PILOT'S OPERATING HANDBOOK

PIPER CHEROKEE LANCE

FAA APPROVED IN NORMAL CATEGORY BASED ON CAR 3 AND FAR PART 21, SUBPART J. THIS DOCUMENT INCLUDES THE MATERIAL REQUIRED TO BE FURNISHED TO THE PILOT BY CAR 3 AND FAR PART 21, SUBPART AND MUST BE CARRIED IN THE AIRPLANE AT ALL TIMES.

AIRPLANE SERIAL NO. _____

AIRPLANE REGISTRATION NO. _____

PA-32R-300
REPORT: VB-750

FAA APPROVED BY: [redacted]

WARD EVANS
D.O.A. NO. SO-1
PIPER AIRCRAFT CORPORATION
VERO BEACH, FLORIDA

DATE OF APPROVAL: AUGUST 1, 1975

PIPER

TABLE OF CONTENTS

SECTION 3

EMERGENCY PROCEDURES

3.3 EMERGENCY PROCEDURES CHECK LIST

ENGINE FIRE DURING START

Starter.....crank engine
Mixture.....idle cut-off
Throttle.....open
Electric fuel pump.....OFF
Fuel selector.....OFF
Abandon if fire continues

ENGINE POWER LOSS DURING TAKEOFF

If sufficient runway remains for a normal landing, leave gear down and land straight ahead.

If area ahead is rough, or if it is necessary to clear obstructions:
Gear selector switch.....UP
Emergency gear lever (Aircraft equipped with backup gear extender).....latched in OVERRIDE ENGAGED position

If sufficient altitude has been gained to attempt restart:
Maintain safe airspeed
Fuel selector.....switch to tank containing fuel
Electric fuel pump.....check ON
Mixture.....check RICH
Alternate air.....OPEN
Emergency gear lever.....as required
If power is not regained, proceed with power off landing.

ENGINE POWER LOSS IN RIGHT

Fuel selector.....switch to tank containing fuel
Electric fuel pump.....ON
Mixture.....RICH
Alternate air.....OPEN
Engine gauges.....check for indication of cause of power loss
If no fuel pressure is indicated, check tank selector position to be sure it is on a tank containing fuel.

When power is restored:
Alternate air.....CLOSED
Electric fuel pump.....OFF

If power is not restored prepare for power off landing.

POWER OFF LANDING

On aircraft equipped with backup gear extender, lock emergency gear lever in OVERRIDE ENGAGED position before airspeed drops to 122 mph IAS (106 KIAS) to prevent landing gear from inadvertently free falling.
Trim to 106 mph IAS (92 kts IAS).
Locate suitable field.
Establish spiral pattern. 1000 ft above field at downwind position for normal landing approach. When field can easily be reached slow to 86 mph IAS (75 kts IAS) for shortest landing.

Touchdowns should normally be made at lowest possible airspeed with full flaps.

GEAR DOWN LANDING

For gear down landing, proceed as follows when committed to landing:
Landing Gear Selector.....DOWN
Ignition.....OFF
Master switch.....OFF
Fuel selector.....OFF
Mixture.....idle cut-off
Seat belt and harness.....tight

GEAR UP LANDING

For gear up landing, proceed as follows when committed to landing:
Ignition.....OFF
Master switch.....OFF
Fuel selector.....OFF
Mixture.....idle cut-off
Seat belt and harness.....tight

3.11 ENGINE POWER LOSS IN FLIGHT

Complete engine power loss is usually caused by fuel flow interruption and power will be restored shortly after fuel flow is restored. If power loss occurs at a low altitude, the first step is to prepare for an emergency landing (refer to paragraph 3.13). An airspeed of at least 106 MPH IAS (92 KTS IAS) should be maintained.

If altitude permits, switch the fuel selector to another tank containing fuel and turn the electric fuel pump "ON." Move the mixture control to "RICH" and the alternate air to "OPEN." Check the engine gauges for an indication of the cause of the power loss. If no fuel pressure is indicated, check the tank selector position to be sure it is on a tank containing fuel.

