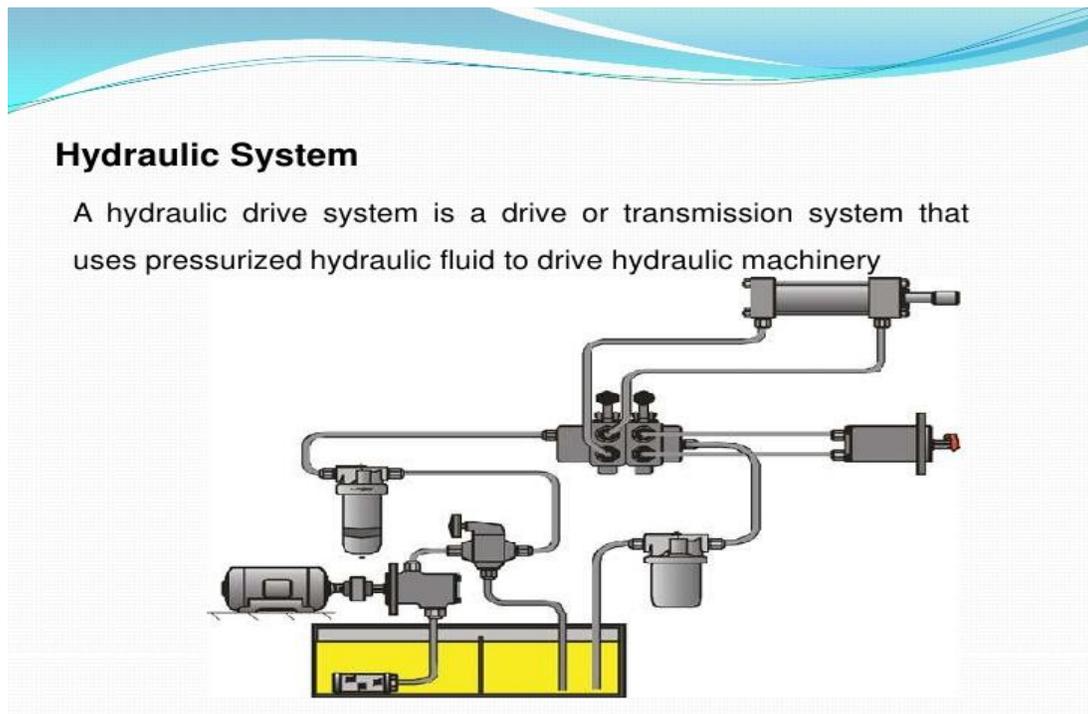


# The Basic Hydraulic System

---

Hydraulic systems can be simple or very complex. There are certain basic elements that are part of almost every hydraulic system.

Understanding what these basic elements are and how they work in a circuit is crucial so you will be able to troubleshoot or spot a potential problem in the place you work. Also in the following lessons you will get acquainted with some of the most common hydraulic symbols.

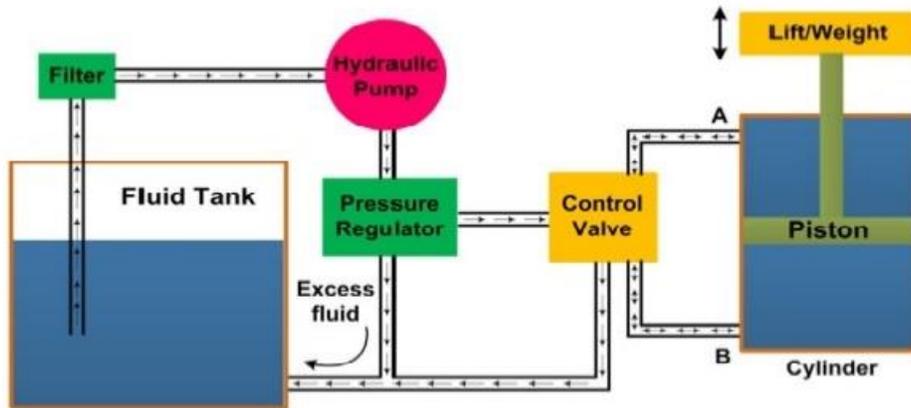


The prime mover, an electrical or gas/diesel motor drives the hydraulic pump which by rotation creates a suction of the fluid which is forced out through the outlet port. This pressurized oil is sent down the line where it is filtered, monitored, and directed to one or more actuators to perform some work before it is returned under low pressure to the reservoir.

## **BASIC ELEMENTS OF A HYDRAULIC SYTEM**

- 1. Fluid, usually Hydraulic Oil.**
- 2. A tank or Reservoir to keep the supply of Fluid.**
- 3. Fluid conditioning devices to keep the fluid clean.**
- 4. A prime mover, usually an electric motor or engine to drive the pump.**
- 5. A pump, to make the fluid flow.**
- 6. Conductors, typically pipes or hoses to carry the fluid.**
- 7. Valves, to control the fluid flow, direction, and pressure.**
- 8. Actuators that can be either rotary (hydraulic motors) or linear (cylinders).**

# OPERATION OF A BASIC HYDRAULIC SYSTEM



Summarizing the operation of a **basic** hydraulic system, the prime mover produces the energy to perform the work; the motor turns the pump which by rotating causes the difference in pressure to vacuum the fluid from the reservoir and through a filter system where impurities are removed. Continuing rotation of the pump forces fluid into the system lines and passes by the **Pressure Relief Valve** where the flow can be redirected to the reservoir if the working pressure is exceeded. Next is the **directional control valve** which directs the flow to the inlet or outlet of the actuator. The speed at which an actuator moves depends on the rate of oil flow directed to it, so in a basic system there is a **flow control valve** in the line between the directional control valve and the actuator.

Restricting the flow using a flow control valve affects the system in different ways than controlling just the actuator speed; the pump keeps on sending more fluid than the lines can accommodate, the system pressure rises and the pressure control valve opens allowing the fluid go back to the reservoir even though fluid still supplied to the actuator through the flow control valve.