

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR23LA154

LANDING GEAR EXAMINATION

May 25, 2023

This document contains 6 embedded photos.

A. ACCIDENT

Location: Upland, California
Date: April 16, 2023
Time: 09:30 PDT
16:30 UTC
Airplane: Cessna T337 / N38C

B. LANDING GEAR EXAMINATION

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C. SUMMARY

The examination of the landing gear system was conducted at the airplane owner's hangar, located in Upland, California. During the examination, it was tested and verified that for the main landing gear doors to close, all three limit switches must be in the closed position. This allows the valves to appropriately direct hydraulic pressure to the door actuators, enabling the doors to be closed. The examination revealed that out of the three limit switches, the left one was not functioning properly.

D. DETAILS OF THE INVESTIGATION

1.0 Accident Site

After examining the landing site, it was discovered that the airplane had impacted the asphalt surface short, and to the right of the runway threshold, leaving forceful impact marks in the surface.

2.0 Airframe Examination

2.1 Fuselage

The bottom of fuselage was substantially damaged.

2.2 Wings

The left wing experienced a significant impact, causing it to bend upwards by approximately 30°, starting from around the midpoint of the wing.

2.3 Landing Gear

Prior to the investigative team's arrival at the examination site, the airplane had been placed on jacks and supported additionally by lifting equipment. The landing gear remained in position as when the accident occurred. The nose landing gear was broken and separated in the down and locked position. The left main landing gear was broken and separated in the down and locked position. The right main landing gear was in the down and locked position in an undamaged condition. Both main landing gear doors were opened.

During the examination, the landing gear system was cycled multiple times through gear extension and retraction to test each landing gear. An issue was observed with the failure of the main landing gear doors to close properly. While individually testing each limit switch through visual inspection and isolating them one by one, all components operated as expected, except for the left limit switch, which was identified as defective.

2.4 Landing gear hydraulic fluid

The landing gear hydraulic reservoir was found to be full.

E. LANDING GEAR OPERATION EXPLAINED

Landing gear Operation explained by P337H Maintenance Manual

5-3 OPERATION

When the pressure reaches 400 psig, the door close lock check valve opens and the doors on the aircraft open. At 750 psig, the priority valve opens and the landing gear begin to retract. As soon as the landing gear is locked into the UP position, the landing gear up limit switches sequence the door solenoid valve to the door close position.

When pressure in the door close line reaches 1500 psig, the pressure switch shuts off the motor, and the GEAR-UP cycle is complete. The GEAR-DOWN cycle is similar to the GEAR-UP cycle, except the gear solenoid is not energized during the gear-down cycle.

