

# UNIT 6 - AIRFRAME AND POWERPLANT

## HYDRAULIC SYSTEMS

A simple hydraulic system consists of the following components:

<b>Reservoir</b>	This contains the hydraulic fluid for the system and also serves to cater for any thermal expansion of the fluid.
<b>Accumulator</b>	The accumulator is a very important component as it provides backup hydraulic pressure in case of system failure and also dampens any transient pressure surges in order to provide a seamless transmission. The accumulator has a bladder or piston that is charged with nitrogen <sup>3</sup> at one end.
<b>Hydraulic lines.</b>	These transmit the force to the required system. Most hydraulic lines are constructed of stainless steel in order to contain the high pressures and are corrosion resistant. Some lower pressure systems have rubber hoses or steel braided flexi cables (these can be found on brake lines).
<b>Pump Assembly</b>	Light aircraft use hand pumps to transmit the pressure to the actuator or system. These are also backups for electro-mechanical pumps in case of failure. Most power-driven pumps are driven by the engine gearbox for primary systems and have backup electrical pumps for redundancy on large aircraft.
<b>Valves</b>	These can be sequence valves, non-return valves (check valves) or selector valves and direct fluid in a sequence for a particular system operation.
<b>Pressure relief valves (PRV)</b>	These relieve any pressure surges and direct the fluid back in to the reservoir to prevent any damage downstream.
<b>Actuator</b>	The main component driving the control surface, landing gear actuator and comprises of a piston and pump assembly with a shaft.
<b>Filters</b>	These filter any debris or contaminants.

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<sup>3</sup> Nitrogen is used to charge any accumulators or fill aircraft tyres. The reason is that Nitrogen contains no water and can therefore not freeze at altitude. Plus, being an inert gas, does not pose any flammability issues.