse Garnet	Almandine garnet crushed to an effective size of 1.22 mm. Slightly darker than fine garnet	140
Manganese Greensand	Purplish-Black media processes from Glauconitic greensand.	85
Calcium Carbonate	Crushed and screened white marble.	90
Magnesium Oxide	Processed bead-like magnesia.	82
Activated Carbon	Granular activated carbon, made from bituminous coal.	23
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

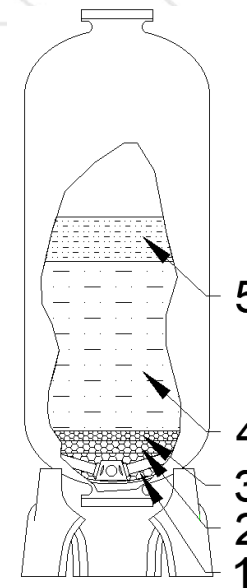
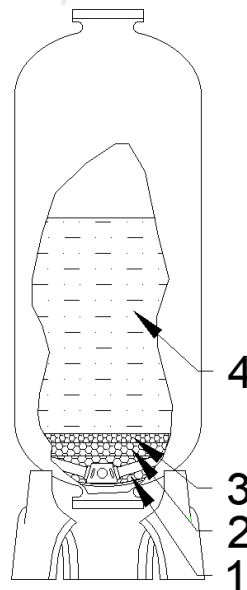
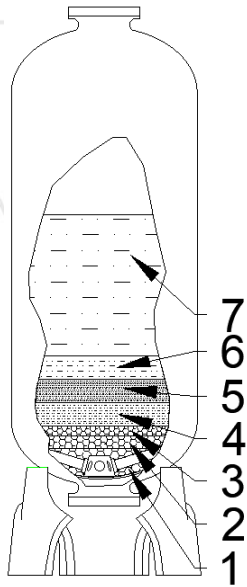
Special Media Loading, (Optional)

Section 5.2.1



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

Media Loading



Section 5.2

5.2.2 Multi-media Bed

Multi-media (FT ³)									
Tank Size	Part Number	Coarse Gravel	Medium Gravel	Fine Gravel	Coarse Garnet	Fine Garnet	Fine Filter Sand	Anthracite	Weight (LBS)
		#1	#2	#3	#4	#5	#6	#7	
30	450030	0.50	1.00	1.00	1.60	1.60	1.60	7.40	1259
36	450036	1.00	1.00	2.00	2.30	2.30	2.30	10.50	1826
42	450042	2.00	2.00	2.00	3.20	3.20	3.20	14.00	2536
48	450048	3.00	3.00	3.00	4.00	4.00	4.00	19.00	3388
63	450063	7.00	8.00	8.00	7.00	7.00	7.00	33.00	6611

5.2.3 Carbon Bed

Carbon (FT ³)						
Tank Size	Part Number	Coarse Gravel	Medium Gravel	Fine Gravel	Carbon	Weight (LBS)
		#1	#2	#3	#4	
30	450430	0.50	1.00	1.00	12.50	565
36	450436	1.00	1.00	2.00	17.60	827
42	450442	2.00	2.00	2.00	24.00	1168
48	450448	3.00	3.00	3.00	31.00	1622
63	450463	7.00	8.00	8.00	54.00	3528

Note: If carbon filter pretreatment for an RO, ensure bed is fully rinsed so incoming pH matches the effluent pH.

5.2.4 Greensand Bed

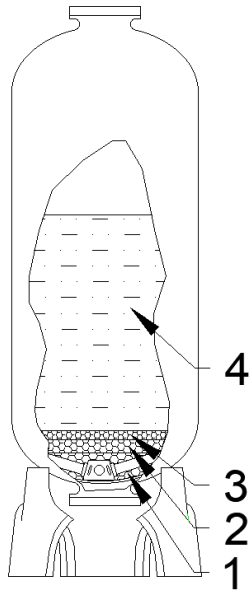
Greensand (FT ³)							
Tank Size	Part Number	Coarse Gravel	Medium Gravel	Fine Gravel	Greensand	Anthracite	Weight (LBS)
		#1	#2	#3	#4	#5	
30	450530	0.5	1	1	10	2.5	1270
36	450536	1	1	2	14	3.5	1812
42	450542	2	2	2	19	5	2515
48	450548	3	3	3	25	6	3377
63	450563	7	8	8	43.3	11	6593

Note: Manganese greensand does not come fully regenerated . Review section 5.0

Media Loading

Section 5.2

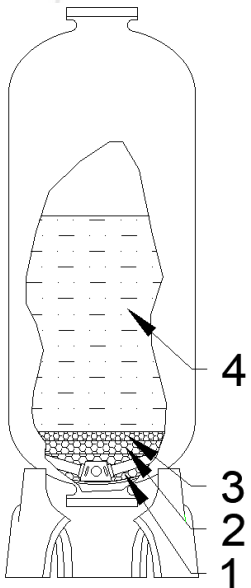
5.2.5 Chem Free Bed



Chem Free (FT³) Note: Media Requires Immediate Backwash To Prevent Cementing								
Tank Size	Part Number	Coarse Gravel	Medium Gravel	Fine Gravel	Filter Sand (.45-.55MM)	Magnesium Oxide	Calcite Carbonate	Weight (LBS)
		#1	#2	#3	#4	#4	#4	
30	450630	0.80	0.70	0.70	3.00	0.70	8.00	1333
36	450636	1.50	1.00	1.00	4.20	0.84	10.60	1827
42	450642	2.00	2.00	2.00	6.00	1.72	15.60	2773
48	450648	3.00	3.00	3.00	7.50	2.30	20.30	3689
63	450663	7.00	8.00	8.00	13.00	3.73	34.78	7050

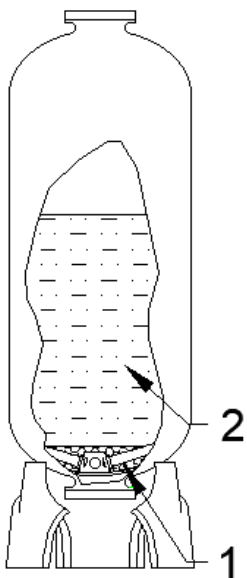
Note: This media requires immediate backwashing to prevent the bed from cementing once the media becomes wet. A long initial backwashing is required to fully mix the filter sand, the mag. Oxide and calcium carbonate into a "salt and pepper" mix. Once the bed is wet, do not drain down the media.

5.2.6 Birm Bed



Birm (FT³)						
Tank Size	Part Number	Coarse Gravel	Medium Gravel	Fine Gravel	Birm	Weight (LBS)
		#1	#2	#3	#4	
30	450830	0.50	1.00	1.00	12.25	780
36	450836	1.00	1.00	2.00	17.70	1248
42	450842	2.00	2.00	2.00	24.00	1700
48	450848	3.00	3.00	3.00	31.00	2680
63	450863	7.00	8.00	8.00	54.00	3700

5.2.7 Nextsand Bed



Nextsand (FT³)					
Tank Size	Part Number	Medium Gravel	Nextsand	Weight (LBS)	
		#1	#2		
30	450930	2.50	12.50	978	
36	450936	4.00	17.60	1408	
42	450942	6.00	24.00	1960	
48	450948	8.00	31.00	2545	

Nextsand is temperature sensitive in relation to backwash rates. The warmer the backwash temperature, the higher the recommended backwash rate.

Typical Backwash Flow Requirement vs Water Temp					
Flow	80°F (27°C)	70°F (21°C)	60°F (16°C)	50°F (10°C)	40°F (4.5°C)
U.S.gpm/ft ²	22.3	19.8	17.2	14.8	12.5
% Increase	1.79	1.59	1.38	1.18	1

NOTE: It is important to follow the startup instructions as improper start up may result in unsatisfactory filter operation or possibly damage the filter.

Piping Inspection

Section 6.0

Before starting up the unit check and confirm the following:

- All system piping is correct. (inlet to the valve inlet, outlet to the valve outlet, etc.) and all connections are complete, (see installation drawing section 3).
- There are flex connections (if required) 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 .
- Diaphragm valves usually control the regeneration flowrates by adjusting the travel stops. The travel stops on valves 3 and 6 should be at least 3/4 or almost fully closed to start. A flow meter (not included, see section 4) or other method to measure flowrate is required on the regeneration water. Ensure the drain line has a proper air gap.
- Check all electrical connections and ensure that they are correct and complete.
- **If this is a greensand filter, a media bed chemical soak MUST have been completed.**

See section 5

Programming

Section 6.1

- Confirm the valve programming is correct and familiarize yourself with the controllers (See section 8). Usually the programming has been adjusted at the factory, and in most cases, the only items that may require adjustment is the time of day for the regeneration to occur and the time period between regenerations. Normally the factory setting for filter systems is set for every 3 days, but is adjusted to suit the application on site.

- Once everything has been checked and confirmed correct, manually advance the unit into backwash position. To do this on the next stager controller, push and release the “extra cycle “ button on the controller. Once the stager moves into the backwash position, unplug the controller. This way the unit will stay in the backwash position, allowing to slowly fill the tank with water from the bottom on up. Make sure the travel stop on the backwash outlet (valve #3) is just slightly open to allow the unit to fill slowly.