F. LANDING GEAR SYSTEM DIAGRAM

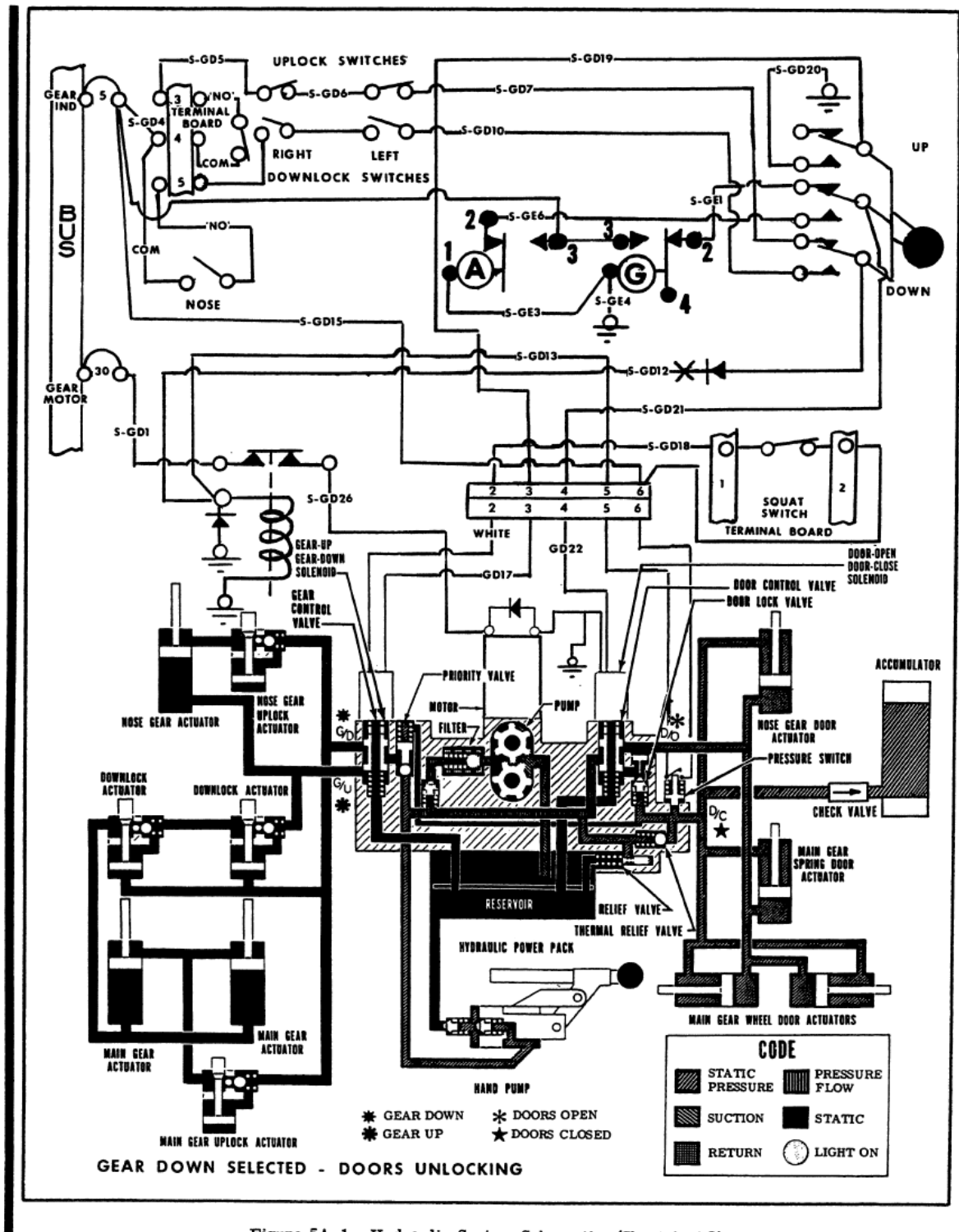


Figure 5A-1. Hydraulic System Schematic (Sheet 1 of 2)

5A-2 Change 7

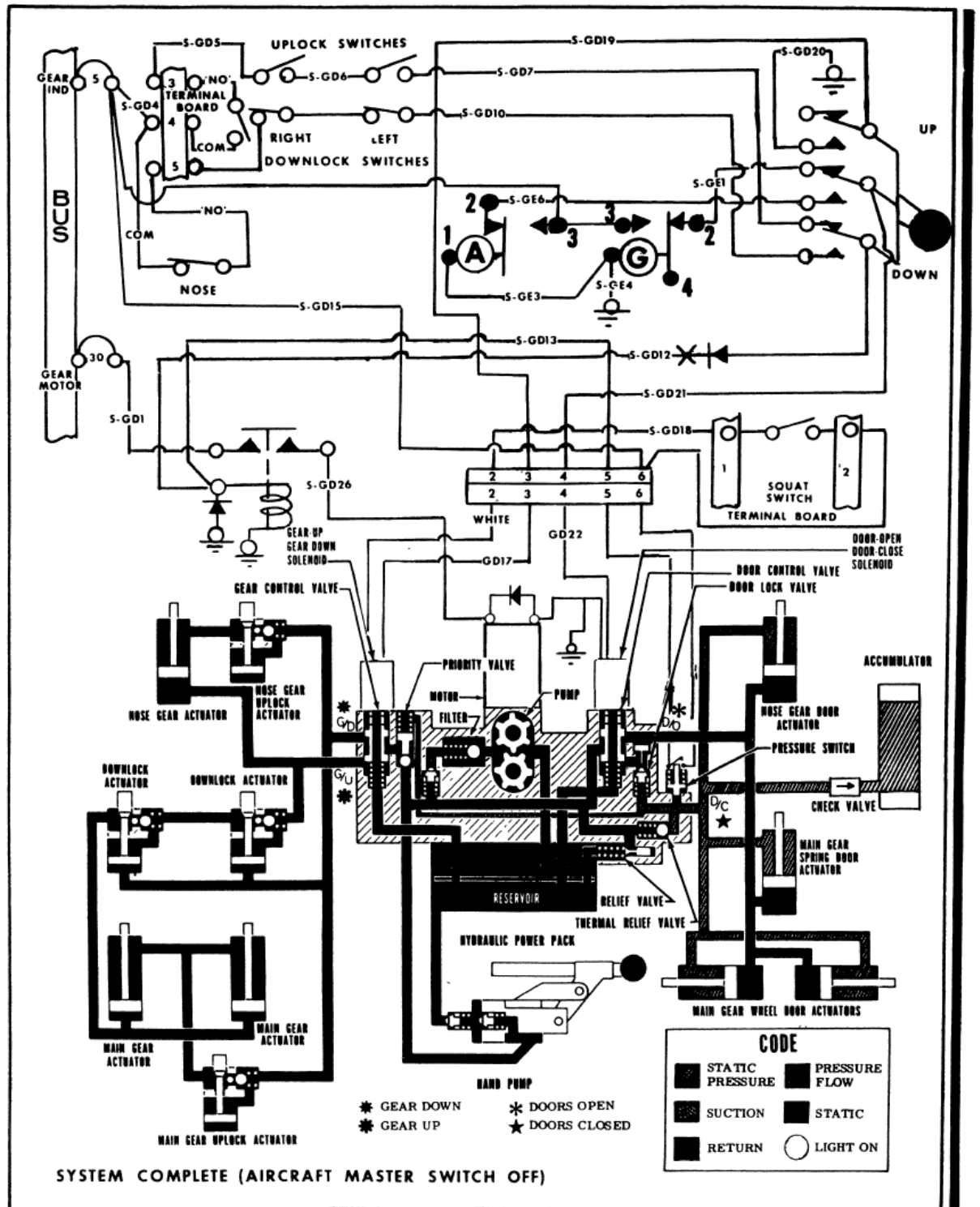


Figure 5A-1. Hydraulic System Schematic (Sheet 2 of 2)

PHOTO EXHIBIT



Figure 1. Left wing view



Figure 2. Front landing gear



Figure 3. Right landing gear



Figure 4. Bottom view



Figure 5. Left landing gear limit switch



Figure 6. Impact site view

Submitted by: Paul Rho
Investigator in Charge

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WPR23LA154
PG 8 OF 8