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The landing gear consists of a forward retracting nose gear and two retractable main gears mounted partially in the side pods and partially in the fuselage. They are hydraulically operated. Gear doors enclose the landing gear bays.

Each main gear assembly has an oleopneumatic shock absorber and is equipped with two wheels. Each main wheel is fitted with brakes and anti-skid.

The two wheel nose gear assembly includes an oleopneumatic shock absorber and a nose wheel steering system.

In case of hydraulic or electrical power supply failure, the landing gear may be extended by gravity.

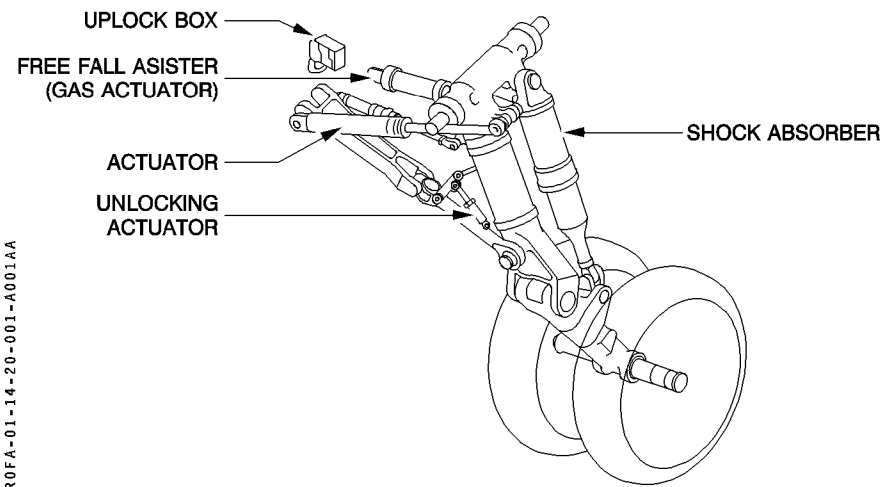
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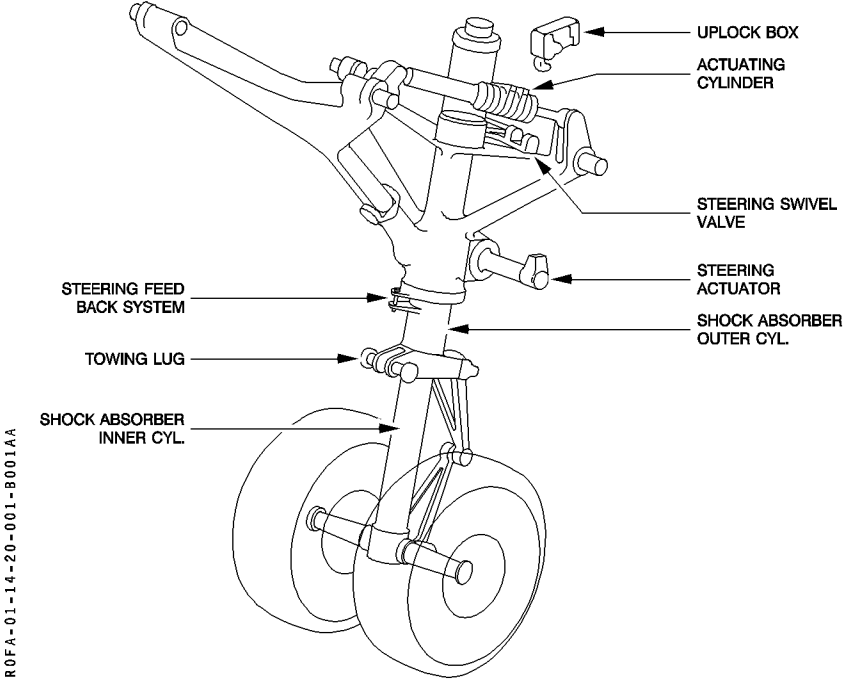
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20.1 DESCRIPTION

