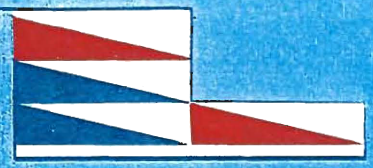
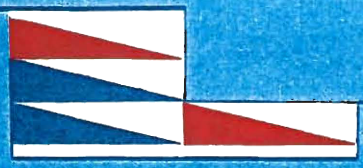
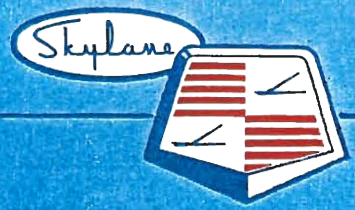






CESSNA

ON YOUR TRAVELS, STOP AT CESSNA SERVICE STATIONS FOR FAST, EFFICIENT, ECONOMICAL SERVICE.

Your 1957-58 Cessna SKYLANE *and* 182

CESSNA AIRCRAFT COMPANY WICHITA, KANSAS

Owner's Manual

This manual describes the operation and performance of the 1957 and 1958 Cessna Model 182, and the 1958 Cessna Skylane. Equipment described as "Optional" denotes that the subject equipment is optional on the Model 182. Much of this equipment is standard on the 1958 Cessna Skylane. Except for minor equipment changes, the 1957 and 1958 models are identical structurally and operationally, and have the same performance; therefore, this manual is applicable for both years. The main difference between a 1957 and 1958 model is the rudder trim system which is installed on the 1958 model only. The 1957 model has a rudder trim tab which is also described in this manual.

D139-13-CES-250-12/73

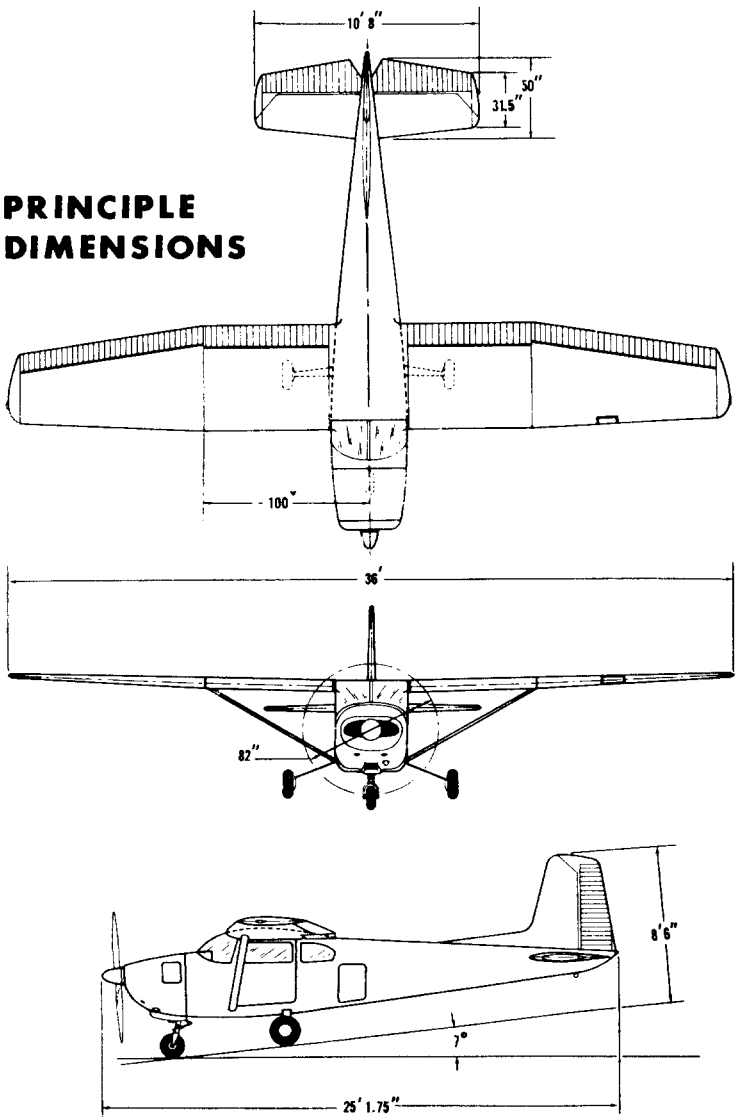
Congratulations . . .

■ You are now the owner of a truly outstanding airplane. Your Cessna has been engineered to give you the ultimate in performance, styling, durability, flying comfort, and economy for both business and pleasure.

■ We share your pride as a Cessna owner and have prepared this Owner's Manual as a guide to acquaint you with your airplane and its fine construction, equipment, ease of operation and its care.

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

PRINCIPLE DIMENSIONS



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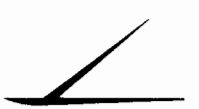
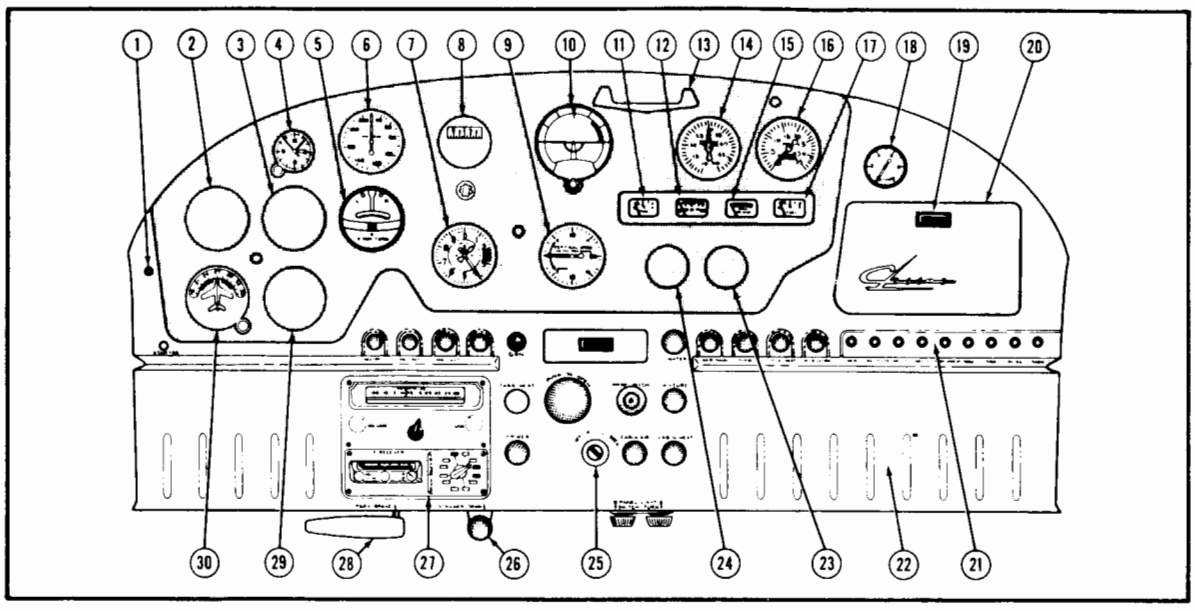




1. Headphone Jack
2. Azimuth Indicator (Opt. Equip.)
3. Speed Control Indicator (Opt. Equip.)
4. Clock (Opt. Equip.)
5. Turn and Bank Indicator (Opt. Equip.)
6. Airspeed Indicator
7. Altimeter
8. Directional Gyro (Opt. Equip.)
9. Rate-of-Climb Indicator (Opt. Equip.)
10. Gyro Horizon (Opt. Equip.)
11. Left Tank Fuel Quantity Indicator
12. Oil Pressure Gage
13. Compass Card Holder
14. Manifold Pressure Gage
15. Oil Temperature Gage
16. Tachometer
17. Right Tank Fuel Quantity Indicator
18. Suction Gage (Opt. Equip.)
19. Glove Compartment Door Handle.
20. Glove Compartment Door
21. Electrical System Control Panel (See figure 5)
22. Optional Radio Space
23. Carburetor Air Temperature Gage (Opt. Equip.)
24. Cylinder Head Temperature Gage (Opt. Equip.)
25. Control Panel (See figure 2)
26. Fuel Strainer Drain Knob
27. Optional Radio
28. Parking Brake Handle
29. Optional Instrument Space
30. Omni Indicator (Opt. Equip.)

Figure 1. Instrument Panel

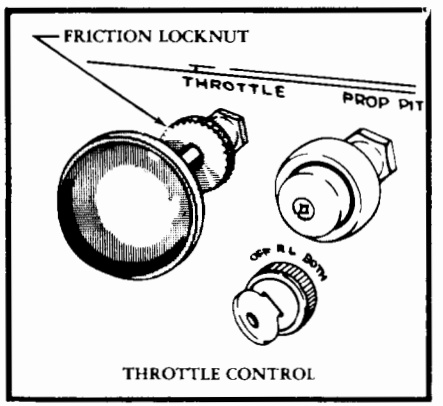
Section I

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.

ENGINE.

A six-cylinder, Continental Model O-470-L, 230 horsepower engine powers your airplane. Compact, dependable and efficient, the engine incorporates hydraulic valve-lifters which silence valve operation. Built by a company whose name has become a byword for precision-built, performance-packed aircraft engines, the Continental 230 horsepower engine means top performance for your airplane at low maintenance cost.



THROTTLE CONTROL

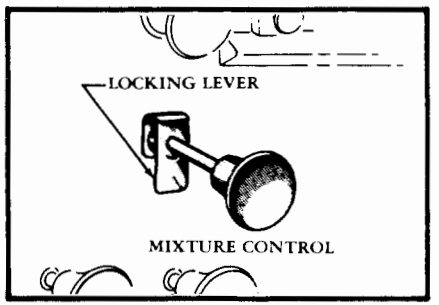
THROTTLE.

The throttle (3, figure 2) is centrally located on the lower half of the instrument panel and is easily identified by its large, round knob. Engine power can be increased by pushing the throttle in toward the instrument panel or decreased by pulling the control out. To prevent the throttle from creeping, a knurled, friction-type, lock nut is incorporated on the control to secure it at any desired setting.

NOTE

Because of the constant speed propeller mechanism, standard equipment on the airplane, advancing the throttle will *not* increase engine rpm. It will increase the manifold pressure. With each power increase, the constant speed propeller automatically takes a larger "bite", enabling the engine to run at

a constant speed at all times. Engine rpm can be changed by adjusting the propeller control. Refer to "PROPELLER PITCH CONTROL" paragraph on page 1-5 for this procedure.



MIXTURE CONTROL.

The mixture control (7, figure 2) is the second knob to the right of the throttle in the lower center portion of the instrument panel. A locking lever is incorporated on the control to prevent its unintentional use. *To lean the mixture,* it is necessary to depress the locking lever while pulling the mixture control knob out. This operation can be accomplished with one hand by using the thumb to press the locking lever in and the index and middle fingers to pull the mixture control knob out. The locking lever is effective only in the leaning operation. Forward movement of the mixture control is not affected by the locking lever. For detailed operating instructions on the use of the mixture control, refer to Section III.

CARBURETOR AIR HEAT CONTROL.

The carburetor air heat control (1, figure 2) is located to the left of the throttle. The push-pull control operates the carburetor air intake butterfly valve which proportions the hot and cold air entering the carburetor. Pulling the control out provides heated air for the carburetor while pushing the control all the way in provides only cold air for the carburetor.

The control has a center button locking device. To move the control, press the lock button in with the thumb and hold while moving the control to the desired position. Lock the control by releasing the thumb pressure on the button.

Air pulled into the heater muffs and subsequently into the engine does not pass through the air filter. For this reason, when taxiing on dirty, dusty, or sandy fields, carburetor heat should not be used until the engine is cleared prior to take-off. After a full stop landing under these conditions, carburetor heat should be returned to full cold in order for the air filter to become fully effective again.

Carburetor ice can form on the ground with the engine idling. Therefore, just before take-off, when you run-up the engine and check magnetos, be sure to put the carburetor heat in the "ON" position after the magneto check. Leave it in this position until just before you open the throttle for the take-off run. Then move carburetor heat to the "COLD AIR" position. This gives maximum power for the take-off. Watch engine for any indications of ice (roughness or a drop in manifold pressure) during climb and

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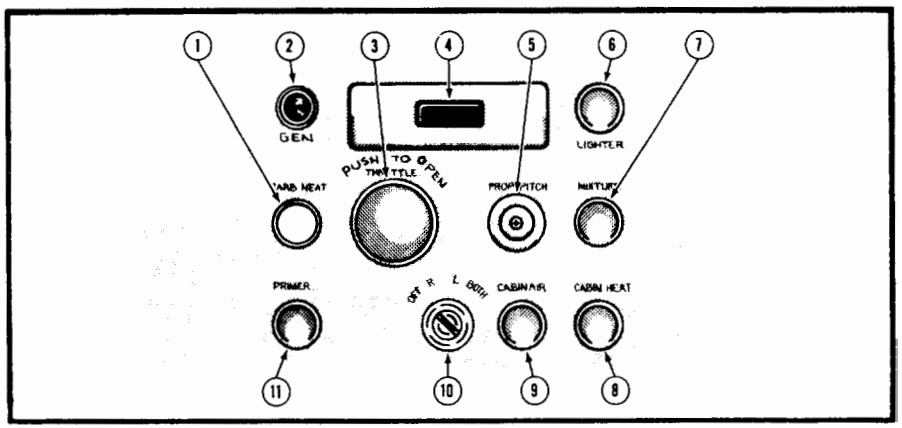

Figure 2. Control Panel

1. Carburetor Air Heat Control
2. Generator Warning Light
3. Throttle
4. Ash Receiver
5. Propeller Pitch Control
6. Cigarette Lighter
7. Mixture Control
8. Cabin Heat Knob
9. Cabin Air Knob
10. Ignition Switch
11. Engine Primer

apply full carburetor heat if carburetor begins to ice. (No change will be noticed in the rpm because the constant speed propeller will automatically compensate for this.)

