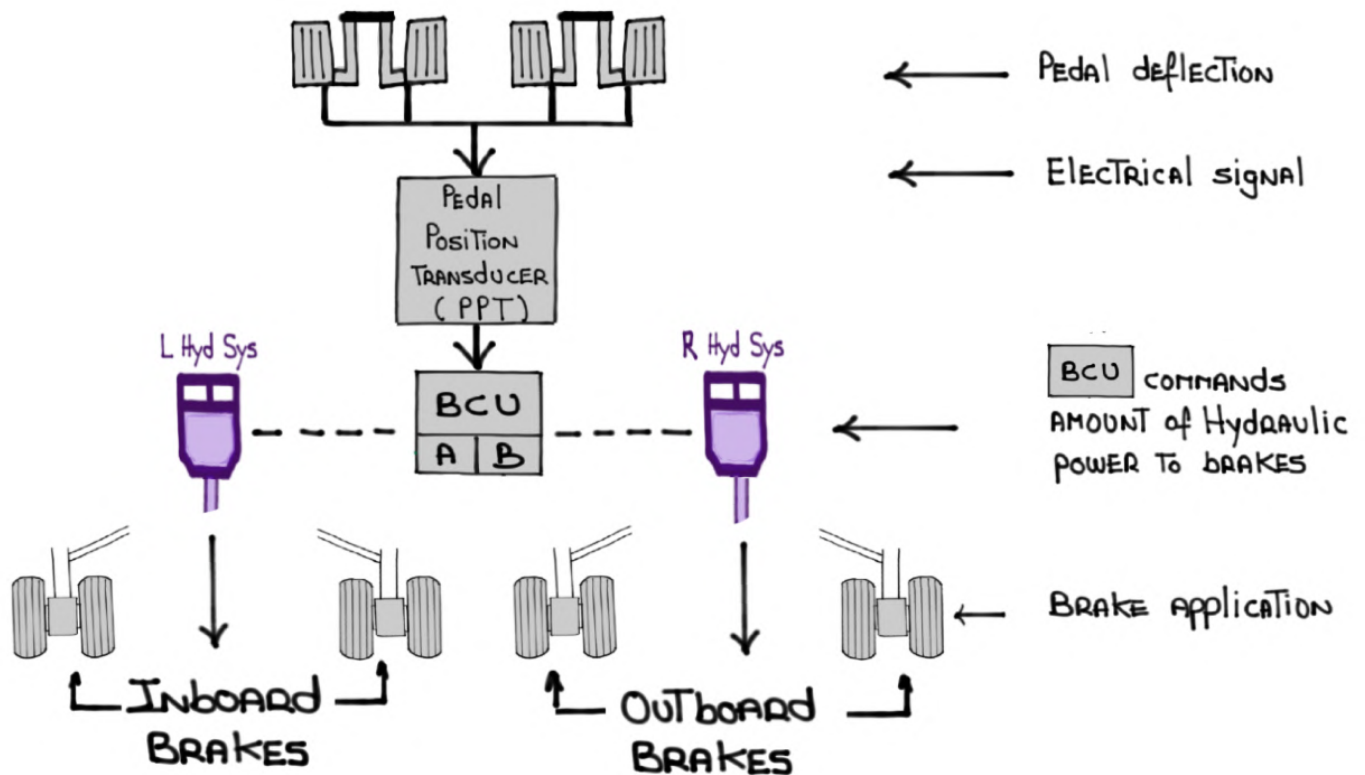
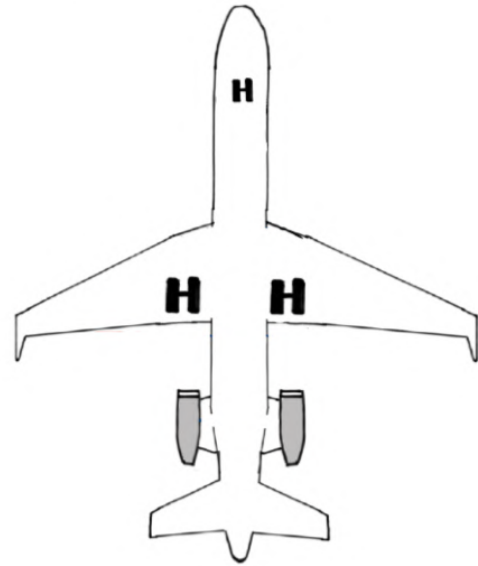
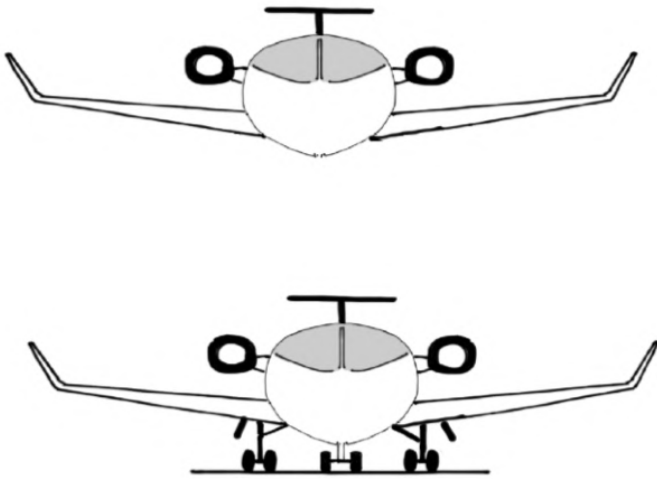


# G500 LANDING GEAR & BRAKES SYSTEM



For study purposes only

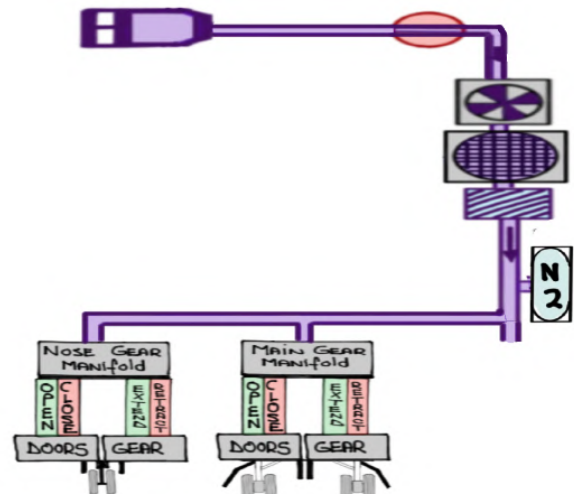
- Fully RETRACTABLE Tricycle landing GEAR



- SEQUENCING AND OPERATION of GEAR AND GEAR DOORS ARE CONTROLLED by a MICROPROCESSOR CALLED THE LANDING GEAR CONTROL UNIT (LGCU)

LGCU

- The landing gear is ELECTRICALLY CONTROLLED/SEQUENCED AND HYDRAULICALLY OPERATED

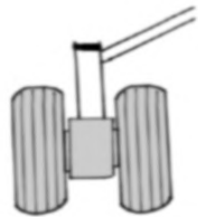


- If **hydraulic** pressure is NOT available The landing gear can be extended via compressed nitrogen stored in two **(2)** bottles located in the nose wheel well

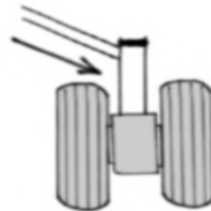


- Each gear incorporates a conventional oleo-pneumatic shock strut with dual wheels and tires

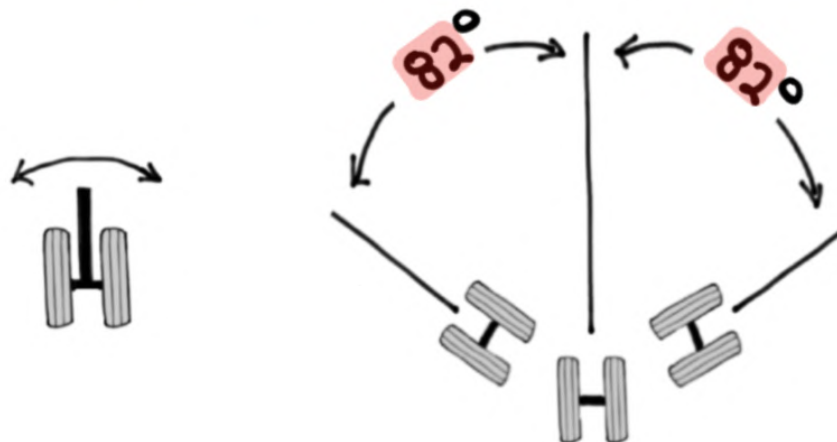
Tires:  
Nitrogen



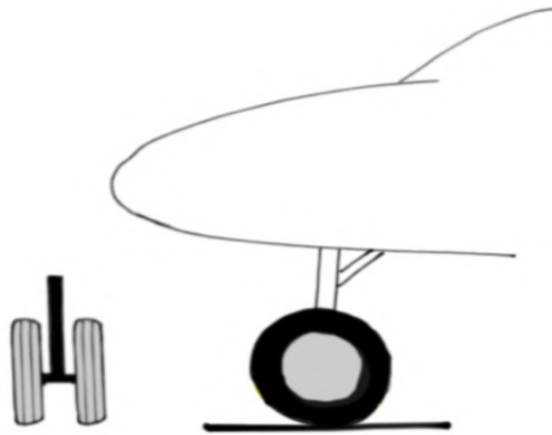
Struts:  
MIL-H-5606



- The nose gear's steering system is **Electrically** controlled and **hydraulically** driven by a STEER-by-wire system

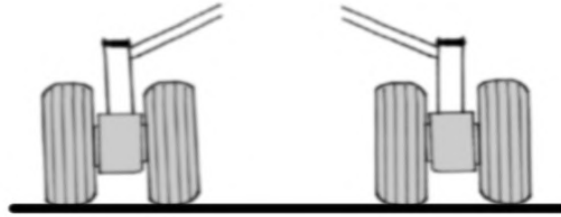


- ONE SET of Two (2) NOSE wheel TIRES (Goodyear)



- RATED AT: 195 KTs
- TIRE PRESSURE: 182 Psi
- LANDINGS: APPROXIMATELY 220
- DESIGNED TO DEFLECT WATER AWAY FROM THE FUSELAGE AND THE ENGINE INLETS
- EACH WHEEL HAS ONE (1) SAFETY plug TO DEFLATE THE TIRE IF INTERNAL PRESSURE EXCEEDS 375 psi  $\pm$  25 psi (OVER INFLATION)

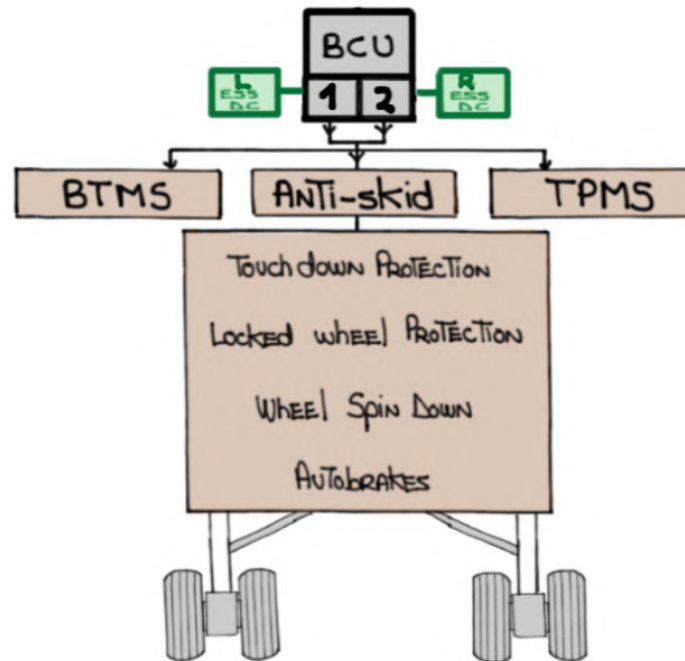
- Two SETS of Two (2) MAIN TIRES EACH (Goodyear)