MAIN LANDING GEAR



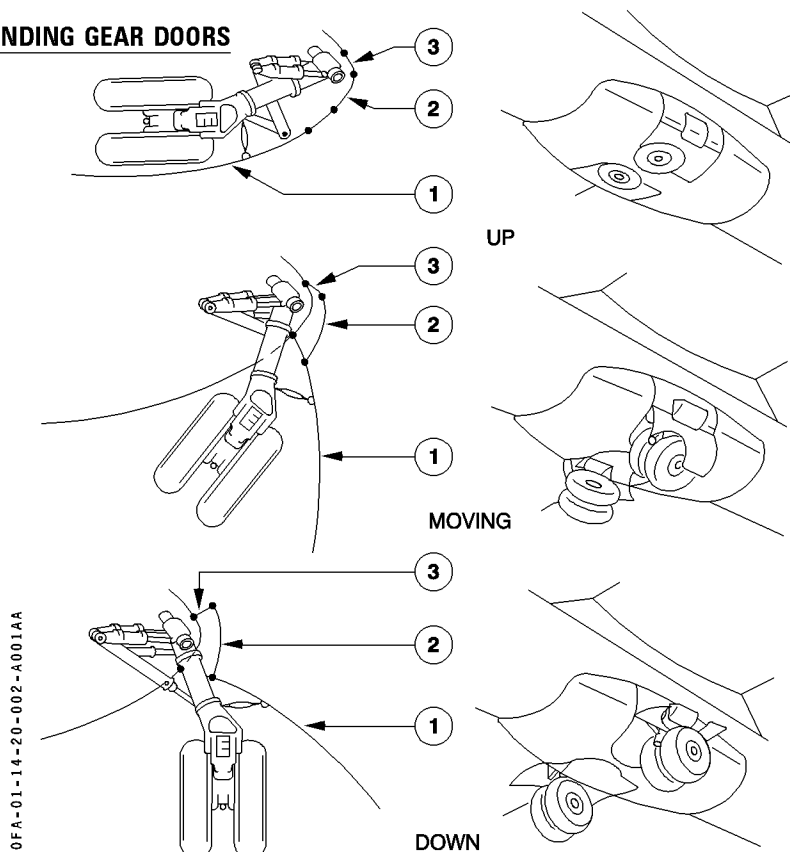
NOSE LANDING GEAR



|                                                                                                                       |                     |  |         |     |        |
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### MAIN LANDING GEAR DOORS



### GEAR POSITION DETECTION AND INDICATION SYSTEMS

The landing gear position detection and indication systems consist of two independant systems.

Primary system is managed by MFC module 1A. The associated gear position is displayed on the main instrument panel.

Secondary system is managed by MFC module 2A. The associated gear position is displayed on the overhead panel.

Each system uses its own detectors and indications :

- down lock and air/ground signals from proximity sensors,
- up lock signal from mechanical limit switches.

Each system commands gear extension and retraction, gear anti-retraction system and the warning associated to "LDG GEAR NOT DOWN".

**Note :** Gear must be considered down when one system indicates three green lights (▼)

Each system has its own WOW circuit : WOW 1 into MFC module 1B and WOW 2 into MFC module 2B.

The WOW signals are used by the MFC to have the system using WOW informations switched to the appropriate air/ground configuration.

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### **GEAR NORMAL OPERATION**

Landing gear extension and retraction is performed by a control lever located on the center instrument panel.

The MFC electrically controls the landing gear selector valve located in the LH main landing gear fairing. This valve supplies hydraulic pressure (green system) to :

- Gear extension hydraulic line. The retraction line is then connected to tank return for extension.
- Gear retraction hydraulic line. The extension line is then connected to tank return for retraction.

**Note 1** *The main gear wheels are automatically braked as soon as the lever is selected up.*

**Note 2** *As soon as the gear is locked in the selected position, hydraulic pressure is released from the connecting line.*

Uplocking is mechanically achieved. Unlocking is hydraulically achieved.

Down locking is achieved by means of a dual alignment folding side brace. Locking springs act as secondary alignment and ensure locking independently of hydraulic pressure availability. Unlocking is hydraulically achieved.

Each main gear incorporates a door mechanism linked to it. The door is therefore operated by the gear during retraction and extension.

Four doors close off the nose gear well and restore the fuselage profile. The doors are actuated mechanically by the gear itself. The two forward doors will be closed after gear extension while the two aft will remain open.

- R Landing gear can not be retracted as long as at least one gear shock absorber senses weight on wheels.

### **GEAR EMERGENCY EXTENSION**

In the event of normal system failure the landing gear can be extended mechanically.

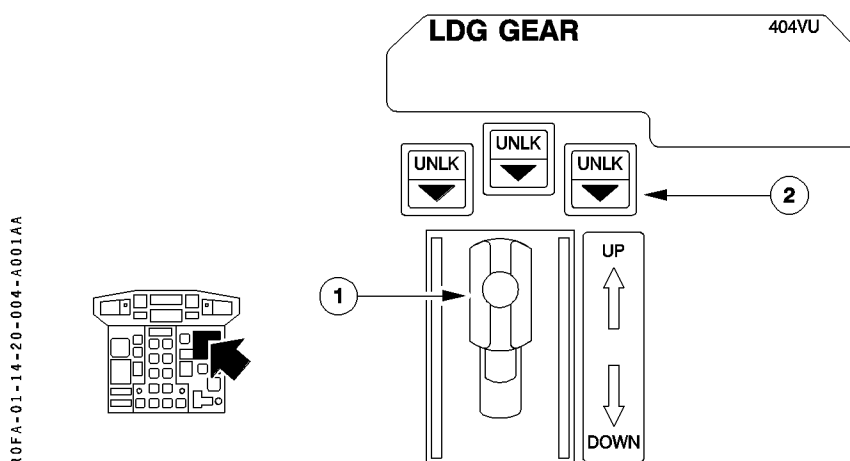
The system is controlled from the flight compartment by means of a push/pull handle which permits landing gear mechanical unlocking. The landing gear extends due to gravity and aerodynamic forces. Main landing gear extension is assisted by a gas actuator. Nose landing gear is assisted by a mechanical device.