The correct way to use carburetor heat is to first use full heat to remove any ice that is forming. By trial and error, determine the minimum amount of heat required to prevent the ice from forming; each time removing any ice that is formed by applying full heat. On each subsequent trial, increase the amount of heat applied until no ice forms. On approach glide just before reducing power, apply full carburetor heat and leave in this position.

Carburetor heat is rarely necessary or desirable during cruising flight. However, if cruising flight conditions demand the use of full carburetor heat, engine operation may become rough due to too rich a mixture. Therefore, for prolonged cruising flight, it may be necessary to lean the mixture whenever full carburetor heat is used.

IGNITION SWITCH.

The key-operated ignition switch (10, figure 2) is located below and slightly to the right of the throttle. This switch controls the dual-magneto ignition system. The four switch positions are "OFF", "R", "L" and "BOTH". The left magneto fires the upper spark plugs on the left bank of engine cylinders and the lower spark plugs on the right bank while the right magneto fires the remaining spark plugs. The engine should be operated on both magnetos, because the dual ignition provides a more

complete burning of the fuel-air mixture driving the pistons. The "R" and "L" positions are used for checking purposes only.

ENGINE PRIMER.

The engine primer (11, figure 2) is a manual pump type and is located below and slightly to the left of the throttle. Regardless of the outside air temperature, use of the primer is normally required for starting the engine. The primer aids starting by supplying an initial charge of raw fuel to the engine cylinders.

NOTE

Only five cylinders are primed by the engine primer. The right rear cylinder (No. 1) provides the manifold pressure source connection and is not primed.

To operate the primer, proceed as follows:

(1) First, unlock the plunger by turning the knob counterclockwise until the knob pops part way out.

(2) Slowly pull the plunger all the way out and then push the plunger all the way in. This action is termed "one stroke of the primer".

(3) Normal weather will require one or two strokes of the primer, and very cold (-20° F) weather may require three or four strokes.

(4) Normally, the engine is started immediately after the priming operation. In very cold weather it is recommended that the engine be turned over while priming. It may be necessary to continue priming until the engine runs smoothly.

STARTER BUTTON.

A push-button switch (1, figure 5) operates the electrical starter motor and is located at the left side of the instrument panel.

TACHOMETER.

A recording engine tachometer (16, figure 1) is mounted above the engine instrument cluster on the right side of the instrument panel. The tachometer indicates engine RPM and records engine operating hours.

MANIFOLD PRESSURE GAGE.

A manifold pressure gage (14, figure 1) is mounted immediately to the left of the tachometer and above the engine instrument cluster on the right side 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. By observing the manifold pressure gage and adjusting the propeller and throttle controls, the power output of the engine can be adjusted to any power setting recommended in the operating procedures of Section II or performance charts of Section V.

CYLINDER HEAD TEMPERATURE GAGE. (OPTIONAL EQUIPMENT.)

A cylinder head temperature gage (24, figure 1) is mounted immediately below the engine instrument cluster on the right side of the instrument panel.

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The gage is calibrated in degrees Fahrenheit and is electrically operated. However, its sole source of power is a thermocouple mounted under the lower spark plug of the left rear engine cylinder and thus the instrument requires no power from the electrical system. By observing the gage readings and adjusting the power setting the pilot can keep the engine temperatures within operating limitations.

PROPELLER.

A constant speed propeller is standard equipment on your airplane, and provides your airplane with maximum performance at take-off, during climb, and while cruising.

A propeller with low blade angles gives the best performance for take-off and climb, while a propeller with high blade angles is more adapted to high speed and high altitude flying.

A fixed-pitch propeller ordinarily is set to obtain best performance while the airplane is cruising, consequently the take-off and climb characteristics are not at their best. The constant speed propeller will permit low blade angles for take-off and climb, thereby giving optimum performance. After the airplane has reached its proper altitude and has leveled off, the propeller can be changed to a higher blade angle and thus provide the desired cruising performance.

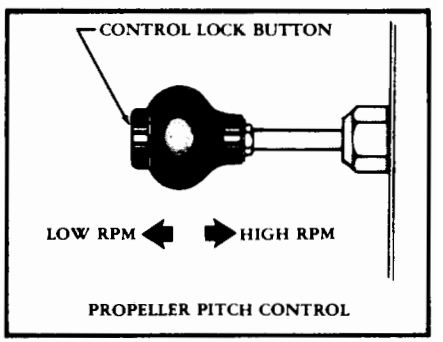
The propeller is controlled by a governor which automatically changes the pitch of the propeller to counteract any tendency of the engine to vary from the rpm setting established by the propeller pitch control. This constant speed feature enables your engine to deliver uniform horsepower for each throttle setting.

PROPELLER PITCH CONTROL.

The control knob (5, figure 2) to the right of the throttle controls the engine speed. With the control full forward, the propeller is in high rpm position. It is moved through its complete range by pressing in the control lock button in the center of the knob and pulling out the control knob to its full out or low rpm position. For sensitive control, the control knob can be screwed in or out by turning the knob with the thumb lock in its normal locking position.

In use, the recommended procedure is to move the control full forward (high rpm) for taxiing and take-off. After take-off and climb, screw out propeller control to the desired cruising rpm. When changing rpm settings during cruising flight, it is recommended that control be moved by screwing in or out since a small movement of the control will cause a considerable change in rpm.

Propeller surging (rpm variation up



PROPELLER PITCH CONTROL

and down several times before engine smooths out and becomes steady) can be prevented by smooth throttle and propeller control operation. *Do not change throttle and propeller control settings with jerky and rapid motions.*

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-L engine has a wet sump oil system which utilizes the engine pan as an oil tank. Other major components of the system are an engine-driven oil pump and an oil cooler integrally mounted on the engine.

Oil temperature is regulated automatically in this system by a thermostatically controlled oil cooler. The thermostat shuts off the passage of oil through the cooler whenever the oil temperatures are below 150° F. Ordinarily, the oil cooler is adequate to keep oil temperatures well within the normal operating range as indicated by the green arc on the oil temperature indicator.

OIL LEVEL.

The oil capacity of the Continental 0-470-L engine is twelve quarts. The quantity can be checked easily by opening the access door on the left side of the engine cowl and reading the oil level on the dipstick, located just aft of the left rear engine cylinder.

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 engine 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.

NOTE

Oil should be added if below nine quarts and should be full if an extended flight is planned.

The oil filler cap is made accessible by opening the access door on the top of the engine cowl. In replacing the oil filler cap, make sure that it is on firmly and turned clockwise as far as it will go to prevent loss of oil thru the filler neck.

OIL SPECIFICATION AND GRADE.

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

Average Outside Temperature	*Recommended Oil Grade*
Below 40° F.	SAE 30
Above 40° F.	SAE 50

ALPHABETICAL INDEX

CESSNA
Sales and Service
DEALERS

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.

CESSNA SERVICE PUBLICATIONS

The Cessna Aircraft Company publishes and revises, as necessary, Manuals, Parts Catalogs, Service Letters and Service News Letters. This material goes to all authorized Cessna Service Stations so that they have the latest authoritative information for servicing your Cessna.

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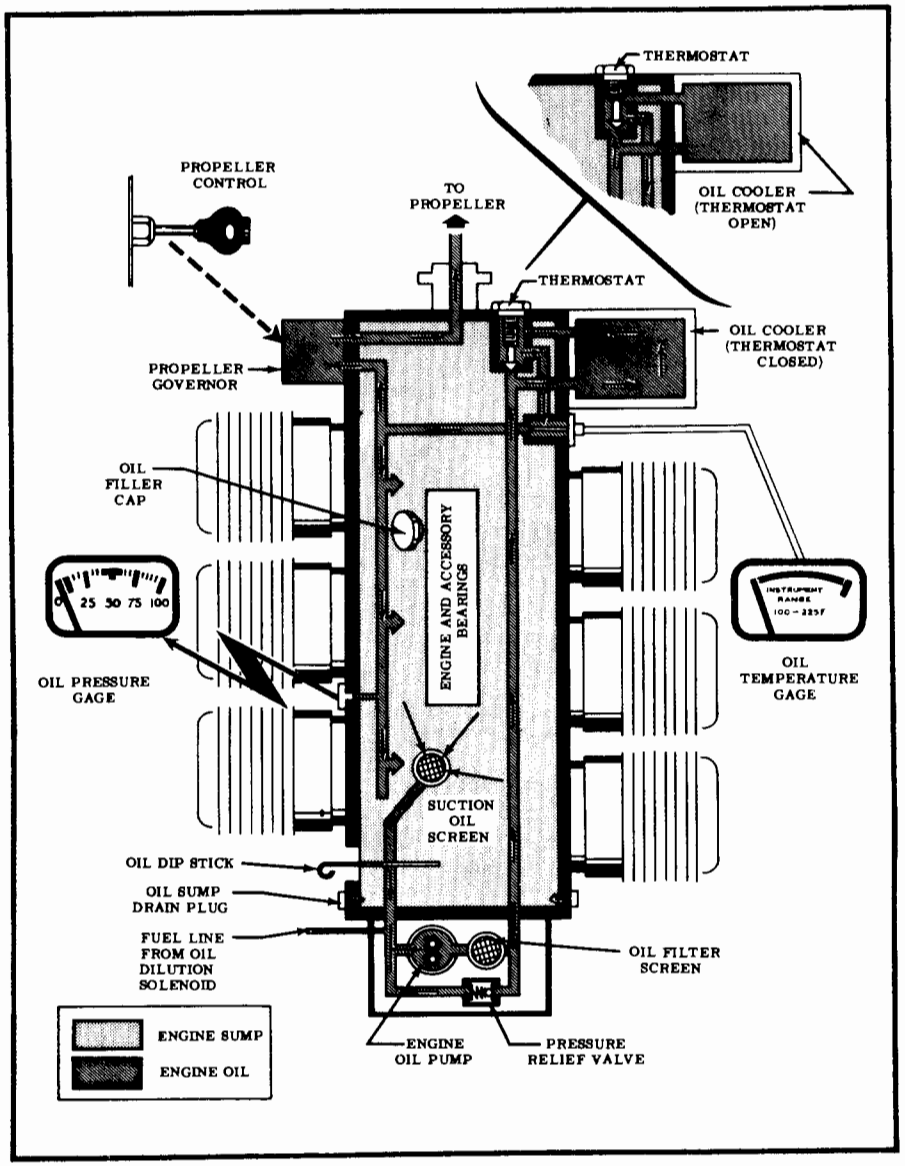


Figure 3. Oil System Schematic

NOTE

During oil changes, remove and clean oil filter screen located on the right side of the engine accessory section.

OIL TEMPERATURE GAGE.

A capillary type, oil temperature gage (15, figure 1) is mounted within the engine instrument cluster on the right side of the instrument panel. A green arc on the gage dial indicates the normal operating range of oil temperatures. Refer to Section IV for instrument markings.

OIL PRESSURE GAGE.

An oil pressure gage (12, figure 1) is mounted within the engine instrument cluster on the right side of the instrument panel. The gage is calibrated in pounds per square inch. Refer to Section IV for instrument markings.

AIR INDUCTION SYSTEM.

Air is ducted to the carburetor from an air scoop located on the bottom of the engine cowl. Dirt and other foreign matter is filtered from the incoming air by a filter screen located in the air scoop. Proper cleaning and servicing of this air filter is important to increase life and maintain top efficiency of the engine. The filter should be serviced every 25 hours (during regular oil change) or oftener when operating in dusty conditions. Under extremely dusty conditions, daily maintenance of the air filter is recommended. Refer to the servicing instructions stamped on the carburetor air filter for the servicing procedure to be used.

FUEL SYSTEM.

