

HYDRAULIC

GENERAL

An open center hydraulic system operates the landing gear, speedbrakes, and thrust reversers. A separate independent system is used for the main wheel antiskid/power brake system.

In the open center system, fluid continually circulates between the hydraulic lines and the reservoir at a pressure of approximately 60 PSI. This very low pressure greatly reduces the quantity of hydraulic fluid required in the reservoir because there is minimum fluid heat buildup. Low pump wear and low system leakage rates are additional benefits of the open center system.

RESERVOIR

The fluid for the system is contained in an accumulator-type reservoir located in the aft tailcone area. The quantity of fluid is shown by a plunger-type sight gauge located on the aft side of the reservoir. The refill, full and overfill indications correspond to 0.2, 0.5 and 0.6 gallons respectively. A microswitch attached to the accumulator plunger will activate an amber LO HYD LEVEL annunciator panel light any time the fluid level drops below the refill position. Servicing requires equipment capable of delivering hydraulic fluid under pressure. Bleeding or relieving an overfill condition is accomplished by opening a relief valve located on the reservoir. Relieved excessive fluid is drained overboard through the underbelly vent mast. Any internal leakage is collected and drained through an overboard vent line into the underbelly vent mast.

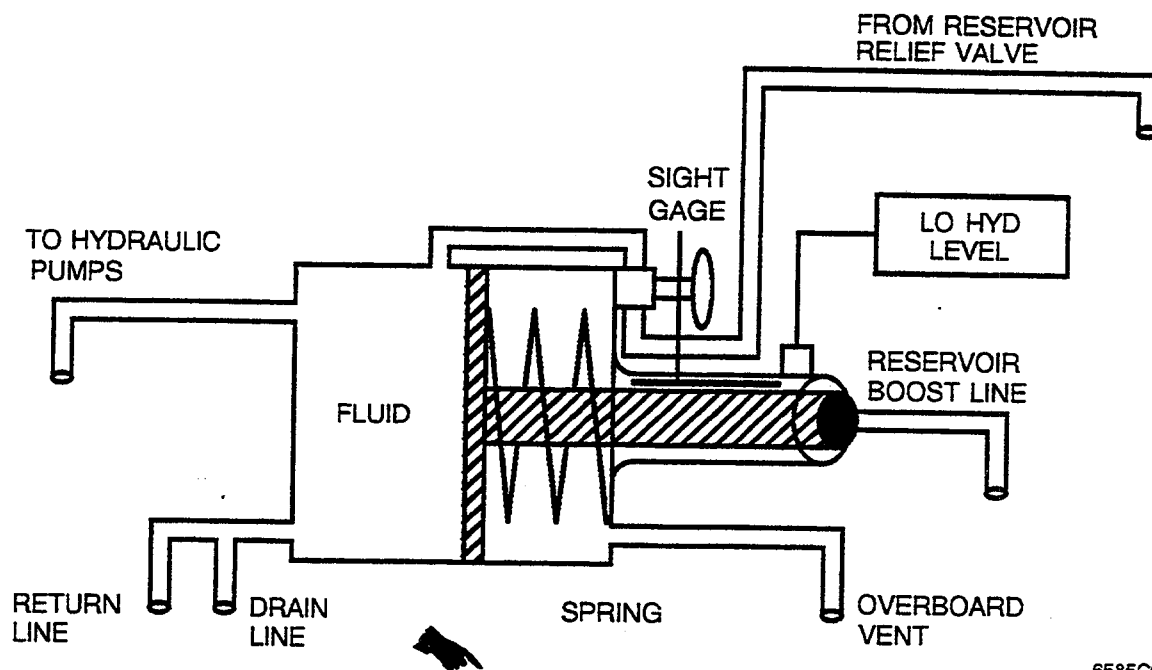
PUMPS

Hydraulic pressure is provided by two positive displacement engine-driven pumps, each mounted on the engine accessory case. Either pump is capable of supplying enough pressure to operate the landing gear, speedbrakes and thrust reversers. From each pump, hydraulic fluid is routed through filters and flow switch check valve assemblies to the bypass valve and relief valve. In the event that either pump output should drop to less than 0.45 gallons-per-minute, +0.10 or -0.10 gallons-per-minute (GPM), the respective amber LO HYD FLOW annunciator panel light will illuminate. The light will extinguish when pump output reaches a minimum of 1.33 GPM.

NORMAL OPERATION

When either the landing gear, speedbrakes, or thrust reversers are actuated, a bypass valve in the return line closes enabling the system to pressurize to 1500 PSI. At the same time, either the speed brake, landing gear or thrust reverser control valve opens allowing flow to go to the selected system. A relief valve which maintains system pressure at 1500 PSI is in parallel with the bypass valve. The relief valve cracks at 1350 PSI and is fully open at 1500 PSI and at an approximate flow rate of 6.6 GPM. The amber HYD PRESS light illuminates on the annunciator panel any time the system is pressurized. Once the selected cycle is complete, the respective control valve closes, the bypass valve opens and the system reverts to the low pressure, open center state.

