

### 12.13 (ATA 32) LANDING GEAR

#### 12.13.1 Introduction

The Dash 8-Q400 landing gear is electrically controlled and hydraulically operated. Hydraulically operated nosewheel steering gives directional control during taxiing, take-off and landing. Each main wheel has hydraulically powered anti-skid brakes. There is also an emergency/park brake system.

#### 12.13.2 General

The tricycle gear is a retractable dual wheel installation. The main gears retract aft into the nacelles and the nose gear retracts forward into the nose section. Doors completely enclose the landing gear when it is retracted and partially enclose the gear when it is down.

A Power Transfer Unit (PTU) supplies back-up hydraulic power to the No. 2 hydraulic system. If the landing gear cannot be extended normally, there is an alternate landing gear extension method.

Advisory lights show position of gear doors and downlocks. There is also an alternate downlock verification system. An aural warning sounds if the gear is not extended during certain landing configurations.

A Proximity Sensor Electronics Unit (PSEU) monitors and controls the operation of the landing gear components. The nosewheels are steerable by a flight deck hand control and by the rudder pedals.

The wheels may be equipped (customer option) with tire fill pressure gauges for quick visual means of verifying tire pressure during aircraft walk-around.

The main wheels are equipped with anti skid multiple disc brakes. The brakes can be controlled by the brake pedals or the EMERG BRAKE lever.

Dash8 - Q400 - Landing Gear

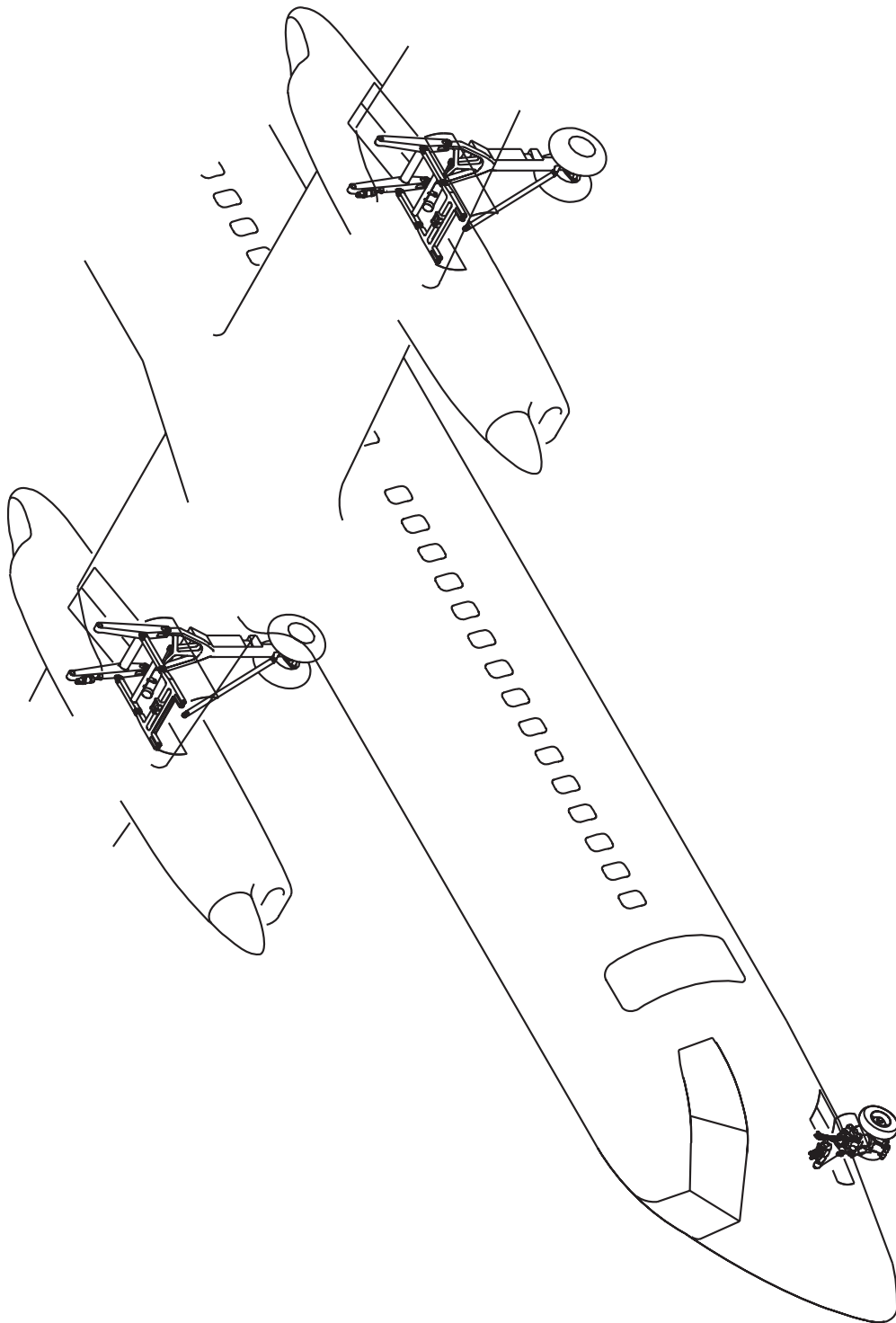
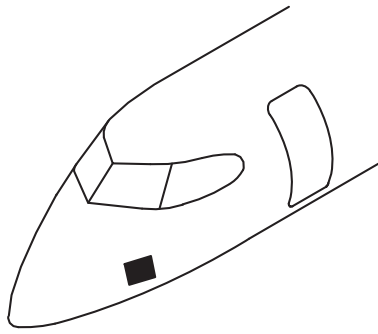


Figure 12.13-1 Landing Gear



Dash8 - Q400 - Landing Gear



**DISENGAGED  
(FULLY RETRACTED)**



**ENGAGED  
(FULLY EXTENDED)**

Figure 12.13-2 Nose Gear Ground Lock Control Handle

**NOSE GEAR GROUND LOCK CONTROL HANDLE CALLOUTS**

**1. NOSE GEAR GND LOCK CONTROL HANDLE PUSHBUTTON (momentary action)**

**PUSH** - releases nose gear control handle from fuselage

- control handle only springs out partly
- control handle must be pulled out fully from sprung out position to rotate

**2. NOSE GEAR GND LOCK CONTROL HANDLE (two position, rotary action)**

**IN** - (flush with fuselage)

- nose gear unlocked

**OUT** - (not rotated)

- nose gear downlock disengaged
- handle must be rotated to engage downlock

**OUT** - (rotated clockwise)

- nose gear downlock engaged
- control handle must be pulled out fully from sprung out position to rotate

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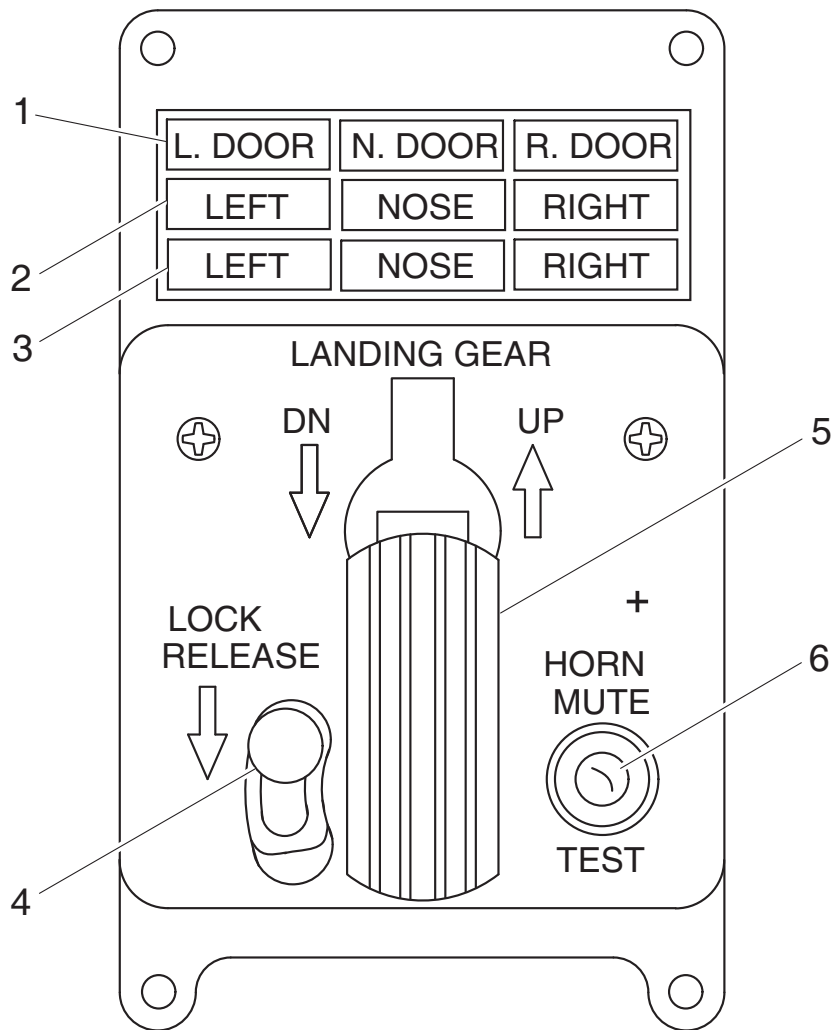
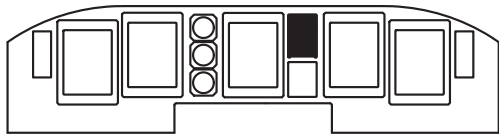


Figure 12.13-3 Landing Gear Control Panel

## LANDING GEAR CONTROL PANEL CALLOUTS

### 1. GEAR DOOR ADVISORY LIGHTS

**(L. DOOR, N. DOOR, R. DOOR)** segment (amber) - related hydraulic gear door open

- hydraulic gear doors stay open with no hydraulic pressure

**(L. DOOR, N. DOOR, R. DOOR)** segment (blank) - related hydraulic gear door closed

- hydraulic gear doors close after normal gear extension and retraction

### 2. LANDING GEAR SAFE ADVISORY LIGHTS

**LEFT, NOSE, RIGHT** segment (green) - related gear down and locked

- lights can be tested using CAUT / ADVSY LIGHTS toggle switch
- gear can also be checked with downlock verification lights

**LEFT, NOSE, RIGHT** segment (blank)

- related gear not down and locked or in uplock position

### 3. LANDING GEAR UNSAFE ADVISORY LIGHTS

**LEFT, NOSE, RIGHT** segment (red) - related gear not locked up or down

**LEFT, NOSE, RIGHT** segment (blank) - related gear locked up or down or no power to lights

### 4. SELECTOR LEVER LOCK BUTTON (momentary action)

**PUSH DOWN AND HOLD** - enables operation of landing gear handle

### 5. LANDING GEAR SELECTOR LEVER/LIGHT (two position)

**UP** - starts landing gear retraction sequence

**DN** - starts normal landing gear extension sequence

- also select **DN** for alternate gear extension
- No Smoking signs come on automatically if not on

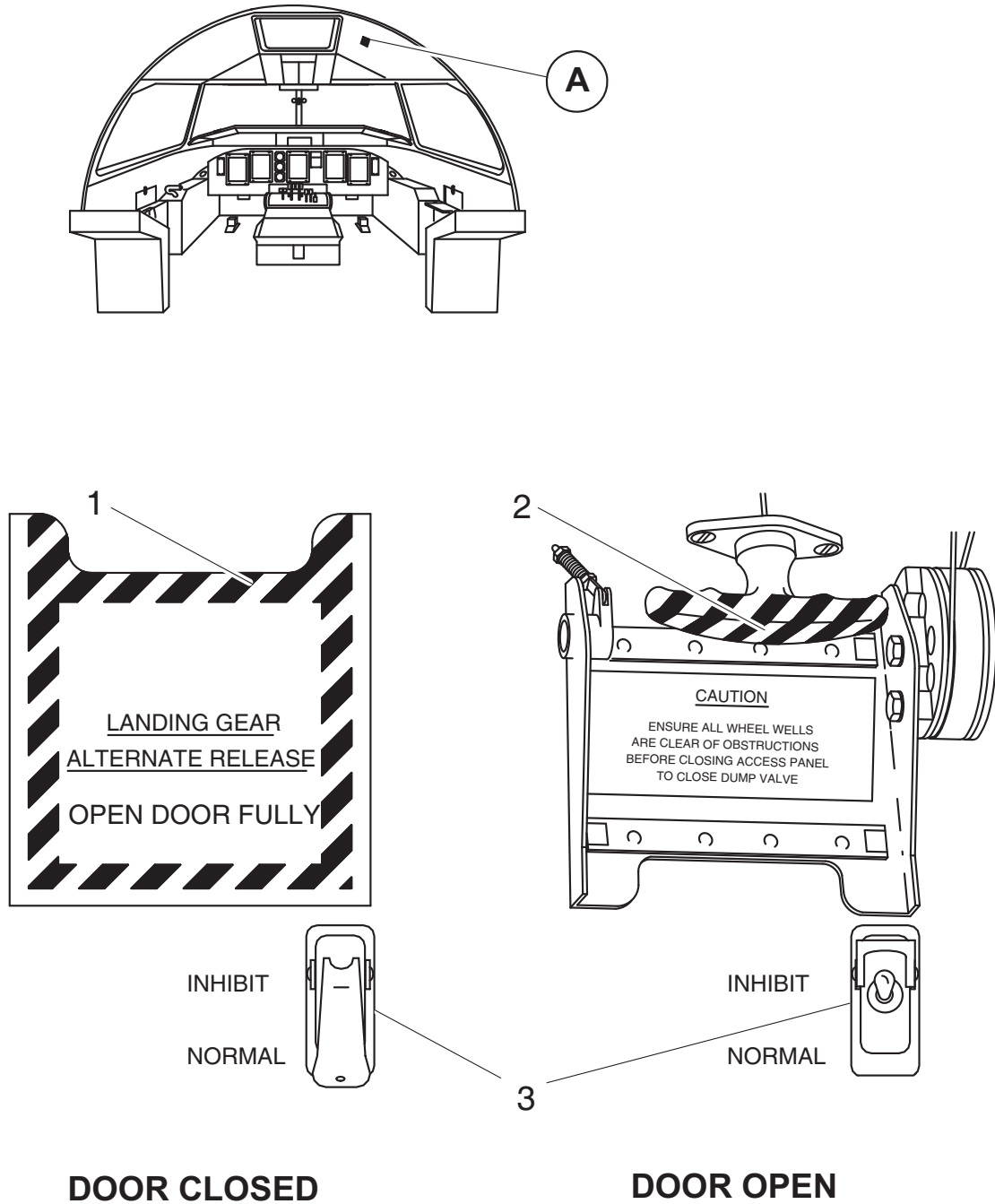
**HANDLE** (amber)

