G550
LANDING GEAR & BRAKES SYSTEM
- The G550 has a fully retractable, tricycle-type landing gear

- Each gear incorporates a conventional oleo-pneumatic shock strut with dual wheels and tires

- Shock struts are filled with MIL-H-5606 hydraulic fluid and are pressurized with dry nitrogen

- Strut extension

![Diagram of G550 landing gear and shock strut]
• One (1) set of two (2) nosewheel tires
  • Rated at: 225 mph
  • Tire pressure: 130 psi
  • Tire weight: 20 pounds

• Two (2) sets of two (2) main tires each
  • Rated at: 225 mph
  • Tire pressure: 199-207 (Min/Max)
  • Tire weight: 82 pounds

• Wheels: Four (4) fusible plugs (Melt at 390°F) to release tire pressure if the wheel overheats.

One (1) safety plug to deflate the tire if internal pressure exceeds 412.5 ± 37.5 psi.

Each of the four (4) main gear wheels has individual braking via a brake-by-wire system with anti-skid protection down to ten (10) knots.
- The landing gear selector/dump valve is the brains of the system. It is located in the gear wheel well area in the center post.

Electrical switch → gear handle

Brains →

Landing Gear Selector/ Dump Valve

Doors

Gear

Hydraulic pressure (muscles) →

L Hyd Sys

Downlocks

Doors

Unlock

Struts

Mechanical actuation →

Position Indication
- Extension and retraction requires:

  1. Electrical power to operate

  - L: ESS DC
  - R: MAIN DC

  2. Hydraulic power to actuate

- Gear retraction and extension is normally provided by:

  - L Hyd Sys

- In the event of a failure of the engine-driven hydraulic pump the gear can be extended or retracted using the:

  - PTU
- Helps retract the landing gear following left engine failure after V1 (regulatory purpose)

- In the event of a total failure of the left hydraulic system the landing gear can be extended via two (2) nitrogen bottles located in the nose gear wheel well.

- The alternate gear extension system ports high pressure nitrogen to the gear extension system to extend the gear. The nitrogen repositions the nose gear and main gear dump valves to a dump position.
- Landing gear extension (normal)

1. L Hyd Sys AND OR PTU available
2. $\leq V_{lo}$ (215 KCAS/0.70 MT)
3. Gear handle (electrical switch) selected down (illuminates ●)
4. Gear doors open fully
5. Landing gear extends and locks
6. Three green (down and locked)
7. Landing gear doors close
8. Gear handle light extinguishes
- Landing Gear Retraction

1. L Hyd Sys and/or PTU available

2. \( \leq V_{lo} \) (225 KCAS/0.70 MT)

3. Gear handle (Electrical switch) selected up (illuminates •)

4. Gear doors open fully

5. Landing gear retracts into the uplocks

6. Landing gear doors close

7. Gear handle light extinguishes
- Landing gear extension (Alternate) - One time use

1. \( \leq V_{lo} \) (175 KCAS)

2. Gear handle (Electrical switch) selected down (illuminates ●)

3. Pull EMER landing gear T-handle

4. Gear doors open fully and remain open

5. Landing gear extends and locks

6. Three green ● ● (down and locked)

7. Gear handle light extinguishes

8. Landing gear doors remain open
**LANDING GEAR WARNINGS**

- **< 500' AGL and < 190 KCAS**
  - **TWO LOW, GEAR**
  - VOICE ORIDE = Silences aural warning
  - GPWS ORIDE

- **< 345' AGL and PLA < 5°**
  - GEAR UNSAFE WARNING HORN will sound (KLAXON TONE)
  - HORN SILENCE = Silences warning horn

- **FLAPS > 22°**
  - GEAR UNSAFE WARNING HORN will sound (KLAXON TONE)
  - HORN SILENCE = WILL NOT SILENCE WARNING HORN

- **HORN SILENCE**
  - • WOW switches compressed
  - • ADS indicates < 60 KTS
  - • Gear handle in the retract position
Limitations

Maximum Altitude to Operate Gear Or Fly With The Gear Extended: 20,000 MSL

- VLO 175 KCAS
- VLO 225 KCAS
- VLO 0.70 MT
- VLE 250 KCAS
- VLE 0.30 MT

Speed Brakes and Gear Down Inflight

Prohibited

Maximum Tire Speed: 195 Knots (Ground Speed)
**Nose Wheel Steering System**

Electrically-controlled and hydraulically-driven by a Steer-by-Wire System.

**Nose Wheel Steering (NWS):** \(80^\circ (\pm 2^\circ)\)

**NWS Overtravel Indicator:** \(\geq 84^\circ\)

**Rudder Pedals:** Left 7° / Right 7°

**Rudder Pedals (NWS Failure):** Left 16° / Right 16°

**Rudder Pedal Input + NWS = Nose Wheel Deflection**

**NWS = Red Guarded Switch**

° "Clunk" = NWS Valve Opening

**Power ON**

**Power OFF**
WOW Switch System

The Weight-On-Wheels (WOW) switch system provides:

- **In-Air**
- **On-Ground**

Sensing for aircraft components that operate only in specific regimes, such as:

- Engine Thrust Reversers
- Ground Spoilers
- Nose Wheel Steering
- Weather Radar
- TCAS
- Cabin Window Heat
- Landing Gear

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Three (3) WOW switches, one (1) on each gear, provide sensing.
- **Main Landing Gear (MLG) WOW Switches**

  - MLG WOW switches have a roller on a cam. The cam rotates to a low point after takeoff which causes the switch to extend.

