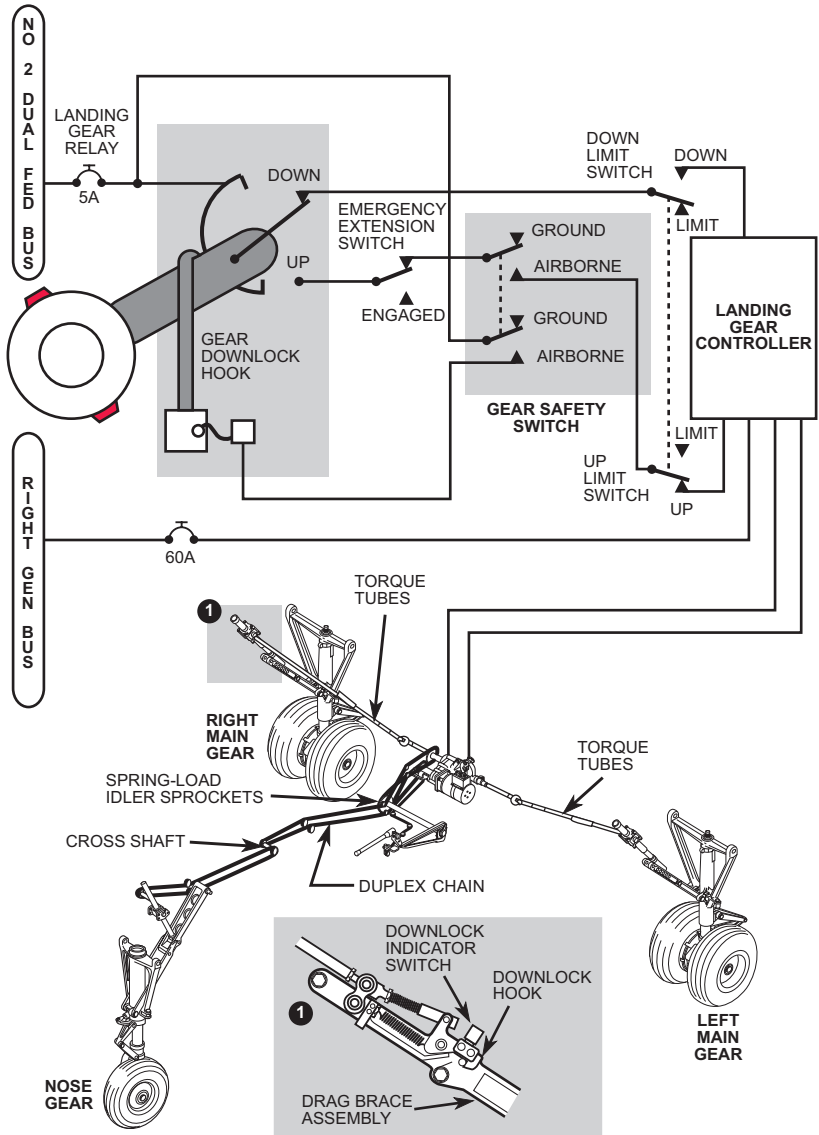