- **Slowly** open the inlet isolation valve, and allow the filter to slowly fill with water. When the filter is full, water begins to run out through the drain. ***If the unit is filled too quickly, the media could be blown out, as well as possible damage the filter.*** When full, close the inlet valve.

Allow the filter to stand for approximately 4 hours or longer once the tank is full to saturate the media bed if this has not already been done during the media loading (see section 5).

Regenerating The System

- Once the media is fully saturated, the actual unit regeneration can occur. With the unit still in the backwash position, slowly start opening the inlet isolation valve. If the unit still has any air inside, it will sputter out. With the inlet isolation valve fully open, slowly start opening the travel stop on the backwash outlet valve #3. Monitor the backwash flowrate to make sure the backwash flowrate (max flowrate to drain) is not exceeded (see section 2). Constantly check the drain water and ensure only fines from the media bed is being backwashed out. If the drain water contains more than fines, reduce the backwash flowrate by turning down (closing) the travel stop on valve #3. Any traces of air in the media bed can result in backwash the media out. If this is occurring, close the inlet isolation valve and allow the media to soak a little longer and repeat the process. Once the backwash flowrate has been properly set, 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. Also note that a few filters like nextsand, the backwash rate is very temperature sensitive. The warmer the water the higher the required backwash rate required to clean the filters properly. See section 5.2.7.

- If this is a carbon filter, ensure the filter has been thoroughly rinsed so the incoming pH equals the pH exiting the filter. This is especially critical if it is pre-treatment in front of an RO as a high pH can cause the membranes to scale rapidly.

- Once completed, close the inlet isolation valve.

- With the inlet still closed, plug the controller back in. The valve may cycle back to the home position. If so, initiate a regeneration again and advance to the fast rinse position. Slowly open the inlet isolation valve and adjust the fast rinse travel stop on valve 6. The fast rinse rate is normally adjusted to the service flowrate of the unit.

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

- Upon completion of the steps above, if the filter is not a greensand filter or a chemical free filter, 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 as intended.

- If the filter is a greensand filter or chemical free filter, see the following section.

Chemical Injection Pump Start-Up, (Manganese Greensand Filters only) Section 6.2

- Check the chemical pump system and ensure it has been correctly installed as outlined in the chemical pump manual.
- Note: The chemical pump must be set up in a manner that it only operates when the system is in operation. On many systems, the chemical pump is wired in with the well pump so that it only runs when the well pump runs. On systems that the service flowrate varies, typically a contacting meter and a contacting type chemical pump is used to vary the amount of chemical (KMnO₄) injected for the different flowrates. It is very important not to overfeed or underfeed the chemical as both conditions result in unsatisfactory operation. Overfeed can lead to “pink” service water, and underfeed can lead to damaging the media bed.
- Mix up a small amount (2 gallons) of potassium permanganate (KMnO₄) solution for the chemical feed system. To estimate the potassium permanganate solution strength, a few calculations must be done.
- Estimate required dosage; calculated by using the raw water analysis and multiplying the level of iron by 0.7 and the level of manganese by 1. Example: 2 ppm of iron and 0.5 ppm of manganese has a required dosage of $(2 \times 0.7) + (0.5 \times 1) = 1.9$ ppm required dosage.
- Calculate 75% of rated capacity of the chemical pump. This is done because it usually desirable to try to operate the chemical pump at around 75% of it's rated capacity. This will help keep maintenance to the chemical pump to a minimum by keeping the stroke fairly long (as this helps keep the check valves cleaner) and still allow some adjustment. Example: The standard chemical pump commonly used is the 12 GPD (gallon per day) pump so the rating you would like to use is $0.75 \times 12 = 9$ GPD

The estimated solution strength is now calculated by the following formula:

$$\frac{\text{SERVICE FLOWRATE (USGPM)} \times \text{REQUIRED DOSAGE (PPM)} \times 1440}{\text{RATED PUMP CAPACITY}} = \text{SOLUTION STRENGTH (PPM)}$$

Example: for system running at 60 USGPM, 2 ppm of iron and 0.5 ppm of manganese and a chemical pump rated at 12 USGPD

$$\frac{60 \text{ (USGPM)} \times 1.9 \text{ (PPM)} \times 1440}{9 \text{ (USGPD)}} = 18240 \text{ SOLUTION STRENGTH (PPM)}$$

- Solution Strength chart

oz of KMnO ₄ in 1 USGallon of water	Solution Strength (PPM)
1	7,500
2	15,000
3	22,500
4	30,000
5	37,500

- Make sure your mix water does not contain any iron or manganese as it will precipitate out as a sludge and can plug up the chemical feeder. The reason for initially mixing up a small amount, is that depending upon the water conditions and flowrates, the solution strength will vary. This only gives you a typical starting point and the final solution strength that works for your application may be quite different.

Temperature °F	Solubility in distilled water wt oz/US gallon
32	3.7
68	8.6
104	16.7
140	30.7

To start up and prime the pump, plug the chemical pump into a power source.

Solenoid Pump

- *Note: If the pump is a solenoid style pump DO NOT adjust the stroke length while the pump is turned off, or not operating. Doing so will damage the internal pump mechanism. Adjustment of the stroke length must only be done while the pump is in operation.*

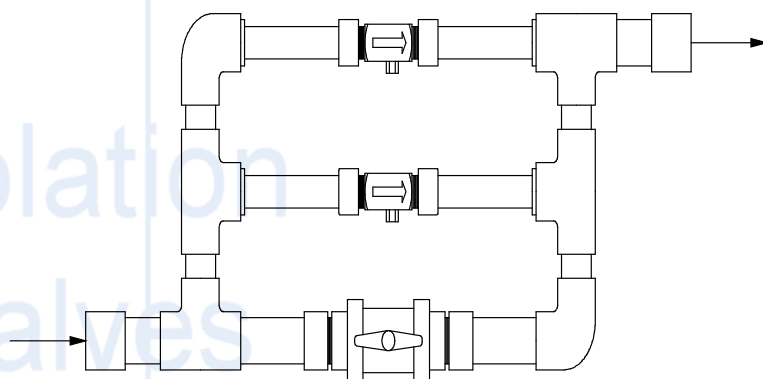
- To prime the pump, turn the bleed valve assembly counter clockwise to bypass the pump discharge from the pressurised destination to the recirculation tubing running back into the tank. Allow the pump to run in this position until the injection fluid is visible running back into the tank. Once this occurs return the bleed valve into the normal position, allowing the injection chemical to flow towards the pressurised destination. All air must be purged from the pump head before the pump will pump against a pressurised flow stream. Once the pump has been primed, reconnect the chemical pump into the system's control circuit.

- Once in operation, the injection rate is varied by adjusting the stroke length of the injection pump until the desired dosage rate is achieved. On the pump the length of the displaced stroke during the movement of the pump diaphragm can be adjusted between 0% and 100%. For efficient and reliable operation of the pump, it is recommended that the stroke length be between 60% to 80%. Shorter strokes than this may not keep the injection fittings clean, and result in plugging the injection system, preventing further injection. Shorter, more rapid strokes will also wear out the internal drive mechanism faster than if longer, slower strokes are used.
- With the filter in service, adjust the chemical dosage rate and the chemical solution strength until the three factors below are satisfied:
 - Influent water has a slight pink colour to it immediately before the filter.
 - Filtered effluent water is clear, with no remaining pink colour to it.
 - Filtered effluent water has acceptable levels of iron and manganese present.
- To ensure the chemical is not being underfed, it is recommended that the system to be slightly overfed until pink is coming through and then gradually cut back on the chemical feed until the effluent become clear.
- If using chlorine, there must be at least a 0.5 ppm of free chlorine coming out of the filter or the coating of the media will be stripped off.

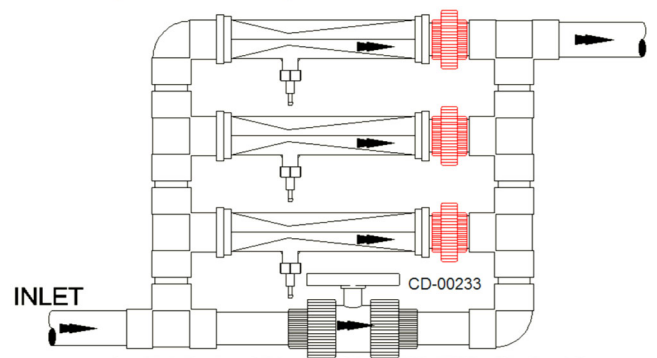
Hydro-Charger Set-Up, (Chemical Free Filters only)

Section 6.3

- Upon completing the filter start-up detailed above, the hydrocharger must be configured in order to draw in enough air in order to oxidize the iron in the water supply. Initially, ensure that the throttling pin located on the side of the hydrocharger (air injector) is turned out fully, allowing for unrestricted flow through the internal venturi bypass.



