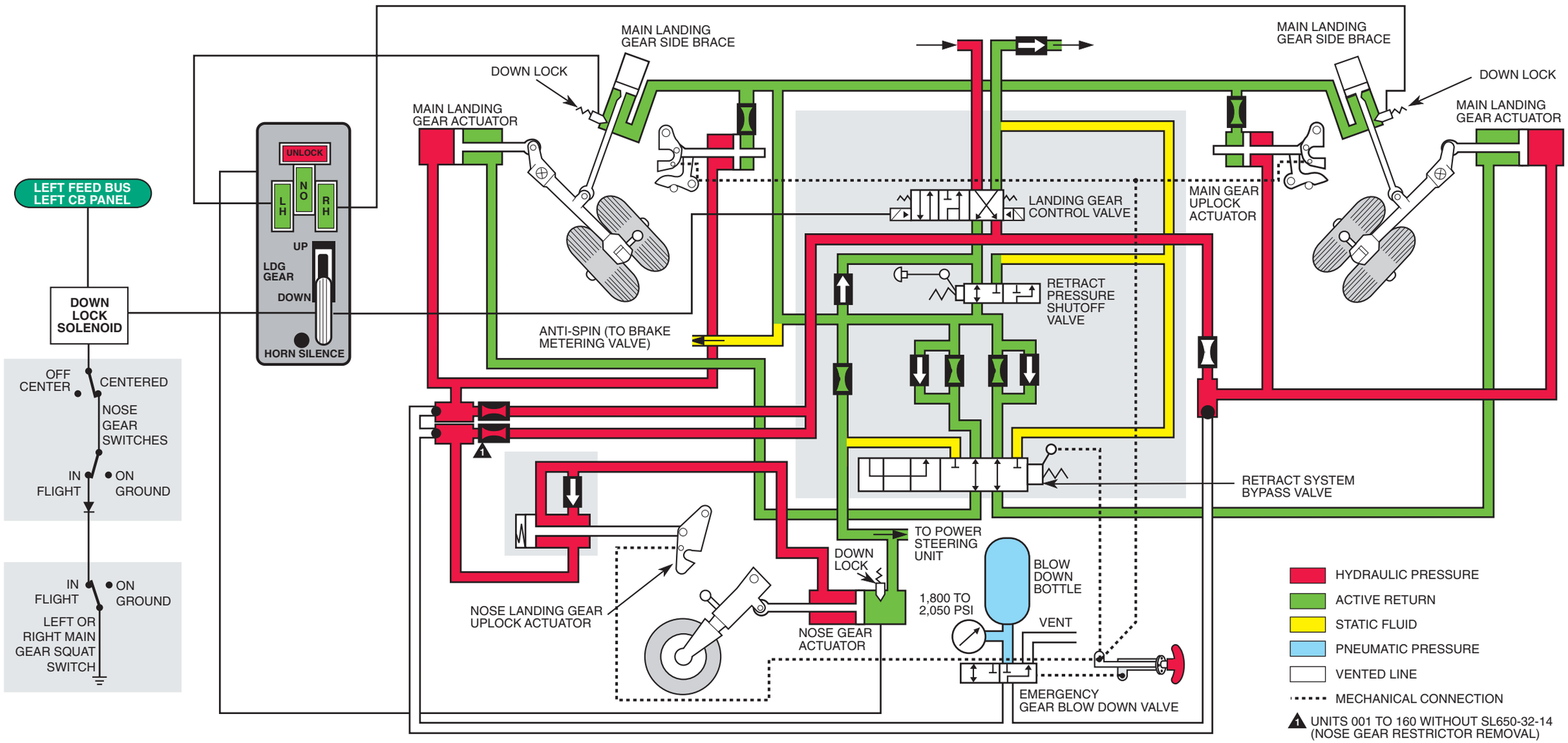
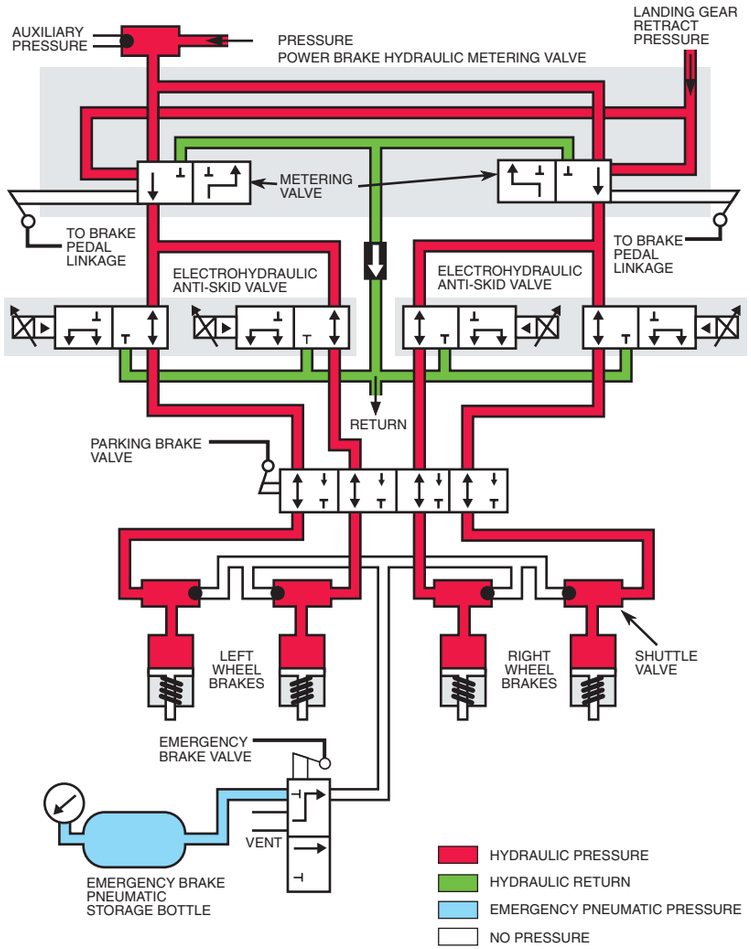
Landing Gear System (Extending)