When power is restored move the alternate air to the "CLOSED" position and turn "OFF" the electric fuel pump.

If the preceding steps do not restore power, prepare for an emergency landing.

If time permits, turn the ignition switch to "L" then to "R" then back to "BOTH." Move the throttle and mixture control levers to different settings. This may restore power if the problem is too rich or too lean a mixture or if there is a partial fuel system restriction. Try other fuel tanks. Water in the fuel could take some time to be used up, and avowing the engine to windmill may restore power. If power loss is due to water, fuel pressure indications will be normal.

If engine failure was caused by fuel exhaustion power will not be restored after switching fuel tanks until the empty fuel lines are filled. This may require up to ten seconds.

If power is not regained, proceed with the Power Off Landing procedure (refer to the emergency check list and paragraph 3.13).

3.13 POWER OFF LANDING

On aircraft equipped with the backup gear extender, if loss of power occurs at altitude, lock emergency gear lever in OVERRIDE ENGAGED position before airspeed drops to 122 mph IAS (106 KIAS) to prevent landing gear from inadvertently free falling. Then trim the aircraft for best gliding angle (106 mph IAS/92 kts IAS) (Air Cond. off) and look for a suitable field. If measures taken to restore power are not effective, and if time permits, check your charts for airports in the immediate vicinity; it may be possible to land at one if you have sufficient altitude. At best gliding angle, with no wind, with the engine windmilling, and the propeller control in full DECREASE rpm, the aircraft will travel approximately 1.6 miles for each thousand feet of altitude. If possible, notify the FAA by radio of your difficulty and intentions. If another pilot or passenger is aboard, let him help.

When you have located a suitable field, establish a spiral pattern around this field. Try to be at 1000 feet above the field at the downwind position, to make a normal landing approach. When the field can easily be reached, slow to 86 mph IAS (75 kts IAS) with flaps down for the shortest landing. Excess altitude may be lost by widening your pattern, using flaps or slipping, or a combination of these.

Whether to attempt a landing with gear up or down depends on many factors. If the field chosen is obviously smooth and firm, and long enough to bring the plane to a stop, the gear should be down. If there are stumps or rocks or other large obstacles in the field, the gear in the down position will better protect the occupants of the aircraft. If, however, the field is suspected to be excessively soft or short, or when landing in water of any depth, a wheels-up landing will normally be safer and do less damage to the airplane.

On airplanes equipped with the backup gear extender, the landing gear will free fall at airspeeds below approximately 118 mph IAS (103 KIAS) and, under normal conditions, will take approximately 10 seconds to be down and locked. If a gear up landing is desired, it will be necessary to latch the override lever in the OVERRIDE ENGAGED position before the airspeed drops to 122 mph IAS (106 KIAS) to prevent the landing gear from inadvertently free falling.

Touchdown should normally be made at the lowest possible airspeed.

(a) Gear Down Landing

When committed to a gear down emergency landing select landing gear DOWN, close the throttle control and shut OFF the master and ignition switches. Flaps may be used as desired. Turn the fuel selector valve to OFF and move the mixture to idle cut-off. The seat belts and shoulder harness (if installed) should be tightened. Touchdown should be normally made at the lowest possible airspeed.

NOTE

If the master switch is OFF, the gear cannot be retracted.

(b) Gear Up Landing

On aircraft equipped with the backup gear extender, latch the emergency gear lever in the OVERRIDE ENGAGED position, prior to reaching 122 mph IAS (106 KIAS), to prevent the gear from inadvertently extending, at airspeeds below 118 mph IAS (103 KIAS).

Touchdowns should normally be made at the lowest possible airspeed with full flaps.

When committed to landing, turn OFF the ignition and master switch. The fuel selector should be OFF and the mixture at idle cut-off.