- RATED AT: 195 KTs
- TIRE PRESSURE: 223 Psi
- LANDINGS: APPROXIMATELY 220
- EACH WHEEL HAS:
  - A) ONE (1) fusible plug (MELTS AT 415°F)  
TO RELEASE TIRE PRESSURE IF THE WHEEL OVERHEATS
  - B) ONE (1) safety plug TO DEFLATE THE TIRE IF INTERNAL PRESSURE EXCEEDS 515 Psi
  - C) 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



- Each of The **four (4)** main gear wheels has individual braking via a **BRAKE-by-Wire** system



- Proximity sensors provide:

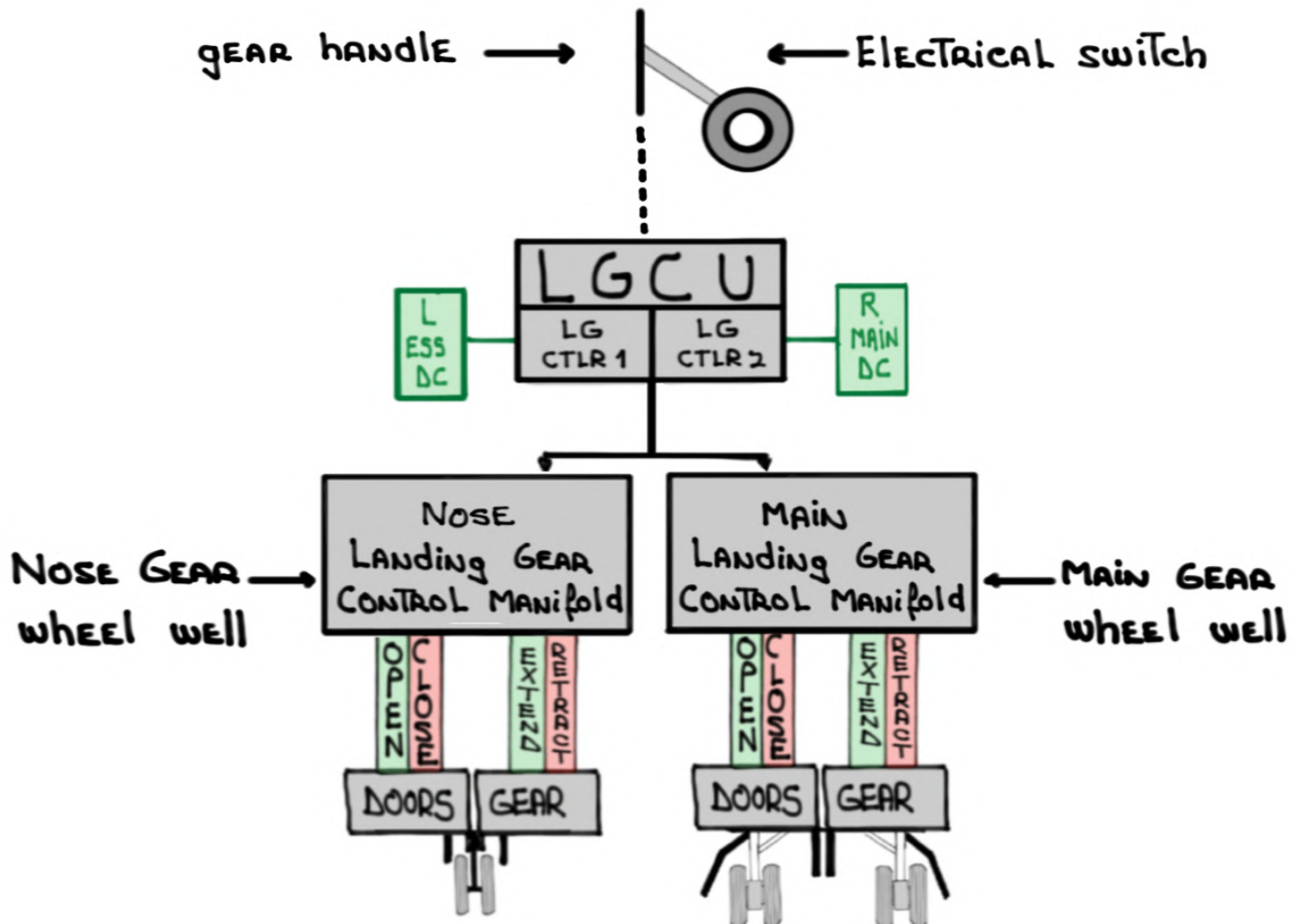
- WOW **AIR** OR **GROUND** mode status
- GEAR position
- GEAR door position

- A **LANDING GEAR MAINTENANCE CONTROL PANEL (LGMCP)** allows retraction/extension of the landing gear on the **ground** while the aircraft is on jacks. The LGMCP can also be used to open the gear doors during the preflight inspection

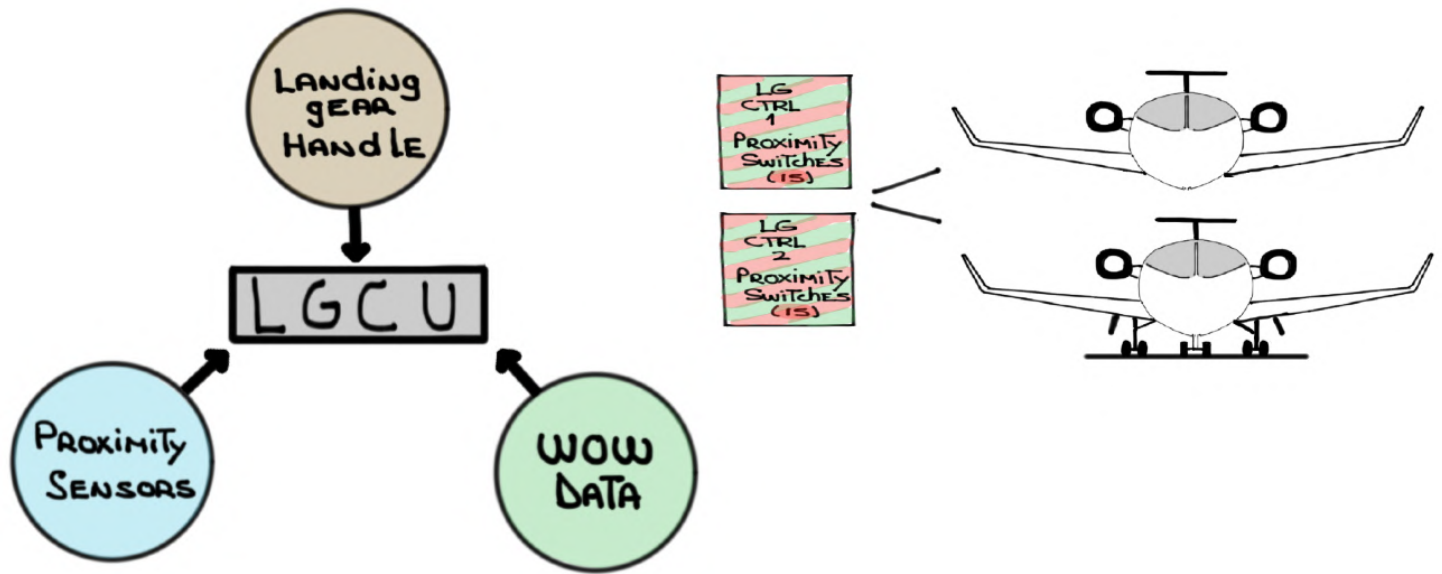


# LANDING GEAR CONTROL UNIT (LGCU)

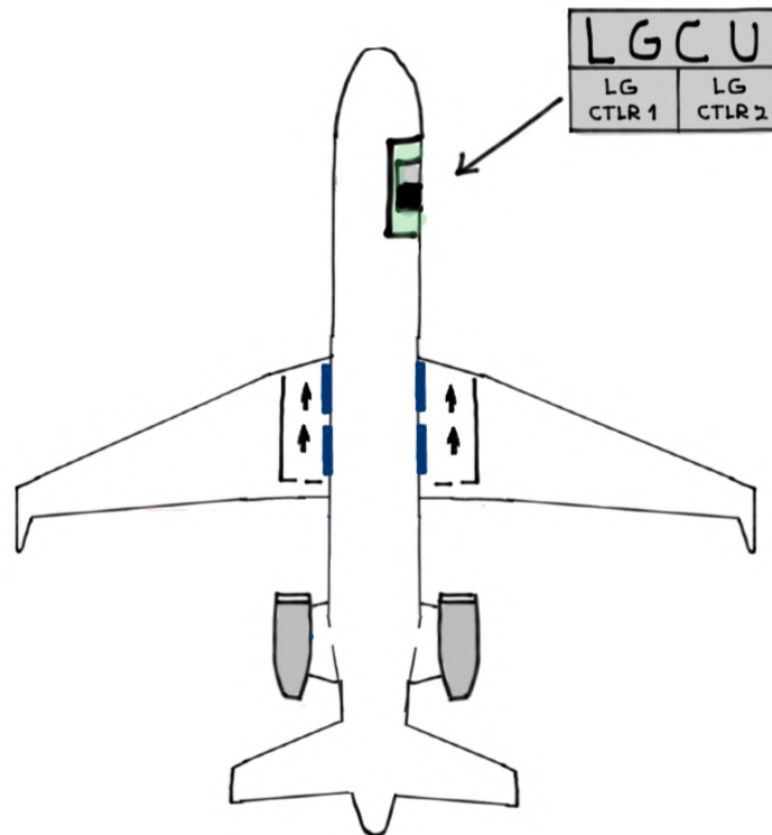
- The LGCU is The brains of The system
- The LGCU controls The electrical sequencing and operation of The landing gear and gear doors
- The LGCU contains Two (2) control lanes and one (1) monitor lane. Either control lane is capable of controlling The landing gear system and has a different power source



- The LGCU RECEIVES input from:



- The LGCU is located in the REER





- EXTENSION AND RETRACTION REQUIRES:

