CESSNA

CESSNA 310

OWNER'S MANUAL

1,50

"Your 310 Businessliner"

P139-13 - RAND - 350 - 1-69

Congratulations . . .

■ YOU are now the owner of a truly outstanding airplane. The Cessna 310 has been engineered to give you the ultimate in performance, flying comfort, and economy for business or pleasure.

■ We share your pride as a Cessna owner and have prepared this Owner's Manual as a guide to acquaint you with its equipment, operating procedures, and maintenance requirements.

■ Every fine possession is worth caring for, and this is especially true of your Cessna 310. This book is dedicated to help you get the utmost flying enjoyment and service from your airplane with a minimum of upkeep.

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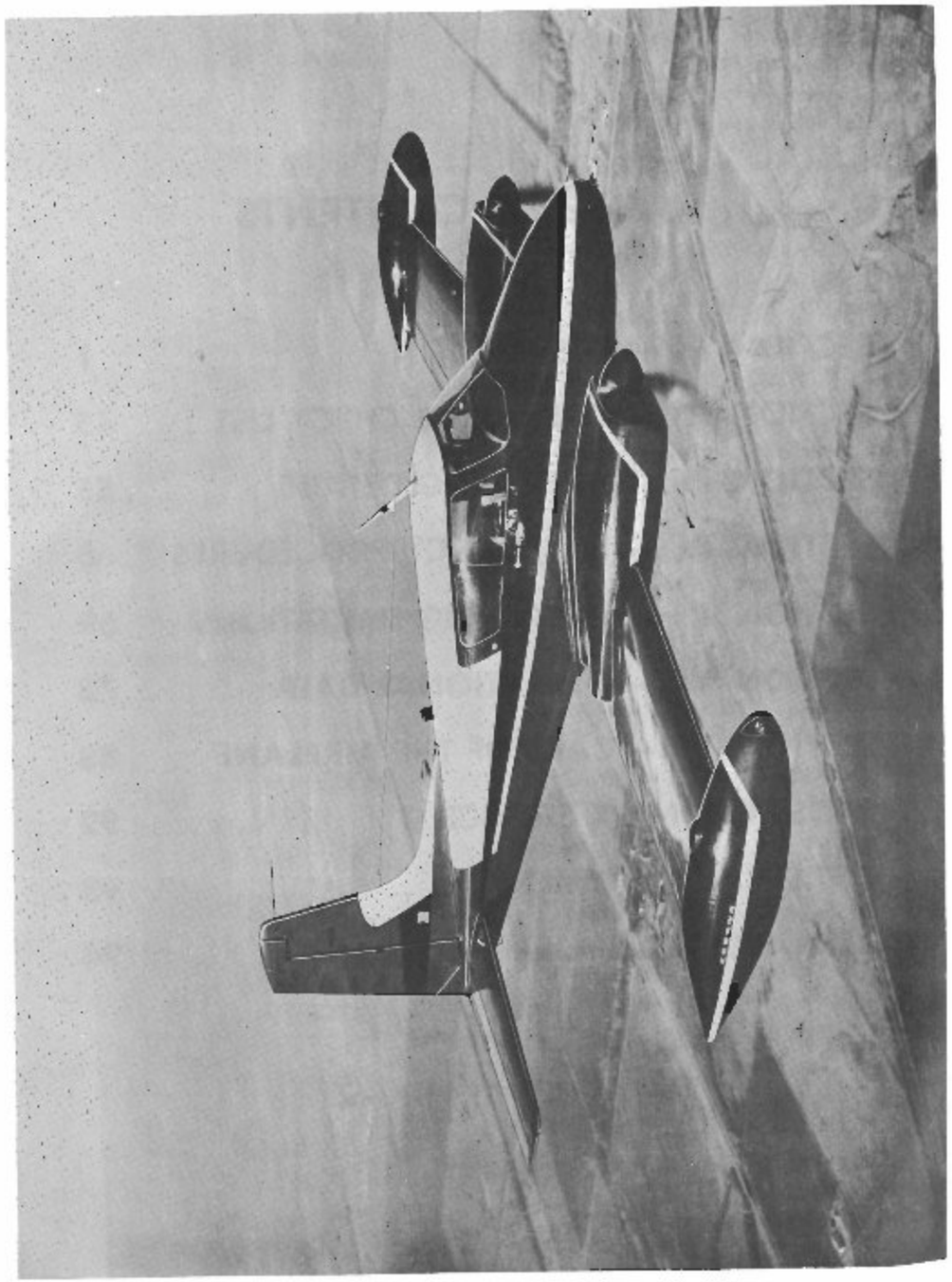


SECTION I

DESCRIPTION

ONE OF THE FIRST STEPS in obtaining the utmost performance, service, and flying enjoyment from your Cessna is to familiarize yourself with your airplane's equipment, systems, and controls. This section will tell you where each item is located, how it operates, and its function.

ENGINES.

Two six-cylinder, Continental Model O-470-M, 240 horsepower engines power your Cessna 310. These engines are compact, dependable, and efficient. Built by a company whose name has become a byword for precision-built, performance-packed aircraft engines, the Continental 240 horsepower engines mean top performance for your airplane at low maintenance cost. The compactness of these engines allows the utmost streamlining of the engine nacelles and, in conjunction with the angle they are mounted on the wing, provide the smallest possible cross-sectional drag. The engines are cushioned by flexible mounts which absorb vibration before it can reach the airframe.

ENGINE COWL

ENGINE COOLING

Engine cooling air is admitted at the front of the engine cowling and is directed around the cylinders to the jet-augmenter tubes. The exhaust gases, expanding and increasing in velocity as they are released into the jet-augmenter tubes, cause a "pumping action" which pulls the cooling air thru all parts of the engine compartment. Cooling is provided by the jet-augmenter tubes according to the power output of the engines and is

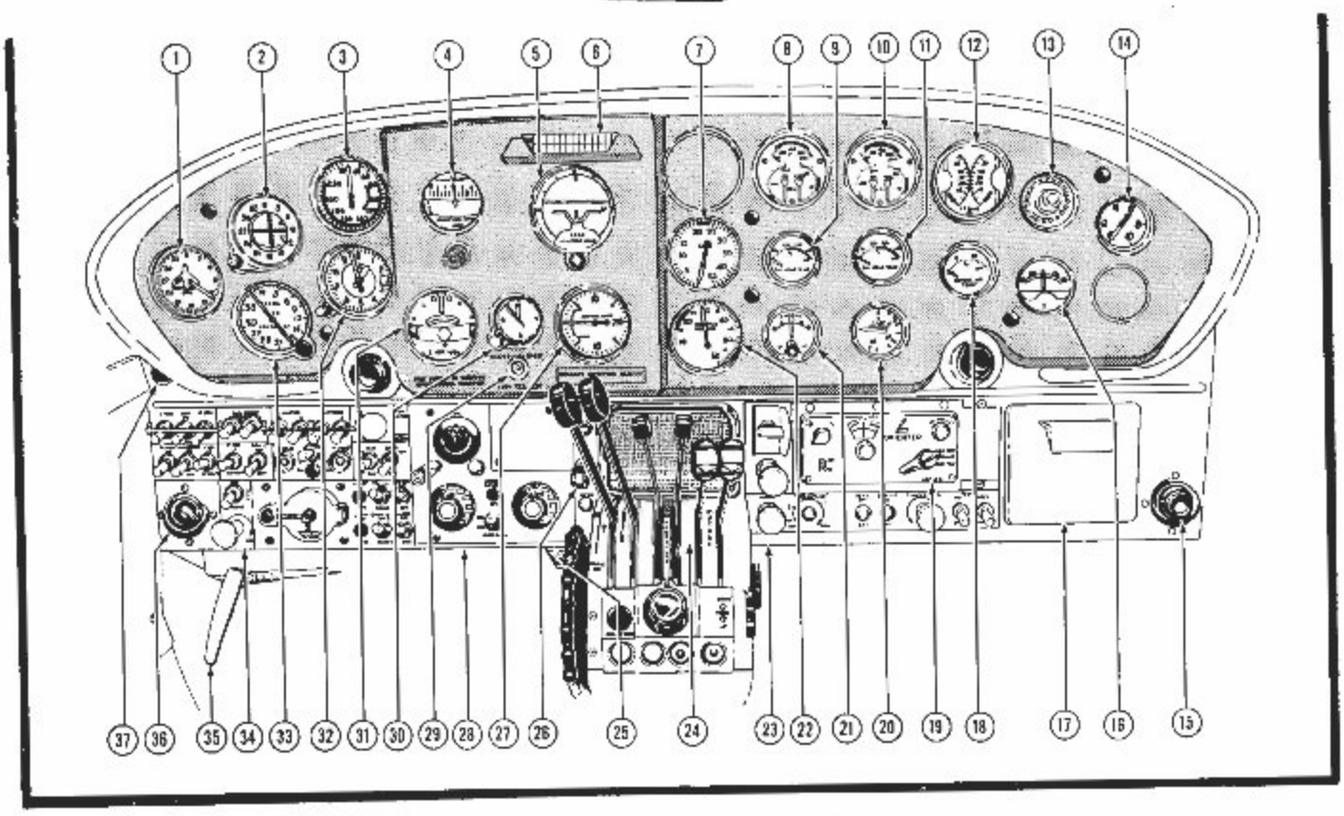


Figure 1. Instrument Panel

1. Radio Compass (ADF) (Optional Equipment)
2. Cross Pointer Meter (Optional Equipment)
3. Airspeed Indicator
4. Directional Gyro
5. Gyro Horizon
6. Compass Correction Card
7. Dual Tachometer
8. Left Engine Combination Gage Unit
9. Left Engine Cylinder Head Temperature Gage
10. Right Engine Combination Gage Unit
11. Right Engine Cylinder Head Temperature Gage
12. Dual Fuel Gage
13. Stall Warning Indicator
14. Suction Gage
15. Air Vent
16. Ammeter
17. Map – Glove Compartment
18. Free Air Temperature Gage
19. Radio Compass (ADF) (Optional Equipment)
20. Flap Position Indicator
21. Rudder Position Indicator (Optional Equipment)
22. Dual Manifold Pressure Gage
23. Right Hand Switch Panel (See figure 3)
24. Engine Control Pedestal (See figure 3)
25. Compass Light Rheostat
26. Landing Gear Switch
27. Rate-of-Climb Indicator
28. Radio (Optional Equipment)
29. Turn and Bank Test and Heater Overheat Light
30. Clock
31. Turn and Bank Indicator
32. Altimeter
33. Course Selector (Optional Equipment)
34. Left Hand Switch Panel (See figure 5)
35. Parking Brake Handle
36. Air Vent
37. Cigar Lighter

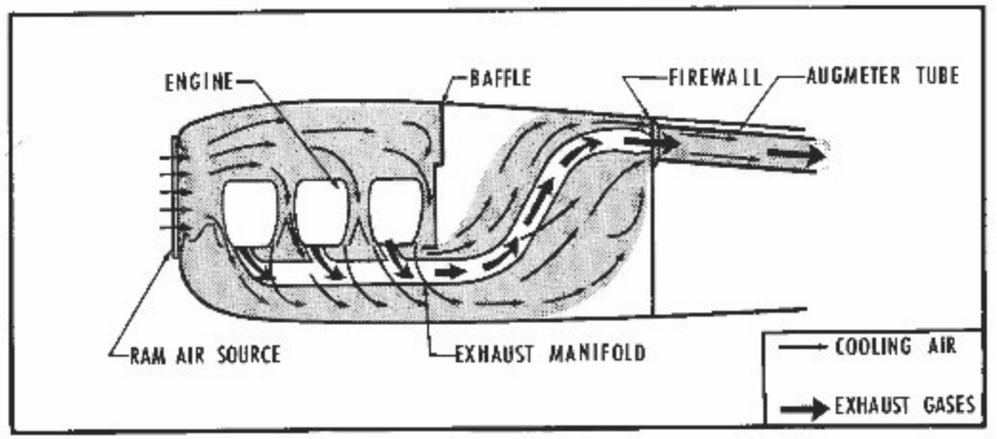


Figure 2. Engine Cooling System

not entirely dependent on the forward speed of the airplane. At high power settings, the "pumping action" of the exhaust gases through the jet-augmenter tubes is increased, thus increasing the flow of cooling air through the engine compartment. Through the use of jet-augmenter tubes, adequate engine cooling at all speeds is assured and the need for cowl flaps has been eliminated (see figure 2).

ENGINE CONTROL PEDESTAL ASSEMBLY.

An attractive and functional engine control pedestal assembly, (figure 3) which contains the throttles, propeller controls, and the mixture controls, is conveniently located between the two front seats where it is readily accessible to either pilot or co-pilot. A knurled friction knob (11, figure 3) is provided on the right side of the pedestal assembly to prevent creeping of the control levers, and allows the friction pressure to be adjusted to any desired setting. To increase friction, rotate the knob clockwise.

This pedestal assembly also houses the carburetor alternate air controls, a lighting rheostat control (19, figure 3) and the aileron, rudder, and elevator trim wheels. Provisions are made on the face of this pedestal for the installation of an automatic pilot control head (12, figure 3).

THROTTLES.

The throttles (21, figure 3) are the two control levers on the top side of the pedestal assembly nearest the pilot. They are easily identified by their round, smooth, black knobs and are the longest levers on the pedestal.

MIXTURE CONTROLS.

The mixture control levers (10, figure 3) are located on the top of the pedestal assembly and are the two levers nearest the co-pilot. These levers are easily distinguished by their sharp-pointed, round, red knobs. The extreme forward position of the mixture control is marked FR (full rich

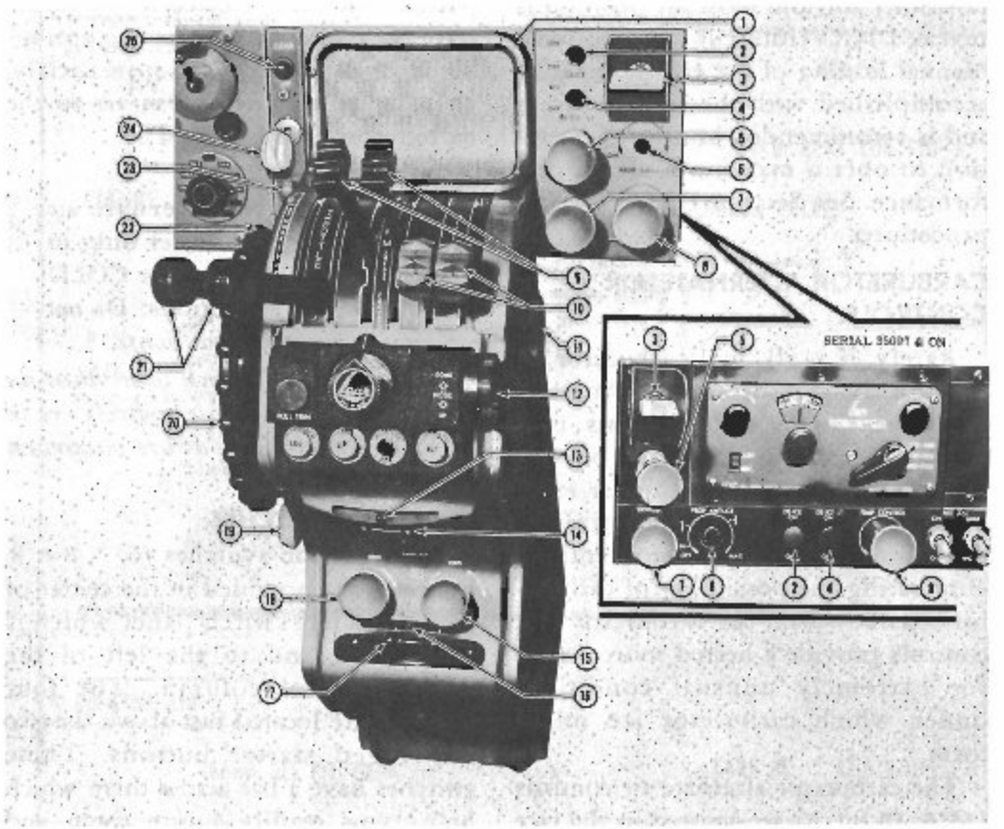


Figure 3. Engine Control Pedestal

1. Radio Speaker
2. De-Ice System Switch Space*
3. Flap Switch
4. De-Ice Light Switch Space*
5. Cabin Air Control
6. Prop Anti-Ice Switch Space*
7. Defrost Air Control
8. Cabin Temperature Control
9. Propeller Controls
10. Mixture Controls
11. Friction Knob
12. Auto Pilot Control*
13. Rudder Trim Position Indicator
14. Rudder Trim Control Wheel
15. Right Engine Alternate Air Control
16. Aileron Trim Position Indicator
17. Aileron Trim Control Wheel
18. Left Engine Alternate Air Control
19. Map Light Rheostat
20. Elevator Trim Control Wheel
21. Throttle Controls
22. Elevator Trim Position Indicator
23. Landing Gear Down Position Indicator Light
24. Landing Gear Switch
25. Landing Gear Up Position Indicator Light

*OPTIONAL EQUIPMENT

position) and the most aft position is marked ICO (idle cut-off position). Manual leaning of the engines may be accomplished with the control levers and is recommended in normal operation to obtain maximum cruise performance. See Section III for leaning procedure.

CARBURETOR ALTERNATE AIR CONTROLS.

Rarely, if at all, will carburetor ice form in the pressure-type carburetors on your Cessna 310. In this type carburetor, fuel is vaporized beyond the venturi (where carburetor ice is usually formed by fuel vaporization and temperature drop), almost entirely eliminating the possibility of carburetor ice. However, the carburetor heat controls provide a heated source of air for extremely unusual conditions under which carburetor ice might form.

The carburetor alternate air controls (15 & 18 fig. 3) are located in the face of the pedestal assembly, between the aileron and rudder trim wheels. The carburetor alternate air control positions are COLD AIR (in position) and HEAT (out position). They can be locked in either of these positions by rotating the knobs clockwise.

When the controls are in the COLD AIR position, ram air is admitted to the carburetors through the carburetor air intake scoops. When the controls are moved to the HEAT position, butterfly valves close off the ram-air intake openings to the carburetors. With the valves in this position a partial vacuum is created in the carburetor air intake boxes, causing spring-loaded valves to open automatically, thereby admitting warm air to the carburetors (see figures 4).

NOTE

The carburetor alternate air controls should be set only in HEAT (out position) or COLD (in position) positions. *Do not use intermediate positions.*

Before take-off, check to see that the carburetor alternate air controls are in the COLD position to assure maximum power for take-off.

IGNITION SWITCHES.

Four ignition switches (6, 7, 8 & 9, figure 5) are provided in the center of the lower left switch panel which is just below and to the left of the pilot's control column. The four switches are located just above the two red-ringed starter buttons. These switches have a bar across them which helps you readily locate them and allows them all to be turned off simultaneously or individually. The switch positions are ON (up position) and OFF (down position).

The left magnetos fire the upper spark plugs on the left banks of the engine cylinders and the lower spark plugs on the right banks, while the right magnetos fire the remaining spark plugs. The engines should be operated on both magnetos, because the dual ignition provides a more complete burning of the fuel-air mixture. The right and left magneto switches for each engine are provided

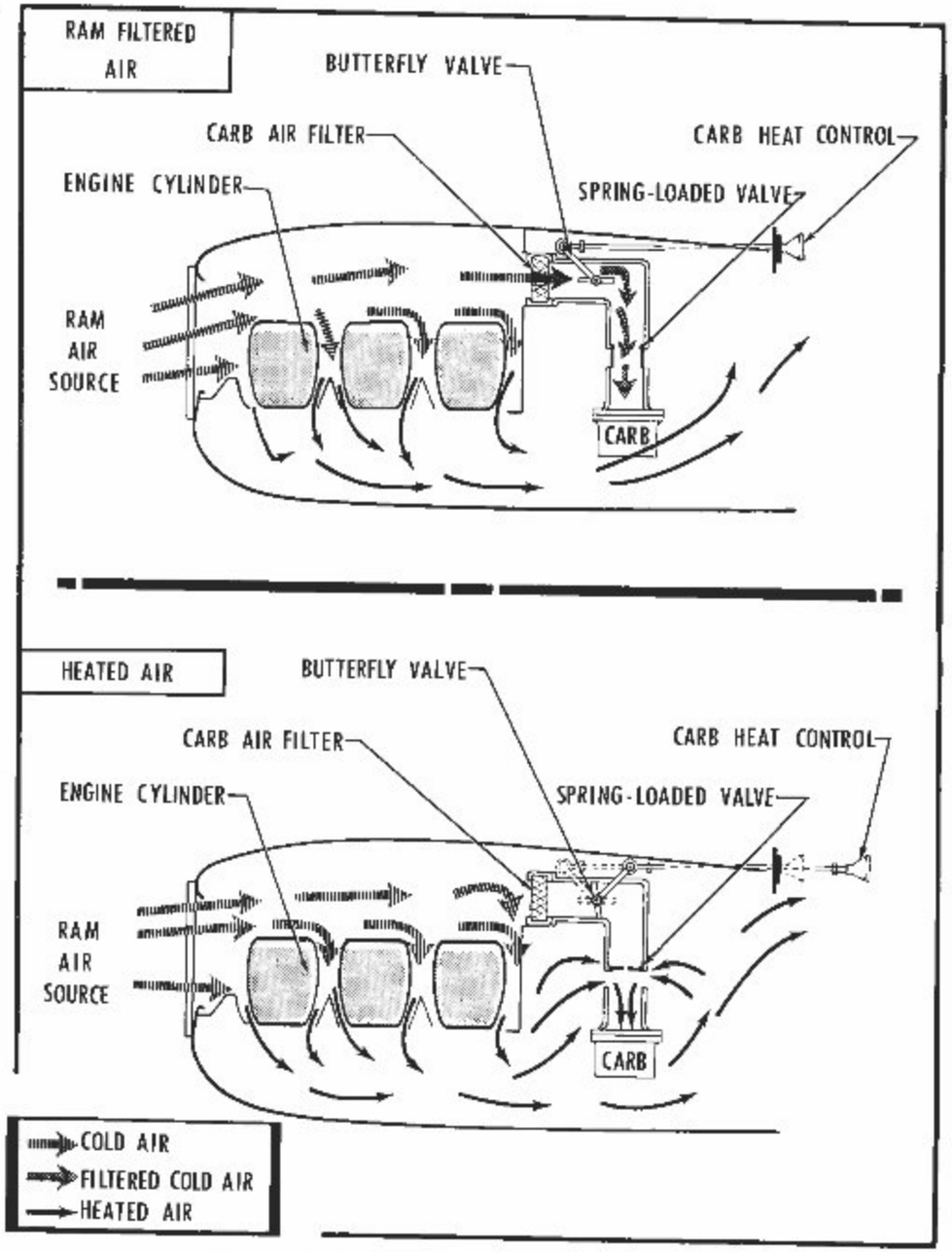


Figure 4. Carburetor Air Induction System

for checking purposes only.

ENGINE PRIMER SWITCH.

An engine primer switch (14, figure 5) is provided on the switch panel between the red-ringed starter buttons for use during cold weather operation only. It is a three-pole, spring-loaded switch. When held to the left (L-PRIME) it primes the left engine or to the right (PRIME-R) it primes the right engine. When the switch is released it automatically springs back to its off position.

When starting an engine, the primer switch should be engaged only if the engine will not start without priming, and then (approximately ½ second at a time) until the engine fires. *Do not hold the switch for too long an interval when priming, as it is very easy to flood the engines.* The primer switch activates a solenoid which allows fuel to flow from the fuel pressure line into the primer lines, thus spraying raw fuel into the cylinders. The fuel booster pump of the engine being started must be turned on at all times during primer operation.

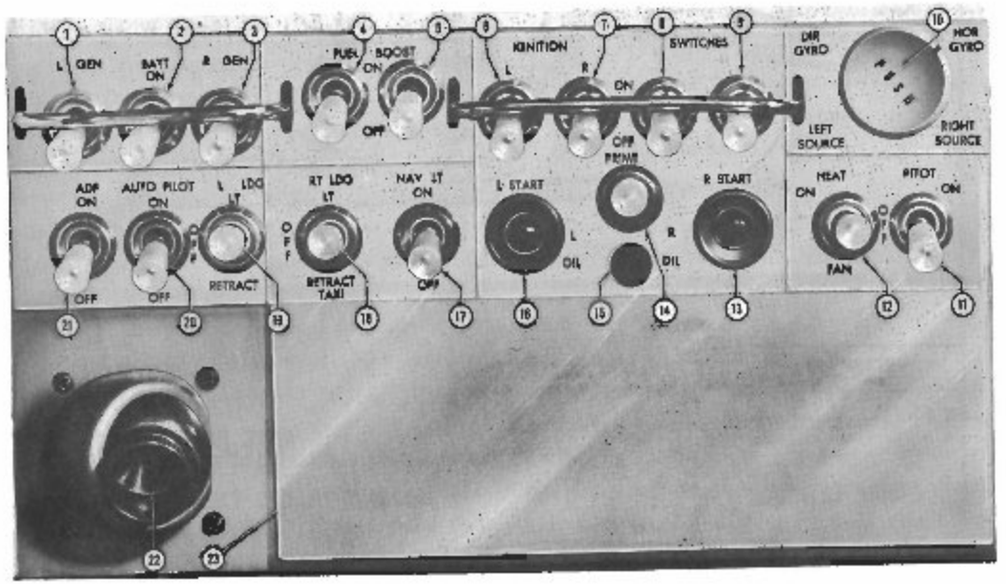


Figure 5. Left Hand Switch Panel

1. Left Generator
2. Battery
3. Right Generator
4. Left Fuel Boost Pump
5. Right Fuel Boost Pump
6. Left Magneto, Left Engine
7. Right Magneto, Left Engine
8. Left Magneto, Right Engine
9. Right Magneto, Right Engine
10. Gyro Test Selector Valve
11. Pitot Heat
12. Heater and Fan
13. Right Starter Button
14. Primer
15. Oil Dilution*
16. Left Starter Button
17. Navigation Lights
18. Right Landing and Taxi Light
19. Left Landing Light
20. Automatic Pilot*
21. Optional Equipment Space
22. Air Vent
23. Electronic Equipment Space*

*OPTIONAL EQUIPMENT

STARTER BUTTONS.

Two push-button starter switches (13 & 16, figure 5) are provided on the switch panel just below the ignition switches. These switches are ringed with a red cup to prevent them from being pushed accidently. When starting the engines, the left engine should be started first as the cables from the battery are much shorter to this engine which permits more electricity to be delivered to the starter motor, and, in the event of a low battery, the left engine should start more readily. After the left engine is started, its generator is used to supply additional electrical power for the starting of the right engine.

TACHOMETER.

A dual tachometer (7, figure 1) is located in the right center of the instrument panel. This tachometer has two indicating hands, marked 1 and 2 to identify left and right engine rpms respectively. The engines can be synchronized to the same rpm by simply placing one indicating hand over the other through adjustment of the propeller controls.

MANIFOLD PRESSURE GAGE.

A dual manifold pressure gage (22, figure 1) is located in the lower right center of the instrument panel. This instrument indicates the pressure of the fuel-air mixture entering the engine cylinders and is calibrated in inches of mercury. Two indicating hands, which are marked 1 and 2, indicate the pressure for the left and right engines respectively. The two engines can be equalized, as to manifold pressure, by placing one indicating hand over the other through adjustment of the throttles. By observing the manifold pressure gage and the tachometer while adjusting the propeller and throttle controls, the power output of the engines can be adjusted to any desired power setting as recommended in the operating procedures of Section II or the performance charts of Section VI.

CYLINDER HEAD TEMPERATURE GAGES.

Two electrical cylinder-head temperature gages (9 & 11, figure 1) are located on the right center of the instrument panel. The bayonet-type thermocouples for these gages are of the 24-volt resistance type. One thermocouple is located on the underneath side of the right hand center cylinder (number 3) on each engine. Through the use of jet-augmenter exhaust tubes on your Cessna 310, the need for cowl flaps has been eliminated. The jet-augmenter tubes provide cooling according to the power output of the engines regardless of the

forward speed of the airplane.

PROPELLERS.

Full-feathering, all-metal, controllable, constant-speed propellers are standard equipment on your Cessna 310, and provide your airplane with maximum performance at take-off, during climb, and while cruising. The full-feathering feature allows you maximum single-engine performance with a minimum of drag from the inoperative engine.

The propellers are controlled by governors which automatically change the pitch of the propellers to counteract any tendency of the engines to vary from the rpm settings established by the propeller pitch controls.

PROPELLER PITCH CONTROLS.