- landing gear operation does not agree with position of landing gear selector handle

### 6. LANDING GEAR WARNING HORN MUTE/TEST SWITCH (two position, momentary action)

**TEST** - gear warning tone sounds over flight deck speakers

**HORN MUTE** - gear warning tone is silenced under certain configurations



**A**

Figure 12.13-4 Landing Gear Alternate Release Door and Inhibit Switch



**LANDING GEAR ALTERNATE RELEASE DOOR CALLOUT**

**| 1. LANDING GEAR ALTERNATE RELEASE DOOR (two position)**

**CLOSED** - landing gear extends and retracts normally

**OPEN** - connects hydraulic extension and retraction lines to return

- gear cannot be extended using normal hydraulic power
- door must stay open for alternate gear extension

**| 2. MAIN L/G RELEASE HANDLE (spring loaded to stowed position)**

**PULL** - make sure the handle is pulled fully (all the way out)

- releases main gear hydraulic doors and main gear uplocks
- hydraulic gear doors will stay open

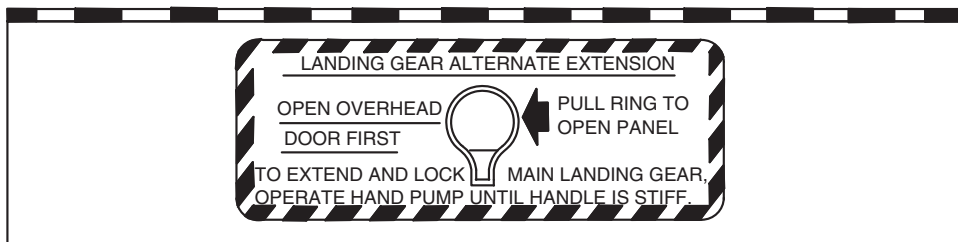
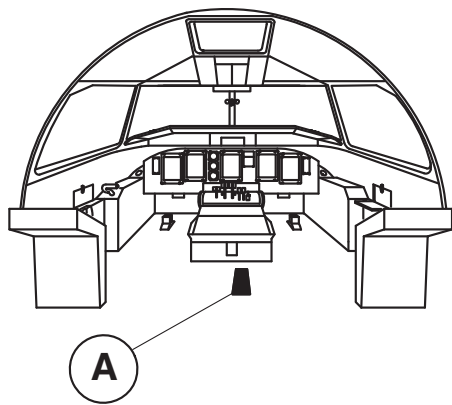
**| 3. LANDING GEAR INHIBIT SWITCH (guarded, two position toggle switch)**

**INHIBIT** - disables normal landing gear extension operation using the LANDIN GEAR lever

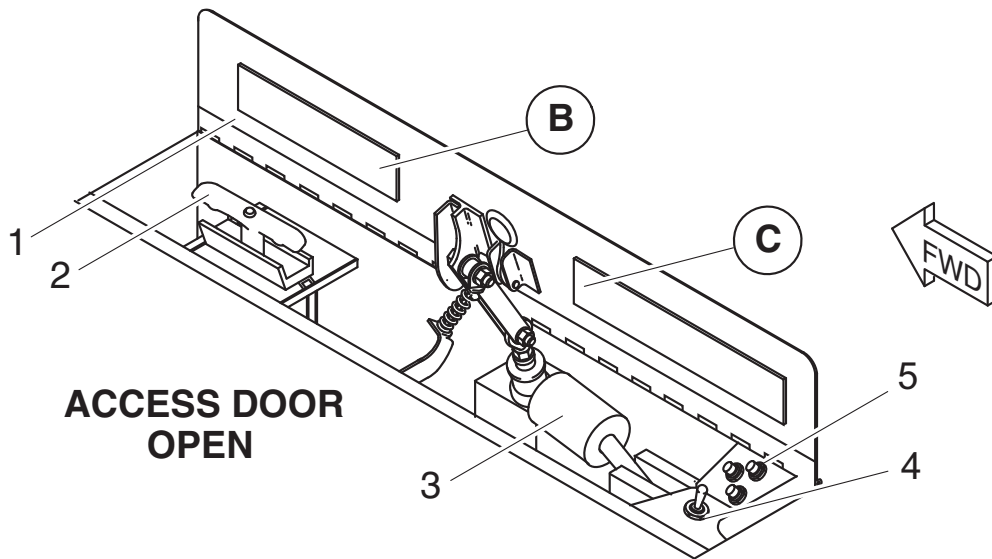
- LDG GEAR INOP caution light comes on (if not already on)

**NORMAL** - landing gear extends and retracts normally

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**A ACCESS DOOR CLOSED**



NOSE L/G RELEASE  
PULL FULLY UP

VISUAL CHECK FOR GEAR DOWN & LOCKED  
 TURN ON LIGHT SWITCH  
CHECK FOR LIGHTS

**B**

**C**

Figure 12.13-5 Landing Gear Alternate Extension Door

**LANDING GEAR ALTERNATE EXTENSION DOOR CALLOUTS**

**1. LANDING GEAR ALTERNATE EXTENSION DOOR (two position)**

**CLOSED** - landing gear extends and retracts normally

**OPEN** - alternate extension hydraulic fluid available for alternate gear extension

- door must stay open for alternate gear extension

**2. NOSE GEAR RELEASE HANDLE (spring loaded to stowed position)**

**PULL** - make sure the handle is pulled fully (all the way out)

- releases nose gear doors and nose gear uplocks
- hydraulic gear doors will stay open

**3. MAIN GEAR ALTERNATE EXTENSION HAND PUMP (two position)**

- pumps fluid from the emergency hydraulic reservoir to the auxiliary main landing gear actuators
- handle located behind copilot's seat is inserted into socket

**4. LANDING GEAR DOWNLOCK VERIFICATION SWITCH (two position, toggle switch)**

**AFT** - activates alternate downlock verification system on each gear

- enables operation of gear verification lights

**CENTER** - alternate downlock verification system deactivated

**5. LANDING GEAR DOWNLOCK VERIFICATION LIGHTS**

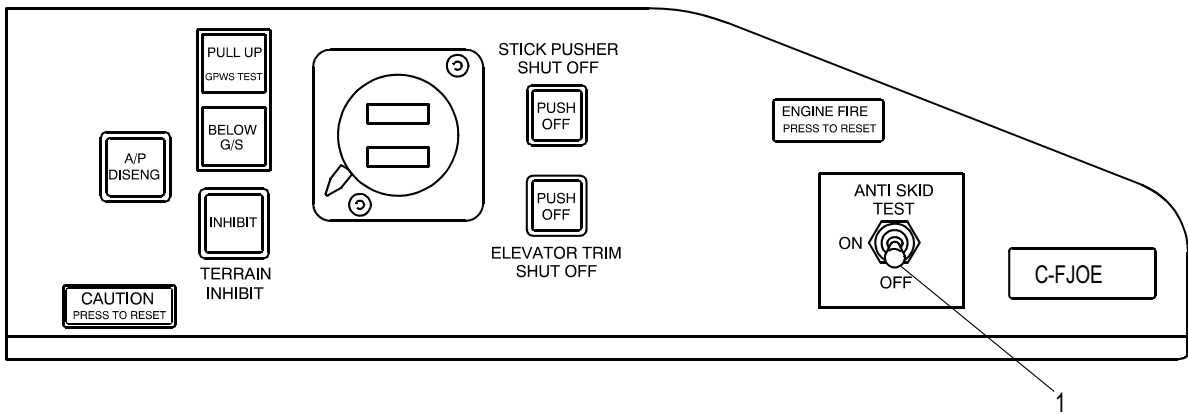
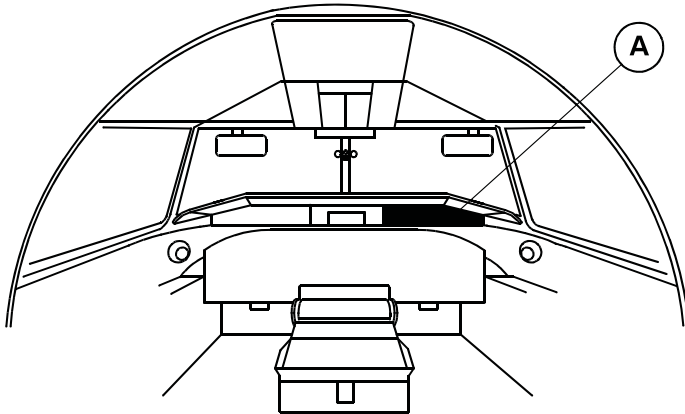
**(NG, LH, RH) (green)**

- related (Nose, Left main, Right main) landing gear is down and locked using the alternate downlock verification system
- downlock verification toggle switch must be set aft

**(NG, LH, RH) - (blank)**

- related (Nose, Left main, Right main) landing gear is not down and locked using the alternate downlock verification system
- downlock verification toggle switch not set aft

Dash8 - Q400 - Landing Gear



A

Figure 12.13-6 Anti Skid Switch

**ANTI SKID SWITCH CALLOUT**

**1. ANTI SKID SWITCH (three position, momentary at TEST)**

**TEST** - held in position and released to ON position

- if airborne with gear down and locked, INBD ANTISKID and OUTBD ANTISKID caution lights come on for 3 seconds then go off to show serviceable anti skid system
- if on the ground, INBD ANTISKID and OUTBD ANTISKID caution lights come on for 6 seconds and then go off to show serviceable anti skid system
- if antiskid test fails, INBD ANTISKID or OUTBD ANTISKID caution lights will stay on

**ON** - anti skid system activated

- anti skid self test is made when switch is first moved to position and if wheel speed is not more than 17 knots
- INBD ANTISKID and OUTBD ANTISKID caution lights go out

**OFF** - anti skid system deactivated

- INBD ANTISKID and OUTBD ANTISKID caution lights come on

# Dash8 - Q400 - Landing Gear

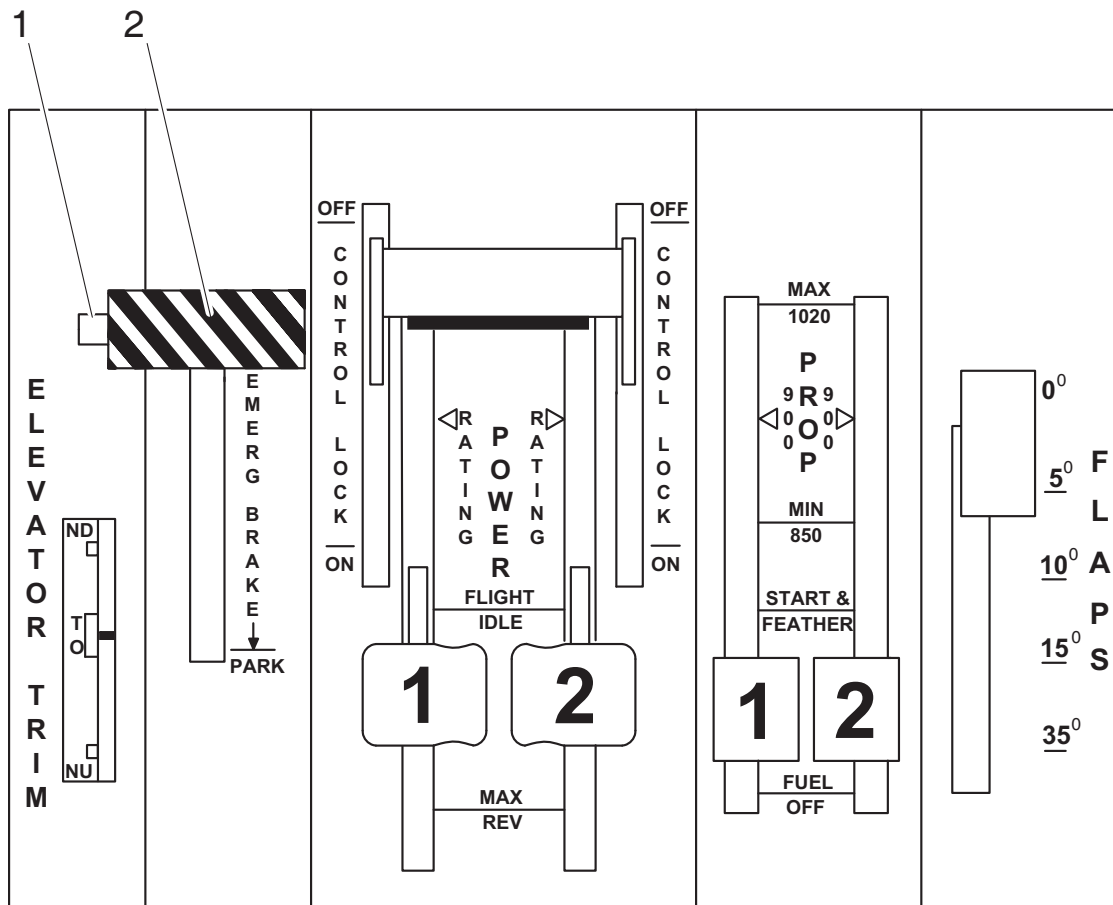


Figure 12.13-7 Emergency/Parking Brake Lever Call-outs

**EMERGENCY/PARKING BRAKE LEVER CALLOUTS**

**1. EMERGENCY/PARKING BRAKE LEVER PUSHBUTTON (momentary action)**

**PUSH** - lets parking brake lever be released from PARK detent

**2. EMERGENCY/PARKING BRAKE LEVER (two position)**

**FORWARD** - emergency brake not engaged

- pull back to actuate emergency brake
- pull back to engage detent for park brake
- uses No. 2 hydraulic pressure or accumulator pressure
- a fully charged accumulator is sufficient for approximately six applications