Using Hydrochargers

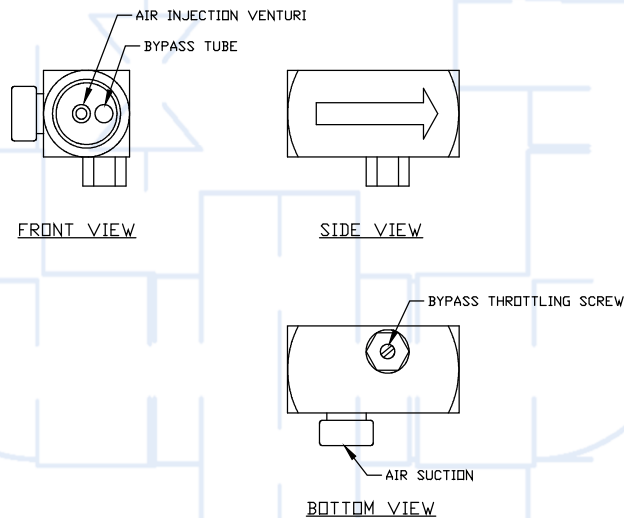


Using Mazzie Ventures

Air Draw Hydrocharger Bank

- *Note: Hydrocharger shown above is for a typical filter systems. Larger or smaller filter units use same general arrangement, but may use more or less air injectors.*

- Begin flowing water through the filter(s) at the recommended service flow rate.
- Upon reaching a stable flow rate and pressure, begin closing the ball valve until all the hydrocharger venturi begins drawing air. This is indicated by either a whistling sound, or by being able to feel the air suction at the venturi inlet. Mazzi air injectors may also be used.



Air Injector

- Once air suction is detected, let the system stabilize at that point. Periodically monitor the effluent iron level, checking to see if the media bed is reducing the iron concentration down to an acceptable level.
- *Note: The chem free media, (which differs from all other filters) is most efficient operation occurs when the media is slightly “dirty”. Once the system is in operation, care must be taken not to over backwash the chem free bed. If the bed is over cleaned, it may have to be run for a while to “dirty up” the bed to make the filter operate properly.*
- If the iron is not being adequately reduced, more water must be forced through the venturi tube. This is done by further closing the ball valve. Minor differences between hydrochargers can be adjusted by minor adjustments using the hydrocharger bypass throttling screw.
- Once again, allow the filter to stabilise at this injection rate. Repeat the water tests in determine the effluent iron concentration.
- Repeat steps 6 & 7 until the iron is being reduced down to an acceptable level.

Operating Conditions

Section 7.0

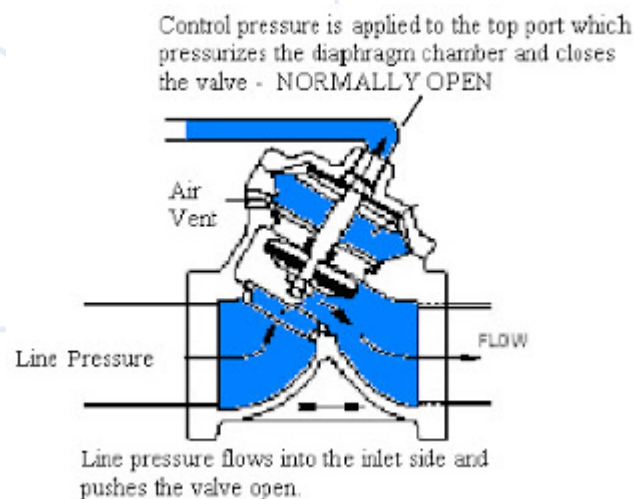
For correct operation of the filter system, the minimum water pressure recommended is 30 psig, (206 kPa), in order for valve to operate effectively. ***Caution: Water pressure should not exceed 100 psig, (690 kPa), water temperature is not to exceed 100 °F, (38 °C), and the unit can not be subjected to freezing conditions.**

The manual bypass valve must always be closed and the manual inlet and outlet isolation valves open except during maintenance of the equipment.

Cycle Operation

Section 7.1

The current position of the control valve can be confirmed by the display on the stager controller. The stager releases the control pressure on the two valves that are to be allowed to open. Control pressure is kept on the valves that are to remain closed.

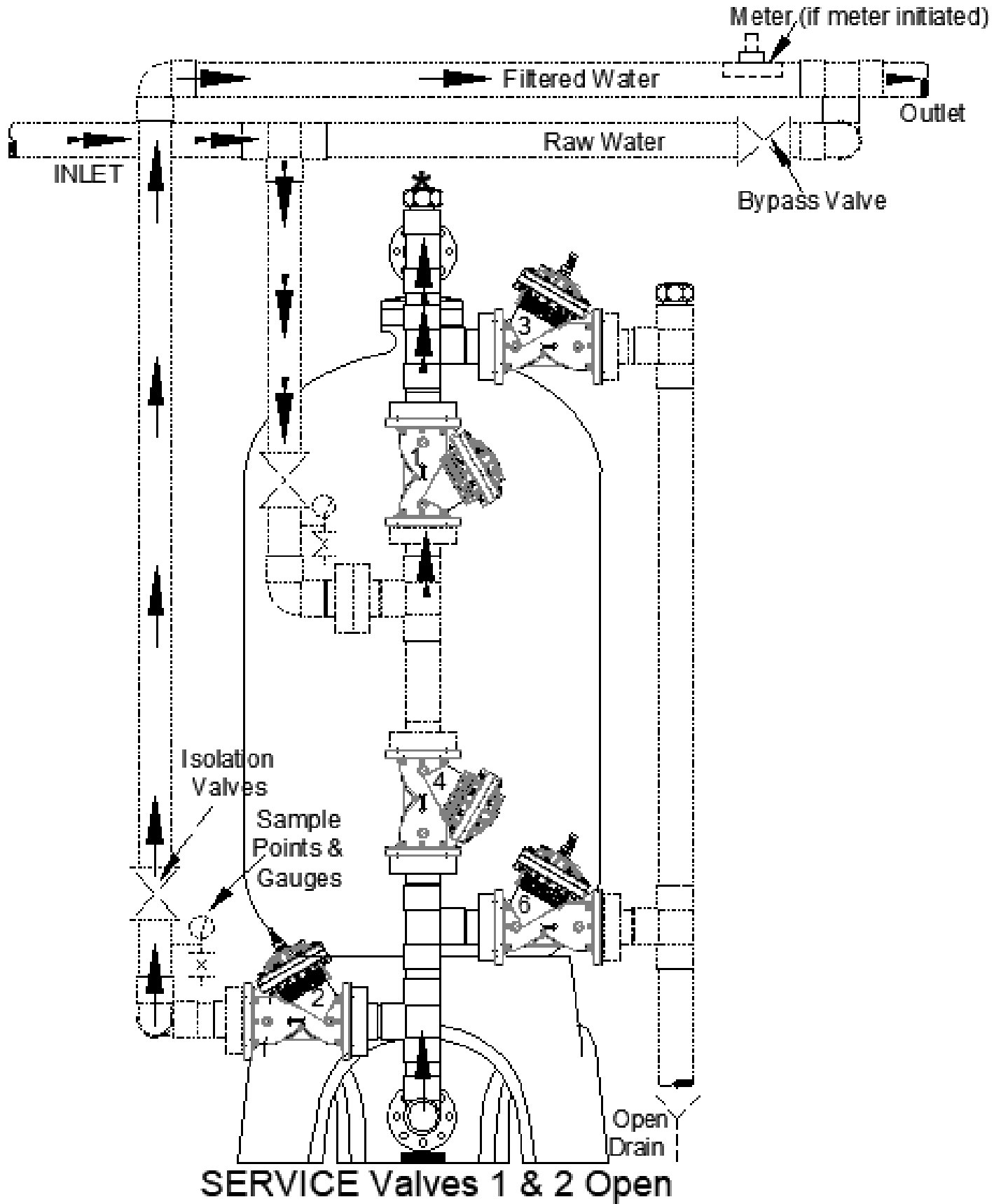


Service Position

Section 7.2

During service, water is directed into the top of the tank by the diaphragm valve #1 valve and flows downward through the filter media, into the distribution, and out to service through diaphragm valve #2. As the water flows through the filtration media, suspended particles and turbidity is removed from the raw water. As the duration of the service run increases, the filter bed accumulates particulate, and becomes "packed", increasing the pressure drop across the unit. The pressure drop can be determined by inlet and outlet pressure gauges on the filter system. Typically, once the pressure drop reaches approximately 8 psi above the clean bed pressure drop, (at the service flow rate), the filter requires regenerating. If pressure loss through the filter begins to effect normal flow, or does not produce the quality of water required, more frequent regenerations will be required. ***Note – the exception to the pressure drop guideline is the carbon filter (which should be regenerated on time or volume).**