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## 20.2 CONTROLS

### LDG GEAR CONTROL PANEL



#### ① Landing gear control lever

The lever must be pulled out prior to selecting one of the two possible positions :

Up The landing gear retraction is selected.

Down The landing gear extension is selected.

A red light is incorporated in the lever. Light will illuminate and the CCAS will be activated through the MFC, whenever any gear is not sensed down and locked by the detection system.

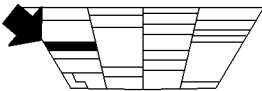
#### ② Landing gear position ind.

Displays the gear position as seen by MFC 1. ▽ illuminates green when respective down lock is sensed engaged. UNLK illuminates red when respective gear is not locked in the lever selected position or, if on the ground, the uplock box is not in the open position.

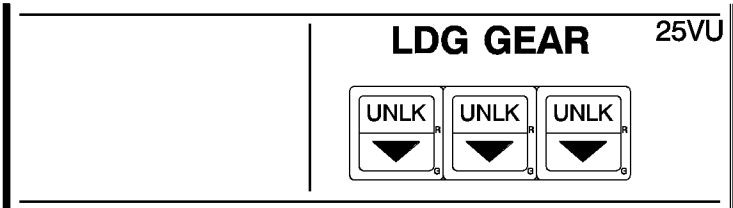
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**LDG GEAR POSITION IND OVERHEAD PANEL**



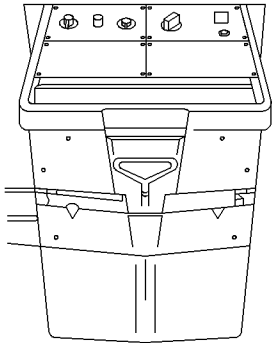
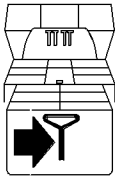
ROFA-01-14-20-005-A001AA



Displays the gear position as sensed by MFC 2. ▽ illuminates green when respective down lock is engaged. UNLK illuminates red when respective gear is not locked in the lever selected position, or if on ground, the UPLOCK box is not in the open position.

**LDG GEAR EMERGENCY EXTENSION HANDLE**

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Pulling the handle above the pedestal level will unlock the landing gear.

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## 20.3 ELECTRICAL SUPPLY/MFC LOGIC/SYSTEM MONITORING

### ELECTRICAL SUPPLY

| EQUIPMENT                                                  | DC BUS SUPPLY<br>(C/B)                         |
|------------------------------------------------------------|------------------------------------------------|
| Primary detection system<br>Landing gear CTL Ind and alert | DC STBY BUS<br>(on lateral panel LDG GEAR CTL) |
| Secondary detection system Ind and Alert                   | DC BUS 2<br>(on lateral panel IND and WARNING) |
| Weight on wheels<br>(air/ground detection)<br>System 1     | DC EMER BUS<br>(on lateral panel WOW SYS 1)    |
| System 2                                                   | DC BUS 2<br>(on lateral panel WOW SYS 2)       |

**MFC LOGIC** See chapter 1.01

### SYSTEM MONITORING

The following conditions are monitored by visual and aural alerts :

- Any gear not seen down locked, and FLAPS normal landing position, and ZRA < 500ft
  - See L/G UNSAFE INDICATION procedure in chapter 2.05.07.
- Any gear not seen down locked, and at least one PL at FI, and ZRA < 500 ft
  - See L/G UNSAFE INDICATION procedure in chapter 2.05.07.



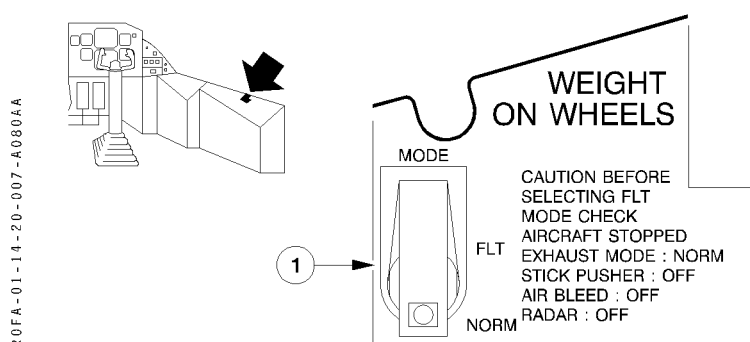
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## 20.4 LATERAL MAINTENANCE PANEL

### W.O.W. SELECTOR

On the RH maintenance panel, a selector enables the weight on wheels systems to be selected to the "in Flight" position when on the ground, for maintenance purposes.