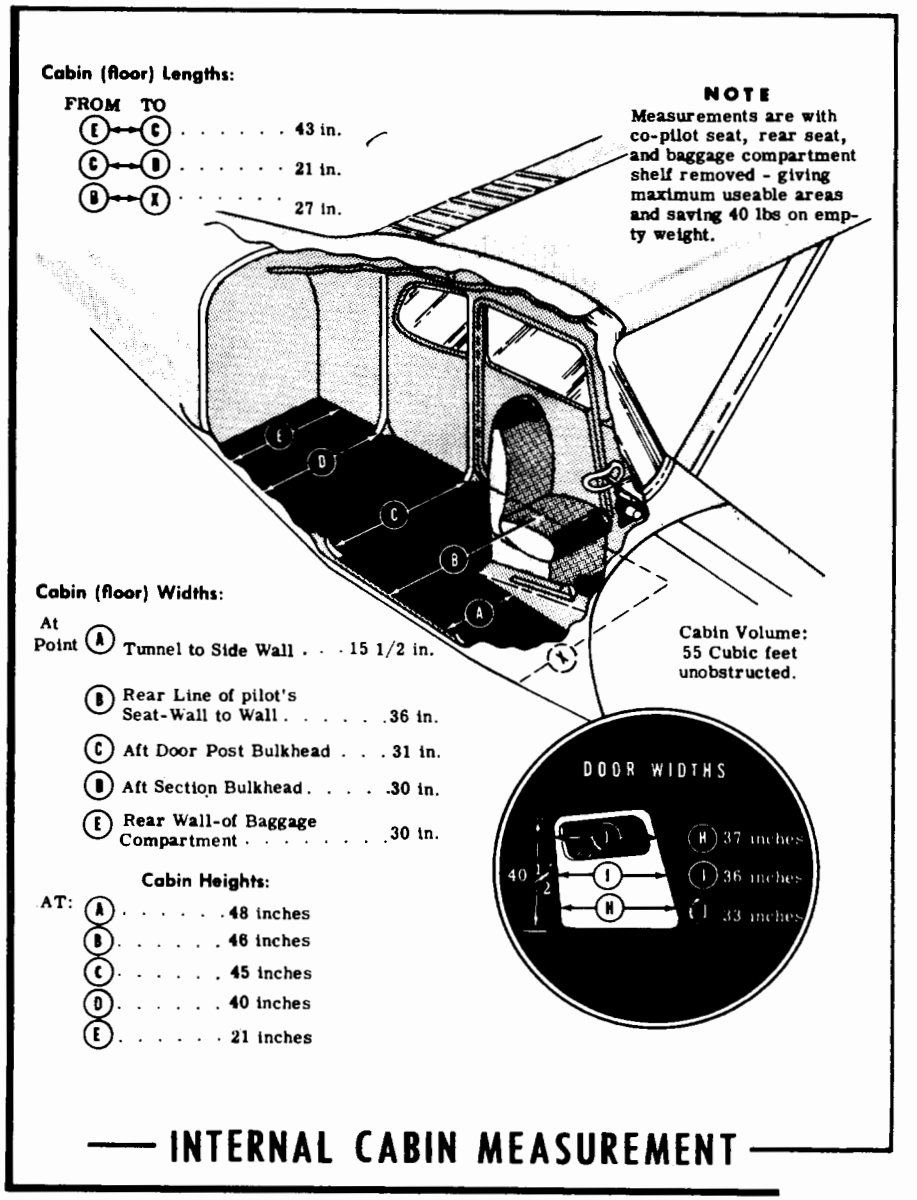
Fuel is supplied to the engine from two rubberized, bladder-type fuel cells, one located in each wing. From these tanks, fuel is gravity-fed through a fuel selector valve and fuel strainer to the engine carburetor.

FUEL SPECIFICATION AND GRADE.

Aviation grade fuel should always be used except under emergency conditions. The recommended fuel is 80 octane minimum rating. Highly leaded fuels are not recommended.

FUEL QUANTITY DATA (U. S. GALLONS).

TANKS	NO	USABLE FUEL ALL FLIGHT CONDITIONS	ADDITIONAL USABLE FUEL FOR LEVEL FLIGHT ONLY	UNUSABLE FUEL	TOTAL FUEL VOLUME EACH
LEFT WING	1	27.5 gal.	3.5 gal.	1.5 gal.	32.5
RIGHT WING	1	27.5 gal.	3.5 gal.	1.5 gal.	32.5



INTERNAL CABIN MEASUREMENT

fuselage attachment. If necessary, tighten landing gear bolts and wedges. With airplane in normal position on the floor visually inspect landing gear spring leaf for cracks. (Remove landing gear wheels and pack with grease at first 100 hours and every 500 hours thereafter unless otherwise designated by owner.)

2. Operate brakes and feel for sponginess. Bleed, and refill brake system if necessary. Check brake linings for wear within permisssible limits.
3. Set parking brake and check exposed lines and hoses for deterioration and evidence of leakage of hydraulic fluid.
4. Examine tires for proper inflation, wear, cuts and blisters. Uneven or excessive wear may indicate need for re-alignment of wheels.

IX. Electrical System.
1. Check electrical system by operating the lights, starter, and all accessories which are incorporated in the electrical system.

X. Visual Check for Exterior Surfaces.
1. Clean exposed surfaces.
2. Check:
   a. Condition of exposed aluminum surfaces.
   b. Airspeed static source holes on each side of fuselage for stoppage.
   c. Evidence of leaking fuel or oil — determine cause.
   d. Condition of decorative paint and all markings.

XI. Recowl the engine and install propeller spinner. Replace all inspection plates, fairings and seats.

XII. Run engine as in preliminary run-up to check for ignition drop, generator charging rate, oil pressure, smoothness, and general operation of engine, propeller, controls, and indicators.

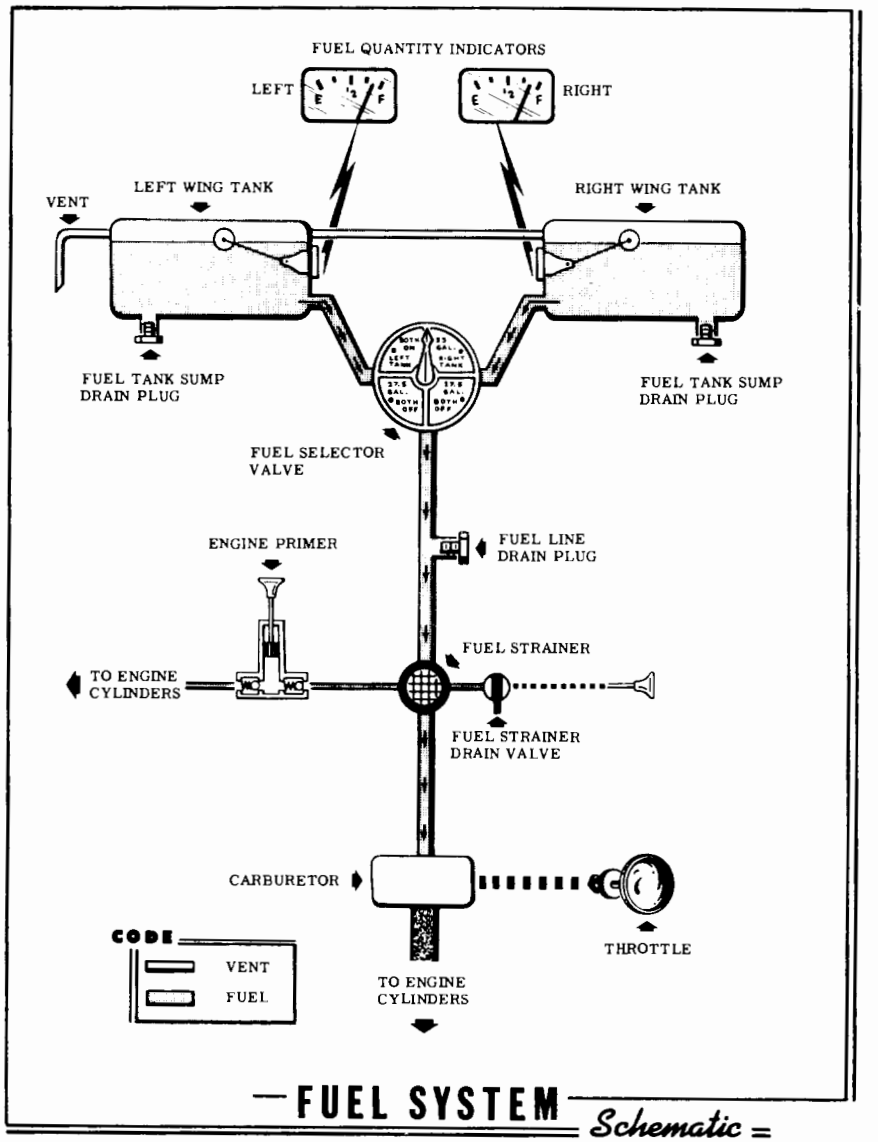
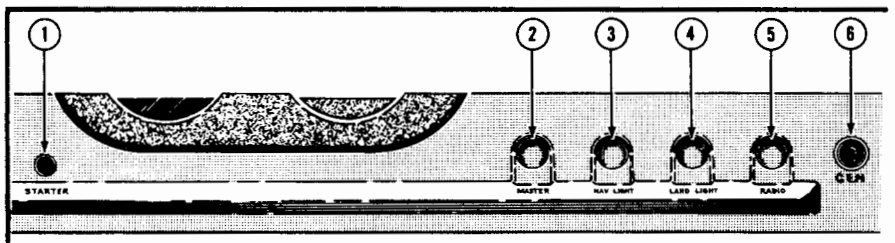


Figure 4.



1. Starter Button
2. Master Switch
3. Navigation Light Switch
4. Landing Light Switch
5. Radio Switch
6. Generator Warning Light
7. Marker Beacon Switch
8. Radio Switch
9. Pitot Heat Switch
10. Oil Dilution Switch

Figure 5. Electrical

FUEL SELECTOR VALVE.

A rotary-type fuel selector valve is located between the front seats at the aft end of the cabin floor tunnel. The valve has four positions labeled "BOTH OFF", "LEFT TANK", "BOTH ON", and "RIGHT TANK". The "BOTH OFF" position shuts off both fuel tanks from the fuel system and allows no fuel to pass the fuel selector valve. The "LEFT TANK" or "RIGHT TANK" position allows fuel to flow from only one fuel tank at a time, while "BOTH ON" permits simultaneous flow from both tanks. *Important* — The fuel valve *handle* is the pointer for the fuel selector valve and indicates the setting of the valve by its position above the dial. *Take-off should be made in the "BOTH ON" position to prevent inadvertent take-off on an empty tank.*

FUEL STRAINER DRAIN KNOB.

A fuel strainer drain knob decaled "STRAINER DRAIN" (26, figure 1) is mounted slightly to the left of center below the instrument panel. The knob provides a quick, convenient method of draining water and sediment that may have collected in the fuel strainer. The fuel strainer is located in the lower aft section of the engine compartment just forward of the firewall.

A two ounce quantity of fuel (approximately 3 to 4 seconds of drain knob operation) should be drained from the strainer before the initial flight of the day or after each refueling operation to insure against the presence of water or sediment in the fuel. The spring loaded drain valve in the strainer is OPEN when the fuel strainer drain knob is *pulled out* all the way. The drain valve automatically *closes* when the knob is *released.*

FUEL TANK SUMP DRAIN PLUG.

A fuel tank sump drain plug is located on the underside of each wing in line with the rear edge of the cabin door and out a few inches from the fuselage. These plugs are used to drain any sediment or water that may collect in the fuel tanks. Under normal

tion. Grease lube fittings. Pack wheel at 500 hours. Check steering arms for security. Check inflation of strut. Fill shimmy dampener.

c. Check rigging of steering. With rudder pedals in neutral, they should measure 6½" from firewall to the hingeline of the brake pedal. With rudder pedals neutral, nose wheel should be in neutral position with no slack in steering rods.

VII. Cabin Section.

1. Clean and check condition of:
   a. Plexiglas windshield and windows.
   b. Upholstery — Vacuum if possible.
   c. Instrument glasses.
   d. Ash trays.
   e. Metal cabin trim.
   f. Instrument and control panels.
   g. Decals, control panel lettering, and compass correction card.
2. Check operation and condition of:
   a. Door latches.
   b. Window opening mechanism.
   c. Manifold heating system valves and ducts.
   d. Control knobs.
   e. Safety belts.
   f. Ventilating system.
   g. Seat adjustment mechanism.
   h. Front seat stop cotter pins on seat rails.
3. Check the primer for leakage and security.
4. On rudder bar and control tee assemblies, check:
   a. Security of mounting.
   b. Cable connection points.
   c. Pulley installations.
   d. Rudder return springs.
5. On battery, check:
   a. Electrolyte level and specific gravity (1.310—1.226)
   b. Cables for security and condition.
   c. Battery security.
   d. Cleanliness of battery box and terminals — clean off and neutralize spilled fluid with soda water solution and rinse with clear water.
6. Drain sediment and water from fuel line at plug located on the belly of the airplane.

VIII. Main Landing Gear and Brakes.

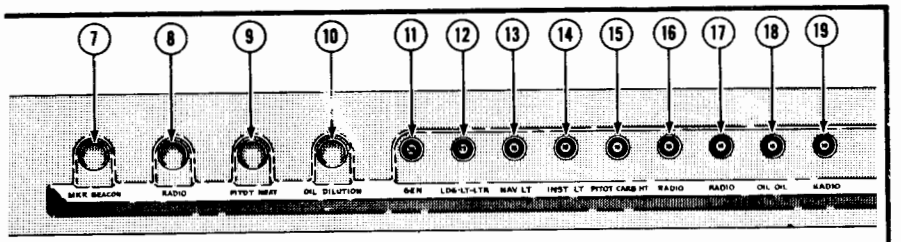
1. Hoist or jack up airplane to remove weight from landing gear. Shake landing gear and wheels for any sign of looseness and visually inspect

work any nicks or abrasions as necessary.
3. Check guide blocks for cracks and wear.
4. Check jamb nut on blade travel-stops for tightness.
5. Check piston and blade clamps for evidence of leakage.
6. Check propeller tightness on shaft.
7. Examine dowel pins to make sure they have not shifted.
8. Grease propeller at grease fittings.
9. Clean engine cowl and propeller spinner.