The propeller pitch controls (9, figure 3) are the two center levers on top of the pedestal assembly. These levers are easily identified by their rectangular, grooved, black knobs. With the controls full forward, the propellers are in the high rpm, or low pitch settings. When the controls are pulled back to the detents, they are in the low rpm, or high pitch position. The controls may be set any place between these positions for any desired rpm. The control slots are marked FEATHER, just behind the detents, DECREASE (for decrease rpm) just in front of the detents, and INCREASE (for increase rpm) at the front of the slot.

To feather a propeller, the propeller control should be pulled back past the detent in the slot to its extreme rear position. *The mixture control should always be pulled back to ICO before feathering a propeller to prevent the engine from being flooded with gas.* Full feathering of the propellers takes approximately 7 to 10 seconds from the time the control is moved to feathering position. *To unfeather a propeller,* follow procedure recommended in Section II.

NOTE

If the engine power and rpm are to be increased, increase the propeller control first and then the throttle. If power and rpm are to be decreased, reduce the throttle first and then the propeller control. In this manner excessive cylinder pressures will be avoided.

OIL SYSTEM.

The Continental 0-470-M engines have wet sump oil systems which utilize the engine pans as oil tanks (see figure 6). The engine-driven oil pumps and oil coolers also are mounted integrally on the engines to eliminate external oil lines and the hazards associated with leaky lines or fittings.

Oil temperature is regulated automatically in these systems by thermostatically controlled oil coolers. The thermostats allow the oil to bypass the coolers whenever the oil temperatures are below 150° F.

OIL LEVEL.

The oil capacity of the Continental 0-470-M engine is twelve quarts. The

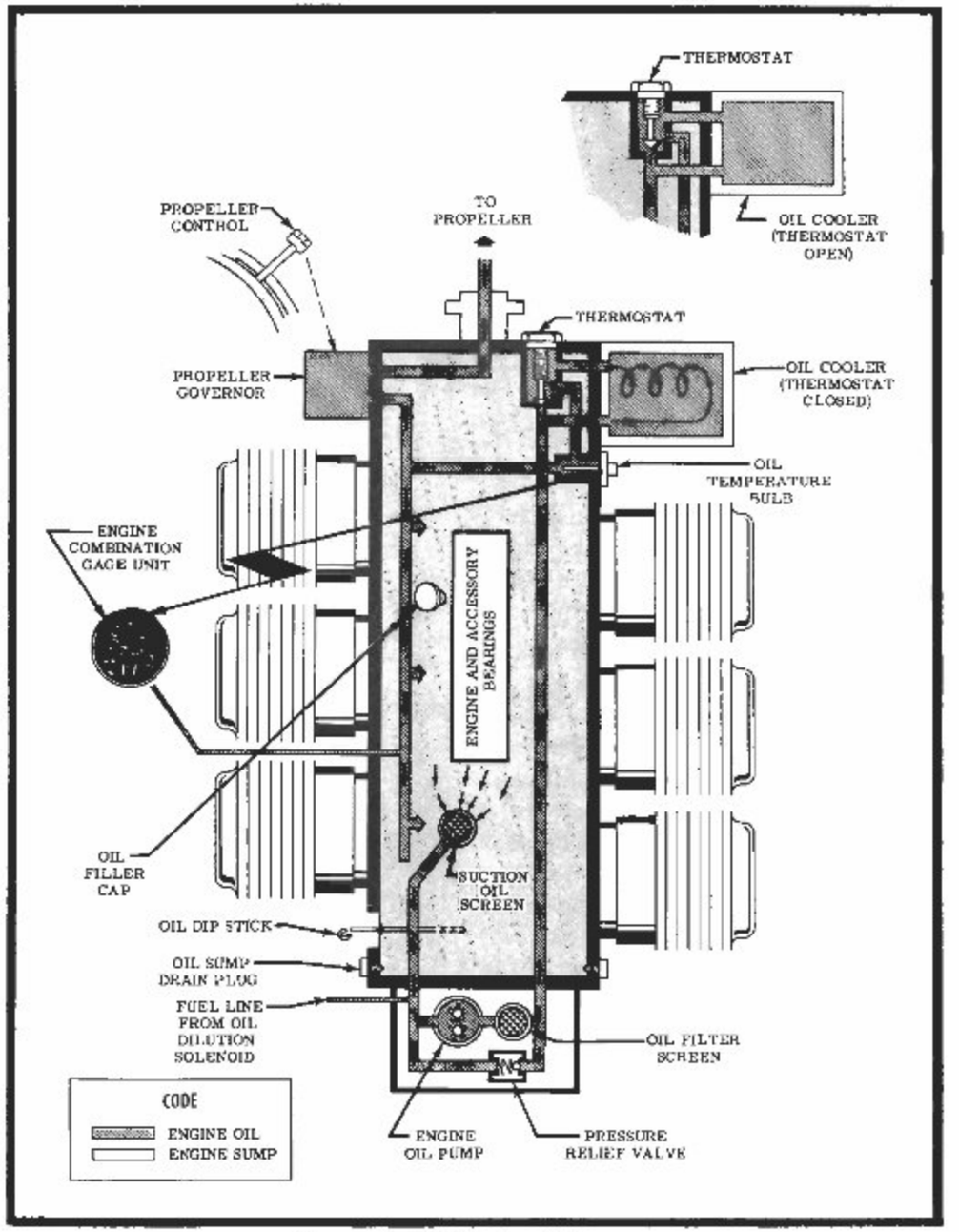


Figure 6. Oil System Diagram

quantity can be checked easily by opening the access door on the aft left side of the engine nacelle (the same for both engines) and reading the oil level on the dipstick located just aft of the rear left engine cylinder.

NOTE

With less than six quarts of oil in the system, it is possible to uncover the oil pick-up line and obtain a loss of oil pressure in an extreme nose high climb. For this reason, the last six quarts of oil are labeled unusable.

The dip stick incorporates a spring lock which prevents it from working loose in flight. The dip stick can be removed by rotating it until the spring lock is disengaged and pulling the dip stick up and out. When replacing the dip stick, make sure that the spring lock is engaged.

To obtain correct oil level readings, it is important that the engines be shut down at least 5 to 10 minutes prior to the oil check. This permits the engine oil to drain out of the engine oil passages into the oil sump giving a more accurate oil level reading.

To check oil:

(a) Remove dip stick from engine and wipe all oil from stick.

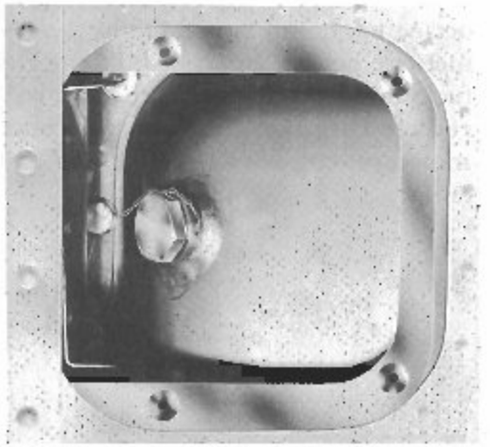
NOTE

This allows any air that might have been trapped in the dip stick tube during engine operation to be released.

(b) Insert dip stick in engine to its full depth.

(c) Remove dip stick and take reading. Oil should be added if below nine quarts and should be full if an extended flight is planned.

The oil filler caps are made accessible by opening the access doors on top of the engine nacelles. In replacing the oil filler caps, make sure that they are on firmly and turned clockwise as far as they will go to prevent loss of oil through the filler neck.



OIL DRAIN PLUG.

An oil drain plug is provided on the underneath side of the engine and is easily accessible through an access hole in the bottom of the cowl. This access hole is covered by a plate which is removed easily by taking out four screws. Removing the drain plug allows the oil to drain readily through the access hole.

OIL SPECIFICATION AND GRADE.

Aviation grade straight mineral oil is recommended for your Cessna 310, and should be changed every 25 hours of operation. When adding or changing oil, use the grades in the following table.

Outside Air Temperatures	*Recommended Oil Grade*
Below 40° F.	**SAE 30**
Above 40° F.	**SAE 50**

OIL TEMPERATURE AND PRESSURE INDICATORS.

Two combination gage units are provided, one for each engine, and are located in the upper right side of the instrument panel. Each of these units consists of an oil temperature gage, an oil pressure gage, and a fuel pressure gage. A 24-volt resistance type oil temperature gage is located in the upper part of each combination gage unit and is calibrated in degrees Fahrenheit. An oil pressure gage calibrated in pounds per square inch is installed in the lower left part of the combination gage unit. See Section V for instrument markings.

OIL DILUTION SYSTEM. (OPTIONAL EQUIPMENT)

Cold weather starting is made easier by an oil dilution system which may be installed as optional equipment in your airplane. This system, used just before the engines are shut off, allows gasoline to flow into the engine oil — thinning the oil to make the next start easier. The diluted oil is not deteriorative to the engines, as the gasoline evaporates away as the engines are warmed up, leaving only the oil for lubrication. Details of this operation are described in section III.

Basically, the oil dilution system consists of electrically operated solenoid valves connected by hoses to the fuel and oil systems. A three-pole, toggle switch (15, figure 5) is located on the switch panel between the starter buttons and below the primer switch. Holding the switch to the left

for the left engine, and to the right for the right engine operates the valves, allowing gasoline to flow into the oil system at an inlet in the crankcase below the fuel pump. Here, the gasoline mixes with the engine oil and is pumped to all moving parts of the engines.

FUEL SYSTEM.

Fuel is supplied to the engines from two rubberized, bladder-type fuel cells; one located in each wing-tip tank. From each tank, fuel is fed through an electric booster pump, a fuel selector valve, a fuel strainer, and through the engine driven fuel pump to the carburetor (see figure 7). The fuel cells provide a total fuel capacity of 102 gallons (51 gallons each fuel cell, of which 50 gallons are usable). The electric fuel booster pumps in the tanks provide a positive fuel flow as emergency pumps in the event of failure of the engine driven fuel pumps and provide fuel pressure for priming and starting. These booster pumps are operated by two electric switches (4 & 5, figure 5) on the switch panel located just to the left of the ignition switches, and the up position is ON. *Always take-off and land with these pumps turned ON.* Vapor return lines from the pressure carburetors return the unused fuel to the fuel cells when the engines are running. Anytime the booster pumps are turned on without the engines running, mixture controls must be in the ICO position to prevent flooding of the intake manifolds.

FUEL SPECIFICATION AND GRADE.

Aviation grade fuel should always be used except in emergency conditions. The recommended fuel is 91 octane minimum rating. Highly leaded fuels are not recommended. Filling the fuel tanks immediately after flight will reduce the air space and minimize moisture condensation in the fuel tanks.

FUEL TANK FILLER CAPS.

The wing-tip tanks are easily filled through the filler caps located on top of the tanks. Access to these filler caps is gained by unsnapping two Dzus fasteners and opening the hinged, streamlined fairing at the top of the tanks.

FUEL SELECTOR VALVES.

Two rotary-type fuel selector valve handles are located between the front seats on the cabin floor. These handles are connected mechanically to fuel selector valves located outboard of each engine nacelle. This arrangement

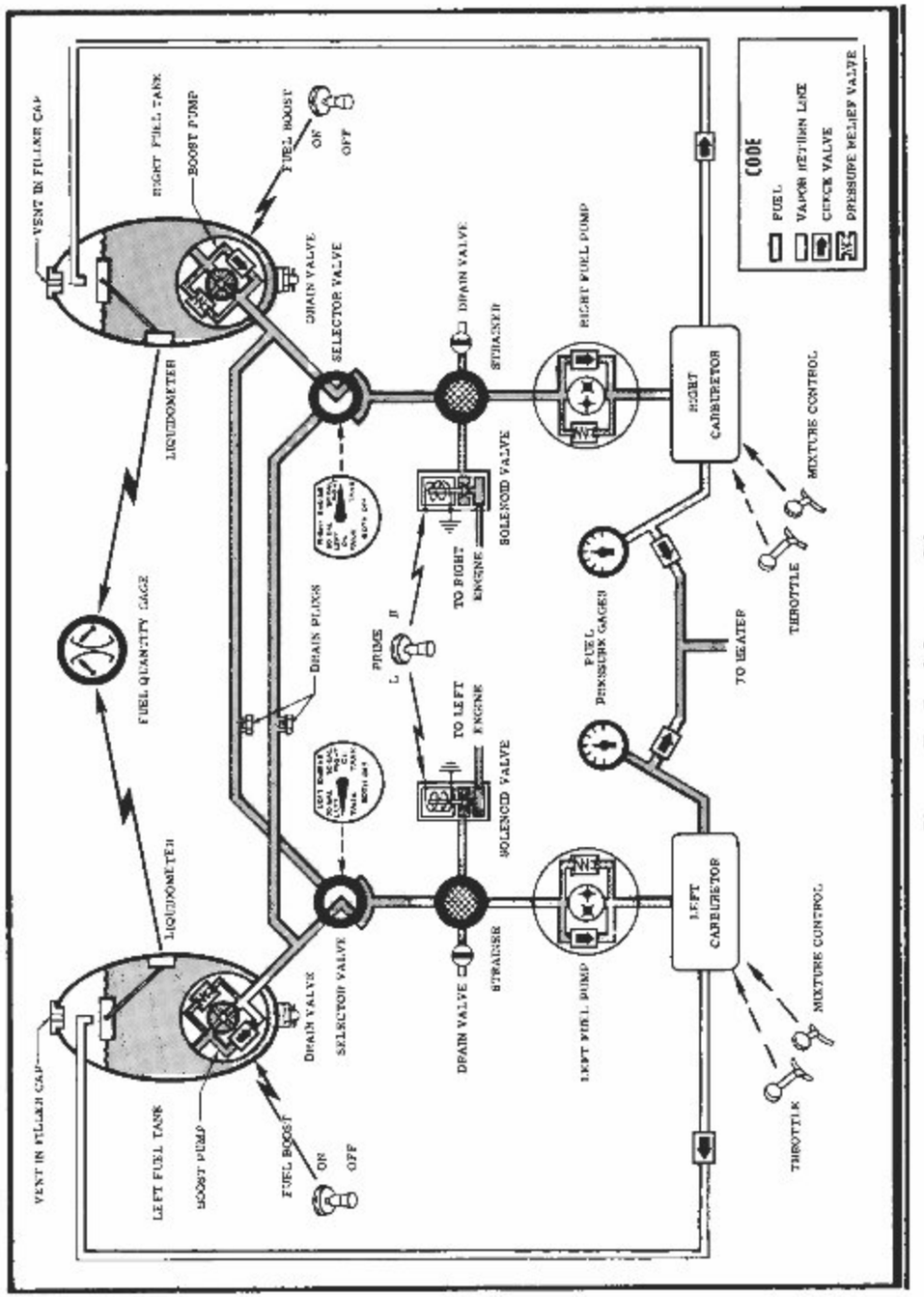
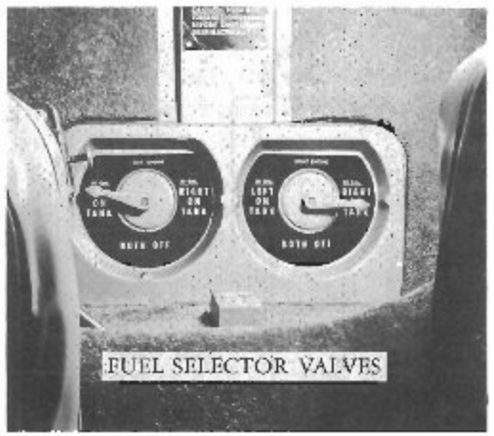


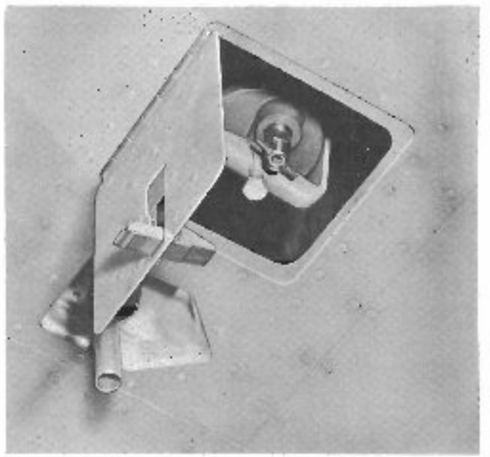
Figure 7. Fuel System Diagram

eliminates fuel line fittings in the cabin area. The left selector valve controls the fuel flow to the left engine and is labeled LEFT ENGINE. The right selector valve controls the fuel flow to the right engine and is labeled RIGHT ENGINE. These valves have three positions; each labeled BOTH OFF, LEFT TANK ON and RIGHT TANK ON.

It is recommended that you set the fuel selector valves to LEFT TANK ON for left engine and RIGHT TANK ON for right engine during take-off, landing, and all normal operations. In flight, it is possible to operate both engines on one tank if necessary. *IMPORTANT — The fuel selector valve handle is the pointer for the fuel selector valve and indicates the setting of the valve by its position above the dial.*

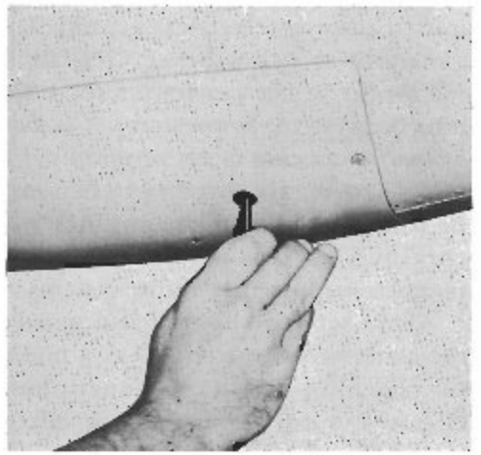

FUEL SELECTOR VALVES

These selector valves are illuminated by a light installed just above them on the forward side of the spar and it is controlled by the map light rheostat. This rheostat (19, figure 3) is located on the left side of the engine control pedestal directly below the elevator trim wheel.



FUEL STRAINER DRAIN VALVES.

A fuel strainer drain valve is located in the bottom of each engine fuel strainer. The fuel strainers are mounted on the firewalls in each engine nacelle. An access door is provided in the bottom of each engine nacelle to provide easy access to the valves. The valves provide a quick method of draining any water or sediment that may have collected in the fuel strainers. A two-ounce quantity of fuel should be drained from the fuel strainers before the initial flight of the day, or after each refueling operation, to check for any sign of water in the fuel. *To open valve,* turn handle counterclockwise. The valve is spring-loaded and will return automatically to a closed position when the handle is released.



FUEL TANK SUMP DRAIN VALVES.

A fuel tank sump drain valve is located on the underside of each wing-tip tank. These valves are used to drain any sediment or water that may collect in the fuel tanks. Access to these valves is gained by removing the access plates from the bottom of each tank. The sumps may be drained without removing these plates thru a small hole in each plate. *To drain the sumps,* insert a screwdriver thru the small hole in the plate and push the drain valve handle up until it turns itself in the slots provided and latches. This lets the fuel flow freely from the tank sump. When a sufficient quantity has been drained, push up on one end of the drain valve handle with the screwdriver to unlatch it and let it slip back into the guide slots. After the handle is back in the guide slots it can be released, and as it is spring loaded, it will automatically close. *These sumps should be drained anytime the presence of water or sediment is found while draining the fuel strainers.* It is recommended that the wing-tip tank sumps be drained at each 100 hour inspection period.

FUEL QUANTITY INDICATORS.

A fuel quantity gage (12, figure 1) with two indicators on its face (one for each tank) is provided in the upper right side of the instrument panel. Each hand indicates in gallons the amount of fuel remaining in its respective tank. The indicators are electrical and receive their signal from a measuring unit in each tank.


FUEL LINE DRAIN PLUGS

FUEL LINE DRAIN PLUGS.

Two fuel line drain plugs, one for each line, are located at the right wing root rib. To gain access to these plugs, the right wing root rib fairing must be removed. At each 100 hour inspection period, these plugs should be removed to drain any water or sediment accumulated in the fuel lines.

FUEL PRESSURE INDICATORS.

The fuel pressure indicators are the lower right indicators of the two combination gage units (8 & 10, figure 1). The pressure for these fuel pressure indicators is taken from the engine carburetors. The normal reading, which is marked with a green arc on the indicator face, is 9 to 15 psi.

ELECTRICAL SYSTEM.

Electrical energy is supplied by a 24-volt, direct-current system, powered by two engine driven generators. Two 12-volt storage batteries, connected in series, are located in the wing just outboard of the left engine nacelle and serve as a stand-by power source, supplying current to the system when the generators are inoperative, or when the generator's voltage is insufficient to close the reverse-current relays. An external power receptacle can be provided, as optional equipment, in the left wing under the batteries to permit using a battery cart for cold weather starting.

BATTERY AND GENERATOR SWITCHES.

A battery switch (2, figure 5) and two generator switches (1 & 3, figure 5) are provided on the left hand switch panel. These switches have a bar across them to aid in identifying them and to allow all of them to be switched off simultaneously or individually. They are OFF in the down position and ON in the up position.

With the battery switch ON, a solenoid switch is energized and the electrical power of the batteries is admitted into the electrical system. The generator switches, when ON, allow the power of the generators to be fed into the system. *In the event of a short or malfunctioning of the airplane's electrical system,* all three switches may be turned OFF and the engines will continue to run on their separate magneto-powered ignition systems.

These separate battery and generator switches are provided as a means of checking for a malfunctioning circuit and to permit such a circuit to be cut off. *If a generator circuit is found to be malfunctioning,* it should be turned OFF and operation (of required equipment only) continued on the remaining generator circuit. *If for some reason both generator circuits should become malfunctioning,* equipment can be operated at short intervals and for a limited amount of time on the battery circuit alone. In either case, operation for any length of time is not recommended and a landing should be made as soon as possible to check and repair the circuits.

CIRCUIT BREAKERS.

All of the electrical systems in the airplane are protected by circuit breakers. These circuit breakers are the "push-to-reset" type and are located in a circuit breaker panel on the left cabin wall just forward of the pilot (see figure 9). The panel is covered by a metal door. To gain access to the panel, simply pull the top of the door out and down. The name of the circuit is indicated at each circuit breaker.

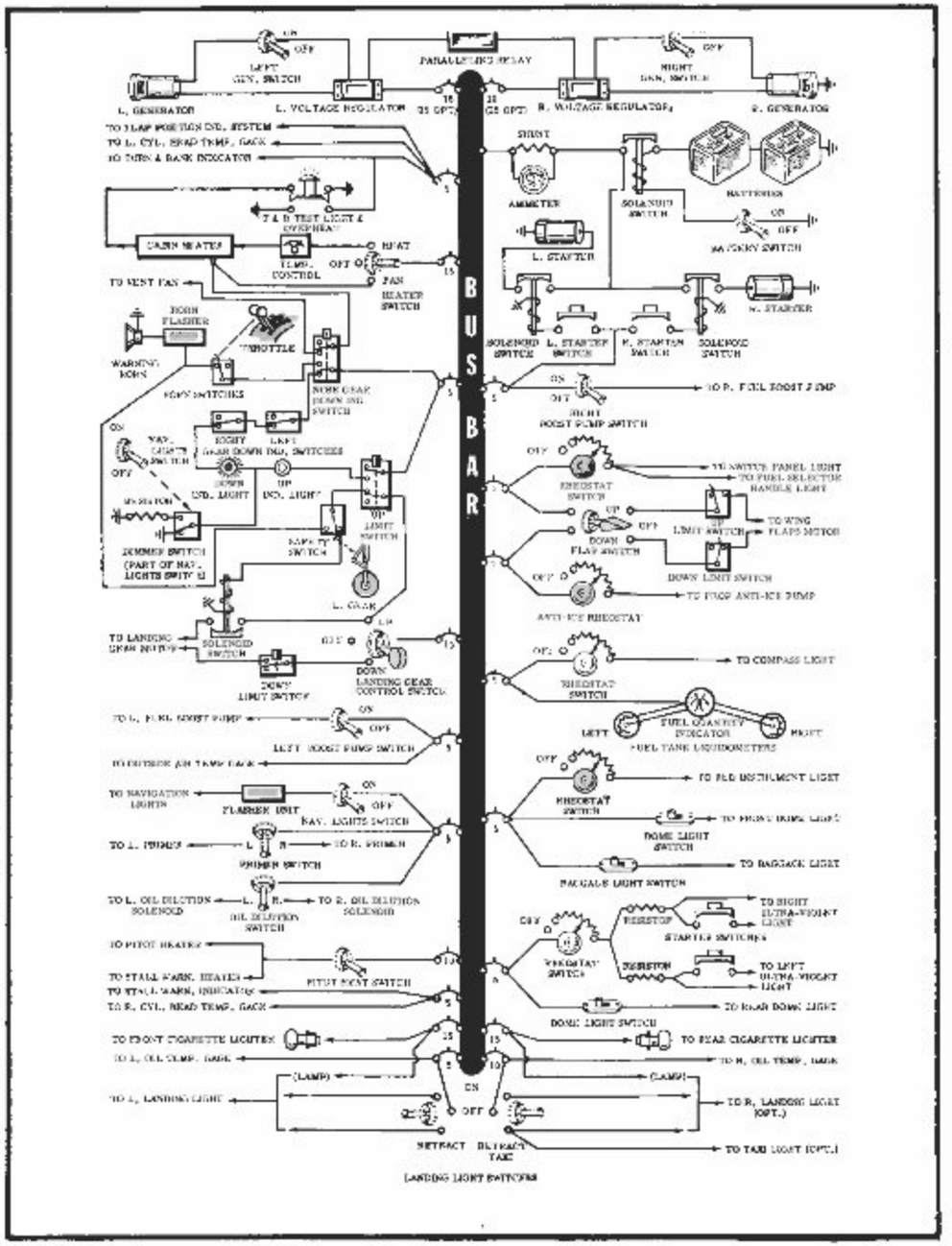


Figure 8. Electrical Diagram

If a circuit is inoperative, wait approximately three minutes for the thermal unit to cool off, then press the circuit breaker button to reset the breaker. If this does not restore power to the circuit, it should be checked for shorts, defective parts, or loose connections. *If a circuit breaker pops out continually,* that system should be checked for a short circuit, over-loaded circuit, or faulty equipment.

FLIGHT CONTROL SYSTEM.

Conventional wheel and rudder pedal controls are provided to operate the primary flight control surfaces. (The co-pilot's control wheel and rudder pedals are optional equipment.) Manually-operated trim control wheels are provided for rudder, elevator, and aileron trim tabs and are located on the engine control pedestal.

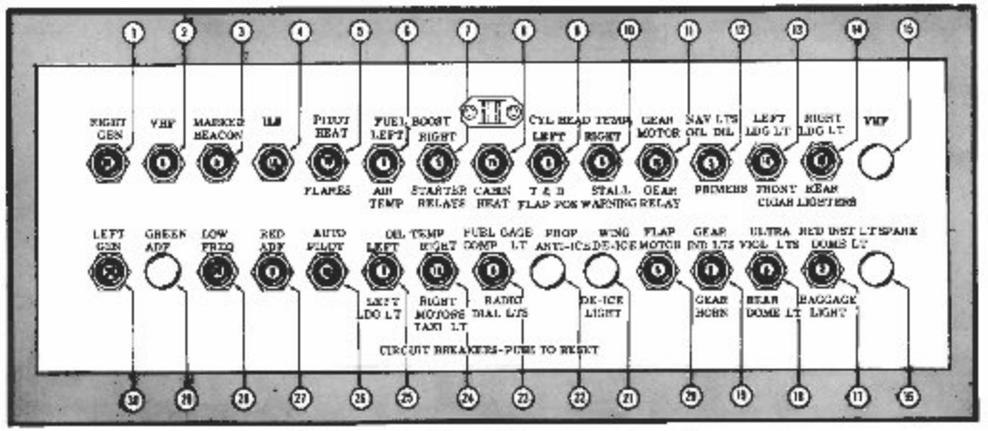


Figure 9. Circuit Breaker Panel

1. Right Generator (25 amps)
2. VHF Radio (5 amps)
3. Marker Beacon (5 amps)
4. Instrument Landing System (10 amps)
5. Pitot Heat and Flares (10 amps)
6. Left Fuel Boost Pump and Free Air Temperature Indicator (5 amps)
7. Right Fuel Boost Pump and Starter Relays (5 amps)
8. Cabin Heater (15 amps)
9. Left Cylinder Head Temperature Gage, Turn and Bank Indicator (5 amps)
10. Right Cylinder Head Temperature Gage and Stall Warning (5 amps)
11. Landing Gear Motor and Landing Gear Relays (15 amps)
12. Navigation Lights, Oil Dilution System and Primers (5 amps)
13. Left Landing Light and Front Cigar Lighter (15 amps)
14. Right Landing Light and Rear Cigar Lighter (15 amps)
15. VHF Radio (5 amps)
16. Spare Circuit Breaker Space
17. Red Instrument Light and Front Dome Light and Baggage Compartment Light (5 amps)
18. Ultraviolet Instrument Lights and Rear Dome Light (5 amps)
19. Landing Gear Indicator Lights and Warning Horn (5 amps)
20. Flap Motor (5 amps)
21. Wing De-Ice System and De-Ice Light (10 amps)
22. Propeller Anti-Ice System (5 amps)
23. Fuel Gage, Compass Light and Radio Dial Lights (5 amps)
24. Right Oil Temperature Gage and Right Landing Light Motor and Taxi Light (10 amps)
25. Left Oil Temperature gage and Left Landing Light Motor (5 amps)
26. Automatic Pilot (10 amps)
27. Red Automatic Direction Finder (5 amps)
28. Low Frequency Radio (10 amps)
29. Green Automatic Direction Finder (5 amps)
30. Left Generator (25 amps)

CONTROL LOCK.

