Fluid power

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Fluid Power Fluid Power Describe briefly the operating principles of a variable displacement axial piston pump. Discuss how the delivery is varied. Also show by sketch.

Answer. A variable displacement axial piston pump consists of casing, drive shaft, cylinder block, swash plate and plunger or swash plate adjusting valve as shown figure 1a. The operation of pump is based on the conversion of mechanical energy to hydraulic (fluid) energy through the displacement, or amount of fluid pumped per revolution of the pump's input shaft. At certain inclination (angle) of swash plate as the pump's shaft rotates a partial vacuum (suction) is created at the pump inlet that allows atmospheric pressure to push the fluid out of the oil tank (reservoir) into the pump intake. Simultaneously due to certain angle of swash plate a compression is created at outlet that mechanically pushes the fluid out of the discharge line.

The amount of fluid pumped per revolution of the pump's input shaft can be varied and controlled by the changing the angle of swash plate that can further be controlled and adjusted through the swash plate adjusting valve as shown in figure 1b. If the swash plate is perfectly vertical to drive shaft, as there will not be any reciprocating motion of the pistons hence there will not be flow of fluid and vice versa (Huzij, Spano & Bennett, 2014).

2. Describe the valve operation.

Answer. Irrespective of the types and applications of valves, all valves operate either opening, closing or partially obstructing various passageways of fluid.

3. Describe the function of the valve.

Answer. Depending upon the type and application of a valve the basic function of a valve is

to regulate, direct or controls the flow of a fluid (gases, liquids, fluidized

solids, or slurries) by

opening, closing, or partially obstructing various passageways of fluid.

References

Huzij, R., Spano, A., & Bennett, S. (2014). Modern Diesel Technology: Heavy

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