

The pilot should read and follow the procedures recommended in the Lycoming Operator's Manual for this engine, in order to obtain maximum engine efficiency and time between engine overhauls.

PROPELLERS

Counter-rotation of the propellers provides balanced thrust during take-off and climb and eliminates the "critical engine" factor in single-engine flight.

The propellers are constant speed, controllable pitch, full feathering Hartzell propellers, operated by oil and nitrogen pressure. Compressed air may be used instead of nitrogen, provided it contains no moisture. Oil pressure sends the propeller toward the high RPM or unfeather position, while nitrogen pressure sends the propeller toward the low RPM or feather position and keeps the propeller from overspeeding. The recommended nitrogen pressure to be used when charging the unit is listed on placards on the propeller dome and inside the spinner. This pressure varies with ambient temperature at the time of charging. A governor, mounted on each engine, supplies oil through the propeller shaft at various pressures to maintain constant RPM settings.

Each propeller is controlled by use of the propeller control lever located in the center of the power control quadrant. Feathering of a propeller is accomplished by moving the control fully aft through the low RPM detent, into the feather position. Feathering takes place in approximately six seconds. Unfeathering is accomplished by moving the propeller control ahead and engaging the starter until the propeller is windmilling.

A feathering lock, operated by centrifugal force, prevents feathering during engine shut-down, by making it impossible to feather any time the engine speed is less than 800 RPM. For this reason if an engine is being feathered to save it the pilot must be sure to move the control to feather position before the engine speed drops below 800 RPM.

LANDING GEAR SYSTEM

To increase cruise speed, climb and other performance, the Seneca is equipped with a retractable tricycle landing gear, which is hydraulically operated.

Hydraulic pressure for gear operation is furnished by an electrically-powered reversible pump controlled by a two-position selector switch located on the instrument panel to the left of the control quadrant. The gear selector switch, which has a wheel-shaped knob, must be pulled out before it is moved to the "UP" or "DOWN" position. When hydraulic pressure is exerted in one direction the gear is retracted; when it is exerted in the other direction the gear is extended. If the landing gear is in transit and the hydraulic pump is running, it is inadvisable to move the gear selector switch to the opposite direction before it has reached its travel limit, because this sudden reversal may be harmful to the electric pump. Retraction or extension normally takes six to seven seconds.

The gear is designed to extend even in the event of hydraulic failure, since the gear is held up by hydraulic pressure. If the hydraulic system develops a leak or if the pressure is relieved for any reason, gravity will cause the gear to extend. Aerodynamic loads and springs assist in extending and locking the gear down. When the landing gear is retracted, the main wheels fold toward the centerline of the airplane and the nose gear retracts forward. Once the nose gear has

started toward the down position, the airsteam pushes against it and assists in moving it to the locked position. When the three gears are down and the downlock hooks engage, a spring maintains force on each hook in the locked position until it is released by hydraulic pressure.

To get the gear to extend and lock if the hydraulic pump fails, it is necessary only to relieve the hydraulic pressure. An emergency gear extension knob, located near the center of the instrument panel, is provided for this purpose. Pulling this knob releases the hydraulic pressure which holds the landing gear in the up position, and the gear can then fall free. A guard over the knob is provided to prevent inadvertent extension of the gear. Prior to pulling the emergency gear extension knob, it is advisable to place the gear selector in the "DOWN" position to prevent the pump from trying to raise the gear. If the emergency gear knob has been pulled out to lower the gear by gravity, due to a gear system malfunction, leave the control in its extended position until the airplane has been put on jacks to check the proper function of the landing gears Hydraulic and Electrical systems. See Aircraft Service Manual for proper landing gear system check out procedures. If the airplane is being used for training purposes or a pilot check out mission, and the emergency gear extension has been pulled out, it may be pushed in again when desired if there has not been any apparent malfunction of the landing gear system.

When the gear is fully up or fully down and the selector is in the corresponding position, electrical limit switches stop the flow of current to the motor of the hydraulic pump. Three green lights indicate that the landing gear is down and locked, and a convex mirror on the left engine nacelle enables the pilot to confirm the position of the nose gear. When the gear is not in the full up or the full down position, a red warning light is illuminated on the instrument panel.

