

PIPER AIRCRAFT
PA-28RT-201 / 201T
MAINTENANCE MANUAL

GENERAL.

This chapter consists of instructions for the overhaul, inspection and adjustment of the various components of the landing gear and brake system. Also are adjustments for the electrical limit, safety and warning switches. This chapter does not cover the hydraulic function of the landing gear. (Refer to Chapter 29.)

DESCRIPTION AND OPERATION.

The airplanes are equipped with retractable tricycle air-oil strut type landing gear which are hydraulically operated by an electrically powered reversible pump. A selector handle on the instrument panel to the left of the control quadrant is used to select gear UP or DOWN positions.

Gear positions are indicated by three green lights located below the selector lever for gear down and locked, and a red light located at the top of the instrument panel for gear unsafe positions. There is no light to indicate the gear has fully retracted other than all lights are out. As the landing gear swings to the down position and each downlock hook moves into its locked position, a switch at each hook actuates to the switch normally closed (NC) circuit to indicate by a green light that the individual gear is safely down and locked. The activation of all three downlock switches will also shut the hydraulic pump off. As the instrument lights are turned on, the green light will dim. When the gear begins to retract and the downlock hook disengages, the down limit switch actuates to the NC circuit and in series with the NC circuit of the up limit switch allows the gear unsafe light to come on. The gear unsafe light will remain on until the gear is up and all up limit switches are actuated to their normally open (NO) circuit.

The red gear unsafe light also operates simultaneously with the warning horn, and in conjunction their purpose is to give warning when power is reduced below approximately 14 inches of manifold pressure and the landing gear has not reached the down and locked position. This circuit is controlled by the three paralleling down limit switches connected in series with a throttle switch (see Figure 32-23) located in the control quadrant. When the airplane is setting on the ground, the warning circuit is controlled through the NO side of the safety switch (squat switch) located on the left gear and the up position of the selector lever. Should the airplane be raised from the ground, such as in flight, far enough to move the safety switch to its NC position, then current is directed in series through the hydraulic pressure switch, the pump switch (providing airspeed has actuated the switch to its NO position). The up limit, safety, throttle, pressure and selector switch, and pump solenoids are all protected by the landing gear control and warning circuit protector. (Refer to Chapter 91 for electrical schematic.)

Each landing gear is retracted and extended by a single hydraulic cylinder attached to the drag link assembly of the nose gear and the side brace link assembly of the main gears. As the gears retract, doors partially enclose each gear through mechanical linkage. The gears are held in their up position by hydraulic pressure alone on the cylinder. There are no uplocks and loss of hydraulic pressure will allow the gears to drop. It is preferred that the gears be extended and retracted with the use of the gear selector handle; however, in the event of hydraulic loss or electrical failure, they can be lowered by pushing down on the emergency extension lever between the pilot seats or they will drop themselves should airspeed drop below approximately 103 KIAS, engine power off. In either instant the hydraulic valve of the back-up extender unit opens to allow hydraulic pressure to neutralize between each side of the cylinder pistons. The emergency extension lever can also be used to manually overcome system malfunctions or to meet special pilot needs such as, a deliberate wheels up landing needed for emergency landings on water, or during various flight maneuvers where airspeed and power settings would normally allow the gear to extend. It also permits gear retraction after takeoff at speeds lower than those normally permitted by the automatic system. When using the manual extension lever, the gear position is controlled by the selector switch, regardless of airspeed/power combinations. An override latch mechanism is installed which allows the pilot to latch the extension lever in the up override position, thus bypassing the automatic portion of the system. A flashing warning light is mounted below the gear selector

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lever to indicate whenever the latch is in use. The latch is disengaged by pulling up on the extension lever. To assist the nose gear to extend under these conditions are two springs, one inside the other, mounted on arms above the gear links. The main gears require no assist springs. Once the gears are down and the downlock hooks engaged, a spring maintains each hook in the locked position until hydraulic pressure again releases it. A further description of the hydraulic system and the gear back-up extender unit may be found in Chapter 29, Hydraulic System.

The nose gear is steerable through a 60 degree arc by the use of the rudder pedals. As the gear retracts, however, the steering linkage becomes separated from the gear so that rudder pedal action with the gear retracted is not impeded by the nose gear operation. A shimmy dampener is also incorporated in the nose wheel steering mechanism. Bungee springs are also incorporated on the push rods. These springs make lighter and smoother ground steering possible.

The two main wheels are equipped with self-adjusting single disc hydraulic brake assemblies. Toe brakes are standard on both the pilots and copilot's rudder pedals. A parking brake is incorporated with the handle, and may be used by pulling back on the handle and pushing forward on the button to the left of the handle. To release the hand brake, pull aft on the handle and allow it to swing forward. Hydraulic fluid for the cylinders is supplied by a reservoir installed on the left forward side of the firewall.

TROUBLESHOOTING.

Mechanical and electrical switch troubles peculiar to the landing gear system are listed in Chart 3201. When troubleshooting, first eliminate hydraulic malfunctions as listed in Chart 3201. Then proceed to switch malfunctions and last to the mechanical operation of the gear itself, both of which are listed in this section. Always place the airplane on jacks before attempting any troubleshooting of the gear. To operate the gear, the emergency gear lever must be maintained in the up override position.

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