

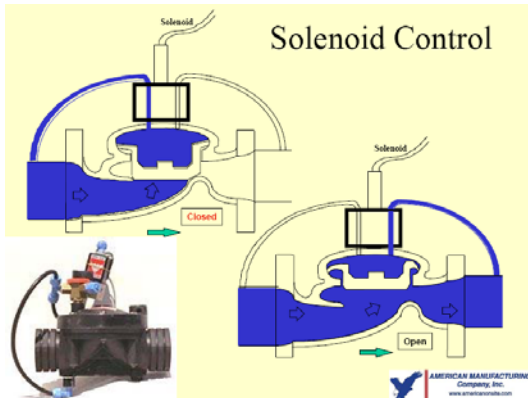


AMERICAN MANUFACTURING COMPANY, INC.

P.O. Box 97, Elkwood, VA 22718
1-800-345-3132

Perceptions Are NOT Always Reality In Drip Systems

SEQUENCING VALVES vs. SOLENOID VALVES



Sequencing Control



Drip Dispersal Systems have been used in onsite wastewater since the early 1990's. The key process to overcome from an engineering and regulatory point of view was to prove sustainable dispersing of wastewater effluent through an 800 micron emitter. Virginia monitored numerous drip installations in the 1990's to gain confidence that emitters could be kept functional. The original standard included flow monitoring, automatic back flushing of mechanical filtration, automatic network flushing, and time dosing the equal distribution system. The key to sustainable drip system installations is to make sure emitters do not lose capacity from clogging. Monitoring drip emitter rates is critical.

In multi zone systems, dependable and controllable automatic alternation between zones in a regime of routine time dosing is extremely important to sustain the integrity of the soil absorption system and provide operational utility. There are primarily two methods of zone dosing management, mechanical sequencing valves, and low voltage Solenoid activated Diaphragm Valves.

Solenoid activated diaphragm valves (Solenoid Valves) have been utilized extensively in the irrigation and wastewater industries. They have been sometimes perceived to be more complicated due to their electrical activation. However, their widespread use by experienced practitioners has shown them to provide exceptional utility for operation. Sequencing valves (indexing valves) as mechanical valves may seem to be economical and simpler but in operation the enclosed mechanical valve is very difficult to confirm system or component operation. The short term system cost may be lower but the long term operation and maintenance cost can be much higher when compared to Solenoid Valves.



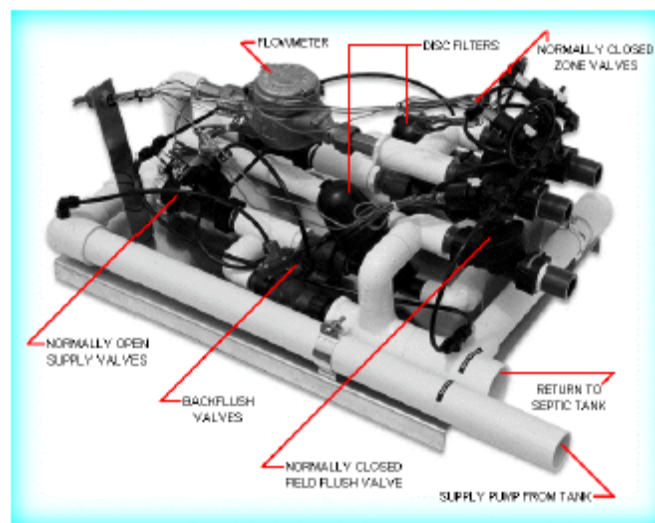
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SOLENOID ACTIVATED DIAPHRAGM VALVES

These valves are a necessary part of a filtration system (headworks) which automatically backwashes or flushes filters and that periodically forward flush the tubing network. They are selected based on flow rate.

The solenoid plunger activates to the open or closed position upon receiving a low voltage signal from the control system. The valve opens and closes based on the hydraulic pressure on either side of the valve, seating the diaphragm over the valve port.



When utilized in a complete drip dispersal package including a pump, floats, control panel, filtration unit and integrated dosing, the solenoid valves are dependable and provide operator interface to enable testing of the entire system quickly. The system is easy to troubleshoot and service. Parts are readily available. It is very easy to test the valve and to take a zone out of service for repair or resting. The individual valves have a manual override operable without requiring electrical control activation.

Valves typically fail in the closed position as a result of solenoid malfunction. Open position failure is a rare occurrence. In both cases the sister zones continue to be dosed in accordance with the standard dosing sequence thus not overloading the soil.

The valves easily address designs requiring multiple zoning on variable contours, down hill drip fields and provide control to provide variable loading rates (different run times for different zones). Remote valve placement down slope at the remote zone controls draindown of the supply line. The valves provide maximum filter backwash and zone flush control to minimize return flush water preventing overloading of treatment system. Solenoid activated diaphragm valves are ideal for telemetry based operation and monitoring.



