

Section 3

Raytheon Aircraft Company

Systems Description

Model 400A

When the LAND SEL switch is placed to FLAPS 30° and the flaps are extended beyond 20° with any gear not down and locked, the aural warning will sound regardless of the thrust lever position. In this condition, the aural warning cannot be cancelled.

STEERING

The nose wheel steering system is controlled through the rudder pedals. When the nose gear is extended, a slotted cam is moved into position and rotates the nose gear strut. The maximum available steering angle is 45° left or right. Rudder pedal mechanical linkage steering angle is 25° left or right with an additional 20 degrees obtained through the use of differential braking and asymmetrical thrust. A steering disconnect pin in the torque link permits free rotation of the nose wheel for towing purposes. When the nose gear is retracted, the steering mechanism is separated mechanically at the slotted cam and the gear is held in the neutral position.

WHEEL BRAKE SYSTEM

The main landing gear wheels are equipped with full powered brakes operated by toe action on the rudder pedals. An anti-skid system is incorporated in the power brake system. Emergency braking is accomplished through the nitrogen brake system. The emergency brake control lever is installed on the upper right side of the pedestal.

POWER BRAKE SYSTEM

When the pilot or copilot depresses the brake pedals, the delivery pressure of the master cylinder (directly connected to the brake pedals) is transferred to the power brake valve through the mixing valves. The power brake valve amplifies the master cylinder pressure and transfers the increase of pressure to the MLG brakes.

NOTE

The power brake system is used with or without the anti-skid system.

ANTI-SKID SYSTEM

The airplane is equipped with an electrically controlled anti-skid system. The system detects the start of a skid condition at the wheels and automatically releases the brake pressure for both wheels in proportion to the severity of the skid. Use of the anti-skid system offers protection from skids and can provide consistently shorter landing rolls for all runway conditions. The system is activated by placing the ANTI SKID switch in the ON position. A stationary wheel speed transducer, mounted inside each main gear axle, electrically senses any change in wheel rotation speed. As a skid is detected, an electrical signal is supplied to the system, which releases hydraulic pressure from the brakes. With brake pressure released, the wheel speed will increase and hydraulic pressure will be restored to the brakes. The anti-skid system continues this control cycling as long as braking

pressure is sufficient to cause the skidding condition. Anti-skid protection is not available below approximately 10 knots.

NOTE

In the event air squat switch logic is not removed from the control box after landing, spin-up override will permit anti-skid protected braking down to approximately 37-47 knots. At approximately 37-47 knots a total brake release (hard pedal with no braking action) will be experienced. The ANTISKID FAIL annunciator will not be illuminated.

Selecting the OFF position on the ANTI SKID switch, located on the center pedestal, will restore the system to the power brake mode after a two to three second delay.

If immediate braking action is required, follow the Power Brake Failure Procedures in the EMERGENCY PROCEDURES Section of the FAA Approved Airplane Flight Manual.

MALFUNCTION

One ground safety switch is inoperative.

One spin generator is inoperative.

Both ground safety switches are inoperative.

Both generators are inoperative.

Hubcap comes off after touchdown.

RESULTS

Normal power brakes with anti-skid down to approximately 10 knots. Then power brakes to stop.

Normal power brakes and anti-skid appears normal; however, anti-skid will be using one signal. Therefore, there will be reduced efficiency, and the anti-skid will drop out at approximately 20 knots.

Anti-skid spin-up override provides normal brakes and anti-skid down to 37-47 knots. Then no brakes with anti-skid switch ON.

No anti-skid. Power brakes to stop.

No brakes until the anti-skid switch is placed in the OFF position.

CAUTION

Do not land with the brake pedals depressed.

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ANTI SKID CONTROL SWITCH

This three-position toggle switch is located on the center pedestal. When the ANTI SKID switch is ON, power is supplied to the system. The anti-skid system may be shut off by placing the ANTI SKID switch to OFF. The system is tested by applying the brakes while the airplane is in motion and noting that the brakes release when the ANTI SKID switch is placed to TEST.

WARNING

If the ANTI SKID switch is placed to ON immediately after the test, normal braking is not available for 3 to 4 seconds. Normal braking is available with the ANTI SKID switch OFF.

ANTISKID FAIL ANNUNCIATOR

The ANTISKID FAIL annunciator illuminates if a malfunction exists in the system when the gear is extended and the ANTI SKID switch is ON. The annunciator will also illuminate when the ANTI SKID switch is OFF.

NOTE

When the ANTISKID FAIL annunciator illuminates, the system is in a fail-safe condition and complete control of braking, through the normal braking system, is available.

PARKING BRAKE

The parking brake is a part of the normal brake system and employs check valves that prevent the return of fluid after the brake pedals have been released.

- Parking brakes are set by pulling out the PARKING BRAKE handle, located under the lower left side of the instrument panel, and depressing the toe brakes two or three times. Do not set the parking brake with the copilot's pedals if the engines are not running. Without power boost (i.e. engines not running) the copilot's pedals require several pumps to set brakes. This may cause the first or second subsequent application of brakes from the pilot's pedals to be ineffective. The parking brake is released by pushing in the handle.