ROFA-01-14-20-007-A080AA

#### Mode Selector

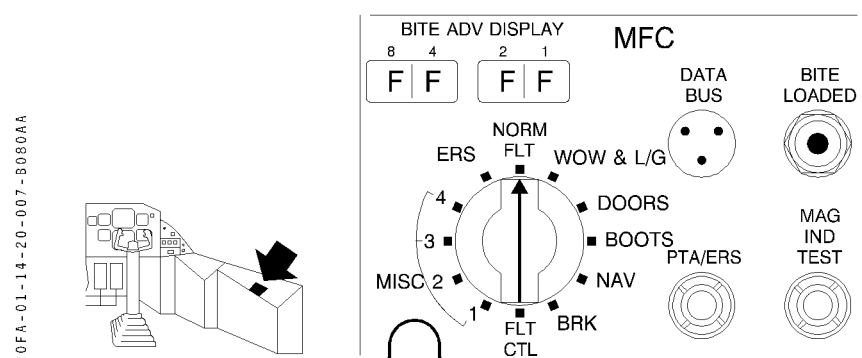
Controls the overriding of weight on wheels system.

**NORM** The system works normally.

**FLT** The systems are forced to the in"FLIGHT" position. "MAINT PNL" light illuminates amber on the CAP.

### FAILURES READOUT DISPLAY

The right side maintenance panel includes a readout display for failures of systems linked to the MFC. Landing gear malfunctions are indicated when the rotary selector is selected on the WOW/LDG position.



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### 30.1 DESCRIPTION (See schematic p 3/4)

Nose wheel steering is provided by means of a servomechanism mechanically controlled from the flight compartment and powered by the blue hydraulic system. Control is achieved using the steering control hand wheel mounted on the captain's lateral console. Nose steering angle is  $\pm 60^\circ$ . Nose wheel deflection of  $\pm 91^\circ$  is possible during towing with no pressure in the system.

An internal mechanism returns the wheel to centered position when the aircraft is off the ground.

A swivel valve shuts off hydraulic pressure to the steering system when the nose landing gear is not locked down and pressure is also shut off by a solenoid valve when the main and nose gear shock absorbers are not compressed.

*Note : Should any gear rise from ground after all gears have been compressed, the steering control will be maintained as long as one gear at least, stays on ground.*

A switch is provided to deactivate the steering system if required.

In case of either steering system deactivation or blue hydraulic pressure failure, the aircraft can be guided using differential braking and/or differential engine thrust.

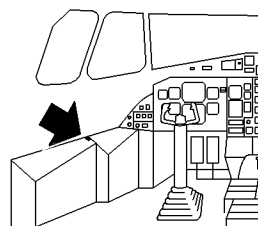
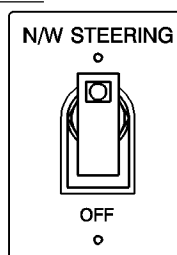
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| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>LANDING GEAR</b><br><br><b>NOSE WHEEL STEERING</b> | 1.14.30 |     |        |
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### 30.2 CONTROLS

#### N/W STEERING SW

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This guarded sw controls activation/deactivation of the nose wheel steering system.

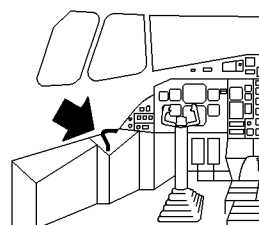
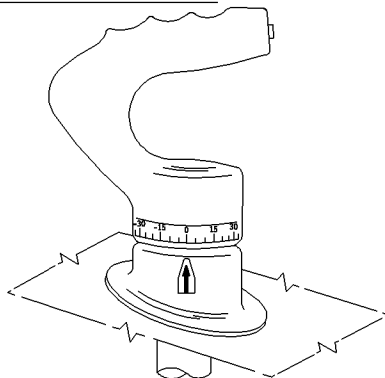
It is a guarded type in the ON position.

**ON** the steering solenoid valve is electrically armed. The solenoid is energized when the steering relay is excited. The valve opens when the steering hydraulic control is actuated.

**OFF** unpressurizes the steering system by de-energizing the solenoid valve.

#### STEERING HANDWHEEL

R0FA-01-14-30-002-B001AA



The steering handwheel controls the nose wheel steering angle

up to 60° in either direction :

