LOW LEVEL WARNING

Low level warning functions independently of the normal quantity indicating system and provides a visual warning to the crew when a minimum amount of usable fuel remains in either tank. The system consists of a float switch in each fuel cell and LH and RH FUEL LOW LEVEL annunciator panel lights and MASTER CAUTION. A usable fuel quantity of 185 ± 15 pounds in either tank will illuminate the associated light. When operating with low fuel loads, it is possible for the lights to illuminate momentarily in turbulent flight conditions or while taxiing on rough surfaces. The system is calibrated to give an accurate indication in level unaccelerated flight. A four second delay is incorporated into the MASTER CAUTION circuit to preclude nuisance momentary MASTER CAUTION illuminations in turbulence.

FUEL SHUTOFF

Electrically operated firewall shutoff valves can be individually closed by depressing the LH or RH ENG FIRE button. Actuation of a shutoff valve will be indicated by illumination of the respective LH or RH F/W SHUTOFF annunciator panel light. The hydraulic fluid flow and generator are also shut off.

HYDRAULIC

GENERAL

An open center hydraulic system operates the landing gear, speed brakes, flaps, and thrust attenuators. A separate independent system is used for the main wheel antiskid/power brake system. For both systems, only MIL-H-83282 hydraulic fluid is approved.

In the open center system, fluid continually circulates between the hydraulic lines and the reservoir at low pressure. This 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 a pressurized reservoir located in the right aft wing fairing. The reservoir is pressurized by the 23 PSI service bleed air system, which serves to prevent foaming. The quantity of fluid is shown by a sight gauge located on the side of the reservoir. The sight gauge is marked at the FULL and ADD levels. Fluid level is measured with the landing gear extended and the flaps, speed brakes, and thrust attenuators retracted. FULL capacity is 125 cubic inches, or two liters. The hydraulic fluid is filtered during its pressure stage and again upon its return to the reservoir. Servicing does not require equipment capable of delivering hydraulic fluid under pressure. Bleeding or relieving an overfill condition is accomplished when servicing the reservoir, by opening a relief valve located on the reservoir. Relieved excessive fluid is drained overboard through an overboard drain tube.

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 and thrust attenuators. From each pump, hydraulic fluid is routed through filters and flow switch check valve assemblies to the loading valve and and relief valve. In the event that either pump output should drop to a flow rate of between .35 to .55 gallons per minute the respective HYD FLOW LOW annunciator panel light will illuminate. The light will extinguish when pump reaches an adequate output.

(Refer to **NOTE** Next Page)

NOTE

If near zero or negative G loads are experienced in flight, it is possible to introduce air into the open center system causing cavitation of one or both hydraulic pumps, as evidenced by illumination of the respective HYD FLOW LOW annunciator(s). Should this occur, the pumps will automatically reprime themselves within a few minutes. Speed brakes, flaps, landing gear, and thrust attenuators will not operate if both pumps remain cavitated. Plan to use the Landing Gear Will Not Extend and the Flaps Inoperative Approach and Landing procedures from the Abnormal Procedures Section.

NORMAL OPERATION

When either the landing gear, flaps, speed brakes or thrust attenuators are actuated, the loading valve in the return line closes enabling the system to pressurize to 1500 PSI. At the same time, either the speed brake, landing gear, flap, or thrust attenuator 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 loading valve. The relief valve cracks at 1350 PSI and is fully open at 1500 PSI. The white HYD PRESS ON light illuminates on the annunciator panel any time the system is pressurized. Once the selected cycle is complete, the respective control valve closes, the loading valve opens, the HYD PRESS ON light extinguishes, and the system reverts to the low pressure, open center state.

WHEEL BRAKES

An independent power brake and anti-skid system is used for wheel braking. The closed center hydraulic system is comprised of an independent power pack assembly (pump, electric motor and filter), accumulator and reservoir which provides pressurized hydraulic fluid to the brake metering valve and anti-skid valve. A hand-controllable pneumatic emergency brake valve is provided in the event of a power brake failure. Pneumatic pressure is transmitted to the brakes through a shuttle valve integral to each brake assembly.