IV. Wing Inspection.
1. Check front and rear wing bolts attaching wing to fuselage (both wings).
2. Check strut bolts for security (both wings).
3. Check all wing control surfaces for freedom of movement and bolts for security.
4. Check aileron bellcranks and cables for security, conditions, and proper safety (both sides).
5. Check flap bellcranks, tracks, and pulleys and cables for security, condition and proper safetying (both sides).
6. Drain wing fuel tank sumps and resafety — check for fuel leaks.
7. Check pitot tube for cleanliness and freedom from obstructions.
8. Check landing light window for cracks and cleanliness.
9. Check navigation lights for damage.
10. Check flap travel (0° to 38° $^{+2}_{-1}$) and aileron travel (20° ±2° up and 14° ±2° down).

V. Empennage and Surfaces.
1. Check both stabilizer and vertical fin for possible damage.
2. Check attaching bolts on both fin and stabilizer for security.
3. Check rudder and elevator attaching bolts for security and surfaces for freedom of movement.
4. Check elevator and rudder hinges.
5. Check rudder trim system for security and correct rigging.
6. Check surface travels. Elevator 25° ±1° up and 23° ±1° down from streamlined with the stabilizer in its full-down position. Rudder 24° ±1° left and right. Adjustable stabilizer travel is fixed, but the mechanism should be checked to see that the stabilizer moves in full range between the fixed stops.
7. Check elevator and rudder bellcranks.
8. Check balance weights for security.
9. Check navigation light for damage.

VI. Nose Gear.
1. Clean nose gear assembly. Check for security and freedom of operation.



11. Generator Circuit Breaker
12. Landing Light & LTR Circuit Breaker
13. Navigation & Dome Light Circuit Breaker
14. Instrument Light Circuit Breaker
15. Pitot & Carburetor Heat Circuit Breaker
16. Radio (Additional Circuit Breaker Space)
17. Radio (Additional Circuit Breaker Space)
18. Oil Dilution Circuit Breaker
19. Radio (Additional Circuit Breaker Space)

System Control Panel

operating conditions, it is recommended that the wing tank sumps be drained at each 100 hour inspection period.

FUEL LINE DRAIN PLUG.

A fuel line drain plug is located on the underside of the airplane directly below the fuel tank selector valve. At each 100 hour inspection period, this plug should be removed to drain any sediment or water accumulated in the fuel line.

FUEL QUANTITY INDICATORS.

Electrically-operated fuel quantity indicators (11 and 17, figure 1) are mounted below the tachometer within the engine instrument cluster.

NOTE

After the master switch is turned on, a warming period is required before the indicator needles will arrive at the actual reading. Also, the needles will require several seconds to readjust themselves to the actual reading after any abrupt change in flight attitude of the airplane.

The indicators, identified "LEFT" and "RIGHT" indicate the amount of fuel remaining in their respective tank. A red arc extending from the empty to ¼ full range on each indicator dial warns the pilot that the respective tank is ¼ full or less. *Do not take off if the pointer is in the red arc.*

ELECTRICAL SYSTEM.

Electrical energy is supplied by a 12-volt, direct-current system powered by an engine-driven generator. A 12-volt storage battery, located aft of the baggage compartment curtain, serves as a stand-by power source, supplying current to the system when the generator is inoperative or when the generator voltage is insufficient to close the reverse-current relay.

MASTER SWITCH.

The master switch (2, figure 5) is mounted at the left end of the switch row in front of the left front seat. The switch positions are: "ON" (out posi-

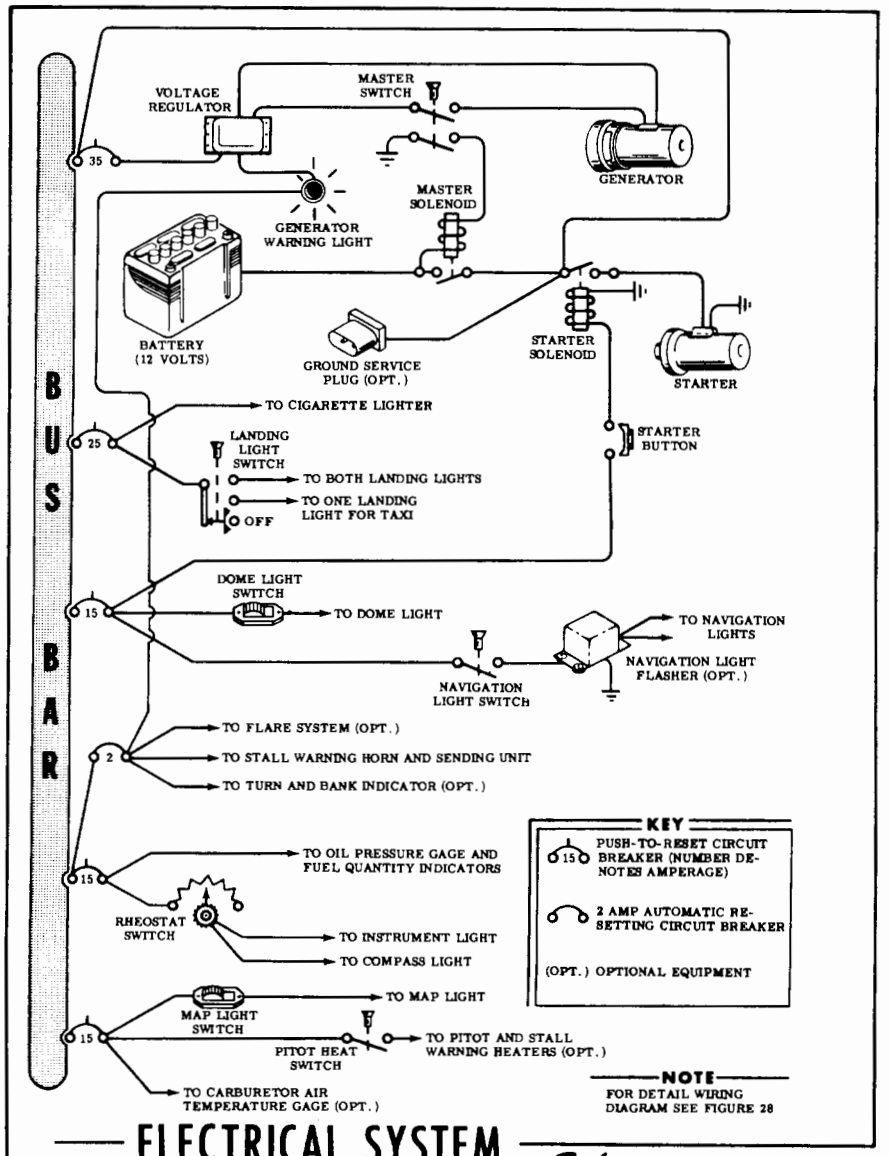


Figure 6.

8. Open upholstery headliner zipper.
9. Remove scuff plates and rudder pedal shields, roll back floor covering and remove round inspection plates above landing gear bulkhead.
10. Remove stabilizer control wheel cover, rudder trim control wheel cover, rear center tunnel cover plate, and roll back tunnel upholstery.
11. Remove inspection plates just forward of the rear seat.
12. Remove curtains at the aft end of the baggage compartment for access to cables, bellcranks, pulleys, battery, and radio units.
13. Open landing gear fairing at fuselage.
14. Remove wheel and brake fairings.

II. Engine Check.

1. Remove engine cowl and propeller spinner.
2. Visually check engine for oil leaks.
3. Drain oil from engine, clean oil screen located on rear side of accessory case, and refill with new oil of the recommended weight.
4. Wash down engine and propeller.
5. Remove heater muffs. Inspect mufflers and exhaust stacks for possible cracks.
6. Check carburetor air and heater hoses for holes, collapsed tubes, burning, and security of mounting.
7. Check magnetos for condition and security of mounting. Check timing of magnetos, if required (22° BTC).

NOTE

Since the engine timing marks are covered by the spinner adapter, the use of a top center gage and clamp-on type timing disc is recommended for timing the engine—otherwise, the propeller must be pulled in order to use the engine timing marks for timing the engine.

8. Check cylinder base nuts for tightness.
9. Remove spark plugs, clean, set gap (.016—.018), and test. Check condition of copper gaskets.
10. Check engine mount bolts for security and engine mount tubes and gussets for condition.
11. Check all wires forward of the firewall.
12. Check all engine controls for travel and free movement.
13. Remove and clean fuel strainer bowl and screen.
14. Clean carburetor air screen, re-oil, and reinstall.

III. Propeller Check.

1. Check propeller track.
2. Check propeller blades, hubs and blade clamps for condition and re-

best mechanics in each community to Cessna service facilities. Many Dealers' mechanics have attended Cessna Aircraft 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 Dealers' mechanics.

Cessna Dealers maintain stocks of genuine Cessna parts and Service facilities consistent with the demand.

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.

100 HOUR INSPECTION.

Before beginning the inspection, the shop foreman or mechanic runs the engine to check for ignition drop, generator charging rate, oil pressure variation, and to check smoothness and general operation of the engine, propeller, controls, and indicators. He records these facts as an aid to the mechanic. The inspection consists basically of the following procedures:

I. Remove all inspection plates and fairings, consisting of the following:
   1. Remove lower half of wing root fairing (both sides).
   2. Remove the eight inspection plates on underside of each wing.
   3. Remove the two inspection plates on cabin top adjacent to the wing flaps.
   4. Remove tail group fairing and disconnect stinger.
   5. Remove the inspection plate on the underside of fuselage just forward of the stabilizer.
   6. Remove the three inspection plates on the belly of the fuselage.
   7. Remove rear seat back and front seats.

tion) and "OFF" (in position). With the switch on, a solenoid switch is energized and the electrical power of the battery and generator is admitted into the electrical system. In the event of a short or malfunctioning of the airplane's electrical system, the master switch may be turned off and the engine will continue to run on the magneto ignition system.

CIRCUIT BREAKERS.

All the electrical circuits in the airplane are protected by circuit breakers. The stall warning and turn-and-bank indicators are safeguarded by an automatically resetting circuit breaker mounted behind the instrument panel (out of sight of the pilot) immediately to the right of the glove compartment door. The remaining electrical circuits are protected by "push-to-reset" circuit breakers (see figure 5) mounted below the glove compartment on the right side of the instrument panel. The name of the circuit is indicated below each circuit breaker.

If a circuit is inoperative, press the circuit breaker button to reset the breaker. If this does not restore the circuit, it should be checked for shorts, defective parts, or loosened connections. *If a circuit breaker pops out continually,* its circuit should be checked.

GENERATOR WARNING LIGHT.

A generator warning light (6, figure 5) is located directly above the carburetor air heat control. The light, which is red and is labeled "GEN", gives an indication of generator output. It will remain off at all times when the generator is functioning properly. The light will not show drainage on the battery. It will illuminate: when the battery or external power is turned on prior to starting the engine; when there is insufficient engine RPM to produce generator current; and when the generator becomes defective.

FLIGHT CONTROL SYSTEM.

Conventional wheel and rudder pedal controls are provided to operate the primary flight control surfaces (ailerons, rudder and elevators). The horizontal stabilizer is adjusted manually through the use of the stabilizer trim control wheel located between the two front seats. The rudder trim tab is adjustable on the ground only. The wing flaps are controlled by a hand lever mounted between the front seats.

CONTROLS LOCK.

A controls lock is provided as standard equipment to lock the ailerons and elevators in neutral position. Thus, these control surfaces are protected from damage caused by buffeting in high winds. The controls lock is designed with a large red metal flag which covers the airplane master switch making it impossible to start the engine with the controls lock installed. *To install the controls lock,* pull the control wheel back until the hole in the control wheel shaft is aligned with the hole in the collar assembly mounted on the instrument panel. Position the controls lock on the right

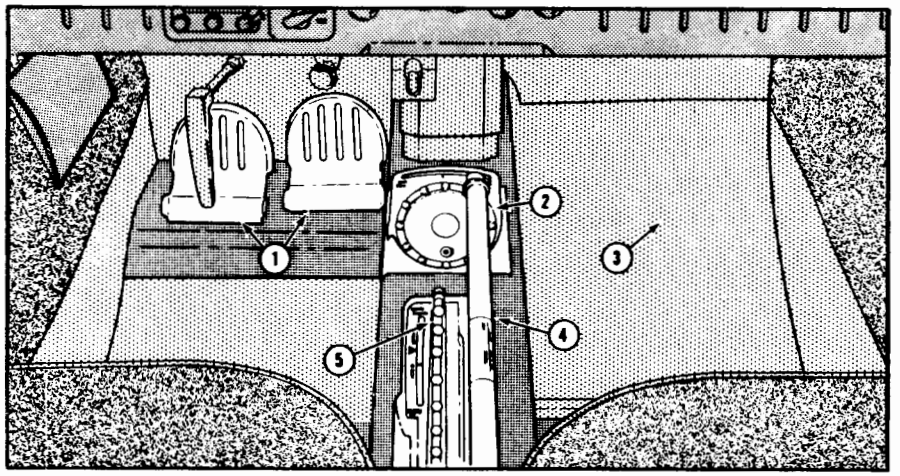


Figure 7. Lower Forward Section of Cabin

1. Pilot's Rudder Pedals
2. Rudder Trim Control Wheel
3. Footrest
4. Wing Flap Handle
5. Stabilizer Trim Control Wheel

side of the control wheel shaft adjacent to the instrument panel so that the lettering on the red flag is legible. Insert the short shaft of the controls lock down through the holes in the collar assembly and control wheel shaft. Check that the controls lock is fully inserted. *To remove the controls lock,* pull it up and out of the collar assembly and control wheel shaft.