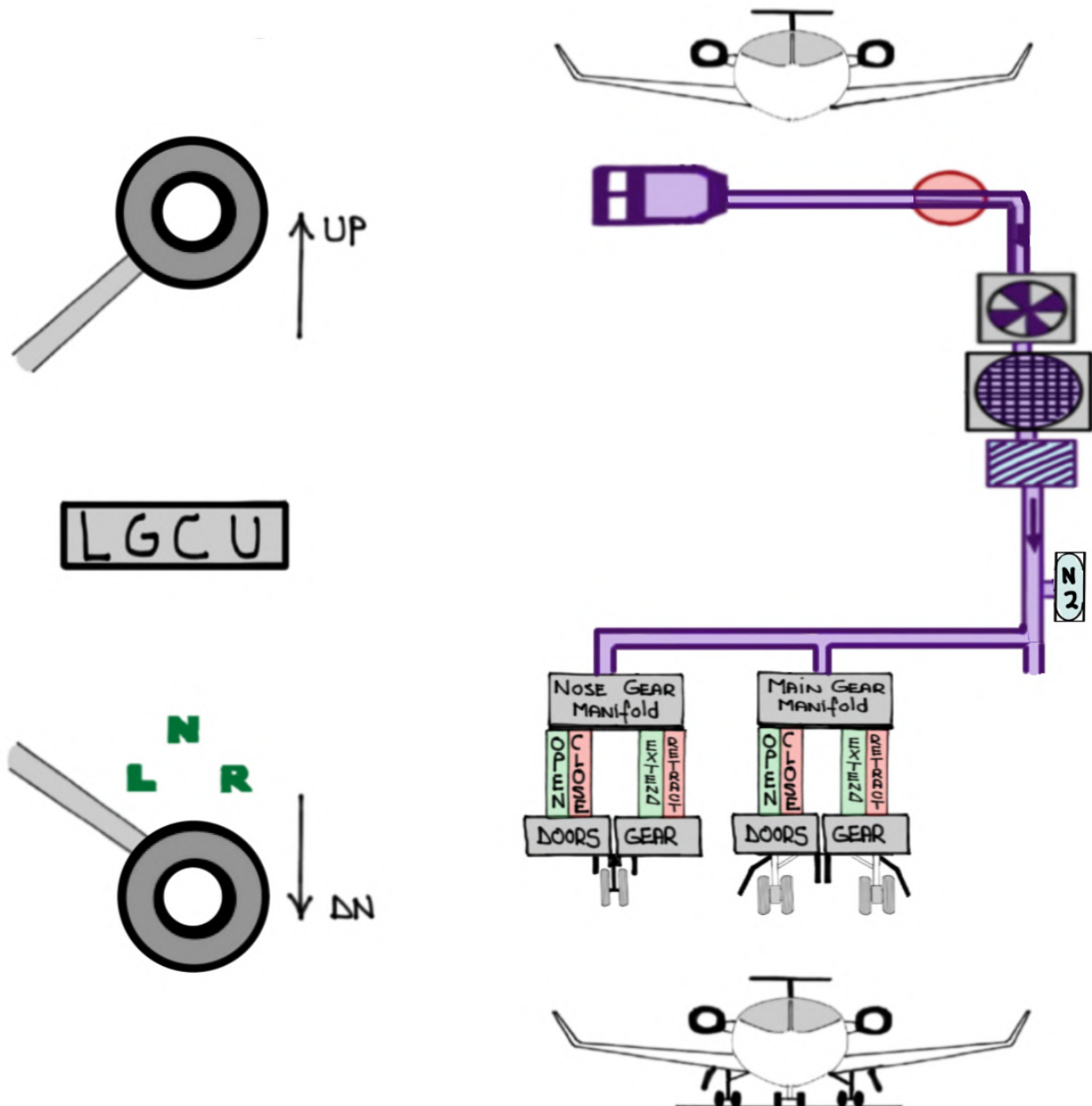
① ELECTRICAL power to operate

LESS DC

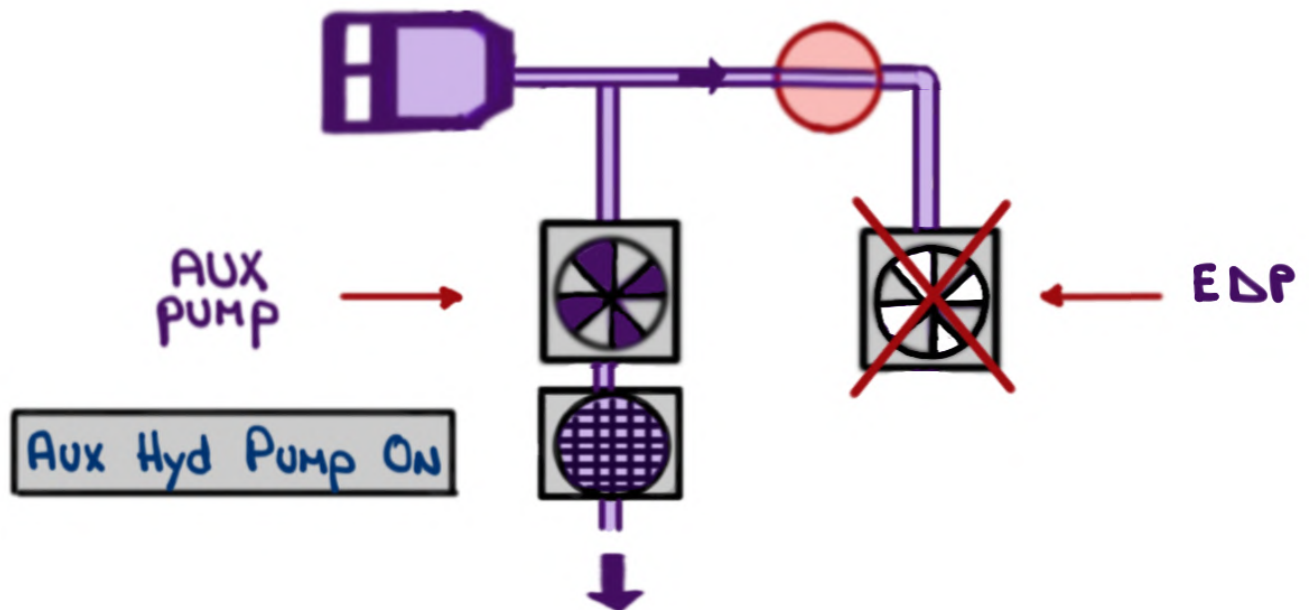
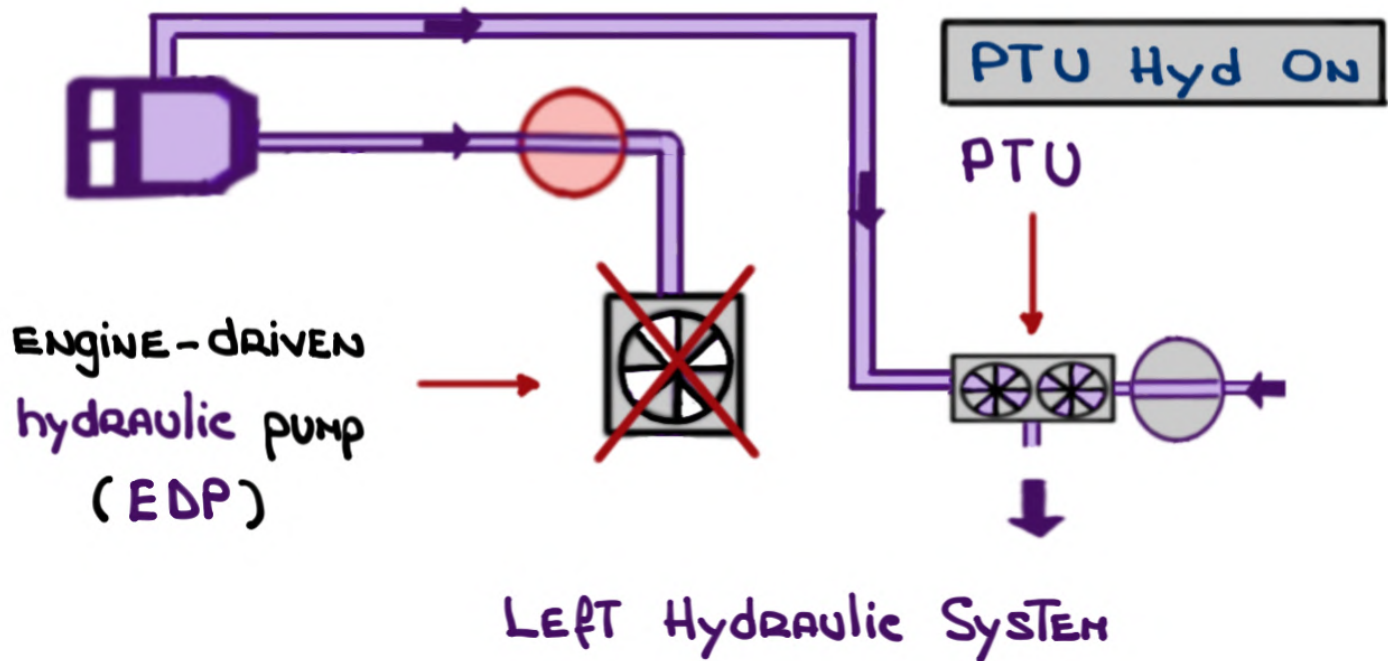



② Hydraulic power to actuate

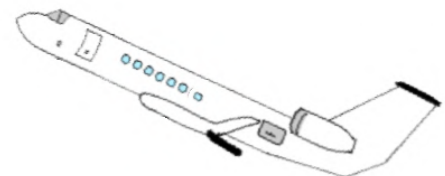
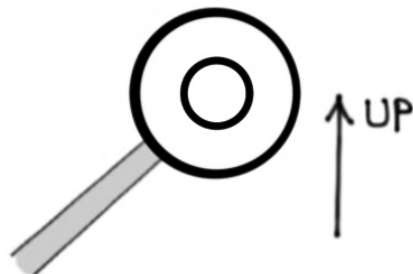
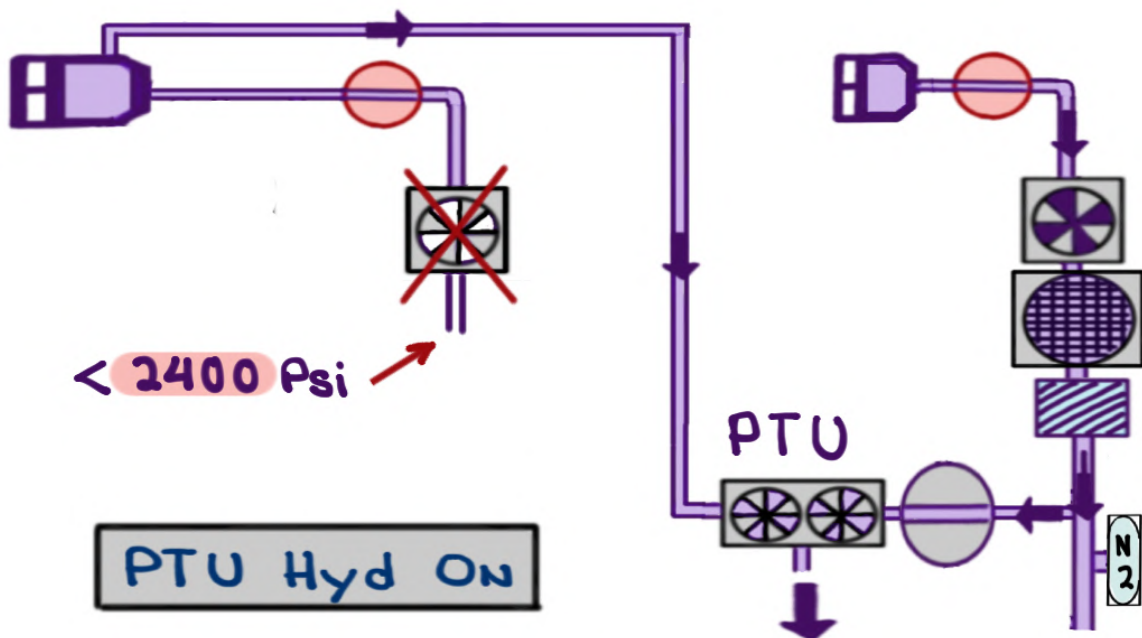
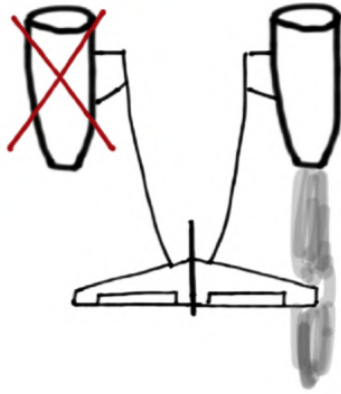
NORMALLY PROVIDED BY THE LEFT HYDRAULIC SYSTEM



