

GROUND CONTROL

Direct linkage from the rudder pedals allows for nose wheel steering. When the rudder control is augmented by a main wheel brake, the nose wheel deflection can be considerably increased.

The minimum wing-tip turning radius, using partial braking action and differential engine power, is 39 feet 10 inches.

FLAPS

The flaps are operated by a sliding switch handle on the pedestal just below the condition levers. Flap travel is registered on an electric indicator on top of the pedestal. Three detents provide for quick selection of UP, APPROACH (or takeoff), and DN positions. The flaps cannot be stopped in an intermediate position. A safety mechanism is provided to disconnect power to the electric flap motor in the event of a malfunction which would cause any flap to be three to six degrees out of phase with the other flaps.

The flap-motor power circuit is protected by a 20-ampere flap-motor circuit breaker placarded FLAP MOTOR, located on the left circuit breaker panel below the fuel control panel. A 5-ampere circuit breaker for the control circuit (placarded FLAP CONTROL) is also located on this panel.

LANDING GEAR

The retractable tricycle landing gear is electrically controlled and hydraulically actuated. The system utilizes folding braces, called drag legs, that lock in place when the gear is fully extended. The nose gear actuator incorporates an internal mechanical down-lock to hold the gear in the fully extended position. The main gear incorporates mechanical locks on the drag leg and no locks on the actuators. The landing gear is held in the up-lock position by hydraulic pressure.

Hydraulic pressure to the system is supplied by a hydraulic power pack. A hydraulic reservoir located in the left center wing section provides hydraulic fluid to the power pack. The reservoir incorporates a dip stick to provide a visual check of fluid level.

Electrically actuated control valves control the flow of hydraulic fluid to the individual gear actuators. The control valves receive electrical power through the landing gear control switch.

Accidental retraction of the landing gear is prevented through safety switches located on the main landing gears.

LANDING GEAR EXTENSION AND RETRACTION

The nose and main landing gear assemblies are extended and retracted by a hydraulic power pack in conjunction with hydraulic actuators. The hydraulic power pack is located in the left center section, just forward of the main spar. One hydraulic actuator is located at each landing gear. The power pack consists of: a hydraulic pump, a 28 VDC motor, a two section fluid reservoir, filter screens, gear selector valve, two solenoids, a fluid level sensor, and an up-lock pressure switch. For manual extension the system has a hand-lever-operated pump located on the floor between the crew seats. Hydraulic lines, one for normal extension, and one for retraction, routed from the power pack, and one for emergency extension from the hand pump, are routed to the nose and main gear actuators. The normal extension lines and the manual extension lines are connected to the upper end of each hydraulic actuator. The hydraulic lines for retraction are fitted to the lower ends of the actuators. Hydraulic fluid under pressure generated by the power pack pump and contained in the accumulator acts on the piston faces of the actuators which are attached to folding drag braces resulting in the extension or retraction of the landing gear.

An internal mechanical lock in the nose gear actuator and the over-center action of the nose gear drag leg assembly lock the nose gear in the down position. Notched hook, lock link and lock link guide attachments fitted to each main gear upper drag leg provide positive down-lock action for the main gear.

Electrical overload to the system is prevented through the use of a 60 ampere circuit breaker located below the flooring near the hydraulic power pack.

The landing gear hydraulic power pack motor is controlled by the use of the landing gear control handle placarded **LDG GEAR CONTROL - UP - DN** located on the pilot's subpanel. The **LDG GEAR CONTROL** must be pulled out of a detent before it can be moved from either the UP or DN position.

Safety switches, called squat switches, on the main gear torque knees open the control circuit when the strut is compressed. The squat switches must close to actuate a solenoid which moves a down-lock hook on the **LDG GEAR CONTROL** to the released position. This mechanism prevents the **LDG GEAR CONTROL** from being placed in the UP position when the airplane is on the ground. The hook automatically disengages when the airplane leaves the ground, and can be overridden by pressing down on the red down-lock release button located to the left of the **LDG GEAR CONTROL**.

In flight, as the landing gear moves to the full down position, the down lock switches are actuated and interrupt current to the pump motor. When the red gear in-transit light in the **LDG GEAR CONTROL** extinguishes and the three green **GEAR DOWN** indicators illuminate, the landing gear is in the fully extended position.

Two gear select solenoids located on the valve body of the pump are energized through positioning of the **LDG GEAR CONTROL** either to the UP or DN position. Once energized, the gear select valve is actuated, allowing hydraulic fluid to flow to the actuators.