Brake System



Landing Gear and Brakes

The Citation III/VI has a tricycle-type landing gear consisting of a single wheel nose gear and dual wheel main gear. A chined nosewheel tire deflects slush and rain away from the engine intakes. Each landing gear strut is an air/oil type that absorbs taxiing and landing shocks. Hydraulic pressure normally retracts and extends the landing gear. If the hydraulic system fails, free fall and pneumatic pressure extend the landing gear.

An electrically operated and hydraulically powered nosewheel steering system positions the nose gear in response to rudder pedal or nosewheel tiller movement.

The main gear has hydraulically operated brakes with an electrically operated anti-skid system. The anti-skid system provides maximum braking efficiency on all runway surfaces while minimizing wheel skid.

Landing Gear

Squat switches on the nose and main landing gear, a nose centering switch, and uplock and downlock switches control the landing gear position and warning system.

Retraction

After the aircraft leaves the ground, the nosewheel and main gear squat switches and the nosewheel centering switches actuate to release the handing gear handle locking solenoid. The landing gear will not retract if the nosewheel is out of center.

Pulling the landing gear handle out releases it from the detent. Moving the handle to the UP position begins the retraction sequence by actuating the retract switch. As the retract switch actuates, it energizes the landing gear control valve, illuminates the red UNLOCK light, and momentarily applies the brakes.

The control valve then shifts and hydraulic pressure, provided by the engine-driven pumps, flows through the control valve and bypass valve to the retract side of the nose and main gear actuators. The nose gear internal downlock and the main gear drag brace locks unlock; the landing gear begins retracting. As the gear unlocks, the downlock switches de-actuate to extinguish the green LH, NO, and RH gear position lights.