The brake metering valve regulates a maximum of 1000 psi +50/-20 psi to the brakes based upon pilot/copilot input to the left and right rudder pedals. RPM transducers at each wheel sense the onset of a skid and transmit information to the anti-skid control box. The anti-skid control box reduces brake pressure by sending electronic inputs to the anti-skid valve. Pressure to the brake metering valve is controlled by mechanical input through a bellcrank and push-rod sytem from either the pilot or the copilot's rudder pedals. A manually operated parking brake valve allows the pilot to increase brake pressure while the brake is set, and provides thermal relief at 1200 psi. After thermal relief, pressure will drop to no less than 600 psi, and the pilot or copilot must restore full brake pressure prior to advancing both engines to take-off power.

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.

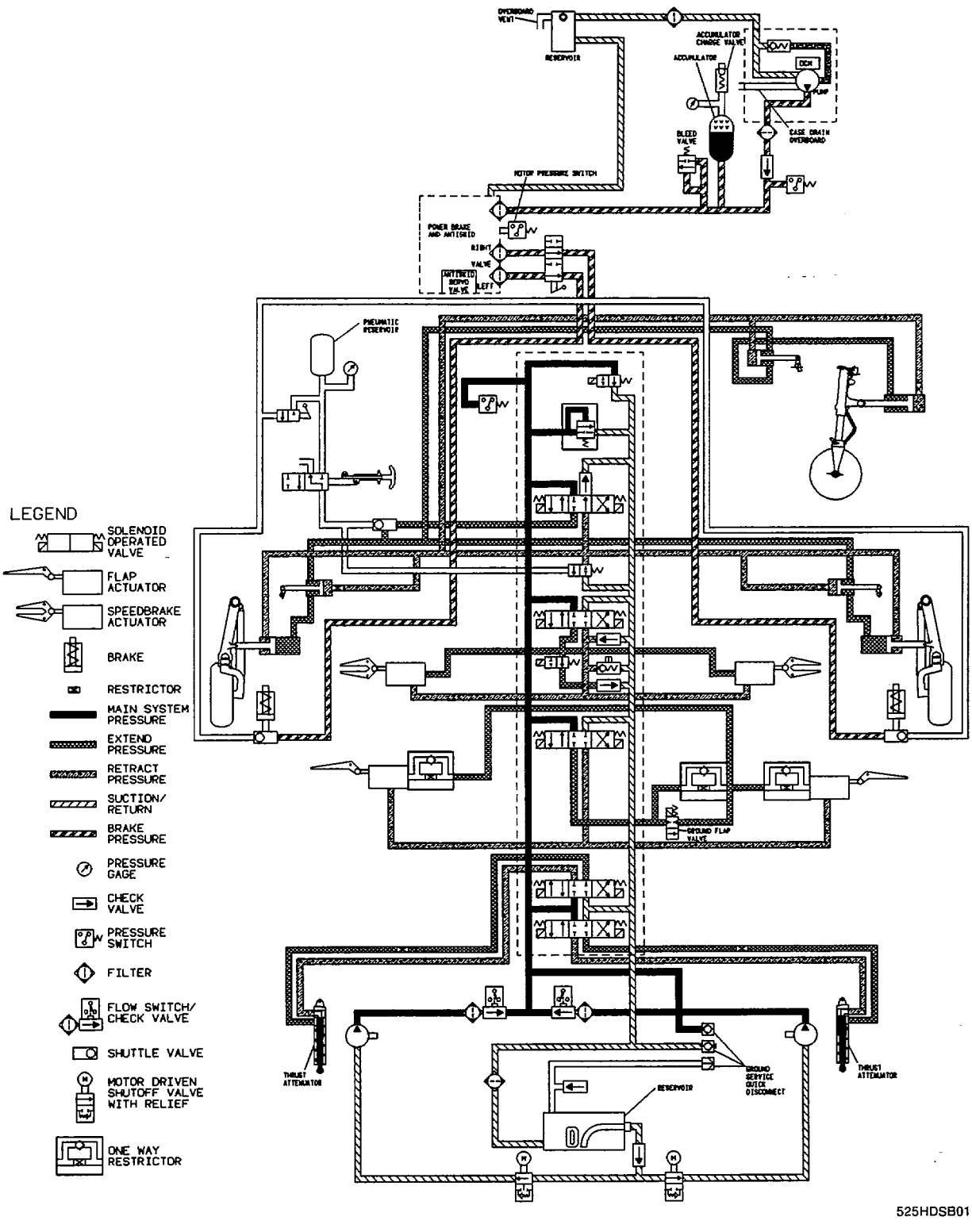

Figure 2-9. Hydraulic System Schematic (Sheet 1 of 2)