When not in use, the controls lock may be stored in the glove compartment.

CONTROL WHEELS.

The elevator and aileron surfaces are operated by conventional movement of the control wheel. The control wheel is located directly in front of the pilot's seat and operates through the instrument panel. A dual control wheel is available as optional equipment.

RUDDER PEDALS.

A set of rudder pedals (1, figure 7) are provided to operate the rudder. These rudder pedals are located just aft of the firewall directly in front of the pilot's seat. Dual rudder pedals are available as optional equipment.

ADJUSTABLE STABILIZER CONTROL WHEEL.

Design of the airplane enables the entire stabilizer to be trimmed to meet different load and speed conditions. The stabilizer is adjusted by rotating the adjustable stabilizer control wheel (5, figure 7), located to the left of the flap control handle. Nose attitude of the airplane is indicated by a position indicator incorporated in the adjustable stabilizer control wheel mechan-

cense (if transmitter installed).
(4) Weight and Balance Data.
(5) Airplane Log Book.
(6) 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 to your Dealer reasonably soon after you take delivery of 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 your airplane. 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

i Texaco Regal Starfak Special.

McCauley propeller — On assembly, lubricate propeller with MIL-L-7711 grease. Using a suitable applicator, load the bottom race of each blade retention bearing with lubricant, apply a circumferential ring of lubricant to the preload bearing race of each blade, apply approximately one tablespoon of lubricant in each of the eight pockets on the inside of the hub behind the blade bore diameter, and apply a small amount of lubricant around the outer two retention nut threads in the hub.

F —— Adjustable Stabilizer Jack — Coat threads with MIL-L-7711 grease every 500 hours or whenever stabilizer is removed.

NOTE 1. All pulleys, control surface hinge bearings, bellcrank clevis bolts, flap actuating handle, brake pedal pivots, rudder pedal crossbars, door hinge and mechanism, Bowden controls, throttle, control rod universal (if unsealed) and control column balls, should be lubricated with SAE 20 General Purpose light machine oil as required or every 1,000 hours.

Note 2. In general, roller chains and control cables tend to collect dust, sand, and grit when greased or oiled. More satisfactory operation, except under seacoast conditions, results when the chains are wiped clean occasionally with a clean dry cloth.

WING ADJUSTMENT.

Initial rigging is accomplished by setting the two eccentric bushings on each rear spar attachment at neutral position. These two eccentric bushings should always be rotated together whenever the setting is changed. Never rotate them separately. If flight test shows excessive wing heaviness, re-rig by rotating the proper bushings, which will increase or decrease the angle of attack of the wing.

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 Li-

ism. Forward movement of the wheel trims the nose down. Backward movement of the wheel trims the nose up. This allows the elevator forces to be trimmed out for the various load and flight conditions. (Control wheel loads are very heavy when the stabilizer is not properly set.) Take-off is made with indicator in "TAKE-OFF" position.

RUDDER TRIM CONTROL WHEEL.

A rudder trim system is installed in the airplane to provide a means of directional trim. The system also increases directional stability and is especially useful during "climb-out" operations when the engine is operating at nearly full power and the airplane forward speed is relatively low. The trim system compensates for engine torque by applying slight rudder control in the direction necessary for maintaining straight forward flight. Under cruising conditions, the rudder trim system may be adjusted to maintain directional trim at any power setting.

The system is operated by the rudder trim control wheel (2, figure 1-7). Clockwise rotation of the control wheel provides "NOSE RIGHT" trim, and counterclockwise rotation provides "NOSE LEFT" trim. A rudder trim position indicator is located just forward of the rudder trim control wheel and is labeled "NOSE RIGHT" and "NOSE LEFT" indicating the trim setting when the trim control wheel is adjusted. For easier steering while taxiing, the rudder trim position indicator should be in the neutral position as indicated by the white neutral mark. Prior to take-off and climb, the trim control wheel may be rotated approximately 2 turns clockwise.

WING FLAP HANDLE.

The wing flaps are controlled by a wing flap control handle (3, figure 7) mounted between the two front seats. The handle is operated by depressing the thumb button and moving the handle to the desired flap setting. By releasing the thumb button, the handle can be locked to provide 0, 10, 20, 30 and 40 degree flap positions.

The flaps may be lowered or raised during normal flying whenever the airspeed is less than 100 mph. The flaps supply considerable added lift and drag; the resulting action steepens the glide angle of the airplane enabling the pilot to bring the airplane in over an obstruction and land shorter than could be done without flaps.

The use of flaps is not recommended for take-offs in strong cross-winds. For additional information on the use of wing flaps for take-off, refer to page 3–4.

Wing Flap Settings

For take-off	*Up (0°)*
	1st notch (10°)
	2nd notch (20°)
For landing	*3rd notch (30°)*
	4th notch (40°)

LANDING GEAR.

MAIN LANDING GEAR.

Your airplane is equipped with

Cessna's "Land-O-Matic" landing gear. It consists of a tapered, spring-steel leaf supporting each main wheel. This spring leaf is made from the highest quality chrome-vanadium steel; heat-treated and shot-peened for added fatigue resistance.

NOSE GEAR.

A steerable nose gear, incorporating an air and oil shock strut, is mounted on the firewall. Nose wheel steering is accomplished through normal operation of the rudder pedals. The nose wheel is steerable through an arc of approximately 12° each side of neutral, after which it becomes free-swiveling up to a maximum deflection of 30° right or left of center. Thru the use of the brakes, the airplane can be pivoted about the outer wing strut fitting.

BRAKE SYSTEM.

The hydraulic brakes on the main wheels are conventionally operated by applying toe pressure to either the pilot's or co-pilot's rudder pedals. The rotation of 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 handle.

BRAKE PEDALS.

Conventional toe-type brake pedals are incorporated as the upper part of the pilot's rudder pedals. Two brake cylinders are mounted directly to the pilot's brake pedals. Pressure applied to the co-pilot's brake pedals is transmitted by a mechanical linkage to the pilot's pedals which in turn actuate the brake cylinder.

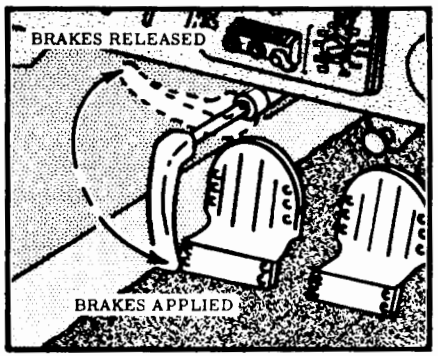


Figure 8. Parking Brake Operation

PARKING BRAKE HANDLE.

The parking brake handle (28, figure 1) is mounted below the instrument panel directly in front of the pilot's seat. The handle locking mechanism is connected, by cables, to the pilot's rudder pedals which actuate the brake master cylinders. Operation of the parking brake handle applies a downward pressure on the rudder pedal, thus actuating the brake master cylinders to apply the main wheel brakes. *To set the parking brake,* grasp the handle, and while turning it counterclockwise ¼ turn (handle pointing downward), pull it out using moderate pressure.

Note

Toe pressure may be applied to the rudder pedals to aid in depressing the brake master cylinders if desired; however, this operation is not necessary.

To release the parking brake, turn the handle clockwise ¼ turn and

LUBRICATION.

Figure 29 outlines the lubrication requirements for your airplane.

LUBRICATION CODE

Code Letter

A — — MIL-L-7711 — Grease

B — — Carburetor Air Filter — Service every 25 hours or oftener when operating in dusty conditions. Under extremely dusty conditions, daily maintenance of the air filter is recommended. Service the air filter in accordance with the servicing instructions stamped on the filter.

C — — Engine Oil Tank — Check dip-stick before each flight. Drain and refill every 25 hours, and clean oil filter screen.

D — — Brake Master Cylinders—Should be checked and refilled periodically with MIL-O-5606 Oil—Hydraulic (Petroleum base). Also shimmy dampener on nose wheel strut.

E — — Hartzell propeller—Grease propeller every 100 hours. To prevent entrapping air and high pressures, remove the zerk fitting adjacent to the zerk being greased. Fill each fitting until grease oozes from adjacent zerk fitting hole. Add equal amounts of grease at each clamp to retain propeller balance.

When lubricating Hartzell propellers, the following greases are recommended in the order of listing:

a. Lubriplate 630 AA
Fiske Brothers, Toledo, Ohio.

b. Stroma HT-1 (Z-801 Grease)
Union Oil Co. of California.

c. RPM Aviation Grease No. 2
Standard Oil Co. of California.

d. Stroma LT-1 (Z-815 Grease)
Union Oil Co. of California.

e. RPM Aviation Grease No. 1
Standard Oil Co. of California.

f. Lubriplate 707
Fiske Brothers, Toledo, Ohio.

g. Mobilgrease Aero General Purpose
Socony Mobil Oil Co.

h. No. 84 Medium Grease
Keystone Lubricating Co.

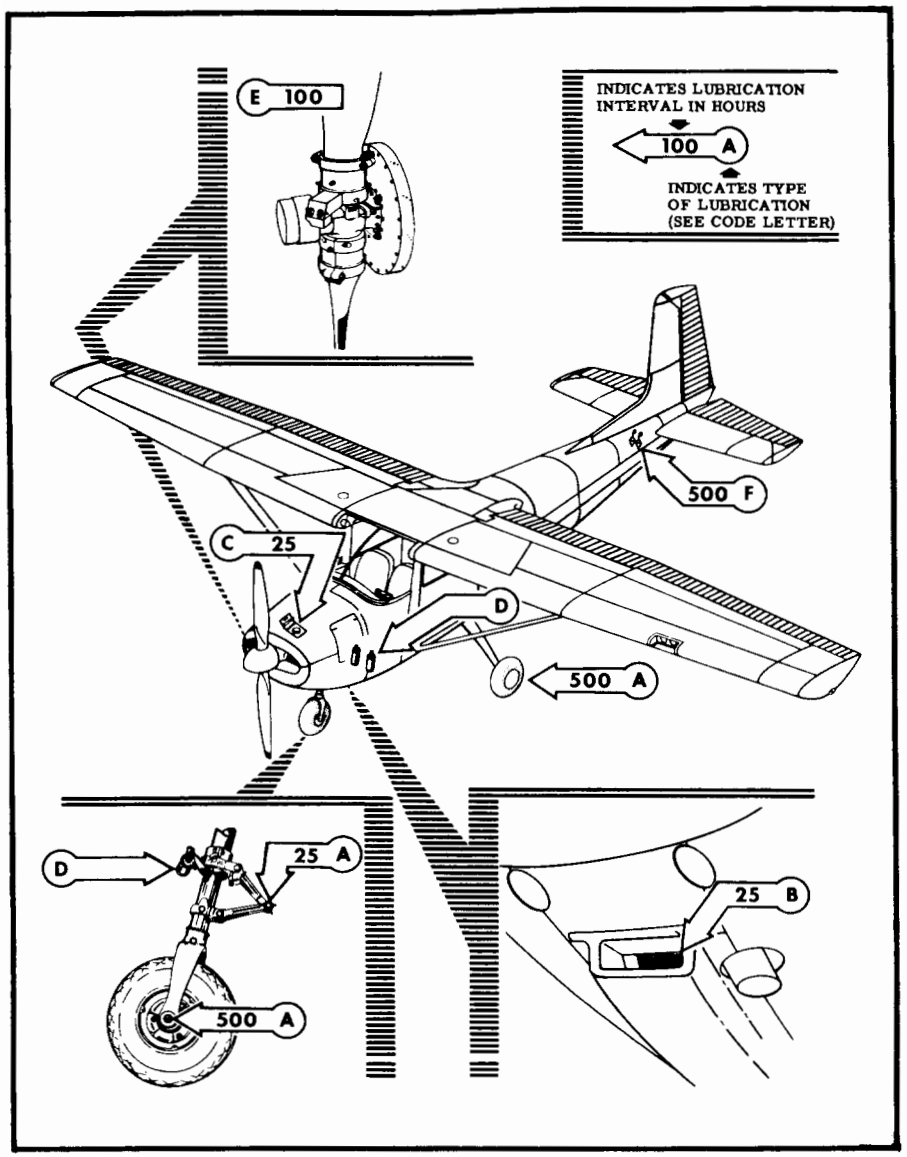


Figure 29. Lubrication Diagram

allow it to return to the stowed position.

INSTRUMENTS.

All instruments are mounted on the instrument panel with the exception of the magnetic compass and a free air temperature gage. The magnetic compass is mounted on the windshield centerstrip in full view of the pilot. The free air temperature gage (optional equipment) is located in the right cabin-ventilator. For correct readings, the ventilator must be slightly open.

TURN AND BANK INDICATOR (OPTIONAL EQUIPMENT).

The turn and bank indicator (5, figure 1) is an electrically operated instrument. Turned on by operation of the master switch, the indicator remains in operation until the master switch is turned off. The indicator has no separate control switch.

PITOT-STATIC SYSTEM.