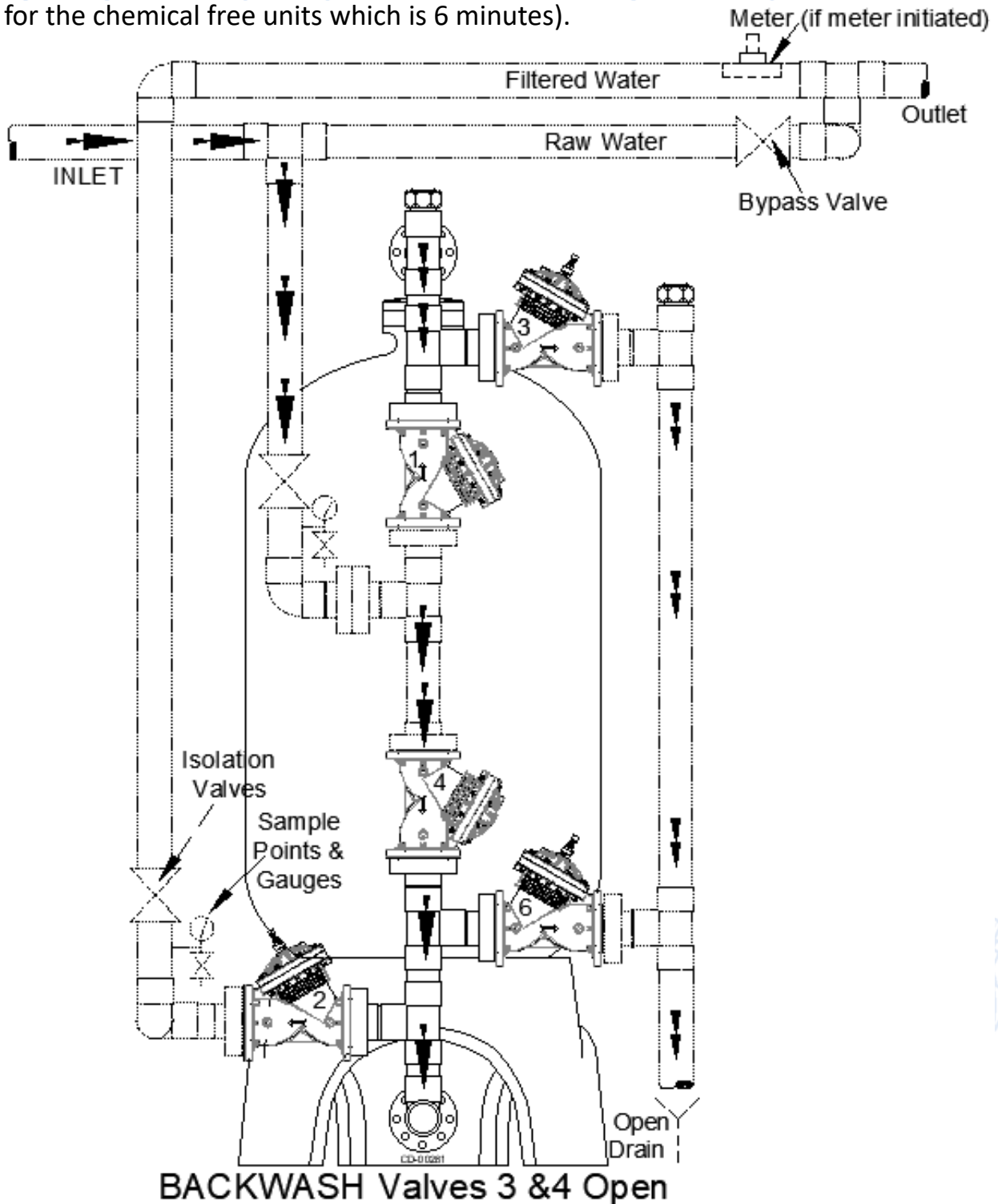
Service Position



Backwash Position

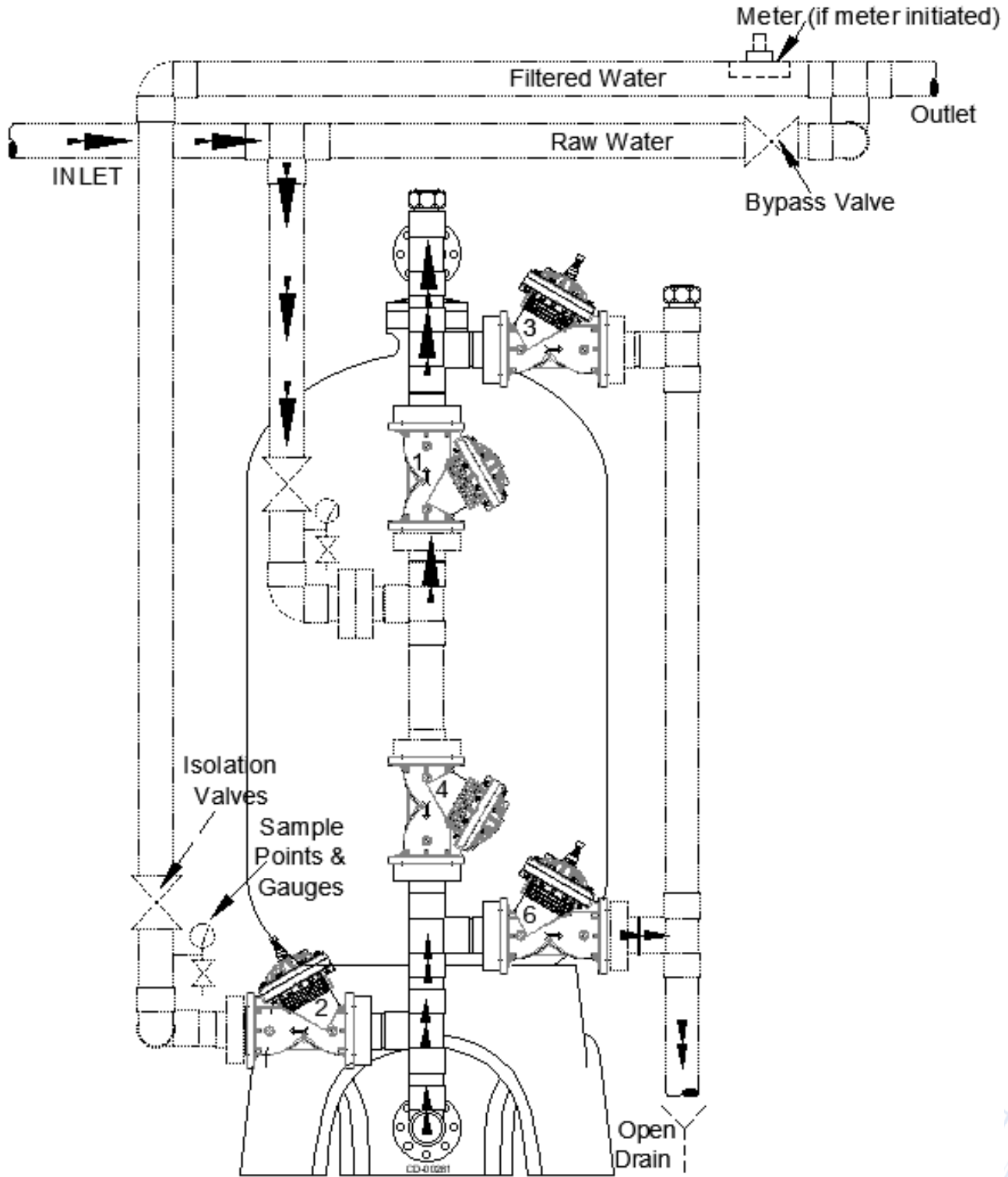
Section 7.3

The regeneration procedure is performed automatically by the filter after the cycle controller is started. Each regeneration cycle consists of two steps: #1 backwash, and #2 rinse. During backwash, water is directed down through diaphragm valve #4, into the bottom hub and laterals, then upwards through the filter bed. The water then flows out through diaphragm valve #3 and out to drain. This expands the filter bed, releasing the trapped particles, and cleans it thoroughly. The accumulated dirt and sediment are flushed to drain. The backwash cycle has been factory pre-set to take place for 12 minutes (except for the chemical free units which is 6 minutes).



Rinse Position

Section 7.4



FAST RINSE Valves 1 & 6 Open

- During rinse, water is directed downwards through the media bed, into the hub & laterals, up the riser tube, and out to drain. This reconsolidates the media bed and rinses any remaining particles in the media bed to drain. Once rinsed, the filter is ready to return to service.

Controller Overview

Section 8.0

The stager controllers that is used on the FMVS filter system is the NXT.

Also see controller manual.