**PARK** (detent)

- parking brake set if parking brake hydraulic pressure is correct
- PARKING BRAKE caution light comes on
- minimum 500 psi parking brake pressure is required to ensure adequate park brake pressure before engine start
- hand pump located in right main wheel well can be used to increase park brake system pressure
- alternatively, if an AC power supply is available, park brake system pressure can be increased by running the SPU and the PTU

# Dash8 - Q400 - Landing Gear

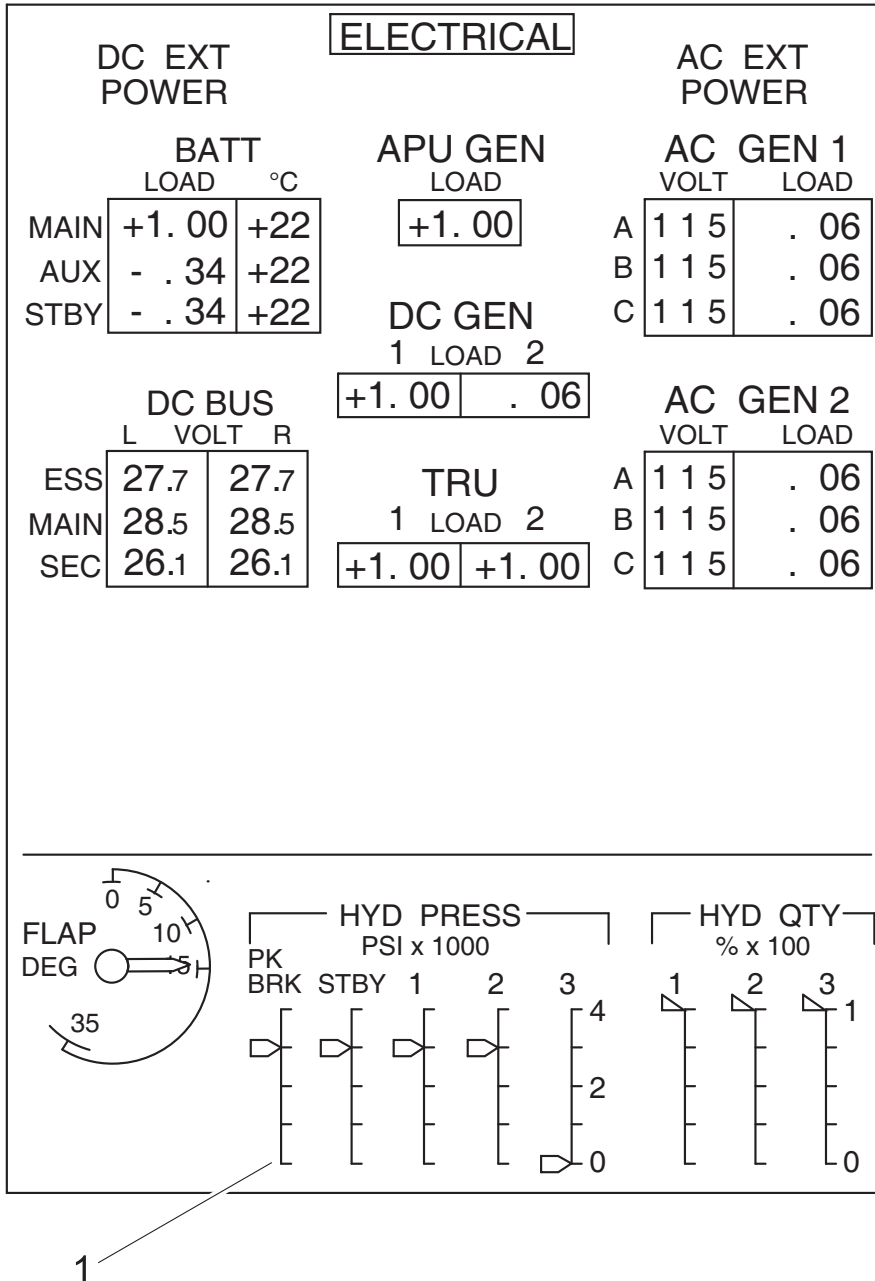
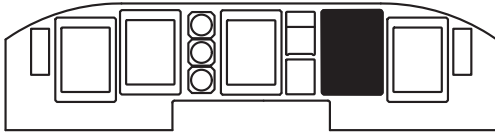


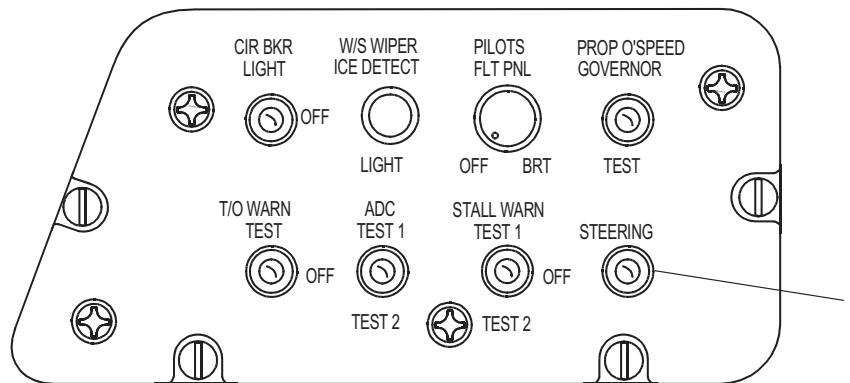
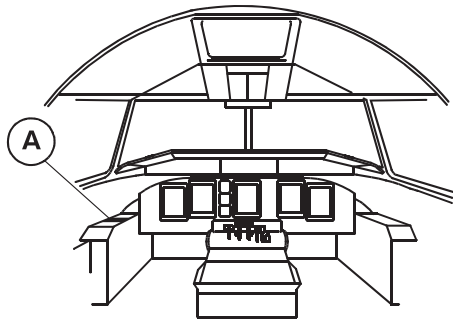
Figure 12.13-8 MFD Parking Brake Hydraulic Pressure



**MFD CALLOUT PERTAINING TO LANDING GEAR**

**1. PK BRK INDICATOR**

- hydraulic pressure in the emergency/parking brake system
- normally the same as No 2 hydraulic system pressure
- shows brake accumulator pressure if No 2 hydraulic system pressure is not available
- minimum 500 psi is required if Engine no.2 is started first  
minimum 1000 psi is required if Engine no. 1 is started first
- pressure shown in psi
- indicates from 0 to 4000 in 1000 psi increments
- in composite mode, hydraulic brake pressure shown digitally



A

Figure 12.13-9 Nosewheel Steering Toggle Switch

**PILOT'S SIDE PANEL CALLOUTS PERTAINING TO STEERING**

**1. NOSEWHEEL STEERING SWITCH (two position, toggle)**

**STEERING** - nosewheel steering activated if aeroplane is on ground and nosewheel is within 70° of center

- NOSE STEERING caution light will illuminate if a fault is detected in the Nosewheel Steering system.

**OFF** - nosewheel steering deactivated and is in the castor mode

- nosewheel assumes shimmy damped or castor mode
- use when tow bar is connected to nose gear
- NOSE STEERING caution light comes on if there is hydraulic pressure in the steering system

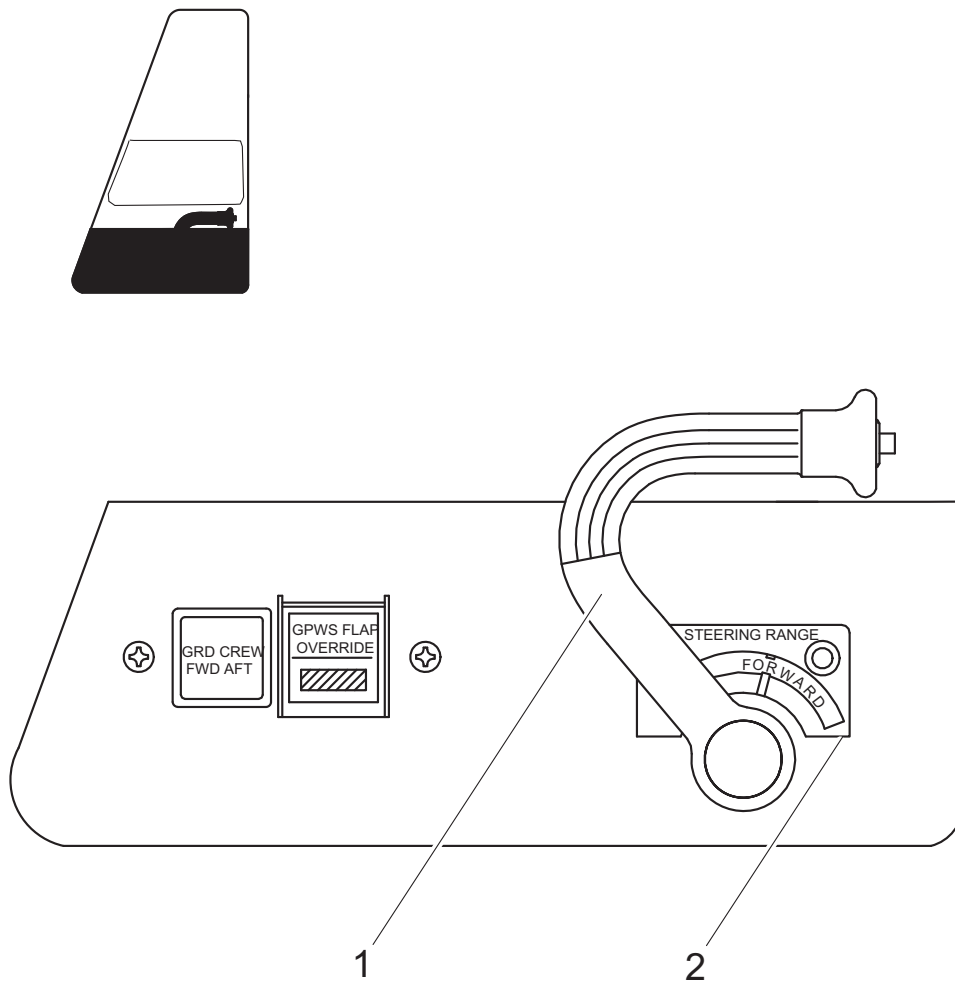
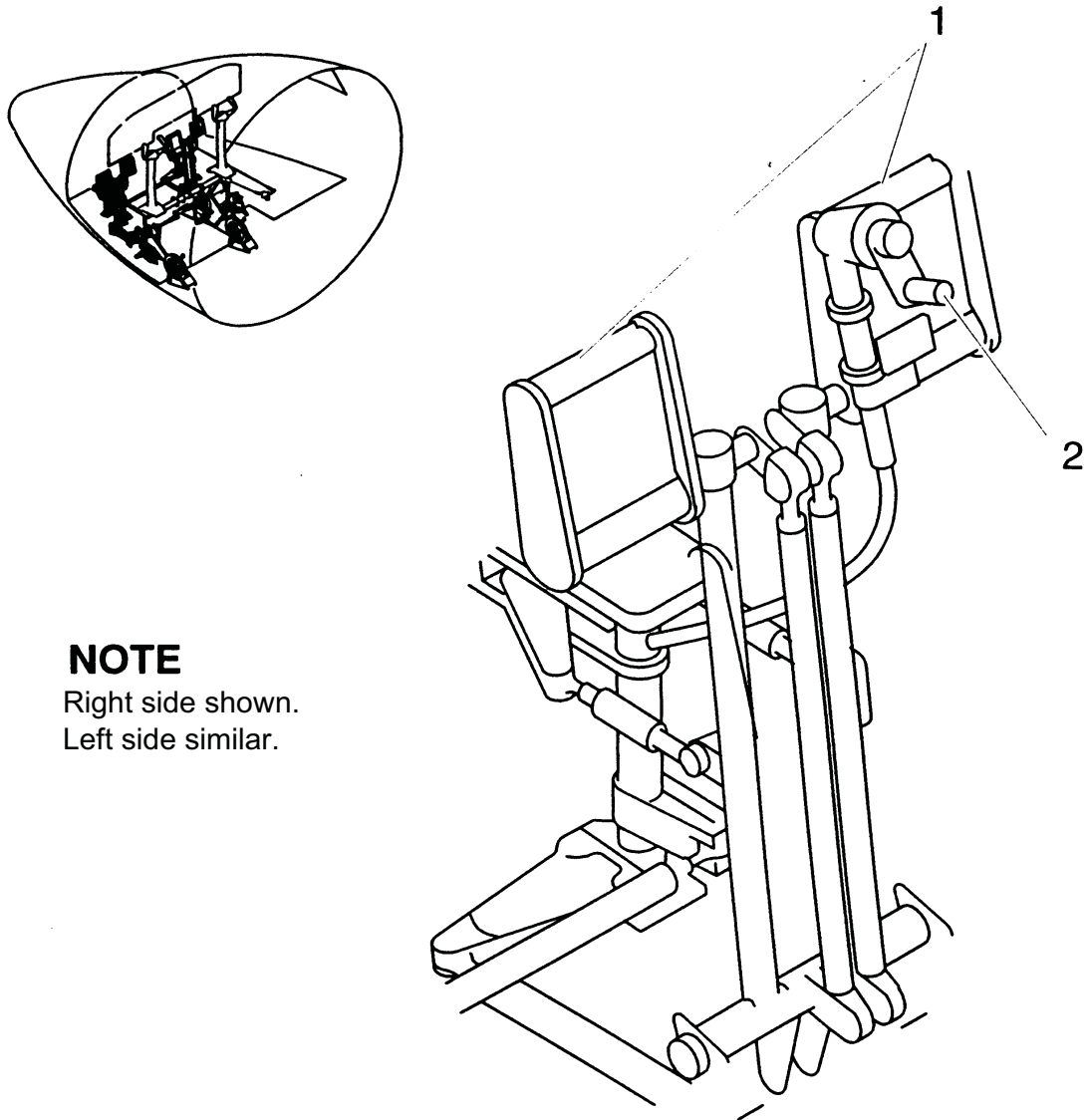


Figure 12.13-10 Nosewheel Steering Hand Control

### NOSEWHEEL STEERING HAND CONTROL CALLOUTS

- 1. STEERING HAND CONTROL (rotatable control, self centering)**
  - rotate left or right to steer nosewheel up to 70° either side of center
  - nosewheel STEERING toggle switch must be set to STEERING
  - spring loaded to center position
- 2. STEERING RANGE LABEL (decal)**
  - shows forward steering range or for steering hand control
  - can be used for reference with mark on steering hand control



**NOTE**

Right side shown.  
Left side similar.