- Clockwise : steering to the right
- Counter clockwise : steering to the left

*Note : Nose wheel steering is self centering after lift-off.*

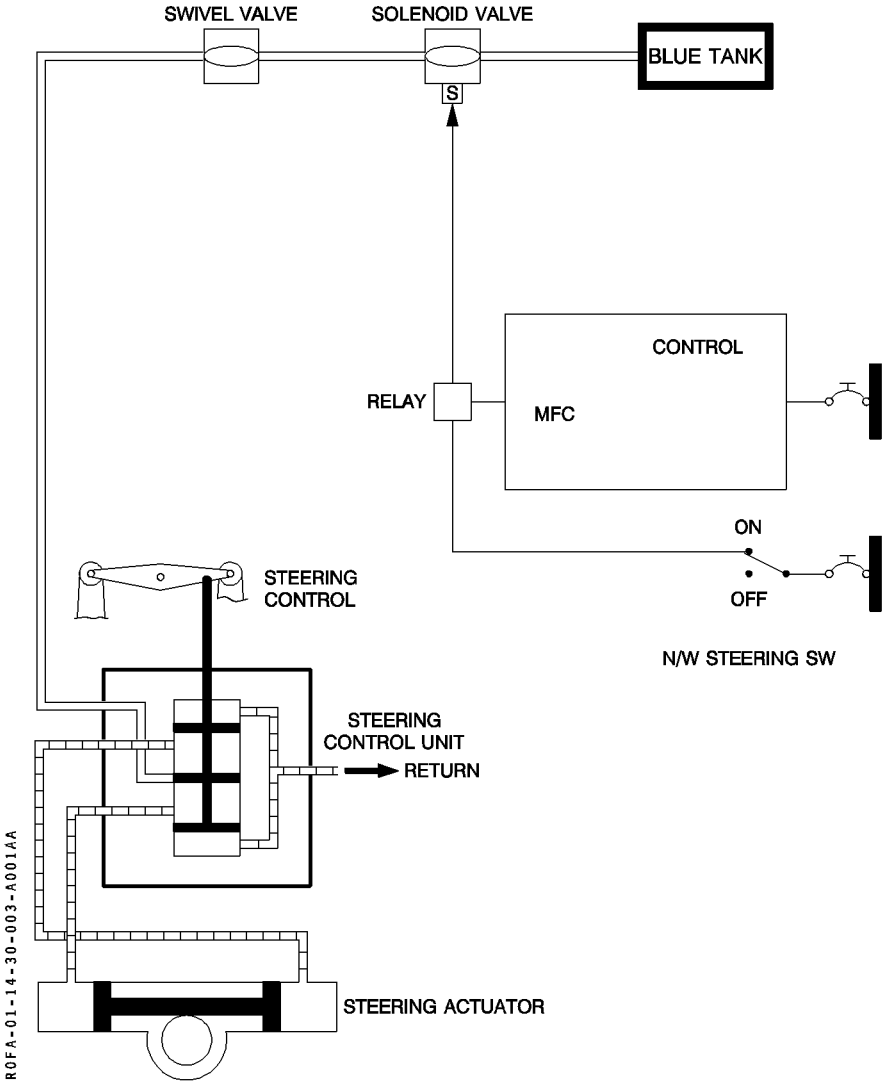
### 30.3 ELECTRICAL SUPPLY

| EQUIPMENT                           | DC BUS SUPPLY (C/B)                              |
|-------------------------------------|--------------------------------------------------|
| Nose wheel steering selection valve | DE EMER BUS<br>(on lateral panel STEERING VALVE) |

|                                                                                                                                          |                     |  |         |     |        |
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| <div>  <br/> <b>ATR 72</b> <br/> <b>F.C.O.M.</b> </div> | LANDING GEAR        |  | 1.14.30 |     |        |
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30.4 SCHEMATIC



|                                                                                   |                  |         |     |        |
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AB

#### 40.1 DESCRIPTION

##### WHEELS AND BRAKES

The four main gear wheels are equipped with multidisc carbon brakes, each operated by one set of five hydraulically powered pistons.

Two modes are available

- normal, controlled by pilot's brake pedals and supplied by green system.
- emergency and parking controlled by the emergency and parking brake handle and supplied by blue system.

Each brake is equipped with an automatic adjuster, a wear indicator pin, and an overheat detector.

The wheels are fitted with tubeless tires

The main gear wheels are braked automatically as soon as the pilot selects up the landing gear control lever.

The main gear wheels are fitted with fusible plugs which protect against tire and wheel burst in the event of overheat. These fusible plugs are designed to release internal pressure when the wheel temperature exceeds 177°C/350°F.

##### ANTI SKID SYSTEM

The antiskid system is provided as soon as the gear is down and locked, and as long as the aircraft speed exceeds 10 kts.

Each wheel and each pair of external or internal wheels are monitored.

The aim of the system is to provide the maximum stopping performance by controlling brake pressure in order to minimize wheel slip, brake and tire wear, depending on runway conditions.

Touchdown protection is ensured (spin up, locked wheel).

The system consist of :