When the landing gear reaches the fully retracted position, hydraulically operated uplocks engage the gear and hold it in the retracted position. The nose gear doors close when the nose gear completely retracts. The main gear doors follow the main gear as it retracts.

When the landing gear is up-and-locked, uplock switches actuate to extinguish the red UNLOCK light and de-energize the landing gear control valve.

Extension

Pulling the landing gear control handle out to unlock it and moving it to the DOWN position begins the landing gear extension sequence. The extend switch actuates to illuminate the UNLOCK light and energize the landing gear control valve. The control valve shifts and hydraulic pressure flows through it and the bypass valve to the uplock and landing gear actuators. The uplock actuators then retract to release the gear. Hydraulic pressure to the landing gear actuator extend ports extends the landing gear. Movement of the nose gear from the retracted position opens the nosewheel doors.

As the landing gear reaches the down-and-locked position, hydraulic pressure drives the main landing gear side braces and the nose gear internal downlock to the locked position. When the gear locks, downlock switches actuate to illuminate the green LH, NO, RH gear position lights.

Emergency Extension

Pulling the red T-handle below the pilot's instrument panel and rotating it clockwise mechanically releases the landing gear uplocks to allow the landing gear to free-fall to the down-and-locked position. Yawing the aircraft assists gear extension and locking by exerting pressure on the landing gear through the gear doors. With the gear handle in the DOWN position, the green LH, NO, and RH gear position lights illuminate when the gear is down-and-locked.

If the gear fails to extend because of a hydraulic block, pulling the LDG GEAR EMERG HYD PRESS REL knob on the floor near the aft toilet mechanically shifts the retract pressure shutoff valve to release retract pressure and route it to the hydraulic reservoir.

Pulling the emergency gear blow down handle mechanically shifts a valve to route pressurized nitrogen from a storage bottle into the landing gear extension lines. On **units 001 to 115**, the storage bottle has a 60 to 70 cubic inches of pressurized nitrogen. On **unit 116 and subsequent**, the bottle has a 90 to 100 cubic inch capacity. Normal bottle pressure is 1,800 to 2,050 PSIG.

Nosewheel Steering

With the nose gear squat switch actuated (weight-on-wheels) and the NOSE WHL STEERING switch ON, movement of the nosewheel tiller or rudder pedals mechanically positions the directional control valve. As the control valve moves, it directs hydraulic pressure from the main hydraulic system or a 25 cubic inch accumulator through the open bypass valve to either side of the steering piston. The steering piston, in turn, shifts left or right to position the nosewheel.

When the nose gear strut extends and its squat switch de-actuates (weight-off-wheels) or the crew presses the control wheel AP/TRM/NWS DISC switch, the bypass valve closes to block hydraulic pressure flow to the steering piston.

The steering wheel provides 75° left or right nosewheel movement. The rudder pedals provide only 6° of movement left or right.

On **unit 145 and subsequent and earlier aircraft with SB650-32-27**, a modification allows arming of the nosewheel steering system before landing. This provides immediate steering control once the nose gear squat switch actuates.

Wheels and Brakes

The nosewheel carries has a 18 x 4.4, 10 ply rating (PR) tubeless tire inflated to approximately 125 to 140 PSIG (depends on the aircraft). Each main wheel carries a 22 x 5.75-12, 10 PR tubeless tire inflated to approximately 155 to 168 PSIG (depends on aircraft) 128 +6/-0 PSI. The tires must be serviced with dry nitrogen.

Normal Braking

Pressing on the top of the rudder pedals (toe brakes) mechanically actuates the two power brake metering valves. Supplied with main or auxiliary hydraulic system pressure at 3,000 PSI, the metering valves regulate braking pressure from 0 to 2,000 PSI depending on the force applied through the toe brakes.