A control lock assembly is provided to secure the pilot's control column when the airplane is parked outside. The lock assembly incorporates a sliding pin that passes completely through the socket and tube of the pilot's control column. The lock assembly also has a red metal flag which, when the lock is installed, covers the ignition switches making it impossible to start the engines with the controls locked.

To install the lock assembly, slide the lock assembly over the control tube and socket from below and slip the locking pin into the outboard hole in the socket. Pull the control column back until you can see the holes in the tube and align them with the holes in the socket. Then push the pin through the aligned holes, being sure to push it far enough that the inboard end locks securely in the clamp on the lock assembly.

To unlock the controls, simply pull the locking pin outboard until it is free of both tube and socket and remove the assembly. The lock assembly can be conveniently stowed in the glove compartment when not in use.

ELEVATOR TRIM CONTROL WHEEL.

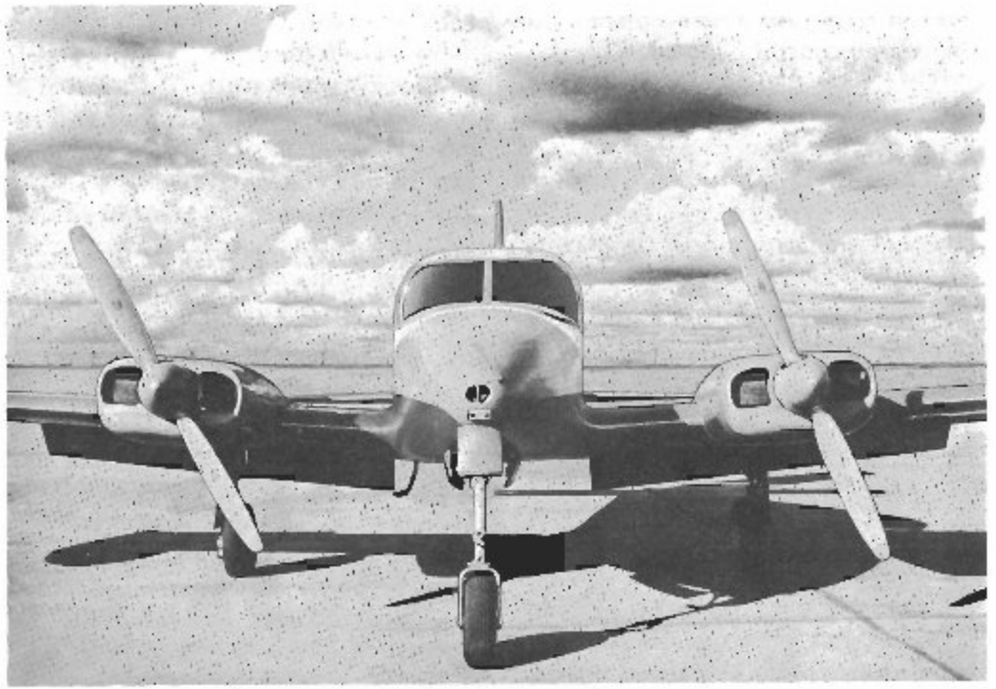
The elevator trim control wheel (20, figure 3) is mounted vertically on the left, or pilot's side, of the engine control pedestal. Its position indicator (22, figure 3) is installed in the pedestal beside the control wheel and is marked NOSE DOWN, NOSE UP, and TAKE-OFF. At the take-off marking, there is a small arrowhead which shows the most satisfactory position for the indicator during normal take-offs.

RUDDER TRIM CONTROL WHEEL.

The rudder trim control wheel (14, figure 3) is mounted on the face of the engine control pedestal just above the carburetor heat control knobs. It is mounted horizontally in the pedestal with its position indicator (13, figure 3) located directly above it. The indicator is marked NOSE, with L (nose left) and R (nose right) on their respective sides.

AILERON TRIM CONTROL WHEEL.

The aileron trim control wheel (17, figure 3) is located on the face of the engine control pedestal just below the carburetor heat control knobs. The indicator (16, figure 3) for the wheel is immediately above it and is labeled ROLL, with L (roll left) and R (roll right) on their respective sides.



WING FLAPS.

The wing flaps are of the split type and can be extended to any angle between 0° and 45°. Under normal conditions at 4600 pounds gross weight, the use of 45° flaps will lower the power-off stalling speed approximately 13 mph (from 82 mph to 69 mph TIAS). This enables a slow, steep approach for short field landings over an obstacle. *Over 15° of flaps should never be used for take-off at anytime.* The flaps can be lowered at any airspeed below 130 mph but should never be lowered above this speed. The knob of the flap switch is the shape of an airfoil. The UP and DOWN positions of the switch are momentary hold-on positions and the switch automatically returns to the middle OFF position when released. The flaps can be lowered or raised to any position between 0° and 45°, and stopped at this position by allowing the flap switch to return to the OFF position. The flaps will remain in the selected position until the switch is moved to raise or lower them. When the flaps are extended or retracted to their limits, the actuator motor is automatically turned off by limit switches.

The position of the flaps is shown on a flap position indicator (20, figure 1)located in the instrument panel. The indicator shows, in degrees, the position of the flaps at all times.

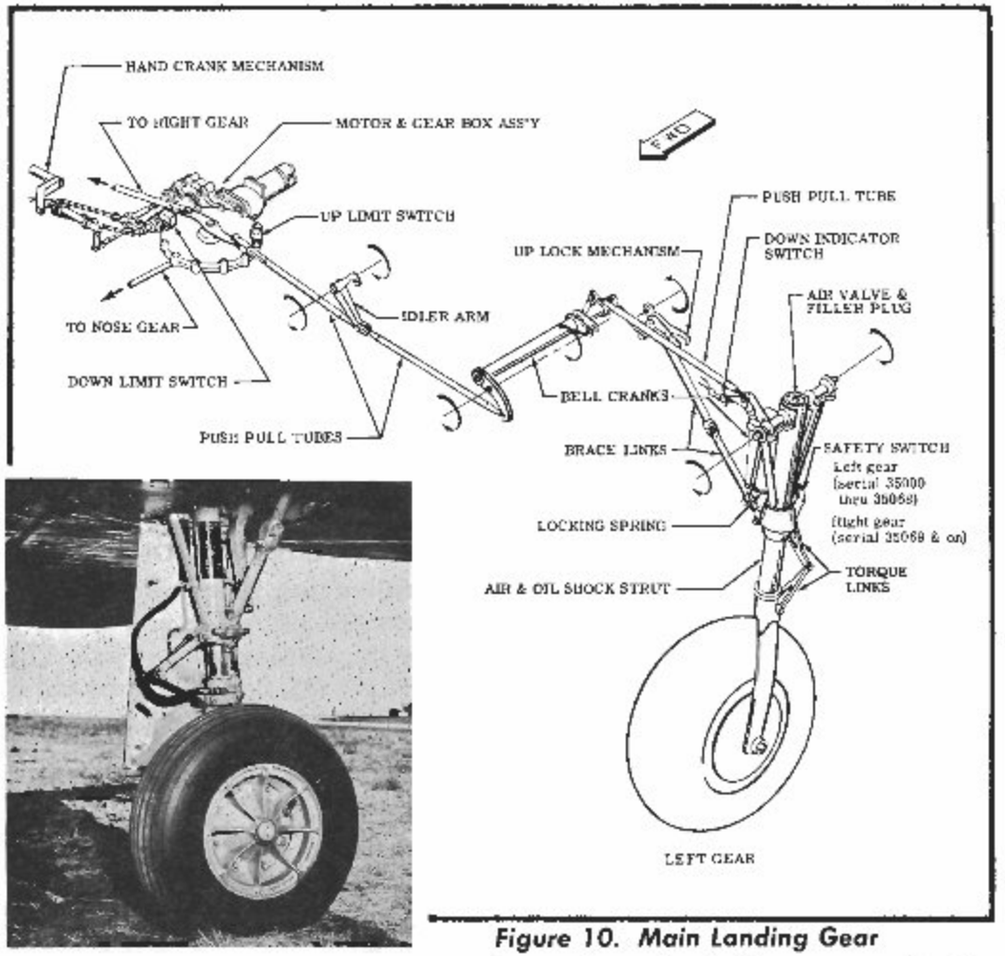


Figure 10. Main Landing Gear

LANDING GEAR.

Your Cessna 310 has fully-retractable tricycle landing gear. When the gear is retracted, it is fully enclosed giving you the utmost in aerodynamic cleanness. The inboard wheel well doors also close after the gear is extended, reducing drag to a minimum. The landing gear and its doors are electrically operated by an electric motor, driving a gear box, which in turn is mechanically connected to the landing gear struts (see figure 10). Up and down limit switches are provided in the system to prevent overload on the mechanism. They automatically stop the motor as the full up, or full down position is reached. A safety switch is provided on the right shock strut which prevents operation of the UP circuit until the right strut is almost fully extended, thus preventing retraction of the gear on the ground.

MANUALLY OPERATED HAND CRANK.

A hand crank is provided beside the pilot's seat to manually operate the gear mechanism should the landing gear motor fail to extend the gear (see figure 11). When the handcrank is pulled into operating position, from its folded stowed position, it automatically disengages the electric motor from the system.

To extend the gear manually, place the gear switch in the center (OFF) position, release the crank handle from its stowage clamp and unfold the crank to operating position. (The crank handle will automatically lock in this position). Rotate the crank clockwise until the indicator light shows that the gear is fully extended (approximately 60 turns). See Section IV for manual gear extension procedure.

Use the manual system to extend the gear only, never to retract it as undue loads may cause excessive wear on the mechanism. If the gear will not retract electrically, land and find out why.

NOTE

The handcrank must be in the stowed position to operate the gear electrically.

To stow the hand crank, push the lock release button provided on the crank handle and fold the handle. Insert the handle into the clamp located beside it, where it will be securely stowed.

LANDING GEAR SWITCH.

The electrical landing gear switch (24, figure 3) is located in the lower center of the instrument panel and is identified by its small wheel knob. The switch knob must be pulled out before the switch is moved from one position to another. The handle when released automatically locks in the slot of the selected position. The switch has an UP position for raising the gear, a DOWN position for lowering the gear. A center (OFF) position for manual lowering of the gear is provided to disconnect the electrical circuit during cranking operation.

LANDING GEAR POSITION LIGHTS.

Two landing gear position lights are provided, one above and the other below the landing gear switch. The upper light (25, figure 3) is red and is on at all times when the gear is fully retracted. The lower light (23, figure 3) is green and has three switches hooked in series in its circuit, one on each wheel strut. All three wheels must be fully extended and locked to close the circuit turning on the light. When neither light is on, the gear is in an intermediate position.

LANDING GEAR WARNING HORN.

The landing gear warning horn is controlled electrically by the throttles. The horn will sound if either throttle is retarded below 13 inches of manifold pressure with the gear up. Aircraft with serials 35306 and on have a flasher unit connected in the circuit which makes the horn sound intermittently. On aircraft with serials

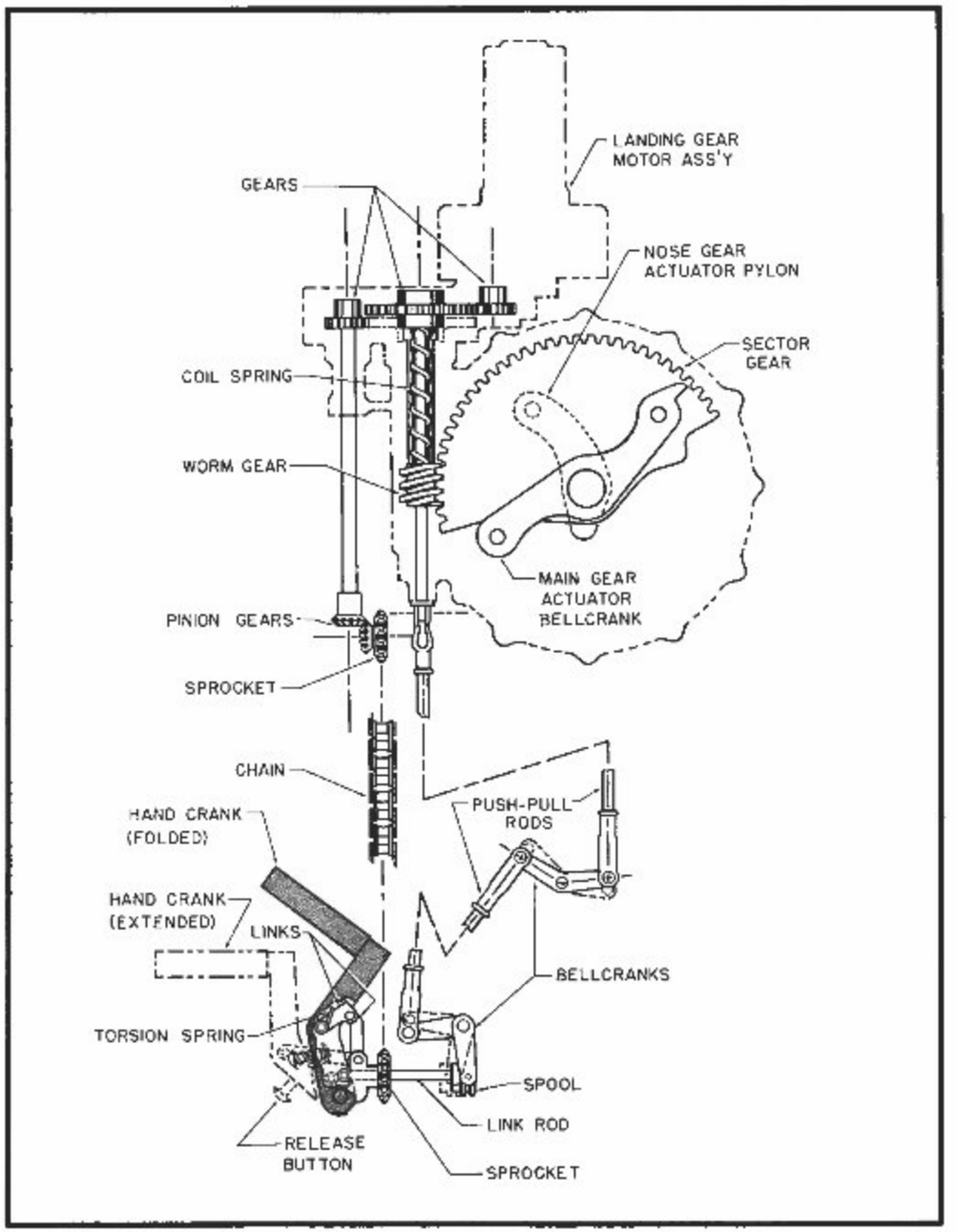


Figure 11. Manual Gear Operation Mechanism

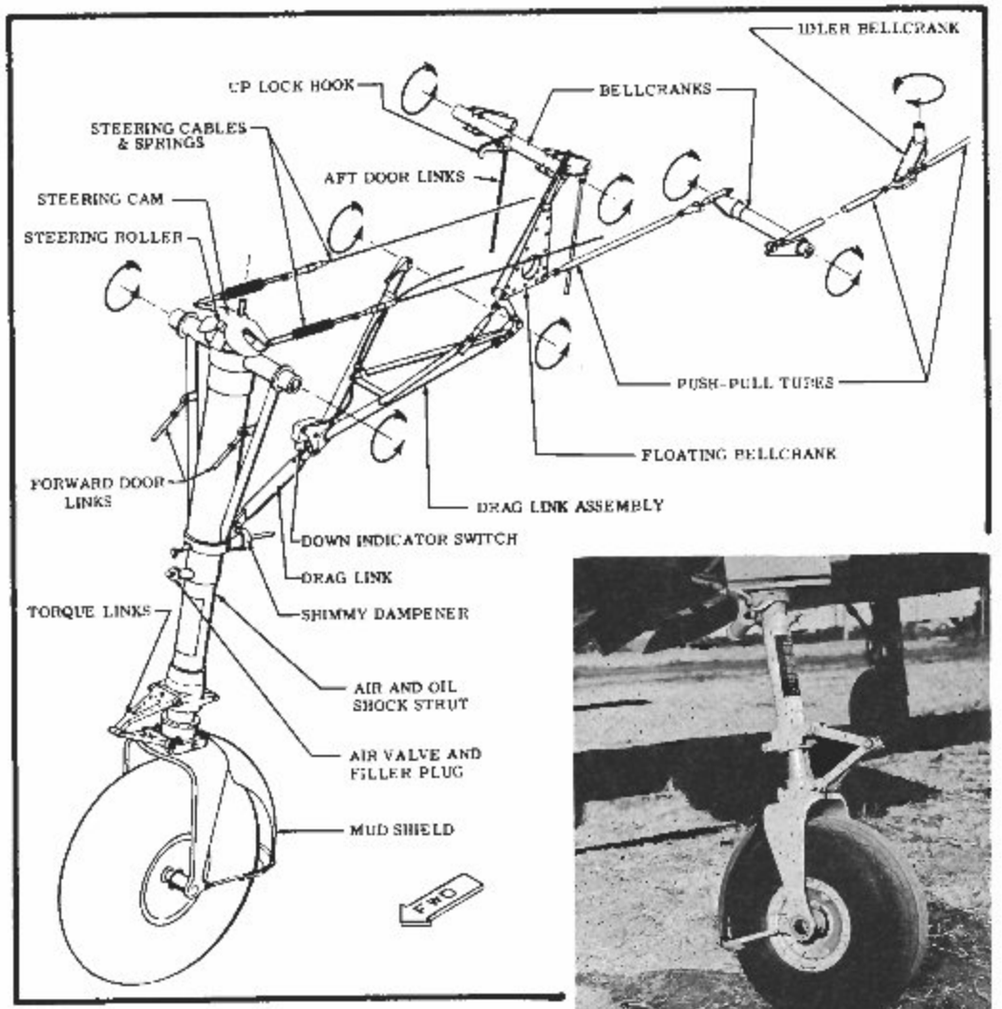


Figure 12. Nose Gear

35069 and on, the UP position of the landing gear switch is electrically connected to the warning horn and the warning horn will sound if the switch is placed in the UP position while the airplane is on the ground.

STEERING SYSTEM.

The nose wheel is steerable with the rudder pedals up to 15°, either right or left of center, after which it becomes free-swiveling up to a maximum deflection of 55° right or left of center. This deflection of 55° allows you, through use of brakes and throttles, to turn your airplane in a relatively small radius. The steering linkage automatically disconnects from the nose wheel as the wheel is retracted and the nose wheel is automatically straightened as it goes into the wheel well.

BRAKE SYSTEM.

The hydraulic brakes on the main wheels are conventionally operated by applying toe pressure to the pilot's or the co-pilot's (optional) rudder pedals. Depressing the pedals actuates the brake cylinders, resulting in a braking action on the main landing gear wheels. The brakes may also be set by operating the parking brake control which is located on the left cabin wall under the instrument panel.

PARKING BRAKE HANDLE.

The parking brake handle (35, figure 1) is connected to the pilot's brake pedals by cables. When the parking brake is pulled on, it pulls the pilot's brake pedals down, thus applying the brakes. Pushing down on the brake pedals with the feet, as the parking brake is pulled on, aids in applying pressure to the brake cylinders. The parking brake handle has a ratchet mechanism which holds it in the on, or out position. Turning the handle counterclockwise releases this rachet, allowing the spring-loaded handle to retract, thus releasing the brakes.

INSTRUMENTS.

All instruments are mounted on the shock-mounted instrument panel. All flight instruments are mounted on the left side of the panel and the engine and other instruments are mounted on the right side. A complete set of gyro instruments are standard equipment on the airplane. All of the instrument gage markings and hands have a fluorescent coating for night operation.

TURN AND BANK INDICATOR.

The turn and bank indicator (31, figure 1) is an electrically-operated instrument located on the lower left side of the instrument panel. Turned on by the battery switch, the indicator remains in operation until the battery switch is turned off, as it has no separate control switch. A "push-to-test" light marked T & B TEST (29, figure 1) is installed in the turn and bank electrical circuit and is located below and to the right of the turn and bank indicator. This light will work when pushed in if the circuit is in order. This light also serves as an overheat warning light for the heater.

PITOT-STATIC SYSTEM.

The airspeed indicator (3, figure 1), altimeter (32, figure 1), and rate-of-climb indicator (27, figure 1) are operated by the pitot-static system. This system consists of a pitot tube mounted on the nose of the fuselage, and two static pressure holes, mounted on opposite sides of the fuselage aft of the baggage compartment. The altimeter and rate-of-climb indicator are connected to lines from the static pressure sources while the airspeed indicator is connected to both the pitot and static pressure lines. *The static*

pressure openings should be kept free of polish, wax, and dirt for proper indicator operation.

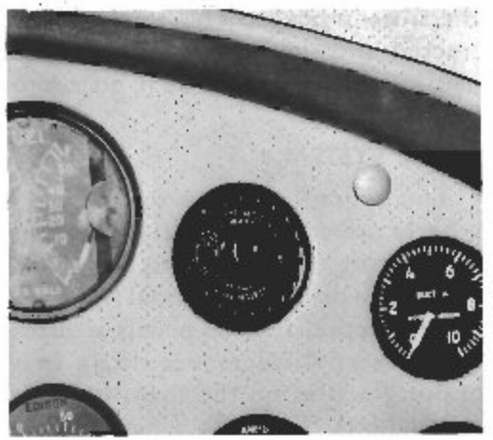
PITOT HEATER.

A pitot heater is installed to prevent ice from obstructing the pitot tube opening. This system consists of an electrical heating element mounted within the pitot tube and a pitot heater switch (11, figure 5) located in the lower left switch panel at the extreme right of the second row of switches. The switch positions are ON (up position) and OFF (down position). *This switch should be turned ON only while in flight.*

VACUUM SYSTEM.

The directional gyro (4, figure 1), the artificial horizon (5, figure 1), and the suction gage (14, figure 1) comprise the instruments of the vacuum system. Two engine driven pumps, utilizing a single suction relief valve, supply the system with vacuum. If either pump fails, a reverse flow is prevented by check valves incorporated in the supply lines.

Suction gage readings may be obtained from any of four sources in the vacuum system with a manually-operated (push-to-turn) selector valve (10, figure 5). The available sources are, as marked on the switch panel, DIR GYRO (directional gyro), HOR GYRO (horizontal gyro), LEFT SOURCE (left pump), and RIGHT SOURCE (right pump). The valve is located at the top right corner of the lower left switch panel. The suction gage is located in the upper right corner of the instrument panel and is calibrated in inches of mercury.



STALL WARNING INDICATOR.

A stall warning indicator is located in the top right side of the instrument panel. It consists of a horn and a red light which operate concurrently. This instrument gives your Cessna 310 protection from inadvertent stalls. It gives warning whenever a stall is approached regardless of speed, attitude, altitude, acceleration, load, or other factors which change the stalling speed. The stall warning indicator is set to give warning approximately 5 to 10 mph above the stalling speed.

The stall warning transmitter, mounted on the leading edge of the left wing, incorporates a heater element to prevent ice from hampering its operation. The heater element is operated by the pitot heater switch.

CLOCK.

An eight-day, stem-wind, aircraft clock (30, figure 1) is installed in the instrument panel just to the right of

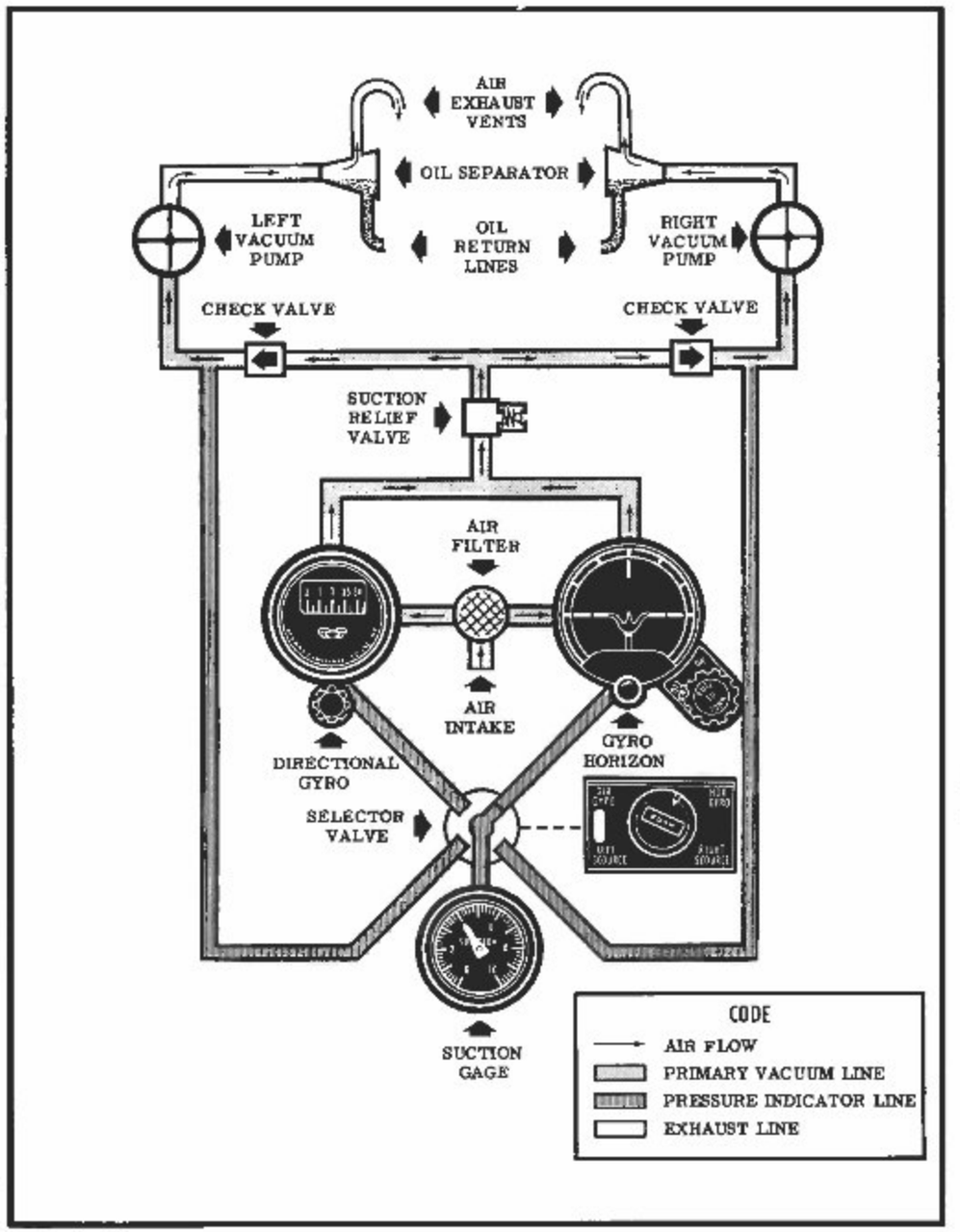


Figure 13. Vacuum System Diagram

the turn and bank indicator. This clock has a full sweep second hand to facilitate quick and easy reading.

FREE AIR TEMPERATURE GAGE.

A free air temperature gage (18, figure 1) is located on the lower right side of the instrument panel. It is calibrated in degrees Fahrenheit. It receives its readings electrically from a bulb located in the fresh air inlet duct in the nose of the airplane.