NXT Timer 24VAC

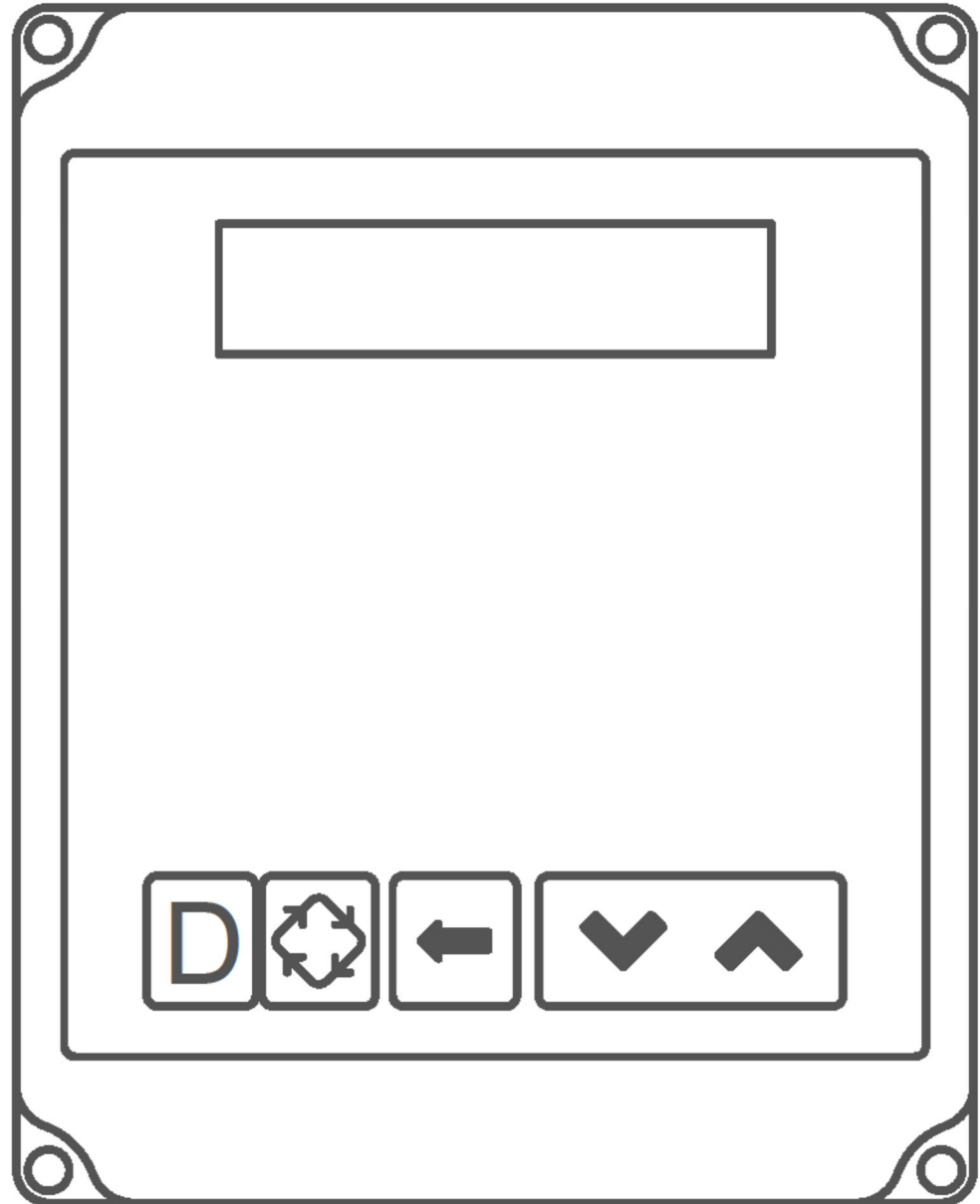


Fig. 8.0.1

Keypad Configuration

Section 8.1

NXT Controller

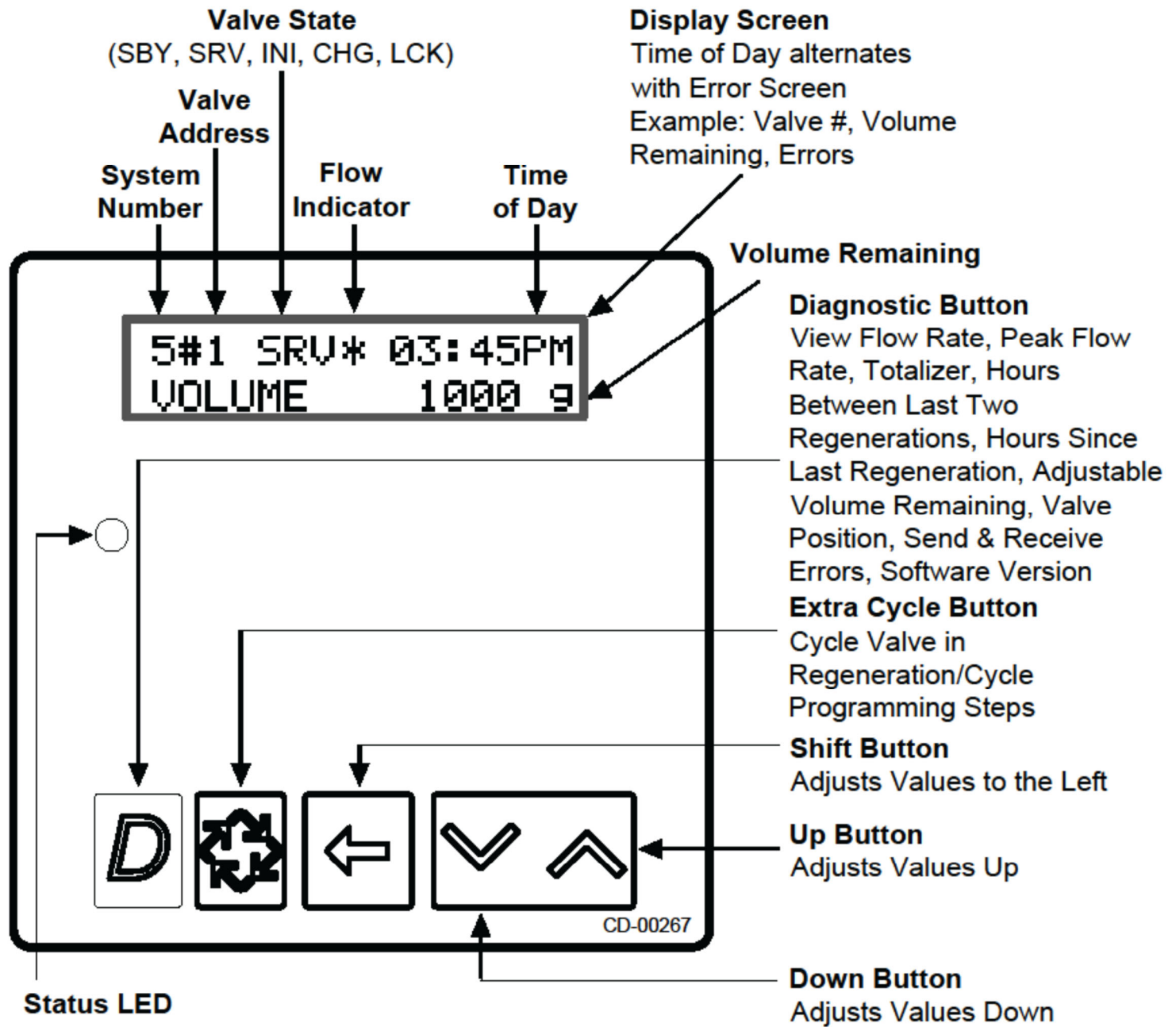


Fig. 8.1.1.1

Resets

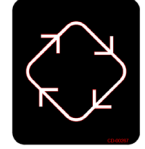
Section 8.2

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.

Important Items To Note:

Section 8.2.1

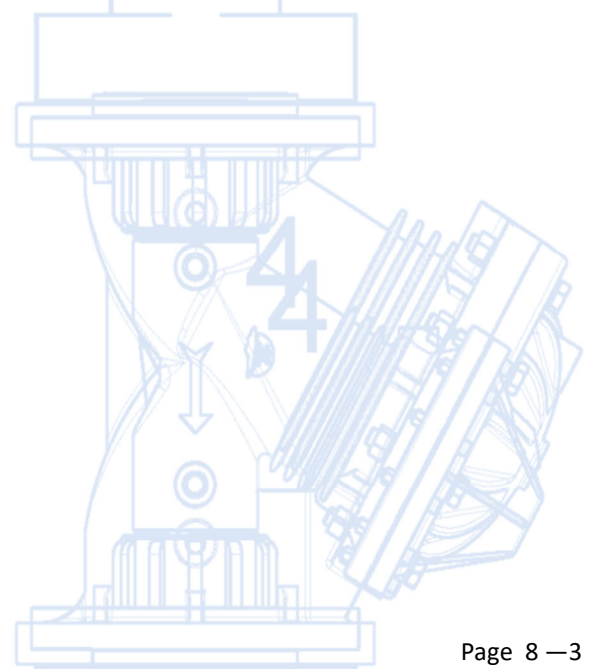
-Each control valve in the system must have a unique number. The valves must be labelled 1, 2, 3, and 4.

-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.

solution
Valves







Sample
Points &



Programming

Section 8.3

NXT Controller -Entering Master Programming Mode.

- Press and hold the **Shift** and **Up** 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.

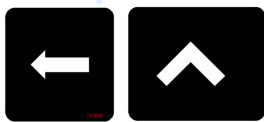
NXT Controller -Exiting Master Programming Mode.

- 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: 06
Series Regeneration



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:
Stager

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



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:
0000000 GRAINS



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:
1 GPG

Options: 1 TO 199 Grains/gallon (U.S. format); 20 to 1,999 milligrams CaCO₃/L

If a harness of 1 gpg is used, the capacity is the gallonage that the controller will initiate a regeneration. Note that the gallonage is for one unit.

