

CHAPTER 16 – LANDING GEAR

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1. INTRODUCTION

The landing gear is a retractable tricycle type consisting of two, wing root mounted, main landing gear assemblies and a forward, fuselage mounted, steerable, nose landing gear assembly. The main landing gear assemblies retract inboard and the nose landing gear assembly retracts forward. Each landing gear has a nitrogen filled shock strut to absorb and dissipate the shock loads encountered when the aircraft lands.

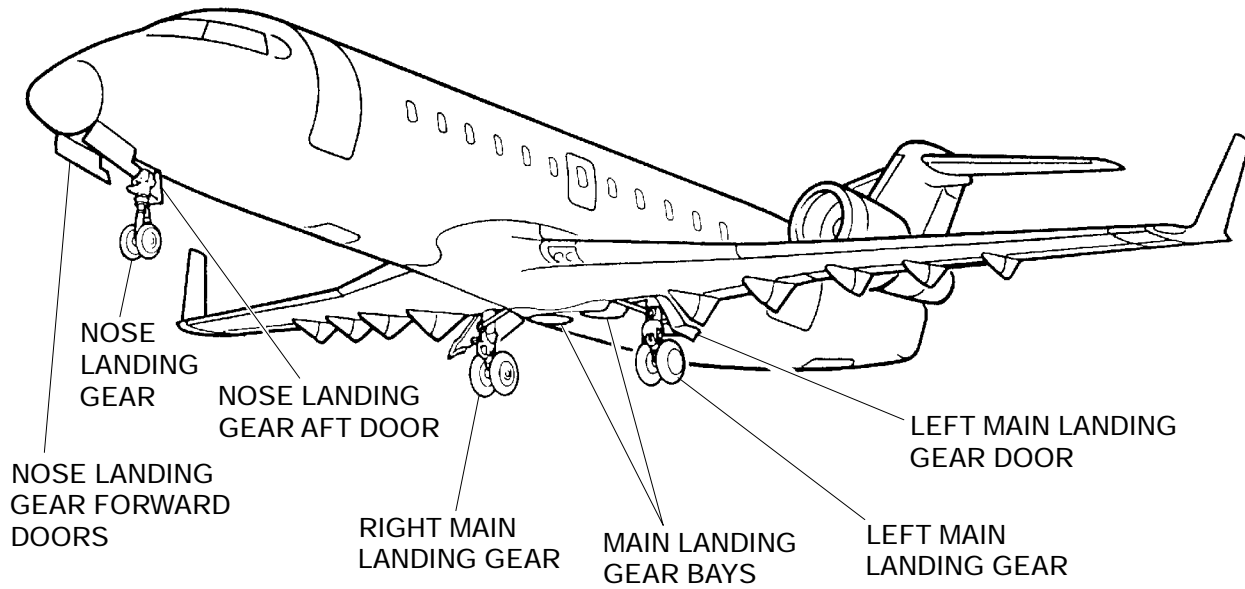
The landing gear subsystems are as follows:

- Landing gear extension and retraction
- Landing gear doors
- Alternate landing gear extension
- Landing gear overheat detection
- Brake system
- Brake temperature monitoring system (BTMS)
- Antiskid
- Nose wheel steering
- Proximity sensing electronic unit (PSEU).

Landing gear extension and retraction is electrically activated by the landing gear selector lever and controlled by the proximity sensing electronic unit (PSEU). Sensors for the PSEU are mounted on the landing gear and landing gear doors. The PSEU also provides landing gear position indication for display on the EICAS. In normal operation, the landing gear is hydraulically actuated by number 3 hydraulic system. An alternate independent means of extending the landing gear is available should the normal extension system fail.

Each gear assembly has two wheels and each of the four main wheels is fitted with a, hydraulically operated, steel multi-disc brake assembly.

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Landing Gear and Landing Gear Doors
Figure 16-10-1

	LANDING GEAR Nose and Main Landing Gear	Vol. 1	16-20-1
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1. NOSE AND MAIN LANDING GEAR

Normal extension or retraction of the landing gear is initiated by landing gear control lever selection. The retraction or extension signal is sent to the proximity sensing electronic unit (PSEU) which monitors various landing gear proximity sensing inputs and weight-on-wheels inputs. If the correct parameters are met, the PSEU energizes a selector valve to retract or extend the landing gear using No. 3 hydraulic system.

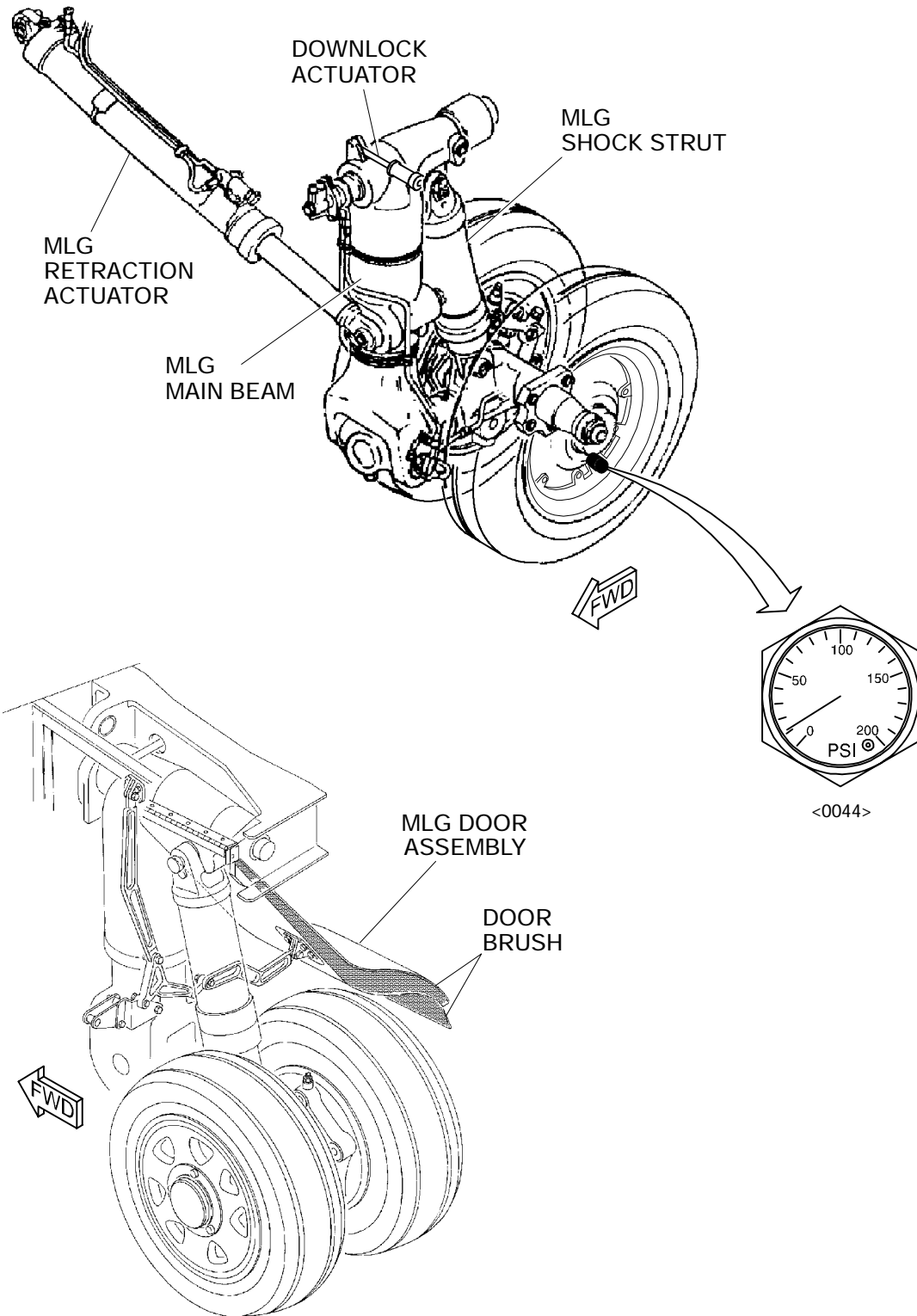
The landing gear control lever is equipped with a solenoid lock which prevents an up selection of the landing gear control lever with the aircraft on the ground. In the event of a solenoid lock malfunction, a downlock release (DN LCK REL) on the landing gear control panel, permits up selection of the landing gear control lever by overriding the solenoid lock.

Retraction and extension of each landing gear is driven by a retract/extend actuator. Tension springs assisted by a downlock actuator ensure that the main gear locks in the down position. The lock is released at the start of the retraction cycle. An uplock assembly locks the main gear in the retracted position. An uplock release actuator releases the uplock assembly at the start of the extension cycle.