Tighten the seat belts and shoulder harness (if installed).

3.15 FIRE IN FLIGHT

The presence of fire is noted through smoke, smell and heat in the cabin. It is essential that the source of the fire be promptly identified through instrument readings, character of the smoke, or other indications since the action to be taken differs somewhat in each case.

Check for the source of the fire first

If an electrical fire is indicated (smoke in the cabin), the master switch should be turned OFF. The cabin vents should be opened and the cabin heat turned OFF. A landing should be made as soon as possible.

If an engine fire is present, switch the fuel selector to OFF and close the throttle. The mixture should be at idle cut-off. In all cases, the heater and defroster should be OFF. If the terrain permits, a landing should be made immediately.

NOTE

The possibility of an engine fire in flight is extremely remote. The procedure given is general and pilot judgment should be the determining factor for action in such an emergency.

4.39 LANDING GEAR

Some airplanes are equipped with an airspeed - power sensing system (backup gear extender) which extends the landing gear under low airspeed - power conditions even though the pilot may not have selected gear down. This system will also prevent retraction of the landing gear by normal means when the airspeed - power values are below a predetermined minimum. To override this system or to hold the emergency gear lever in the OVERRIDE ENGAGED position without maintaining manual pressure on the emergency gear lever, pull the lever full up and push the latch down. To release the override, pull lever up to disengage the latch, then release lever.

For normal operation, the pilot should extend and retract the gear with the gear selector switch located on the instrument panel, just as he would if the backup gear extender system were not installed.

The pilot should become familiar with the function and significance of the landing gear position indicators and warning lights.

The red gear warning light on the instrument panel and the horn operate simultaneously in flight when the throttle is reduced to where the manifold pressure is approximately 14 inches of mercury or below, and the gear selector switch is not in the DOWN position. On aircraft equipped with the backup gear extender, this warning will also occur during flight when the system has lowered the landing gear and the gear selector switch is not in the DOWN position and the throttle is not full OPEN.

The red gear warning light on the instrument panel and the horn will also operate simultaneously on the ground when the master switch is ON and the gear selector switch is in the UP position.

The three green lights on the instrument panel operate individually as each associated gear is locked in the extended position.

WARNING

Radio lights' dimmer switch must be off to obtain gear lights full intensity during daytime flying. When aircraft is operated at night and radio lights' dimmer switch is turned on, gear lights will automatically dim.

On aircraft equipped with the backup gear extender, the yellow Auto Ext OFF light immediately below the gear selector switch flashes whenever the emergency gear lever is in the OVERRIDE ENGAGED position.