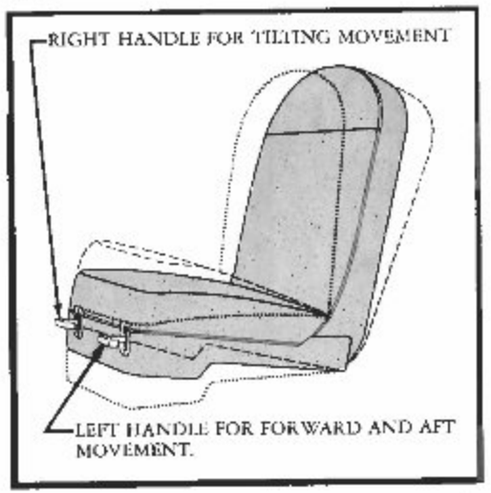
MAGNETIC COMPASS.

A magnetic compass is located at the center of the windshield above the instrument panel. The compass correction card (6, figure 1) is mounted on the left top center of the instrument panel for quick and easy reference when reading the magnetic headings. The light in the compass is controlled by a rheostat switch located underneath the instrument panel directly below the landing gear switch.

SEATS.

FRONT SEATS.

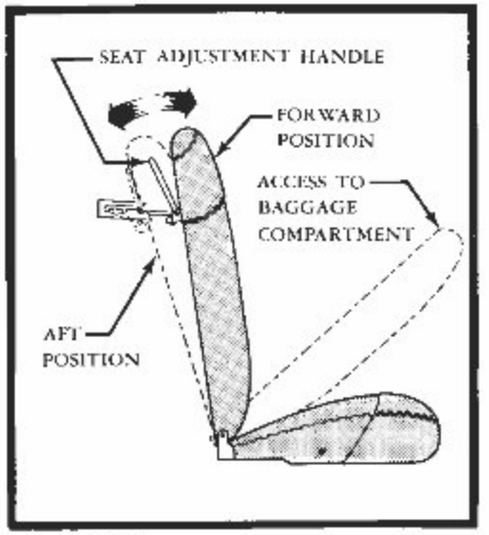
The front seats are individually mounted on tracks and are adjustable fore and aft. They are also adjustable through three reclining positions. The seat adjustment handles are located within easy reach on the front of the seats. The front seat backs fold forward to provide room for entrance to the rear seat. Entrance to the left front seat may be made by stepping in behind the right front seat and forward through the aisle to the left front seat.



To adjust the seats fore and aft, simply pull up on the left handle and slide the seat to the most comfortable position.

To adjust the reclining angle of the seat, pull up on the right handle and lean forward or back to the desired position.

This double adjustment of the seats makes it possible for them to be adjusted to the most comfortable position for any person in a matter of seconds. These adjustments, along with the contoured, sponge rubber padded seats and seat backs, provide exceptional comfort.



REAR SEAT.

The wide rear seat provides plenty of hip, leg, and shoulder room for three people. This seat and seat back also have foam rubber padding for added passenger comfort. The rear seat back is hinged at the bottom to permit seat adjustment and easy access to the baggage compartment from inside the cabin. The seat adjustment handle is located behind and at the top of the rear seat back.

CABIN VENTILATION AND TEMPERATURE CONTROL.

The cabin ventilation and temperature control system is designed to provide an ample quantity of controlled air, heated or cool, to all areas of the cabin. The controls for the system consist of a cabin airflow control, a defroster airflow control, a cabin temperature control, an electrical heater and ventilating fan switch, and six individual, manually-adjustable air vents. All ventilating air enters the airplane thru the ram-air opening in the nose and may be heated when desired. The ventilating air is not re-circulated through the heater, but is a continuous supply of fresh air which is exhausted into the slipstream through a vent at the rear of the cabin (see figure 14).

VENTILATING FAN AND CABIN HEATER.

The cabin heater, incorporating a ventilating fan, is located in the nose, just to the right of the nose wheel well. The heater is a "sealed flame" internal combustion type. The heater combustion air and exhaust gases are completely separated from the cabin ventilating air ducts, to prevent the products of combustion from mixing with the ventilating air. The heater and ventilating fan are controlled with a three position toggle switch, (12, figure 5) which is located on the lower left switch panel and is marked FAN (down position) , OFF (middle position), and HEATER (up position).

The ventilating fan is designed to supply a good volume of air to the cabin when the airplane is on the ground. It supplies cool air when the switch is in the FAN position and warm air when the switch is in the

HEAT position. The fan becomes inoperative by means of a cut-out switch mounted on the nose gear when the landing gear is retracted, as the ram air provided in flight makes the fan unnecessary.

To start heater:

(1) Place battery switch ON. (One of the fuel booster pumps must be turned on, with the corresponding mixture control in ICO, anytime the heater is to be operated without the engines running.)
(2) Close the cabin air and defroster valves.
(3) Turn the cabin temperature control to full on (extreme clockwise position).
(4) Turn cabin heater switch to FAN position and leave in this position for 30 seconds. This operation primes the heater.
(5) Turn cabin heater switch to the HEAT position.
(6) After 30 to 40 seconds, pull the cabin air control on, making sure some of the vents are open. (Warm air should be felt coming out of the vents within a minute.)
(7) After heater has been operating approximately one minute, set cabin temperature control at the desired setting.

If heater does not start:

(1) Reprime heater by turning cabin heater switch to FAN position and leave in this position for 30 seconds.
(2) To start, turn heater switch to HEAT.
(3) If heater does not start, return cabin heater switch to OFF and check circuit breaker labeled CABIN HEATER.
(4) If heater does not ignite after third attempted start, service is required and no further attempt should be made.

To stop heater:

(1) Return cabin heater switch to OFF. Do not turn battery switch off at this time.
(2) The heater combustion fan and the ventilating fan (on ground only) will continue to operate to act as cooling fans for the heater. When the heater has cooled off sufficiently, a thermostatic switch will automatically turn off the fans.
(3) After the heater has shut itself off, turn battery switch OFF.

AIR FLOW CONTROLS.

Two basic airflow controls are provided on the instrument panel and are located in the lower right center switch panel. These controls are the CABIN AIR control (5, figure 3) and the DEFROSTER control (7, figure 3).

The CABIN AIR control activates a valve which regulates the airflow to all vents except the defroster vents. When the control is full out, the valve is fully open permitting either cool or heated air to flow to all of the out-

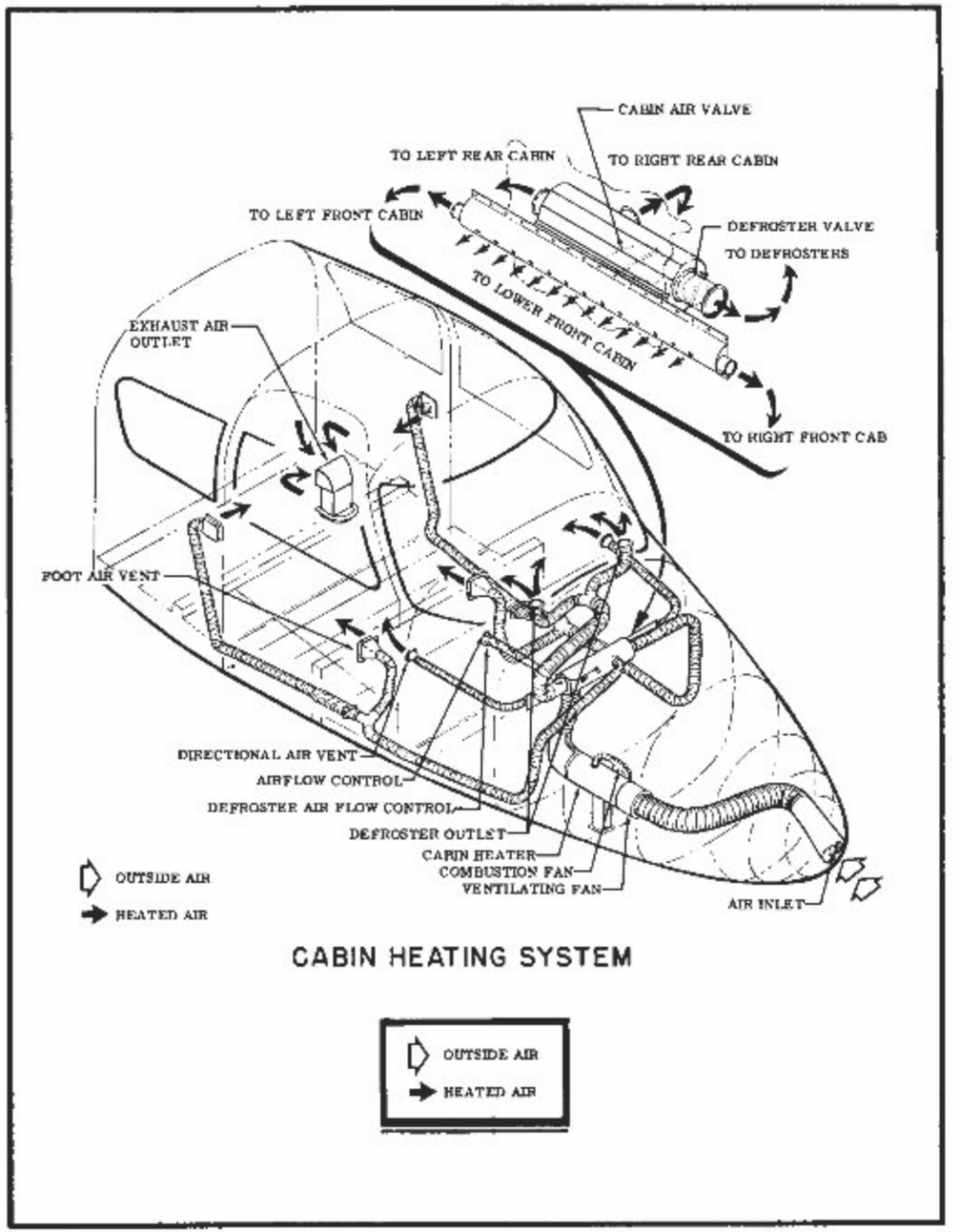


Figure 14. Heating System

let vents in the cabin. When it is full in, the valve completely closes off all airflow to all of the vents except the defroster vents. This control may be set in any intermediate position so that overall airflow may be selected as desired by the pilot.

The DEFROST airflow control (7, figure 3) works identically to the cabin air control except that it controls the airflow to the defroster outlet vents only. This control may be set in any position to supply only the desired quantity of air.

It is recommended that during heater operation at least one of the above controls be out at all times to prevent overheating of the heater. *If at anytime the heater does overheat,* the turn and bank indicator test light on the instrument panel will come on as a warning. This light (29, figure 1) is marked T & B TEST and OVERHEAT. *In the event that this light should come on,* the defrost and cabin air controls should be pulled out to allow a greater airflow through the heat exchanger. The heater will automatically restart itself after it cools sufficiently. *If, after a reasonable time, the overheat indicator light does not go out with the above controls open,* the heater should be shut down and checked for defects before any further operation.

CABIN TEMPERATURE CONTROL.

A cabin temperature control (8, figure 3) is also located on the lower center right hand switch panel and is marked TEMP CONTROL. This knob controls the setting of the cabin thermostat and is turned clockwise to increase the temperature. The cabin thermostat is located aft of the left rear window and maintains an even temperature in the cabin at all times during heater operation. When the cabin temperature reaches the selected setting of the temperature control, the heater goes from high heat into low heat and continues to deliver warm air to maintain this temperature. If the amount of warm air delivered to the cabin with the heater in the low position is not sufficient to maintain the selected cabin temperature, the heater cycles between the two positions to maintain an even cabin temperature.

AIR VENTS.

There are eight air outlets (including the defroster outlets) plus a row of vent holes along the cabin front forward of the rudder pedals. This row of vent holes is controlled by the cabin air control only, just as the defroster vents are controllable only by the defrost control. The other six vents are not only controllable by the cabin air control but can also be controlled individually at their outlets.

DIRECTIONAL AIR VENTS.

Two directional air vents (15 & 36, figure 1) are located at the cabin front on the two lower corners of the instrument panel. Two more are located in the cabin walls at either side of the rear seat. These four vents are adjustable both as to the amount of air flowing through them and the direction it is deflected. A knurled ring is provided around the outlet hole which controls a valve in the vent. Turning this ring clockwise opens the valve and it may be set in any position between full open and closed for any desired airflow. The heads of these outlets are full-swivel and may be turned in any direction by merely grasping the head and turning it to the desired position.

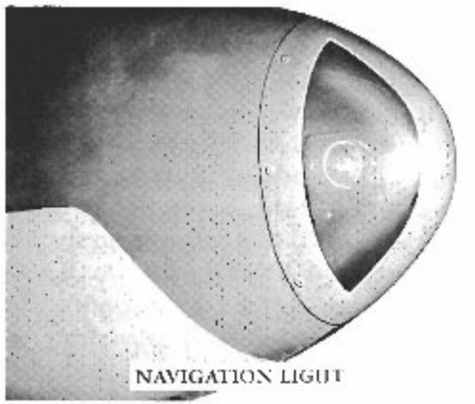
FOOT VENTS.

Two foot vents are provided to control air to the rear seat. One of these vents is located under each of the front seats pointing directly to the rear. These vents have shutter type valves in them which can be adjusted to give any desired amount of airflow. The vents should be open during heater operation.

LIGHTING EQUIPMENT.

NAVIGATION LIGHTS.

The navigation lights consist of a red light in the nose of the left wing tip tank nacelle, a green light in the nose of the right wing tip tank nacelle, and a clear light on the tip of the fuselage stinger. The navigation light switch (17, figure 5) is mounted in the lower left switch panel just to the left of the starter buttons. This switch is marked NAV LT, ON (up position), OFF (down position). A blinker is installed in the circuit which blinks the lights at regular intervals. This blinker does not have a switch to control its operation. The pilot can observe proper operation of the wing tip lights at night through the small holes in the inboard tip of the light housing. A resistor is provided in the navigation light circuit which dims the landing gear position indicator lights


NAVIGATION LIGHT

when the navigation lights are turned on. This helps eliminate cabin glare for efficient night vision.

LANDING AND TAXI LIGHTS.

A retractable landing light is mounted in the bottom of the left wing. Provision is made for an identical light under the right wing as optional equipment. Provision is also made for a taxi light to be mounted on the nose gear strut, as optional equipment. This taxi light is operated from the right landing light switch. The landing light switches (18 and 19, figure 5) are located in the lower left switch panel just to the left of the navigation light switch.

The right landing light switch is marked R LDG LT (up position), OFF (middle position), and RETRACT & TAXI (down position). The left landing light is marked L LDG LT (up position), OFF (middle position), and

RETRACT (down position).

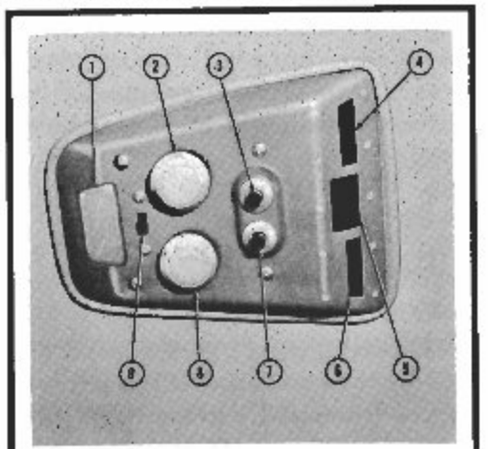
When the switches are moved to the up position, the landing lights extend and automatically go on when fully extended. The lights may be left in this extended position and turned off and on as desired by moving the switches between the OFF (middle position) and the (up position). To retract the landing lights and to turn on the taxi light, move the switches to RETRACT (down position for left switch) and RETRACT & TAXI (down position for right switch). The taxi light immediately turns on and the landing lights turn off and start retracting, automatically stopping when they are fully retracted.

It is impossible to have the right landing light extended and on when the taxi light is on; however, the left landing light may be used when the taxi light is on, if so desired.

The taxi light may be operated independent of the right landing light by moving the switch between the middle (OFF) position and the down (RETRACT & TAXI) position. These positions have no effect on the landing light unless it is extended and on. The right landing light and taxi light switch should always be left in the off position when neither light is in use. The left landing light switch may be left in the RETRACT (down position) when the light is not in use if so desired, but the OFF (middle position) is the recommended idle position for it.

INSTRUMENT LIGHTS.

Three instrument lights with their switches are mounted in the ceiling in the forward part of the dome light assembly. The two outboard lights are ultraviolet lights and are controlled both by the starter buttons, mounted directly behind them, and the left hand rheostat switch also located behind them. *To turn on these lights,* first turn the rheostat to full brightness (clockwise as far as it will go), then push the starter buttons until the lights come on. The rheostat may now be adjusted to the desired brilliance. *To turn them off,* simply turn the rheostat counterclockwise to its full OFF position. The middle light, which has a red lens, is controlled by the right hand rheostat. *To turn this light on,* simply turn the rheostat clockwise to its ON position, and adjust it to the desired brilliance. *To turn it OFF,* turn the rheostat counterclockwise as far as it will go.



INTERIOR LIGHTS CONSOLE PANEL

1. Dome Light
2. Red Instrument Light Rheostat
3. Right Ultraviolet Light Starter Button
4. Right Ultraviolet Light
5. Red Instrument Light
6. Left Ultraviolet Light
7. Left Ultraviolet Light Starter Button
8. Ultraviolet Light Rheostat
9. Dome Light Switch

DOME LIGHTS.

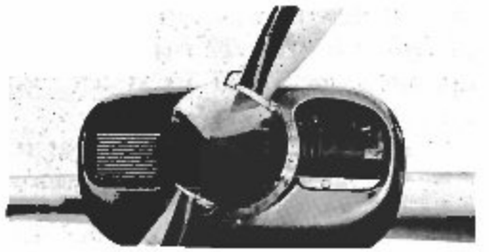
Two dome lights are provided in the cabin ceiling. One is located over the front seats immediately behind the instrument lights, and the other over the rear seats. The front dome light is controlled by a slide switch mounted directly in front of it. The rear dome light is also controlled by a slide switch which is mounted directly behind it.

FUEL SELECTOR VALVE LIGHT.

A light is provided to illuminate the two fuel selector valves. This light is mounted on the forward side of the front spar immediately above the selector valves. The control for this light is the rheostat (19, figure 3) mounted on the left side of the engine control pedestal. This rheostat also controls the switch panel and map light.

SWITCH PANEL AND MAP LIGHT.

A switch panel and map light is mounted on the left cabin wall just above the circuit breaker panel and is controlled by the rheostat switch (19, figure 3) which is mounted on the left side of the engine control pedestal. This light illuminates the switch panel and circuit breaker panel as well as serving as a map light. The light is adjustable directionally and incorporates a lens adjustment knob, integrally mounted on the rear of the light, which makes it possible to change the beam from spot to flood illumination.



PROPELLER ANTI-ICE SYSTEM. (Optional Equipment)

The propeller anti-ice system control (6, figure 3) is located on the lower right switch panel just above the cabin temperature control, except on alternate radio installations. This control is marked PROP ANTI-ICE and is an electrical rheostat which controls the anti-ice fluid electrical pump. The control is moved clockwise to increase speed and flow of the pump. It is marked OFF at its extreme counterclockwise position.

When the control is turned on, it

activates the pump causing the anti-ice fluid to flow through tubes to the propeller spinner slinger rings which distribute the fluid to the propeller blades. The pump and a reservoir tank, which holds four and one-half quarts of liquid, are located in the right wing, outboard of the nacelle. The pump's maximum output (extreme clockwise position of the rheostat) is approximately one quart every four minutes per propeller. The prop anti-ice fluid can be either MIL-F-5566 or MIL-A-6091.

Additional index marks, designating minimum (MIN) and maximum (MAX) flow rates of anti-ice fluid, are provided on the rheostat panel. To operate propeller anti-ice system, proceed as follows:

a. Just before entering suspected icing conditions, turn rheostat control to MAX (full on) for one minute to wet the blades.
b. At the end of one minute, turn rheostat control back to MIN position.
c. Adjust rheostat for more or less fluid depending on the sound of the ice. A slush sound against the fuselage is desired and fluid should be reduced until the slushing sound is heard. Sharp bangs show the ice is solid and more fluid is required.

NOTE

Never set rheostat between MIN and OFF, as fluid will not flow and pump will overheat.

Under average icing conditions, the above procedure will provide approximately one-half hour of anti-icing operation before the fluid is exhausted.

DE-ICE SYSTEM. (Optional Equipment)

A de-icing system for the wings and the horizontal stabilizer is available as optional equipment (see figure 15). The control for this system is an electrical switch (2, figure 3) on the lower right switch panel and is marked DE-ICE, OFF (down position) and ON (up position). When the switch is turned on, it allows an electrical timer to control valves which distribute air pressure and suction to the boots on the leading edges in alternate impulses (approximately once a minute). *Ice should be allowed to build up to at least ¼" before activating de-icers.*

After all ice is broken off, turn OFF the switch and repeat the cycle as necessary. This air pressure and suction is supplied by two engine-driven air pumps (one on each engine). Check valves in the lines prevent loss of air in the event one pump fails. When the system is not in operation, the pumps are continuously supplying suction to hold down the boots in flight.

Continuous operation at an icing level is not recommended. You cannot obtain the utmost performance from any airplane in icing conditions, therefore, it is advisable that upon encountering icing conditions you immediately seek a non-icing level.

A light is provided in the left engine nacelle which shines on the lead-

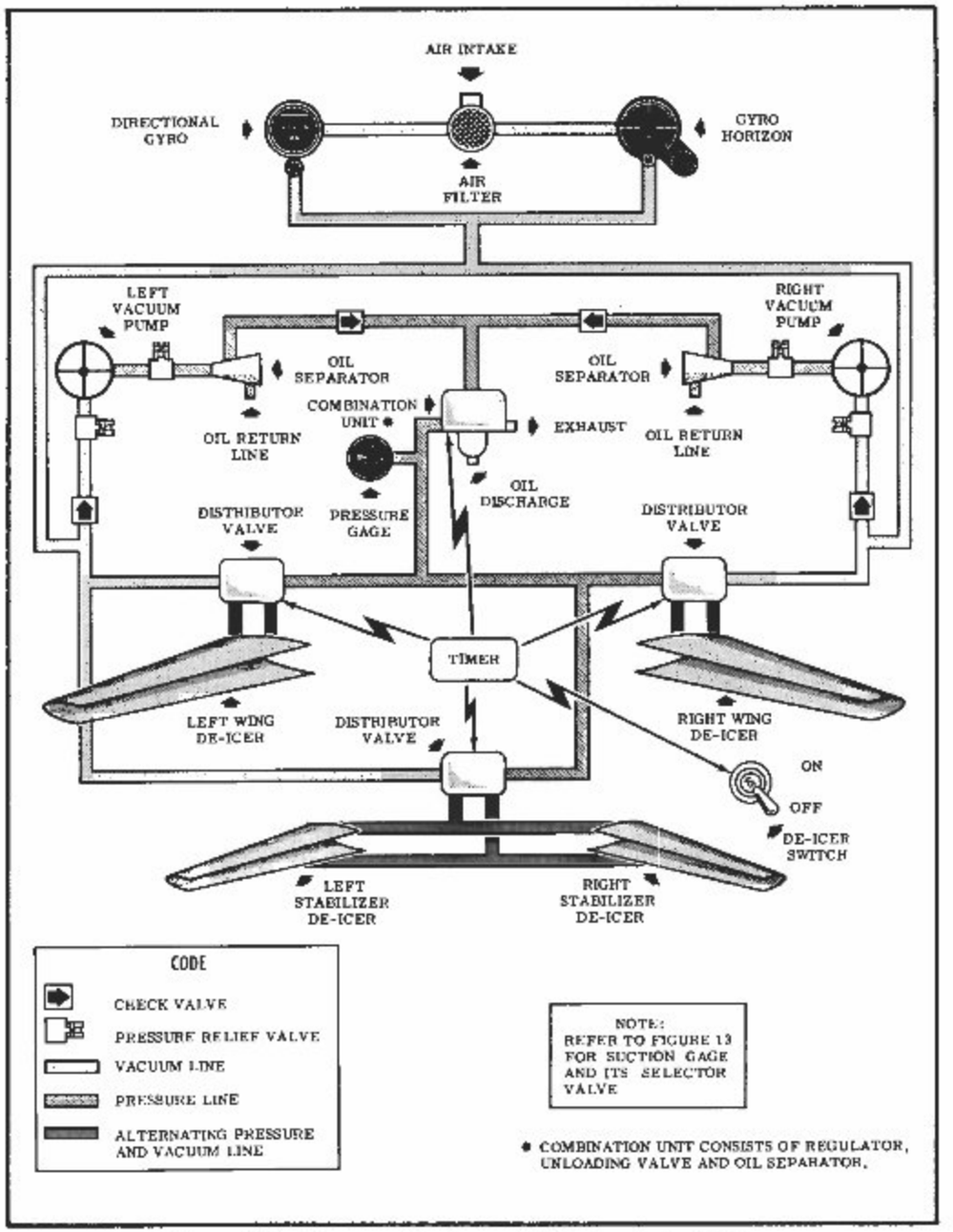


Figure 15. Vacuum System with De-ice Installation

ing edge so any ice forming or being removed may be observed at night. This light is controlled by a switch (4, figure 3) marked DE-ICE LT, OFF (down position), ON (up position), and is located directly below the de-ice switch. This light may be purchased as optional equipment, independent of the de-ice system.

MISCELLANEOUS EQUIPMENT.

CABIN DOOR

One door, incorporating a large, fixed, acrylic plastic window, is provided on the right side of the airplane for passenger entrance and exit. It is equipped with a key lock and a flush type door handle on the outside, a conventional type door handle on the inside, and a door stop.

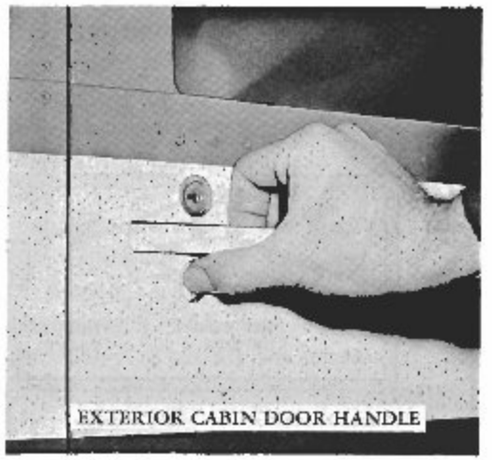
The key lock is located above the outside door handle and is operated by turning the key approximately 180 degrees. For your convenience, the key which operates the door lock also operates the baggage door.

The door stop is provided at the bottom edge of the door to hold the door open for easy loading of the airplane. *To engage the door stop,* open the door to the limit of its travel; *to disengage,* simply close the door.

The cabin door is equipped with one of two types of handle arrangements. On early airplanes, the interior door handle is located at the top of the door. On later airplanes, this handle is located below the window near the forward edge of the door. Refer to subsequent paragraphs for detailed descriptions of the door handles.

DOOR HANDLES (WITH INTERIOR HANDLE ABOVE WINDOW)

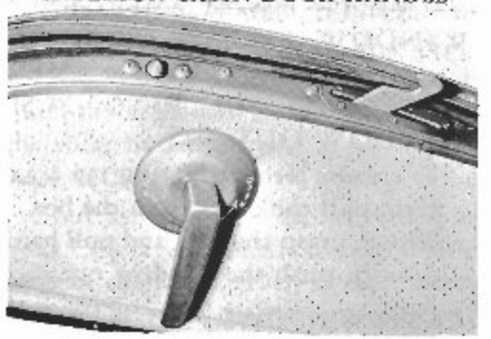
The interior door handle on this door is located at the top of the door and has three positions marked LOCK, CLOSE, and OPEN. A flush, pop-out type, door handle is installed on the outside of the cabin door and is actuated by a push button located immediately below the handle.


EXTERIOR CABIN DOOR HANDLE

To open the cabin door from the outside, push door handle button, grasp handle, and pull. *To close the door from the outside,* place the interior door handle in the CLOSE position and shut the door.