Figure 12.13-11 Brake Pedals

**BRAKE PEDAL CALLOUTS**

**1. BRAKE PEDALS (differential action)**

**PUSH** - top of pedals for brakes

- left pedal for left brake
- right pedal for right brake

**2. RUDDER PEDALS ADJUSTMENT HANDLE (rotary action)**

**ROTATE** - moves both pedals forward or aft

### 12.13.4 Landing Gear - Description

The main gear retracts aft and has multiple disc brakes with an anti skid system (Figure 12.13-12). The nose gear retracts forward and has steerable nosewheels (Figure 12.13-13). The landing gear is operated by the No. 2 hydraulic system and is controlled by the landing gear selector lever on the LANDING GEAR control panel. There is an alternate (emergency) means of extension for the main and nose landing gear. Advisory lights give extension/retraction and fail/safe information.

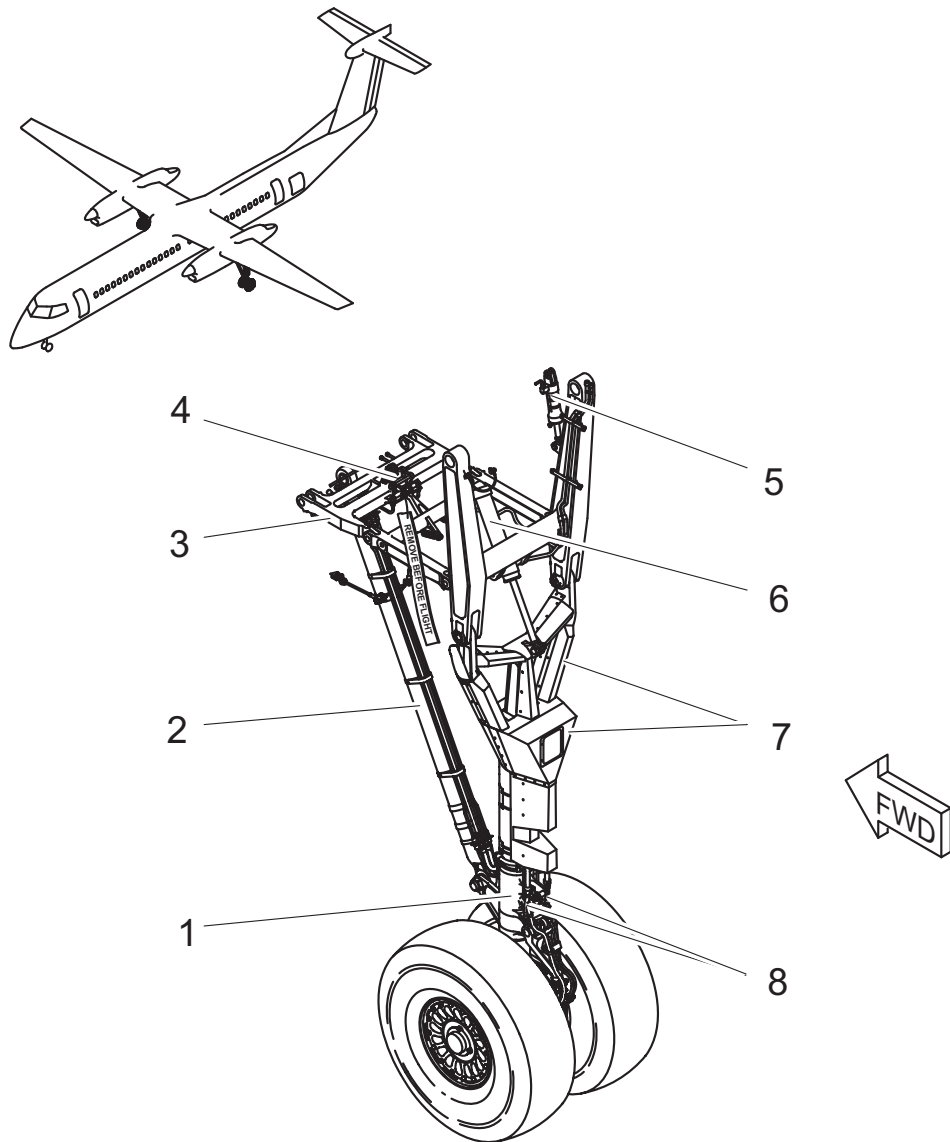
Each main gear has a pair of forward and aft doors hinged to the nacelle side structure (Figure 12.13-14). When the gear is up, all doors enclose the main wheels. With the main gear down, the forward door on each main gear stays open. The nose gear has a pair of forward and aft doors, which completely enclose the nose gear when the gear is up (Figure 12.13-15). With the gear down, the forward nose doors are closed, while the aft doors stay open.

The Proximity Sensor Electronic Unit (PSEU) controls the landing gear, hydraulically operated gear doors and related advisory lights. It also monitors Weight-on-Wheels (WOW) sensors. WOW signals prevent gear retraction while on the ground. Failure of a WOW system turns on a WT ON WHEELS caution light. Redundancy is built in to ensure landing gear operation if there is a PSEU failure. An audible warning tone sounds, when the gear is not down and locked with landing flap or power settings.

Ground lock pins are supplied for the main gear and an integral ground lock mechanism is controlled from outside the aeroplane for locking the nose gear. The main gear lock-pins may be kept in the forward compartment of the forward passenger door. With the gear extended, the pins are inserted into the main gear stabilizer brace assemblies (Figure 12.13-16).

There are also landing gear door lock pins for the nose (Figure 12.13-17) and main (Figure 12.13-18) hydraulic doors. This prevent the hydraulic gear doors from closing.

## Dash8 - Q400 - Landing Gear

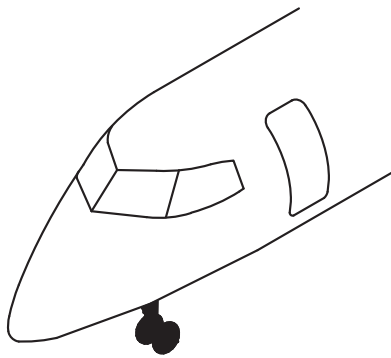


### LEGEND

1. Shock Strut.
2. Drag Strut.
3. Stabilizer Brace.
4. Main Gear Pin.
5. Auxiliary Actuator.
6. Main Actuator.
7. Fairings.
8. Proximity Sensors.

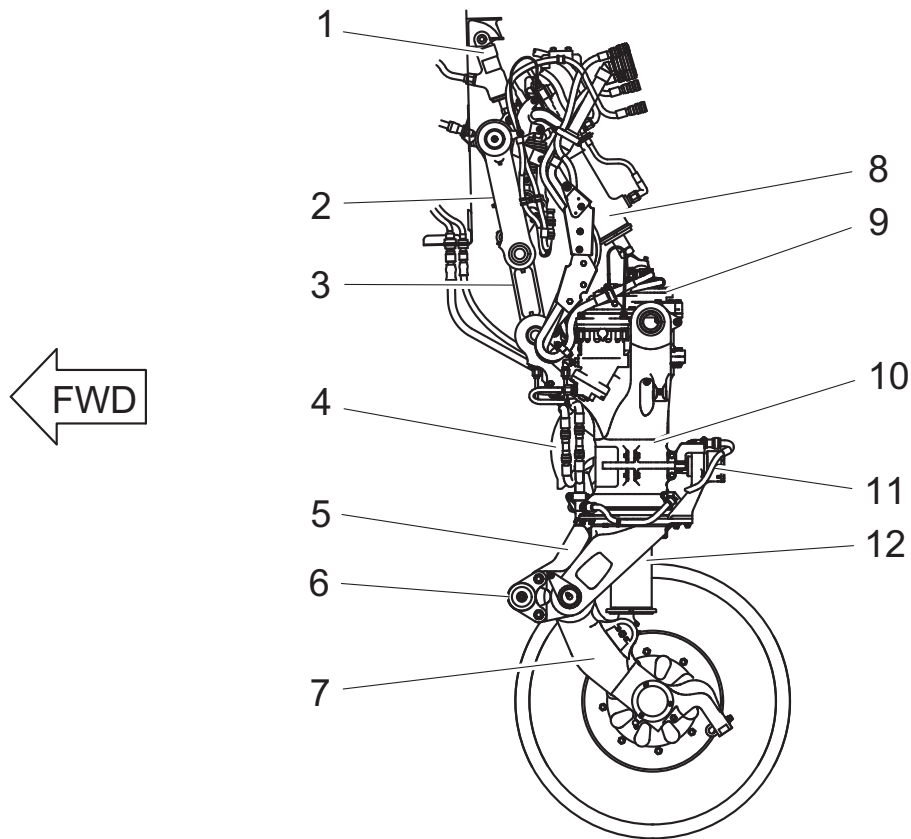
Figure 12.13-12 Main Landing Gear Assembly

## Dash8 - Q400 - Landing Gear



### NOTE

Left nosewheel removed for clarity.

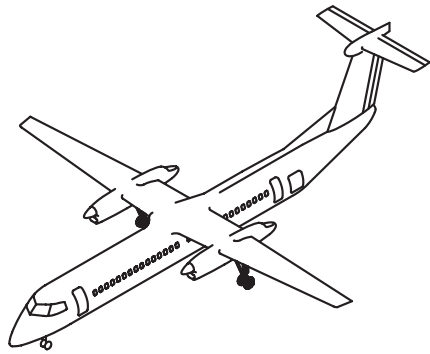


### LEGEND

- |                       |                         |
|-----------------------|-------------------------|
| 1. Downlock Actuator. | 8. Retraction Actuator. |
| 2. Upper Drag Strut.  | 9. Steering Gearbox.    |
| 3. Lower Drag Strut.  | 10. Outer Cylinder.     |
| 4. Taxi Light.        | 11. Centering Actuator. |
| 5. WOW Cover.         | 12. Piston Assembly.    |
| 6. Tow Assembly.      |                         |
| 7. Trailing Arm.      |                         |

Figure 12.13-13 Nose Gear Landing Gear Assembly

# Dash8 - Q400 - Landing Gear



## NOTE

Left gear shown.  
Right gear similar.