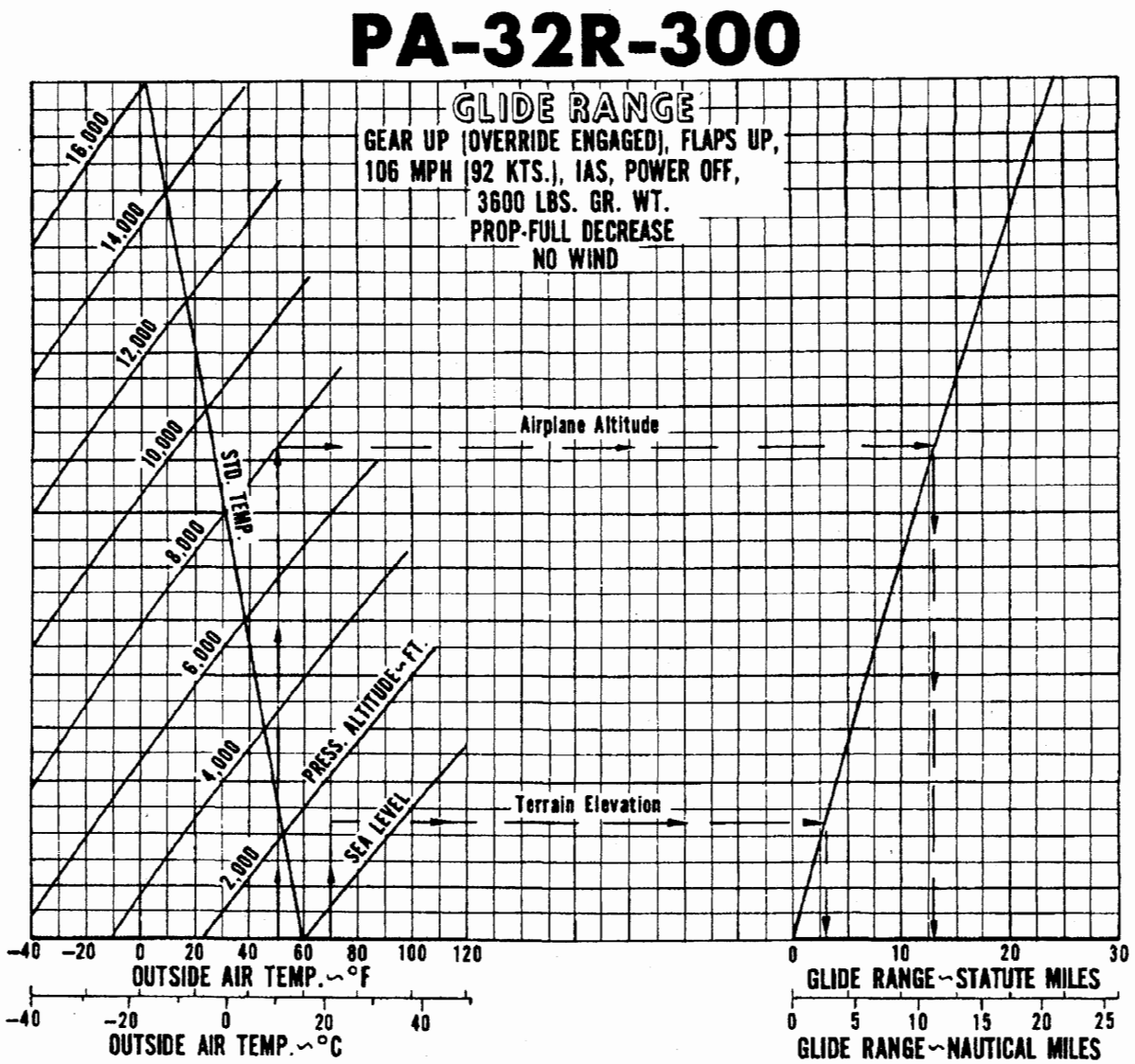
When the Emergency Landing Gear Extension Procedure (Paragraph 3.27) is performed for training purposes, the following changes must be made to the procedure in order to prevent the hydraulic pump from activating during the procedure. On aircraft equipped with the backup gear extender, the landing gear selector must be left in the UP position until all gear position indicators are green. On aircraft which do NOT have the backup gear extender, a pull type LANDING GEAR PUMP circuit breaker is installed and must be pulled prior to executing the emergency extension procedure. The circuit breaker must be reset after the completion of the procedure to allow normal gear system operation.

4.41 WEIGHT AND BALANCE

It is the responsibility of the owner and pilot to determine that the airplane remains within the allowable weight vs. center of gravity envelope while in flight.

For weight and balance data, refer to Section 6 (Weight and Balance).

*Approximately 118 mph IAS, (103 kts IAS) at any altitude, power off.