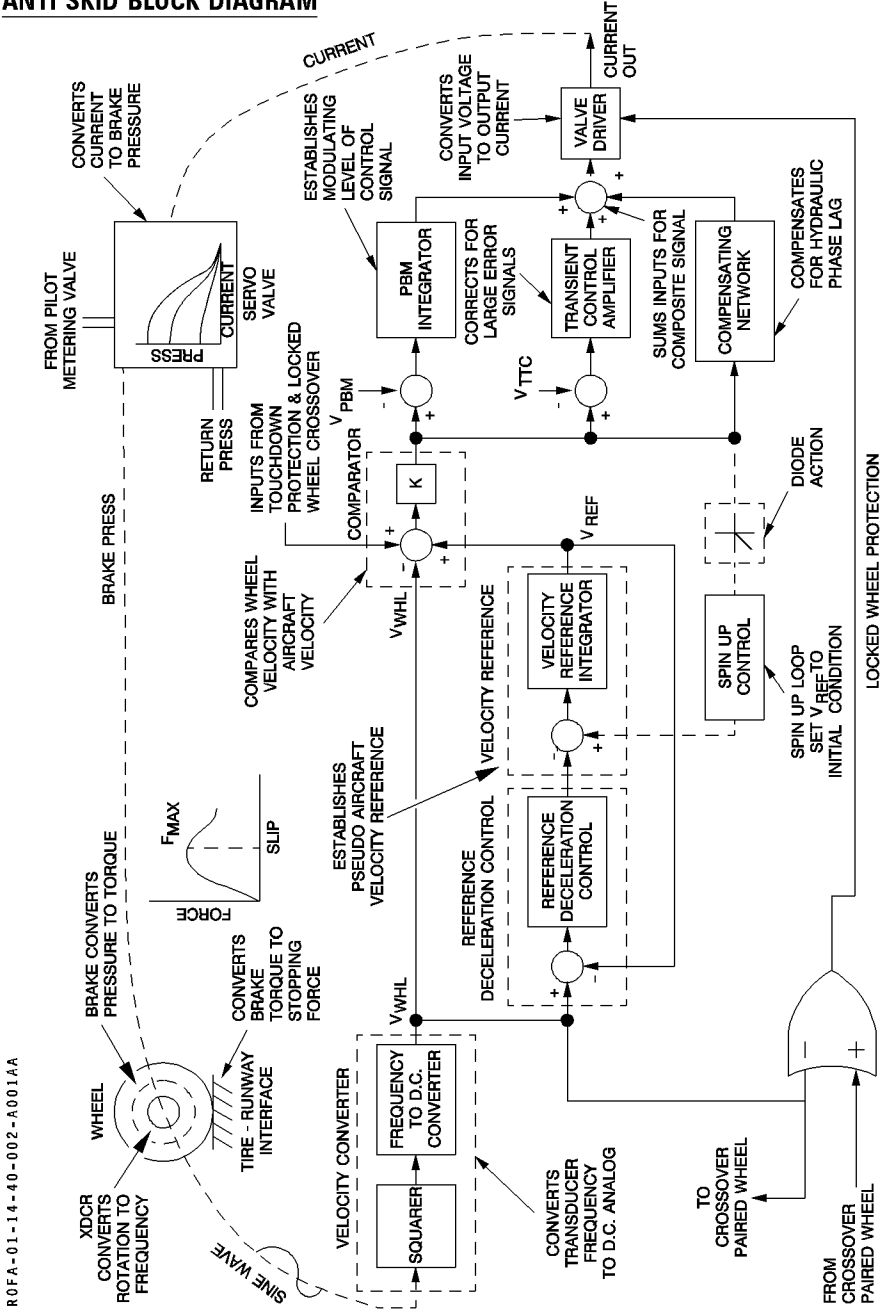
- 4 wheel speed transducers (one per main gear wheel),
- 1 control box,
- 1 antiskid module.

A reference velocity signal is elaborated. The anti skid applies a deceleration law continuously adapting the actual wheel speed to the reference speed.

|                                                                                                                       |                         |  |  |         |     |        |
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**ANTI SKID BLOCK DIAGRAM**



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|                                                                                   |                  |         |     |        |
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#### **LOCKED WHEEL PROTECTION**

The system includes locked wheel protection to preclude tire scuffing. The crossover is applied between R.H. and L.H. inboard and between RH. and L.H. outboard. For velocities above 23 kts a speed differential of 50% or greater between the two speed signals will result in generation of a locked wheel signal and thus in release of brakes.

#### **TOUCHDOWN PROTECTION**

At main gear compression, the braking action is inhibited as long as wheel spin up is below 35 kt or for 5 s, in order to preclude inadvertent brake application prior to wheel spin up on low friction pavements or with light wheel vertical loading.

In the event of electrical supply loss, the antiskid is no more operative and brakes are directly operated.

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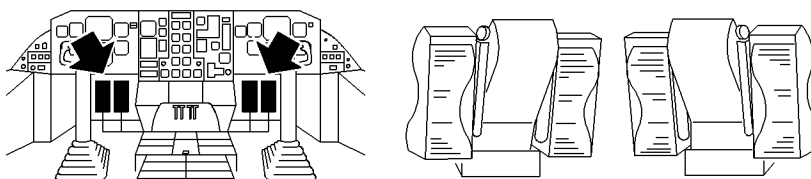
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## 40.2 CONTROLS

### PILOT BRAKE PEDALS

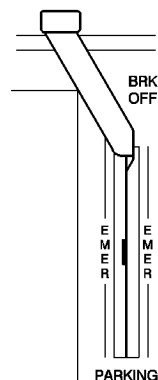
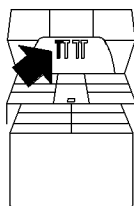
ROFA-01-14-40-004-A001AA



Controls normal braking mode through the normal mode metering valve.