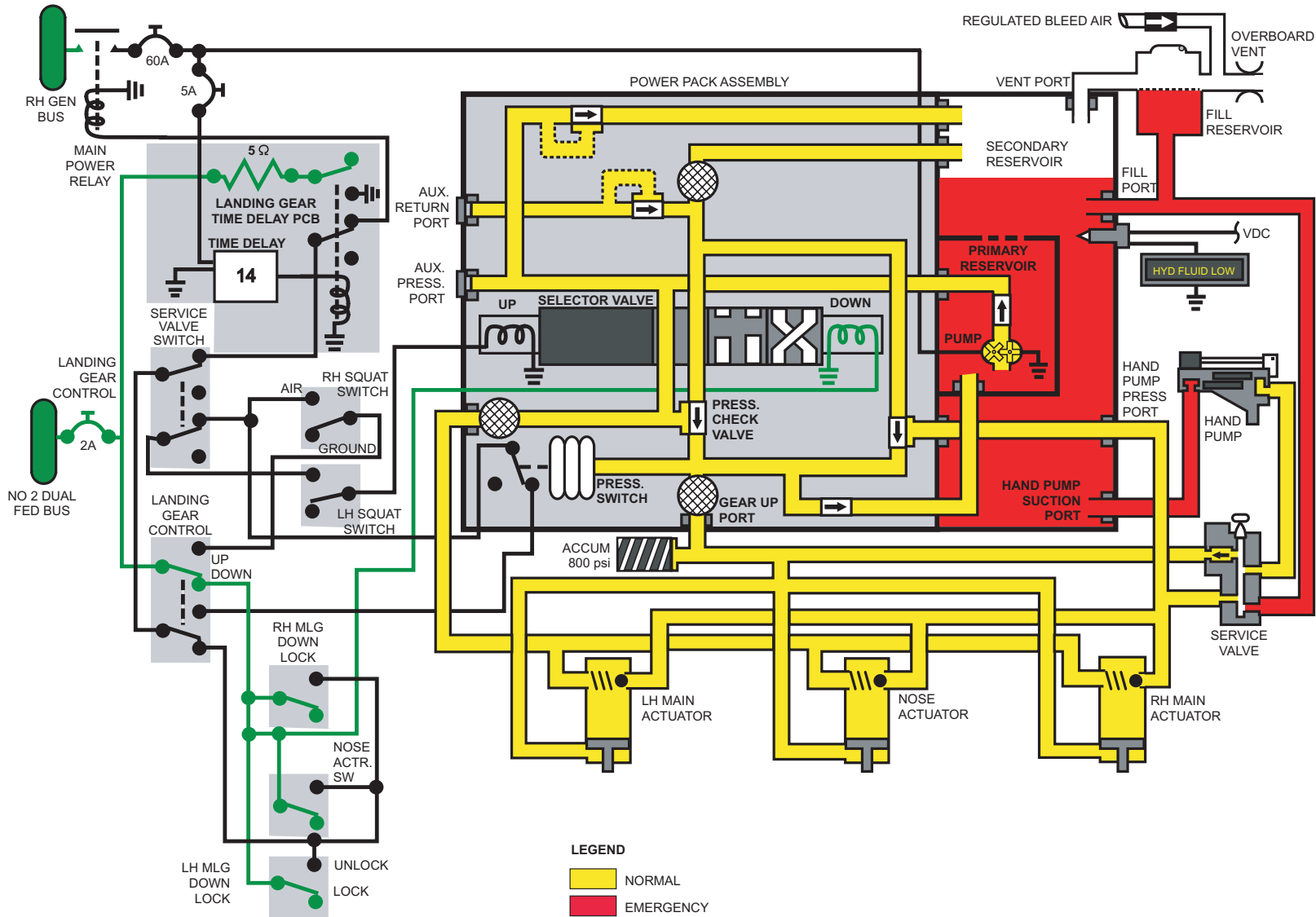