The gear lights are automatically dimmed when the navigation lights are turned on. For this reason, if the navigation lights are unintentionally turned on in the daytime, it is difficult to see the landing gear lights. If the green lights are not observed after the landing gear switch is put in the "DOWN" position, the first thing to check is the position of the switch for the navigation lights.

If one or two of the three green lights do not illuminate when the gear down position has been selected, this could indicate that for each of the lights that is out, any of the following conditions might exist:

- a. The gear is not locked down.
- b. The bulb is burned out.
- c. There is a malfunction in the indicating system.

The square indicating lights can be pulled out and moved around in order to check the bulbs.

A micro switch incorporated in the throttle quadrant activates a warning horn under the following conditions:

1. Gear up and manifold pressure reduced below 14 inches on either one or both engines.
2. Gear selector switch in the "UP" position when the airplane is on the ground.

If the gear selector knob is placed in the "UP" position when the airplane is on the ground, a safety switch located on the left main gear will prevent the hydraulic pump from actuating if the master switch should be turned on. On take-off, when the oleo extends in excess of eight

inches, the safety switch closes to complete the circuit so that the hydraulic pump can raise the landing gear when the gear switch is moved to the "UP" position. On take-off the gear should be retracted before an airspeed of 125 MPH is exceeded. It may be extended at any speed up to 150 MPH.

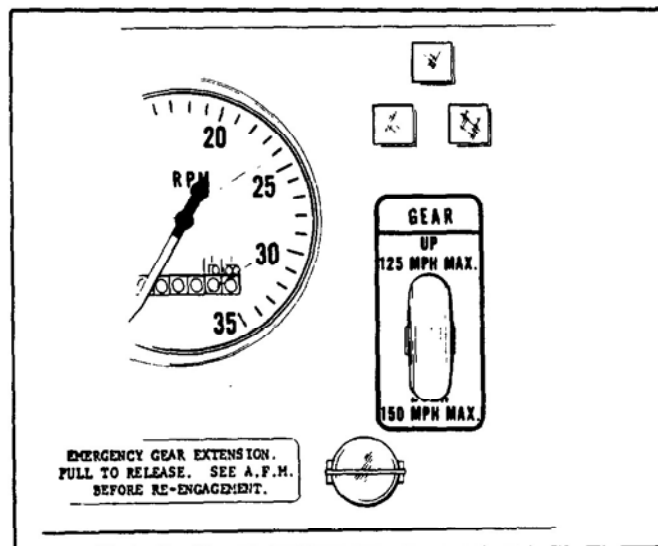
The nose gear is steerable through a 27 degree arc each side of center by using a combination of full rudder pedal travel and brakes. As the gear retracts, the steering linkage disengages to reduce rudder pedal loads in flight and the nose wheel straightens as it enters the wheel well. A gear centering spring, incorporated in the nose gear steering system, prevents any tendency to shimmy. This system also incorporates a bungee assembly to reduce ground steering effort and to dampen shocks and bumps during taxiing.

The hydraulic reservoir for landing gear operation is an integral part of the gear hydraulic pump. Access to the combination pump and reservoir is through a panel in the nose baggage compartment. For filling instructions see the Seneca Service Manual.

The three landing gear wheels are the same size - 6.00-6. The nose wheel has a 6-ply tire and the main gear has 8-ply tires. Struts for nose and main gear are air-oil assemblies.

The brake system, which incorporates a single-disc double puck brake assembly on each main gear strut, is designed to meet all normal braking needs. A brake system hydraulic reservoir, independent of the landing gear hydraulic reservoir, is located behind a panel at the rear top of the nose baggage compartment. The fluid should be maintained at the level marked on the reservoir. The brake assemblies are actuated by individual toe brake cylinders mounted on the left (optional on the right) set of rudder pedals and a handle-operated brake cylinder located below and behind the left center of the instrument panel.

The parking brake is actuated by pulling back on the handle and pushing forward on the button to the left of the handle. The brake can be released by pulling aft on the handle without touching the button, and allowing the handle to swing forward.



Landing Gear Actuator