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SEQUENCING VALVES

There are a number of design, installation, and operational variables that need to be considered when utilizing sequencing valves to achieve a minimal level of expected performance for each site. The hydraulic system must provide a minimum flow rate and pressure to dependably sequence from one zone supply line to the next. Sequence valves have a high head loss. The valve must be carefully positioned, typically located at the highest elevation at top of the fields, to eliminate any back pressure on the unit. Zone supply line drainage down slope from the valve must be accounted for in design. Air locking conditions need consideration. Cold season considerations include icing as well as expansion / contraction of the valves internal mechanism.



The valve should be routinely disassembled to inspect for any solids and precipitates (scaling) that need to be cleaned from the internal mechanism to insure proper function. Inspection and cleaning involves disassembling the valve.

The valve may appear to sequence as desired, but weeping into the remaining outlets is a common condition, effectively gravity dosing all the remaining zones to some degree. This condition is difficult to monitor and troubleshoot as with these mechanical valves it is not readily easy to ascertain which outlet is being dosed and the status of the remaining outlets.

In addition to the passive "weeping" described above the valve may "hang up" and not sequence. In this condition, the valve fails in the open position, allowing the effluent to be dosed to that single zone. In the case of a two zone system, one zone receives twice the design wastewater loading. In the case of a four zone system, 25% of the drip field receives the entire design wastewater loading. This situation is compounded when valves are placed in series. Short of wastewater surfacing, there is no indication to the owner / operator that the valve is not performing as designed.

There are other operational limitations. Pump flow surges may cause skipping of zones. A zone cannot be readily taken out of service for resting or repair without disassembling the valve and changing the appropriate cam locations.

Operationally significant, individual zones cannot be dosed at variable loading rates as maybe necessary with differing soil conditions among zones.

In the case of routine network forward flushing, all the zones must be flushed as a group in sequence. If the valve "hangs up" zones may not be flushed at the prescribed frequency. If the valve "weeps" then pressure and flow is reduced to the lead zone being flushed.