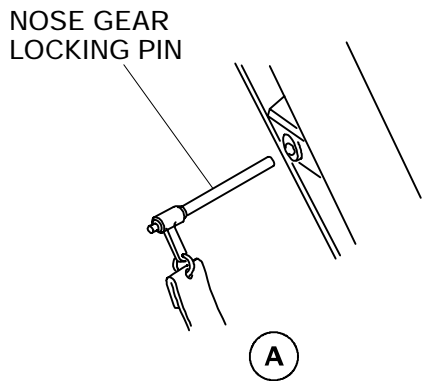
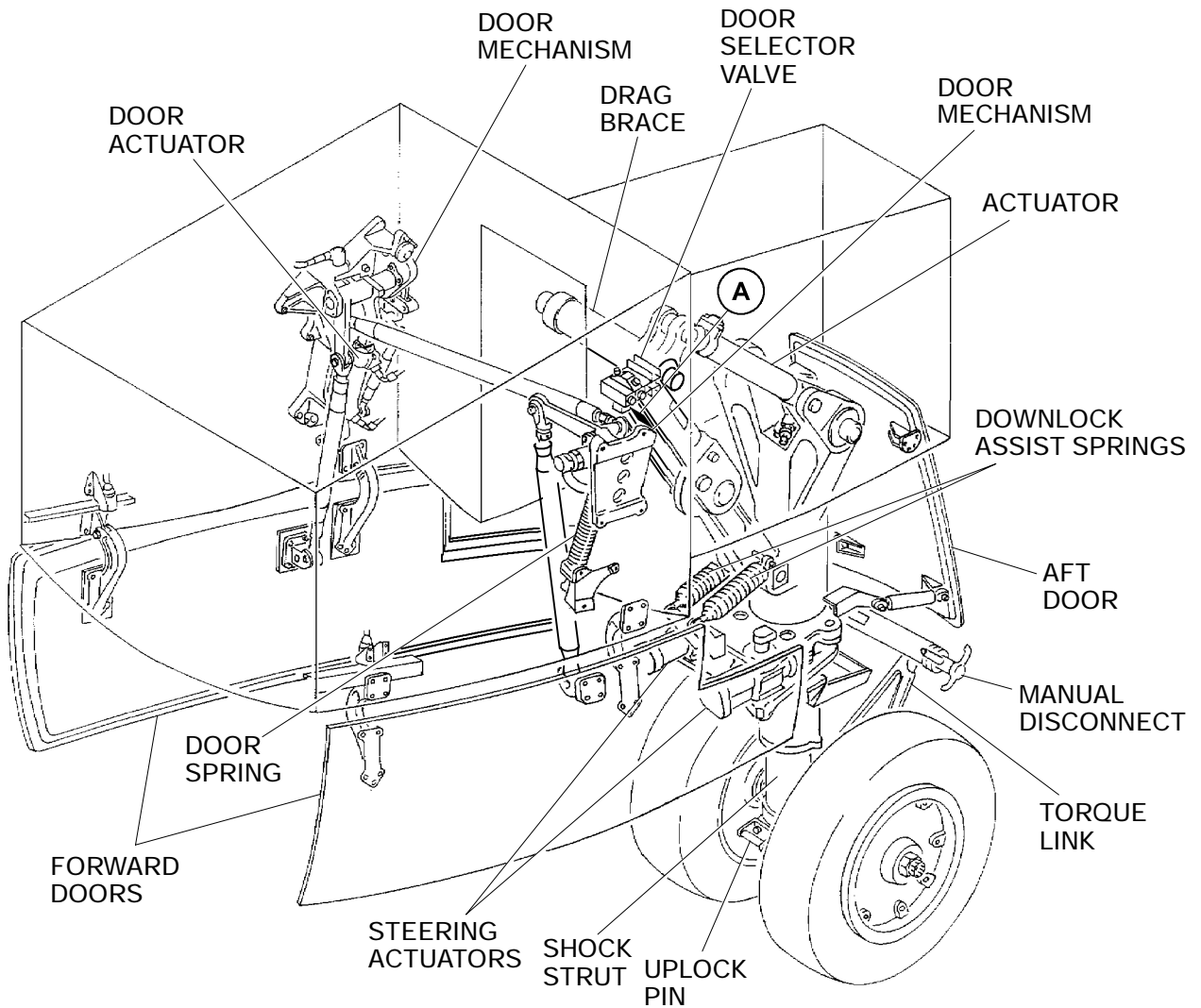
The nose landing gear (NLG) is hydraulically extended in the aft direction and mechanically locked in the down position. The NLG is hydraulically retracted in the forward direction and mechanically locked in the up position.

The main landing gear doors and the nose landing gear aft door are mechanically linked to the respective landing gears, and therefore, retract and extend with the landing gears. The nose landing gear forward doors are actuated hydraulically from No. 3 hydraulic system. The nose landing gear forward doors open before extension and retraction and then close after extension and retraction.

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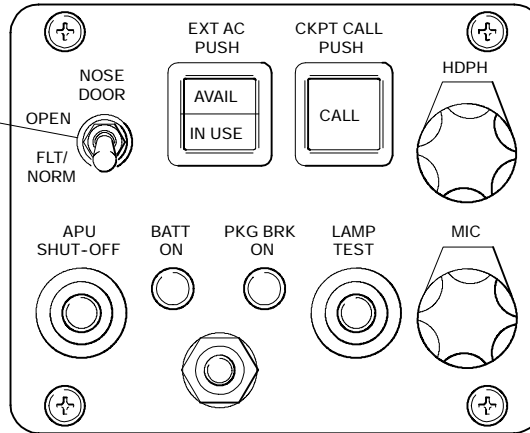
Main Landing Gear <MST>
Figure 16-20-1



Nose Landing Gear
Figure 16-20-2

NOSE DOOR toggle switch

- OPEN - opens nose landing gear doors and disables the nose landing gear door selector valve. The nose landing gear doors will remain open with or without hydraulic power, as long as the switch is in this position.
- FLT/NORM - closes nose landing gear doors and enables the nose landing gear door selector valve, provided there is hydraulic power.



External Service Panel



Ensure that the nose landing gear bay area is clear before selecting the nose door switch to FLT/NORM.

Nose Landing Gear Doors – Ground Operation
Figure 16-20-3

	LANDING GEAR Nose and Main Landing Gear	Vol. 1	16-20-5
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For landing gear retraction,
Once the aircraft is airborne, with no weight-on-wheels signal, the PSEU commands and monitors the following events:

- The landing gear control lever solenoid downlock is released to permit UP selection of the landing gear control lever
- The nose landing gear doors selector valve is energized, to open the forward nose landing gear doors
- The nose landing gear and main landing gear selector valves are energized to release the downlocks and the main and nose landing gears retract. Hydraulic pressure from the nose landing gear up-line is routed to activate the brake control valves to stop main wheel rotation
- Uplocks of the nose landing gear and main landing gear are engaged to secure the landing gears in the retracted position
- The nose landing gear doors selector valve is energized, to close the forward nose landing gear doors.

NOTE

The nose landing gear wheel well area can be inspected by opening the forward nose landing gear doors, through selection of the NOSE DOOR switch on the External Service Panel.

For landing gear extension,
The PSEU commands and monitors the following events:

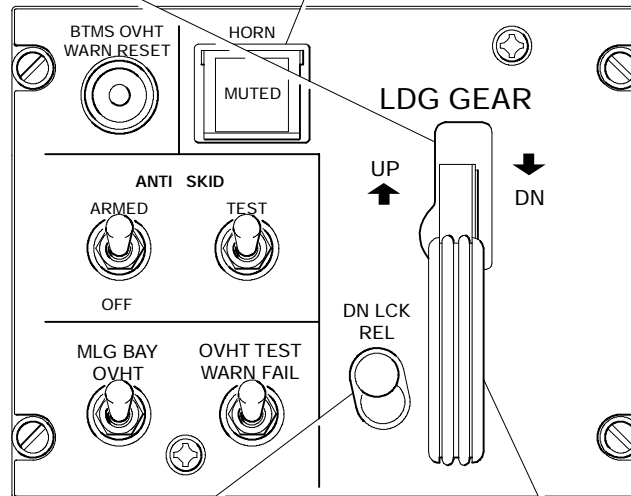
- The landing gear control lever is manually selected to the DN position
- The nose landing gear doors selector valve is energized, to open the forward nose landing gear doors
- The nose landing gear and main landing gear selector valves are energized to release the downlocks and extend main and nose landing gears
- Downlocks of the nose landing gear and main landing gear are engaged to secure the landing gears in the extended position
- The nose landing gear doors selector valve is energized, to close the forward nose landing gear doors.

Ground lock pins are inserted by ground crew to prevent inadvertent retraction of the landing gear when the aircraft is on the ground.

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Landing Gear Control Lever Down Lock (lever solenoid)
Used to prevent inadvertent landing gear up selection when on ground. When airborne, a WOW signal completes a circuit which disengages the lock and permits gear up selection.

Mute Horn Switch/Light
Mutes landing gear warning horn. White light will come on to indicate that landing gear warning horn has been mute.



**Landing Gear Control Panel
Centre Instrument Panel**

Landing Gear Control Lever Down Lock Release Lever
Used if there is a fault in the solenoid release circuit. Move switch down and hold down to manually override the LDG GEAR control lever solenoid lock.

Landing Gear Lever
Controls retraction and extension of the landing gear. Lever must be pulled out to be moved to alternate position.

- UP - Retracts landing gear.
- DN - Extends landing gear.

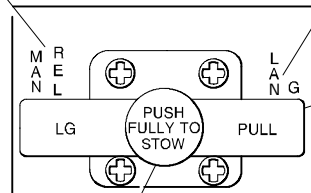
Landing Gear Controls
Figure 16-20-4

LANDING GEAR MANUAL RELEASE handle (red)

- Used to manually lower the landing gear:
Pull handle and hold handle in the fully extended position until EICAS indicates the nose and main landing gear are in the down and locked position.