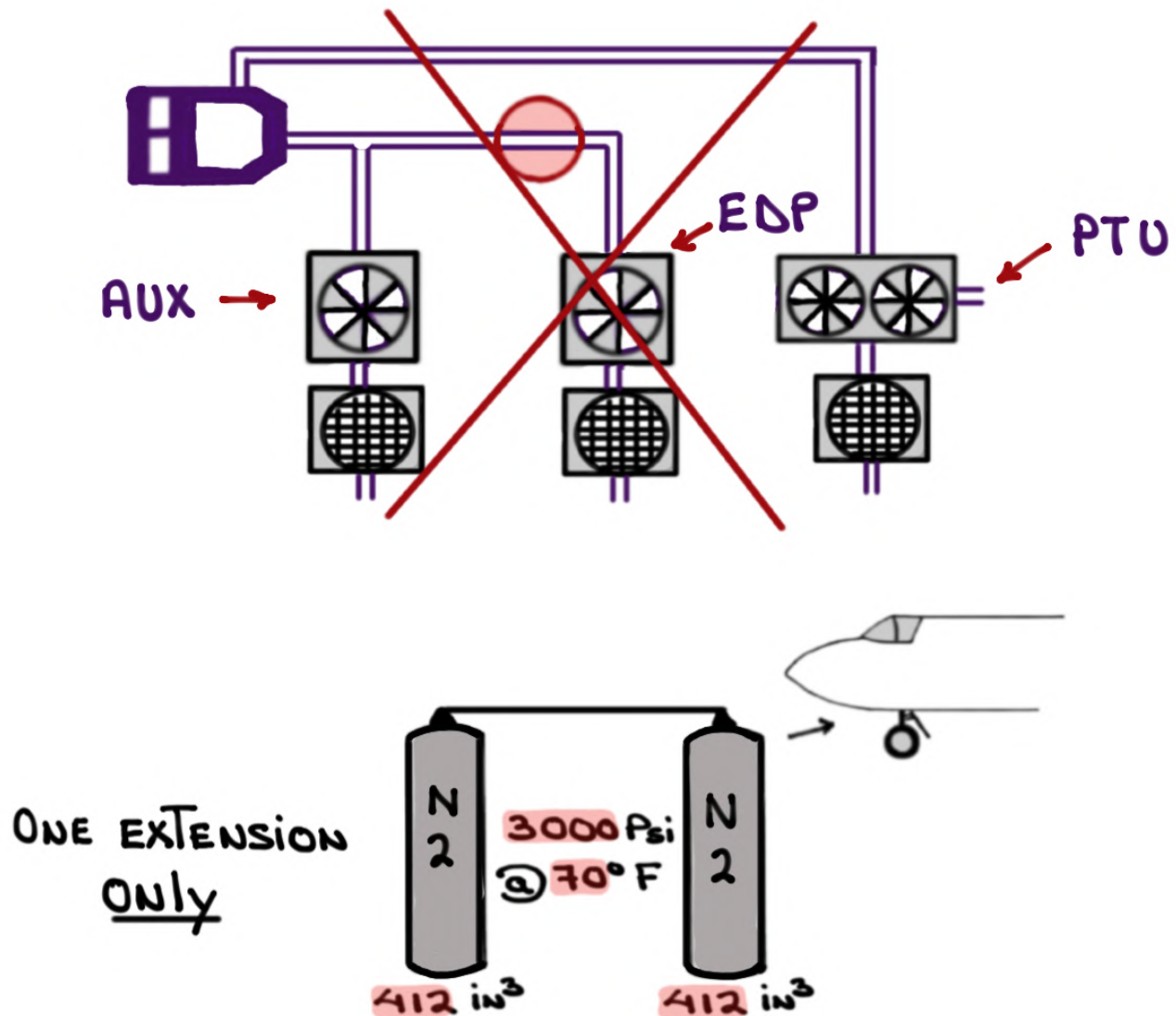
- In the event of failure of the engine-driven hydraulic pump The landing gear can be extended or retracted by the PTU or AUX pumps



- The **PTU**  ACTIVATES AUTOMATICALLY (< 2400 psi) AND HELPS RETRACT THE LANDING GEAR FOLLOWING A LEFT ENGINE FAILURE AFTER V<sub>1</sub> (REGULATORY REQUIREMENT)



- In The EVENT of 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 AND MAIN gear dump VALVES TO A dump position

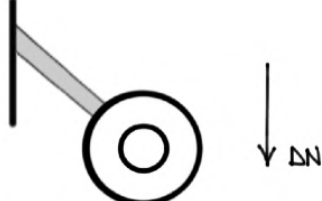


# NORMAL

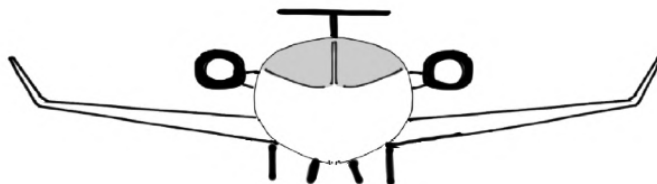
## LANDING GEAR EXTENSION

①   AND  OR  AVAILABLE

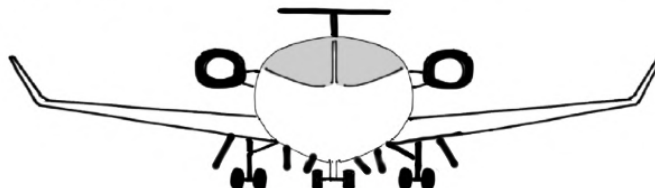
②  $\leq V_{LO}$  (225 KCAS)

③  GEAR HANDLE (ELECTRICAL SWITCH) SELECTED DOWN (ILLUMINATES WHITE)

④ GEAR DOORS OPEN FULLY

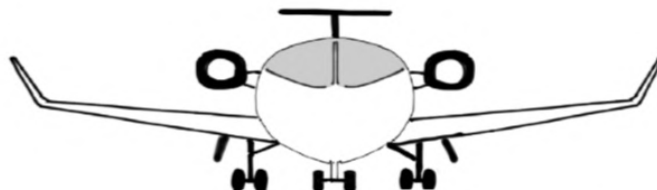


⑤ LANDING GEAR EXTENDS AND LOCKS

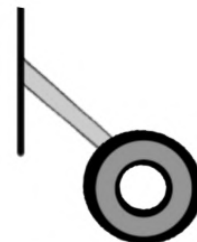


⑥ THREE GREEN    (DOWN AND LOCKED)

⑦ LANDING GEAR DOORS CLOSE



⑧ GEAR HANDLE LIGHT EXTINGUISHES

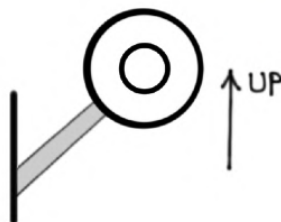


# NORMAL

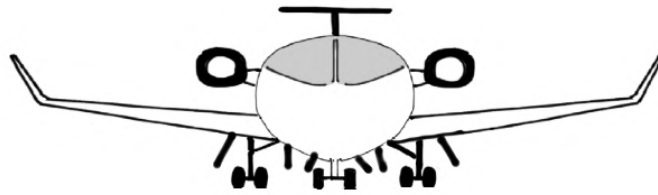
## Landing gear RETRACTION



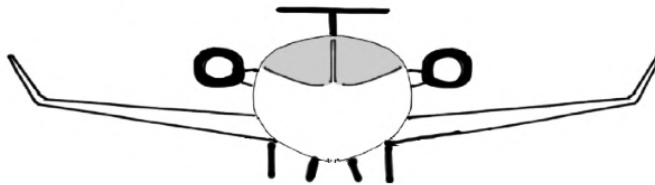
②  $\leq V_{LO}$  (225 KCAS)

③  GEAR handle (ELECTRICAL switch)  
SELECTED UP (ILLUMINATES WHITE)

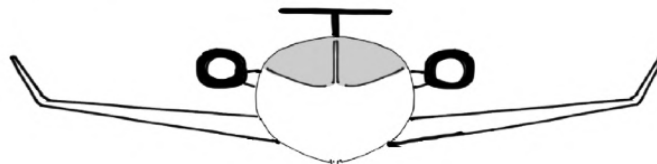
④ GEAR doors open fully



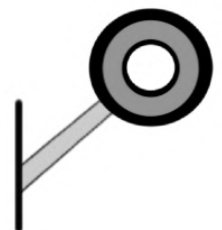
⑤ LANDING gear RETRACTS INTO THE uplocks



⑥ LANDING gear doors close



⑦ GEAR handle light EXTINGUISHES

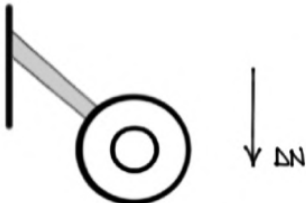


## ALTERNATE

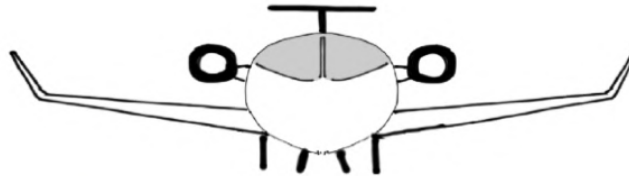
### LANDING GEAR EXTENSION (NITROGEN)

①  $\leq 175$  KCAS

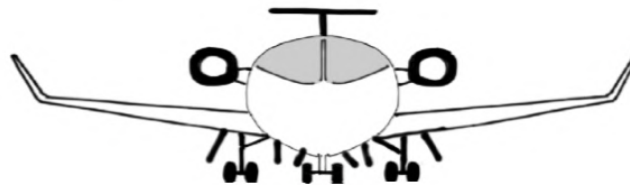
② **EMER LDG GEAR** Pull **EMER LDG GEAR** handle

③  GEAR handle (ELECTRICAL switch)  
SELECTED DOWN

④ GEAR doors open fully AND REMAIN OPEN



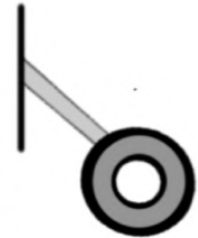
⑤ LANDING gear EXTENDS in six (6) SECONDS



⑥ THREE GREEN **L<sup>N</sup> R** (down AND locked)

⑦ GEAR handle light EXTINGUISHES

⑧ LANDING gear doors REMAIN OPEN



NOSE GEAR DOOR OPEN

L-R MAIN GEAR DOOR OPEN

# LANDING GEAR WARNINGS

- < 500' AGL
- < 190 KTS



"Too low, gear"

TSC 1-4

MENU → AURAL InhibiTs

**GPWS Inhibit** = silences warning horn



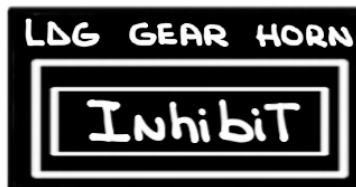
- Flaps < 22°
- ≤ 345' AGL
- NEAR idle



GEAR UNSAFE  
WARNING HORN  
will sound  
(KLAXON TONE)