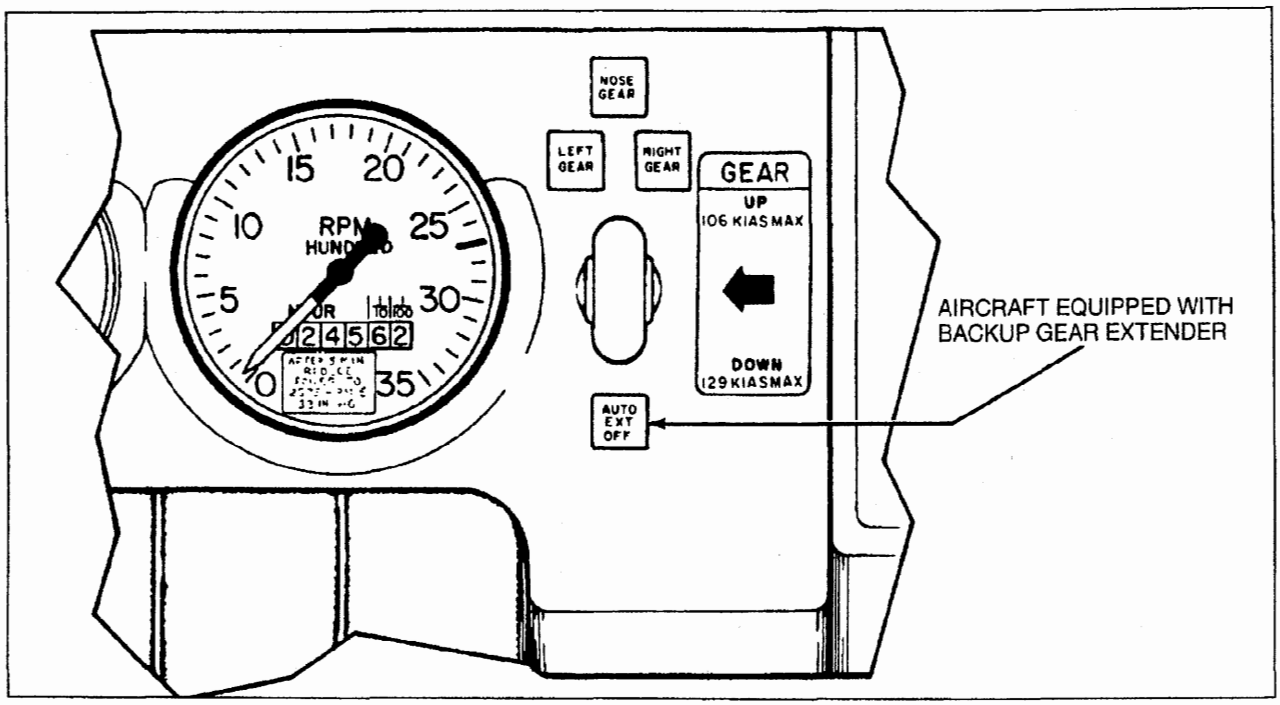


Example:

Cruise altitude	= 8000 ft.
Terrain elevation	= 1300 ft.
Glide distance	= 13 miles minus 3 miles equals 10 miles

GLIDE RANGE

Figure 5-29



LANDING GEAR SELECTOR

Figure 7-3

7.11 LANDING GEAR

The Cherokee Lance is equipped with a retractable tricycle landing gear, which is hydraulically actuated by an electrically powered reversible pump. The pump is controlled by a selector switch on the instrument panel to the left of the control quadrant (Figure 7-3). The landing gear is retracted or extended in about seven seconds.

WARNING

Avoid ejecting objects out of the pilot storm window which could possible enter or obstruct the holes in the mast.

Some aircraft also incorporate a pressure sensing device in the system which lowers the gear regardless of gear selector position, depending upon airspeed and engine power (propeller stlipstream). Gear extension is designed to occur, even if the selector is in the up position, at airspeeds below approximately 118 mph with power off. The extension speeds will vary from approximately 93 mph to approximately 118 mph depending on power settings and altitude. The device also prevents the gear from retracting at airspeeds below approximately 93 mph will full power, though the selector switch may be in the up position. This speed increases with reduced power and/or increased altitude. Manual override of the device is provided by an emergency gear lever located between the front seats to the right of the flap handle (refer to Figure 7-9). The sensing device operation is controlled by differential air pressure across a flexible diaphragm which is mechanically linked to a hydraulic valve and an electrical switch which actuates the pump motor. A high pressure and static air source for actuating the diaphragm is provided in a mast mounted on the left side of the fuselage above the wing. Any obstruction of the holes in this mast will cause the gear to extend. An optional heated mast is available to alleviate obstruction in icing conditions. The optional heated mast is turned on whenever the PITOT HEAT is turned on.