To open the cabin door from the inside, rotate the interior door handle counter-clockwise to the OPEN position and push door open until it engages the door stop. *To close the door from the inside,* place the interior door handle in the CLOSE position, grasp

INTERIOR CABIN DOOR HANDLE

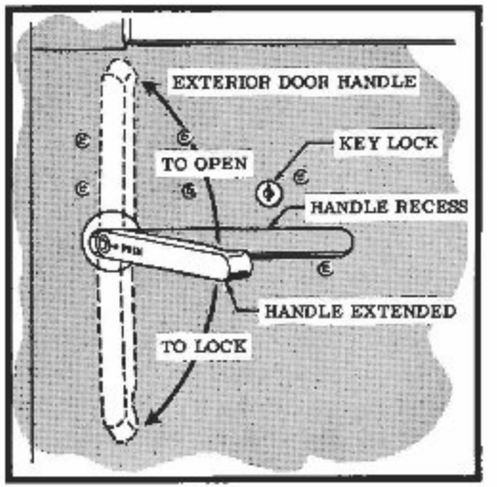


the arm rest, and shut the door. *To lock the door from the inside,* check to see that the door is latched, then rotate the interior door handle clockwise to the LOCK position. Rotating the handle to the LOCK position, causes a latch hook, located in the top of the door, to engage with a pin in the upper door jamb — thus securing the top of the door. *The door must be securely locked before take-off as it is difficult to lock in flight.*

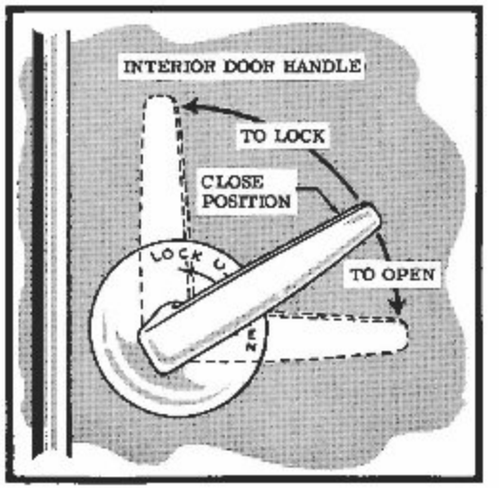
DOOR HANDLES (WITH INTERIOR HANDLE BELOW WINDOW)

The interior door handle on this door is located below the window near the forward edge of the door and has three positions marked LOCK, CLOSE, and OPEN. A flush, pop-out type, door handle is installed on the outside of the cabin door.

To open the cabin door from the outside, push on the aft end of the door handle, pull handle out and rotate counter-clockwise, then return handle to its recess. *To close door from the outside,* place the interior door handle in the CLOSE position and shut



the door. *To secure the door from the outside,* press on the aft end of the door handle, pull handle out, and rotate clockwise to its stop (approximately 90 degrees), then return the handle to its recess.



To open the cabin door from the inside, rotate the interior door handle clockwise to the OPEN position and open door until it engages the door

stop. *To close the door from the inside,* place the interior door handle in the CLOSE position, grasp the arm rest, and shut the door. *To lock the door from the inside,* check to see that the door is latched and rotate the interior door handle counter-clockwise to the LOCK position. Rotating the handle to the LOCK position drives a locking pin into the lower door jamb, forces the door latch deeper into the latch plate, and causes a hook, located in the top of the door, to engage with a pin in the upper door jamb. *The door must be securely locked before take-off as it is difficult to lock in flight.*

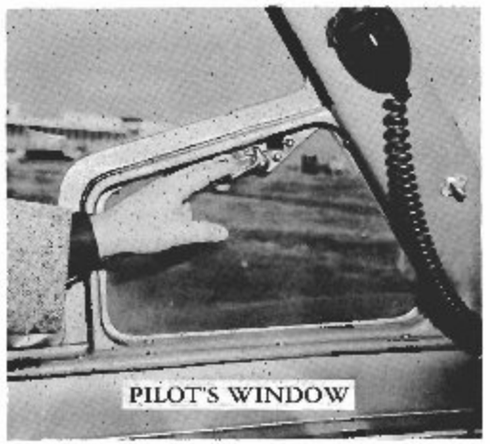
EMERGENCY EXIT.

The left rear window is provided as an emergency exit in that the whole window can be popped out as a unit when the emergency release is pulled. This emergency release is located in the left cabin wall just forward of and below the left rear window. It consists of a red ring attached to a cable installed in a box with a plexi-glass cover. This cover has a hole in the center and is marked EMERGENCY WINDOW RELEASE, PULL. The left rear window is marked EMERGENCY EXIT, PULL RING—PUSH WINDOW OUT.

To operate the exit:
First, pull the cover from the box,
Second, grasp the ring and pull hard,
Finally, push the window out.

CABIN WINDOWS.

All windows in the cabin are of the fixed type and cannot be opened, with the exception of the small pilot's window which is installed in the lower front corner of the large left front window. This pilot's storm window opens out and down and has a latch at the top. To open the window, push center button and rotate the latch counterclockwise to its limit and push window open. The window has a stop which holds it open at approximately



90°. *Do not open the window above 130 mph.* To close the window simply pull closed and rotate the handle clockwise to its limit to latch. Opening this window will permit the cabin door to close more easily by relieving pressure within the cabin. All of the side windows are tinted in order to reduce the solar heat transfer.

ASH RECEIVERS.

Four ash receivers are provided in your Cessna 310. One is located beside each of the front seats in the cabin walls. The remaining two are located at each end of the rear seat, also in the cabin walls.

CIGARETTE LIGHTERS.

Two cigarette lighters are provided. One (37, figure 1) is mounted on the lower left hand corner of the instrument panel. The other is located in the lower side of the right rear window sill. A replaceable fuse is located at the end of the lighter receptacle. If the lighter fails to function properly, this fuse should be checked and replaced, if faulty.

COAT HANGER HOOKS.

For your convenience, two coat hanger hooks have been installed in the cabin ceiling above the back of the rear seat. Your coats can be hung, full-length and wrinkle-free, between the back of the rear seat and the baggage shelf, without interfering with the comfort of rear-seat passengers.

REAR WINDOW CURTAINS.

Each rear window has a curtain which slides on a rod at top and bottom. These curtains may be pulled forward to cover the entire rear window and shut out sunlight or pushed aft to the window where they do not obstruct vision.

CABIN RADIO LOUDSPEAKER.

A cabin radio loudspeaker (1, figure 3) is located at the lower center of the instrument panel. The volume of the speaker is controlled by the volume control on the radio unit.

MICROPHONE AND EARPHONE HOOKS.

Two hooks are provided on the post between the left front window and the windshield. The upper hook fits a grooved slot in the back of the microphone and the lower provides a place to stow the earphones when not in use.

SUN VISORS.

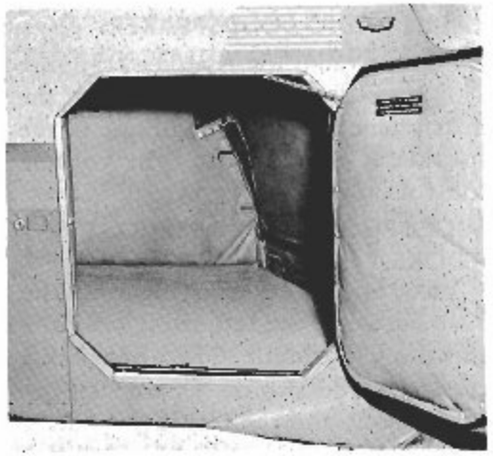
Two sun visors are provided on the ceiling above the windshield directly forward of each front seat. These sun visors are adjustable as to angle up and down and are full swivel so that they may be moved to either the front or the side window.

MAP-GLOVE COMPARTMENT.

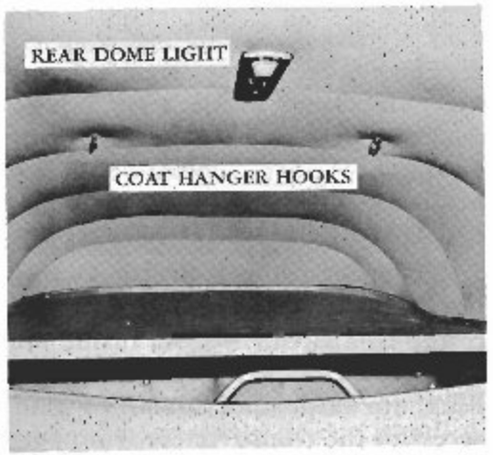
A map-glove compartment (17, figure 1) is located on the right side of the instrument panel. *To open, pull out* on the map-glove compartment door handle.

BAGGAGE COMPARTMENT.

A baggage compartment is located just aft of the rear seat. To gain access to the compartment from inside the airplane, rotate the top of the rear seat back, forward, and down. To gain access to the compartment from outside the airplane, a baggage door is located just aft of the wing on the right side of the fuselage. A recessed push-button just aft of the door opens the baggage door. A lock is provided



just aft of this push-button and is operated by the same key that operates the cabin door lock. A limit chain is used as a door stop to prevent the door from being opened back against the fuselage. The door is closed by pushing the door shut until the latch catches.



UTILITY SHELF.

A spacious utility shelf is located just above the baggage compartment. This shelf will prove very handy for storing hats, brief cases, and small articles.

BAGGAGE COMPARTMENT LIGHT.

A baggage compartment light is mounted in the baggage compartment wall just above and forward of the baggage door. This light is operated by a slide switch which is mounted just forward of it.

ASSIST STEP.

A retractable assist step provides easy access to the wing walk and requires no attention from the pilot. The step is attached to the linkage of the main landing gear and extends and retracts with this gear.

LOADING YOUR CESSNA 310.

There are several different ways to "load" your Cessna, all of which are satisfactory. However, from experience, we have found the following sequence of steps to be most satisfactory under average loading conditions as it allows the pilot to supervise the loading of the aircraft.

First, load your baggage in the baggage compartment

Second, load the rear seat

Third, load the right front seat

Finally, the pilot steps in behind the right front seat and forward thru the aisle to the left front seat

A loading schedule is provided with each airplane for your convenience in checking the airplane gross weight and center of gravity position should it become necessary. Under most normal conditions the airplane loading will be within limits and no check is needed.

SECTION II

OPERATING CHECK LIST

AFTER FAMILIARIZING YOURSELF with the equipment of your Cessna 310, your primary concern will be the operation of the airplane. This section lists in Pilot's Check List form the steps necessary to operate your Cessna efficiently and safely. It is intended to expand the normal check list in the airplane with additional information useful to the pilot.

The flight and operational characteristics of the Cessna 310 are normal in all respects. There are no "unconventional" operating characteristics that need to be mastered. All controls respond in the normal way within the entire range of operation of the airplane.

All airspeeds mentioned in sections II, III, and IV are indicated airspeeds. Corresponding true indicated airspeeds may be obtained from the airspeed correction table in section VI.

BEFORE ENTERING AIRPLANE.

(1) Perform an exterior inspection (see figure 16).

BEFORE STARTING ENGINE.

(1) Adjust seats to a comfortable position and fasten safety belts.
(2) Lock cabin door.
(3) Remove control lock if used and stow in glove compartment.
(4) Check landing gear switch "DOWN."
(5) Generator switches "ON."
(6) Battery switches "ON."
(7) Check circuit breaker panel for faulty circuits.
(8) Check fuel quantity gage.
(9) Check left engine fuel selector valve "ON LEFT TANK," and right engine fuel selector valve "ON RIGHT TANK."

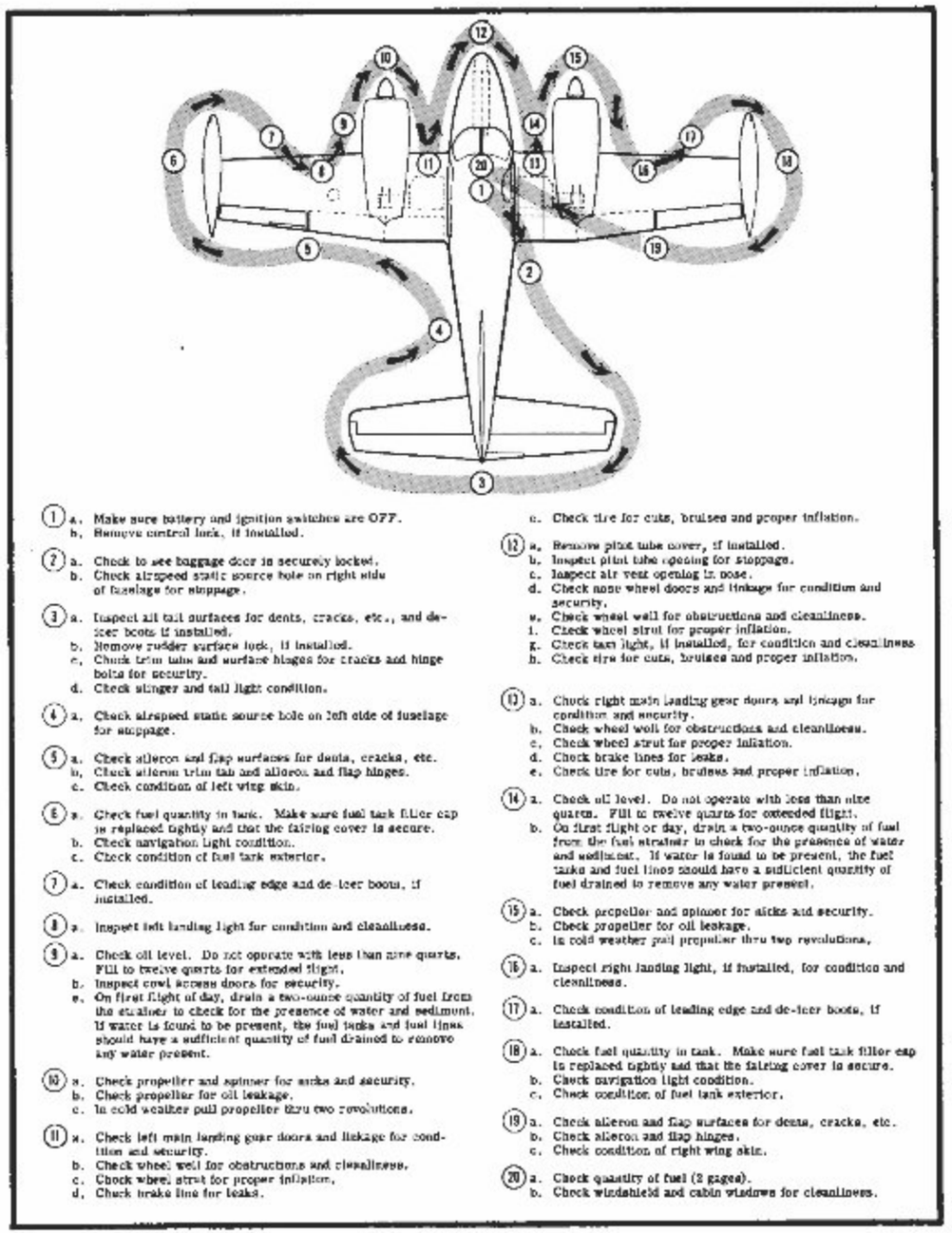


Figure 16. Exterior Inspection

(10) Adjust elevator trim tab to "TAKE-OFF" range.
(11) Adjust rudder trim tab pointer to neutral position.
(12) Adjust aileron tab to neutral and check tab position visually.
(13) Set altimeter and clock.
(14) Turn all radio switches "OFF."
(15) Release parking brake and test operate brakes, noting any "spongy" action or excessive brake pedal travel.
(16) Check flight controls for free and correct movement.
(17) Set parking brake.
(18) For night flying, test operate all exterior and interior lights and check condition of flashlight.

STARTING ENGINE. (Left engine first)

(1) Set mixture control full forward for "FULL RICH."
(2) Set propeller control full forward for "HIGH RPM."
(3) Open throttle approximately ½ inch.
(4) Turn ignition switches "ON."
(5) Clear the propeller.
(6) Depress starter button.
(7) After several engine revolutions turn fuel boost pump "ON."
(8) In cold weather engage primer switch ½ second at a time if required.

NOTE

If engine fails to start, it is probably loaded since downdraft carburetors tend to load easily. Repeat starting procedure with throttle open approximately ½, mixture control in idle cut-off, and fuel boost pump "OFF." As engine fires move mixture control to full rich and decrease throttle to idle position. Avoid leaving mixture control in full rich position with fuel boost pump turned on.

(9) Check for an oil pressure indication within 30 seconds in normal weather and 60 seconds in cold weather. *If no indication appears shut off engine and investigate.*
(10) Disconnect external power — if used.

WARM-UP AND GROUND TEST. (During taxiing)

(1) Set both engines at 800 to 1,000 rpm.
(2) Turn radio "ON" if required.
(3) Continue the warm-up while taxiing out to the active runway.
(4) In extremely cold weather, use carburetor alternate air ("HEAT" position) only if necessary for smooth engine operation.

(5) Stop the airplane at the "run up" location with nose wheel straight and set parking brake. To avoid propeller tip abrasion, do not run up engine on loose cinders or gravel.
(6) Turn fuel boost pump "OFF" momentarily to check engine driven fuel pump pressure and operation.
(7) Advance throttle to 1700 rpm with control wheel neutral or forward.
(8) Check engine instruments for operation.
(9) Check generator operation.
(10) Set flight instruments (check operation of each vacuum pump thru use of vacuum source selector valve).
(11) Check magnetos (100 rpm maximum allowable drop).
(12) Check carburetor alternate air source operation by noting rpm and manifold pressure drop.
(13) Retard propeller control until engine speed drops to 1000 rpm, then advance to full forward position.

NOTE

If propeller operation has been unusually sluggish or erratic, feather propeller twice to 600 rpm in run up, retarding throttle as necessary to avoid excessive manifold pressure at low rpm. Exercising the propeller in this manner insures optimum propeller governing in flight.

(14) If engine accelerates smoothly and oil pressure remains steady at some value between 30 and 60 PSI, the engine is warm enough for take-off.

BEFORE TAKE-OFF OR DURING TAXIING.

(1) Recheck free and correct movement of flight controls.
(2) Recheck elevator trim tab for "TAKE-OFF" range.
(3) Recheck rudder trim tab for neutral position.
(4) Recheck aileron trim tab for neutral and check tab visually.
(5) Check carburetor alternate air source at "COLD."

CAUTION

Maximum power is reduced approximately 7% when carburetor alternate ("HEAT" position) air is applied. *Avoid intermediate positions of alternate air source control for proper engine operation.*

(6) Recheck propellers in "HIGH RPM" position (full forward).
(7) Check fuel boost pumps "ON."

TAKE-OFF.

NORMAL TAKE-OFF.

(1) Flaps 0°.
(2) Apply full throttle smoothly to avoid propeller surging.
(3) Maintain airplane in level attitude in take-off run.
(4) Keep heels on floor to avoid dragging brakes.
(5) Apply slight back pressure to raise nose wheel as airplane approaches flying speed.
(6) After take-off, level off and accelerate to 93 mph (minimum single engine control speed).
(7) Apply toe brakes momentarily to stop wheel rotation.
(8) Retract landing gear.
(9) Accelerate to 123 mph (best rate-of-climb speed).
(10) Turn fuel boost pumps "OFF" individually, checking final fuel pressure indications.

MINIMUM RUN TAKE-OFF.

(1) Extend flaps 15°.
(2) Hold brakes while applying full throttle.
(3) Release brakes and maintain a moderately tail-low attitude when take-off speed is approached.
(4) Keep heels on floor to avoid dragging brakes.
(5) Fly airplane off ground in a tail-low attitude.

OBSTACLE CLEARANCE TAKE-OFF.

(1) Extend flaps 15°.
(2) Hold brakes while applying full throttle.
(3) Release brakes and maintain a slightly tail-low attitude when take-off speed is approached.
(4) Keep heels on floor to avoid dragging brakes.
(5) Retract landing gear when airplane is airborne.
(6) Accelerate to 103 mph (best angle-of-climb speed).
(7) After obstacle is cleared, accelerate to 123 mph (best rate-of-climb speed).
(8) Retract wing flaps slowly.

CROSSWIND TAKE-OFF.

(1) Use minimum flap setting necessary for runway length.
(2) If necessary, carry additional power on the upwind engine until the rudder becomes effective.
(3) Accelerate to a slightly higher than normal take-off speed by holding nose wheel on ground; then take-off abruptly so that airplane will not settle to the runway while drifting.

(4) When clear of ground, make a coordinated turn into the wind to correct for drift.

ENGINE FAILURE DURING TAKE-OFF BELOW 93 MPH.

(1) Cut power and decelerate to a stop.

ENGINE FAILURE AFTER TAKE-OFF ABOVE 93 MPH WITH OBSTRUCTIONS AHEAD.

(1) Push engine controls full forward for maximum power.
(2) Retract landing gear.
(3) Determine inoperative engine (idle engine same side as idle foot).
(4) Feather propeller on inoperative engine.
(5) Set trim tabs for single-engine climb.
(6) Climb at 110 mph if flaps are retracted, and at 108 mph if flaps are 10°, or 103 mph if flaps are 15°.
(7) Accelerate to 121 mph and retract flaps slowly after obstacle is cleared.
(8) Secure dead engine by turning OFF boost pump, ignition switches and fuel selector valve, and putting mixture control in IDLE CUT-OFF.

CLIMB.

TWIN ENGINE.

(1) In normal operation, if no obstacle is ahead, climb out with flaps retracted at 130-140 mph, with 23 inches of manifold pressure and 2300 rpm.
(2) With obstacle ahead after take-off, climb at 103 mph (best angle-of-climb speed) with gear and flaps retracted using full throttle and 2600 rpm.
(3) For maximum rate of climb, use full throttle and 2600 rpm at 123 mph, decreasing climb speed to 119 mph at 10,000 feet.
(4) Mixture should be full rich unless engine is rough due to rich mixture.

SINGLE ENGINE.

(1) If no obstacle is ahead, climb out with gear and flaps retracted at 121 mph, with full throttle and 2600 rpm.
(2) With obstacle ahead, climb out with gear and flaps retracted at 110 mph with full throttle and 2600 rpm.
(3) For maximum single-engine climb, bank airplane 5° toward operative engine, allowing full rudder trim tab to hold airplane straight.
(4) Mixture should be full rich unless engine is rough due to rich mixture.

CRUISING.

(1) Select cruising power setting from range charts (See Section VI). Normal cruising power settings are 23 inches and 2300 rpm and maximum cruising power settings are 24 inches and 2450 rpm.
(2) After speed is stabilized, trim airplane.
(3) Lean engines individually until slight roughness or loss of power is perceptible; then enrichen mixture slightly beyond the setting required for smooth engine operation. Check cylinder head temperature for abnormal change after leaning.
(4) Adjust friction knob to prevent engine controls from creeping.

ENGINE FAILURE DURING FLIGHT.

(1) Increase power to maintain altitude and airspeed.
(2) Determine inoperative engine (idle engine same side as idle foot).
(3) Trim rudder for single engine flight.
(4) Check fuel pressure and, if deficient, turn fuel boost pump "ON."
(5) Check fuel quantity and switch to opposite tank if necessary.
(6) Check oil pressure and oil temperature indications and shut down engine if oil pressure is low.
(7) Check ignition switches.
(8) If proper corrective action was taken, engine will restart.
(9) If cause of failure was not determined, put mixture in "IDLE CUT-OFF."
(10) Feather inoperative propeller.
(11) Secure dead engine by turning boost pump, fuel selector valve, and ignition switches "OFF."
(12) Turn electrical equipment "OFF" as required to eliminate a negative reading on the ammeter, thus preventing unnecessary battery drain.
(13) Select cruise power setting on good engine.
(14) Trim airplane 3-5° wing low on the side of the operative engine.
(15) Land at the nearest suitable airport.

RESTARTING ENGINE IN FLIGHT. (After feathering)

(1) Check fuel selector valve "ON."
(2) Advance throttle forward until gear warning horn is silent.
(3) Advance propeller control forward to feathering detent.
(4) Turn ignition switches "ON."
(5) Set mixture control full forward for full rich.
(6) Depress starter button.
(7) After several engine revolutions turn fuel boost pump "ON."
(8) In cold weather engage primer switch ½ second at a time if required.
(9) After engine starts, turn fuel boost pump "OFF."

NOTE

If start is unsuccessful, turn magneto and boost pump switches

"OFF," retard mixture control to "IDLE CUT-OFF," open throttle fully, and engage starter for several revolutions. Then repeat air start procedure.

LET DOWN.

(1) Set mixture control full rich.
(2) Reduce power to obtain desired let down rate at cruising speed.
(3) For steep let downs decrease speed to 130 mph or less and extend landing gear.

BEFORE LANDING.

(1) Check right engine selector valve to "RIGHT TANK" and left engine selector valve to "LEFT TANK." (If there is sufficient fuel in both tanks).
(2) Recheck mixture full rich.
(3) Extend landing gear below 130 mph.
(4) Check for green landing gear light indicator.
(5) Carburetor alternate air source should be "COLD" unless severe icing conditions prevail.
(6) Turn fuel boost pumps "ON."
(7) Set propeller controls for 2600 rpm (full forward) for maximum power in case of a go-around.
(8) Lower flaps below 130 mph to 30-45°.
(9) Trim airplane for approach condition.
(10) Approach at approximately 95 mph with or without power.

LANDING.

NORMAL LANDING.

(1) Land on main wheels first.
(2) Lower nose wheel gently to the runway after speed is diminished.
(3) Avoid excessive braking unless obstacle is ahead.

SHORT FIELD LANDING.

(1) Extend flaps fully to 45°.
(2) Approach at 80-90 mph with as little power as practicable.
(3) Make a normal flare-out, reducing power if possible in the flare-out.
(4) Land on main wheels first, immediately cutting power if used.
(5) Lower nose wheel to ground immediately after touch-down.
(6) Apply heavy braking as required.

CROSSWIND LANDING.

(1) Use minimum flap setting required for field length.
(2) Approach with airplane crabbed into wind at normal approach speed.

(3) Immediately before touchdown, align airplane with the flight path by applying downwind rudder.
(4) Land in a nearly level attitude.
(5) Lower nose wheel to runway immediately after touchdown.
(6) Hold straight course with steerable nose wheel and occasional braking if necessary.

SINGLE-ENGINE LANDING.

(1) Approach at 105 mph with excess altitude.
(2) Delay extension of landing gear until within gliding distance of field.
(3) Avoid use of flaps until landing is assured.
(4) Decrease speed below 93 mph only if landing is a certainty.

NOTE

When speed drops below 93 mph, the airplane is committed to land because a climb out at full power is impossible at any speed lower than single engine minimum control speed.

(5) Land with some excess speed to allow for gusts, poor technique, etc.
(6) Maintain enough momentum to turn off the active runway without power because single-engine taxi is difficult at slow speed in certain wind conditions.

GO-AROUND. (Single engine)

(1) If absolutely necessary and speed is above 93 mph, apply full throttle and increase engine speed to 2600 rpm.
(2) Retract landing gear.
(3) Reduce flap setting to 10°.
(4) Climb at 121 mph (110 mph with obstacles directly ahead).
(5) Trim airplane for single engine climb.
(6) Retract flaps as soon as all obstacles are cleared and a safe altitude and airspeed are obtained.

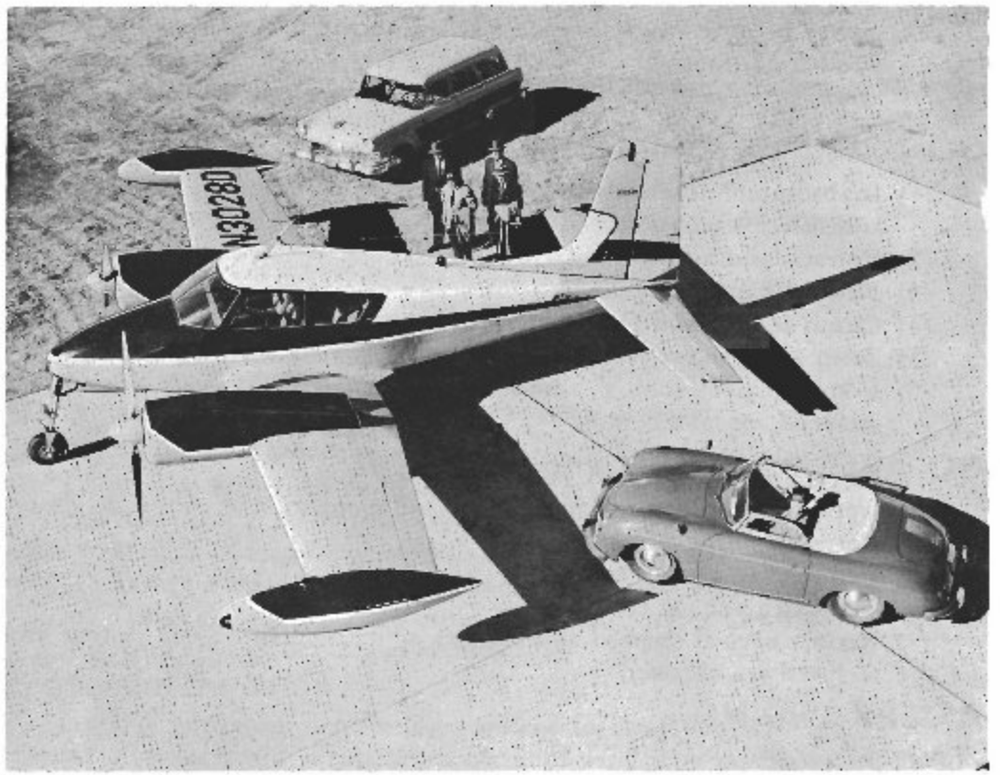
GO-AROUND. (Twin engine)

(1) Apply full throttle and increase engine speed to 2600 rpm if necessary.
(2) Retract landing gear.
(3) Reduce flap setting to 10°.
(4) Trim airplane for climb.
(5) Retract flaps as soon as all obstacles are cleared and a safe altitude and airspeed are obtained.