HYDRAULIC RESERVOIR



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Figure 2-11

WHEEL BRAKES

An independent system is used for the wheel brakes. Fluid is supplied from a reservoir mounted on the right forward side of the forward pressure bulkhead. Sight gauges on the reservoir allow the pilot to visually inspect the brake fluid quantity during preflight. The fluid used in the brake system is the same type as the main hydraulic system. The electric motor, hydraulic pump, check valve, relief valve and filter are combined in one modular assembly. A bleed-off valve discharges stored fluid back into the reservoir so that accumulator precharge may be checked.

Four brake master cylinders, one for each of the pilot's and copilot's pedals, are paired in series. When the pedals are depressed, fluid is forced from the outlet ports of the master cylinders into the respective brake signal inlet ports of the power brake valve assembly. The amount of pressure going to the brakes is proportional to the amount of pressure exerted from the outlet side of the master cylinder by the brake pedals. With the brakes released, a check valve is held open, allowing fluid to move freely in either direction.

A parking brake valve is incorporated in the system to maintain pressure on the brakes after the pedals have been depressed and the parking brake control handle pulled. With the handle off, the check valves are open and fluid can move freely in either direction. The parking brake valve assembly also has two thermal relief valves which open at approximately 1000 PSI to protect the brake system from being damaged by excess pressure resulting from expanding fluid.

Pneumatic pressure from the emergency air bottle is available as a backup to the normal system.

HYDRAULIC SYSTEM SCHEMATIC

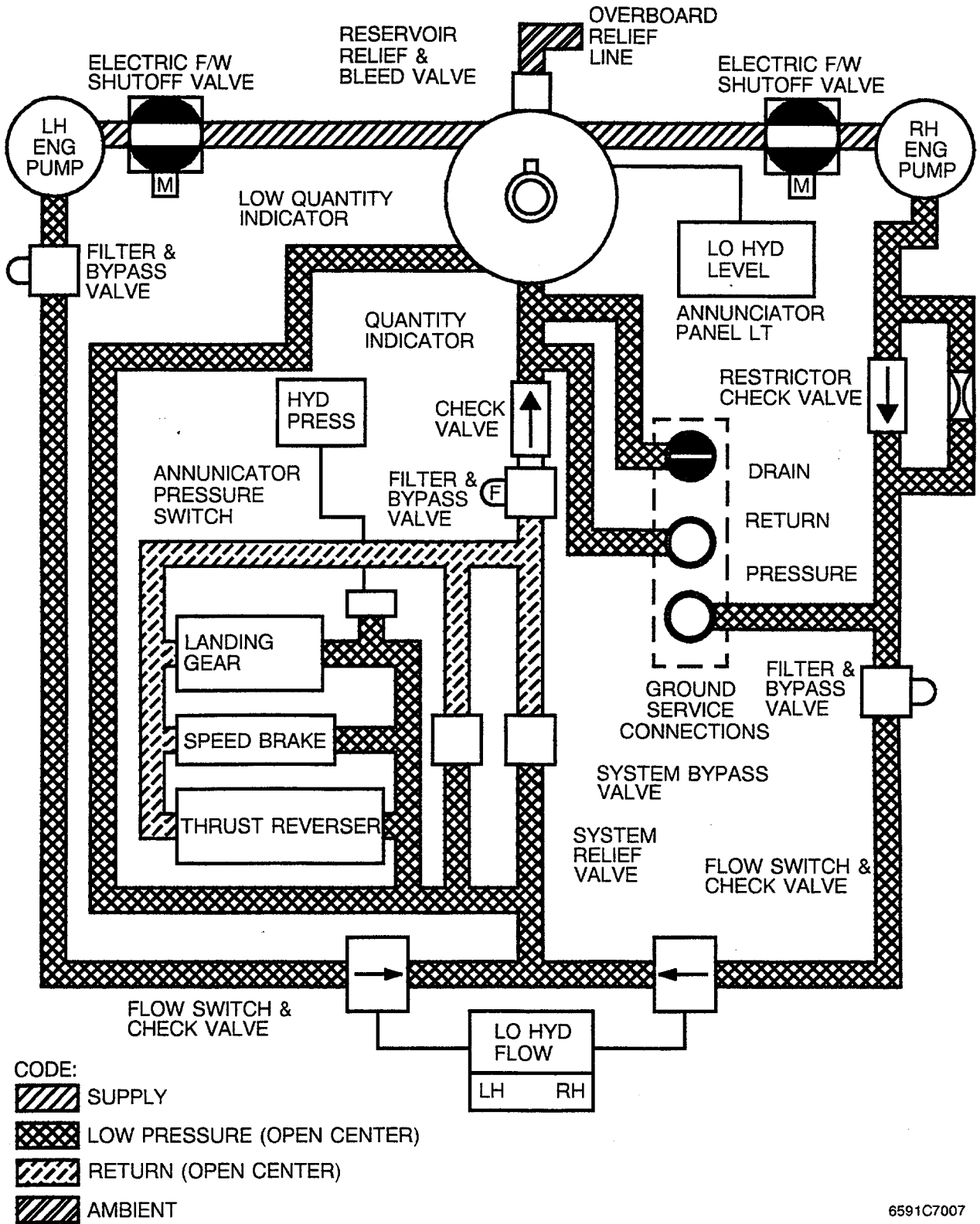


Figure 2-12