The airspeed indicator (6, figure 1) and altimeter (7, figure 1), and rate-of-climb indicator (9, figure 1) are operated by the pitot-static system. This system consists of a pitot tube, mounted under the leading edge of the left wing, and two pressure ports mounted on opposite sides of the fuselage just aft of the firewall. To keep the pitot tube opening clean, a cover may be placed over the pitot tube whenever the plane is idle on the ground. The static pressure port openings should be kept free of polish, wax, or dirt for proper airspeed indicator operation.

PITOT HEATER (OPTIONAL EQUIPMENT).

If desired, a pitot heater can be installed, as optional equipment, 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 (9, figure 5) installed in the switch row on the right side of the instrument panel. The switch positions are "ON" (out position) and "OFF" (in position).

STALL WARNING INDICATOR.

A stall warning indicator is mounted on the back of the glove compartment box, next to the firewall. This instrument gives you full and complete warning against inadvertent stalls. It gives warning whenever a stall is approached regardless of speed, attitude, altitude, acceleration or other factors which change the stalling speed. The stall warning horn is set to give an audible warning approximately 5 mph above the normal straight ahead stalling speed. Other attitudes and speeds provide a wider margin.

The only time you may hear the indicator under safe flight conditions will be merely a short beep as you land. Usually no warning will be evident on a properly executed landing because the indicator takes the ground effect into consideration. (If the airplane is leveled off high, however, the indicator will signal.) The indicator automatically cuts out on the ground, although high surface winds may give

signals when taxiing. It therefore requires no silencing switch which might be inadvertently left off.

STALL WARNING TRANSMITTER HEATER (OPTIONAL EQUIPMENT).

If desired, a heater can be installed, as optional equipment, to prevent ice from hampering operation of the stall warning system transmitter unit mounted on the leading edge of the left wing. The heater element is installed when an optional pitot heater is provided on your airplane. The heater is operated by the pitot heater switch (9, figure 5).

CLOCK (OPTIONAL EQUIPMENT).

An eight-day, stem-wind, aircraft clock (4, figure 1) may be installed as optional equipment in the upper left hand corner of the instrument panel.

MAGNETIC COMPASS.

A magnetic compass is mounted on the windshield center strip. The compass correction card is mounted on the instrument panel in full view of the pilot for quick and easy reference when reading the magnetic headings.

SEATS.

FRONT SEATS.

The front seats are individually mounted on tracks and are adjustable fore and aft. The seat adjustment handle is located within easy reach on the left front side of each front seat. *To adjust the seat,* simply pull up on the handle and slide the seat to the most comfortable position.

NOTE

Test the front seats for secure latching after adjusting them to the desired position.

REAR SEAT.

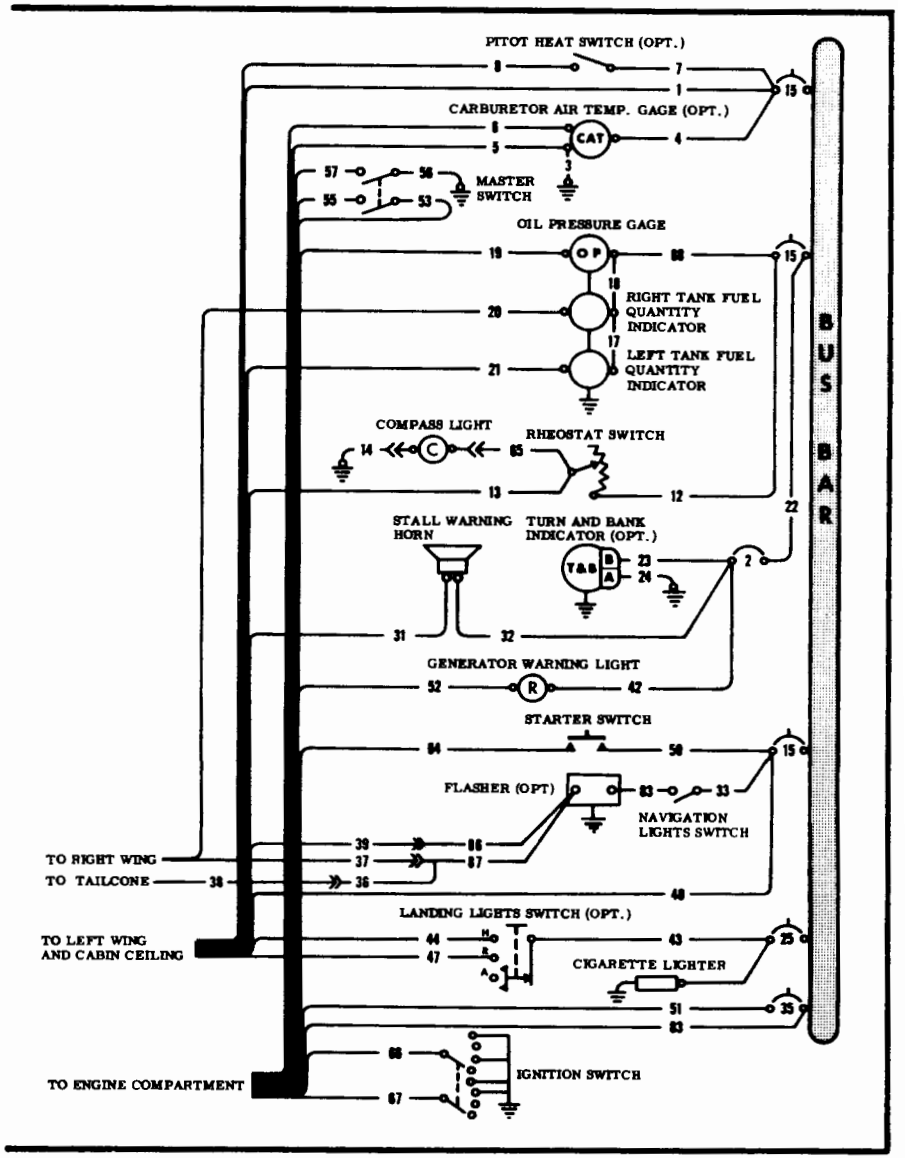
The rear seat has provisions to accommodate two people. The back of the seat is hinged at the bottom to permit seat adjustment and easy access to the baggage compartment. A seat adjustment handle is located behind and at the top of the rear seat back.

CABIN TEMPERATURE CONTROL SYSTEM.

The cabin temperature control system was designed to provide fresh air to the cabin at all times, with a means of regulating the air temperature.

Cabin temperature is controlled by a cabin heat knob (8, figure 2) located immediately below the mixture control. With the cabin heat knob pushed full in, unheated air is ducted to the cabin. As the knob is pulled out, more and more heated air is added. With the knob pulled all the way out, all of the air entering the cabin through the cabin temperature control system is heated.

Air outlets are provided in front of the pilot's and co-pilot's rudder pedals and at the door posts. The forward outlets are ten holes in each end of a duct running completely across the firewall. The rear cabin area is heated and ventilated by ducts, one on either side of the cabin, extending along each wall and terminating at the door posts. A defroster outlet, incorporat-



Wiring Diagram

The numbers indicate wire numbers which can be found on each wire in the airplane.

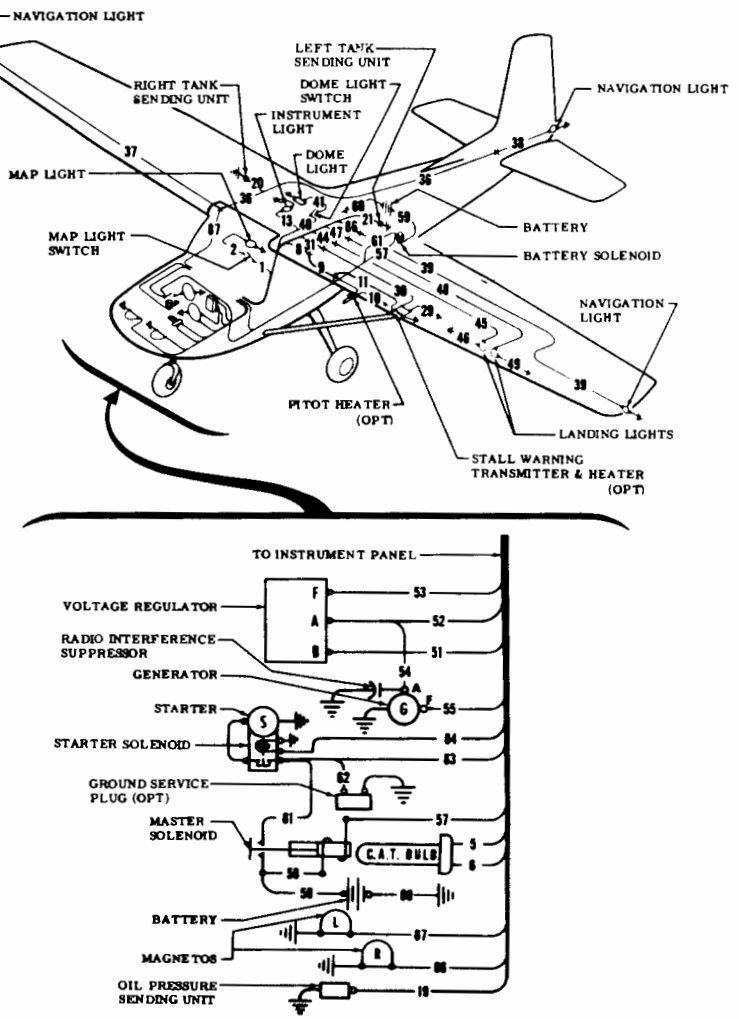


Figure 28. Electrical

ing a slide valve to control the quantity of air through it, is provided on the pilot's side just behind the windshield.

To provide a flow of warm air, pull the cabin heat knob out. *To provide a flow of cool air,* push in the cabin heat knob.

To prevent any air (hot or cold) from entering the cabin through the heater ducts, push the cabin heat knob in and pull out the cabin air knob (9, figure 2).

(Never pull the cabin air knob out when the cabin heat knob is out. This may result in overheating of the heater muff hoses.)

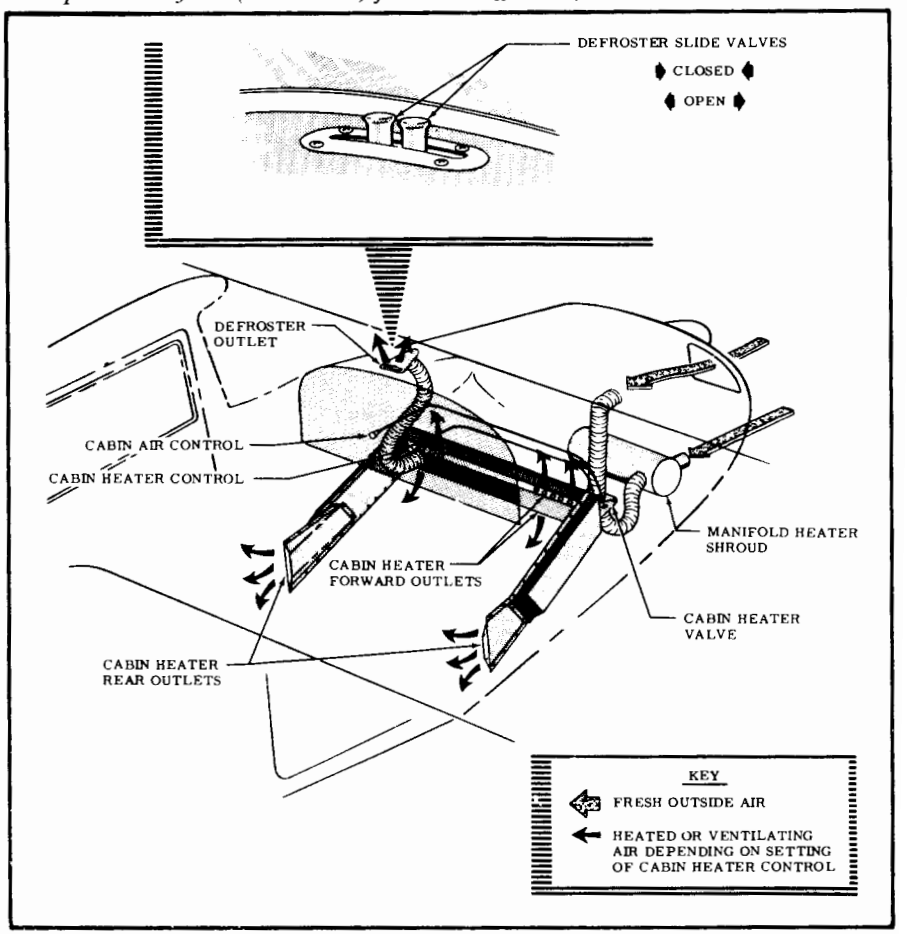
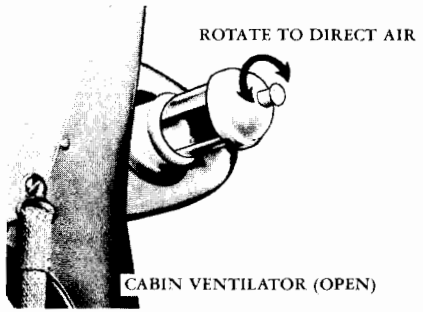


Figure 9. Cabin Air Temperature System



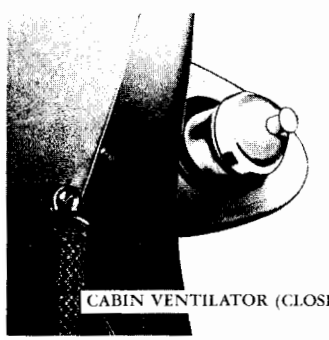
CABIN VENTILATOR (OPEN)

CABIN VENTILATORS.