TSC 1-4

MENU → AURAL InhibiTs



LG HORN Audio Inhibited



Flaps > 22°



GEAR HORN OVERRIDES  
Inhibit





# Limitations

MAXIMUM ALTITUDE TO OPERATE GEAR OR fly with the  
GEAR EXTENDED: 20,000' MSL ↓

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EMER LG GEAR

175 KCAS



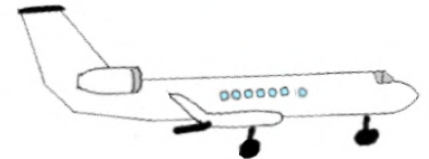
VLO

225 KCAS



VLE

250 KCAS

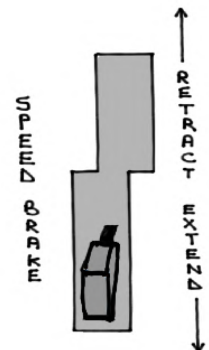


SPEED BRAKES AND GEAR down in flight

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prohibited



MAXIMUM TIRE SPEED: 195 knots (ground speed)

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# NOSE WHEEL STEERING SYSTEM (NWS)



ELECTRICALLY - CONTROLLED



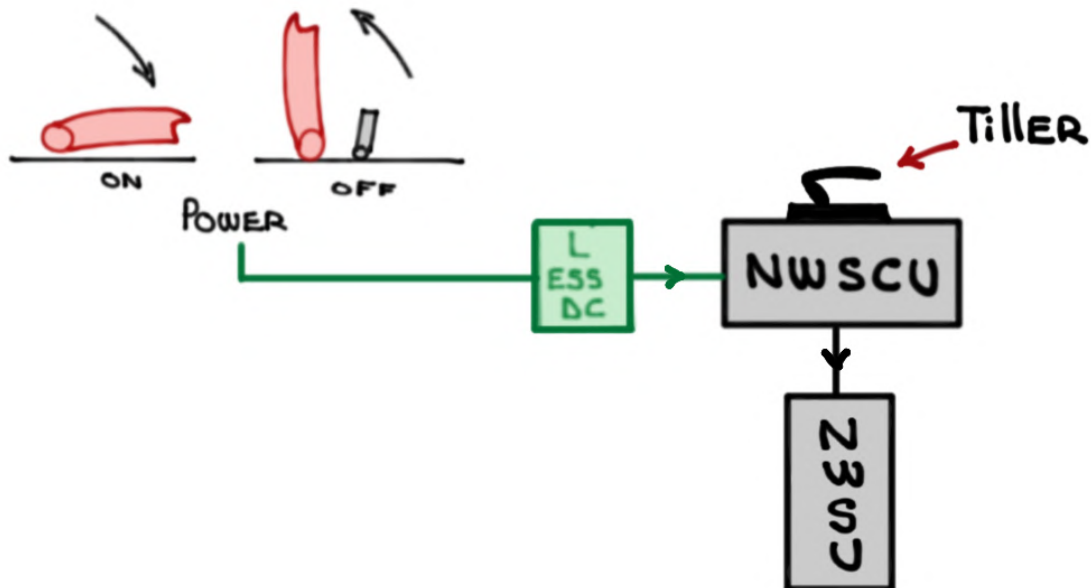
HYDRAULICALLY - DRIVEN



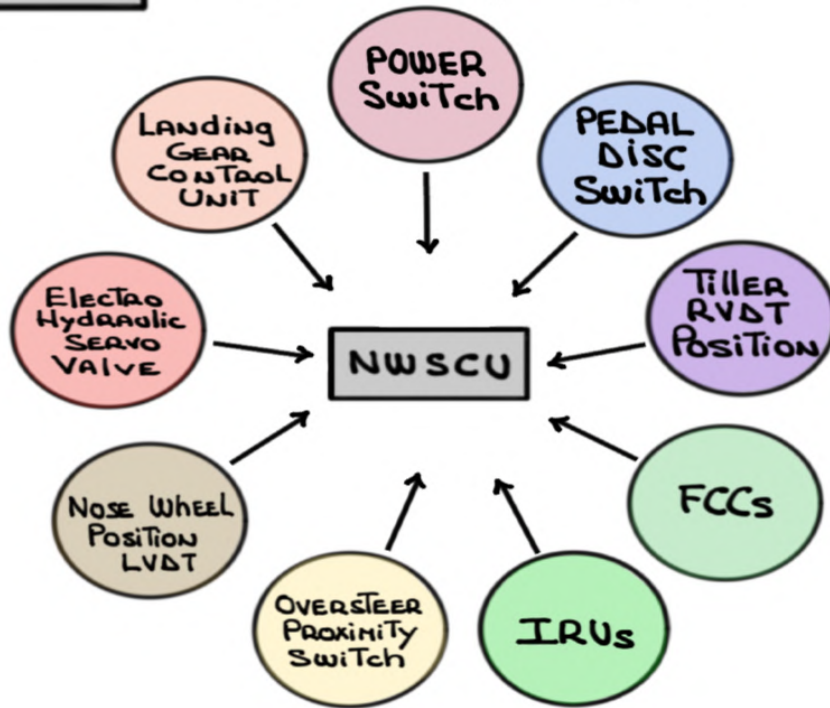
MECHANICALLY - ACTUATED

by a STEER-by-WIRE System

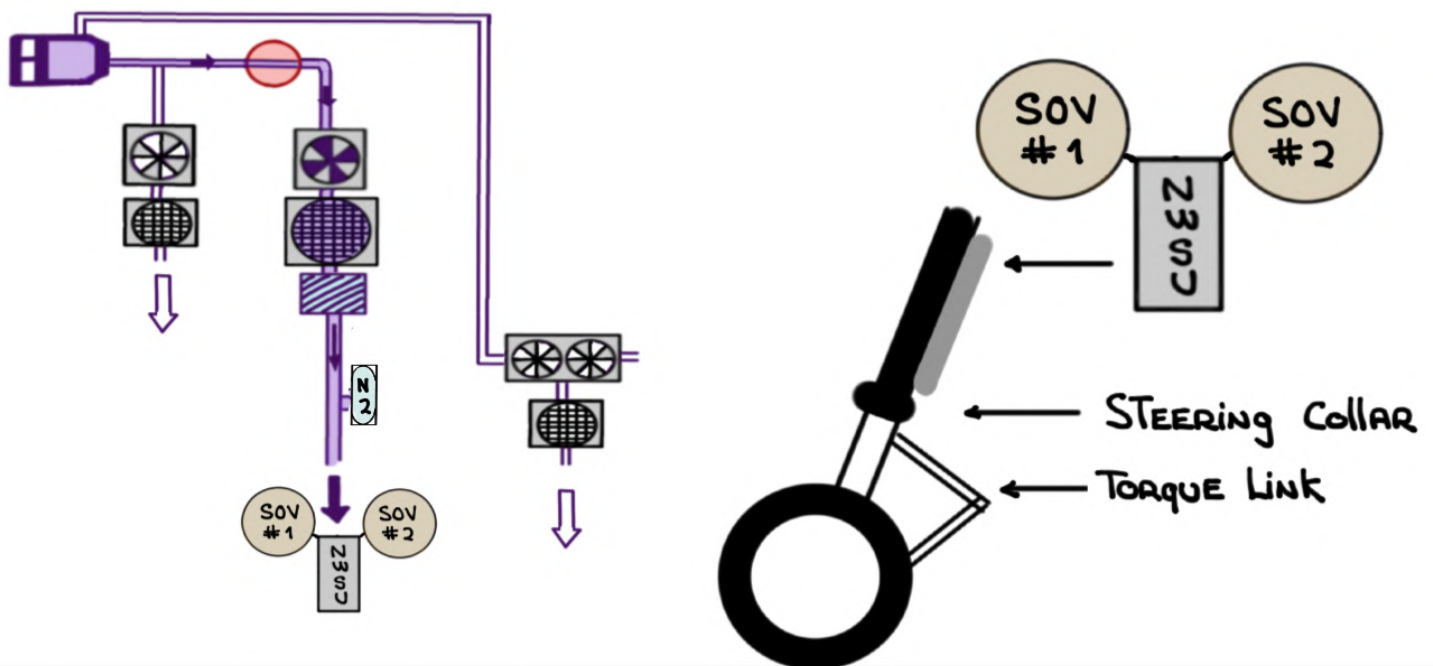
- The NOSE WHEEL STEERING CONTROL Unit (NWSCU) is a MICROPROCESSOR-BASED CONTROL UNIT LOCATED INSIDE THE CONTROL HOUSING PANEL
- The NWSCU is POWERED by 28 VDC
- PROVIDES STEER-by-WIRE inputs TO THE NOSE WHEEL STEERING UNIT (NWSU)



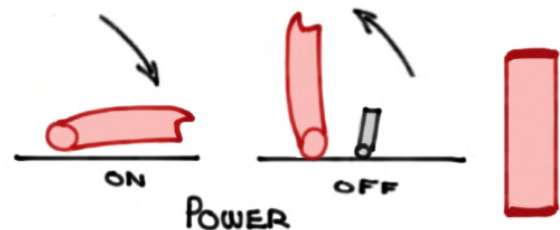
- The **NWSCU** RECEIVES input from:



- The NOSE WHEEL STEERING Unit (NWSU) CONVERTS **hydraulic** PRESSURE INTO TORQUE TO ROTATE NOSE WHEELS VIA THE STEERING COLLAR WHICH TRANSFERS TORQUE TO THE TORQUE LINKS



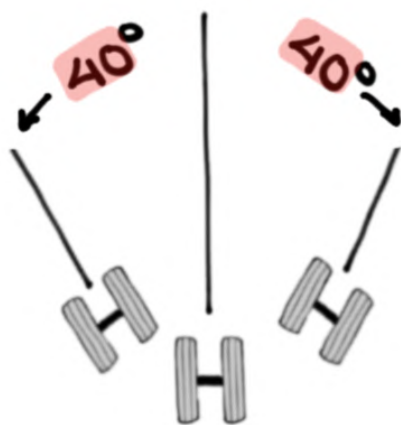
- NWS = RED guarded switch



- SPEED SENSITIVE STEERING:

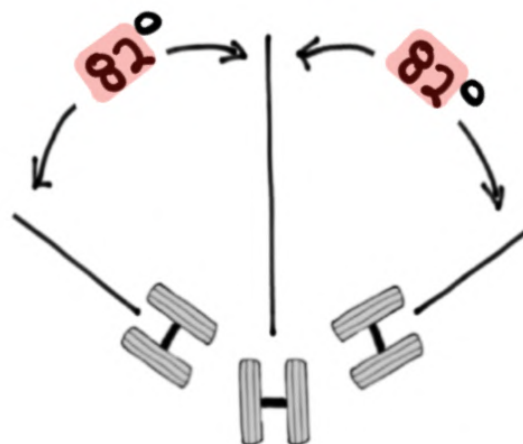
- PEDAL STEERING

- $\pm 40^\circ \leq 13$  knots
- $\pm 7^\circ @ 40$  knots



- TILLER STEERING

- $\pm 82^\circ \leq 15$  knots
- $\pm 7^\circ @ 160$  knots



- PEDAL + TILLER STEERING is ADDITIVE BUT WON'T EXCEED  $82^\circ$
- USE of TILLER on landing RESTRICTED TO  $\leq 30$  knots