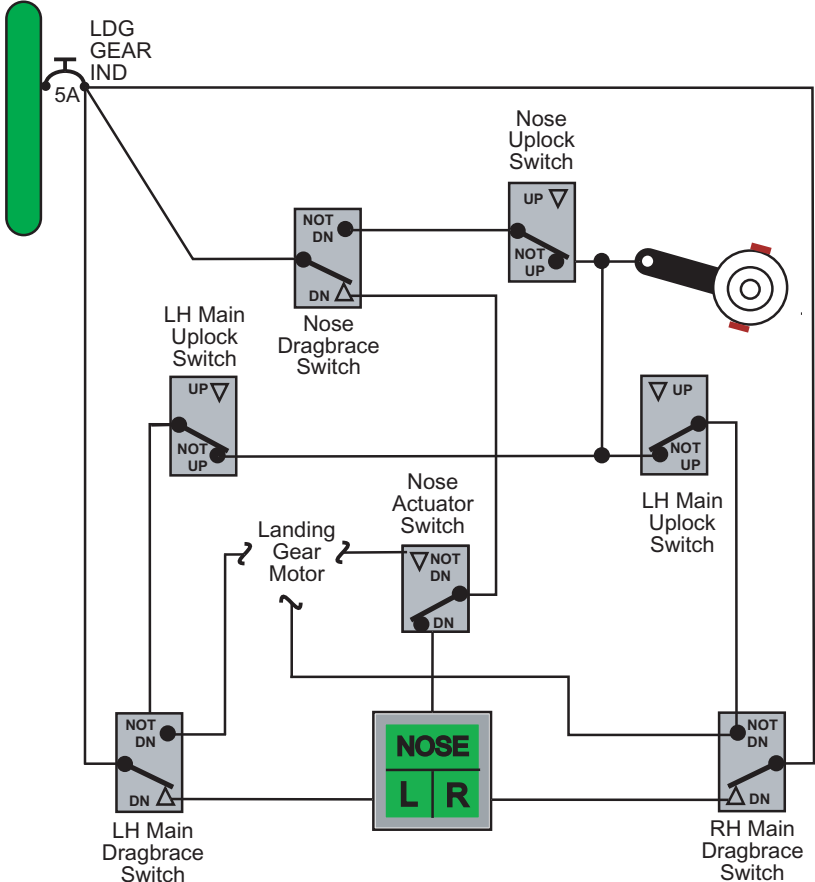
Electro-Mechanical Landing Gear System



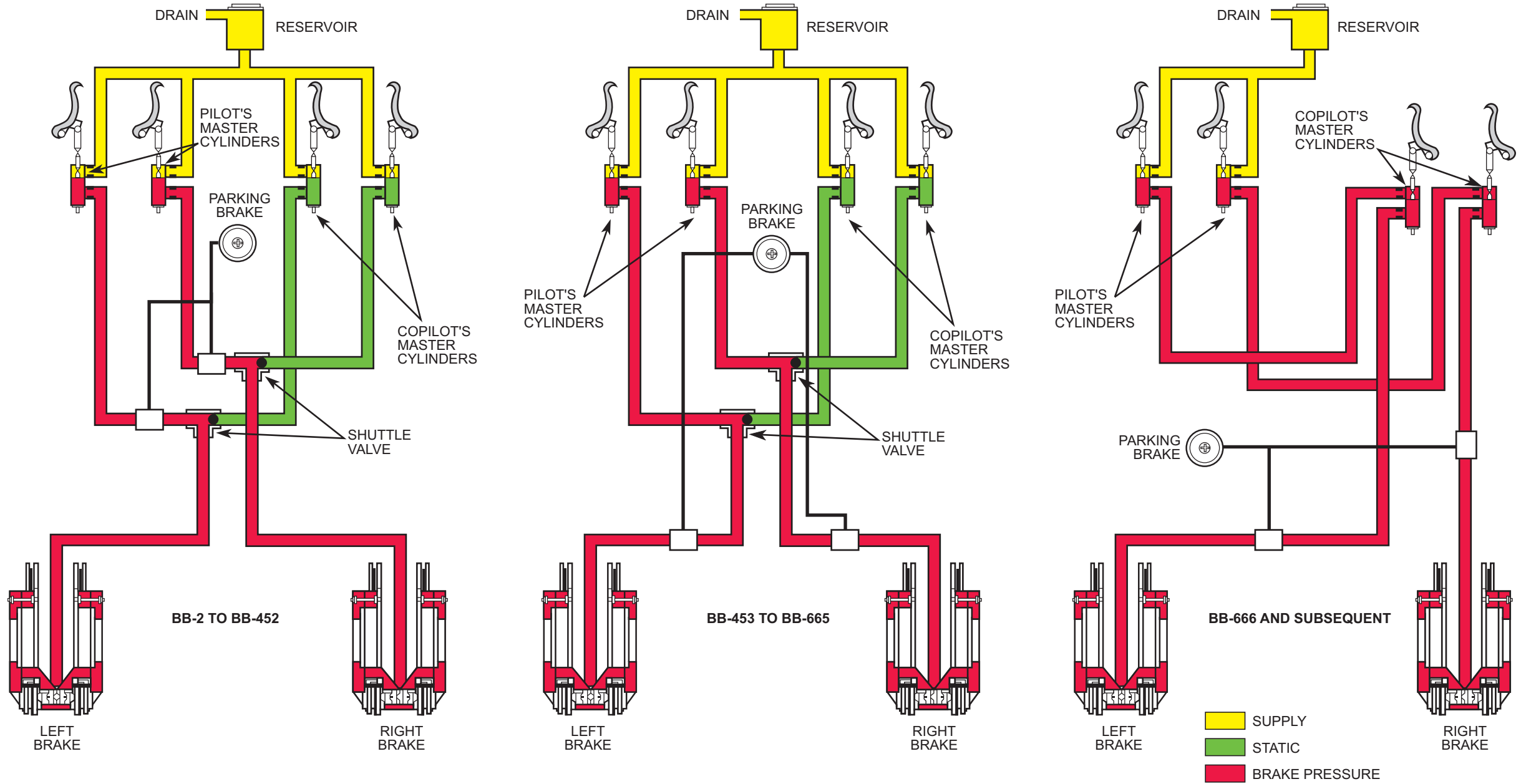
Hydraulic Landing Gear System



Hydraulic Gear Position Indication



Brake System



Landing Gear and Brakes

The aircraft has a tricycle-type landing gear that is, depending on aircraft serial number, either electrically or hydraulically operated. The nose and main gear have conventional air/oil struts to absorb taxi and landing shocks. A position indicating system provides indication of safe and unsafe landing gear configuration.