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A - ASD152-S122 - 15 gpm 2 Zone Drip w/ Simplex 2 Filter, 2 Zone Control Panel				B - ASD153-S124 - 15 gpm 3 Zone Drip w/ Simplex 2 Filter, 4 Zone Control Panel			
<u>LINE#</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>LINE#</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>	<u>QTY</u>
CENTRAL UNIT EQUIP PACKAGES				CENTRAL UNIT EQUIP PACKAGES			
1	DH2-22KIT	2 ZONE DRIP SYSTEM KIT	1	1	DH2-23KIT	3 ZONE DRIP SYSTEM KIT	1
2	DP1-B9140P	SIMPLEX 2 ZONE CONTROL	1	2	DP1-B9141P	SIMPLEX 4 ZONE CONTROL	1
3	PUTURB1512112W	15 GPM TURBINE	1	3	PUTURB1512112W	15 GPM TURBINE	1
4	COOLGUIDE15	LAMINAR FLOW COLLAR, 6", 15 GPM	1	4	COOLGUIDE15	LAMINAR FLOW COLLAR, 6", 15 GPM	1
5	PUMPKITDRIP	DRIP PUMP KIT 1½"	1	5	PUMPKITDRIP	DRIP PUMP KIT 1½"	1
6	BIOLINE1000	DRIP TUBING PER 1000' ROLLS	2	6	BIOLINE1000	DRIP TUBING PER 1000' ROLLS	3
7	PVC12FLEX	½" FLEX PVC 100'	1	7	PVC12FLEX	½" FLEX PVC 100'	2
8	BIOINSERT12X34	BIOLINE INSERT ADAPTER ½" X ¾"	50	8	BIOINSERT12X34	BIOLINE INSERT ADAPTER ½" X ¾"	75
9	PVCPRFIP12X34	FEMALE ADAPTER ½" X ¾" SxT SCH40	50	9	PVCPRFIP12X34	FEMALE ADAPTER ½" X ¾" SxT SCH40	75
10	BIOCOUP	BIOLINE REPAIR COUPLING ½"	6	10	BIOCOUP	BIOLINE REPAIR COUPLING ½"	9
11	DH-TOPFEEDKIT1	TOP FEED MANIFOLD KIT 1"	2	11	DH-TOPFEEDKIT1	TOP FEED MANIFOLD KIT 1"	3
C - ASD154-S124 - 15 gpm 4 Zone Drip w/ Simplex 2 Filter, 4 Zone Control Panel				D - ASD151-S124 - 15 gpm 2 Remote Zone Drip w/ Simplex 2 Filter, 4 Zone Control Panel			
<u>LINE#</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>LINE#</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>	<u>QTY</u>
CENTRAL UNIT EQUIP PACKAGES				CENTRAL UNIT EQUIP PACKAGES			
1	DH2-24KIT	4 ZONE DRIP SYSTEM KIT	1	1	DH2-21KIT	MASTER VALVE DRIP SYSTEM KIT	1
2	DP1-B9141P	SIMPLEX 4 ZONE CONTROL	1	2	DP1-B9157P	SIMPLEX 4 ZONE CONT. W/ MAST. VLV.	1
3	PUTURB1512112W	15 GPM TURBINE	1	3	PUTURB1512112W	15 GPM TURBINE	1
4	COOLGUIDE15	LAMINAR FLOW COLLAR, 6", 15 GPM	1	4	COOLGUIDE15	LAMINAR FLOW COLLAR, 6", 15 GPM	1
5	PUMPKITDRIP	DRIP PUMP KIT 1½"	1	5	PUMPKITDRIP	DRIP PUMP KIT 1½"	1
6	BIOLINE1000	DRIP TUBING PER 1000' ROLLS	4	6	ZONEVALVE1	REMOTE ZONE VALVE 1" VLV. X 1" PIPE	2
7	PVC12FLEX	½" FLEX PVC 100'	2	7	DH-VALVEBOX	VALVE BOX 20" X 14" X 12" W/ COVER	2
8	BIOINSERT12X34	BIOLINE INSERT ADAPTER ½" X ¾"	100	8	BIOLINE1000	DRIP TUBING PER 1000' ROLLS	2
9	PVCPRFIP12X34	FEMALE ADAPTER ½" X ¾" SxT SCH40	100	9	PVC12FLEX	½" FLEX PVC 100'	1
10	BIOCOUP	BIOLINE REPAIR COUPLING ½"	12	10	BIOINSERT12X34	BIOLINE INSERT ADAPTER ½" X ¾"	50
11	DH-TOPFEEDKIT1	TOP FEED MANIFOLD KIT 1"	4	11	PVCPRFIP12X34	FEMALE ADAPTER ½" X ¾" SxT SCH40	50
				12	BIOCOUP	BIOLINE REPAIR COUPLING ½"	6
				13	DH-TOPFEEDKIT1	TOP FEED MANIFOLD KIT 1"	2
E - ABD151-S121-SV2 - 15 gpm 2 Zone QM WASHDOWN w/ Sequencer & LCD Control				F - ABD121-S121-SV2 - 12 gpm 1 Zone QM Skid Mount w/ Sequencer & LCD Control			
<u>LINE#</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>LINE#</u>	<u>COMPONENT</u>	<u>DESCRIPTION</u>	<u>QTY</u>
CENTRAL UNIT EQUIP PACKAGES				CENTRAL UNIT EQUIP PACKAGES			
1	DH0-1B	1 FILTER 1 ZONE WASHDOWN UNIT	1	1	DH0-2B	2 FILTER 1 ZONE SEMI-AUTO QM UNIT	1
2	SWITCHBARDRIP4	FLOAT BAR 4, (2) PO15 & (2) DO15M	1	2	SWITCHBARDRIP4	FLOAT BAR 4, (2) PO15 & (2) DO15M	1
3	DP0-B9114	SIMPLEX 1 ZONE LOGO CONTROL	1	3	DP0-B9114	SIMPLEX 1 ZONE LOGO CONTROL	1
4	PUTURB1512112W	15 GPM TURBINE	1	4	PUTURB1512112W	15 GPM TURBINE	1
5	COOLGUIDE15	LAMINAR FLOW COLLAR, 6", 15 GPM	1	5	COOLGUIDE15	LAMINAR FLOW COLLAR, 6", 15 GPM	1
6	PUMPKITDRIP	DRIP PUMP KIT 1½"	1	6	PUMPKITDRIP	DRIP PUMP KIT 1½"	1
7	BIOLINE1000	DRIP TUBING PER 1000' ROLLS	2	7	BIOLINE1000	DRIP TUBING PER 1000' ROLLS	2
8	PVC12FLEX	½" FLEX PVC 100'	1	8	PVC12FLEX	½" FLEX PVC 100'	1
9	BIOINSERT12X34	BIOLINE INSERT ADAPTER ½" X ¾"	50	9	BIOINSERT12X34	BIOLINE INSERT ADAPTER ½" X ¾"	50
10	PVCPRFIP12X34	FEMALE ADAPTER ½" X ¾" SxT SCH40	50	10	PVCPRFIP12X34	FEMALE ADAPTER ½" X ¾" SxT SCH40	50
11	BIOCOUP	BIOLINE REPAIR COUPLING ½"	6	11	BIOCOUP	BIOLINE REPAIR COUPLING ½"	6
12	DH-TOPFEEDKIT1	TOP FEED MANIFOLD KIT 1"	2	12	DH-TOPFEEDKIT1	TOP FEED MANIFOLD KIT 1"	2
13	SEQUENCEVALVE2	SEQUENCE VLV 1½" 4 OUTLET 2 ZN	1	13	SEQUENCEVALVE2	SEQUENCE VALVE 4 OUTLET 2 ZONE	1