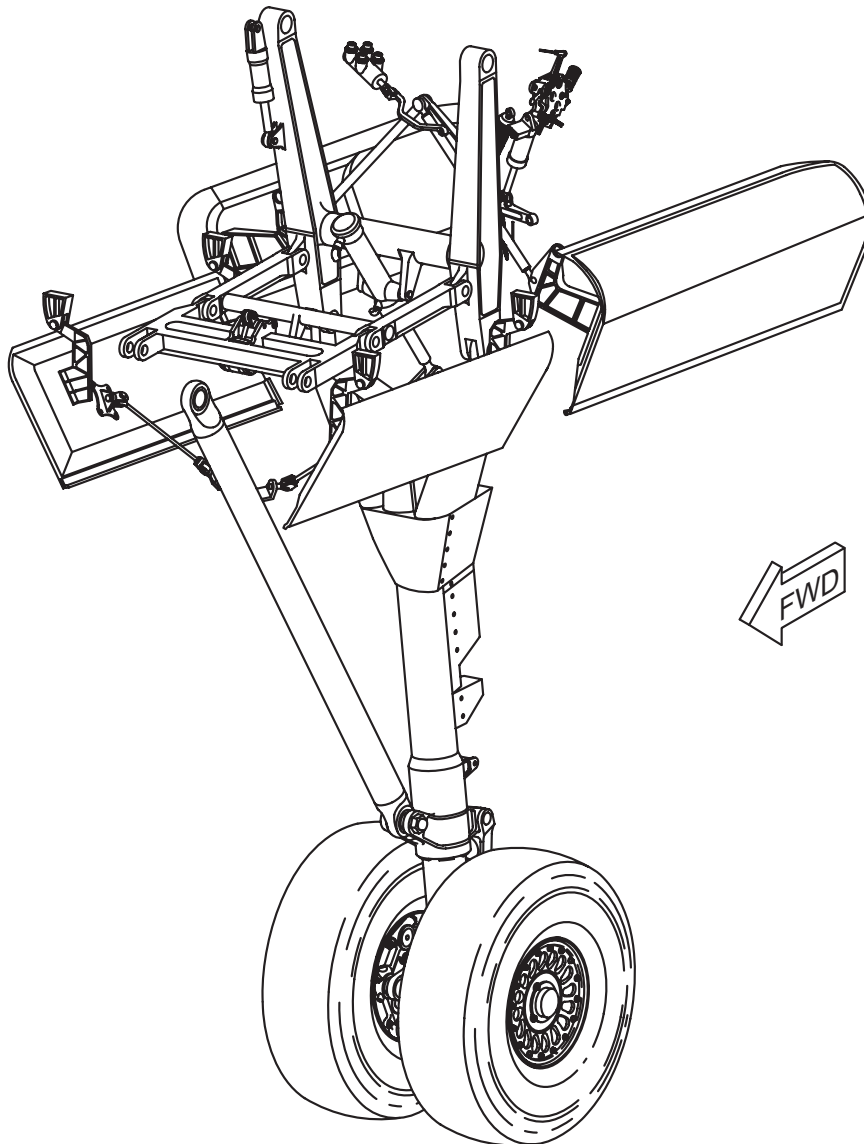
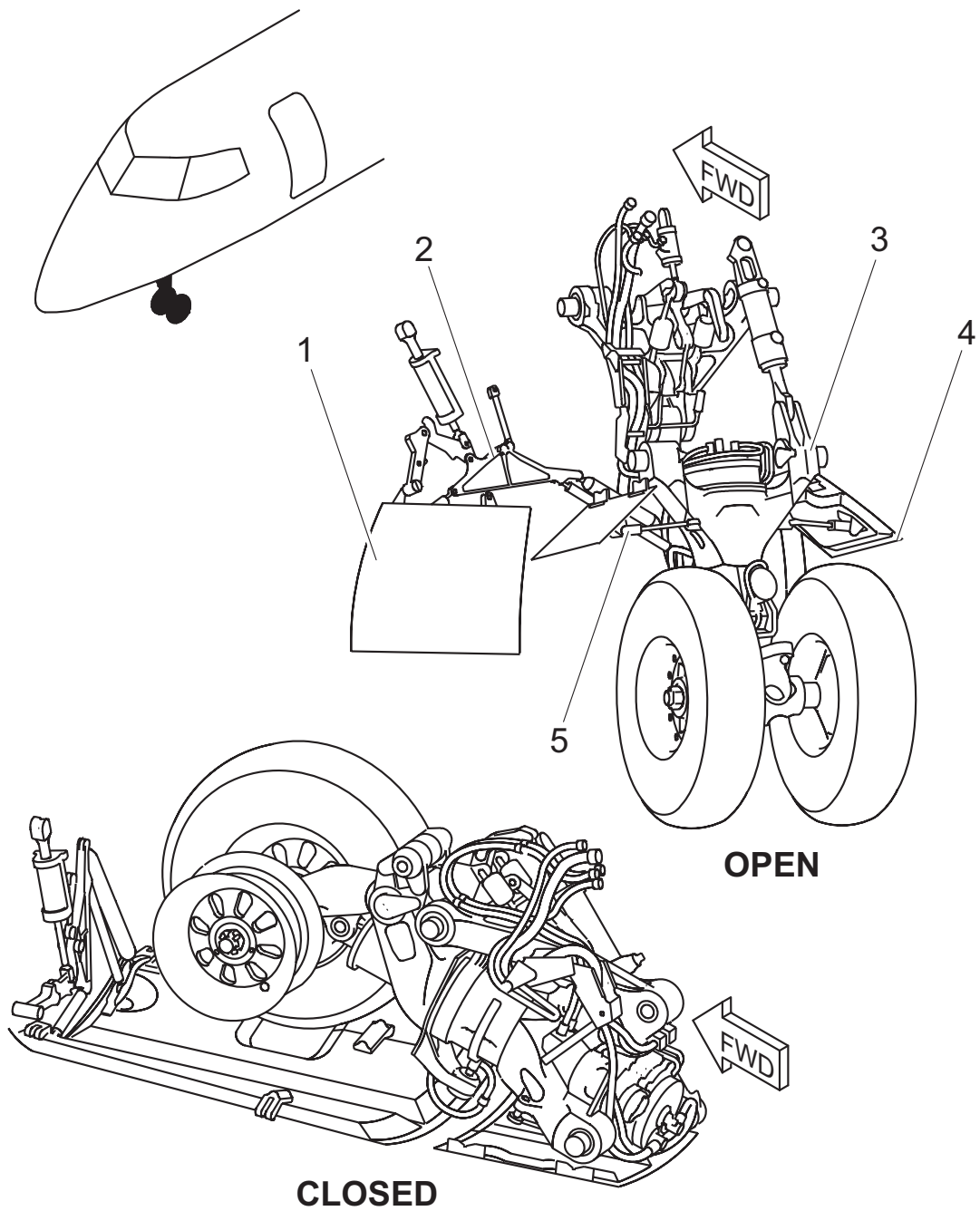


Figure 12.13-14 Main Landing Gear Extended Doors Open



## Dash8 - Q400 - Landing Gear



### LEGEND

1. Forward Door.
2. Forward Door Operating Mechanism.
3. Shock Strut Assembly.
4. Aft Door.
5. Aft Door Actuating Linkage.

Figure 12.13-15 Nose Landing Gear Extended and Retracted

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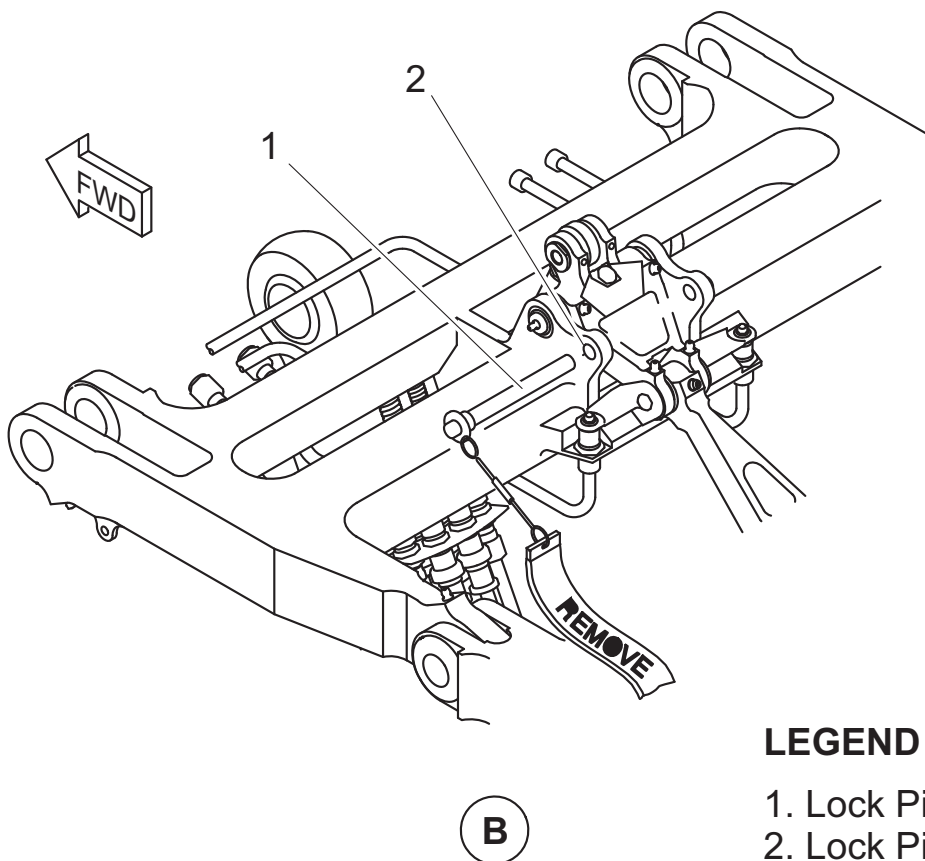
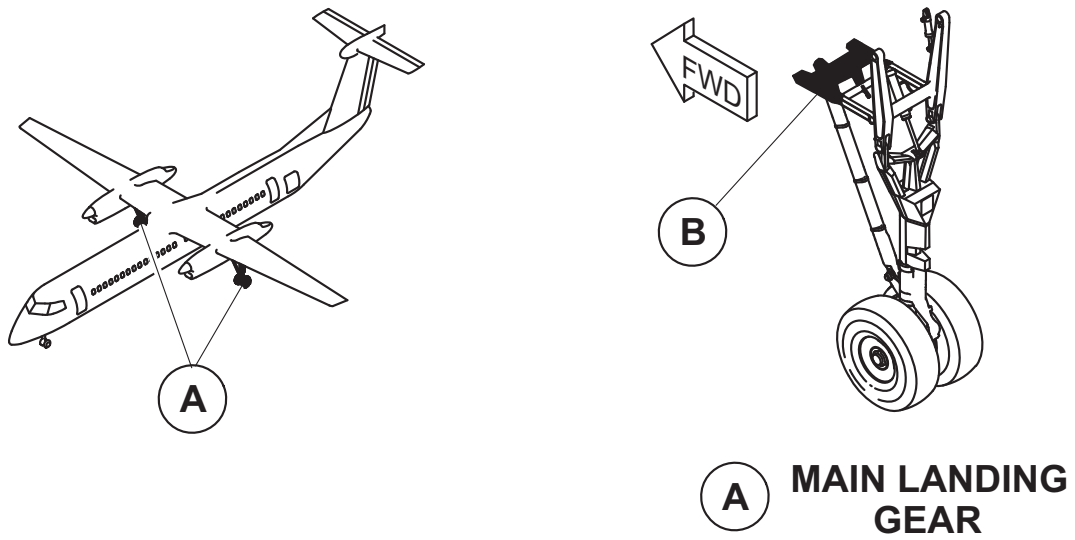
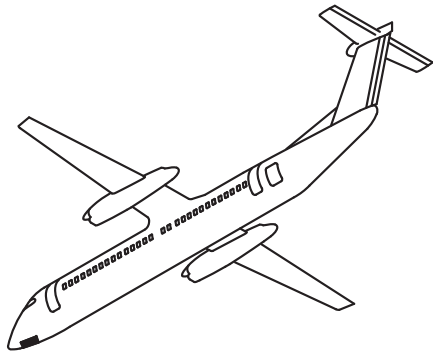


Figure 12.13-16 Main Gear Ground Lock Pin



**NOTE**

View shown with debris guard removed.

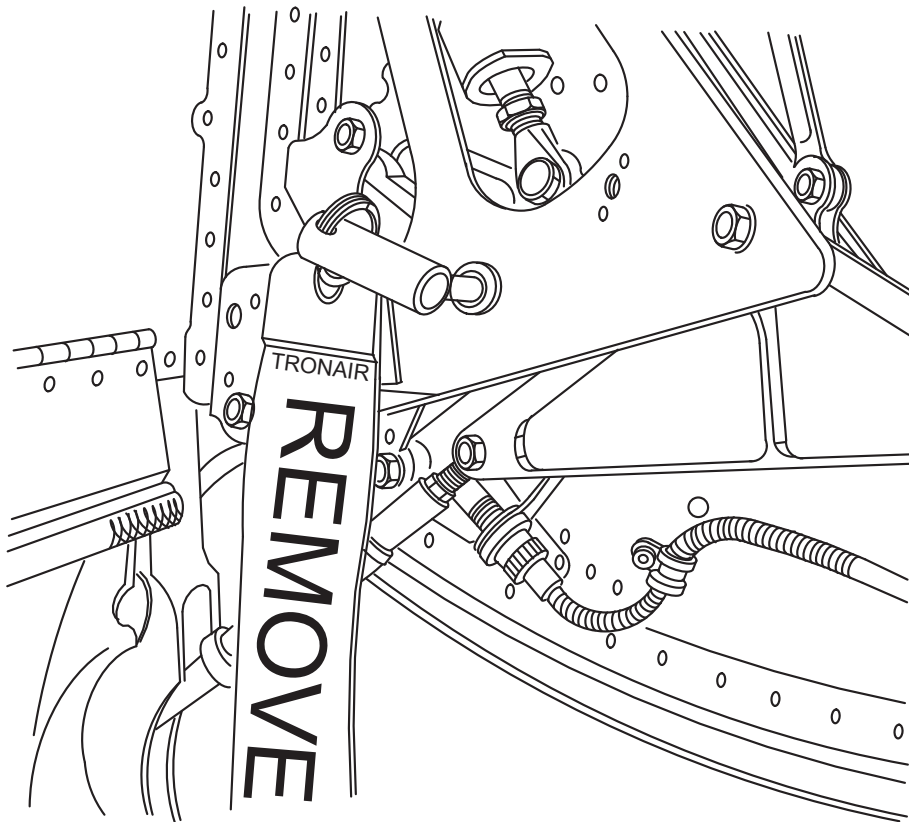
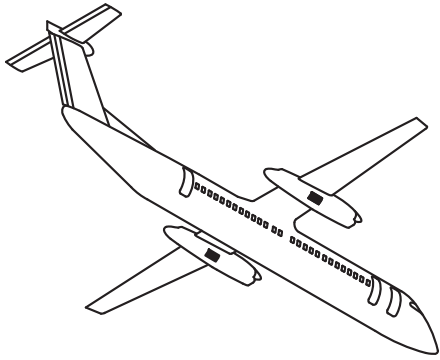


Figure 12.13-17 Nose Gear Hydraulic Door Lock Pin

Dash8 - Q400 - Landing Gear



**NOTE**

Right side shown.  
Left side similar.

