

Variable Displacement: In Figure 9-07, the hand pump has a positive-displacement but does not have a fixed displacement. The operator could choose to move the handle only a portion of the available stroke. In this case, the output volume per cycle would be a fraction of the potential output volume. Variable-displacement pumps use a variety of methods to change the stroke or change the cavity size of the pumping chambers. Depending on the type of control, this variation in displacement can enhance the efficiency of hydraulic systems.

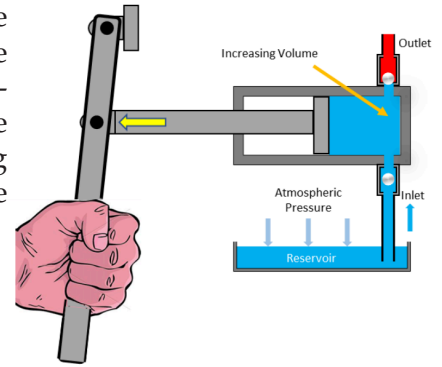
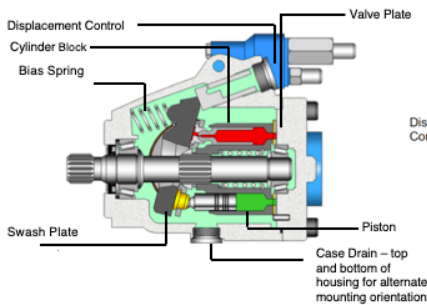
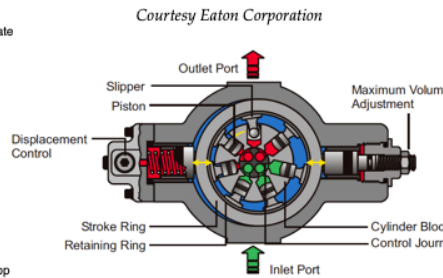


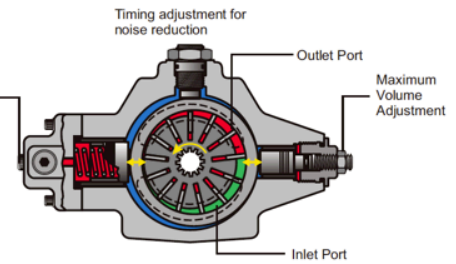
Figure 9-07



Variable Displacement Axial Piston Pump



Variable Displacement Radial Piston Pump



Variable Displacement Vane Piston Pump

Pump Control

Fixed Displacement Pump Control: The output flow from a fixed-displacement pump is normally controlled by the rpm of the prime mover. The pressure is determined by the resistance to the flow up to the setting of the relief valve. Flow from the pump can only be varied by adjusting the speed of the pump. Using a variable speed electric motor, shifting the gear ratio on a power-take-off (PTO), or modulating engine speed are common ways of controlling the output of a fixed-displacement pump.

Digital Control: An exception to the rule are the Digital Displacement® pumps. These are fixed-displacement radial piston pumps. Each piston has a position sensor and an electrically operated poppet valve. The flow from each piston, at any point during the piston power stroke, can be unloaded to the low-pressure core of the pump. This fixed-displacement pump provides a variable flow at a fixed rpm by limiting the effective stroke of the pistons and/or regulating the number of pistons that are activated.