MANUAL
RELEASE

LANDING
GEAR



NOTE

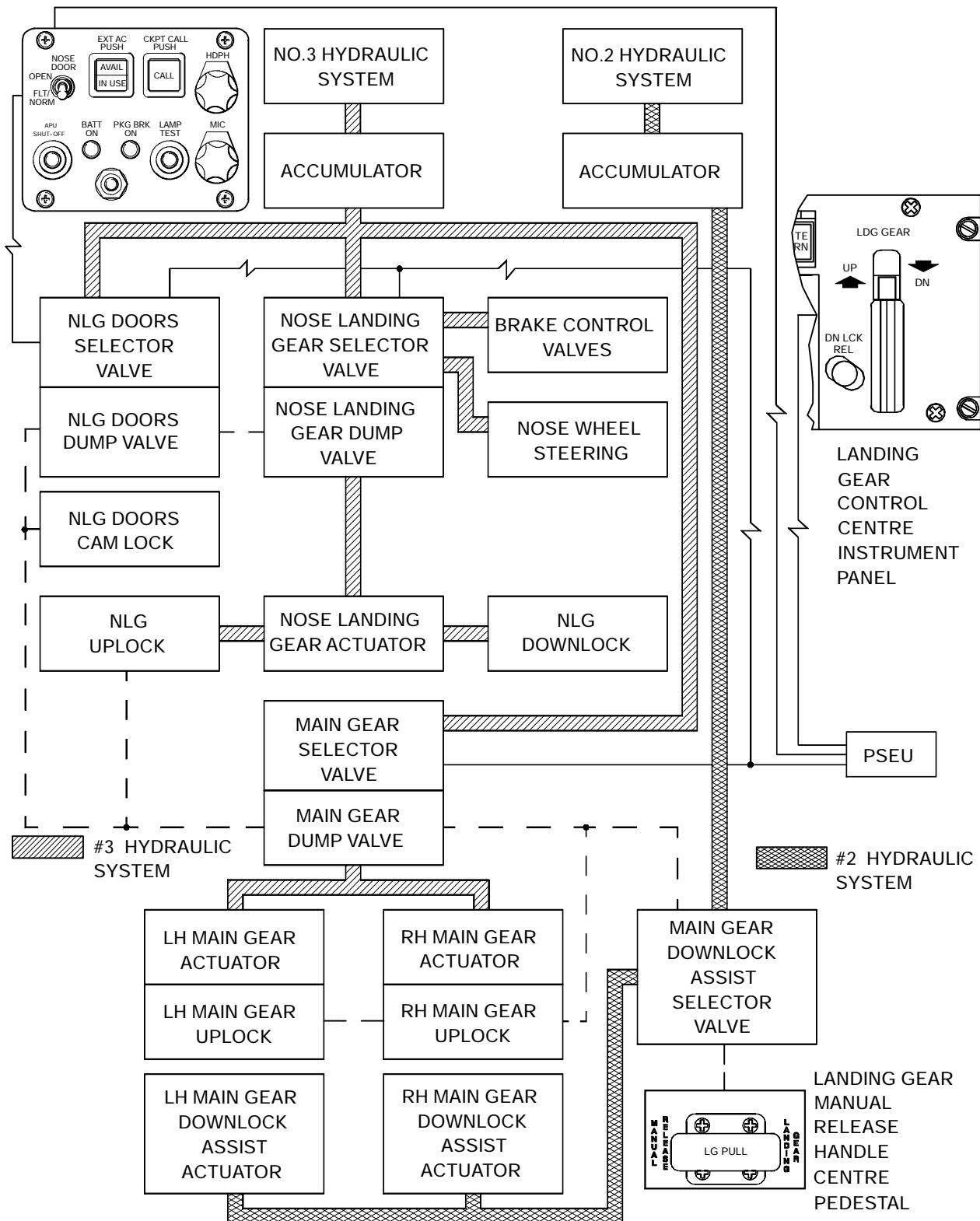
Considerable force is required to operate the landing gear manual release system.

**Landing Gear Manual Release Handle
Center Pedestal**

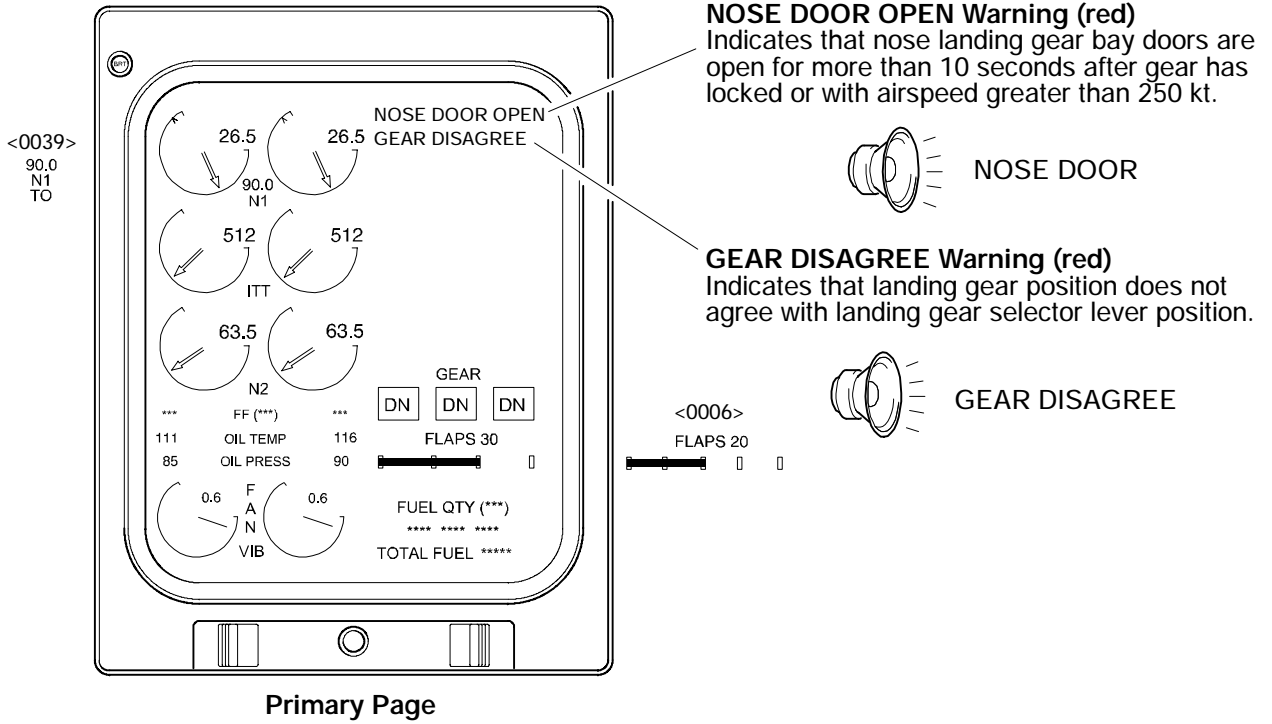
PUSH FULLY TO STOW button (red)

- Used to reset the manual release system (stow the LG PULL handle):
Hold handle, press button and then slowly return handle to the stowed position.

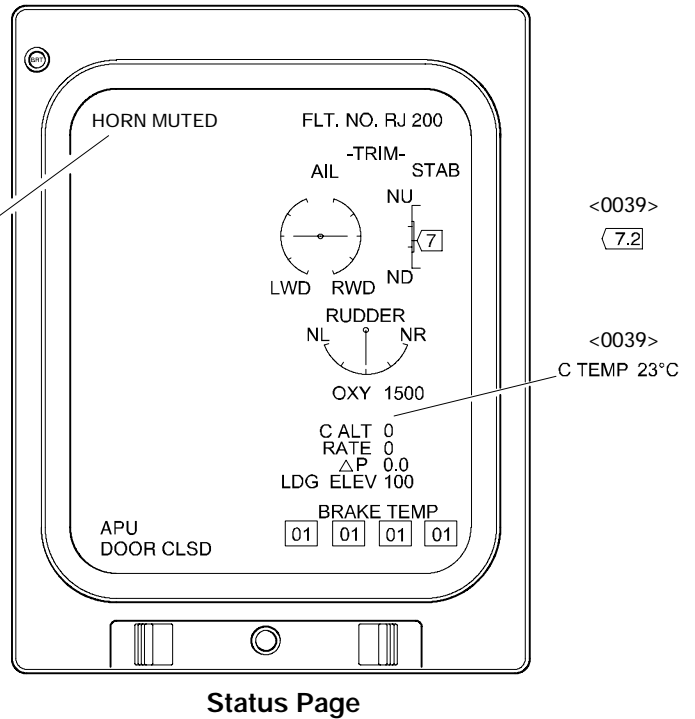
Landing Gear Manual Release
Figure 16-20-5



Landing Gear Retraction and Extension – Schematic
Figure 16-20-6



HORN MUTED Status (white)
Indicates that landing gear warning horn has been manually muted.



Landing Gear EICAS Messages <MST>
Figure 16-20-7



"Landing Gear Warning Horn"

Comes on to warn that the landing gear are unsafe if:

- Airplane is below 1,000 AGL, and
- Rate of descent is ≤ 400 fpm, and
- Landing gear are not down and locked.

NOTE <0039>

The gear symbols and flap position indicators come on whenever the landing gear warning horn is active.

TOO LOW GEAR (Aural warning)

Is heard if any landing gear is not down and locked with the radio altitude less than 500 ft AGL and the indicated airspeed is less than 190 knots.

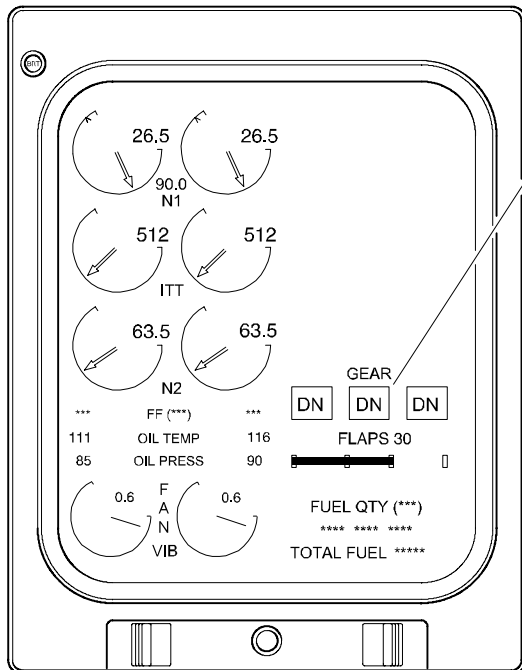
Landing Gear Position Indicator

- UP (white) - Indicates that respective landing gear is in the up and locked position.
- DN (green) - Indicates that respective landing gear is in the down and locked position.
- (amber) - Indicates that respective landing gear is in transition.
- (red) - Indicates that respective landing gear is not safe.
- - - (amber dashes) - Indicates that respective landing gear is in unknown position.