### EMERGENCY/PARKING BRAKE HANDLE

ROFA-01-14-40-004-B001AA



Controls emergency and parking braking mode through the emergency and parking metering valve. Springloaded to the OFF position.

**EMER** A metered pressure is applied to the brakes.

**PARKING** Full pressure is applied to the brakes.

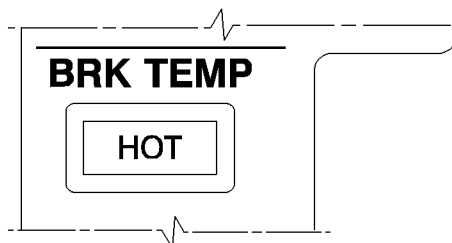
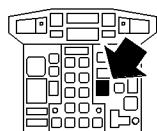
**CAUTION :** Brake handle applies braking without any antiskid operation.

*Note 1 :* In case of hydraulic power system failure, the brake accumulator allows at least six braking applications.

*Note 2 :* When brake handle is not in the fully released position, amber "PRKG BRK" caution light illuminates on CAP and is taken into account by the T/O CONFIG warning system.

### BRAKE TEMP INDICATOR

ROFA-01-14-40-004-C001AA



"HOT" light

The light illuminates amber and the C CAS is activated when at least one of the brakes temperature exceeds 150°C.

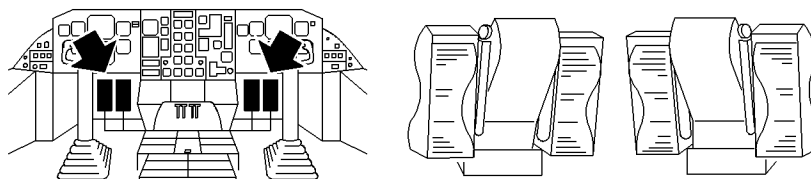


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## BRAKES PRESS IND

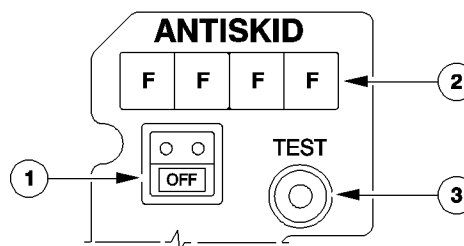
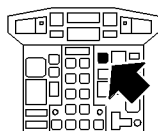
ROFA-01-14-40-005-A001AA



- ① **HYD SYST press ind.**  
Blue and green hydraulic system pressures are displayed. Normal value is 3 000 PSI
- ② **BRAKE ACCU press ind.**  
Displays the pressure of the accumulator supplied by the blue system.  
Normal value is 3 000 PSI

## ANTI SKID PANEL

ROFA-01-14-40-005-B001AA



- ① **ANTI SKID pb**  
Controls activation/deactivation of the antiskid system.  
(pb pressed in) antiskid system is activated.  
OFF (pb released) antiskid system is deactivated. OFF light illuminates white.
- ② **Antiskid channel FAULT lights**  
Illuminate amber and the CCAS is activated if a failure is detected in the associated channel. Antiskid is lost on the associated wheel.
- ③ **TEST pb.**  
Press the button initiates an automatic sequential test to verify the primary antiskid protection capabilities of the system. The test duration is approximately three seconds in flight and six seconds on ground. If initiated on ground when brake pedals are depressed, the test duration is sufficient to allow observation of the brake compression and release, thereby allowing system verification testing to be performed.  
**CAUTION :** Do not perform the test on the ground, engines running, without parking brake set.  
The antiskid channel FAULT lights illuminate during the test. If one channel is sensed as failed, the associated FAULT light remains illuminated.  
*Note : The test is inhibited when wheel speed exceeds 17 kt*

|                                                                                   |                                                    |         |     |        |
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#### 40.3 ELECTRICAL SUPPLY/SYSTEM MONITORING

##### ELECTRICAL SUPPLY

| EQUIPMENT                            | DC BUS SUPPLY<br>(C/B)                            |
|--------------------------------------|---------------------------------------------------|
| Antiskid control for inboard wheels  | DC ESS BUS<br>(on lateral panel INBOARD WHEELS)   |
| Antiskid control for outboard wheels | DC EMER BUS<br>(on lateral panel OUTBOARD WHEELS) |
| Antiskid caution system              | DC STBY BUS<br>(on lateral panel CAUTION)         |
| Emer Brake accu pressure ind.        | DC STBY BUS<br>(on lateral panel PRESS IND)       |
| Brake temp system                    | DC STBY BUS<br>(on lateral panel MONITORING SYS)  |

##### SYSTEM MONITORING

The following conditions are monitored by visual and aural alerts :

- Anti skid channel loss (power loss or loss of transducer or valve continuity)
  - See ANTI SKID FAULT procedure in chapter 2.05.07.
- Brake temperature over 150°C.
  - See BRK TEMP HOT procedure in chapter 2.05.07.

