and fill it with fresh fluid. It's not worth the risk of running contaminated fluid through the system only to have it eat the seals and grind the surfaces.

Reservoir

The system reservoir is basically a permanently installed can of hydraulic fluid that includes a reserve supply. Because hydraulic fluid expands as the temperature increases, the can is oversized to accommodate expansion. It also serves to release air from the fluid to prevent the air from entering the lines. Pressurized reservoirs are primarily used on aircraft that operate at high altitudes because the reduced ambient pressure causes the fluid to foam. Light aircraft, because they operate at lower altitudes and lower system pressures, use the simpler, nonpressurized reservoir.

Pump

The heart of the hydraulic system is the pump. There are a number of methods employed to power a pump, including electricity, bleed air from a turbine engine, directly off a reciprocating engine, or even by hand. While the use of hand-driven pumps in aviation has become relatively rare, some aircraft still use them fairly effectively. The Mooney Mark 21, for instance, uses a single-action hand pump for its flap system; each downstroke pumps the flaps down a little more. There also are double-action pumps, where each stroke up or down moves the flaps.

In light aircraft, virtually all major hydraulic systems are engine-driven. The important thing to remember about pumps is that they don't create pressure; they just move fluid. Pressure is created by a resistance to the movement of the fluid.

Pressure Control Valves

There are two basic methods of controlling system pressure: the pressure regulator valve and the pressure relief valve.

The pressure regulator valve, which is controlled by spring tension, senses the system pressure downstream from the pump. If system pressure begins to exceed that specified by the manufacturer, it offsets the spring, and a ball check valve opens and recirculates the fluid to a point outside the pressure-controlled area for reuse.

A pressure relief valve is primarily a backup system. It is set to open at some specific, higher-than-normal, system pressure to act as an escape valve. In normal operation the valve is never used. Should something cause the system to experience a higher than allowable pressure, its force will be greater than the spring tension in the valve, causing the valve to open and allowing the excess pressure to vent.

Fluid Control Valves

Similar to electrical systems, hydraulic systems have their own kind of fuses and diodes in the form of valves, though fuses are more common in large systems that support several functions. If there is a rupture in a line, the fuse prevents fluid loss and allows continued