The nose is a single wheel assembly while the main gear is a two wheel assemblies with dual hydraulic brakes.

Mechanical Landing Gear

Aircraft BB-2 to 1192 except 1158, 1167; BL-1 to 72 have a mechanical landing gear system. A split-field electric motor drives a gearbox that, in turn, provides force to the nose and main gear actuators through a chain drive and torque tubes. One field drives the motor to retract the gear while the second drives the motor in the opposite direction to extend the gear.

A squat switch on the right main gear torque knee opens the landing gear control circuit when the strut is compressed (aircraft on ground). The squat switch also actuates a solenoid-operated downlock hook on the landing gear control switch to prevent the handle from being raised when the aircraft is on the ground. The hook automatically unlocks when the aircraft leaves the ground. If the downlock solenoid fails, press the red DOWNLOCK REL button alongside the landing gear handle to release the downlock.

Two red parallel-wired indicator lights in the landing gear control handle indicate that the gear is in transit or unlocked. The red lights extinguish in a GEAR UP condition.

The lights receive information from the normally-closed, up-position switches, one of which is in the upper portion of each wheel well. When the gear is in the fully retracted position, each strut actuates its respective switch and opens the circuit from the intransit light to ground. As the gear moves from the fully

retracted position, the switches close and illuminate the intransit light. The intransit light extinguishes when the drag brace in each landing gear actuates its respective downlock switch.

Illumination of the landing gear intransit light indicates on or more of the following conditions:

- landing gear handle is in the UP position and aircraft on the ground with weight on gear
- one or both power levers are retarded below a preset 79% N₁ level and at least one landing gear is now down and locked
- any one or more landing gear is not fully retracted or in the down and locked position
- one or more of the landing gear is not down and locked and the flaps are selected past approach. Warning horn only can be silenced by retracting flaps or extending the landing gear.

If the normal landing gear system fails, the gear can be manually extended. Pull the LANDING GEAR RELAY CB on the pilot right panel and verify that the gear handle is in the DN position. Pull up on the EMERGENCY ENGAGE handle and turn clockwise about 60 to engage the emergency extension mechanism.

Pumping the manual extension lever mechanically drives the nose and main landing gear actuators through the motor gear-box, chain drive, and torque tubes. When the landing gear reach the extended position and the green down-and-locked lights illuminate, discontinue use of the manual extension lever to prevent damage to the landing gear operating mechanism.

Hydraulic Landing Gear

Aircraft BB-1158, 1167, 1193 and subsequent; BL-73 and subsequent; aircraft with kit 101-8018 have a hydraulically-operated landing gear system with an electric-driven hydraulic pump (powerpack), selector valve, hydraulic gear actuators, and related plumbing and valves.

Placing the landing gear lever to DN actuates the powerpack down solenoid. Fluid then flows to the extend side of the actuators. As the actuator piston extends the landing gear, fluid on the other side of the actuators exits through the retract port and flows back to the powerpack through retract plumbing. Fluid from the pump flows through the selector valve, opens a pressure check valve, and then allows the return fluid flow into the primary reservoir.

When the actuator piston positions to fully extend the gear, an internal mechanical lock in the nose gear actuator locks the actuator piston and holds the gear in the down position. The main gears are held in the extend position by this mechanical locking system. The downlock switches interrupt current to the power relay.

Moving the landing gear handle to UP provides hydraulic fluid under pressure to the retract side of the gear actuators. As the actuator pistons moves to retract the gear, the fluid in the other side of the actuators exits through the extend port and flows back to the powerpack through the extend plumbing. Fluid flows the powerpack through the selector valve and returns to the primary reservoir.

When the gear reaches the fully retracted position, hydraulic system pressure hold the gear in the up position. When hydraulic pressure reaches approximately 2,775 PSI, the uplock pressure switch opens the landing gear relay to interrupt current to the pump motor. The same pressure switch actuates the pump that increases hydraulic pressure if it drops below 2,475 PSI. The system also has a 14-second timer that interrupts current to the pump motor 14 seconds after it has started.