NOTE <0039>

The amber gear symbols will flash if the landing gear warning horn is on for more than 10 seconds.

<0039>
90.0
N1
TO



<0006>



Primary Page

Landing Gear – Primary Page Gear Indications <MST>
Figure 16-20-8

	LANDING GEAR		Vol. 1	16-20-11
	Nose and Main Landing Gear		REV 56, Jan 31/03	

The PSEU monitors the position of the landing gears, nose landing gear doors and the uplocks and downlocks. Landing gear position is displayed on the EICAS primary page. The gear position information is removed from the primary page 30 seconds after the gear is up and locked.

A. Landing Configuration Warning

The landing gear warning horn will sound if:

- 2 minutes after ground to air transition, any landing gear is not down and locked, and
- The indicated airspeed is less than 163 knots with one or both thrust levers selected to IDLE, or
- The indicated airspeed is less than 185 knots with the flaps at less than 5° and one or both thrust levers selected to IDLE.

NOTE

1. The landing gear warning horn may be muted with one thrust lever at IDLE and the landing gear not in the down and locked position.
2. The landing gear warning horn cannot be muted when the flaps are selected to greater than 30°, or both thrust levers are set to IDLE.
3. The landing gear warning horn is inhibited during take-off windshear conditions.
4. The landing gear warning horn will not sound during a radio altimeter test in flight and the horn is inhibited during take-off windshear conditions. <0039>

B. Alternate Landing Gear Extension

Should a failure occur in the landing gear control system or in hydraulic system 3, landing gear extension is still possible by pulling the landing gear manual release handle.

When the handle is pulled, the nose landing gear forward door camlock and the three landing gear uplocks are released by mechanical means. At the same time the associated dump valves are opened to route No.3 hydraulic system pressure to return which permits the landing gear to extend under its own weight.

The main landing gear is assisted to the down-and-locked position by the main gear down lock assist actuators which are powered by No.2 hydraulic system. The nose landing gear is assisted to the down-and-locked position by two tension springs and by airflow.

C. Wheels and Tires

Each wheel has a pressure relief plug (overpressure valve) and an inflation valve. Refer to the Aircraft Maintenance Manual for tire pressure adjustment.

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LANDING GEAR
Nose and Main Landing Gear

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Four heat sensitive fusible plugs are installed in each main wheel to release excessive air pressure caused by heat build-up. The fusible plugs protect the main wheel tires from bursting, that could occur under heavy braking activity.

Wheel mounted tire pressure gauges, installed on all six wheels, directly measure the pressure of the tire. <0044>

	LANDING GEAR Proximity Sensing System	Vol. 1	16-30-1
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1. PROXIMITY SENSING SYSTEM

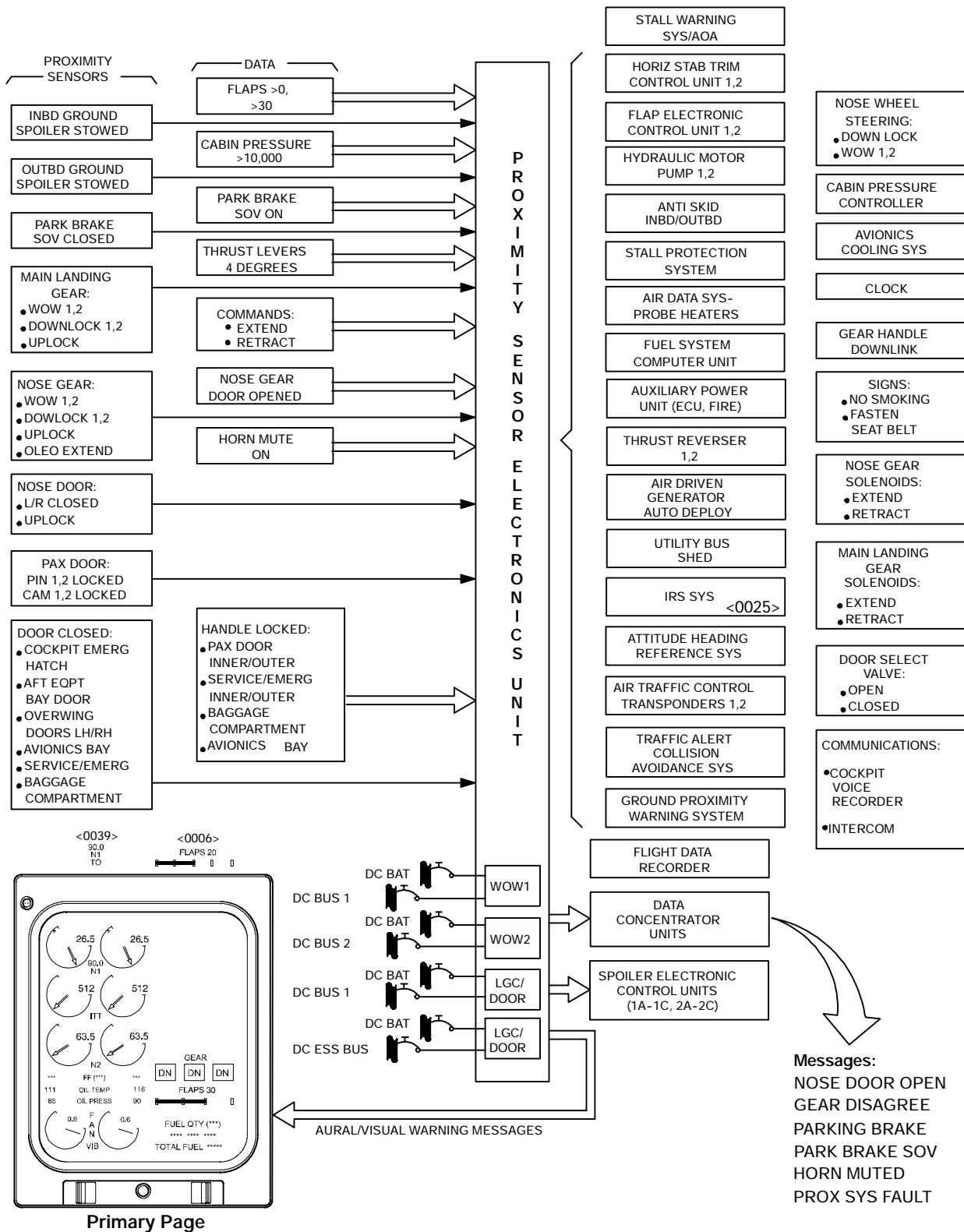
The proximity sensor system (PSS) includes the proximity sensor electronics unit (PSEU) and associated proximity sensors, proximity switches and microswitches installed throughout the aircraft. The PSS provides five basic functions:

- Normal landing gear positioning control,
The PSS provides the signals that command the landing gear to extend and retract and the nose gear doors to open and close.
- Landing gear position indication,
The PSS monitors landing gear position and provides indication and position status to the EICAS.
- Weight-on-wheels indication,
The PSS monitors landing gear strut compression and provides indication of air or ground status to the aircraft systems that require the information.
- Fuselage door indication,
The PSS monitors the fuselage door positions and provides inputs to the EICAS for indication on the primary page, status page and door synoptic page. (refer to Chapter 6).
- Thrust reverser indication,
The PSS monitors and reports to EICAS the (stowed/unstowed) status of the left and right thrust reversers (refer to Chapter 20).

The PSEU, after processing sensor inputs, generates outputs that are used to control the landing gear position. The PSEU also reports system status and provides control data to other aircraft systems.

Continuous and periodic tests are performed by the PSEU to monitor specific aircraft systems health and status. Landing gear position and status are displayed on the engine indication and crew alerting system (EICAS) primary page. The landing gear position indication is removed 30 seconds after the landing gear is in the up and locked position with the flaps at 0 degrees.

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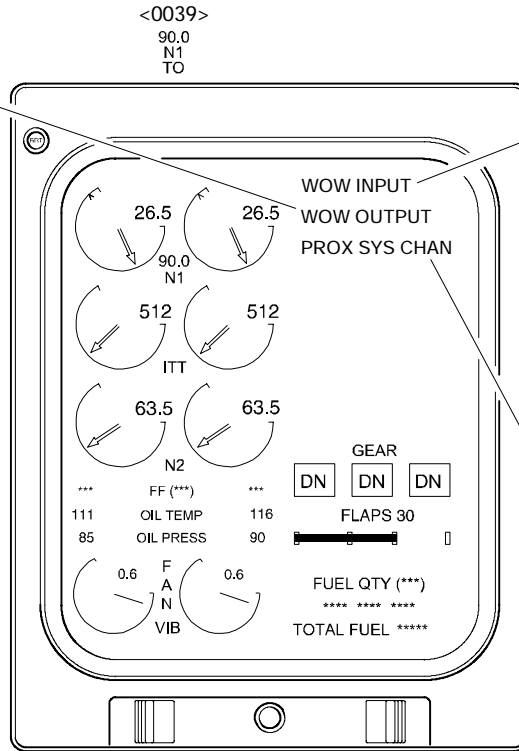
Landing Gear Functional Schematic <MST>
Figure 16-30-1

WOW OUTPUT Caution (amber)
Comes on to indicate that WOW outputs, channel 1 and channel 2 do not agree.