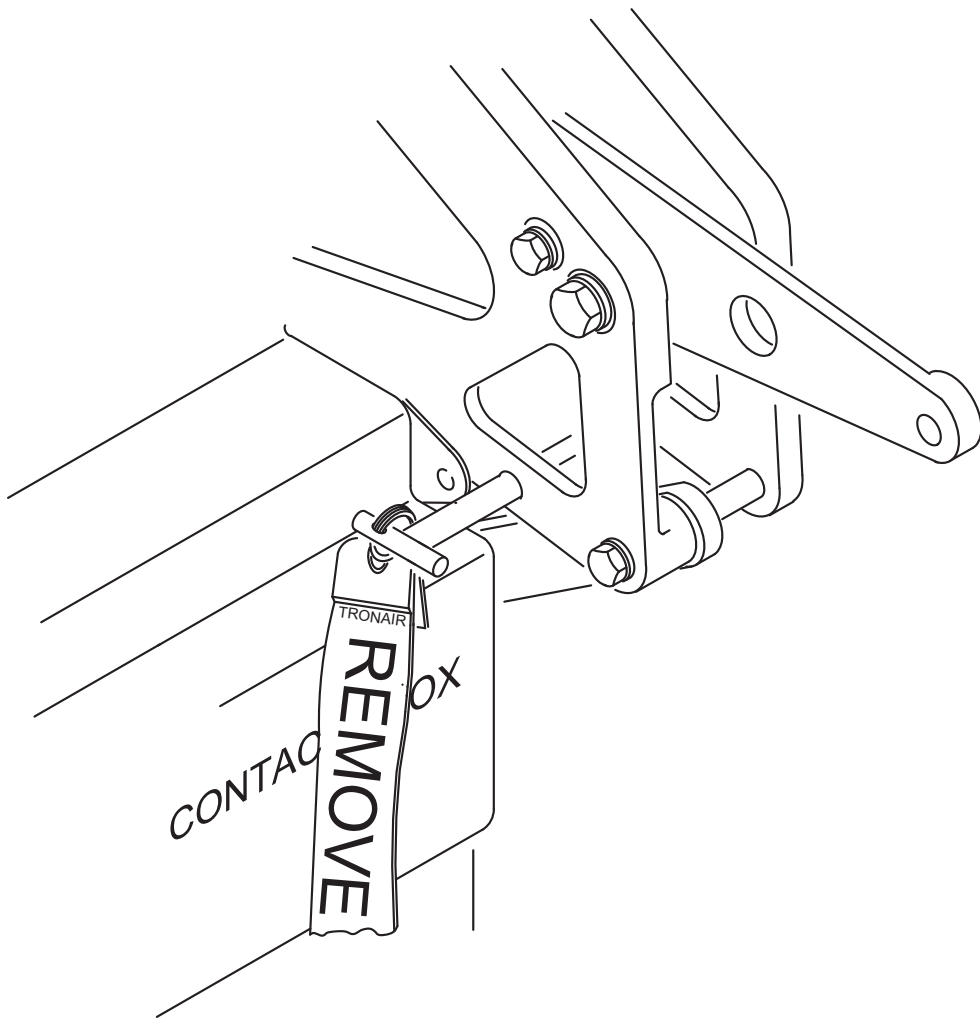


Figure 12.13-18 Main Gear Hydraulic Door Lock Pin

### 12.13.4.1 Gear Operation

Landing gear operation is controlled and monitored from the **LANDING GEAR** control panel, adjacent the Engine Display (ED). The landing gear is selected **UP** or **DN** (down) by moving the landing gear selector lever. A **LOCK RELEASE** selector lever must be held down to let the gear selector lever move in either direction.

An alternate downlock verification system confirms downlock engagement if the primary downlock indication is in doubt. Three green downlock verification lights are located under the **LANDING GEAR ALTERNATE EXTENSION** panel in the flight deck floor.

### Gear Warning Tone

A landing gear warning tone sounds over the flight compartment speakers if the HORN switch is held at TEST. It also sounds if the gear is not down and locked and:

1.
  - flaps > 8.5°
  - either engine torque < 50%
  - both PLA < RATING detent
  
2.
  - both PLA < FLIGHT IDLE +12°
  - KIAS < 156
  - RA < 1053 ft (321 m) if it is valid
  
3.
  - one PLA < FLIGHT IDLE + 12°
  - both PLA < RATING detent
  - HORN switch not latched at MUTE
  - KIAS < 156
  - RA < 1053 ft (321 m) if it is valid

**NOTE:** This is the only case in which the landing gear warning tone may be muted. Engine failure at airspeed less than 156 KIAS.

# Dash8 - Q400 - Landing Gear

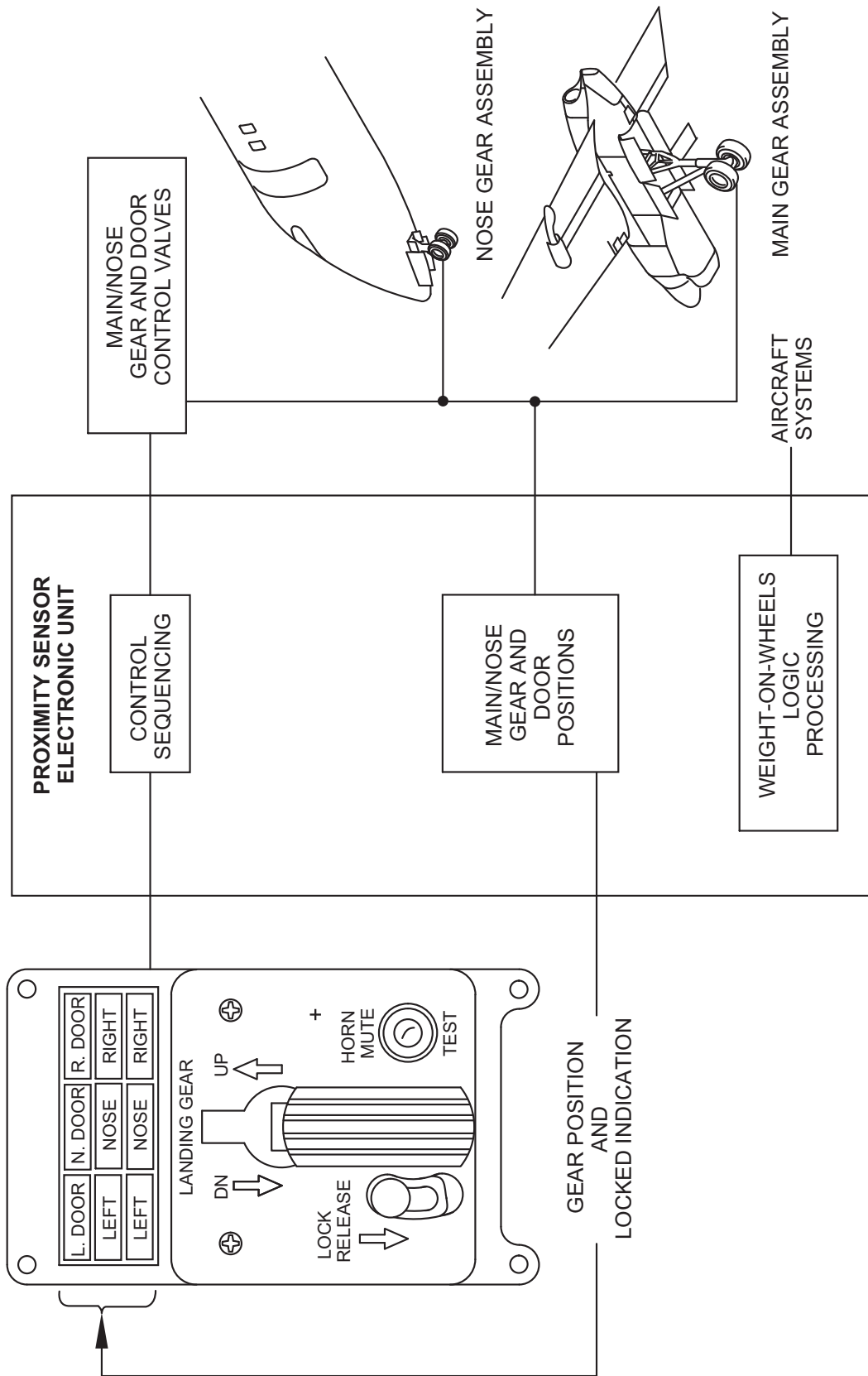


Figure 12.13-19 Landing Gear Retraction Schematic

### Retraction Sequence

When the landing gear selector lever is selected to the UP position, hydraulic pressure from No. 2 system is applied to the retract side of the system (Figure 12.13-19). This opens the nose gear forward doors and retracts the nose gear, it also opens the main gear aft doors and retracts the main gear. The aft nose gear doors are mechanically linked and close with the retracting nose gear. After nose gear retraction, the forward nose gear doors close hydraulically. The forward main gear doors are mechanically linked and close with the retracting main gear. After main gear retraction, the aft main gear doors close hydraulically.

The advisory light sequence during retraction starts with the LEFT, NOSE and RIGHT red unsafe lights and the amber selector handle light coming on. At the same time, the green LEFT, NOSE and RIGHT lights go off to show the gear is not locked down. The amber door advisory lights come on to show the hydraulically operated gear doors are open. When the landing gear is retracted and locked in the up position, the amber selector handle light and red advisory lights go out. Finally, the amber gear door advisory lights go out to show all the hydraulic gear doors have closed. No advisory lights should be on if the gear is up correctly. The main and nose gear are held in the up position mechanically with uplocks, and hydraulic pressure is removed from the system.

### Extension Sequence

When the landing gear selector lever is moved to the DN position, hydraulic pressure is applied to the extend side of the system through the solenoid selector valve (Figure 12.13-19). The main and nose hydraulic doors open, and the main and nose gear extend. The hydraulic forward nose and aft main gear doors close after the gear is down and locked.

The advisory light sequence during extension starts with the LEFT, NOSE, and RIGHT red unsafe lights and the amber gear selector handle light coming on. The amber door advisory lights then come on to show the hydraulically operated gear doors are open. When the landing gear is fully extended and locked in the down position, the red unsafe lights, and the selector handle light goes out. Then the green LEFT, NOSE, and RIGHT advisory lights come on. Finally, the gear door advisory lights go out when the hydraulically operated doors are closed. Continuous hydraulic pressure acts on the gear when down and locked, however primary downlock is by the overcenter locks.

If a landing gear hydraulic sequencing valve fails, or the PSEU is unable to control it, the LDG GEAR INOP caution light comes on.

**NOTE:** With the LDG GEAR INOP caution light on, ALTERNATE GEAR EXTENSION procedure is to be followed.

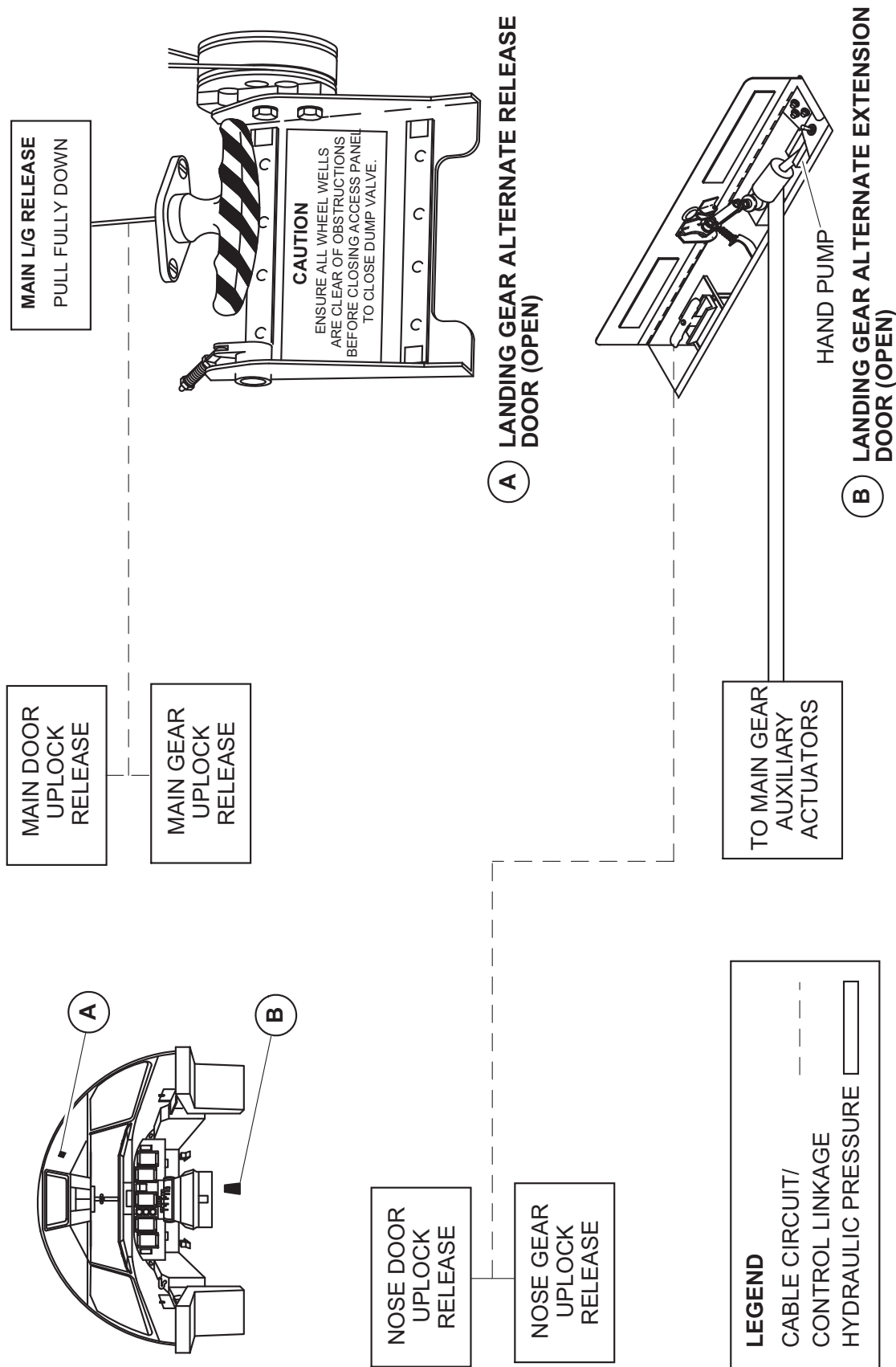


Figure 12.13-20 Alternate Landing Gear Extension Schematic



### 12.13.5 Alternate Gear Extension

The alternate extension system (Figure 12.13-20) gives a means of extending the landing gear when:

- LDG GEAR INOP caution light is on
- Landing gear indication fails
- Loss of No. 2 hydraulic system pressure

The landing gear extension INHIBIT switch is installed in the flight deck ceiling, adjacent to the main LANDING GEAR ALTERNATE RELEASE door. Setting the switch to INHIBIT isolates all hydraulic pressure from the landing gear system.