  - The MLG WOW switches “make” on-ground. They physically make contact.

  - During the exterior pre-flight inspection the crew must confirm that there is no gap between the roller and the cam.

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![Diagram of MLG WOW switches](image)

- Green check mark indicating correct position.
- Red 'X' indicating incorrect position with text: "MLG WOW NO GAP".
Nose Landing Gear (NLG) WOW Switch

- The NLG WOW switch is a microswitch that is either compressed or not.

- The NLG WOW switch "breaks" on-ground. It does not make contact.

- During the exterior pre-flight inspection, the crew must confirm that there is a gap.
**Dedicated WOW Signal Outputs:**

- **NWS WOW Switch**
  - **NWS AUX Pump**
  - **L MLG WOW Switch**
  - **R MLG WOW Switch**
    - **Ground Service Bus (GSB)**

- **Left Bus Power Control Unit (BPCU)**

- **On-side Brake Control and Indication**
- **On-side Thrust Reverser**
- **Ground Spoilers**
- **Combined WOW (Through MAU #1 and #2)**
WOW FAULT WARNINGS

L MLG WOW switch and/or R MLG WOW switch

Air mode

Speed < 50 KTS

= WOW FAULT CAS MESSAGE

L MLG WOW switch and/or R MLG WOW switch

Ground mode

Radar Altitude > 147.5 feet

= WOW FAULT CAS MESSAGE
Combined WOW does not have anything to do with the ground spoilers.

Combined WOW does not prevent the ground spoilers from deploying in the event of a WOW FAULT.

Combined WOW simply advises the crew that there is a problem. Therefore if:

1. **WOW FAULT** CAS message after takeoff

2. **Disarm the ground spoilers before retarding the thrust levers to idle**

Otherwise, the ground spoilers, three (3) panels per wing, will deploy, destroy all lift... and kill you!
The main landing gear brakes are air-cooled, multiple carbon-fiber discs with anti-skid protection.

- **Overheat protection for tires and wheels** is provided by fusible plugs in the wheels that melt, releasing tire pressure, if high temperature thresholds are exceeded.

- A **Brake Temperature Monitoring System (BTMS)** monitors and displays brake temperatures.

- **Hydraulic pressure** (3,000 psi) is provided by:
- If no hydraulic pressure/fluid is available from the **L** Hydraulic System:
  
  - **Accumulator pressure from the Parking/Emergency brake system will provide 5 to 6 brake applications**
  
  - **Braking is applied simultaneously to all four (4) wheel brakes**
  
  - **No anti-skid protection capability**
- If the brake pedals are applied (>10°) and left hydraulic system pressure is < 1,500 Psi the AUX pump Auto Latch feature will command the AUX pump, if armed, to come ON.

1. **GROUND** and brake pedal application > 10°

2. OR

3. AUX PUMP
   - OFF/ARM
   - ON

- L Sys
- PTU
- Pump
- Motor
- < 1,500 Psi

- Brake Pedal
  - Application
  - > 10°
- Parking Brake System

The Parking Brake System has an accumulator pre-charged to 1,200 psi with Nitrogen and hydraulically charged to 3,000 psi.

Hydraulically charged (3,000 psi)

Parking brake must be set prior to checking the brake wear indicators - "life remaining" (two in the front and two in the rear)
Parking brake accumulator pressure will decrease continuously over a short time. Always chock aircraft until ready for engine start. Otherwise it may roll... away.
Anti-skid Protection

Anti-skid protection for the main landing gear brakes is provided down to ten (10) knots.

Below this speed the main wheels brakes can be locked in order to allow tight turns while taxiing.

The Anti-skid Electronic Control Unit (ECU) is the brains of the system.

The ECU is located in the LEER.

[Diagram showing the integration of the Anti-skid Electronic Control Unit with other components such as the Wheel Speed Monitoring Unit (WMU), Micro Inertial Reference Unit (IRU), and Anti-skid Control Valves.]
The anti-skid electronic control unit (ECU) endeavors to keep wheel rotation velocity within two percent (2%) of IRU sensed ground speed.

- Wheel velocity within two percent (2%) of IRU sensed ground speed
- 50 knots

**SPEED**

**TIME**

IRU #1: Outboard
IRU #2: Inboard

Touchdown protection: precludes landing with brakes on

- Brakes available
- Wheel speed > 50 kts
- WOW GROUND + 5 seconds, or
Locked wheel protection: compares wheel speeds

if 30% < its paired wheel = brake pressure released

Wheel spin down: decelerates main gear wheels prior to entering the wheelwells with a three (3) second brake application. If it fails a Wheel Despin Fail CAS message alerts the crew.
Safety Pins (6)

To make them more visible there is a "Remove Before Flight" red flag.

- Three (3) gear pins are installed during post-flight inspection. The pins are removed during the exterior pre-flight inspection in preparation for departure.

One pilot removes/stores the pins. The other pilot confirms that all pins have been removed and announces it. Failure to remove the pins will prevent the landing gear from retracting after takeoff.
The QRH addresses landing gear pins mistakenly left in.
Refer to: ATTEMPTED LANDING GEAR RETRACTION WITH SAFETY PINS INSTALLED

One (1) nose gear and two (2) main gear door pins are installed before opening the gear doors.

The AUX pump is used to open the gear doors.

AUX Pump Switch
Questions, comments or errors?
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Thank you!