Additional ventilation for the cabin area is provided by manually-adjusted cabin ventilators. Two ventilators are installed: one on each side of the cabin in the upper corner of the windshield.

To provide a flow of air, pull ventilator tube out. The amount of air entering the cabin can be regulated by varying the distance that the ventilator tube is extended.

To change the direction of air flow, rotate the ventilator tube to the position desired.


CABIN VENTILATOR (CLOSED)

To stop the flow of air, push the ventilator tube all the way in.

LIGHTING EQUIPMENT.

NAVIGATION LIGHTS.

The navigation lights consist of a red light on the left wing tip, a green light on the right wing tip, and a white light on the tip of the fuselage stinger. The navigation light switch (3, figure 5) is mounted in the switch row on the instrument panel. *To turn the navigation lights on,* pull the navigation light switch out. *To turn the lights off,* push the switch in.

NAVIGATION LIGHTS FLASHER (OPTIONAL EQUIPMENT).

A navigation lights flasher system may be installed in your airplane as optional equipment. The navigation lights flash continuously when turned on by the navigation lights switch (3, figure 5). *To turn the navigation lights on,* pull the switch out. *To turn the lights off,* push the switch full in.

LANDING LIGHT.

The landing light consists of two lamps mounted side-by-side in the leading edge of the left wing. Both lamps are adjusted to give proper illumination of the runway during take-off and landing. During taxi, it is recommended that only one lamp be used to prevent an unnecessary drain on the battery during periods of low engine speed when the generator is not charging. The landing light switch (4, figure 5) is mounted on

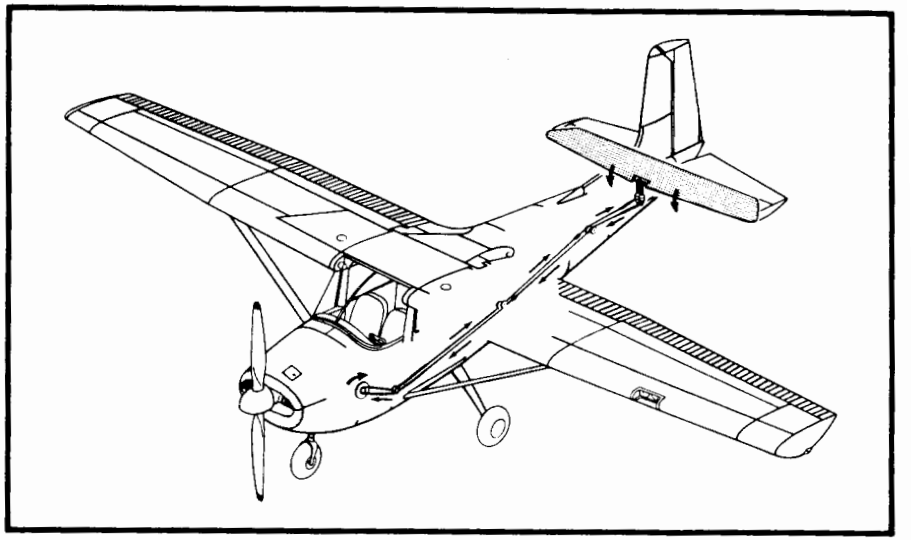


Figure 27. Adjustable Stabilizer Control System

control wheel to full-back position and the screw-jack actuators to full-down position.

(2) Set the chain on the sprockets at the actuators and the control wheel, allowing two chain links to extend forward of the bulkhead in front of the left actuator.

(3) Tighten the cables to a tension of 10 to 15 pounds.

(4) Install stabilizer and fin.

(5) Check the operation of the system by turning the control wheel full forward to see if the stabilizer moves through its full operational range.

(6) Reinstall remaining tail surfaces, tail cone, fairing, and inspection plates removed for the above steps.

RUDDER TAB.

The rudder tab is a fixed tab located on the trailing edge of the rudder and can be set by bending, in either direction, the amount desired.

ELEVATORS (See figure 26).

Elevator travel is 25° ±1° up and 23° ±1° down with the stabilizer in its full-down position. This travel is controlled by two stops located adjacent to the rear elevator bellcrank in the rear of the fuselage.

(1) Move the stabilizer trim wheel until the stabilizer is full-down.
(2) Streamline the elevator with the stabilizer for neutral position.
(3) Set the aft elevator bellcrank stops for an elevator travel of 25° ±1° up and 23° ±1° down.
(4) With elevator in full down position, the measurement from firewall to the edge of the chain sprocket hub on the control column should be ½".
(5) Tighten cables to approximately 30 lbs.

STABILIZER TRIM CONTROL (See figure 27).

The stabilizer trim is changed by screw-jack actuators linked by a chain and cable system to the stabilizer control wheel. Down travel of the stabilizer is limited by a horizontal bulkhead and upward travel is limited by a fixed stop. *Note:* The stabilizer must be removed to rig the screw-jack actuators.

(1) Install cables. Turn stabilizer

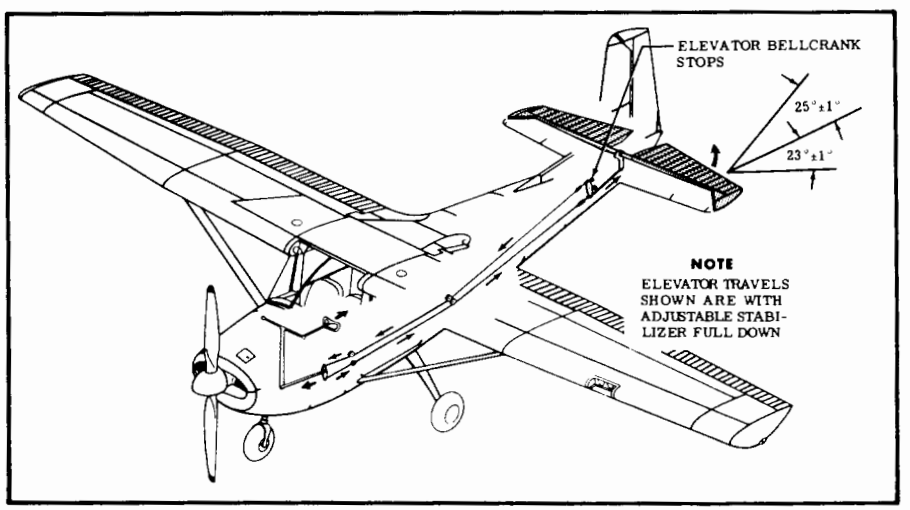
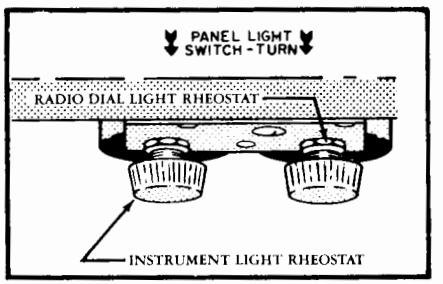


Figure 26. Elevator Control System

the instrument panel. *To turn one lamp on for taxiing,* pull the switch out to the first stop. *To turn both lamps on for landing,* pull the switch out to the second stop. *To turn lights off,* push the switch all the way in.

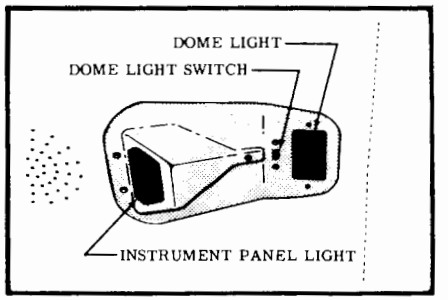
RADIO DIAL LIGHT.

A rheostat switch is provided with factory installed radios to control your radio dial light or lights. The rheostat switch is located on the bottom edge of the instrument panel to the right of the instrument light rheostat switch. *To turn the radio dial light on,* rotate the radio dial light rheostat switch clockwise until the desired illumination is obtained. *To turn the light off,* turn the switch counterclockwise as far as it will go.



INSTRUMENT LIGHTS.

An instrument light incorporating a red lens is mounted in the cabin ceiling. The light, in conjunction with a compass light, is controlled by a rheostat switch (see figure 1) located on the bottom edge of the instrument panel. *To turn the compass and instrument light on,* rotate the instrument light rheostat knob clockwise until the desired illumination is obtained. *To turn the lights off,* turn the knob counterclockwise.

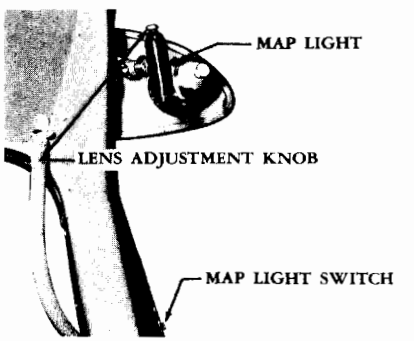


DOME LIGHT.

A dome light is mounted in the cabin ceiling and is controlled by a slide switch mounted just ahead of the dome light.

MAP LIGHT.

A map light is mounted adjacent to the left cabin ventilator and is controlled by a slide switch mounted on the left door post. The light is adjustable to shine in various directions, and a lens adjustment knob, integrally mounted on the light, makes it possible to change the beam from spot to flood illumination.



MISCELLANEOUS EQUIPMENT.

CABIN DOORS.

Two cabin doors are provided on your airplane. Each door incorporates a flush type door handle on the outside and a conventional type door handle on the inside.

To open the door from the outside, apply pressure on the forward end of the flush handle, and pull out on the aft end of the handle until the door latch releases. *To open the door from the inside,* rotate inside door handle down and forward.

NOTE

When closing the door, the inside door handle must be in the unlocked position (neutral). Otherwise, the locking bolt will interfere with the door jamb.

Both cabin doors can be locked from the inside. *To lock either door,* rotate inside door handle aft and up as far as it will go(approximately 90 degrees). *To unlock,* rotate handle down.

The left door can be locked from the outside by means of a key-operated lock. The same key that is used for the ignition is also used to lock the door.

A door stop is incorporated in the front edge of each cabin door to hold the door open for easy loading of the airplane. *To engage the door stop,* swing the door out to the limit of its travel and release. *To disengage the door stop,* simply close the door.

CABIN WINDOWS.

The rear cabin windows are of the fixed type and do not open. The cabin door windows are a full door width, providing you with excellent side visibility. They are hinged along the top allowing them to open outward for additional ventilation.

To open these windows, depress the small lock release button and turn the handle upward. The window will open outward without pressure due to spring loaded limit arms in the upper portion of the window.

NOTE

Caution should be exercised when opening these windows during flight since air pressure will tend to "pop" them outward with considerable force. This may result in damage to the limit arms. Therefore it is recommended that you hold firmly to the handle and ease the window outward to its open limit.

ASSIST STRAPS.

Two assist straps are mounted on the front door posts and are used as an aid in entering and leaving the airplane.

ASSIST STEPS.

An assist step is installed on each main landing gear spring to aid in entering and leaving the airplane.

CIGARETTE LIGHTER.

A cigarette lighter (6, figure 2) is mounted on the instrument panel as

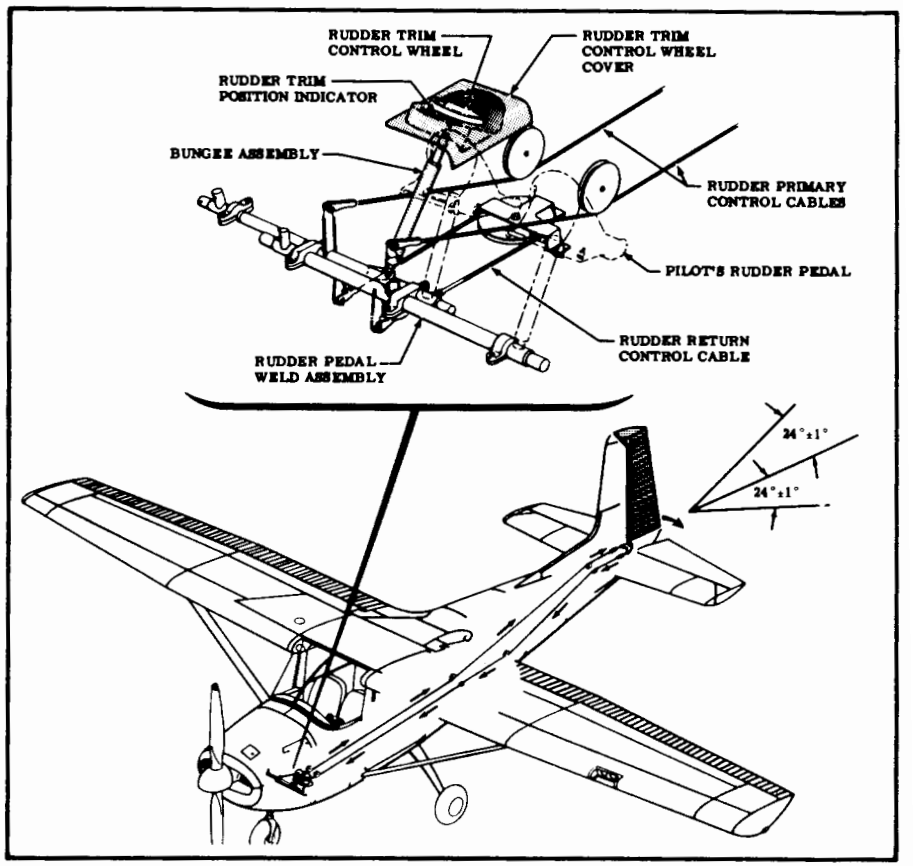


Figure 25. Rudder Control System

rigged, rig nose wheel steering as follows:

(1) Disconnect steering tubes from the nose wheel strut.
(2) Install surface control lock to hold rudder in neutral position.
(3) Raise nose wheel clear of the ground, either by depressing the tail or hoisting the nose.
(4) Check visually or by measurement from each main wheel axle centerline to assure that nose wheel is properly centered.
(5) With steering tubes fully extended, but not compressing their internal springs, adjust steering tube clevis end fittings as required to attach steering tubes to the strut steering arms.
(6) Remove rudder control lock.