When the main LANDING GEAR ALTERNATE RELEASE door on the flight deck ceiling is opened it mechanically opens a bypass valve in the normal hydraulic extension system, and gives access to the MAIN L/G RELEASE handle. Pulling the handle releases the main landing gear doors and uplocks. The main gear will free fall but may not fully extend. The LANDING GEAR ALTERNATE EXTENSION door, on the flight deck floor, must then be fully opened giving access to the alternate extension handpump and the NOSE L/G RELEASE handle. Opening the door mechanically operates the MLG alternate selector valve. If the MLG does not reach the down and locked position, the extension pump handle, located behind the copilot, is inserted into the pump handle socket and operated to complete main gear extension and subsequent down-lock (Figure 12.13-21). Both the LANDING GEAR ALTERNATE EXTENSION door and the MAIN LANDING GEAR ALTERNATE RELEASE door must be left fully open after alternate landing gear extension.

When the NOSE L/G RELEASE handle is pulled, the nose gear uplock and doors are released and the nose gear free falls to a down and locked position, assisted by the airflow to a down and locked position.

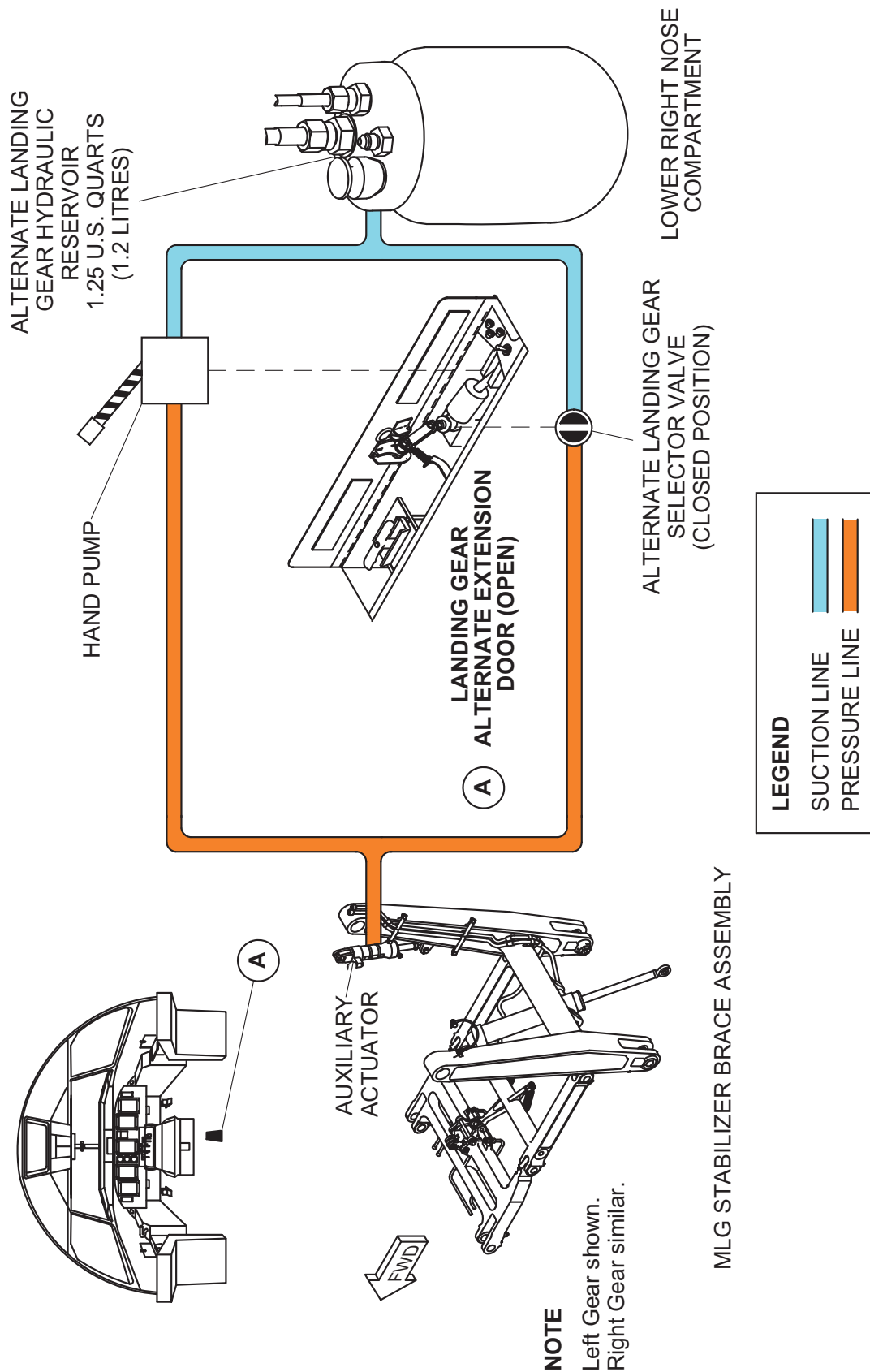


Figure 12.13-21 Main Landing Gear Alternate Extension System

# Dash8 - Q400 - Landing Gear

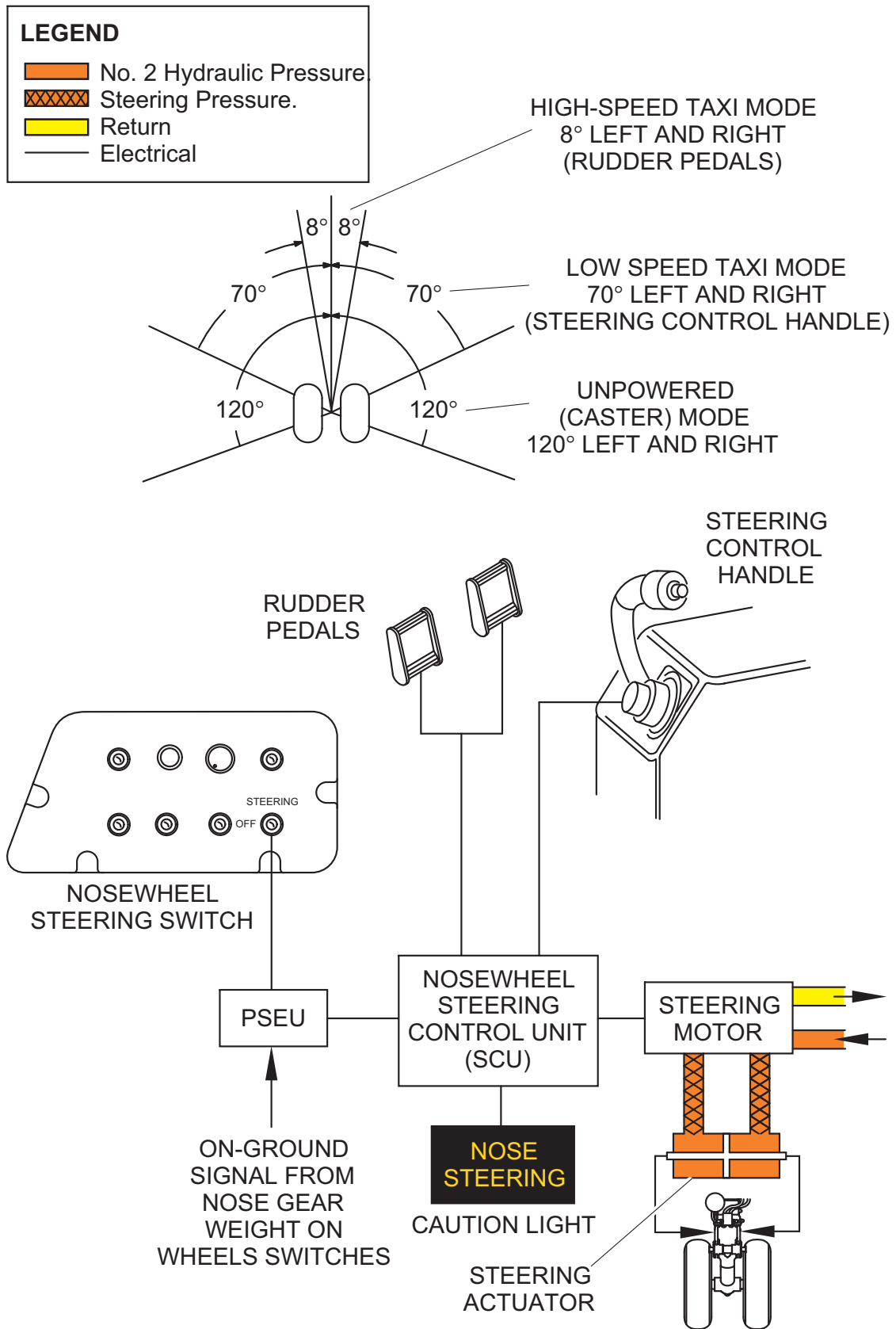


Figure 12.13-22 Nosewheel Steering Schematic

### 12.13.6 Nosewheel Steering System

Directional control on the ground is by the nosewheel steering (NWS) system (Figure 12.13-22), powered by the No. 2 hydraulic system. Steering control is by either the Steering Hand Control or the rudder pedals. The Steering Hand Control turns the nosewheel up to 70° either side of center for low speed taxi. Steering with the rudder pedals turns the nosewheel up to 8° either side of center for high-speed taxi, take-off and landing roll. After take-off, the nosewheel automatically centers before retraction.

The hand control, located on the Pilot's Side console, is self-centering and operates when the STEERING switch is set to the STEERING position. The nosewheel must be within 70° of center for the steering to work. An index mark on the hand control shows the relative position of the nosewheel against a fixed STEERING RANGE decal. With the STEERING switch set to STEERING, power is directed to the nosewheel Steering Control Unit (SCU), if the nose gear is down and locked with weight-on-wheels.

The nosewheel will revert to a passive shimmy dampened castoring mode if:

- The nosewheel angle is greater than 70°
- The SCU detects a failure
- STEERING switch is set to OFF

In the passive mode, the nosewheel will castor up to 120° either side of center. Differential braking and/or power may be used for directional control in the passive mode.

The NOSE STEERING caution light comes on if:

- SCU detects a failure with STEERING switch set to STEERING
- hydraulic pressure detected in steering system with STEERING switch set to OFF

The NOSE STEERING caution light does not come on if electrical power is removed from the SCU.

When taxiing in reverse the STEERING switch must be selected on. However, no steering is permitted with either the tiller or the rudder pedals.

**NOTE:** Nosewheel steering using the hand control is limited to forward taxiing only, with the STEERING switch set to the STEERING position.

**CAUTION:** Do not set the STEERING switch to STEERING if tow bar is connected to nose gear.

# Dash8 - Q400 - Landing Gear

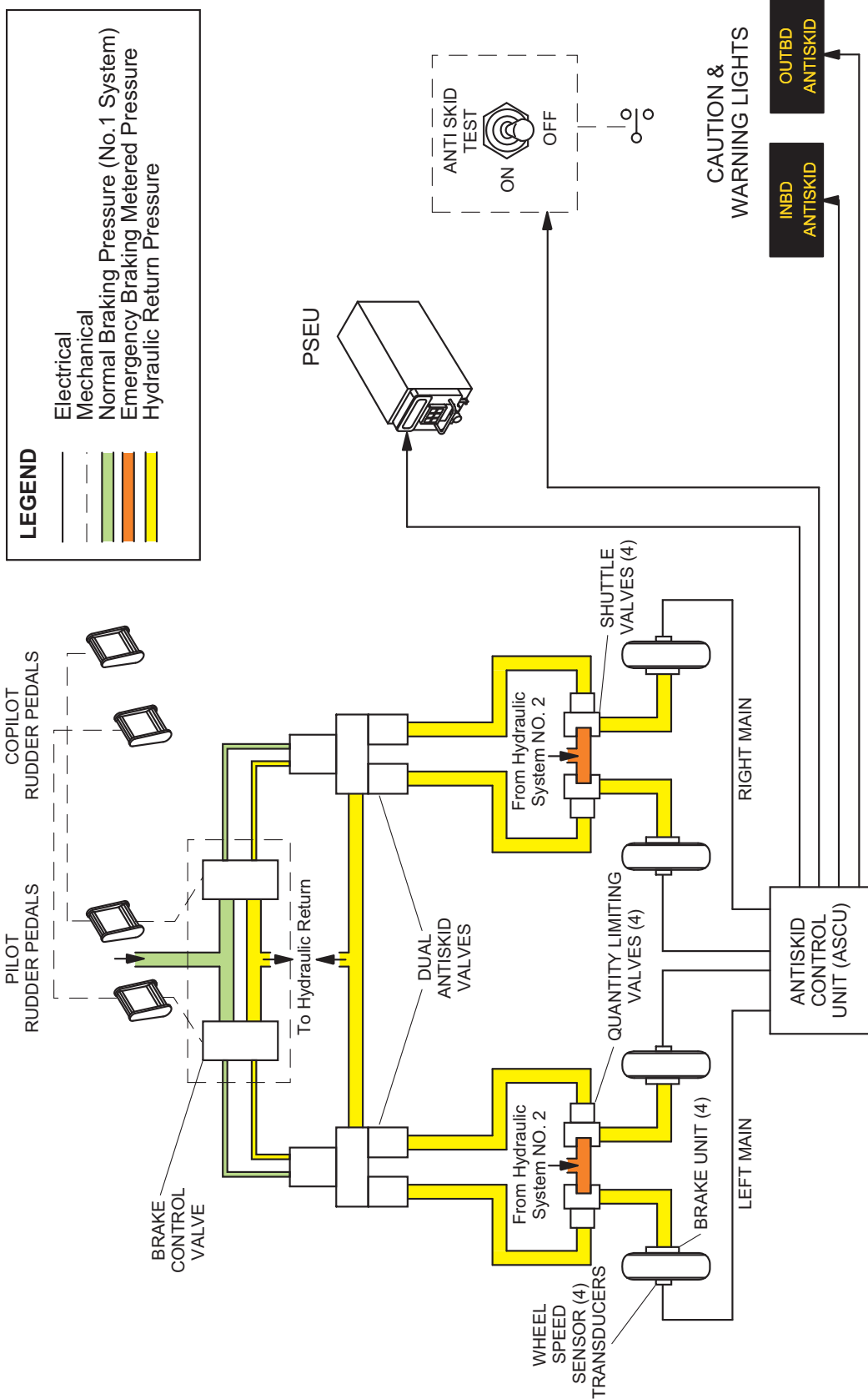


Figure 12.13-23 Normal Brake System

## 12.13.7 Brake System

### 12.13.7.1 Normal Braking

Each main wheel is equipped with a multiple disc brake unit powered by the No. 1 hydraulic system (Figure 12.13-23). An Anti Skid Control Unit (ASCU) modulates the application of brake pressure to each brake unit.