Programming NXT

Section 8.3



REGENERATION DAY
OVERRIDE: **ON**

Options: OFF or 1 to 99 days. Standard is 3 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)

solution
Valves

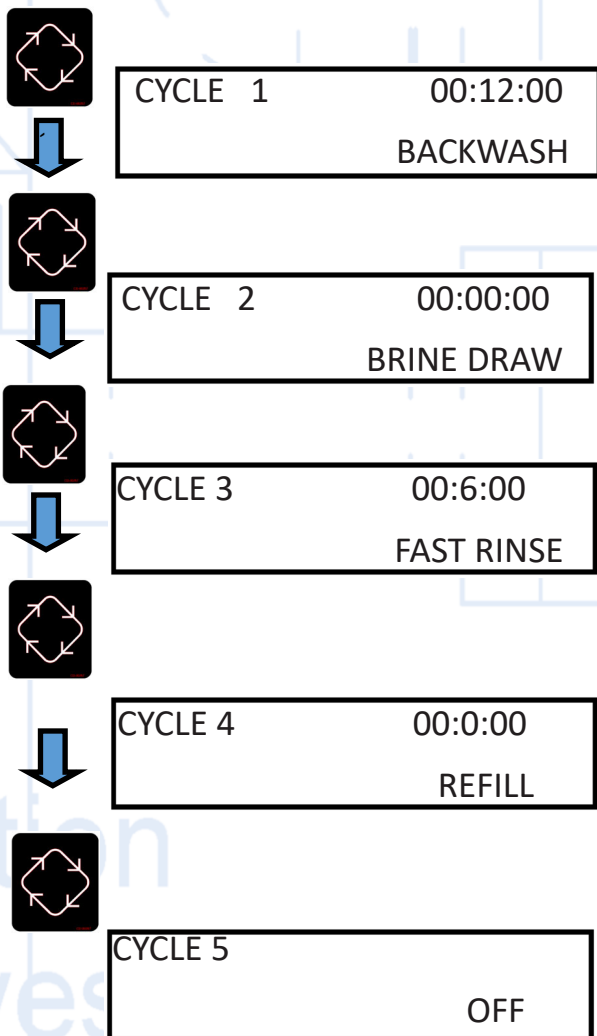
Sample
Points &

Programming NXT

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 a backwash pump or lockout.. 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.

Section 8.3

Programming NXT



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 unit controller 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 controller 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.

General Tools Recommended

Tools recommended to perform basic service

- 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
- Socket set.
- Large flat screw driver.
- Needle nose, channel lock & snap ring pliers.
- 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.

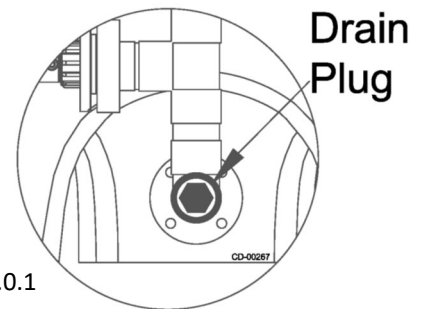


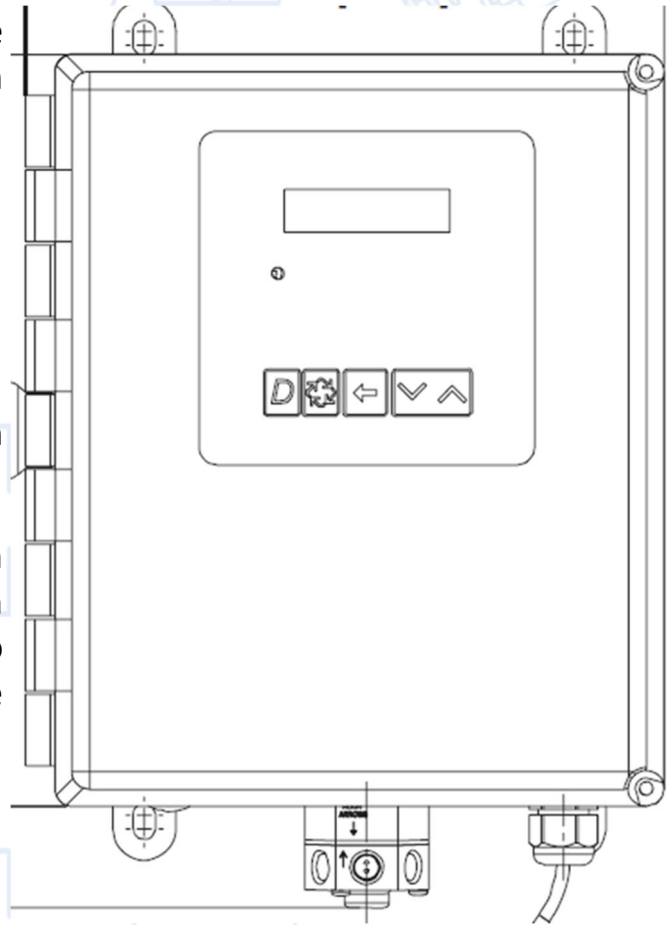
Fig 9.0.1



General Maintenance Clean Stager Controller Inlet Screen

Section 9.1

- Close unit inlet and outlet isolation valves as once the control pressure is released, all diaphragm valves will open.
- Close control pressure isolation valve.
- Cycle controller to release pressure.
- Remove screen and clean as required.
- Reassemble and open control pressure isolation valve.
- The unit has most likely partially drained down when control pressure was released. Slowly open the inlet isolation valve and allow the unit to refill. Purge air as required. Unit may have to be cycled into backwash to properly purge the air.
- Once air purged, open outlet isolation valve.

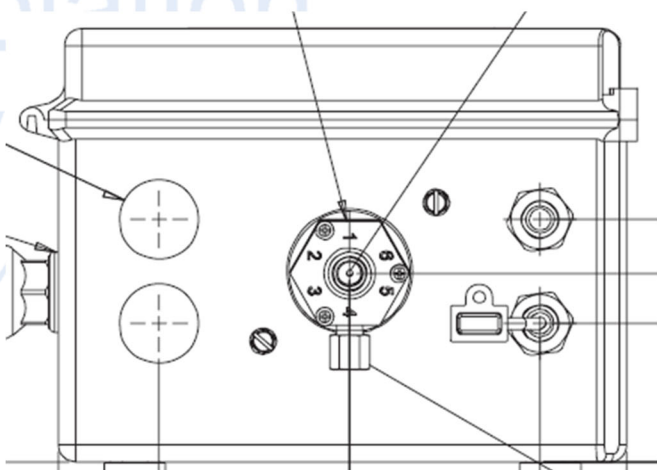


CONTROL PORTS CONNECTED TO

1/8" NPT INLET CONNECTION C/W FILTER SCREEN

(PORT # TO SAME DIAPHRAGM VALVE #)

1/8" NPT DRAIN PORT



Installing O-rings

Section 9.2

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.

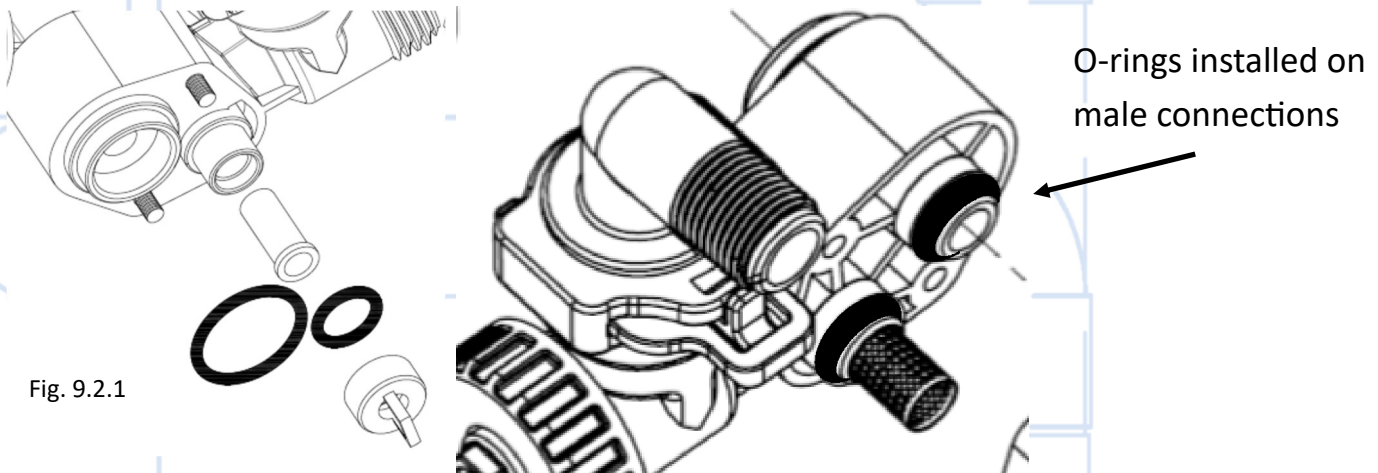


Fig. 9.2.1

Pictured below and to the right is a diagram reflecting

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.
- 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.