Braking pressure flows from each metering valve through two anti-skid valves and a parking brake valve before it reaches the main wheel brake assemblies. Supplied with pressure from 750 (normal) to 2,050 PSI (maximum braking pressure), the braking assembly pistons apply pressure against the pressure plate to force the stators and rotors together. Releasing pressure from the pedals releases the brakes by allowing the downstream fluid pressure to return through the metering valves.

During gear retraction, landing gear retract pressure through the metering valves' landing gear up port applies the brakes to stop wheel spin before they enter the main gear wheel wells.

Anti-Skid System

The electro-hydraulic anti-skid system provides maximum braking efficiency on all runway surfaces while preventing wheel skid. With the ANTI SKID switch in ON, 28V DC from the Left Feed bus powers the anti-skid system. The anti-skid system is active at rollout and taxi speeds between 10 and 175 kts.

A transducer in each main wheel axle provides wheel speed signals to the anti-skid system control box. If the control box senses an excessive wheel deceleration indicative of an impending skid, it commands the respective anti-skid valve to reduce braking pressure to that wheel. When the wheel spins up to match the other wheels, the system restores normal braking pressure to that wheel brake assembly.

The anti-skid system also provides touchdown and locked wheel crossover protection. If the brakes are applied before touchdown, the system dumps pressure until the squat switches actuate on touchdown. Locked wheel crossover protection compares inboard or outboard wheel speeds and dumps pressure when the slow wheel's speed is 50% or slower than the fast wheel.

If an anti-skid component fails, the ANTISKID annunciator illuminates. After a system failure, the ANTI SKID switch should be placed in OFF. Normal braking without anti-skid protection is still available.

Emergency Braking

If the main and auxiliary hydraulic systems fails, nitrogen at 1,800 to 2,050 PSI from a 90 to 100 cubic inch bottle provides braking pressure. Anti-skid protection is not available.

Pulling the EMER BRAKE PULL handle below the pilot's instrument panel mechanically opens the brake valve assembly to release pressurized nitrogen into the supply lines. Pressure in the supply lines shifts a shuttle valve at each wheel brake assembly to stop cut normal hydraulic system pressure and to admit pressurized nitrogen into the brake assemblies. Braking pressure is proportional to handle extension. Pulling the handle out completely supplies 2,000 PSI of braking pressure. Releasing the handle shifts the brake valve assembly to vent pressure and release the brakes.

Parking Brake

With the aircraft on the ground and the hydraulic system pressurized, applying toe pressure applies the brakes. Pulling the parking brake handle out shifts the parking brake valve to trap pressure and hold the brakes. Pushing the handle down releases the brakes.

With the parking brakes set, the PARK BRAKE annunciator illuminates.

Landing Gear System

Power Source	Main hydraulic system Pneumatic pressure (emergency) Left Feed bus – 28V DC (control, warning horn) Crossover Right Feed bus (indicator lights)
Control	Landing gear control handle Auxiliary gear extension handle Emergency gear extension knob Gear retract hydraulic shutoff valve Nose gear centering switch Squat switches
Monitor	Red UNLOCK light Green LH/NO/RH lights Warning horn
Protection	Circuit breakers GEAR CONTROL (5A) AURAL WARN 1 (5A) LDG GEAR (2A) Squat and nose centering switches

Nosewheel Steering System

Power Source	Hydraulic pressure Nosewheel steering accumulator Left Feed bus – 28V DC
Control	Rudder pedals Nosewheel tiller NOSE WHL STEERING switch TRIM/AP/WS switch (deactivates system)
Monitor	ARMED/ON lights
Protection	PWR STEER CB (5A) Squat switch

Brake System

Power Source	Hydraulic pressure Pneumatic pressure (emergency) Left Feed bus – 28V DC (anti-skid)
Control	Rudder pedals (toe brakes) Emergency brake handle Anti-skid system switch Parking brake handle
Monitor	ANTI SKID annunciator Hydraulic system indicators
Protection	ANTI-SKID CB (5A) Anti-skid system