|                                                                                   |                  |  |         |     |        |
|-----------------------------------------------------------------------------------|------------------|--|---------|-----|--------|
|  | LANDING GEAR     |  | 1.14.40 |     |        |
|                                                                                   | BRAKES ANTI SKID |  | P 7/8   | 001 |        |
|                                                                                   |                  |  |         |     | DEC 96 |

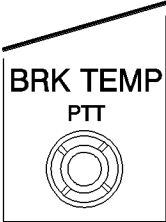
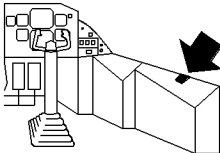
AA

40.4 LATERAL MAINTENANCE PANEL

BRK TEMP TEST

On the RH maintenance panel, a test pb is used to test brake overheat detection system. When depressed, MC flashes amber, HOT amber light illuminates, WHEEL amber light illuminates on CAP, SC is sent by the CCAS.

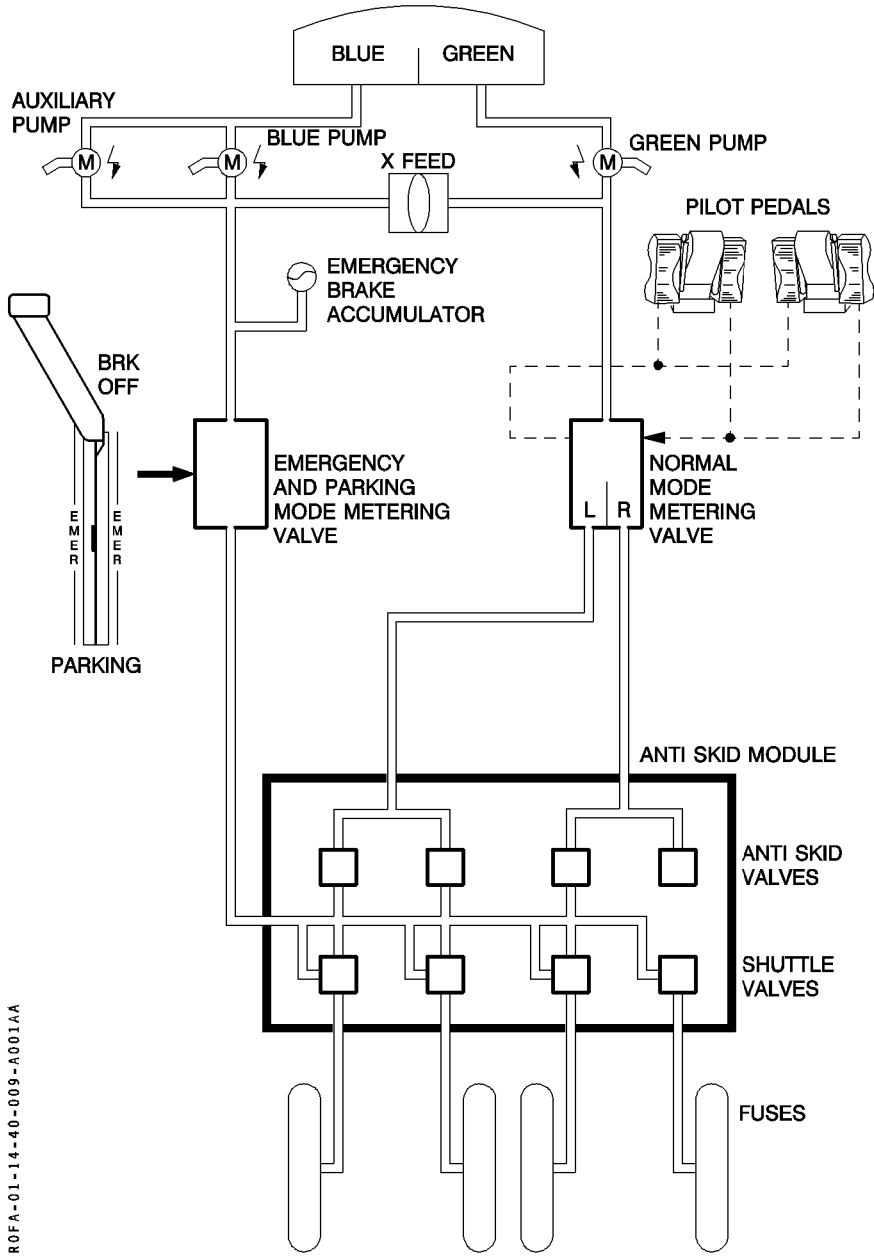
ROFA-01-14-40-007-A001AA



|                                                                                                                       |                     |  |         |     |        |
|-----------------------------------------------------------------------------------------------------------------------|---------------------|--|---------|-----|--------|
| <br><b>ATR 72</b><br><b>F.C.O.M.</b> | <b>LANDING GEAR</b> |  | 1.14.40 |     |        |
|                                                                                                                       |                     |  | P 9/10  | 001 |        |
|                                                                                                                       | BRAKES ANTI SKID    |  |         |     | DEC 96 |

AB

40.5 SCHEMATIC



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