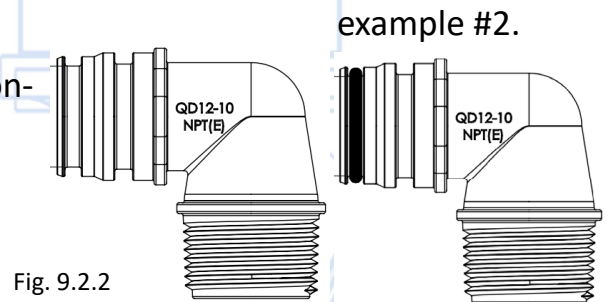
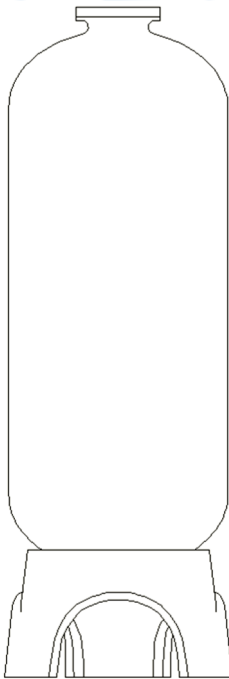


Fig. 9.2.2

Repair Parts

Section 10



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

Table 10.1.1

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Fig. 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" DIAMETER 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" DIAMETER 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

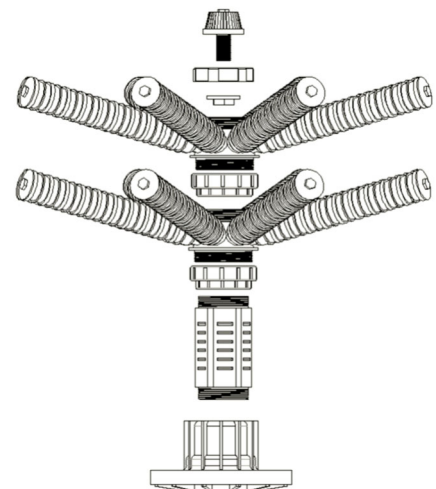


Fig. 10.2.1

Table 10.2.1

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Repair Parts - Valves

Section 10.3.1

Diaphragm Valves

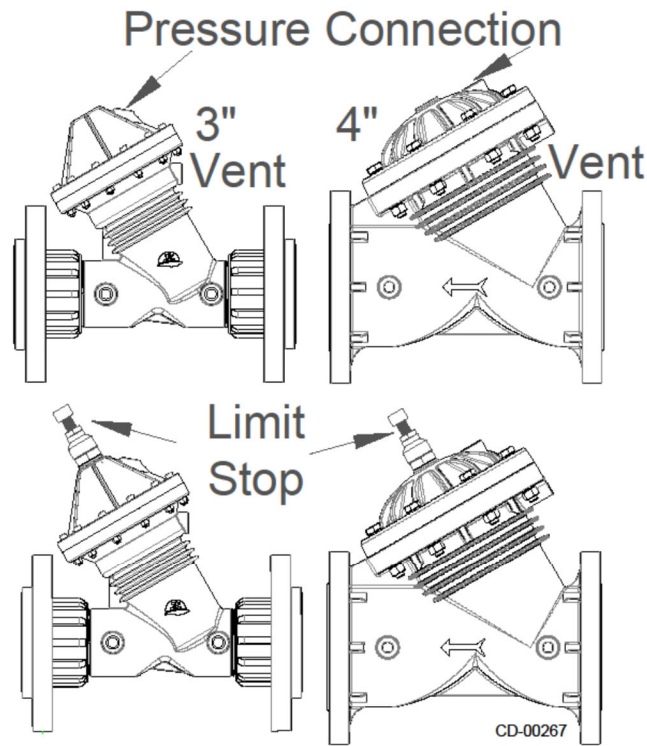


Fig. 10.3.1.1

CD-00267

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

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Repair Parts - Stager Controller

Section 10.3.2

-Also see timer manual

NXT Circuit board
#61674

Fig. 10.3.2.1

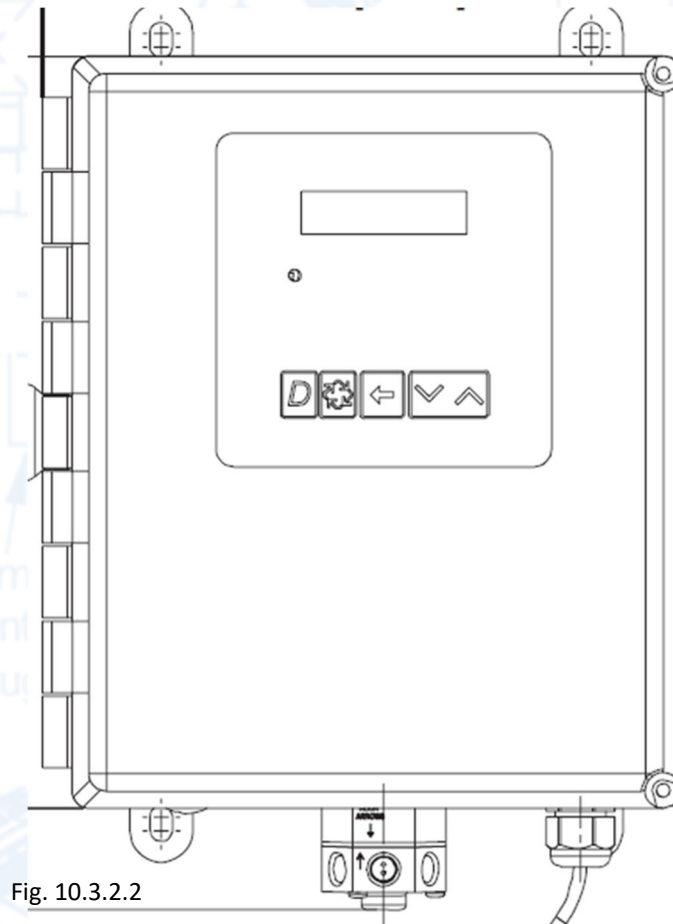
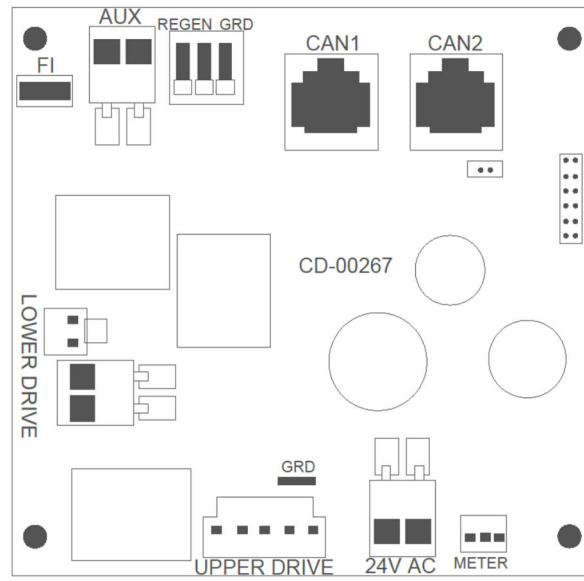


Fig. 10.3.2.2

Repair Parts - FMVS Manifolds

Section 10.3.3

- Manifold Assemblies—Sch 80 PVC.

Manifold Assembly	Label	2" Manifold	3" Manifold	4" Manifold	4"BW-3"S Manifold
Complete Manifold (less valves)		24555420-1	24555430-1	24555440-1	24555441-1
FMVS Top Front	D	24550020D	24550030D	24550040D	24550043D
FMVS Lower Front	E	24550020E	24550030E	24550040E	24550043E
FMVS Tank Top Tee	F	24550020F	24550030F	24550040F	24550040F
FMVS Tank Lower Elbow	G	24550020G	24550030G	24550040G	24550040G
FMVS Lower Pipe With Union	L	24550020L	24550030L	24550040L	24550040L
FMVS Top Pipe With Flanges	T	24550020T	24550030T	24550040T	24550040T
BOLT,HEX HD,5/8X3.5,ZP	110631	14	34	66	54
NUT,HEX,5/8-11,ZP	115050	14	34	66	54
WASHER,5/8,STEEL,ZP	116036	26	66	130	106
WASHER,LOCK,5/8,ZP	116084	14	34	66	54
GASKET 2" FLANGE RS2-2	80030738	3			
GASKET 3" FLANGE RS2-3	80030938		8		3
GASKET 4" FLANGE RF2-4	80030934			8	5