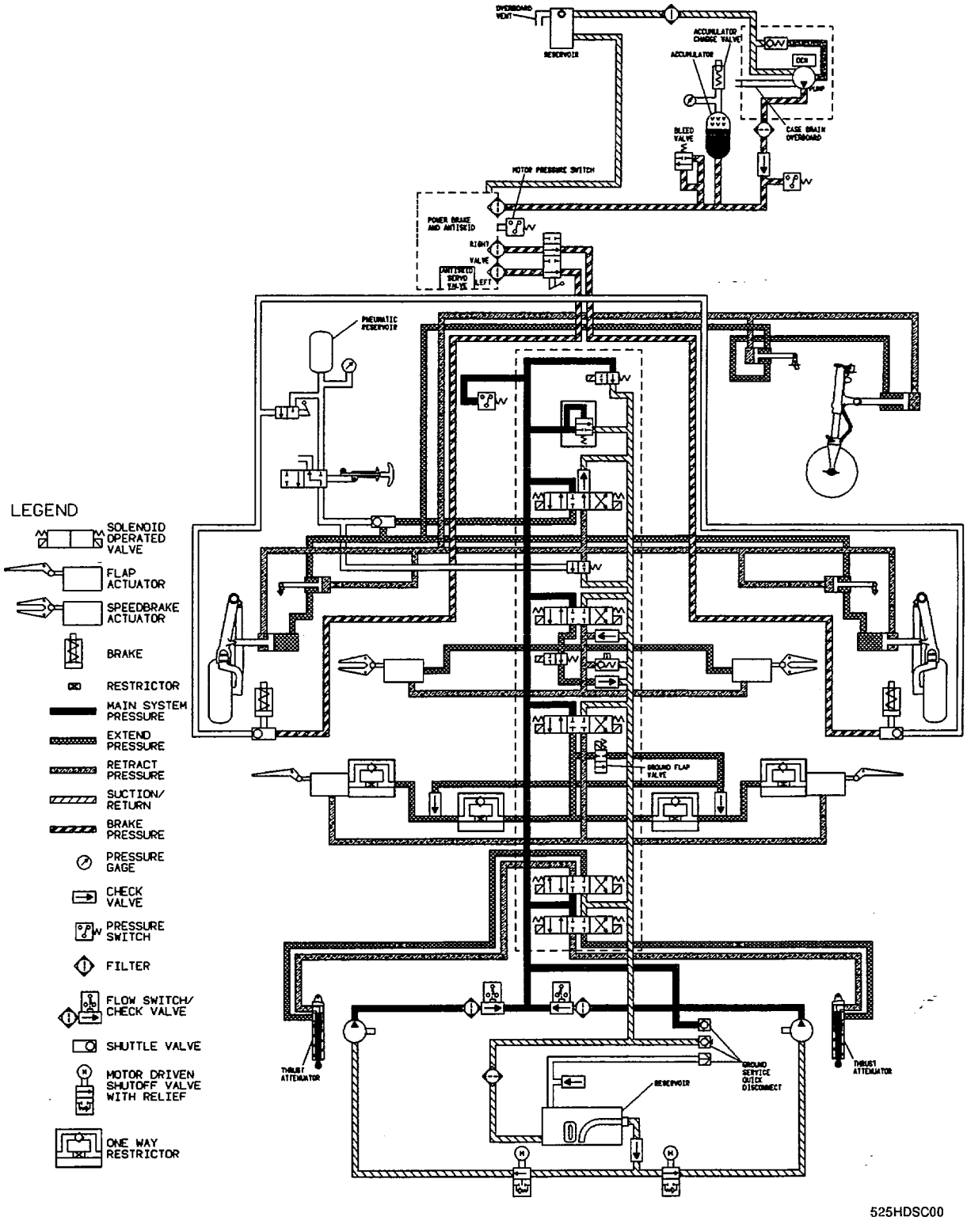

Figure 2-9. Hydraulic System Schematic (Sheet 2 of 2)