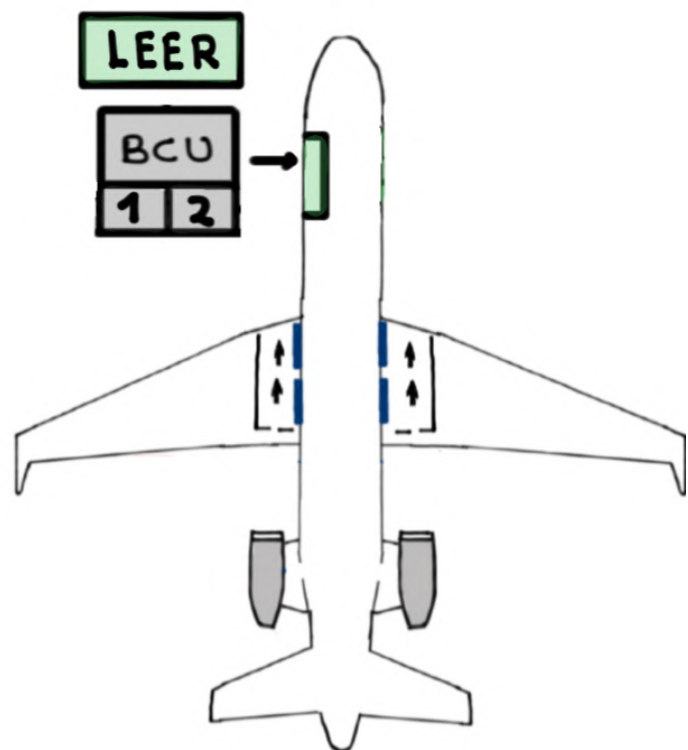
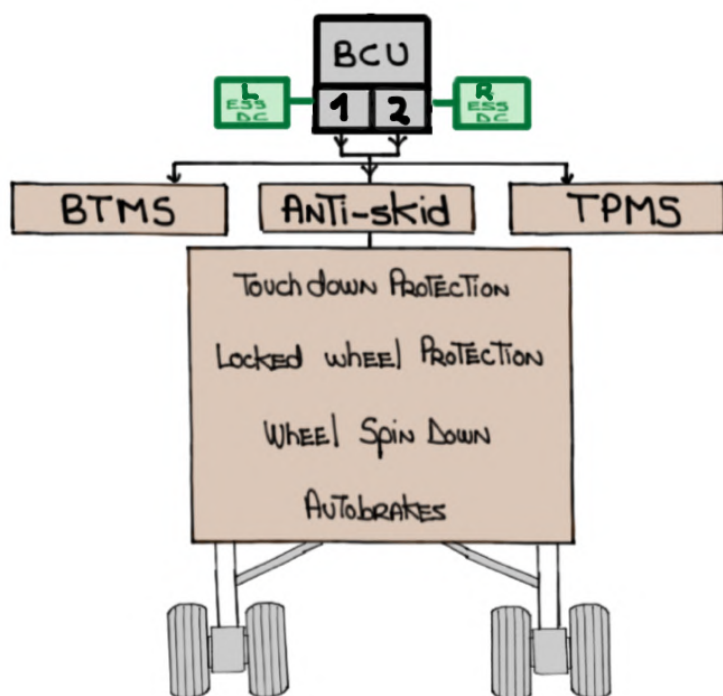
- NWS OVERTRAVEL INDICATOR:



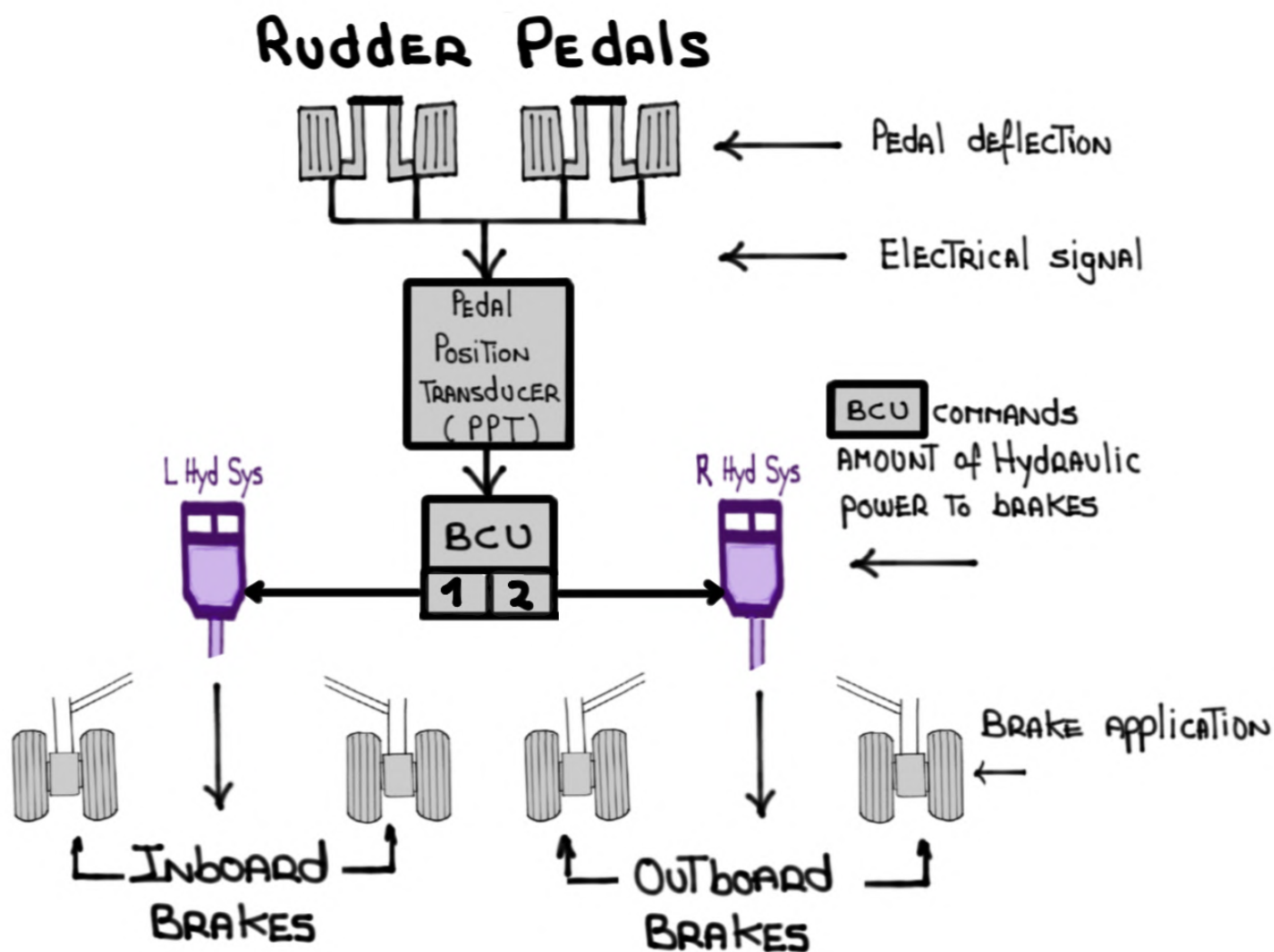


# MAIN WHEEL BRAKES

- A digital dual channel microprocessor called The Brake Control Unit (BCU) controls The Brake-by-Wire system
- The BCU is located in the **LEER** and contains two channels. The left channel is powered by the **L ESS DC** bus and controls left hydraulic system pressure to operate the inboard brakes. The right channel is powered by the **R ESS DC** bus and controls right hydraulic system pressure to operate the outboard brakes. A failure of one channel does not affect the operation of the other.

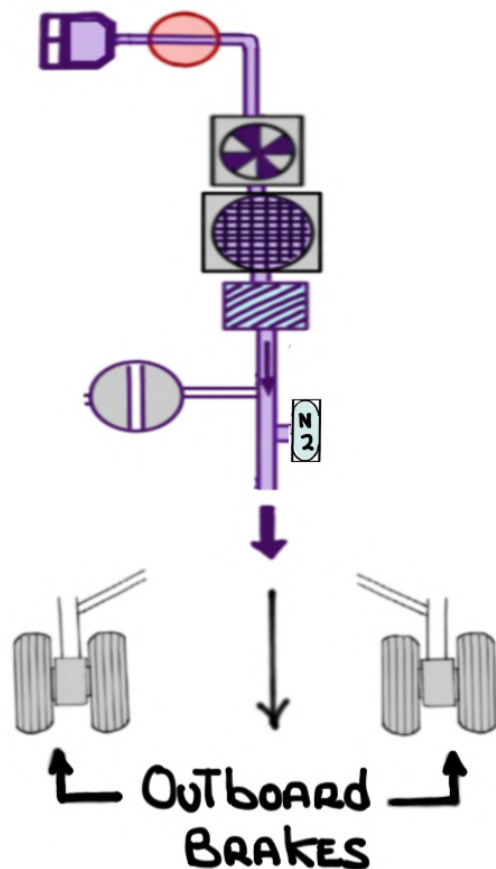
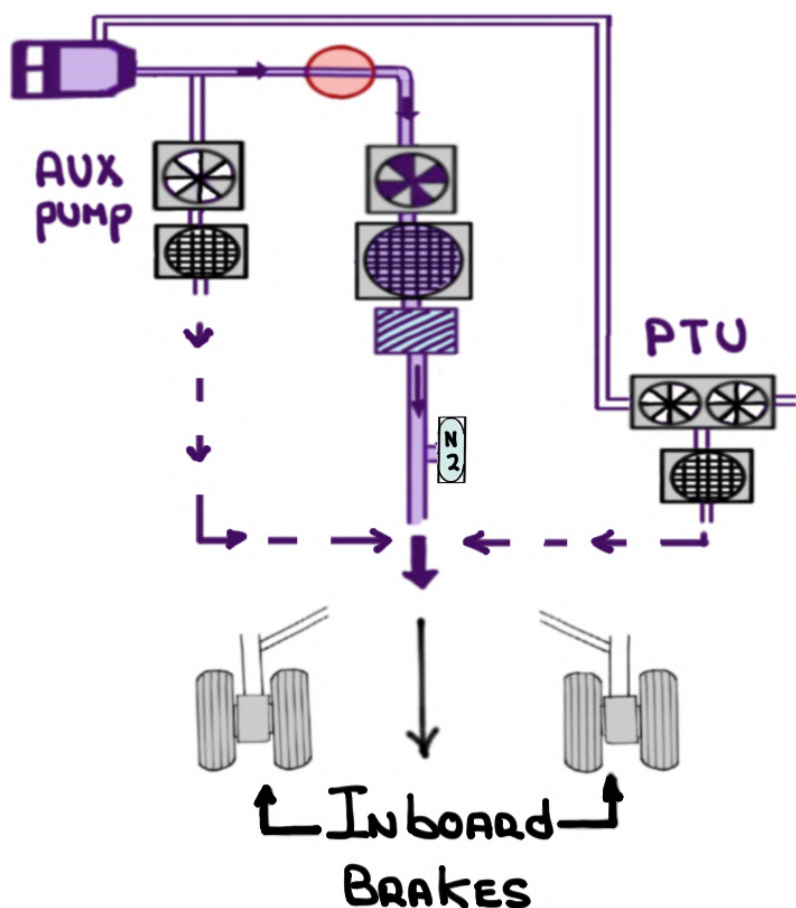



- The Two (2) IDENTICAL brake control system channels, operating simultaneously from independent hydraulic and electrical systems, control normal braking
- The purpose of the BCU is to prevent tire damage or failure caused by skidding or locked wheels during landing or a rejected takeoff



- The brakes ARE hydraulically powered by:

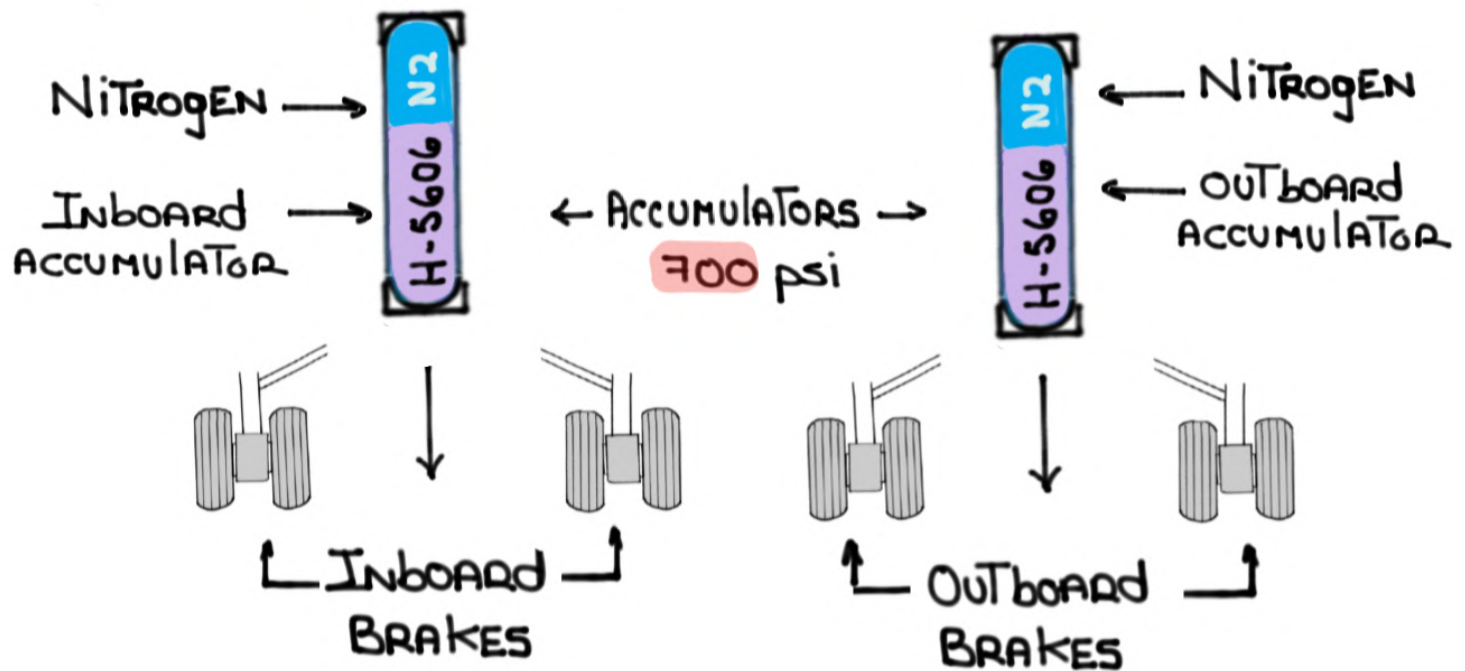
- Left Hydraulic System
  - Power Transfer Unit (PTU)
  - AUX pump
  - Inboard accumulator
- Right Hydraulic System
  - Outboard accumulator



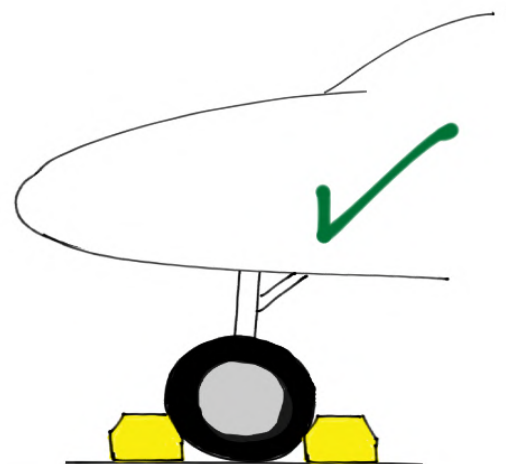
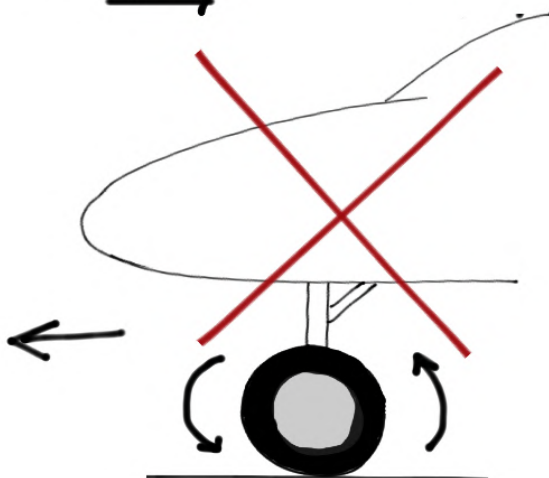
If  pump is selected ON during ground operations with engines NOT RUNNING only the inboard accumulator is charged



- The parking brake system has two (2) independent accumulators pre-charged to 700 psi with Nitrogen and hydraulically charged to 3,000 psi

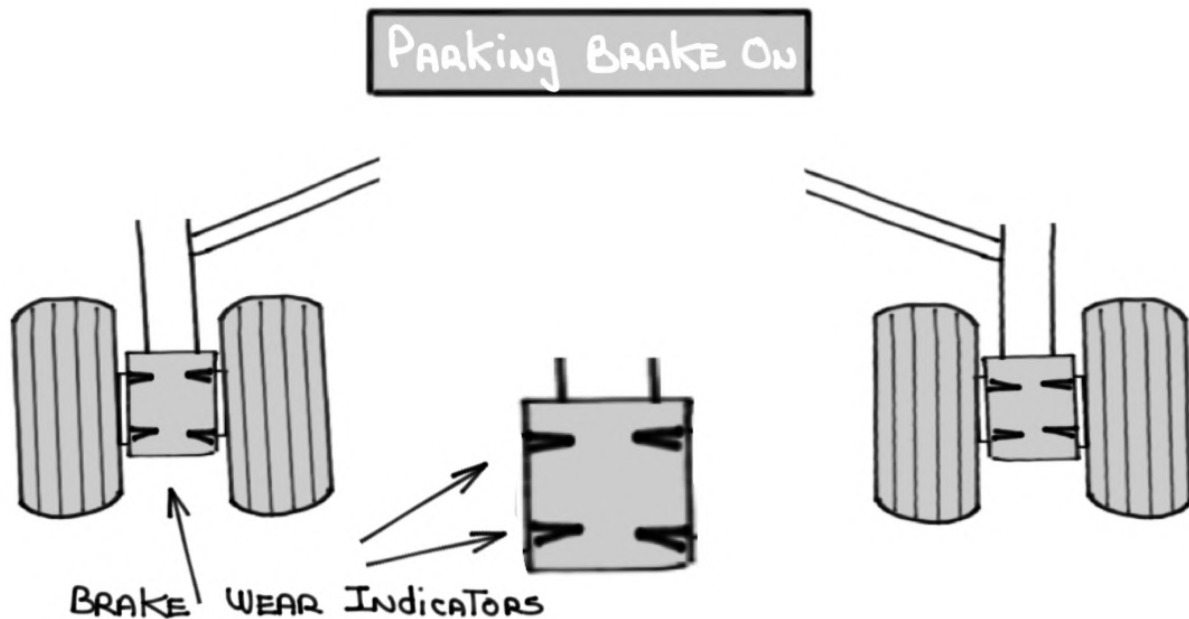


Parking brake accumulator pressure will decrease continuously over a short time. Always chock aircraft until ready for engine start. Otherwise it may roll ... AWAY!





- PARKING BRAKE MUST BE SET PRIOR TO CHECKING THE BRAKE WEAR INDICATORS (BWI) - "LIFE REMAINING"



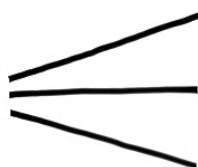
- Two (2) BWI PER BRAKE ASSEMBLY
- AMOUNT of PROTRUSION INDICATES "LIFE REMAINING"
- No protrusion: MX
- DURING ground operations with only AUX Hydraulic pump available: inboard brakes BWI only
- BRAKES: APPROXIMATELY 1,400 LANDINGS


## - ANTI-skid SYSTEM:

- DESIGNED TO SAFELY MINIMIZE STOPPING DISTANCE
- MODULATES **HYDRAULIC** PRESSURE TO THE MAIN WHEEL BRAKES WHEN A SKID IS DETECTED
- ANTI-skid PROTECTION IS AVAILABLE DOWN TO TEN (10) KNOTS
- BELOW TEN (10) KNOTS TIGHT TURNS WITH DIFFERENTIAL BRAKING CAN BE MADE
- THE ANTI-skid SYSTEM PROVIDES THE FOLLOWING PROTECTIONS:

### ① Touchdown protection:

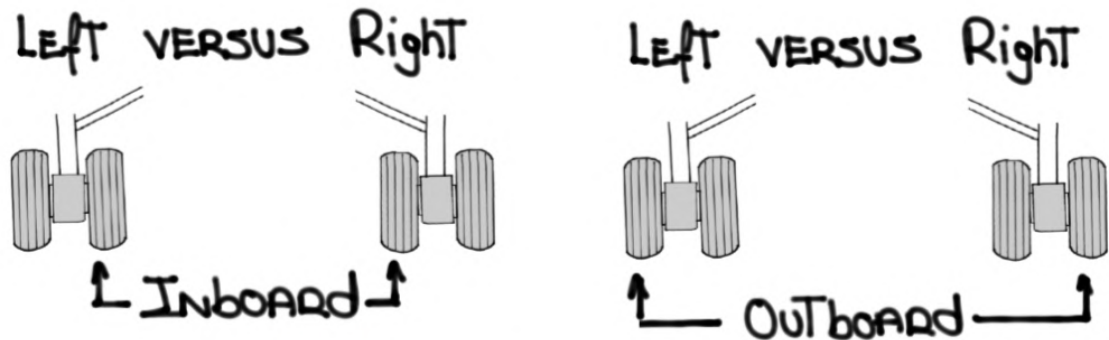
- PREVENTS LANDING WITH BRAKES ON

- PROVIDED  AIR MODE  
LANDING GEAR DOWN/LOCKED  
WHEEL SPEED < 70 KNOTS

- BRAKES AVAILABLE  WOW(6) + five (5) SECONDS if  
WHEEL SPEED IS < 30 KNOTS  
OR  
WHEEL SPEED > 70 KNOTS

## ② Locked wheel protection:

- COMPARES wheel speeds



- If Thirty (30%) < Than its paired wheel brake pressure is released on that wheel
- Brake pressure remains modulated until speed recovers

## ③ Controlled wheel spin down:

- Brake pressure is applied during gear retraction/extension
- Controls rate of wheel spin down during retraction by applying 500-800 psi of brake pressure for 4.5 seconds
- Checks system health during extension and applies 1,500 psi of pressure for 4 seconds

## - AUTOBRAKES SYSTEM:

- AUTOMATIC APPLICATION OF BRAKES DURING A REJECTED TAKEOFF OR DURING LANDING
- THERE ARE THREE (3) LEVELS OF DECELERATION ON LANDING - Low, Medium AND High, AND A SINGLE REJECTED TAKEOFF (RTO) MODE SELECTED VIA TSC 1-4

- Landing:

- INITIAL BRAKE APPLICATION ASSISTS IN DE-ROTATION
- DECELERATION BRAKING RAMPs IN OVER THREE (3) SECS
- THREE (3) RATES OF DECELERATION:

AUTOBRAKE LOW 7'/SEC<sup>2</sup>

AUTOBRAKE MEDIUM 10'/SEC<sup>2</sup>

AUTOBRAKE High MAXIMUM ANTI-SKID BRAKING

- AUTOBRAKES ARE DISCONNECTED BY APPLICATION OF TOE BRAKES (RUDDER PEDALS)

- TAKEOFF: AUTOBRAKE RTO

- THRUST LEVERS TO IDLE
- BRAKE PRESSURE APPLICATION:

600 psi < 80 KTS > MAXIMUM ANTI-SKID BRAKING



## - BRAKE TEMPERATURE MONITORING SYSTEM (BTMS):

THE BTMS MONITORS CURRENT BRAKE TEMPERATURES  
SENSED ON ALL MAIN WHEEL BRAKES

**BRAKE OVERHEAT**

> 600°C SENSED IN ONE OR MORE BRAKE ASSEMBLIES

## - TIRE PRESSURE MONITORING SYSTEM (TPMS):

THE TPMS ALERTS THE CREW OF IMPROPER PRESSURES ON  
ALL SIX (6) TIRES

< 101 psi **TIRE PRESSURE LOW**

**TIRE PRESSURE LOW**

NOSE < 156 psi

MAIN < 191 psi

RECOMMENDED TIRE PRESSURE FOR ALL TAKEOFF WEIGHTS:

\* • NOSE: 182 psi (MINIMUM 156 psi)

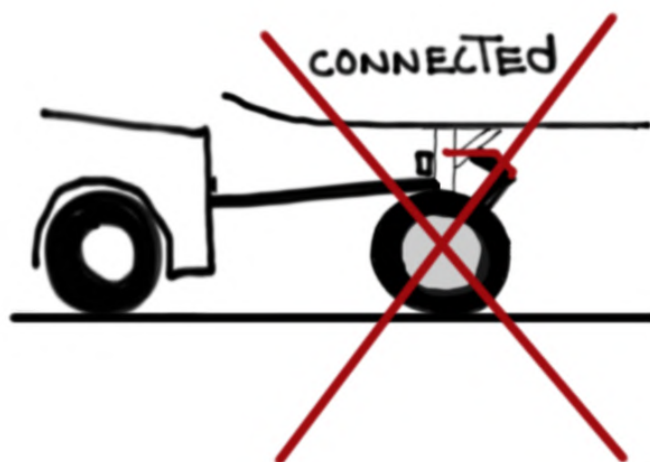
\* • MAIN: 223 psi (MINIMUM 191 psi)

\* STATIONARY ≥ TWO (2) HOURS

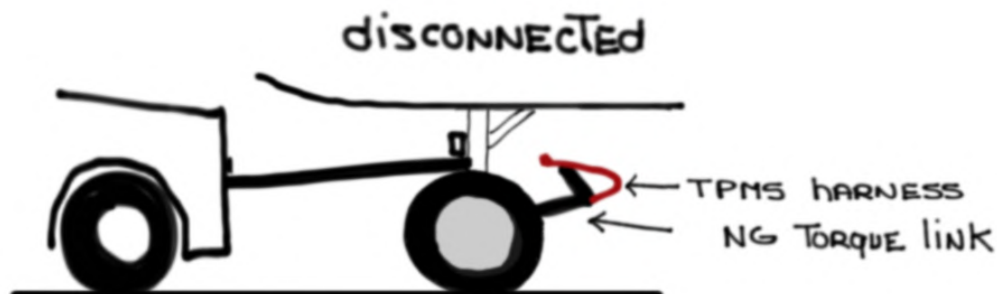
TIRE PRESSURE is indicated on:

- TSC 1-5
  - GROUND SERVICE Synoptic 1/6 page
- 

Prior to Towing The NOSE wheel TPMS HARNESS AND THE NOSE GEAR TORQUE link MUST BE DISCONNECTED



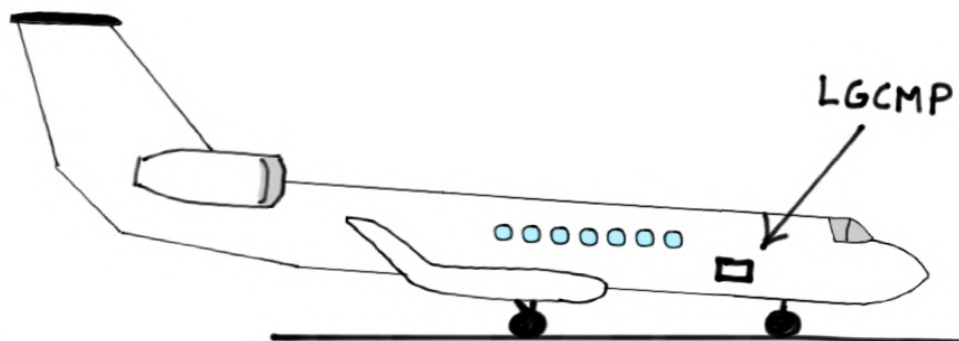
TPMS MAINTENANCE REQD




# LANDING GEAR CONTROL MAINTENANCE PANEL (LGCMP)

The LGCMP is located on the right side of the fuselage and is used to:

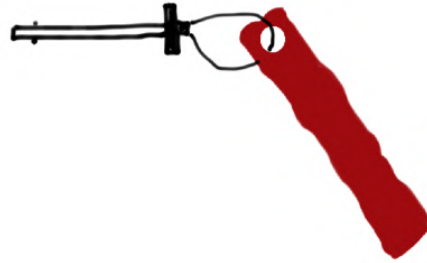
- ① Change WOW mode LG MAINTENANCE Mode
- ② RETRACT/EXTEND the landing gear while the aircraft (MAINTENANCE function only)
- ③ Open/close landing gear doors (EXPANDED EXTERIOR pre-flight inspection)



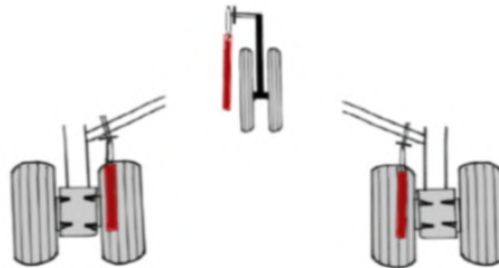
AUX  pump is the normal source of hydraulic fluid and pressure for these activities

# Safety Pins (8)

Each pin has a "REMOVE before flight" STREAMER



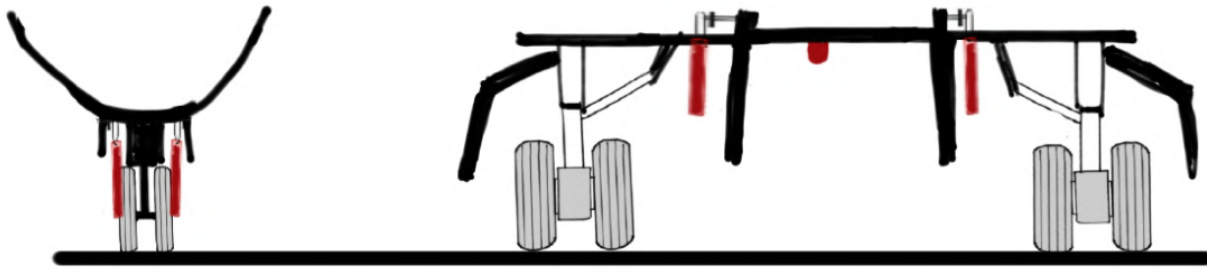
- THREE (3) GEAR PINS ARE INSTALLED AS PART OF THE POST-FLIGHT INSPECTION. THE PINS MUST ALSO BE INSTALLED PRIOR TO TOWING. PINS MUST BE REMOVED FOR FLIGHT



ONE PILOT REMOVES/STORES THE PINS. THEN 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

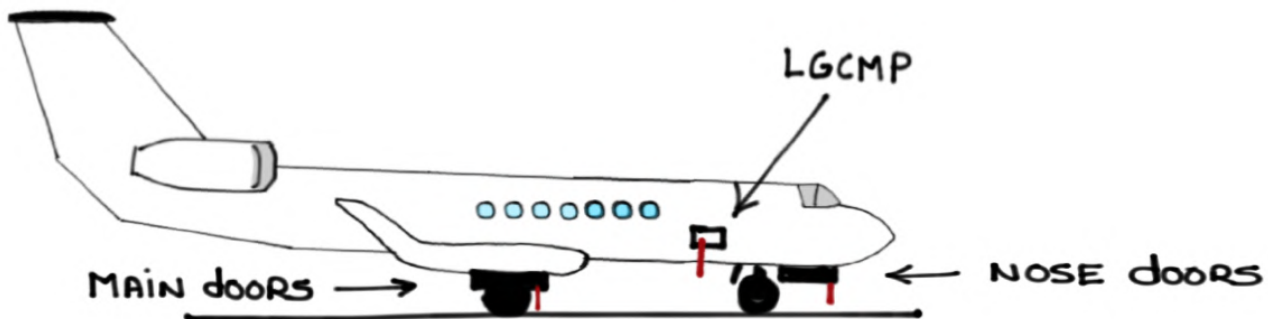


- Two (2) NOSE GEAR AND Two (2) MAIN GEAR door pins ARE INSTALLED AFTER OPENING THE GEAR DOORS VIA THE LGCMP



\* WHOEVER OPENS THE GEAR DOORS SHOULD BE THE ONLY ONE CLOSING THE DOORS

- ONE (1) LG MODE PiP PIN IS INSTALLED IN THE LGCMP WHEN CHANGING MODES - **NORMAL** → MAINTENANCE



A CAS MESSAGE WILL ALERT THE CREW WHEN THE LGCMP IS SET TO MAINTENANCE MODE

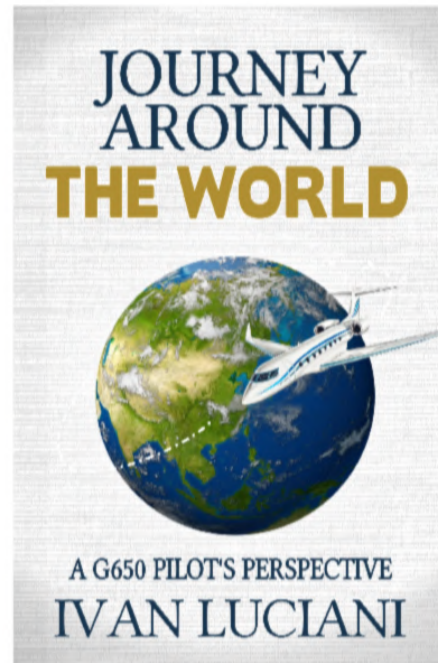
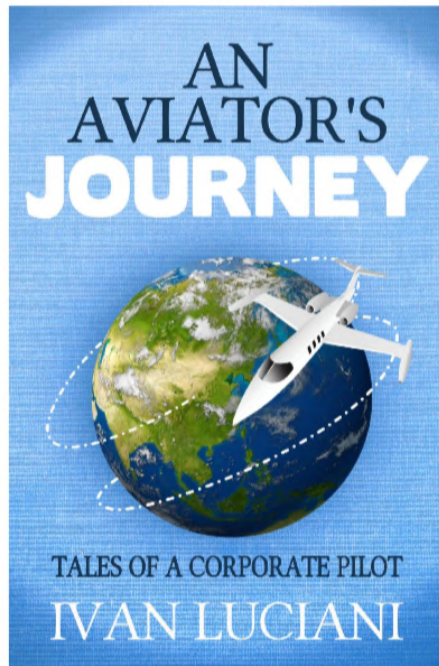
**LG MAINTENANCE MODE**

RETURNING TO **NORMAL** MODE REQUIRES REMOVAL OF THE PIN

**REMINDER:** these system notes are intended for study purposes only. Always refer to official Gulfstream manuals and other approved references when operating your aircraft.

NOTE: these system notes are updated from time to time and what is posted on Code450.com will always be the most recent version.

Questions, comments or errors...please do send me an email:  
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Thank you!