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Table 10.3.3.1

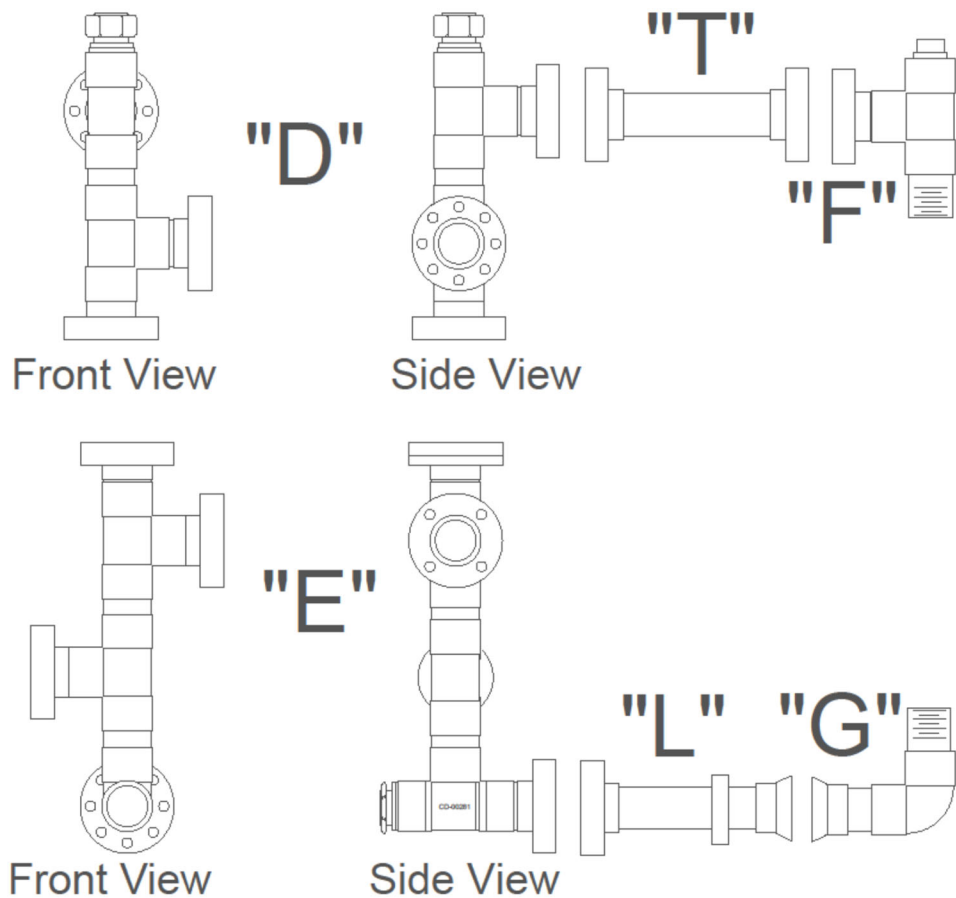


Fig. 10.3.3.1

Media Beds

Section 10.4

- Replacement media bed breakdown c/w gravel support, see section 5

REPLACEMENT MEDIA BEDS PART NUMBERS						
Tank Diameter	Multi Media(0) Fig.10.4.1	Activated Carbon (4) Fig.10.4.2	Greensand (5) Fig. 10.4.3	Chem Free (6) Fig.10.4.2	Birm (8) Fig.10.4.2	Nextsand (9) Fig.10.4.4
30	450030	450430	450530	450630	450830	450930
36	450036	450436	450536	450636	450836	450936
42	450042	450442	450542	450642	450842	450942
48	450048	450448	450548	450648	450848	450948
63	450063	450463	450563	450663	450863	fhf-mvs-sec10.xlsx

Table 10.4.1

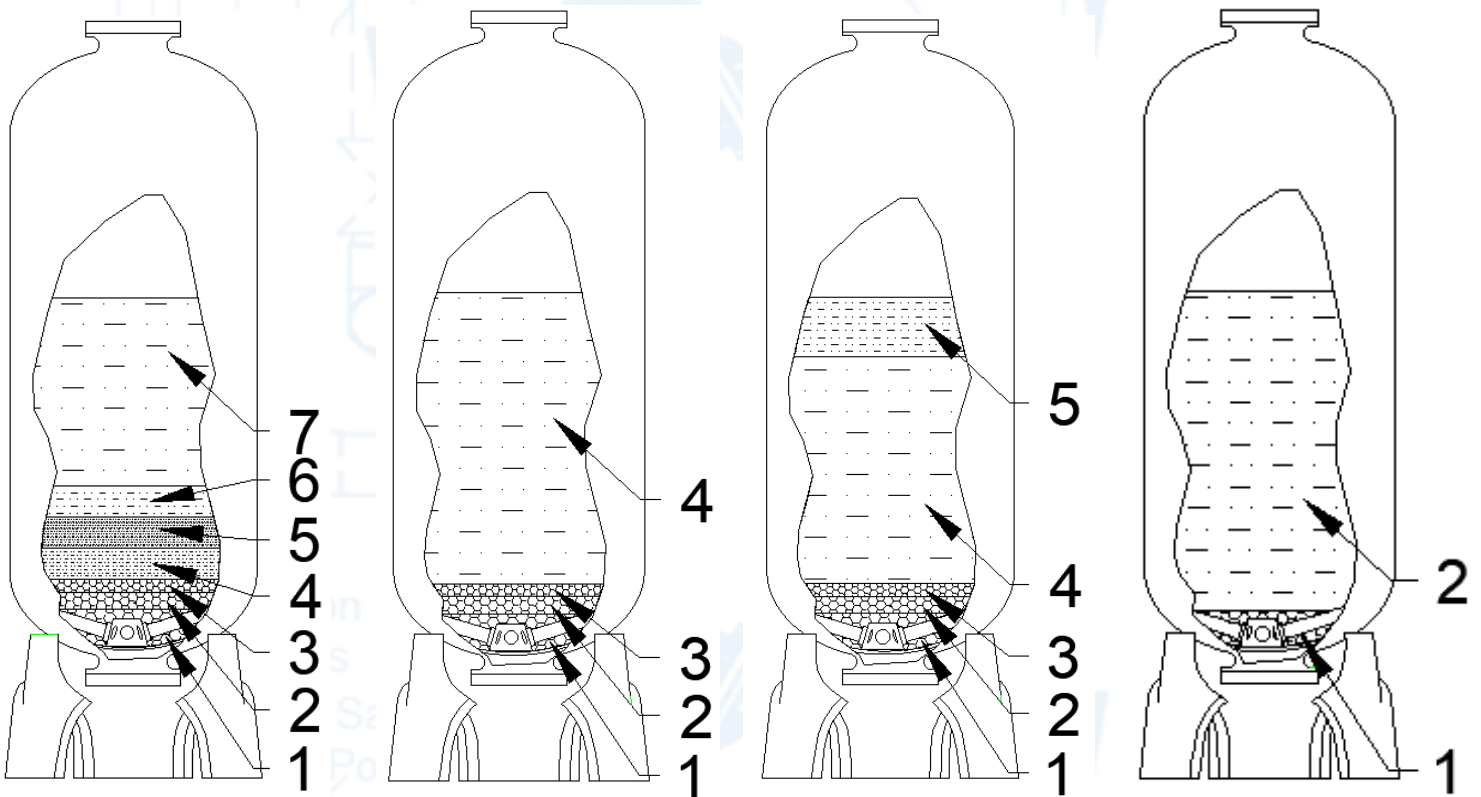


Fig. 10.4.1

Fig. 10.4.2

Fig. 10.4.3

Fig. 10.4.4

Repair Parts - Misc. Parts

Section 10.5

Description	Part #
Meter Cable 100"	19791-04
2" PVC Electronic Meter Soc	60502020
3" SS Electronic Meter NPT	61935-10
NXT Stager Controller	60024157
Plug 1/8" Brass	28051
Tubing 1/4" black Poly	115205
Connector 1/4" QC x 1/8" MNPT	PI010821S
Connector, Elbow 1/4" QC x 1/8" NPTF	80010036
Connector, Elbow 1/4" QC x 1/8" MNPT	PI480821S
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Table 10.5.1

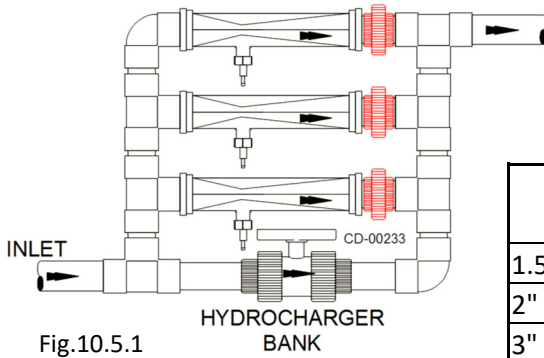


Fig.10.5.1

Standard Hydrocharger Banks	
1.5" inlet, 1.5" bypass valve-1 air inductor	P151501
2" inlet, 1.5" bypass valve-3 air inductors	P201503
3" inlet-2" bypass valve -2 Air inductors (K)	M302002-K
3" inlet-2" bypass valve -3 Air inductors (L)	M302003-L
Vacuum breaker 1.5" MNPT	310527
Air release valve Brakmaun	50701
Valve Vacuum breaker 1" mnpt	3105271
Chemical feeder 45MHP2-120V	11873/11809
50 gallon graduated chemical tank	40380
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Table 10.5.2

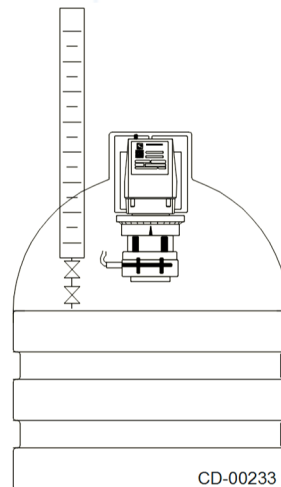


Fig.10.5.2

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.	A. Close by-pass valve
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 drain line & 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 backwash flowrate.
5. Media in the service line.	A. Distribution 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. Micro switch faulty. B. Defective circuit board.	A. Replace micro switch. B. Replace circuit board.
7. Water running to drain when in service.	A. Foreign matter in diaphragm valve. . B. Internal leak. C. To low or no control pressure	A. Inspect diaphragm valve. B. Replace diaphragm valve or install kit. C. Check, control pressure. clean or replace the control pressure screen.
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solution
Valves

Sample
Points &

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.