Hydraulic system pressure performs the up-lock function, holding the landing gear in the retracted position. When the hydraulic pressure reaches 2775 ± 55 psi, the up-lock pressure switch will cause the landing gear relay to open and interrupt the current to the pump motor. The same pressure switch will cause the pump to actuate, should the hydraulic pressure drop to approximately 2400 psi.

A caution annunciator, placarded HYD FLUID LOW, in the caution/advisory annunciator panel will illuminate (amber) whenever the hydraulic fluid level in the hydraulic power pack is low. The annunciator is tested by pressing in the HYD FLUID SENSOR TEST button located on the pilot's subpanel.

The LDG GEAR CONTROL should never be moved out of the DN detent while the airplane is on the ground. If it is, the landing gear warning horn will sound intermittently, and the red gear-in-transit lights in the LDG GEAR CONTROL will illuminate (provided the MASTER SWITCH is ON), warning the pilot to return the handle to the DN position.

Landing gear position is indicated by an assembly of three green annunciators. When illuminated, the annunciators indicate that a particular gear is DN. Absence of illumination indicates gear UP.

Two red parallel-wired indicator lights, located in the LDG GEAR CONTROL, illuminate to show that the gear is in transit or unlocked. The red lights in the handle also illuminate when the landing gear warning horn is actuated.

The red lights may be checked by pressing the HDL LT TEST button located adjacent to the LDG GEAR CONTROL.

LANDING GEAR WARNING SYSTEM

The landing gear warning system is provided to warn the pilot that the landing gear is not down during specific flight regimes. Various warning modes result, depending upon the position of the flaps.

With the FLAPS in the UP or APPROACH position and either or both power levers retarded below approximately 80% N_1 , the warning horn will sound intermittently and the LDG GEAR CONTROL lights will illuminate. The horn can be silenced by pressing the GEAR HORN SILENCE button located on the left power lever. The lights in the LDG GEAR CONTROL cannot be cancelled. The landing gear warning system will be rearmed if the power levers are advanced sufficiently.

With the FLAPS beyond APPROACH position, the warning horn and LDG GEAR CONTROL lights will be activated regardless of the power settings, and neither can be cancelled.

MANUAL LANDING GEAR EXTENSION

An alternate extension handle, placarded **LANDING GEAR ALTERNATE EXTENSION**, is located on the pilot's side of the pedestal. To engage the system, pull the **LANDING GEAR RELAY** circuit breaker, located to the left of the **LDG GEAR CONTROL** on the pilot's right subpanel and ensure that the **LDG GEAR CONTROL** is in the DN position. Remove the alternate extension handle from the securing clip and pump up and down. While pumping, do not lower the handle below the level of the securing clip during the down stroke as this will allow accumulated hydraulic pressure to bleed off. Continue the pumping action until the three green gear down annunciators are illuminated, and further resistance is felt, then stow the handle in the securing clip. If one or more gear down annunciators do not illuminate, the alternate handle must not be stowed. Instead, leave it at the top of the up stroke. Continue to pump the handle when conditions permit until the gear is mechanically secured after landing. Refer to **LANDING GEAR MANUAL EXTENSION** in Section IIIA, **ABNORMAL PROCEDURES**. If any of the following conditions exist, it is likely that an unsafe gear indication is due to an unsafe gear and is not a false indication.

1. The inoperative gear down annunciator illuminates when tested.
2. The red light in the handle is illuminated.
3. The gear warning horn sounds when one or both power levers are retarded below a preset N_1 .

After a practice manual extension of the landing gear, the gear may be retracted hydraulically. Refer to **LANDING GEAR RETRACTION AFTER PRACTICE MANUAL EXTENSION** in Section IV, **NORMAL PROCEDURES**.

BRAKE SYSTEM

The dual hydraulic brakes are operated by depressing the toe portion of either the pilot's or copilot's rudder pedals. The series system plumbing enables braking by either pilot or copilot.

Dual parking-brake valves are installed adjacent to the rudder pedals between the master cylinders of the pilot's rudder pedals and the wheel brakes. A control for the valves, placarded **PARKING BRAKE**, is located below the pilot's left subpanel. After the pilot's brake pedals have been depressed to build up pressure in the brake lines, both valves can be closed simultaneously by pulling out the parking brake handle. This retains the pressure in the brake lines. The parking brake is released by depressing the pedals briefly to equalize the pressure on both sides of the valve, then pushing in the parking brake handle to open the valve.

CAUTION

The parking brake should be left off and wheel chocks installed if the airplane is to be left unattended. Changes in the ambient temperature can cause the brakes to release or to exert excessive pressures.