NOTE

The WOW OUTPUT caution message may be accompanied by the following:

- PFD, speed trend vector inoperative,
- PFD low speed cue comes on,
- PFD displays TA only,
- RTU indicates TCAS STANDBY and ATC 1(2) STANDBY,
- Inadvertent takeoff configuration warnings,
- Fuel quantity fluctuates during pitch and bank maneuvers.



Primary Page

<0006>

FLAPS 20

WOW INPUT Caution (amber)
Comes on to indicate that a WOW sensing circuit has failed or is in disagreement with the other sensing circuits.

NOTE

One or more of the WOW sensors disagree with each other which may affect air and ground modes of operation. Expect that inadvertent operations of WOW dependant systems may occur.

PROX SYS CHAN <0039> Caution (amber)
Comes on to indicate that the normal landing gear extension/retraction system is inoperative.

NOTE

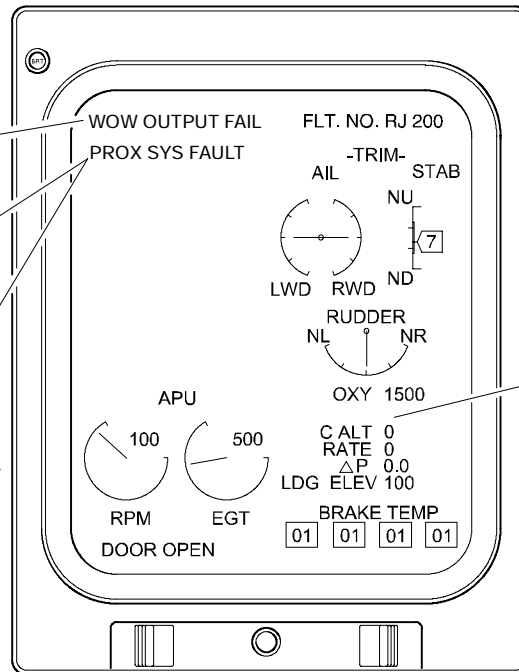
If landing gear extension/retraction is abnormal, GEAR DISAGREE warning message will not come on.

WOW OUTPUT FAIL Status (white)
Comes on to indicate that a WOW output fault is detected in a non-critical system.

PROX SYS FAULT Status (white)
Comes on to indicate a failure in the PSEU system.

PROX SYS FAULT <0039> Status (white)
Comes on to indicate that the PSEU has detected:

- a sensor/internal failure, or
- a loss of redundancy



Status Page

PSEU – EICAS Messages <MST>
Figure 16-30-2

<0039>

7.2

<0039>

C TEMP 23°C



**LANDING GEAR
Proximity Sensing System**


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16-30-4

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A. System Circuit Breakers

SYSTEM	SUB-SYSTEM	CB NAME	BUS BAR	CB PANEL	CB LOCATION	NOTES
Proximity Sensing	Landing Gear Control	PROX SENS LGC /D2	DC ESS	4	B13	
		PROX SENS LGC /D2 WOW 1 & 2	DC BAT	2	P3	
		PROX SENS LGC /D1			P2	
		PROX SENS LGC /D1	DC BUS 1	1	F6	
		PROX SENS WOW 1			F7	
		PROX SENS WOW 2	DC BUS 2	2	F9	

	LANDING GEAR Brake System	Vol. 1	16-40-1
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1. BRAKE SYSTEM

Each wheel of the main landing gear is equipped with self-adjusting multi-disc brakes. The brakes of the inboard wheels are powered by No. 3 hydraulic system and the brakes of the outboard wheels are powered by No. 2 hydraulic system.

Brake application is initiated by pressing the rudder pedals which are mechanically linked to the associated brake control valves. The brake control valves meter hydraulic pressure, proportional to the pedal pressure, to the four main wheel brake units, through four independent anti-skid control valves and four hydraulic fuses.

If a leak occurs in a brake line, the associated hydraulic fuse will close off the hydraulic line, preventing loss of the entire system fluid.

With the loss of one hydraulic system, the aircraft has 50% symmetric braking capability with full anti-skid control to the working brakes. In the event of a failure of both No. 2 and No. 3 hydraulic systems, accumulators in each hydraulic system will provide reserve pressure for six braking applications (providing the anti-skid is selected OFF).

Available inboard and outboard brake pressure is continuously monitored and displayed on EICAS on the hydraulic synoptic page, and any abnormal brake pressure detected is displayed on the EICAS in the form of a visual and/or aural message.

NOTE

A brake overheat condition may trigger a MLG BAY OVHT warning message (refer to chapter 10, section 40).

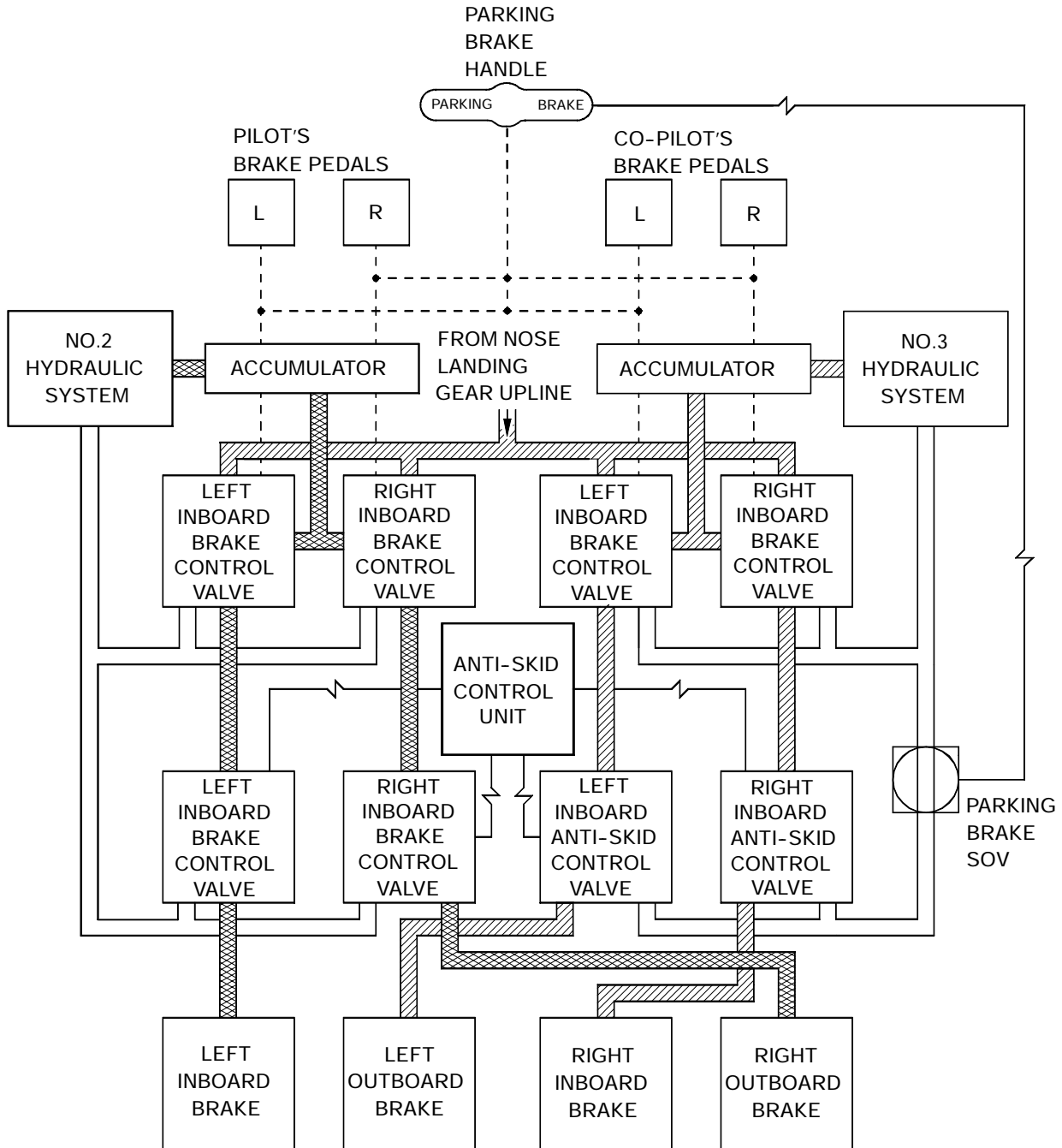
During landing gear retraction, hydraulic pressure is applied to the main wheel brake control valves to stop main wheel spin.

Two brake wear indicator pins, installed on each brake assembly, provide a visual indication of brake wear. If the indicator pin is flush with the top of the indicator housing, maintenance should be informed.