AFTER LANDING.

(1) Retract flaps.

(2) Park with nose wheel aligned straight ahead if possible. (If gusty wind conditions prevail, caster the nose wheel to the extreme right or left position. This action will help to protect the rudder from wind damage.)
(3) Turn fuel boost pumps "OFF."
(4) Stop engine by putting mixture control in "IDLE CUT-OFF."
(5) After engine stops turn ignition switch "OFF."
(6) Turn switches "OFF."
(7) Set parking brakes.
(8) Install control lock if required.



SECTION III

OPERATING DETAILS

THIS SECTION GIVES in narrative form detailed information on those check list items in Section II that require further explanation.

CLEARING THE PROPELLER

Since the wing obscures ground crew personnel when they are draining the fuel strainer or connecting the external power source to the airplane it becomes doubly important to clear the propeller properly before starting. Calling out "clear" in loud tones is best. An answering "clear" from visible ground crew personnel is the response that is required.

ENGINE OPERATING PROCEDURE.

STARTING.

It is important to remember that these engines will tend to flood more easily than conventional lightplane engines because of the downdraft type carburetor in conjunction with a fuel boost pump. For this reason the starting procedure is designed to prevent flooding or loading the engine. For example the boost pump is not operated until the engine has been turned over several revolutions. If by accident the mixture control is in "FULL RICH" position and the fuel boost pump is ON" with the engine not turning over, fuel will flow through the carburetor into the intake manifold. Depending upon the time interval it is possible to collect as much as one to two pints of solid fuel in the intake manifold. If this happens, it is advisable to wait several minutes while the solid fuel escapes through the automatic valves located in the most desirable positions in the intake manifold system to drain the fuel while the airplane is in normal level attitude on the ground.

Engine mis-starts with weak intermittent explosions followed by puffs of black smoke from the exhaust stacks indicate overpriming or flooding. Excess fuel can be cleared from the combustion chambers by setting the mixture control in "IDLE CUT-OFF" position, throttle "FULL OPEN," ignition switch "OFF" and then cranking the engine through several revolutions.

If the engine is underprimed which is more likely in cold weather with a cold engine, repeat starting instruc-

tions and energize the electric primer at more frequent intervals.

WARM-UP.

Most of warm-up should be accomplished during taxi. The engine speed should not exceed 1600 rpm while the oil is cold. Since the engine is closely cowled for efficient in flight cooling, precaution should be taken to avoid overheating on the ground. Full throttle checks on the ground are not recommended unless the pilot has good reason to suspect that the engine is not turning up properly.

ENGINE OPERATION DURING TAKE-OFF.

Since full throttle is not recommended in the static run-up it is important to observe full throttle engine operation early in the take-off run. Any signs of rough engine running, unequal power between engines, or sluggish engine acceleration is good cause for discontinuing the take-off. If this occurs the pilot is justified in making a thorough full throttle static run-up before another take-off is attempted.

Full throttle operation is recommended on take-off because it is important that minimum single-engine control speed (93 mph) be obtained as rapidly as possible. In addition it is desirable to accelerate to best single engine climb speed (121 mph) without delay. However, after this speed is reached power should be decreased as soon as practicable to avoid unnecessary engine abuse.

ENGINE OPERATION DURING CLIMB.

Part throttle engine operation is recommended for climbs at low altitude where high engine power is available. At higher altitudes where relatively low power is obtainable and when the engine has had time to warm up sufficiently full throttle operation in climbs may be used.

Engine speeds above 2450 rpm increase the rate of climb only slightly, because part of the extra horsepower output of the engines is lost due to lower propeller efficiency at high engine speeds. Therefore, only a slight gain in rate of climb at 2600 rpm is accomplished with an appreciable increase in fuel consumption.

ENGINE OPERATION DURING CRUISE.

Maximum power for cruise is obtained with 24 inches of manifold pressure and 2450 rpm. Greater range can be obtained with lower power settings as shown in range charts (See Section No. VI). These ranges are based on flight test data with lean mixture at all altitudes. Mixture leaning is accomplished as follows: Pull mixture control back until engine roughness or loss of power becomes barely perceptible, then enrichen mixture slightly beyond this point. Check cylinder head temperature for any abnormal rise after leaning. Repeat this procedure with opposite engine. Any change in altitude, power, or carburetor alternate air requires a change in lean mixture setting.

The pressure carburetors on these engines are considered to be a non-icing type. In addition the internal location of the carburetor air intake should preclude the possibility of impact ice covering the intake air filter. Therefore, the only need for the carburetor alternate air would be to provide warm air to the carburetor to improve fuel vaporization and mixture distribution in extremely cold temperature. If rough engine operation in cold weather indicates this need, the alternate air source controls should be fully opened (out position). This action closes butterfly type valves in the air intake ducts which results in a momentary suction in these ducts. The suction pulls open spring loaded valves located between the carburetors and the closed butterfly valves, allowing warm air to flow from the accessory compartment into the carburetors. It can be seen that partial carburetor alternate air application is to be avoided, since this would result in low power at full throttle, erratic airflow through the carburetor, and possible rough engine operation due to poor mixture distribution.

Selection of a cruising engine speed should be made after the following factors have been considered:

(1) The use of high power with low engine speed results in excessive internal pressure in the cylinders. This condition gives one the impression that the engine is laboring. High pressures in the cylinder cause high stresses and detonation at high temperatures.

(2) At the other extreme, high engine speeds result in harmful reciprocating and centrifugal strains as well as excessive engine wear and high fuel consumption.

It is suggested that for a given throttle setting one should select the lowest engine speed in the green arc range that will give smooth engine operation with no evidence of engine laboring.

ENGINE OPERATION DURING LET DOWN.

Let downs should be performed with mixture "RICH," and enough power to keep engine warm and cylinders clear. The throttles are normally retarded until the landing gear horn blows and then advanced enough to silence the horn. If a steeper let down is desired at slower speed it is best to decrease the speed to 130 mph and extend the landing gear. The propeller control may be left in cruising rpm position.

IDLING ENGINE.

The engine is set to idle below 600 rpm to insure satisfactory taxi control. However, prolonged idling should be done at 800 to 1,000 rpm to insure satisfactory piston lubrication.

STOPPING ENGINE.

The engine should be allowed to idle (800 rpm) for a minute or two before stopping. This idling period is usually accomplished while taxiing

back to the parking area. This not only permits the temperature of the various engine parts to equalize, but works oil up around the pistons and rings, thus leaving the engine in good condition for the next start.

The engine should be stopped by placing the mixture control in idle cut-off position. Do not open the throttle as the engine stops. After the engine stops turn the ignition switches "OFF."

TAXIING.

Steering is performed with the aid of nose wheel steering, rudder, differential power, and differential braking on the main wheels. These aids are listed in the preferred order of use. With practice the use of differential power becomes especially useful in steering.

If the airplane is parked with the nose wheel turned fully in either direction initial taxiing should be done with caution. To straighten the nose wheel it is recommended that full opposite rudder and differential power be applied instead of differential braking. After several feet of forward travel the nose wheel will steer normally. The nose wheel steering mechanism provides positive control up to 15° left or right and free turning from 15° to 55° for sharp turns. This allows a minimum turning radius within a few inches of the tread width of the airplane.

Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller tips. Static engine run-ups over loose gravel can chew up propeller tips in a few seconds.

When parking the airplane align the nose wheel straight ahead before stopping. This simplifies the steering during subsequent departures from the parking area.

TAKE-OFF.

Before take-off from moderately short fields it is worthwhile to mentally review emergency procedures as minimum single engine control speed, single engine procedure with emphasis on inoperative engine determination, best single engine climb speeds, etc.

The use of 15° flaps reduces the ground run and the total distance over a 50 foot obstacle by approximately 13 per cent.

After take-off the toe brakes should be applied momentarily to stop wheel rotation. A rapidly rotating wheel causes the tires to "grow" due to centrifugal force. If an accumulation of mud or ice is present in the wheel well it is possible to get a rubbing action from the rotating wheel as it is retracted into the wheel well.

The best time to retract the landing gear after take-off is at that point along the runway where a wheels down forced landing on that runway would become impracticable. To minimize unnecessary strain on the landing gear retraction motor, the airplane should be climbing straight ahead during gear retraction. Turning flight imposes an additional "g" load which effectively increases the weight of the landing gear. Under conditions of sharp turning and gusty air it is possible to overload the landing gear motor to the point of blowing a circuit breaker. This can be detected by the absence of a "gear up" RED LIGHT after a normal length of time has elapsed since starting gear retraction. To complete the retraction cycle, push the landing gear circuit breaker after allowing it to cool for several minutes.

CLIMB.

NORMAL CRUISING CLIMB.

A cruising climb at 23 inches manifold pressure, 2300 rpm and 130-140 mph is recommended for saving time and fuel for the overall trip. In addition, this type of climb provides better engine cooling, less engine wear, and more passenger comfort due to lower noise level.

BEST RATE-OF-CLIMB.

Best rate-of-climb speed is that speed which allows the airplane to reach a given altitude in the shortest time using maximum power. This speed varies from 123 mph at sea level to 117 mph at 15,000 feet.

BEST ANGLE-OF-CLIMB.

Best angle-of-climb speed is that speed which produces the steepest flight path over an obstruction at maximum power, with gear and flaps retracted. This speed varies from 103 mph at sea level to 106 mph at 7,000 ft. These speeds are normally used only with obstructions ahead; therefore, the less effective engine cooling noticeable at these low speeds is present for only a short duration.

With gear down and flaps 15° the best angle of climb speed is approximately 79 mph below 7,000 ft.

CRUISE.

Tabulated cruising information for normal cruising power and altitudes are presented in Section No. VI. More detailed information for cruising at speeds for best range and at altitudes up to 20,000 feet are presented in the form of graphs in Section number VI also. These charts are based on 100 gallons of fuel for cruise, lean mixture, 4600 pounds gross weight, zero wind, and no fuel reserve. Allowances for warm-up, take-off, climb, headwinds, variations in mixture leaning technique, and fuel reserve should be made and are in addition to those shown in the charts.

Since the main advantage of the airplane over ground transportation is speed, one should utilize the HIGH cruising speeds obtainable. However, if a destination is slightly out of reach in one flight at normal cruising speed it would save time and money to make the trip non-stop at some lower speed. An inspection of these cruising graphs shows the long ranges obtainable at lower cruising speeds.

Normal cruising is done between 60% and 70% power. The power settings required to obtain these % powers at various altitudes and outside air temperatures are shown in Section VI. A maximum cruising power of approximately 75% is allow-

able with 24 inches of manifold pressure and 2450 rpm at 5300 feet.

Sychronization of the propellers is accomplished by setting one propeller at the desired engine speed, turning the friction control knob to prevent propeller control creep, and then adjusting the other propeller control until the tachometer needles are aligned one over the other. If synchronization is slightly off, as indicated by an intermittent noise "beat," one propeller control should be adjusted to eliminate this beat. Synchronization is simplified by limiting the adjustments to only one propeller. To avoid slack in controls make final movement of controls in a decreasing rpm direction.

NIGHT FLYING.

Before starting the engine for a night flight, sufficient interior illumination is desired to check all switches, controls, etc. Rheostats located under the instrument panel on the left side, on the control pedestal below the elevator trim control, and overhead in the panel lighting group should be turned up to required lighting intensity. In addition the overhead dome light may be used if desired. The flexibly mounted map light below the left windshield post may be rotated to illuminate the switch panel, circuit breaker panel, flare panel, or maps, etc.

Navigation lights are then checked by observing illumination in the small windows in the inboard leading edges of the wing tip tanks and reflection from the pavement or ground below the tail light. The retractable landing light may be extended and checked for operation momentarily. Returning the toggle switch to neutral switches the light off but leaves the light extended ready for instant use, if desired.

Before taxi, the interior lighting intensity is normally decreased to the point where all controls and switches are discernible. During taxi, the landing light should be used intermittently to avoid an unnecessary electrical drain on the batteries. Taxiing over loose gravel should be avoided with the landing light extended. In the engine run-ups special attention should be directed to the generator operation by switching generators off and on and noting the response on the ammeter.

Take-offs are conventional, although the gear retraction operation is usually delayed slightly to insure that the airplane is well clear of the runway. The landing light, if used, should be retracted before the airspeed exceeds 130 mph.

In cruising flight the interior lighting intensity is usually decreased even further for better vision outside of the airplane.

Pilot preference will determine the choice between red and fluorescent panel lighting. Fluorescent lights illuminate only the phosphorescent painted instrument markings while red lights illuminate the entire panel.

Configuration	Angle of Bank 0°	20°	40°	60°
Gear and Flaps Up	82 mph	85 mph	94 mph	116 mph
Gear Down and Flaps 15°	77 mph	79 mph	88 mph	109 mph
Gear Down and Flaps 45°	69 mph	71 mph	79 mph	98 mph

Figure 17. Stall Speed Chart

STALLS.

Stall characteristics of this airplane are normal in all configurations. Mild buffeting provides stall warning between 5 and 10 mph above the stall. In addition a Safe Flight Indicator gives visual and aural warning as the stall is approached. Power-off stall speeds at 4600 pounds gross weight are presented as true indicated airspeeds in figure No. 17 because indicated airspeeds are inaccurate near the stall.

Single engine full power stalls are characterized by a gradual loss of directional and lateral control with the airplane eventually winding up in a steep spiral. Reducing power on the operative engine allows the airplane to stall normally.

SPINS.

Intentional spins are prohibited. If a spin is entered inadvertently, recovery may be made with the following procedure:

(1) Cut power on both engines.
(2) Apply full rudder, opposing the direction of rotation.
(3) Approximately ½ turn after applying rudder, push control wheel forward briskly.
(4) To expedite recovery add power to engine toward inside of direction of turn.
(5) Pull out of dive with smooth steady control pressure.

DIVING.

The maximum permissible diving speed is 246 mph in smooth air. Dives must be made with caution because the airplane picks up speed rapidly, and if rough air is encountered unexpectedly it is difficult to slow the airplane down to a safe speed. Pull outs should be very gentle to avoid excessive stresses in the airplane as well as discomfort to the passengers.

LANDING.

Landings are simple and conventional in every respect. If power is used in landing approaches it should be eased off cautiously near touchdown because the power on stall speed is considerably less than the power off stall speed. An abrupt power reduction at five feet altitude could result in a hard landing if the airplane was near stalling speed.

On rough fields the nose wheel should be held off the ground as long as possible in the landing roll. This technique also can be used in moderately short field landings in lieu of heavy braking.

FLIGHT PROCEDURE WITH OPEN CABIN DOOR.

Airflow over the curved cabin door produces negative pressure over the door surface, resulting in an outward pull force that increases with speed. Consequently if the door should open accidentally in flight because of insecure latching it will float outward enough to disturb the airflow over the tail. This effect is shown by moderate buffeting of the tail.

This buffeting attains its maximum with gear-up, flaps 20°, and 80 mph and occasionally produces a noticeable nose down pitch and possibly a slight roll as the door pops open. Although these motions are controllable it is best to avoid this situation close to the ground. Therefore, checking the door handle before take-off is important. The door may be closed in flight by slowing the airplane to 100 mph, grasping the arm rest with one hand and the upper handle with the other hand, momentarily pushing the door outward against the slipstream, and then slamming it hard. Opening the storm window may help to relieve the high cabin pressure caused by the rapidly slamming door.

COLD WEATHER OPERATION.

Prior to starting on cold mornings it is advisable to pull the propeller through several times by hand to "break loose" or "limber" the oil, thus conserving battery energy. The starting procedure is normal, although additional priming will be required. If rough engine operation is persistent due to poor fuel vaporization use full carburetor alternate air ("HEAT" position) until maximum power is needed for take-off.

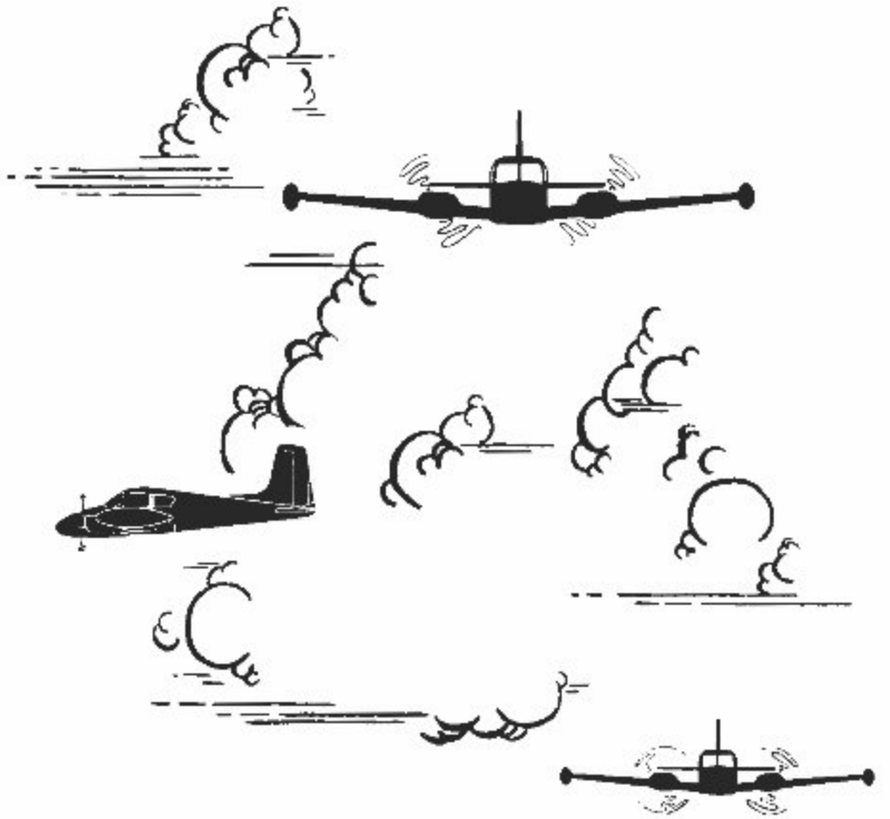
Where the oil pressure gage is extremely slow in indicating pressure it may be advisable to fill the pressure line to the gage with kerosene. No temperature indication need be apparent on the oil temperature gage prior to take-off if outside air temperatures are very cold. After a suitable warm-up period (2-5 minutes at 1000 rpm) accelerate the engines several times to higher rpm. If the engines accelerate smoothly and the oil pressure remains normal and steady, the airplane is ready for take-off.

OIL DILUTION SYSTEM. (Optional Equipment)

During oil dilution the engines should be idled at 1000 rpm. At this speed when the switch is pressed, gasoline will flow into the engine at the rate of one quart every 90 seconds. The fuel boost pumps must be turned on during the dilution operation. Holding the switch for three minutes will normally provide adequate oil dilution for cold weather starts. With the oil at its normal 12 quart level, the switch may be held for a maximum of six minutes — *further dilution will cause an overflow of oil sump resulting in a fire hazard.* When severe cold conditions are anticipated and it is desirable to dilute the oil of each engine for longer than six minutes, it will be necessary to drain oil from the engines unless the oil is already below the 12 quart level. Drain one quart of oil from each engine for each 90 seconds of oil dilution time required over six minutes.

CAUTION

Care should be exercised to avoid over dilution since the normal engine sump capacity is 12 quarts. With a total diluted oil volume of 16 quarts the engine may discharge an excessive amount of oil in an extreme nose up or nose down flight condition. The pilot should warm up engines sufficiently on the ground to reduce the total diluted volume to a minimum before take-off.



(8) Depress button on hinged crank link, and stow crank in clip.
(9) Adjust seat reclining angle to upright position if desired for landing.

FORCED LANDING. (Precautionary Landing With Power)

(1) Drag over selected field with flaps 15° and 95 mph airspeed, noting type of terrain and obstructions.
(2) Plan a wheels down landing if surface is smooth and hard (pasture, frozen lake, etc.)
(3) Execute a normal short field landing, keeping nose wheel off ground until speed is decreased.
(4) If terrain is rough or soft plan a wheels up landing as follows:
  (a) Approach with flaps down 20° at 95 mph.
  (b) Turn all switches "OFF" except magneto switches.
  (c) Unlatch cabin door prior to flare-out.

CAUTION

Be prepared for mild tail buffet as cabin door is opened.

  (d) Reduce power to a minimum during flare-out.
  (e) Prior to contact switch magnetos "OFF."

CAUTION

If flare-out is sustained with moderate power, cutting power suddenly will result in a hard landing. To avoid this reduce power to a minimum in flare-out before switching magnetos "OFF."

  (f) Land in a slightly tail low attitude.
  (g) Hold wheel fully back in initial slide to keep nacelles from possibly "digging in" in rough terrain.

NOTE

Airplane will slide straight ahead about 500 feet on smooth sod with very little damage.

FORCED LANDING. (Complete Engine Failure)

(1) Feather propellers and rotate them to a horizontal position with starter if time permits.
(2) Mixture controls in "IDLE CUT-OFF."
(3) Fuel selector valves "OFF."
(4) All switches "OFF" except master switch.
(5) Approach at 105 mph.
(6) If field is smooth and hard extend landing gear within gliding distance of field.
(7) Extend flap as necessary within gliding distance of field.

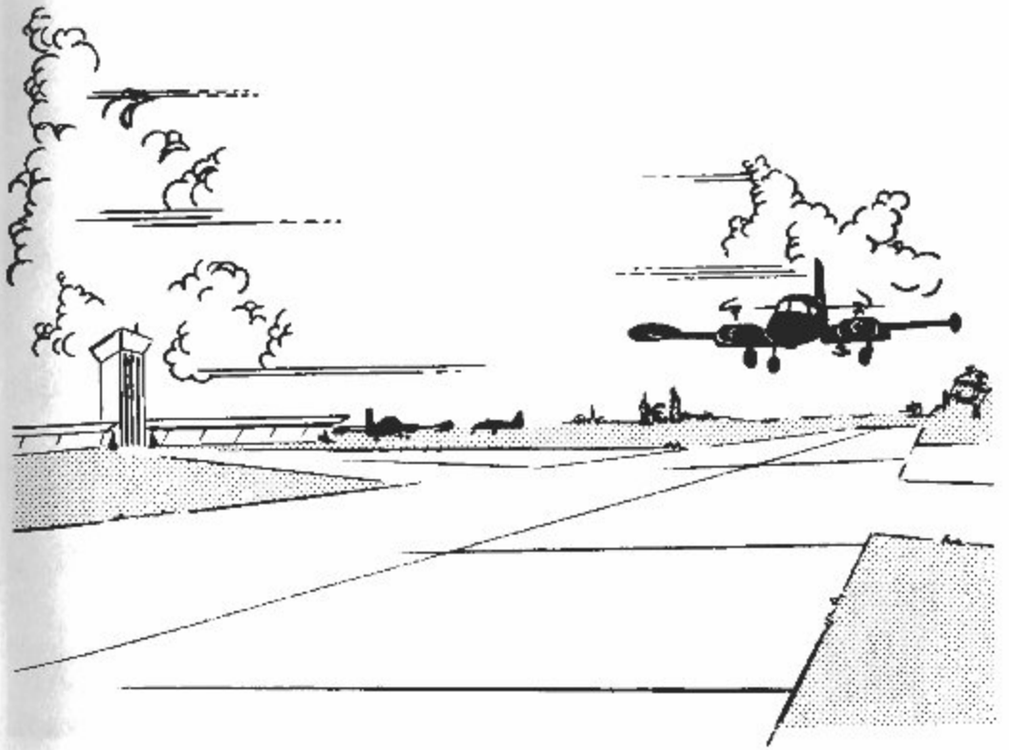
CAUTION

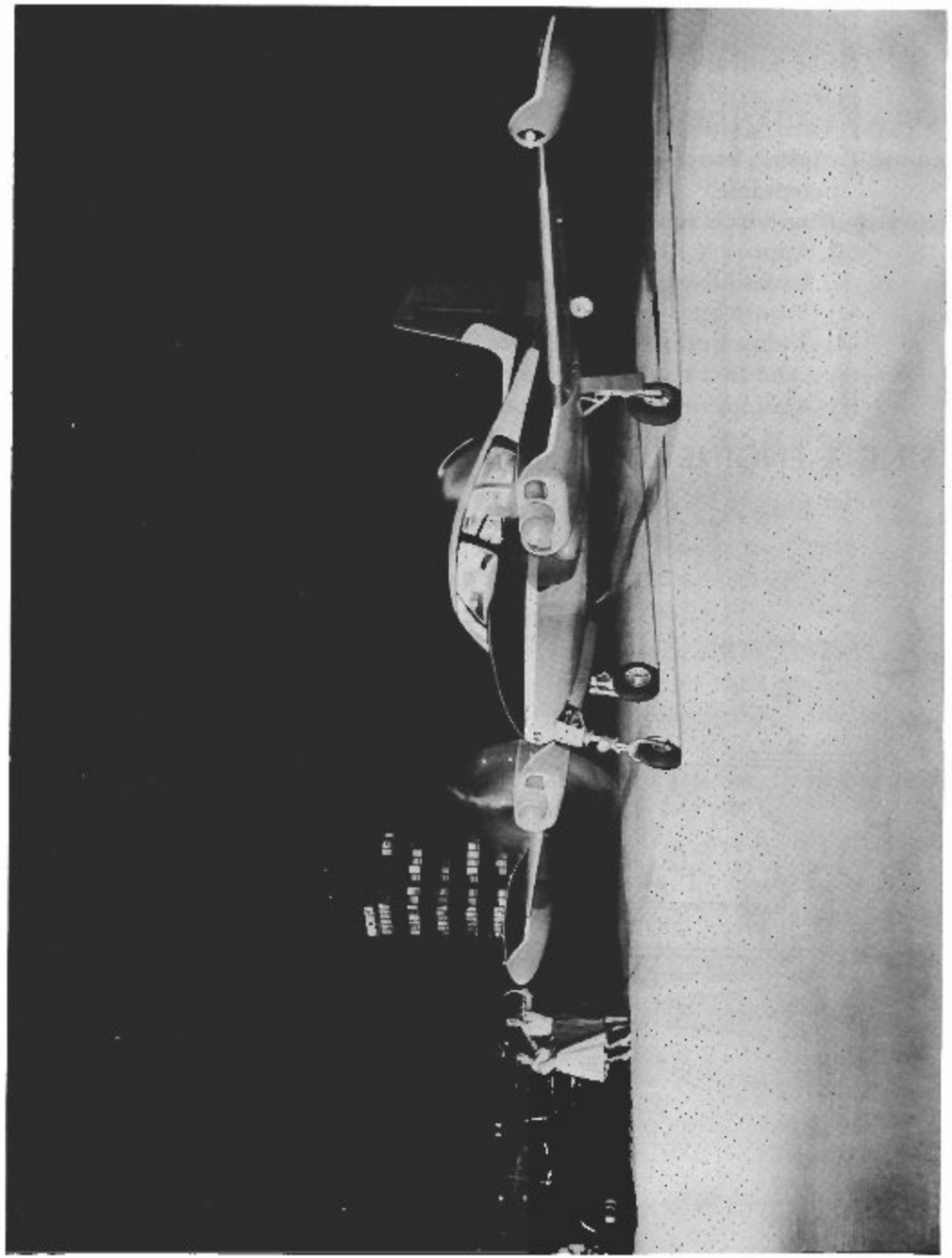
Glide path is extremely steep with flaps and gear down and propellers windmilling.

(8) Turn master switch "OFF."
(9) Make a normal landing, keeping nose wheel off ground as long as practicable.
(10) If terrain is rough or soft plan a wheels up landing as follows:
  (a) Approach 105 mph with gear and flaps retracted.
  (b) Extend flaps to 20° within gliding distance of field.
  (c) Turn master switch "OFF."
  (d) Unlatch cabin door prior to flare-out.
  (e) Land in a slightly tail low attitude.
  (f) Attempt to hold tail low throughout slide.

SINGLE-ENGINE LANDING.

Refer to page 53, Section II.





SECTION V

OPERATING LIMITATIONS

OPERATIONS AUTHORIZED.

Your Cessna 310, with standard equipment as certificated under CAA Type Certification No. 3A10, is approved for day and night operation under VFR or IFR. When operated for hire at night, certificated flares are required.