The emergency gear lever, when placed in the raised position, can be used to override the system, and gear position is then controlled by the selector switch regardless of airspeed/power combinations. The emergency gear lever is provided with a latching device which may be used to lock the override lever in the up position. The latch is located on the right side panel of the console below the level of the manual override lever. To lock the override lever in the up position, raise the override lever to the full up position and push the latch down. A yellow warning light located below the gear selector switch (Figure 7-3) flashes to warn the pilot that the automatic gear lowering system is disabled. The latch is spring-loaded to the off position to aid disengagement. To disengage the latch raise the override lever and release. The lever will return to its normal position and the yellow flashing light will extinguish. The lever must also be latched in the raised (up) position when gear-up stalls are practiced.

The emergency gear lever, when used for emergency extension of the gear, manually releases hydraulic pressure to permit the gear to free fall with spring assistance on the nose gear. The lever must be held in the downward position for emergency extension.

Gear down and locked positions are indicated by three green lights located above the selector, and a red Warning Gear Unsafe light is located at the top of the panel. An all lights out condition indicates the gear is up. The landing gear should not be retracted above a speed of 125 mph and should not be extended above a speed of 150 mph.

The main landing gear uses Cleveland 6.00 x 6 wheels. The main gear incorporate brake drums and Cleveland double disc hydraulic brake assemblies. The nose wheel carries a 5.00 x 5 six ply tire and the main gear use 6.00 x 6 eight ply tires. All three tires are tube type.

Two micro-switches in the throttle quadrant activate a warning horn and red Warning Gear Unsafe light under the following conditions:

1. Gear up and power reduced below approximately 14 inches of manifold pressure.
2. On aircraft equipped with the backup gear extender, if the system has extended the landing gear and the gear selector is UP, except at full throttle.
3. Gear selector switch UP while on the ground.