NOTE

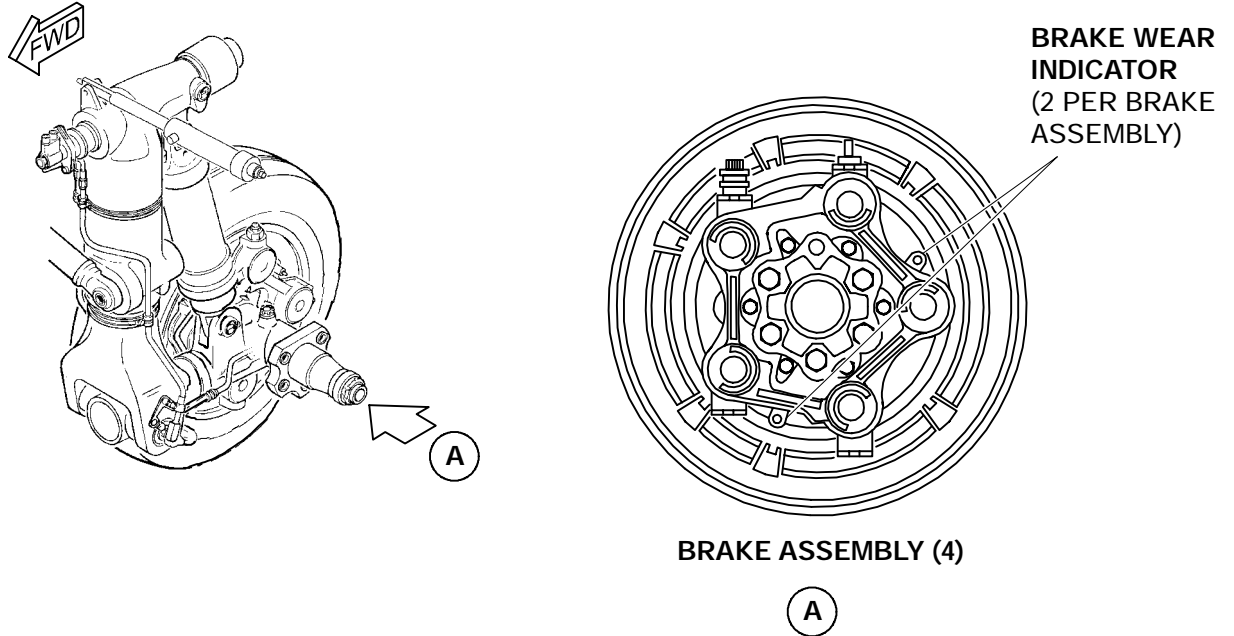
The brake wear indicator pins must be checked with the brakes applied and No. 2 and No. 3 hydraulic systems on.

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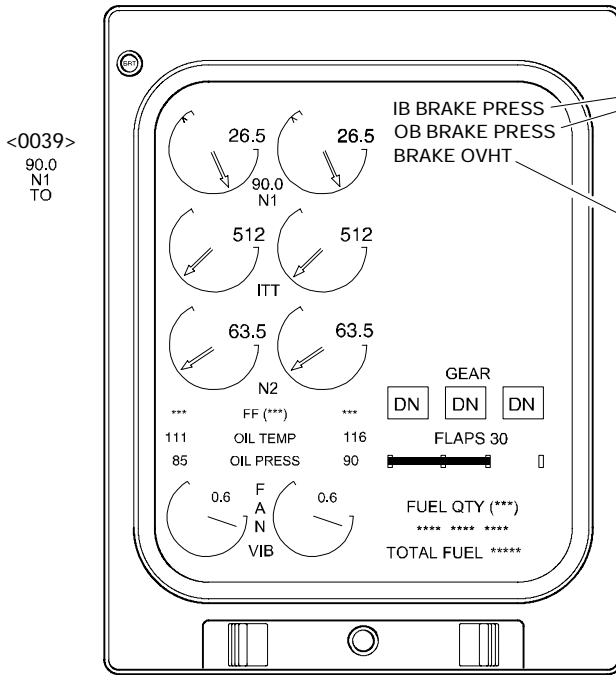


- NO. 2 HYDRAULIC SYSTEM
- NO. 3 HYDRAULIC SYSTEM
- RETURN

Brake System – Schematic
Figure 16-40-1



Brake Wear Indication
Figure 16-40-2



<0039>
90.0
N1
TO

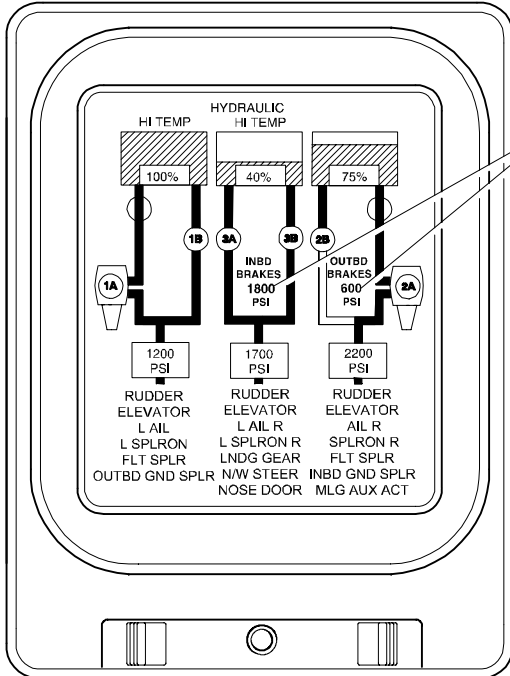
**IB, OB BRAKE PRESS
Caution (amber)**
Indicates that brake pressure of the respective system is less than 1030 psi.

**BRAKE OVHT
Warning (red)**
Indicates an overheat condition (temperature greater than 360°C) exists in any one of the brakes.

<0006>
FLAPS 20



Primary Page



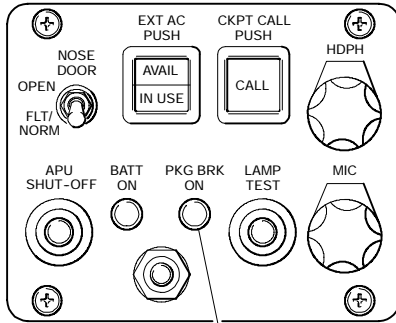
**INBOARD, OUTBOARD
BRAKE PRESSURE
Readout**

Indicates brake pressure of the respective system.
GREEN - Brake pressure is 1000 psi to 3200 psi.
WHITE - Brake pressure is greater than 3200 psi.
AMBER - Brake pressure is less than 1000 psi.

**EICAS Secondary Display - Hydraulic Page
Center Instrument Panel**

**Brake System – EICAS Messages and Synoptic Page Indications <MST>
Figure 16-40-3**

EXTERNAL SERVICE PANEL



PARKING BRAKE ON Light

Comes on to indicate that the parking brake is set.

NOTE

Do not apply torque to the parking brake handle until the parking brake handle is in the full pulled position. Do not rotate the parking brake handle more than 90 degrees to lock.



Parking Brake Handle Pilot's Instrument Panel

PARKING BRAKE Handle (black)

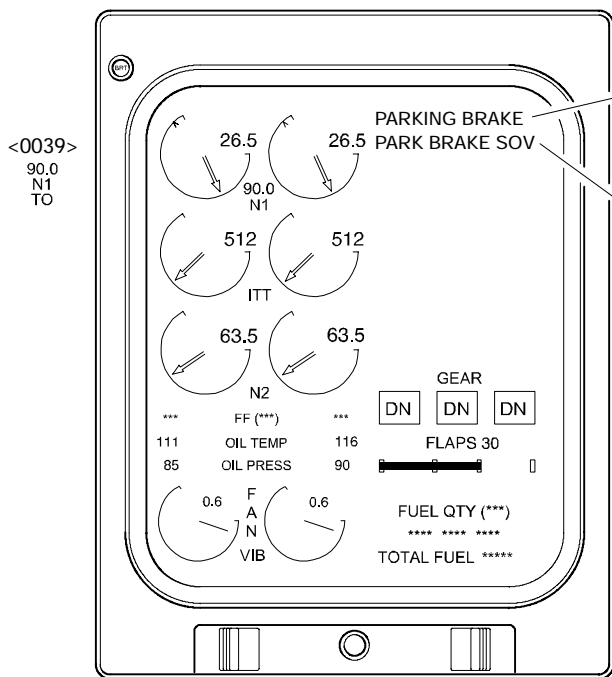
To engage parking brake:

- While fully depressing both brake pedals on the pilot's or copilot's side, pull parking brake handle and rotate it 90 degrees to the locked position.

To disengage parking brake:

- While fully depressing both brake pedals on the pilot's or copilot's side, rotate the parking brake handle to the unlocked position and push it in.

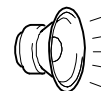
Parking Brake System
Figure 16-40-4



<0039>
90.0
N1
TO

**PARKING BRAKE
Warning (red)**

Indicates that the parking brake is set with the airplane in the air (no WOW) or configured for takeoff with N₁ greater than 70% rpm.



CONFIG
BRAKES

**PARK BRAKE SOV
Caution (amber)**

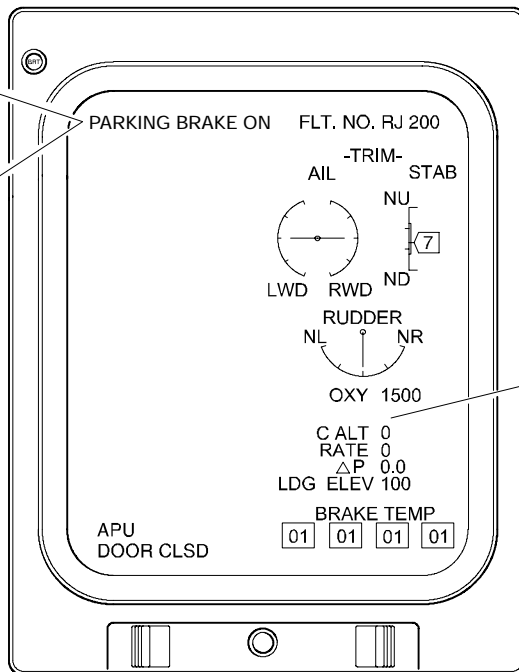
Indicates that the parking brake SOV has failed or the parking brake SOV is in the closed position with the parking brake handle off.