Up and down position switches on the nose and main landing gear illuminate the landing gear lever's red intransit light and the three green down-and-locked lights. Essentially, the intransit light illuminates when a landing gear up and down position switches are simultaneously de-actuated (i.e., with a landing gear transitioning between positions).

The red intransit light illuminates whenever:

- landing gear handle is in up position with weight-on-wheels
- any landing gear is between the fully retracted and down-and-locked position (i.e., intransit)
- landing gear is not down-and-locked with a power lever set below approximately 79% N_1
- landing gear is up and flaps extended past the approach position. Warning horn can be silenced only by retracting flaps or extending landing gear.

If the normal landing gear system fails, manually extend with a hand-operated hydraulic pump. Pull the LANDING GEAR RELAY CB on the pilot inboard subpanel to interrupt electrical power and then place the landing gear lever in the DOWN position. Remove the LANDING GEAR ALTERNATE EXTENSION hand pump handle from the securing clip and pump up and down until three green indicator lights illuminate. The hand pump supplies fluid to the extend side of the gear actuators. Refer to the actual checklist for detailed instruction for extension.

If the landing gear system hydraulic reservoir level drops to a critical level for more than four seconds, an optical sensor illuminates the yellow HYD FLUID LOW annunciator. When the annunciator illuminates, sufficient hydraulic fluid remains to manually extend the landing gear.

Brakes

Each main gear wheel carries a multiple disc brake assembly. Each assembly consists of two rotating discs keyed to the wheel, a piston housing, carrier and lining (stationary disc), and torque plate. The stationary disc and torque plate provide a friction surface for the rotating discs.

Depressing either set of brake pedals compresses the master cylinders' piston rod. Piston rod movement generates hydraulic pressure that flows through rigid and flexible lines to the brake assembly. The brake assembly pistons then extend to force the linings and discs together; braking occurs. Releasing brake pressure allows the brake assembly pistons to retract, the linings move away from the discs, and release of the brakes.

Aircraft BB-2 to 665; BL-1 to 8 have shuttle valves between the pilot's and copilot's brake master cylinders. In this arrangement brake pedal application shifts a shuttle valve to isolate the opposite side's master cylinders. The active pedals then provide the braking pressure. On **aircraft BB-666 and subsequent; BL-9 and subsequent**, the pilot's and copilot's master cylinders are in series so that pilot braking pressure first flows through the copilot's master cylinders before reaching the brake assemblies.

With pilot brake pedals depressed and brake pressure built-up, pulling the PARKING BRAKE handle out closes two parking brake valves. This traps brake pressure within the system to hold the parking brakes. Before releasing the parking brakes, depress the pilot brake pedals and then release the PARKING BRAKE handle.

Landing Gear and Brake Systems

Electro-Mechanical Landing Gear Systems

Power Source	No. 2 Duel-Fed bus Landing gear control relay Right Generator bus 28V DC split-field 1 1/2 HP motor
Control	LDG GEAR CONTROL handle EMERGENCY ENGAGE handle
Monitor	Gear handle light Gear warning horn Gear DOWN position lights
Protection	Landing gear relay (5A) Circuit breaker (80A) Right main gear squat switch Emergency engage handle Limit switches Dynamic brake relay Solenoid-operated down lock hook (landing gear handle)

Hydraulic Landing Gear System

Power Source	Right Generator bus No. 2 Dual-Fed bus Landing gear control power relay Electric Motor-Driven Hydraulic Pump (Power Pack)
Distribution	Landing gear
Control	LDG GEAR CONTROL handle Pressure Switch Down-lock switches (3) Time delay module
Monitor	HYD FLUID LOW annunciator Accumulator precharge direct reading gage
Protection	Circuit breakers LANDING GEAR RELAY (5A) Landing gear powerpack (60A) Pressure switch Thermal relief valve Down-lock switches (3) Internal nose gear mechanical lock Squat switches (L/R) Low fluid level sensor Time delay module Solenoid-operated down-lock hook (landing gear handle)

Brake System

Power Source	Hydraulic pressure
Distribution	Master cylinders Parking brake valves
Control	Brake pedals PARKING BRAKE handle Emergency braking: reverse propeller for taxiing or slowing (-3° blade angle, zero thrust-top of red and white strips on throttle quadrant) Shuttle valves S/N prior to BB-666: valve adjacent to each set of pedals permit changing braking action from one to the other S/N BB-666 and subsequent: dual brakes plumbed in series to allow either set of pedals to perform