

## HYDRAULIC

### GENERAL

The Excel utilizes a phosphate ester-based open center concept to operate the landing gear, flaps, speedbrakes, two-position horizontal stabilizer and the 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 hydraulic bootstrap reservoir located in the aft tailcone area. The reservoir contains an external tapered-piston rod and housing, and the piston extends or retracts based on fluid level in the system. Markings on the piston rod housing indicate refill, full and overfill levels. Any time the fluid level drops below the refill position, the tapered rod will activate a microswitch and cause the amber LO HYD LEVEL annunciator to illuminate. 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 (right hand wing root area). 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 gear, flaps, speedbrakes, two-position horizontal stabilizer and 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 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, flaps, speedbrakes, two-position horizontal stabilizer 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, the respective 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. The 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 REFILL LEVEL

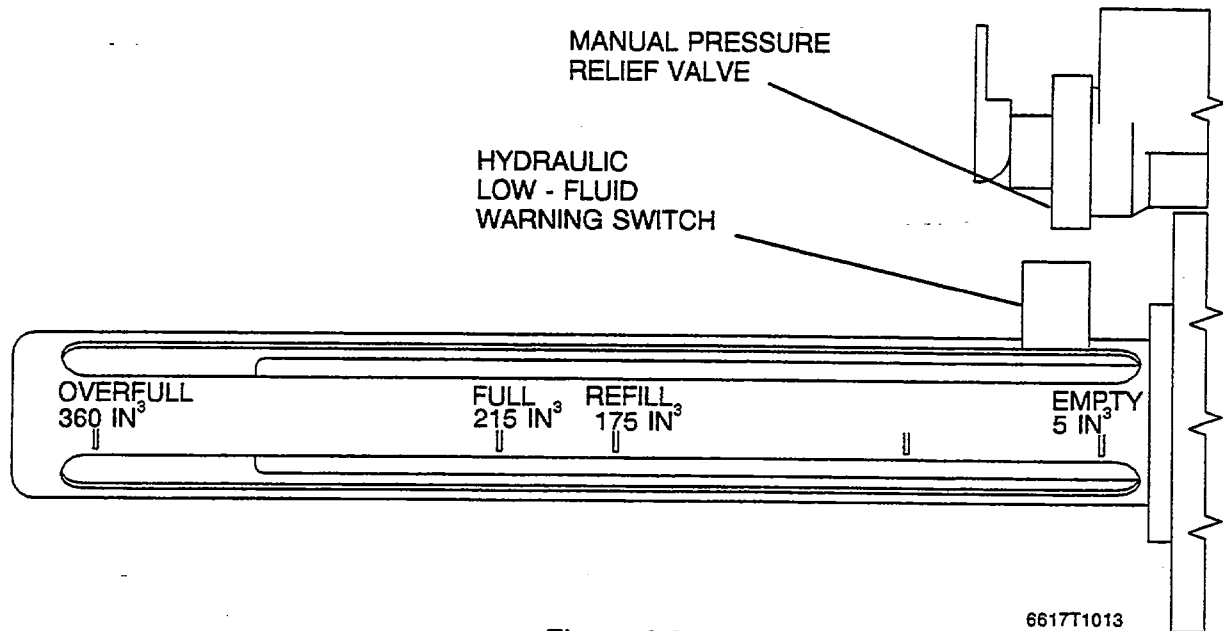


Figure 2-9

## WHEEL BRAKES

The power brake and anti-skid system are designed independent of the main hydraulic system. Refer to the following topic for a complete description.

### POWER BRAKE AND ANTI-SKID SYSTEM

#### GENERAL

The power brake and anti-skid installation is a closed center, phosphate-ester based system with its own separate independent powerpack assembly, accumulator and reservoir. These components provide pressurized hydraulic fluid to the power brake and anti-skid servo valve, which in turn regulates a maximum of 1000 PSI, +20 or -20 PSI pressure to the brakes. This pressure is based upon pilot/co-pilot input through the brake master cylinders, and electronic inputs from the anti-skid control box.

RPM transducers at each wheel sense the beginning of a skid and transmit this information to the anti-skid control. A hand-controllable pneumatic emergency brake valve is provided in the event of a power brake failure. Pneumatic pressure is transmitted to brakes through a shuttle valve integral to each brake assembly. Additionally, a parking brake is included in the basic hydraulic brake system. Specific components are described below.

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