<0006>
FLAPS 20

Primary Page

**PARKING BRAKE ON
Advisory (green)**

Comes on to indicate that the parking brake is set with the airplane on the ground (WOW) and N₁ less than 70% rpm.



<0039>
7.2

<0039>
C TEMP 23°C

**PARKING BRAKE ON
Advisory (green)**

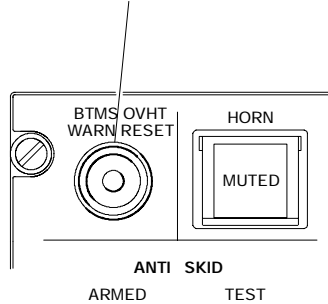
Comes on to indicate that the parking brake is set. Conditions are:
Parking brake is set on ground.
Both N₁ are less than 70%.
Inboard brake pressure is > 900 psi.
Parking brake SOV is closed.

Status Page

**Parking Brake – EICAS Messages <MST>
Figure 16-40-5**

BTMS OVHT WARN RESET Switch

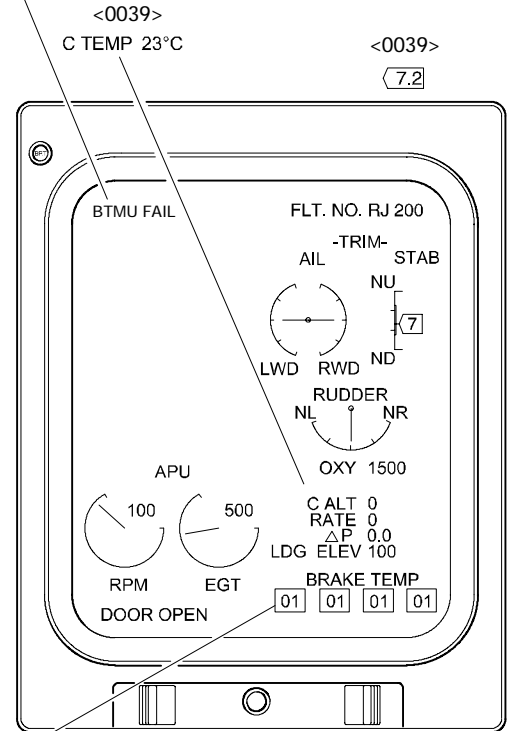
Press to reset the BTMS. The BTMS can only be reset if the brake overheat condition or the brake temperature difference has discontinued.



**Landing Gear Control Panel
Center Instrument Panel**

BTMU FAIL Status (white)

Comes on to indicate that the BTMS unit has failed.



Status Page

Brake Temperature Readout

Indicates temperature value of respective brake.

BRAKE TEMPERATURE READOUT	BRAKE TEMPERATURE READOUT	BRAKE TEMPERATURE READOUT	BRAKE TEMPERATURE READOUT
00 (green)	0 and less	11 (white/red)	351 to 385
01 (green)	1 to 35	12 (red)	386 to 420
02 (green)	36 to 70	13 (red)	421 to 455
03 (green)	71 to 105	14 (red)	456 to 490
04 (green)	106 to 140	15 (red)	491 to 525
05 (green)	141 to 175	16 (red)	526 to 560
06 (white)	176 to 210	17 (red)	561 to 595
07 (white)	211 to 245	18 (red)	596 to 630
08 (white)	246 to 280	19 (red)	631 to 665
09 (white)	281 to 315	20 (red)	greater than 665
10 (white)	316 to 350		

NOTE

BRAKE OVHT warning is triggered at 360°C.

When a brake overheat condition is detected, the brake temperature outline and readout will remain red, regardless of temperature value, until the system is reset by the BTMS OVHT WARN RESET switch.

**Brake Temperature Monitoring System <MST>
Figure 16-40-6**



A. Parking Brake

Inboard brake control valves and the parking shutoff valve are used to provide braking when the aircraft is parked. Pulling the parking brake handle while fully depressing both rudder pedals and turning the handle 90 degrees in either direction, locks both brake control valves in the applied position.

When the hydraulic systems are shut down, hydraulic pressure slowly leaks away via the anti-skid return lines. The parking brake shutoff valve closes when the parking brake is applied, ensuring that hydraulic system 3 accumulator pressure is maintained on the inboard brakes for a prolonged period of time.

NOTE

With the parking brake applied, only the inboard brakes will hold for a prolonged period of time if No. 2 and No. 3 hydraulic systems are not available.

Parking brake configuration and operational condition are continuously monitored and any detected fault is displayed on EICAS in the form of a visual and/or aural message.

Effectivity:

- Airplanes 7003 to 7128 and 7002, 7129 and subsequent incorporating SB601R-24-055

NOTE

On the ground, with the parking brake applied, the ADG automatic deployment is inhibited.

B. Brake Temperature Monitoring System

The brake temperature monitoring system (BTMS) provides an indication to the crew of the main wheel brake temperatures. Individual brake temperatures are displayed as a color coded numerical readout on the EICAS Status page. The brake temperature readout will be displayed when the value of one of the four readouts is six or greater, or when the landing gear and flap positions are displayed on the EICAS.

A BTMS overheat warning reset switch, on the landing gear control panel, is used to reset the system when the brake overheat condition no longer exists.

C. Anti-Skid System

The anti-skid system controls hydraulic pressure to the four main wheel brakes to provide anti-skid protection. The anti-skid system consists of a dual channel (inboard and outboard) anti-skid control unit (ASCU), four (axle mounted) wheel speed transducers and two dual anti-skid control valves.

The anti-skid system performs the following functions:

- Individual wheel anti-skid control: - Prevents skids from developing
- Touchdown protection: - Prevents landing with locked wheels in the event that the pilot(s) are depressing the brake pedals during touchdown
- Locked wheel protection: - Allows a wheel to recover from a deep skid.

Selecting the anti-skid switch, on the landing gear control panel, to the ARMED position enables the ASCU (provided the parking brake is not set and both main landing gear are down and locked).

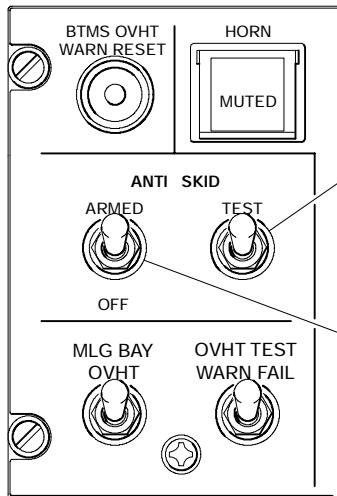
By monitoring each wheel speed individually, the ASCU can detect tire skidding. The ASCU independently reduces the braking pressure at the skidding wheel by modulating the pressure outputs of the appropriate anti-skid control valve. This modulation is controlled by the individual wheel speed and deceleration monitored through the wheel speed transducers.

In the air, with no weight-on-wheels signal, the anti-skid control valves dump pressure to prevent wheel lock-up on touchdown. On the ground, the system becomes operational once a 35 knots wheel spin-up signal is present or a weight-on-wheels signal is present after a 5 second delay. The anti-skid function is operational to a minimum wheel speed of 10 knots.

NOTE

In the event of a failure that causes loss of braking, manual braking is restored by selecting the anti-skid system off.

The ASCU continuously monitors the anti-skid system and any detected faults are displayed on the EICAS primary page.



Anti skid Test Switch (Spring-loaded to normal position)

- TEST - simulates a failure (alternately) in the outboard and inboard channels of the anti skid system. Results are displayed on EICAS.

NOTE

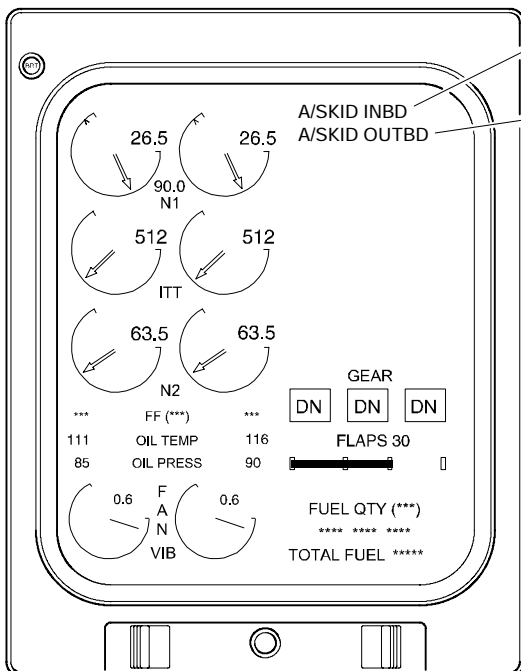
Anti skid test must be performed with the anti skid system armed and landing gear down and locked.

Anti skid Armed Switch

- ARMED - Anti skid system is armed. System is activated with wheel spin-up (35 kt).
- OFF - Anti skid system is disabled.

**Landing Gear Control Panel
Center Instrument Panel**

<0039>
90.0
N1
TO



A/SKID INBD Caution (amber)

Indicates that the inboard channel of the anti skid system has failed.

A/SKID OUTBD Caution (amber)

Indicates that the Outboard channel of the anti skid system has failed.

NOTE

Both the A/SKID INBD and A/SKID OUTBD caution messages will come on if one of the main landing gear fails to downlock.