Brake pressure is applied by pushing the pilot's or copilot's brake pedals (Figure 12.13-25).

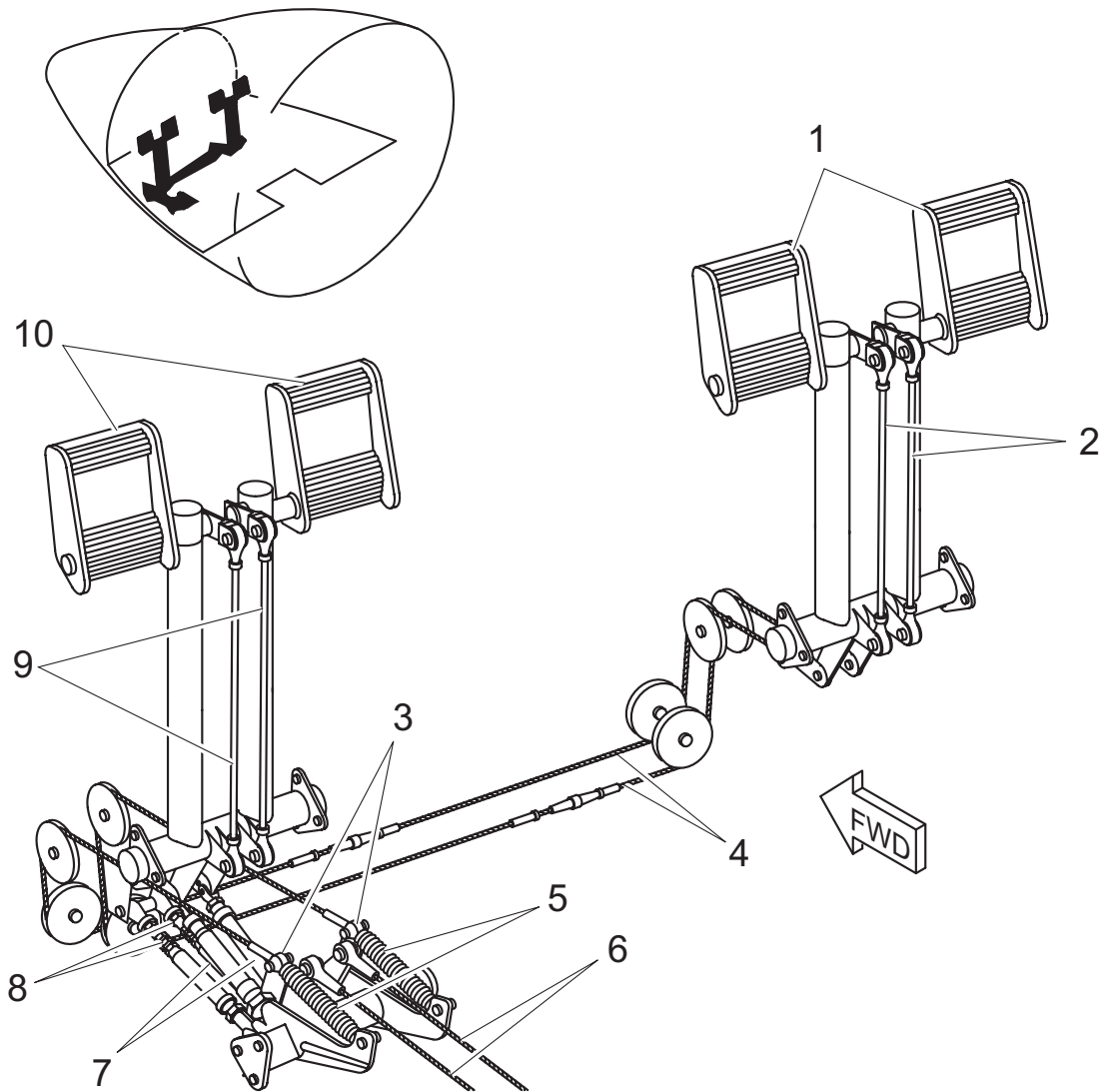
The anti skid control unit:

- Monitors wheel speed
- Modulates the brake pressure applied to each brake unit to prevent wheel lock-up
- Gives maximum braking at all levels of runway friction.

The ANTI SKID switch on the copilot's glareshield panel operates the anti skid system when set to the ON position and the wheel speed is more than 10 knots. A start up self test of the anti skid control circuits is made when the switch is moved to the ON, or momentary TEST. The start up self test is prevented with wheel speed more than 17 knots. If the ANTI SKID switch is held at TEST, the aeroplane on the ground, the INBD ANTISKID and the OUTBD ANTISKID caution lights come on for six seconds and then go out. If the ANTI SKID switch is held at TEST in the air, with the landing gear extended and locked, will turn on the related caution lights for three seconds. If the ASCU senses a fault in the system, it turns on the related caution light.

The PSEU supplies weight-on-wheels and gear up and locked signals to the ASCU, to make sure that the brakes are off until the aeroplane has touched down and the wheels are spinning. In conditions of low runway friction, the main gear wheels may not spin up before the aeroplane's weight is fully on the wheels. In this case, the ASCU gives a 5 second delay before brake pressure is applied. This delay is immediately cancelled when wheel speed is more than 35 knots.

**NOTE:** Brake cooling times must be observed between a landing, or a low energy rejected take-off and a subsequent take-off, to make sure that sufficient brake energy is available to bring the aeroplane to a complete stop if the subsequent take-off is rejected.



**LEGEND**

- 1. Copilot Brake Pedals.
- 2. Tie Rods.
- 3. Brake Control Levers.
- 4. Brake Interconnect Cables.
- 5. Lever Springs.
- 6. Cables to Brake Control Valve.
- 7. Push Rods.
- 8. Spring Rods.
- 9. Tie Rods.
- 10. Pilot Brake Pedals.

Figure 12.13-24 Brake Pedals

### 12.13.8 Emergency Brake System

The emergency/parking brake system (Figure 12.13-25) lets the brakes be applied if the normal brake system fails, or for setting the parking brake. An EMERG BRAKE lever on the Engine Control quadrant operates the system. The emergency/parking brake system is powered by No. 2 hydraulic system, or by parking brake accumulator pressure. Hydraulic pressure to the emergency/parking brake system is shown on the PK BRK indicator on the PERMANENT SYSTEMS AREA (PSA) of the MFD.

The EMERG BRAKE lever operates against a spring to produce a resistance proportional to the brake pressure applied as the lever is pulled back. There is no differential braking and no anti skid protection when using the EMERG BRAKE lever. If the emergency/parking brake system is used with No. 2 hydraulic system inoperative, the accumulator supplies brake pressure. A fully charged accumulator is sufficient for approximately six applications.

The parking brake is engaged by pulling the EMERG BRAKE lever all the way back to the detent PARK position. This turns on the PARKING BRAKE caution light on the Caution and Warning panel. The button on the side of the handle must be pushed to release the lever from the PARK detent.

**NOTE:** Care should be taken when releasing the lever as considerable spring tension will force the lever forward.

**NOTE:** With the parking brake set, application of engine power will cause the take-off warning horn to sound.

A hand pump located in the right main wheel well can be used to increase the park brake system pressure. Minimum pressure required before engine start is 500 psi.

Alternatively, if an AC power supply is available, park brake system pressure can be increased by running the SPU and the PTU.





## 12.13.9 Tires

### 12.13.9.1 Tire Fill Valve Gauges

Tire pressure gauges are offered as a customer option, to operators who want a visual means of checking tire pressures during a walk-around. The dial gauge is integral with the inflation valve and mounted in the same location on the wheel without any additional installation requirements.

A gauge is mounted on each MLG and NLG wheel and has a dial face with a shaded portion of its face denoting the proper inflation pressure plus a 5% tolerance.

The gauge itself uses a Bourdon tube with the closed end attached to a pointer and the other end vented to the tire interior through the inflation valve bore.

### 12.13.9.2 Tire Inspection (Removal criteria)

#### General

Dunlop tires fitted to Q400 has two layers of nylon fabric placed between the **casing** plies and the **base** of the tread grooves. This Inter Tread Fabric (also called **reinforcement fabrics**) forms part of the wearable tread pattern and will be exposed during the life of the tread. (Ref Figure 12.35.26.)

- Examine the tires for signs of wear, damage and other deterioration.

#### 1) Wear

- Remove the tire when tread has worn to the base of any groove or if any **casing** plies are exposed.

**Note:** Tires found to be exhibiting the above removal wear standard, which at the time is at an out-station, the replacement can be postponed to first night stop or to the base whichever comes first.

#### 2) Cuts or cracking

##### a) Tread

- Remove tire if any cut or crack penetrate any **casing** plies.
- Remove tire if cracking undercuts ribs.
- Remove tire if any cut extend more than 35 mm or 50% of any tread rib and has a tread depth of 50% or more than existing tread depth.

##### b) Sidewall

- Remove tire if cracking is found in the sidewall.

**Note:** If only the first casing ply is damaged, the replacement of the tire can be postponed to the first night stop or to base whichever comes first.

#### 3) Bulges or Air Bubbles

- Remove tires if bulges or air bubbles are found in the tread or in the sidewall.

**Note:** Removal of tires exhibiting above removal standard may be postponed to the first night stop or to base whichever comes first.

**Dash8 - Q400 - Landing Gear**

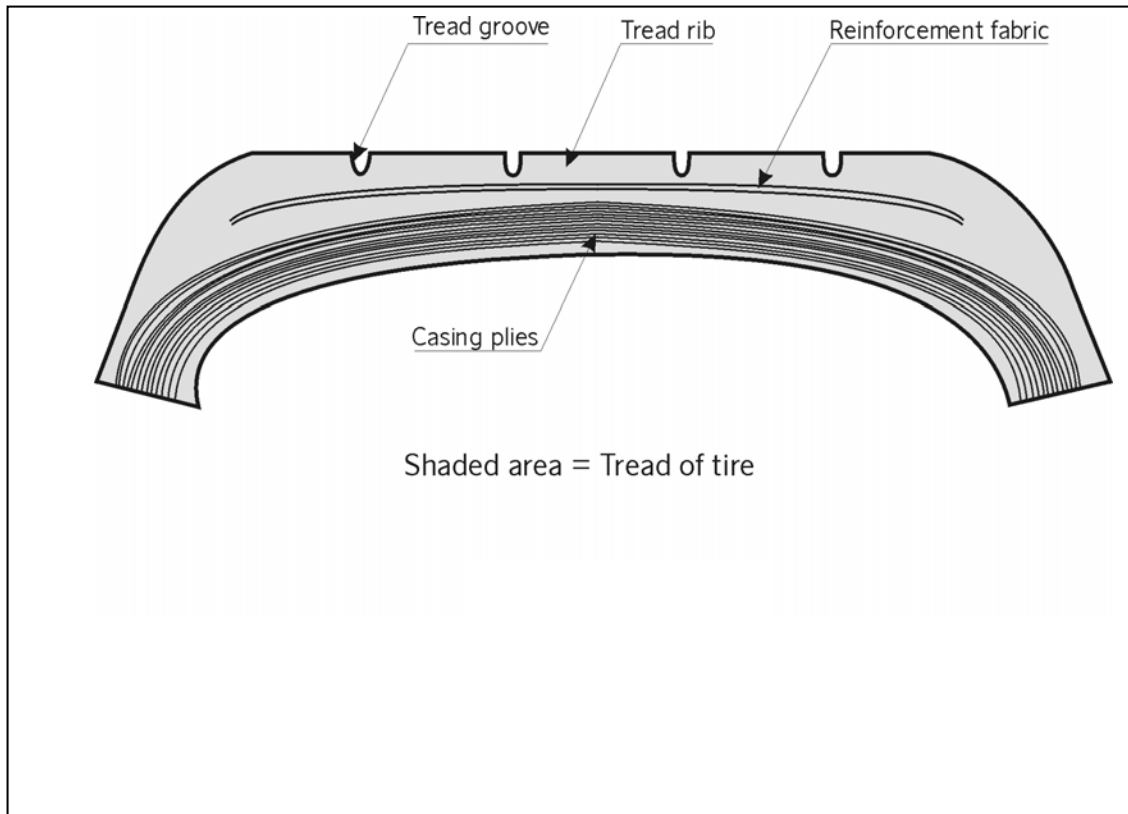


Figure 12.13-26 Tire