The parking brake should not be set if the brakes are very hot. This increases brake cool-down time due to decreased airflow. This may result in sufficient heat transfer from the brakes to cause the parking brake hydraulic pressure to rise excessively, or to melt the thermal relief plugs in the wheel.

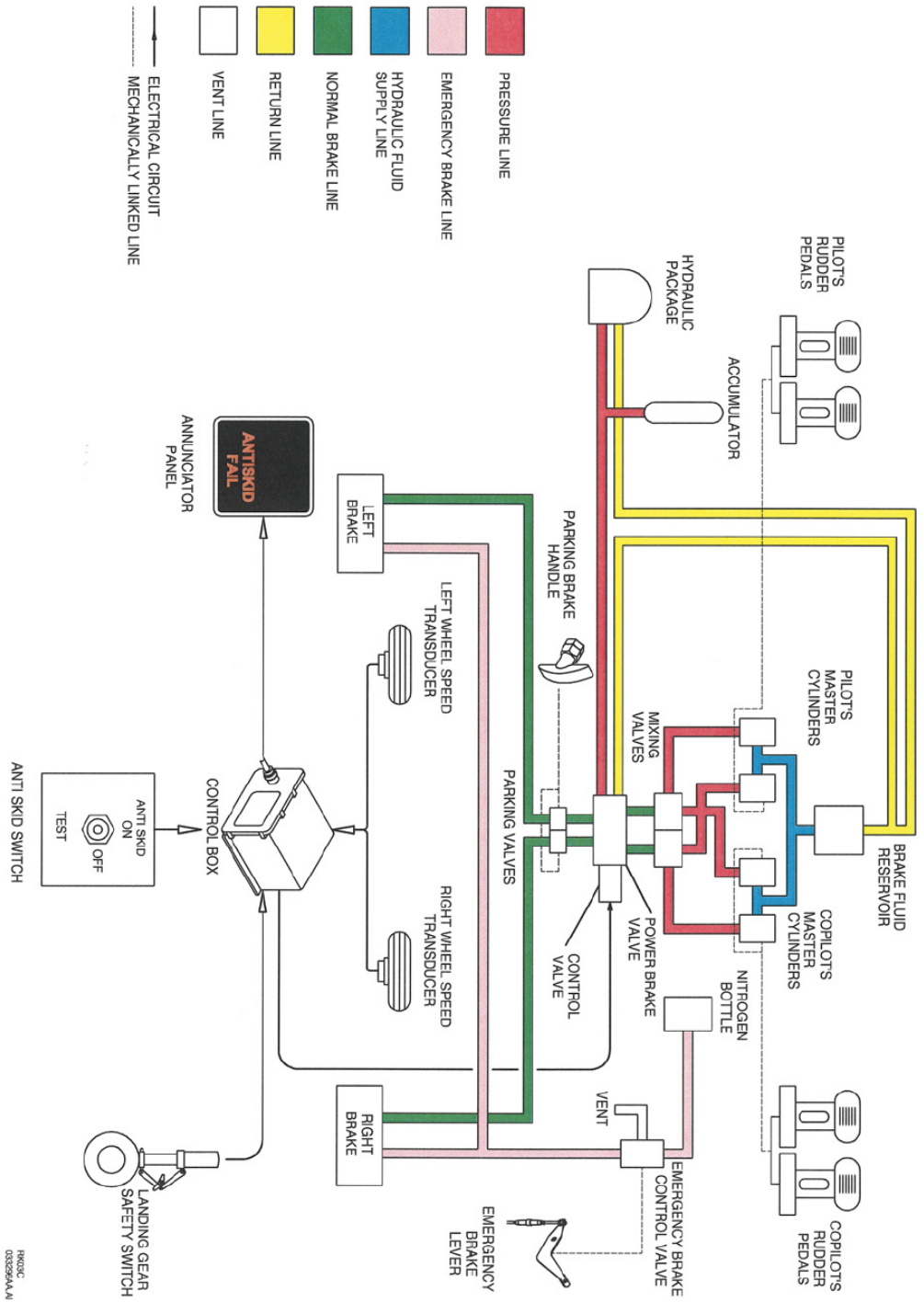
EMERGENCY BRAKE

- In the event of normal hydraulic brake system failure, the pilot or copilot can continue braking operation by using the spring loaded EMER BRAKE lever mounted on the upper right side of the pedestal. The nitrogen bottle, mounted in the lower portion of the left avionic compartment in the nose, contains sufficient pressure for 7 to 10 full brake applications when fully charged.

NOTE

This bottle also provides pressure to close the MLG doors during emergency extension.

For the most efficient use of the system, use steady and smooth application, gradually increasing force until desired braking action is attained. Maintain that pressure until the airplane is stopped. When the lever is released, residual nitrogen pressure from the brakes is vented overboard. Normal braking should not be applied while using the emergency brakes.



BRAKE SYSTEM