

V-RAM BALL VALVE PUMPS VS. POPPET VALVE PUMPS

The V-RAM Ball Valve Pumps differs from the poppet valve type pumps in two general areas of significance: the ball check valves and the electronic switching of the hydraulic cylinders.

The advantages of the V-RAM design are as follows:

BALL CHECK VALVES

1. The ball check valves have been in use for over 50 years in liquid/slurry applications with proven history of reliability and longevity.
2. They feature a self-cleaning action by rolling away from rags and other materials which would normally block any other type of valve.
3. They have been used by V-RAM in municipal sludge cake pumps since early 1995 with only two reported failures.
4. V-RAM ball check valves are fully ported in that the open area between the ball and the inside wall of the valve body is at least as large as the center open area of the valve seat.
5. The effective wear surface of a 6" valve ball is 113 square inches and the seat wear surface is 29.4 square inches as compared to the poppet valve and the seat's 1.5/1.9 square inch (pressure/suction) wear surfaces.
6. The resistance to abrasion and corrosion exhibited by the urethane material of the ball valves and seats is far superior to that of the hardened steel of poppet valves.
7. The ball valve components are readily accessible through hinged sections of the pump head and can be replaced within 2-3 minutes after the pump is opened up.
8. The warranted wear life of the ball valve components is at *least* twenty (20) times longer than the typically experienced with a poppet valve.

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ELECTRONICALLY SWITCHED HYDRAULIC CYLINDERS

V-RAM's use of electronically-switched hydraulic cylinders is far superior to the hydraulically-switched cylinders of poppet valve pumps in that the V-RAM system:

- Is unaffected by hydraulic oil temperature variations.
- Is unaffected by cylinder travel speeds.
- Eliminates malfunctions due to hydraulic bypass line blockages and valve malfunctions.
- Eliminates unnecessary complexity in hydraulic system.
- Enables use of PLC's and sophisticated control systems with pumps.
- Are completely reliable, readily available and easily replaced.

PUMP SERVICEABILITY

1. V-RAM's design eliminates 67% of the hydraulic cylinders, valves, hoses and fittings found with the poppet valve pump; thereby reducing O & M costs by an equal amount at the minimum.
2. V-RAM's design replaces the maintenance intensive poppet valve system with maintenance free ball check valves; thereby reducing the typical maintenance interval from bi-monthly to bi-annually.
3. V-RAM's design enables direct access to both the upper and lower material pistons from both sides and the top and bottom, whereas our competitors pistons must be accessed down through the top of a confined wash box. Moreover, the lower piston of our competitors can be reached only after the upper piston is disassembled, whether it is due for maintenance or not, and at a considerable waste of time and money.
4. V-RAM's design locates all hydraulic valves on the hydraulic power unit, away from the unclean environment of the cake pumps, thus facilitating O & M requirements and avoiding potential contamination.
5. V-RAM's design enables the local procurement of numerous components of standard design and ready availability including the hoses, fittings, valves, pumps, motors and seals for the hydraulic system; the electric motor and solenoid switches for the hydraulic system; the various control components and the in-feed screw auger. This important capability reduces both maintenance costs and equipment downtime to an absolute minimum.

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REPLACEMENT PROCEDURES DIFFERENCES

COMPETITORS

1. Retrace the faulty delivery piston to its rearmost position.
2. Shut the pump down and lock out the power supply.
3. Remove the protective grating from the top of the water box.
4. Drain the water out of the water box, or, in the case of a failed delivery piston manually dig all the sludge out of the water box.
5. With wrenches, in the confines of the water box, loosen the bolts on either end of the connecting rod and remove the rod.
6. If the rod is jammed between the delivery piston and the hydraulic cylinder, then the power unit must be restarted, the hydraulic cylinder slightly re-extended and retracted and then the power locked out again before reaching down into the water box to remove the connecting rod.
7. Restart the power unit, run the hydraulic cylinder forward until it touches the delivery cylinder, shut the power unit off and lock it out.
8. Reconnect the hydraulic cylinder directly to the delivery piston, again within the confines of the water box.
9. Restart the power unit, retract the hydraulic cylinder to bring the delivery piston into the water box, shut the power down again and lock it out.
10. Disconnect the delivery piston from the hydraulic cylinder and remove it from the pump through the water box.

V-RAM PUMPS

1. The hydraulic cylinder is retracted to its rearmost position.
2. The bolts connecting the hydraulic cylinder to the pumping chamber are removed.
3. The hydraulic cylinder is extended approximately 14”.
4. The power unit is turned off and locked out.
5. The two spacer blocks are placed between the flanges of the hydraulic cylinder and pump chamber.
6. The pumping chamber area is flushed out with a spray hose.
7. The pump is restarted and the hydraulic cylinder is retracted to bring the delivery piston out into the open. The pump power is again locked out.
8. The delivery piston is unbolted from the hydraulic cylinder.