MANEUVERS — NORMAL CATEGORY.

The model 310 exceeds the requirements of the Civil Air Regulations, Part 3, set forth by the United States Government for airworthiness. Spins and aerobatic maneuvers are not permitted in normal category airplanes in compliance with these regulations. In connection with the foregoing, the following gross weights and flight load factors apply:

Gross Weight ..... 4600 lbs.
Flight Load Factor* ..... +3.8 −1.52
Flaps Up
Flight Load Factor* ..... +2.0
Flaps Down

*The design load factors are 150% of the above and in all cases the structure exceeds design loads.

Your airplane must be operated in accordance with all CAA approved markings, placards and check lists in the airplane. If there is any information in this section which contradicts the CAA approved markings, placards and checks lists, it is to be disregarded.

AIR SPEED LIMITATIONS.

The following chart lists the certificated true indicated limits for the Cessna 310:

Never Exceed (Glide or dive, smooth air) ..... 246 mph (red line)
Caution Range ..... 200-246 mph (yellow arc)
Maximum Structural Cruising Speed ..... 200 mph
(Level flight or climb)
Normal Operation Range ..... 82-200 mph (green arc)
Maximum Speed Flaps Extended ..... 130 mph

Maximum Speed Gear Extended.....130 mph
Flap Operation Range.....69-130 mph (white arc)
Maneuvering Speed*.....159 mph

*(The maximum speed at which you can use abrupt control travel or fly through extremely turbulent air without exceeding the design load factor.)

ENGINE OPERATION LIMITATIONS.

Maximum Power and Speed (For all operations).....240 bhp at 2600 rpm

ENGINE INSTRUMENT MARKINGS.

OIL TEMPERATURE INDICATORS.

Normal Operating Range.....75-225° (green arc)
Do not exceed.....225° (red line)

OIL PRESSURE GAGES.

Idling Pressure.....10 psi (red line)
Normal Operating Range.....40-60 psi (green arc)
Maximum Pressure.....100 psi (red line)

MANIFOLD PRESSURE GAGES.

Normal Operating Range.....15-24 in. Hg (green arc)

CYLINDER HEAD TEMPERATURES.

Normal Operating Range.....275-380° F (green arc)
Do not exceed.....475° F (red line)

TACHOMETERS.

Normal Operating Range.....2100-2450 rpm (green arc)
Do not exceed (Engine rated speed).....2600 rpm (red line)

FUEL PRESSURE GAGE.

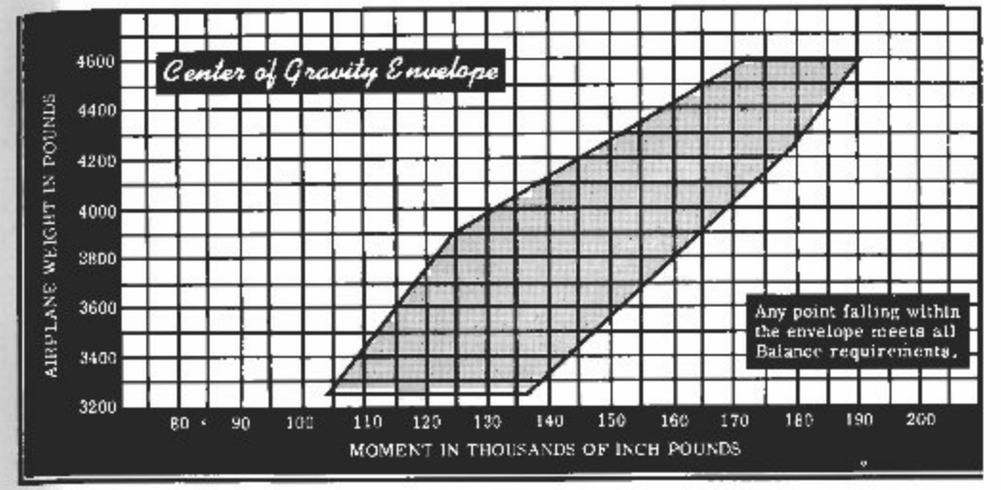
Normal Operating Range.....9 to 15 psi (green arc)

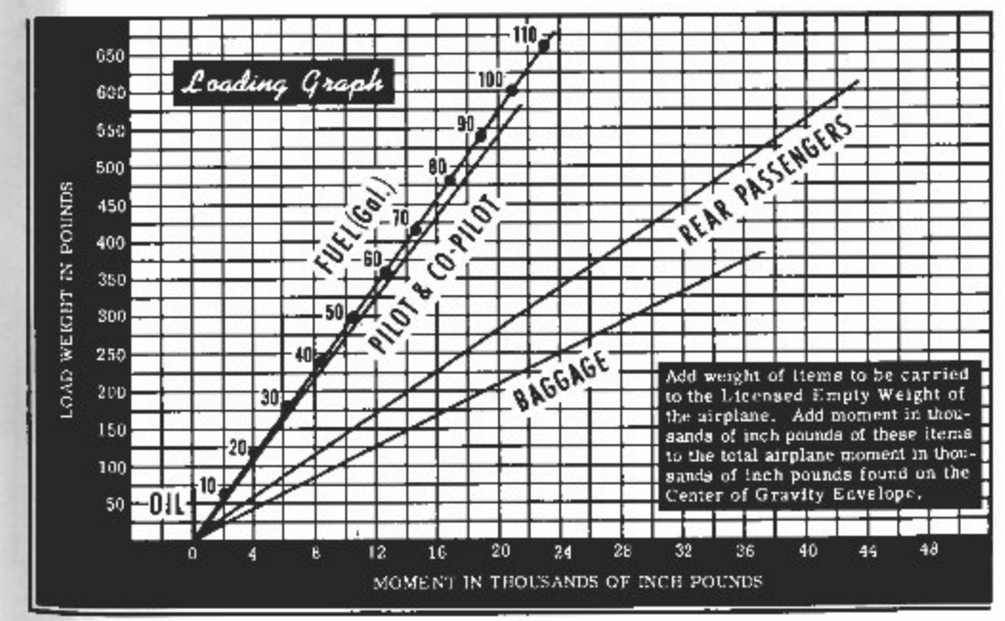
WEIGHT AND BALANCE.

All aircraft are designed for certain limit loads and balance conditions. These specifications for your 310 are charted on page 71.

A weight and balance report and equipment list is furnished with each airplane. All information on empty weight c.g. and allowable limits for your particular airplane, as equipped when it left the factory, is shown. Major changes in the original equipment affecting weight empty c.g. are required by the CAA to be recorded in the repair and alteration form 337.

Using the weight empty c.g. location and moment from the weight and balance report and following the example on page 72, the exact moment may





be readily calculated, which when plotted on the upper chart, will quickly show whether or not the c.g. is within limits.

EXAMPLE: Empty weight of 2905.0 lb., moment of 99351 in. lb.

	Wt.	Arm in Inches.	Moment in Thousands of in. lbs.	
EMPTY WEIGHT (LICENSED)	2905.0	34.2	99.4	
OIL (24 qts.) (Incl. 23 lbs. unusuable)	45.0	0	0.0	
PILOT & FRONT SEAT PASSENGER	340.0	37	12.6	
REAR SEAT PASSENGERS	510.0	71	36.2	
FUEL (ALLOW 6 lbs. PER GAL.)	600.0	35	21.0	
BAGGAGE	200.0	96	19.2	
TOTAL WT.	4600.0		188.4	POINT I
MINUS FUEL ABOVE	−600.0	35	−21.0	
ADD MIN. FUEL	+240	35	+ 8.4	
TOTAL WT.	4240.0		175.8	POINT II

Locate points I and II on the center of gravity envelope graph, and since the points fall within the envelope, the above loading meets all balance requirements.

SECTION VI

OPERATIONAL DATA

THE OPERATIONAL DATA shown on the following pages are compiled from actual tests with airplane and engine in good condition and using average piloting technique and best power mixture. You will find this data a valuable aid when planning your flights. However, inasmuch as the number of variables involved precludes great accuracy, an ample fuel reserve should be provided. The graphs make no allowance for wind, navigational error, pilot technique, warm-up, take-off, climb, etc. All of these factors must be considered when estimating reserve fuel.

In addition to the advantages of comfort and safety, airplanes are primarily an exceptionally rapid mode of transportation. Therefore, to realize the maximum usefulness from your 310, take advantage of the power your engines can develop. For normal cruising, choose a cruising power setting which gives you a fast cruising speed. If your destination is over 650 miles, it may pay you to fly at lower power settings, thereby increasing your range and allowing you to make the trip non-stop with ample fuel reserve. Use the range charts to solve flight planning problems of this nature.

MODEL 310

AIRSPEED CORRECTION TABLE

FLAPS 0°		FLAPS 15°*		FLAPS 45°*	
IAS	TIAS	IAS	TIAS	IAS	TIAS
80	85	70	73	70	71
100	101	80	82	80	80
120	120	90	91	90	89
140	139	100	101	100	99
160	159	110	110	110	108
180	178	120	120	120	118
200	198	130	130	130	128
220	218				

*Maximum flap speed is 130 MPH

Figure 18. Airspeed Correction Chart

MODEL 310 TAKE-OFF PERFORMANCE

TAKE-OFF DISTANCE WITH 15° FLAPS FROM HARD SURFACE RUNWAY

Gross Weight Lbs.	IAS at Obstacle	Head Wind MPH	AT SEA LEVEL AND 59°F		AT 2500 FT. AND 50° F		AT 5000 FT. AND 41° F		AT 7500 FT. AND 32° F	
			Ground Run	Total Distance Over 50' Obstacle	Ground Run	Total Distance Over 50' Obstacle	Ground Run	Total Distance Over 50' Obstacle	Ground Run	Total Distance Over 50' Obstacle
4000	74	0	580	1075	700	1260	825	1455	990	1715
		15	360	755	445	895	535	1040	650	1240
		30	190	480	245	580	305	690	390	835
4300	78	0	690	1240	830	1455	980	1695	1180	2025
		15	435	875	535	1040	645	1225	795	1485
		30	240	570	305	690	375	825	475	1015
4600	81	0	795	1405	965	1670	1140	1960	1370	2375
		15	515	1005	635	1210	760	1435	935	1765
		30	290	660	370	810	455	980	570	1225

NOTE: INCREASE DISTANCES 10% FOR EACH 25°F ABOVE STANDARD TEMPERATURE FOR PARTICULAR ALTITUDE.

MODEL 310 LANDING CHART

Gross Weight-Lbs.	Approach Speed at 50'- IAS	Distance Feet	Sea Level 59° F	2500' 50°F	5000' 41°F	7500' 32°F
4600	90	Air Distance	1100	1180	1250	1330
		Ground Roll	620	650	700	740
		Total Distance Over 50' Obs.	1720	1830	1950	2070
4300	87	Air Distance	1040	1110	1175	1250
		Ground Roll	585	620	660	700
		Total Distance Over 50' Obs.	1625	1730	1835	1950
4000	84	Air Distance	980	1045	1105	1170
		Ground Roll	550	585	620	660
		Total Distance Over 50' Obs.	1530	1630	1725	1830

NOTE: WING FLAPS 45°, POWER OFF, HARD SURFACE RUNWAY, ZERO WIND. REDUCE LANDING DISTANCE 10% FOR EACH 6 MPH HEADWIND

Figure 19. Take-off and Landing Chart

CESSNA 310 POWER SETTINGS

FOR CONTINENTAL O-470-B ENGINE

MANIFOLD PRESSURE AT:

OUTSIDE AIR °F.	2450 RPM ALTITUDE				% BRAKE HORSE POWER	2300 RPM ALTITUDE				OUTSIDE AIR °F.
	2500 Ft.	5000 Ft.	7500 Ft.	10000 Ft.		2500 Ft.	5000 Ft.	7500 Ft.	10000 Ft.	
0°	17.1	16.8	16.4	16.1	50	18.2	17.8	17.5	17.2	0°
	19.5	19.1	19.0	18.8	60	20.8	20.4	20.2	19.9	
	21.9	21.5	21.4		70	23.3	22.9	22.7		
20°	17.4	17.1	16.8	16.5	50	18.5	18.2	17.9	17.6	20°
	19.8	19.6	19.2	19.0	60	21.1	20.8	20.5	20.2	
	22.3	22.0	21.8		70	23.8	23.4			
40°	17.6	17.3	17.0	16.8	50	18.8	18.4	18.1	17.9	40°
	20.1	19.8	19.6	19.3	60	21.5	21.1	20.9		
	22.7	22.3	22.1		70	24.0	23.7			
60°	17.8	17.5	17.3	17.1	50	19.0	18.7	18.4	18.2	60°
	20.4	20.1	19.9	19.7	60	21.8	21.4	21.2		
	23.0	22.7			70	24.4	24.2			
80°	18.1	17.8	17.5	17.3	50	19.2	18.9	18.6	18.4	80°
	20.8	20.3	20.2	20.0	60	22.0	21.7	21.4		
	23.2	23.0			70	24.9	24.5			
100°	18.3				50	19.5				100°
	21.0				60	22.3				
	23.6				70	25.1				

Figure 20. Power Setting Chart

CRUISE & RANGE PERFORMANCE WITH LEAN MIXTURE AT 2500 ft

RPM	MP	BHP/ENG	%BHP	TAS	TOTAL GALS/HR	END HRS	RANGE
2100	21	121	50	170	21.5	4.7	794
	22	129	54	176	22.3	4.5	788
	23	137	57	180	23.0	4.4	785
2200	20	121	50	170	21.8	4.6	780
	21	130	54	176	22.6	4.4	777
	22	139	58	181	23.4	4.3	772
	23	147	61	185	24.2	4.1	767
	24	156	65	190	25.1	4.0	758
2300	19	121	50	170	22.1	4.5	770
	20	130	54	176	22.9	4.4	767
	21	139	58	181	23.7	4.2	763
	22	148	62	186	24.6	4.1	756
	23	157	65	190	25.4	3.9	750
	24	166	69	195	26.4	3.8	740
2400	18	119	50	170	22.4	4.5	750
	19	128	54	176	23.1	4.3	758
	20	138	58	180	24.0	4.2	755
	21	147	61	185	24.8	4.1	750
	22	156	65	190	25.6	3.9	742
	23	165	69	195	26.6	3.8	733
	24	175	73	199	27.6	3.6	721

Range based on 100 gallons of fuel, no fuel reserve, no wind. Gross weight at take-off 4600 pounds.

CRUISE & RANGE PERFORMANCE WITH LEAN MIXTURE AT 5000 ft

RPM	MP	BHP/ENG	%BHP	TAS	TOTAL GALS/HR	END HRS	RANGE
2100	20	117	49	172	21.3	4.7	808
	21	125	52	177	21.9	4.5	805
	22	133	55	181	22.6	4.4	804
2200	19	117	49	172	21.5	4.6	797
	20	125	52	177	22.2	4.5	795
	21	134	56	182	23.0	4.4	792
	22	143	59	187	23.8	4.2	787
	23	151	63	192	24.6	4.1	780
	24	160	67	197	25.5	3.9	770
2300	18	116	48	170	21.7	4.6	785
	19	125	52	177	22.5	4.4	784
	20	134	56	182	23.3	4.3	782
	21	143	59	187	24.1	4.2	777
	22	152	63	192	25.0	4.0	770
	23	161	67	197	25.8	3.9	762
	24	171	71	202	26.9	3.7	751
2400	17	114	47	169	21.8	4.6	775
	18	123	51	175	22.6	4.4	774
	19	132	55	181	23.5	4.3	771
	20	142	59	187	24.4	4.1	765
	21	151	63	192	25.2	3.9	759
	22	161	67	197	26.2	3.8	752
	23	170	71	202	27.1	3.7	742
	24	180	75	206	28.2	3.6	734

Range based on 100 gallons of fuel, no fuel reserve, no wind. Gross weight at take-off 4600 pounds.

Figure 21. Cruise and Range — Lean Mixture

CRUISE & RANGE PERFORMANCE WITH LEAN MIXTURE AT 7500 ft

RPM	MP	BHP/ENG	% BHP	TAS	TOTAL GALS/HR	END HRS	RANGE
2100	20	121	50	178	21.5	4.6	826
	21	129	54	184	22.3	4.5	823
	22	137	57	189	23.0	4.3	819
2200	19	120	50	178	21.8	4.6	811
	20	129	54	184	22.6	4.4	809
	21	138	58	190	23.4	4.3	804
	22	147	61	194	24.2	4.1	798
2300	18	120	50	178	22.1	4.5	800
	19	129	54	184	22.9	4.3	798
	20	138	58	190	23.7	4.2	792
	21	147	61	194	24.5	4.1	787
	22	157	65	199	25.4	3.9	782
2400	17	117	49	176	22.2	4.5	788
	18	127	53	183	23.0	4.4	787
	19	136	57	189	23.8	4.2	784
	20	146	61	194	24.7	4.1	778
	21	155	65	199	25.6	3.9	774
	22	165	69	203	26.6	3.8	767

Range based on 100 gallons of fuel, no fuel reserve, no wind. Gross weight at take-off 4600 pounds.

CRUISE & RANGE PERFORMANCE WITH LEAN MIXTURE AT 10000 ft

RPM	MP	BHP/ENG	% BHP	TAS	TOTAL GALS/HR	END HRS	RANGE
2100	19	116	48	178	21.1	4.7	842
	20	124	52	183	21.8	4.6	842
2200	18	116	48	178	21.4	4.7	831
	19	125	52	183	22.2	4.5	830
	20	133	55	189	22.9	4.4	826
2300	17	115	48	178	21.7	4.6	822
	18	124	52	183	22.4	4.5	821
	19	133	55	189	23.2	4.3	816
	20	142	59	194	24.0	4.2	812
2400	17	121	50	181	22.5	4.5	808
	18	131	55	189	23.4	4.3	808
	19	140	58	193	24.2	4.2	805
	20	150	63	199	25.1	4.0	800

Range based on 100 gallons of fuel, no fuel reserve, no wind. Gross weight at take-off 4600 pounds.

Figure 22. Cruise and Range — Lean Mixture

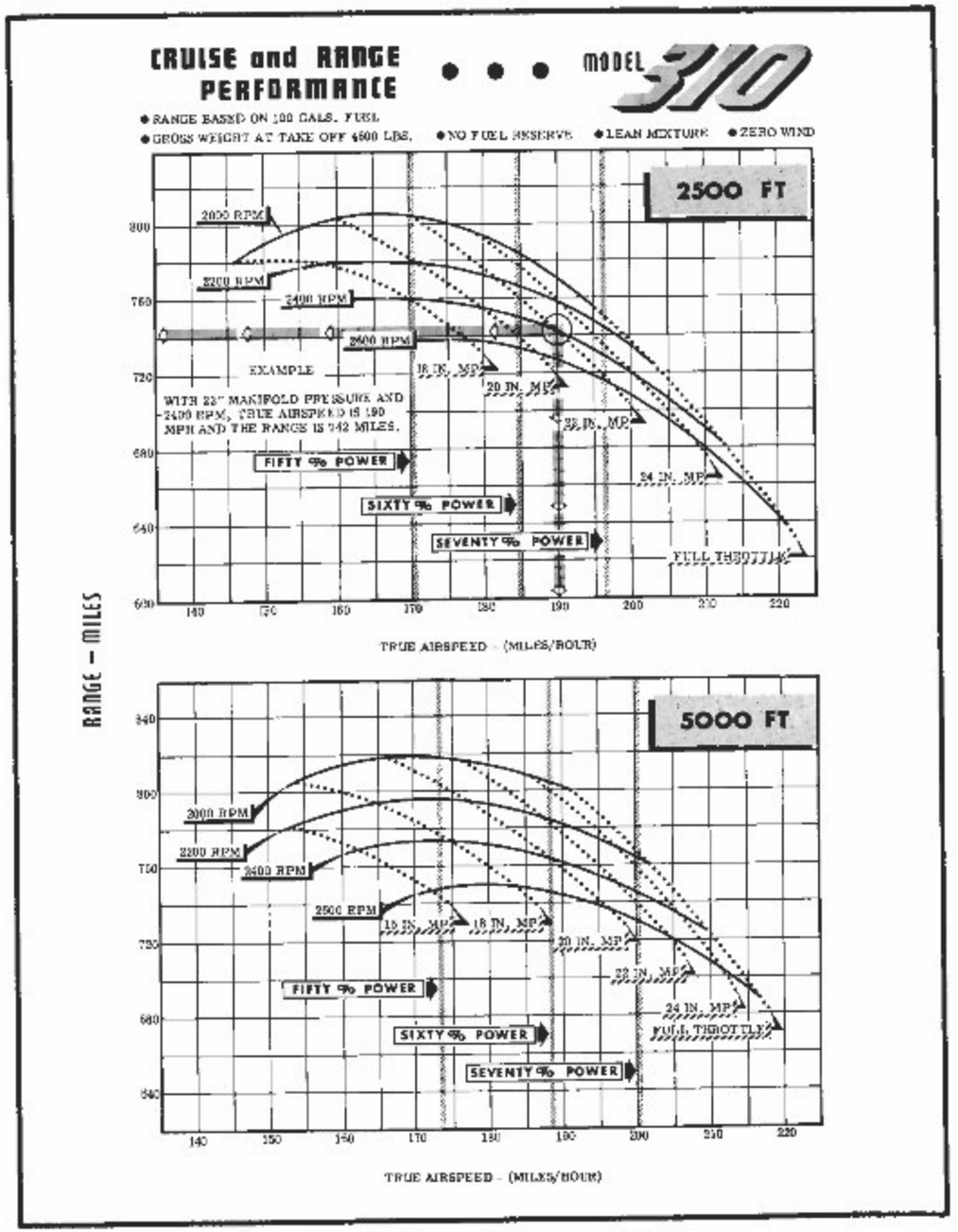


Figure 23. Cruise and Range Performance

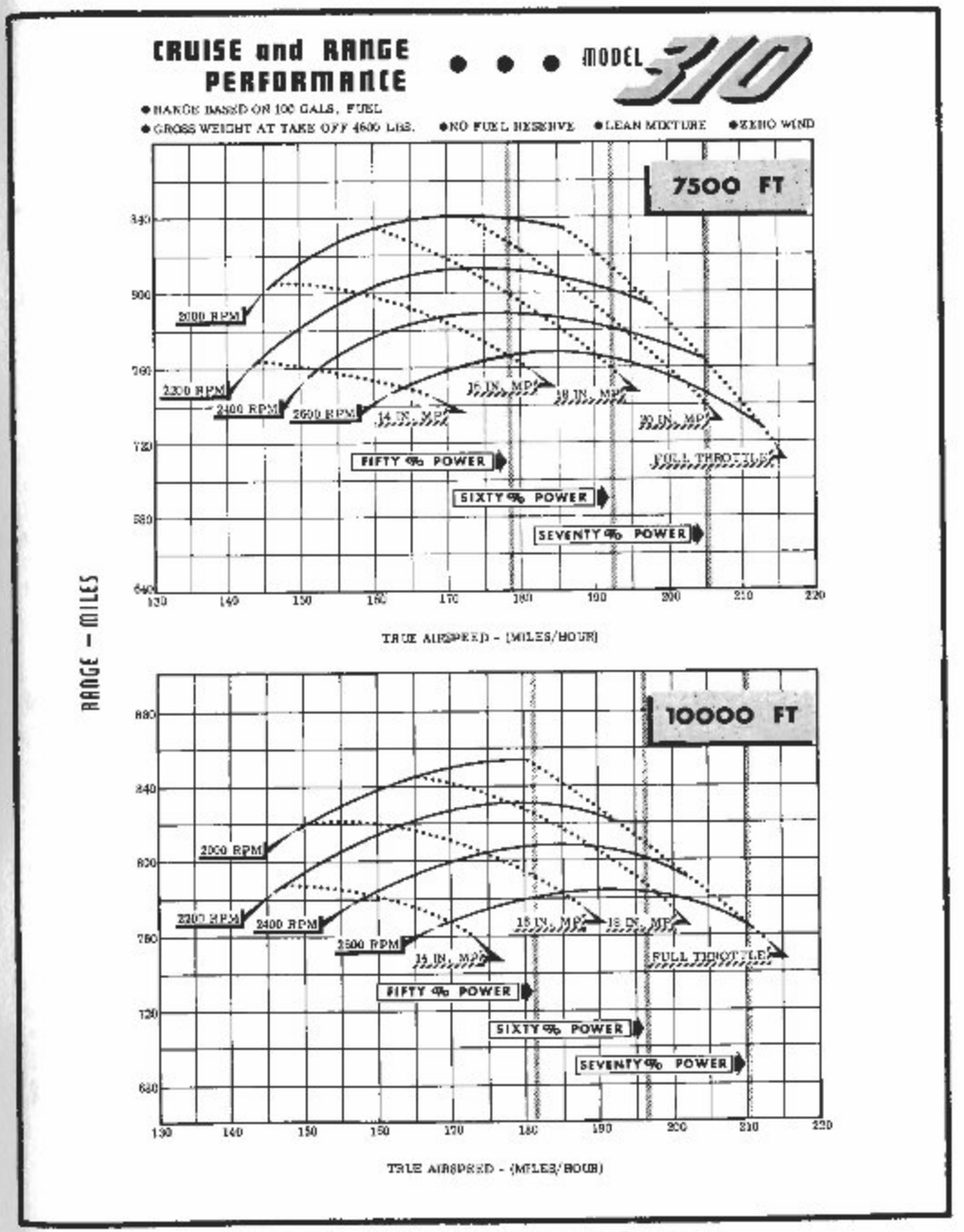


Figure 24. Cruise and Range Performance

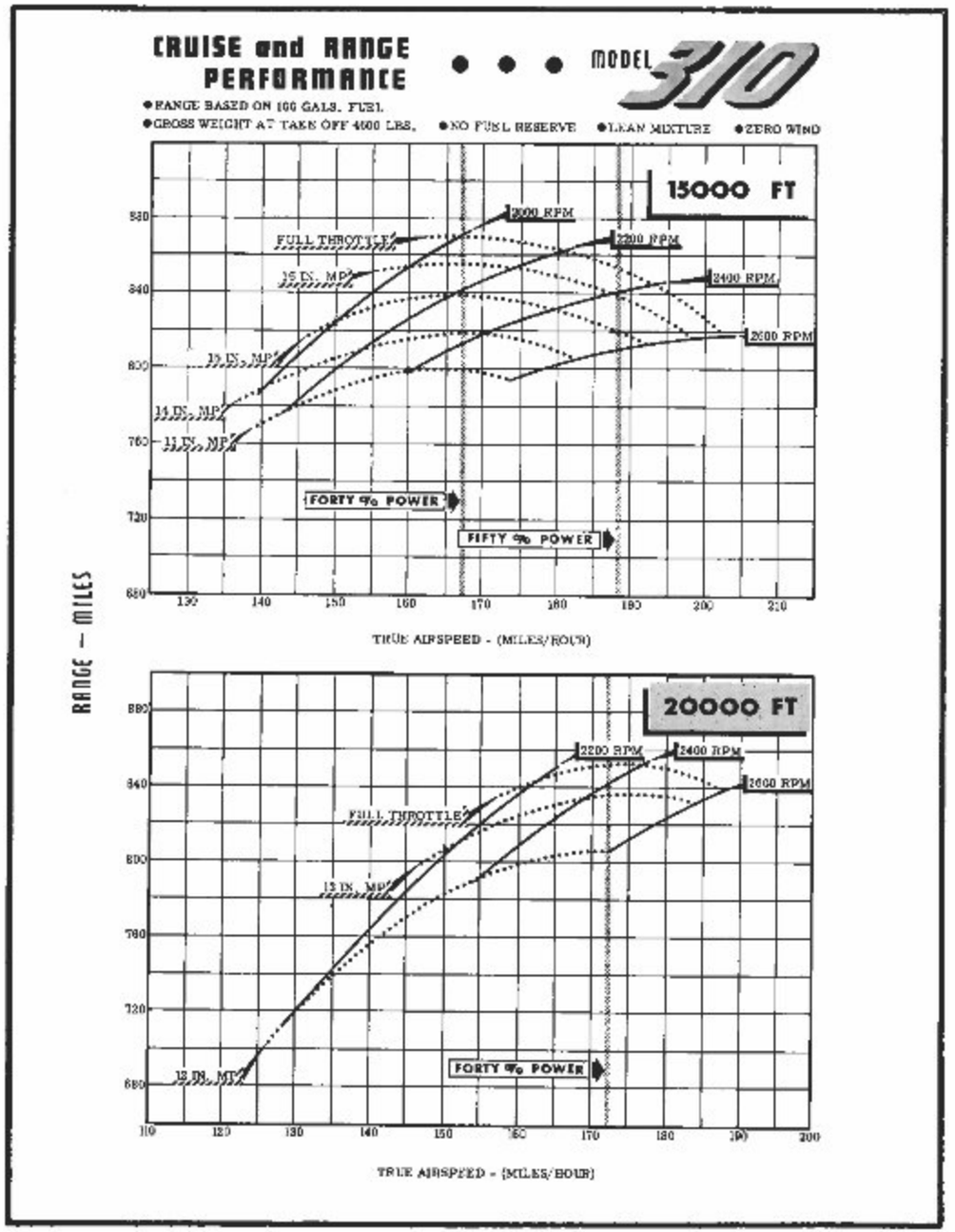


Figure 25. Cruise and Range Performance

TWIN ENGINE CLIMB DATA

GROSS WEIGHT LBS.	At Sea Level and 59°F.			At 5000 Ft. and 41°F.			At 10000 Ft. and 23°			At 15000 Ft. and 5°F.			At 20000 Ft. and -12°F.		
	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	GAL. OF FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	FROM SL FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	FROM SL FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	FROM SL FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	FROM SL FUEL USED
4000	119	2100	2	116	1645	3.8	113	1205	5.8	111	755	8.5	108	320	12.8
4300	121	1885	2	119	1465	4.0	116	1045	6.3	114	625	9.4	111	205	15.4
4600	123	1700	2	121	1300	4.3	119	900	6.9	117	500	10.7	115	100	20.3