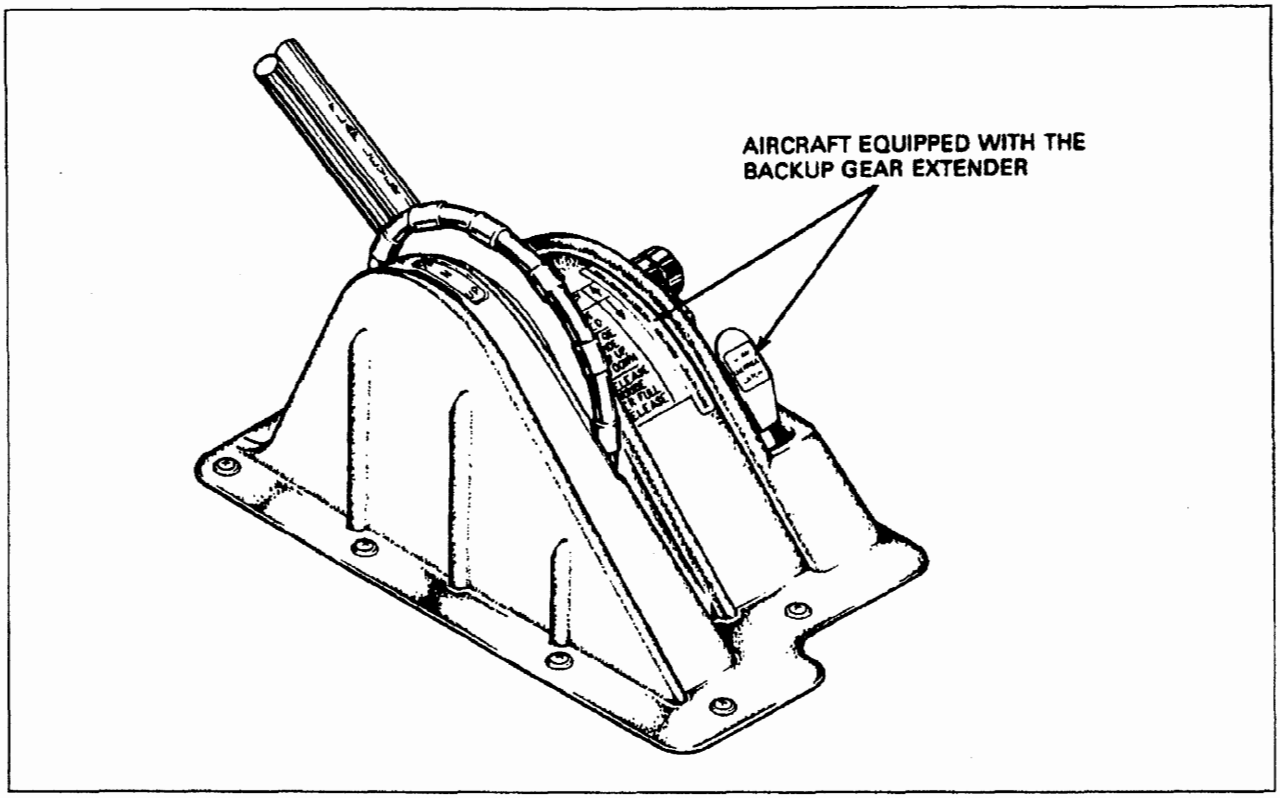
On aircraft which are NOT equipped with the backup gear extender, an additional switch is installed which activates the warning horn and light whenever the flaps are extended beyond the approach position (10°) and the landing gear are not down and locked.

The gear warning horn emits a 90 Hz beeping sound in contrast to the stall warning horn which emits a continuous sound.

The nose gear is steerable through a 22.5 degree arc each side of center through the use of the rudder pedals. As the nose wheel retracts, the steering linkage disengages to reduce rudder pedal loads in flight. The nose wheel is equipped with a hydraulic shimmy dampener to reduce nose wheel shimmy.

The oleo struts are of the air-oil type, with normal extension being 2.60 inches for the nose gear and 4.0 inches for the main gear under normal static load (empty weight of airplane plus full fuel and oil).

The standard brake system includes toe brakes on the left and right set of rudder pedals and a hand brake located below and near the center of the instrument panel. The toe brakes and the hand brake have individual brake cylinders, but all cylinders use a common reservoir. The parking brake is incorporated in the lever brake and is operated by pulling back on the lever and depressing the knob attached to the top of the handle. To release the parking brake, pull back on the brake lever; then allow the handle to swing forward.



FLIGHT CONTROL CONSOLE
Figure 7-9

7.13 FLIGHT CONTROLS

Dual flight controls are provided as standard equipment. A cable system provides actuation of the control surfaces when the flight controls are moved in their respective directions.

The horizontal surface (stabilator) is of the flying tail design with a trim tab/servo mounted on the trailing edge. This tab serves the dual function of providing trim control and pitch control forces. The trim function is controlled by a trim control wheel located on the control console between the two front seats (Figure 7-9). Rotating the wheel forward gives nose down trim and rotation aft gives nose up trim. The stabilator provides extra stability and controllability with less area, drag and weight than conventional tail surfaces.

The rudder is conventional in design and incorporates a rudder trim. The trim mechanism is a spring-loaded recentering device. The trim control is located on the right side of the pedestal below the throttle quadrant. Turning the trim control clockwise gives nose right trim and counterclockwise rotation gives nose left trim.

Ailerons are provided with differential deflection. This feature reduces adverse yaw in turning maneuvers, and thus reducing the amount of coordination required.