<0006>

FLAPS 20

Primary Page

**Anti Skid System <MST>
Figure 16-40-7**



**LANDING GEAR
Brake System**

Vol. 1

16-40-11

REV 56, Jan 31/03

D. System Circuit Breakers

SYSTEM	SUB-SYSTEM	CB NAME	BUS BAR	CB PANEL	CB LOCATION	NOTES
Landing Gear	Brakes	BRAKE PRESS IND	DC BUS 2	2	G3	
		BRAKE TEMP MON	DC BUS 1	1	G3	
	Anti-Skid	ANTI SKID	DC BUS 1		G4	
		ANTI SKID	DC BUS 2	2	G4	



**LANDING GEAR
Brake System**

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	LANDING GEAR Nose Wheel Steering System		Vol. 1	16-50-1
				REV 56, Jan 31/03

1. NOSE WHEEL STEERING SYSTEM

The nose wheel steering system is a steer-by-wire system which is electrically controlled and hydraulically actuated through dual steering actuators on the nose landing gear. The system is controlled by a steering electronic control unit (ECU) and powered by No. 3 hydraulic system.

The steering ECU is armed through a N/W STRG ARMED switch, located on the pilots left side panel, and activated by a weigh-on-wheels and nose gear down-and-locked signal from the proximity sensing electronic unit (PSEU).

The steering ECU controls the nose wheel position based on inputs from either the steering tiller on the pilot's side console or the rudder pedals. Steering commands are processed by the the ECU which electrically controls an electrohydraulic servo valve to modulate hydraulic pressure to the steering actuators. The steering tiller turns the nose wheel up to 70 degrees either side of center, and is intended for low speed taxiing. Steering with the rudder pedals is limited to 7 degrees either side of center and is intended for high speed taxi and take-off and landing rolls. Nose wheel position feedback is sent to the ECU from two position transducers mounted on the steering actuators.

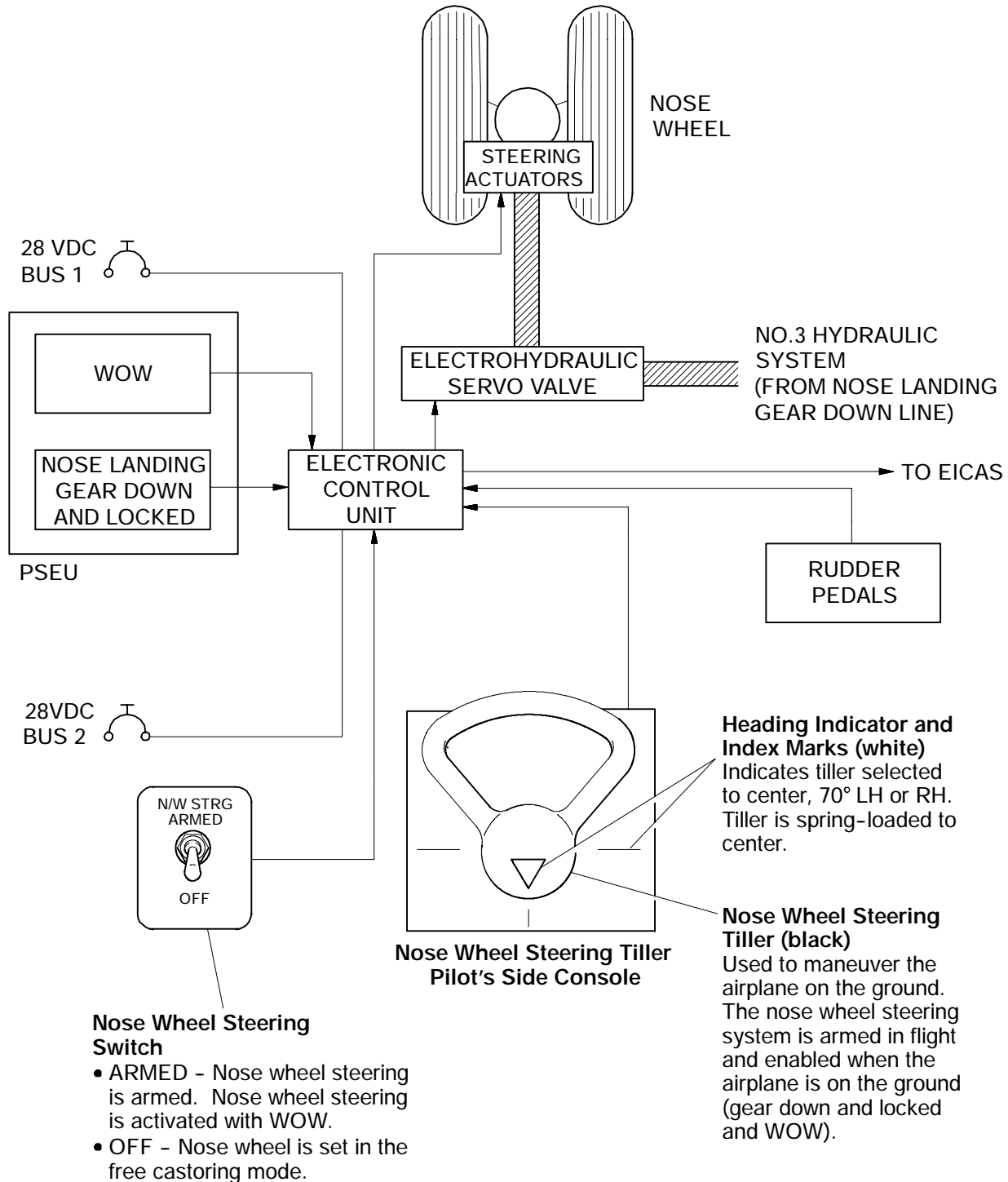
After take-off, the ECU generates a signal to center the nose wheel prior to landing gear retraction. Also, centering cams in the shock strut mechanically center the nose wheel as the strut extends under its own weight.

If a failure is detected by the steering control unit, the system reverts to free castoring mode. The pilot then maintains ground directional control through rudder control and differential braking.

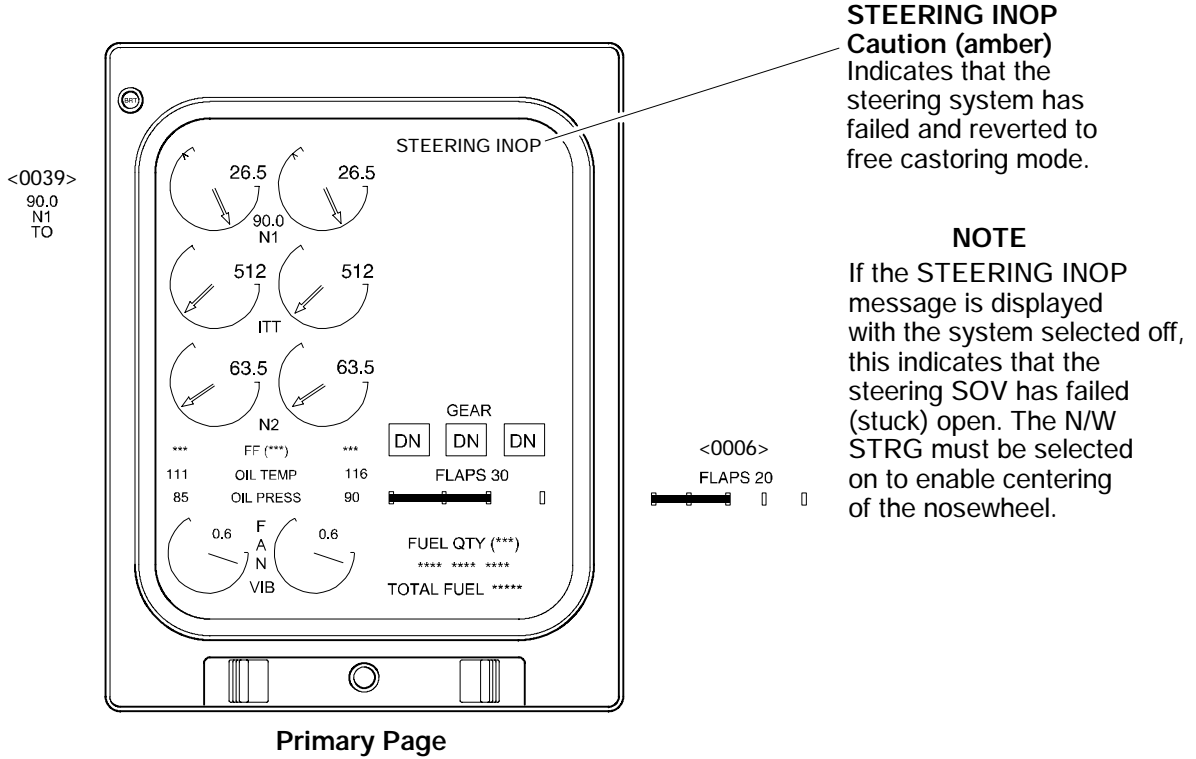
In the event of failure of No. 3 hydraulic system, the nose wheel is centered by the centering cams. Rudder, differential braking and differential thrust will be used for directional control. Reverse thrust and the ground spoilers will decelerate the aircraft, if the brakes are degraded or fail completely.

The steering control unit continuously monitors the nose wheel steering system, and any detected fault is display on the EICAS primary page. Detection of a fault, will result in steering system shutdown. The system will then revert to free castoring mode.

	Flight Crew Operating Manual CSP A-013	MASTER
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Nose Wheel Steering System Schematic
Figure 16-50-1



Nose Wheel Steering System <MST>
Figure 16-50-2



**LANDING GEAR
Nose Wheel Steering System**

Vol. 1 16-50-4

REV 56, Jan 31/03

A. System Circuit Breakers

SYSTEM	SUB-SYSTEM	CB NAME	BUS BAR	CB PANEL	CB LOCATION	NOTES
Nose Wheel Steering	Control Unit	NOSE STEER	DC BUS 1	1	F8	
		NOSE STEER	DC BUS 2	2	F8	