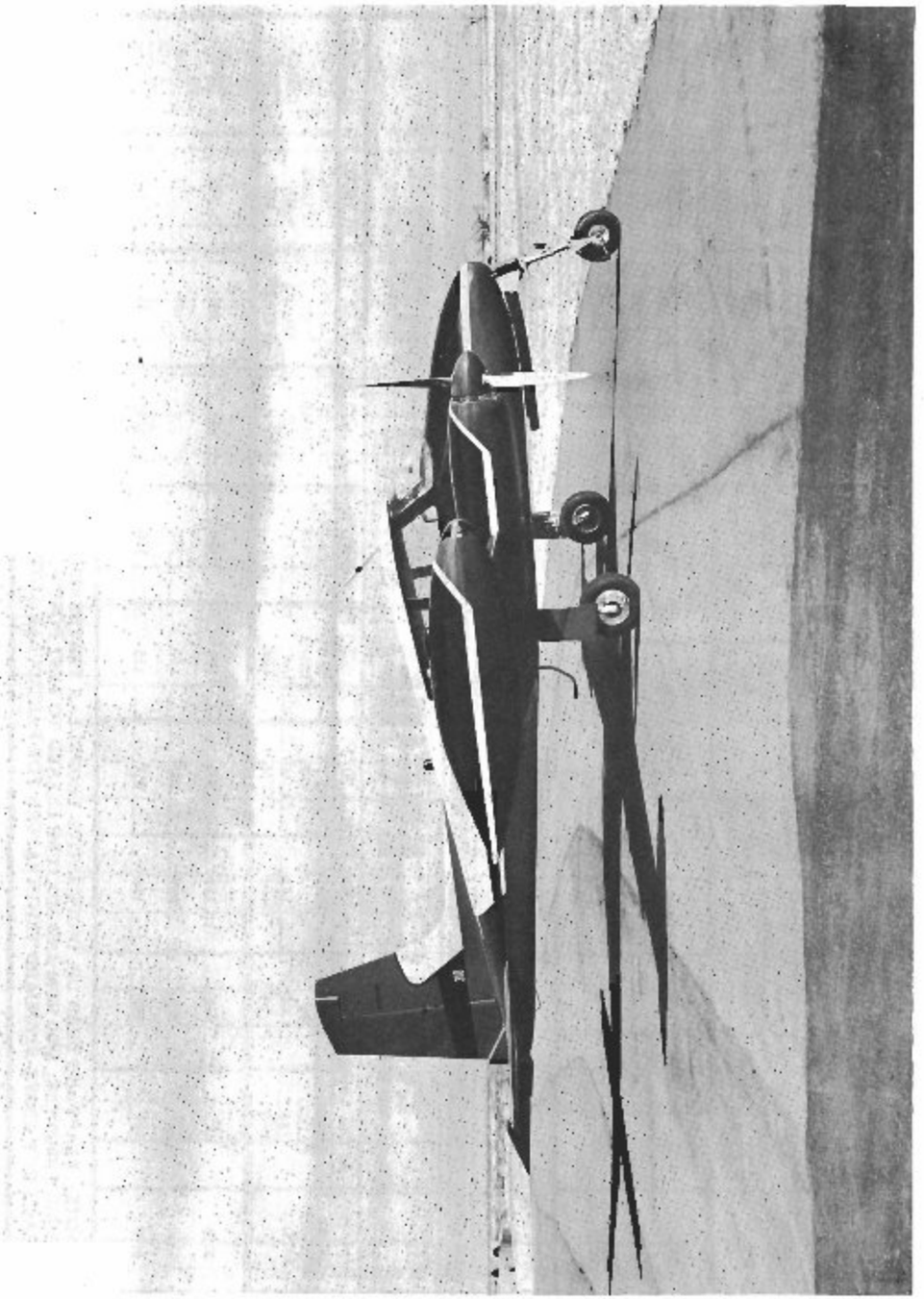
NOTE: FULL THROTTLE, 2600 RPM, RICH MIXTURE, FLAPS & GEAR UP. FUEL USED INCLUDES WARM-UP AND TAKE-OFF ALLOWANCE.

SINGLE ENGINE CLIMB DATA

GROSS WEIGHT LBS.	At Sea Level and 59°F.		At 2500 Ft. and 50°F.		At 5000 Ft. and 41°F.		At 7500 Ft. and 32°F.		At 10000 Ft. and 23°F.	
	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN
4000	117	610	113	500	109	390	105	280	102	170
4300	119	495	116	385	112	275	108	165	105	50
4600	121	380	118	270	115	160	112	55	109	-55

NOTE: FLAPS AND GEAR UP, INOPERATIVE PROPELLER FEATHERED, WING RANKED 5° TOWARD OPERATING ENGINE, FULL THROTTLE, 2600 RPM AND MIXTURE LEANED TO BEST POWER. DECREASE RATE OF CLIMB 10 FT/MIN FOR EACH 10°F ABOVE STANDARD TEMPERATURE FOR PARTICULAR ALTITUDE.

Figure 26. Climb Data



SECTION VII

CARE OF THE AIRPLANE

IF YOUR AIRPLANE is to retain that new plane performance and dependability, certain requirements in its care must be followed. It is always wise to follow a planned schedule of lubrication and maintenance based on the climatic and flying conditions encountered in your locality.

Keep in touch with your Cessna dealer and take advantage of his knowledge and experience. He knows your airplane and how to maintain it. He will remind you when lubrications and oil changes are necessary and about other seasonal and periodic services.

GROUND HANDLING.

Proper ground handling will prevent costly repairs due to careless methods of moving the airplane about on the ground. A tow bar, which fits

TOW BAR INSTALLATION

TOW BAR STOWED

on the nose gear, is provided with your airplane and is mounted on the underneath side of the utility shelf in the baggage compartment. The airplane should be steered by hand with

this tow bar. This bar, when mounted on the swivel nose gear, provides positive control and ease of handling. You should always pull or push horizontally on the tow bar when moving airplane to keep the weight on the nose wheel for positive steering action. *Do not lift.*

MOORING YOUR AIRPLANE.

Proper tiedown procedure is your best protection against damage to your parked airplane by gusty or strong winds. To tie down your airplane securely, proceed as follows:

(1) Tie sufficiently strong (700 pounds tensile strength) ropes or chains to the wing tie-down fittings located on the under side of each wing.

(2) Secure the opposite ends of these ropes or chains to tie-down rings suitably anchored to the ground.

(3) Caster the nose wheel to the extreme left or right position to help protect the rudder from wind damage. Tie a rope (do not use a chain) around the nose gear above the torque link and secure the opposite end to a tie-down ring in the ground.

(4) Tie a rope or chain to the tail skid and secure the other end to a tie-down ring in the ground.

(5) Install control lock at control column.

(6) Set parking brake or use wheel chocks.

STORAGE.

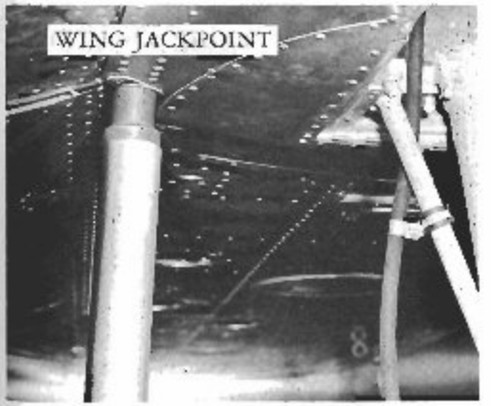
The all metal construction of your Cessna makes outside storage of it practical. Inside storage of the plane will increase its life as it does for your car. If an airplane must remain inactive for a time, cleanliness is probably the most important consideration — whether your airplane is inside or outside. A small investment in cleanliness will repay you many times not only in keeping your airplane looking like new but in keeping it new. Later paragraphs in this section cover the subject in greater detail. Dirt and mud have the same effect as salt, only to a lesser degree.

Do not neglect the engines when storing the airplane. Turn them over by hand or have them turned over every few days to keep the bearings, cylinder walls, and internal parts lubricated. If the airplane is outside, leave the propellers in a horizontal position to prevent water from seeping into the hub mechanism. Full fuel tanks will help prevent condensation and will increase fuel tank life.

Airplanes are built to be used and regular use tends to keep them in good condition. An airplane left idle for any great length of time is likely to deteriorate more rapidly than if it is flown regularly, and it should be carefully checked over before being put back into service.

JACKING.

The airplane has four jack point brackets. Two are located on the underneath side of the fuselage just aft of the nose wheel well. The other two are located on the underneath side of each wing just aft of the main gear attach points. When jacking the airplane all four points should be used and the airplane should be kept as level as possible during the entire operation.



LANDING GEAR.

Correct tire pressure is essential to obtain maximum tire wear. The correct air pressure for the two main tires is 37 lbs./square inch gage pressure, and for the nose gear, 22 lbs./square inch gage pressure. An accumulation of oil and grease on the tires will have adverse effect on tire life and should be removed with soap and water.

The maintenance for the three shock struts is identical. The filling procedure for these struts is as follows:

(1) To deflate — loosen valve plug (2½ full turns maximum).

(2) Remove plug and fill with fluid — Spec. MIL-O-5606 (Strut fully compressed).

(3) Replace plug and inflate to 10 PSI (do not extend strut).

(4) Remove plug and add or bleed fluid to bottom of filler hole.

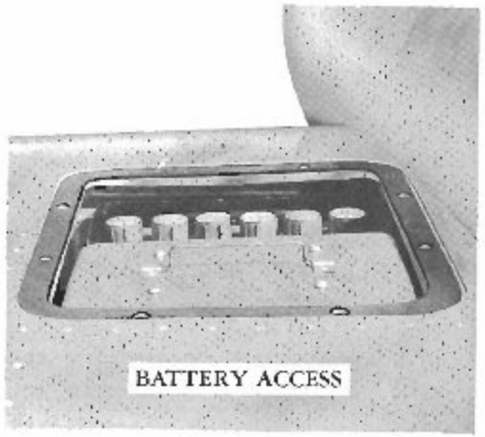
(5) Replace plug and inflate to 2" strut extension under design gross weight.

NOTE

This dimension may vary slightly with wide temperature changes.

BATTERIES.

The two batteries are located in the left wing just outboard of the engine nacelles. They can be reached by removing the access plate from the top of the wing.



BATTERY ACCESS

Maintain the level of the batteries electrolyte at the level of the horizontal baffle plate (the plate with the holes in it) which is approximately two inches below the filler plug, by adding distilled water as required. Maintain the water level but *do not fill* above the plate mentioned above. This water level should be maintained when the battery is in the level position. The space above the horizontal plate is a fluid reservoir when the battery is tipped to the side or inverted. When the electrolyte level is too high, spillage of fluid will result when maneuvering and as a result, the proper concentration of acid will be destroyed. Sponge off any spilled acid and corrosion products with soda water solution to neutralize acid, then rinse with clean water. Do not use excessive amounts of soda water. Keep battery connections tight and clean, otherwise proper battery charging will not be obtained.

Normally, the airplane should not be operated with the master switch in the "OFF" position nor should it be operated without the batteries or with the batteries disconnected. Damage to the generators and the voltage regulators may be the result.

The master switch on the instrument panel operates a solenoid located at the batteries. Occasionally when the batteries are allowed to get sufficiently low, they will not have enough energy to actuate the solenoid when the master switch is turned on resulting in the generators being unable to charge the batteries. In this case the batteries should be removed and recharged.

PLEXIGLAS WINDSHIELD AND WINDOWS.

To clean the plexiglas windshield and windows, wash with plenty of soap and water, using the palm of the hand to feel and dislodge any caked dirt or mud. A soft cloth, sponge, or chamois may be used but only as a means of carrying water to the plastic. Dry with a clean, damp chamois. Rubbing with a dry cloth builds up an electrostaric charge on the glass so that it attracts dust particles from the air. Wiping with a damp chamois will remove this charge as well as the dust and is therefore

recommended.

Remove oil and grease by rubbing lightly with a cloth wet with kerosene. *Do not use* gasoline, alcohol, benzene, acetone, carbon tetrachloride fire extinguisher, or de-icing fluid, lacquer thinner or glass window cleaning spray as they will soften the plastic and will cause crazing.

If after removing dirt and grease, scratching is visible, the plexiglas should be waxed with a good grade of commercial wax. These waxes will fill in minor scratches and help prevent further scratching. The wax should be applied in a thin even coat and brought to a high polish by rubbing lightly with a clean, dry, soft flannel cloth.

PAINTED SURFACES.

A minimum of care is required to keep the painted surfaces of your airplane bright and polished, neat and trim looking. The airplane may be washed with clear water to remove dirt. To remove oil and grease, household type detergent soap powders are effective but should be used cautiously since some of them are strongly alkaline.

It is recommended that the surfaces be kept waxed to exclude all moisture and to retain the bright appearance of the finish. Use only waxes and polishes containing no harsh abrasives or grit, and only those which are neutral in reaction.

ENGINE COMPARTMENTS.

The engine compartments should be kept free of an accumulation of oil, grease, and dirt to prevent fire hazards. The firewall between the wing and the engine is stainless steel and may be cleaned with recommended solvent cleaners for grease and oil.

UPHOLSTERY.

Keeping the inside of your airplane clean is no more difficult than taking care of rugs and furniture in your home. It is a good idea occasionally to take the dust out of the upholstery with a whisk broom and a vacuum cleaner.

If spots or stains get on the upholstery, they should be removed as soon as convenient before they have a chance to soak and dry. Cleaning fluids having a carbon tetrachloride or a naptha base are recommended. Soap or detergents and water *are not recommended* for use on the seats since they will remove some of the fire retardant with which the seats have been treated. When using recommended cleaners, the following method is suggested:

(1) Carefully brush off and vacuum all loose particles of dirt.

(2) *Do not use too much fluid.* The seat cushions are padded with foam rubber and since volatile cleaners attack rubber, these pads may be destroyed if the material gets soaked with cleaner.

(3) Wet a small, clean cloth with the cleaning solution and wring out thoroughly. Then open cloth and allow the fluid to evaporate a trifle.

(4) Tap the spot lightly with the cloth, but don't rub it. This will pick up particles which are too embedded to be removed by brushing. Repeat several times, using a clean part of the cloth each time.

(5) Moisten another piece of clean cloth with a cleaner and allow to evaporate until barely damp. Now rub the spot lightly, working from the outside in toward the center. (This keeps the spot from spreading and is less likely to leave a ring). If necessary, repeat several times.

(6) Brush again to remove any further particles which may have become loosened.

SERVICING.

Figure 27 outlines the servicing requirements for Cessna Model 310.

SERVICING DIAGRAM CODE.

1. External Power Receptacle — Use 24 volt DC external power source.

2. Batteries — Maintain electrolyte level at horizontal baffle (plate with holes). Service at 25 hr. intervals, or oftener if required.

3. Engine Oil — Drain and refill engine oil at 25 hr. intervals, or as required. Use aviation grade straight mineral oil; SAE 30 (MIL-L-6082, grade 1065) below 32°F and SAE 50 (MIL-L-6082, grade 1100) above 32°F. Oil capacity, each engine, is 12 U.S. Qts., 10 Imp. Qts., or 11.4 Liters. Minimum oil for adequate engine lubrication, each engine, is 6 U.S. Qts., 5 Imp. Qts., or 5.7 Liters.

4. Oil Drain Valves — Cut safety wire and open drain valve to drain engine oil. Resafety.

5. Fuel Strainers — Drain small amount of fuel to check fuel for water and sediment before first flight of the day.

6. Shimmy Dampener — Check and fill each 25 hrs., or as required, with MIL-O-5606 hydraulic fluid.

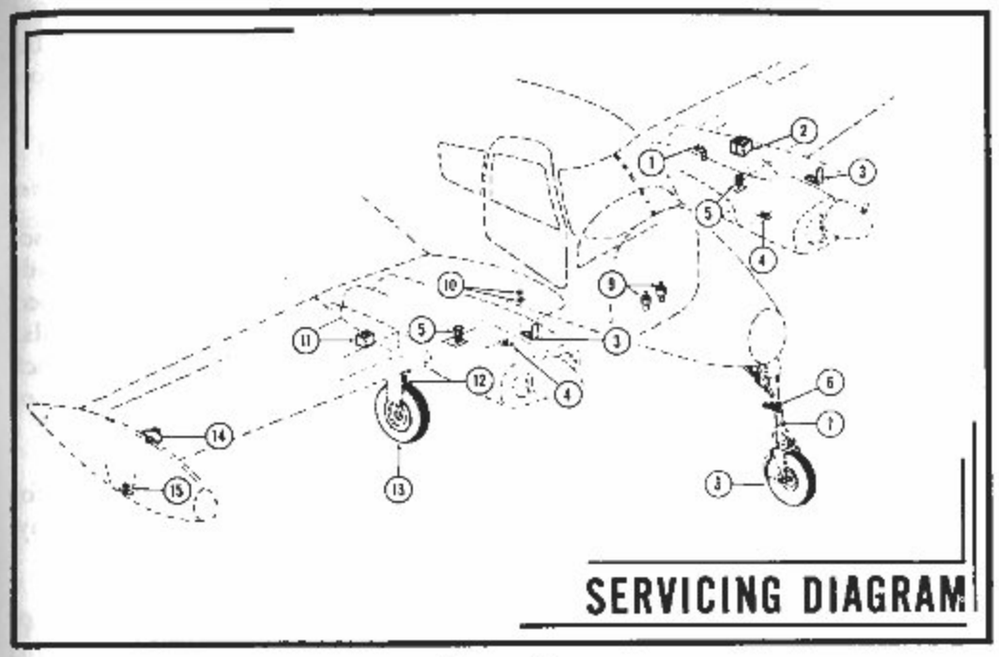


Figure 27.

7. Nose Gear Shock Strut — Check and fill each 500 hrs. Fill to level of filler plug with MIL-O-5606 hydraulic fluid. Inflate strut to 2" extension with airplane at gross wt.

8. Nose Wheel Tire — Maintain 22 p. s. i.

9. Master Brake Cylinder — Check and fill each 100 hrs. with MIL-O-5606 hydraulic fluid.

10. Fuel Line Drain Plugs — To drain fuel lines remove RH wing root fairing, cut safety wire, and remove plugs. Resafety plugs when reinstalled.

11. Anti-Ice Fluid — Fill as required with MIL-F-5566 anti-ice fluid (Isoprophyl Alcohol). Reservoir capacity; 4.5 U.S. Qts., 3.8 Imp. Qts., or 4.3 Liters.

12. Main Gear Shock Struts	Check and fill each 500 hrs. with MIL-O-5606 hydraulic fluid. Fill to level of filler plug. Inflate strut to 2" extension with airplane at gross wt.
13. Main Gear Tires	Maintain 37 p. s. i.
14. Gas Tank Filler Caps	Service airplane with grade 91/96 aviation gasoline, MIL-F-5572. Acceptable alternate grade 100/130. Lead content should not exceed 4.66cc. per gallon. Capacity, each tank; 51 U.S. Gals., 43.22 Imp. Gals., or 193 Liters. Usable fuel, each tank is; 50.5 U.S. Gals., 42.8 Imp. Gals., or 191.1 Liters.
15. Fuel Tank Sump Drains	Drain a small amount of fuel to check fuel for water and sediment before first flight of the day.

PROPELLERS.

Standard periodic inspection and lubrication of the propellers and spinners will disclose any minor propeller troubles before they have a chance to become serious. An occasional wiping of the propeller blades with an oily cloth will result in cleaning off grass and bug stains and will assist materially in corrosion-proofing in salt water areas. Oil and grease stains may be removed with carbon tetrachloride or any non-alkaline grease solvent. Before entering the airplane, examine the propellers for oil leakage and check the blades for nicks and cracks. In ground test, follow the recommended procedure of checking the operation of the propellers through approximately their full range. It is advisable to turn the propellers into a horizontal position when preparing the airplane for tie-down or hangaring. This position prevents water from draining between the clamp and blade into the blade bearing. Sharp nicks in the leading edge of the propellers should be carefully smoothed out to eliminate unnecessary stress concentration in the blades.

AIRPLANE FILE.

There are miscellaneous data, information and licenses that are a part of the airplane file. The following is a check list for that file:

A. To be carried in the airplane at all times:

(1) Aircraft Registration Certificate (Form ACA 500A).
(2) Aircraft Airworthiness Certificate (CAA Form ACA 1362).
(3) Airplane Radio Station License (if transmitter installed).

(4) Pilot's Check List.
(5) Weight and Balance Data.
(6) Airplane Log Book.
(7) Engine Log Book.

B. To be maintained but not necessarily carried in the airplane at all times:

(1) Latest copy of the Repair and Alteration Form 337.
(2) Equipment List.
(3) A form containing the following information: Model, Registration Number, Factory Serial Number, Date of Manufacture, Engine Number and Key Numbers (duplicate keys are available through your Cessna dealer).

INSPECTION SERVICE AND INSPECTION PERIODS.

With your airplane you will receive an Owner's Service Policy. This policy has coupons attached to it which entitle you to an initial inspection and a no-charge 100 hour inspection. If you take delivery from your Dealer, he will perform the initial inspection before delivery of the airplane to you. If you pick up the airplane at the factory, plan to take your Cessna 310 to your Dealer reasonably soon after you take delivery on it. This will permit him to check it over and to make any other minor adjustments that may appear necessary. Also, plan an inspection by your Dealer at 100 hours or 90 days, whichever comes first. This inspection also is performed by your Dealer for you at no charge. While these important inspections will be performed for you by any Cessna Dealer, in most cases you will prefer to have the Dealer from whom you purchase the airplane accomplish this work for you.

The Civil Air Regulations require all airplanes to have an "annual inspection" performed by a person designated by the administrator. In addition, 100 hour periodic inspections made by an "appropriately rated mechanic" are required if the airplane is flown for hire. The Cessna Aircraft Company recommends the 100-hour periodic inspection for the Model 310 airplanes. The procedure for this 100-hour inspection has been carefully worked out by the factory and is followed by the Cessna Dealer organization. The complete familiarity of the Cessna Dealer organization with Cessna equipment and with factory-approved procedures provides the highest type of service possible at lower cost.

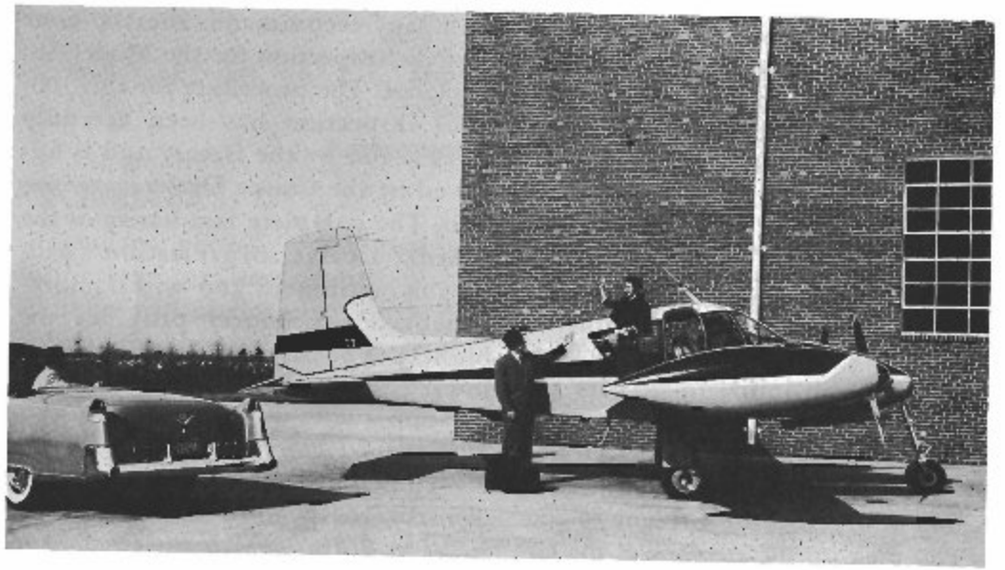
Time studies of the 100 hour inspection at the factory and in the field have developed a standard flat-rate charge for this inspection at any Cessna Dealer. Points which the inspection reveals requiring modification or repairs will be brought to the owner's attention by the Dealer and quotations or charges will be made accordingly. The inspection charge does not include the oil required for the oil change.

Every effort is made to attract the best mechanics in each community to Cessna service facilities. Many Dealer's mechanics have attended Cessna Air-

craft Company schools and have received specialized instruction in maintenance and care of Cessna airplanes. Cessna service instruction activity in the form of service bulletins and letters is constantly being carried on so that your enjoyment and safety in your Cessna will be complete and up-to-date when you have your inspection and service work performed by Cessna Dealer's mechanics.

Dealers carry a full complement of Cessna service parts and possess complete repair and service facilities, including such specialized jigs and toolings as may be necessary.

Your Cessna Dealer will be glad to give you current price quotations on all parts that you might need and will be glad to advise you on the practicability of parts replacement versus repairs that might from time to time be necessary.

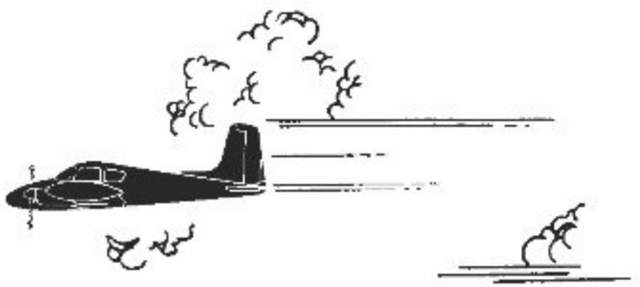


CESSNA CROSS COUNTRY SERVICE

On your cross country travels make it a point to stop at a Cessna service station for your service requirements. Your Dealer will be glad to supply you with a copy of a current service station list, or if you wish, you may write to the Service Department, Cessna Aircraft Company, Wichita, Kansas, asking for it and it will be promptly mailed to you.

OPTIONAL EQUIPMENT

- De-Ice System
- De-Ice Light
- Propeller Anti-Ice System
- Oxygen System
- Taxi Light
- Rotating Beacon
- Flares (four 1½-minute flares)
- Right Landing Light
- Ground Service Plug
- Fire Extinguisher — Hand Type
- Seat Covers — Plastic
- 25-Amp. Generator and Voltage Regulator
- Oil Dilution System
- Co-Pilot's Rudder Pedals and Control Wheel
- Stainless Steel Cables
- Shoulder Straps
- Internal Corrosion Proofing



■ See your Cessna sales and service dealers for the complete line of radio combinations available for your Cessna.

ALPHABETICAL INDEX

WARRANTY

■ The Cessna Aircraft Company warrants each new airplane manufactured to be free from defects in material and workmanship under normal use and service, provided, however, that this warranty is limited to making good at the Cessna Aircraft Company's factory any part or parts thereof which shall, within ninety (90) days after delivery of such airplane to the purchaser, be returned to the Company with transportation charges prepaid, and which upon Company examination shall disclose to the Company satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and all other obligations or liabilities on the part of the Company, and the Company neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of its airplanes.

■ This warranty shall not apply to any airplane which shall have been repaired or altered outside the Company's factory in any way so as, in its judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident.

"LOOK FOR THE RED AND BLUE CESSNA PENNANTS FOR THAT EXTRA SERVICE WHERE IT COUNTS WHEN YOU NEED IT."

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OWNER'S MANUAL