(5) Check travel, which should be 20° up and 14° down with a tolerance of plus or minus 2°.
(6) Any correction necessary on the travel can be made by tightening the direct cable and loosening the carry-through cable, or vice versa, whichever the case may be. *Note:* After corrections have been made, check aileron in neutral position and make adjustment per instructions in Step 4.

RUDDER (See figure 25).

Rudder travel is 24° left and 24° right of the centerline of the airplane, with a tolerance of plus or minus 1°. Travel is limited by stops located on the extreme rear fuselage bulkhead, and adjustment is made by screwing the bolts, which serve as stops, in or out. Rig rudder system as follows:

(1) Adjust stops to allow correct travel of rudder.
(2) Block rudder in neutral position with surface control lock.
(3) Install primary control cables and adjust turnbuckles until rudder pedals are neutral 6½ inches aft of firewall, measuring to the hingeline of the pedals.
(4) Install rudder return control cable and adjust turnbuckle until a tension of 30 lbs. is measured on the primary control cables. Recheck 6½ inch dimension and readjust cables as necessary to maintain this dimension.
(5) Adjust rudder trim control wheel until clevis at lower end of bungee assembly is aligned with arm on right rudder pedal weld assembly and install securing bolt and nut.
(6) If installed, check position of rudder trim position indicator wire for alignment with neutral mark on trim control wheel cover. If indicator is not neutral when rudder is neutral, remove cover, pull upholstery away from right or left side of tunnel and remove clevis pin securing indicator wire to tunnel assembly.
(7) Insert follower arm of indicator wire halfway out (in fifth or sixth revolution) in the continuous groove provided in the underside of the trim control wheel, relocate indicator wire in operating position and install the securing clevis pin and cotter pin. The indicator wire should now be aligned with neutral mark on cover.
(8) Safety wire all turnbuckles, remove rudder control lock and check rudder trim system for correct movement and ease of operation.

STEERING.

The nose wheel is steerable through an arc of approximately 12° each side of neutral, after which it becomes free-swiveling up to a maximum deflection of 30° right or left of center. If rudder control system is properly

standard equipment.

ASH RECEIVERS.

Three ash receivers are provided in your airplane. One ash receiver is located in the center of the instrument panel and is used by the occupants of the front seats. The remaining ash receivers are mounted on the cabin walls just aft of the rear door post bulkheads and are accessible to the rear seat passengers.

GLOVE COMPARTMENT.

A glove compartment (20, figure 1) is located on the right side of the instrument panel. *To open,* pull out on glove compartment door knob.

MAP POCKET.

A map pocket is incorporated in the left forward upholstery side panel. It is readily accessible to the pilot, and is handy for storing maps and flying aids.

COAT HANGER HOOK.

For your convenience, a coat hanger hook has 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.

BAGGAGE COMPARTMENT.

The baggage compartment is located immediately aft of the rear seat. *To gain access from inside the cabin,* rotate the rear seat adjustment handle (top center of rear seat back) upward, disengaging the adjustment bars from the retaining brackets. The seat back can then be rotated forward and down allowing access to the compartment.

Access to the compartment from the exterior is gained thru the baggage compartment door. The baggage door has the same flush type handle as the cabin doors and is locked or unlocked with the same key. A limit chain keeps the door from being opened back against the fuselage.


BAGGAGE COMPARTMENT

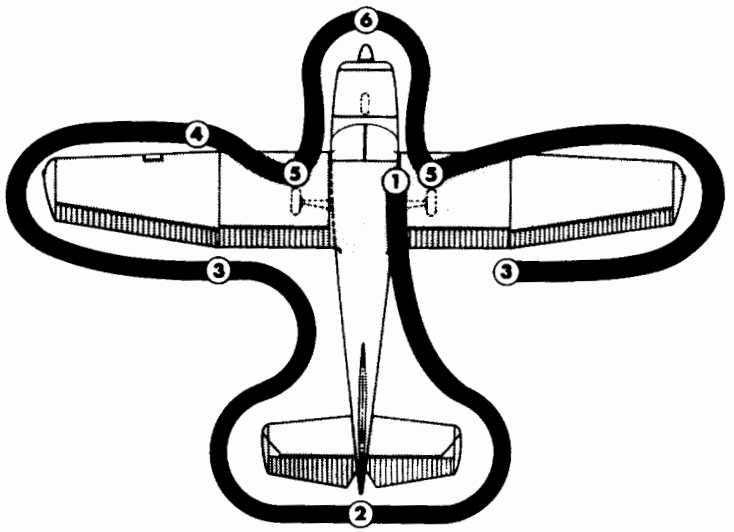
UTILITY SHELF.

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

LOADING YOUR CESSNA.

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:

First, load your baggage in the baggage compartment.
Next, load the front seats.
Finally, load the rear seat.



(1) a. Check quantity of fuel (2 gages).
b. Make sure master and ignition switches are off.
c. Remove control lock or safety belt from control wheel, if installed.
d. On first flight of day, operate fuel strainer drain knob (pulled out for approximately four seconds) to clear fuel strainer of any water or sediment.

(2) a. Remove rudder lock, if installed.
b. Inspect tail surface hinges and hinge bolts.
c. Disconnect tie-down chain.

(3) a. Remove aileron lock, if installed.
b. Check aileron and flap hinges.

(4) a. Remove pitot tube cover, if installed.
b. Inspect pitot tube opening for stoppage.
c. Check fuel tank vent opening for stoppage.

(5) a. Check main wheel tire for cuts, bruises, and proper inflation.
b. Inspect airspeed static source hole on side of fuselage for stoppage.
c. Remove fuel tank cap and check fuel level.
d. Disconnect tie-down chain.

(6) a. Check propeller and spinner for nicks and security.
b. Examine propeller for oil leakage.
c. Check nose wheel strut for proper inflation.
d. Check nose wheel tire for cuts, bruises, and proper inflation.
e. Disconnect tie-down chain.
f. Make visual check to insure that drain valve is closed after draining operation.
g. Check oil level. Do not operate on less than nine quarts. Fill for extended flight.
h. Check carburetor air filter for restrictions by dust or other foreign matter.
i. Inspect cowl access doors for security.

Repeat steps 3 and 5.

Figure 10. Exterior Inspection Diagram

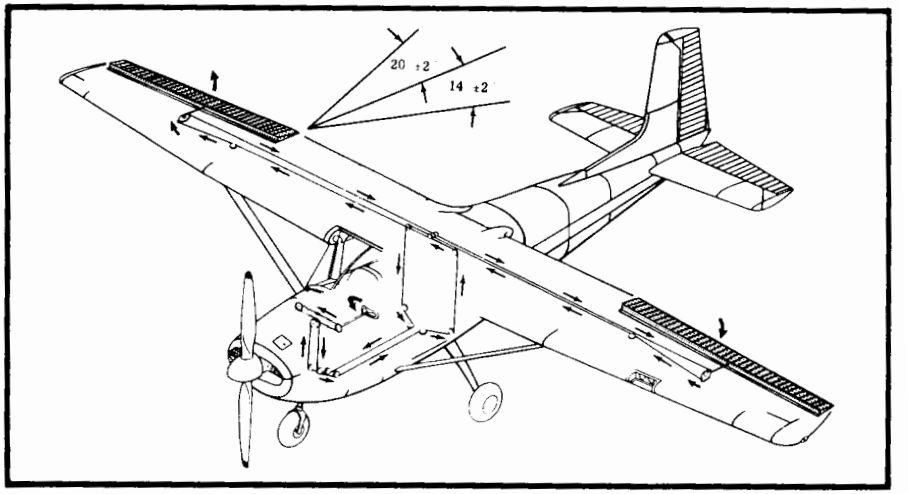


Figure 23. Aileron Control System

forward position. This position should be maintained in checking the travel.

(4) Adjust aileron to neutral position by reference to the wing flaps. This adjustment is made by disconnecting the aileron push-pull tube from the bellcrank, and making adjustment on the rod end at the aileron.

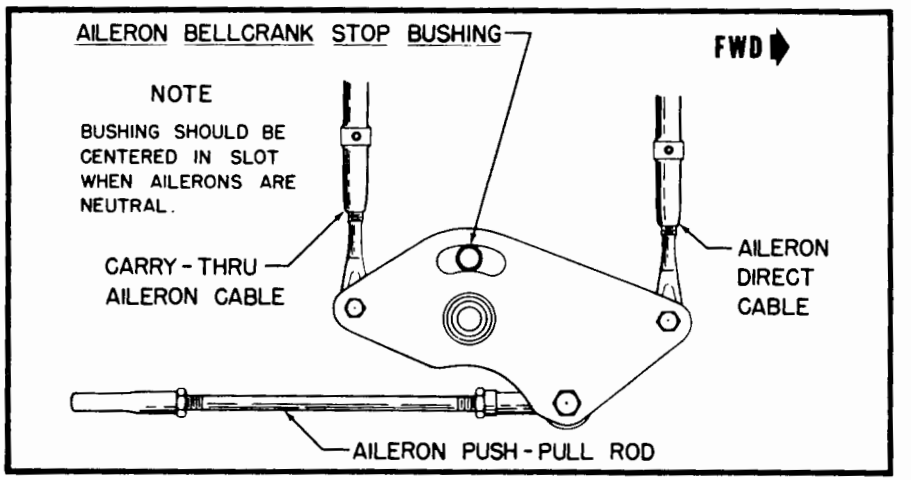


Figure 24. Aileron Bellcrank Adjustment

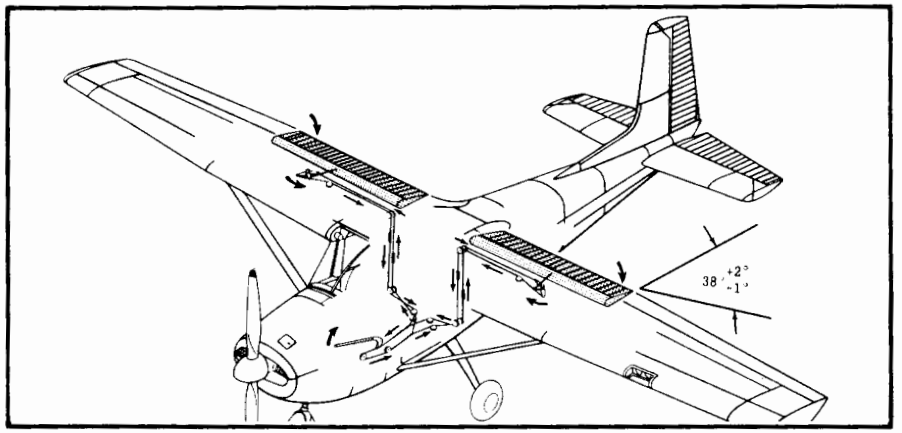


Figure 22. Flap Control System

(2) Hold the flap in the full-up position by applying firm hand pressure upward and forward against trailing edge of flap.
(3) Adjust the flap push-pull rod until the flap bellcrank is in the position shown in figure 21.
(4) Release the hand pressure that was applied to the flap trailing edge in step 2 and tighten the flap-up cable turnbuckle located behind rear cabin door post until cable has a tension of 20-40 lbs.
(5) Repeat steps 2 thru 4 for the opposite flap.
(6) Move flap handle to the flap full-down position.
(7) Tighten the turnbuckles of the flap-down cables until cables have a tension of 20-40 lbs.

AILERONS (See figures 23 and 24).

(1) Place control wheels in neutral position and place a neutral bar across the top of both wheels, using tape or a clamp to secure them. Install chain over sprockets, leaving approximately nine links inboard of chain guard on each side of the turnbuckle.
(2) String cables back through system.
(3) The ailerons are restricted in travel by a feature built into the bellcranks. Stops in the bellcrank allow a total travel of 34°. In rigging the ailerons, it is important that the bellcranks are neutralized. Connect the cables and adjust the forward turnbuckles on each aileron until the bellcrank stop bushing is centered in the slot of the bellcrank as shown in figure 24. Cable tension should be approximately 30 pounds with the control wheels in the full-

Section II

operating check list

AFTER FAMILIARIZING YOURSELF with the equipment of your airplane, your primary concern will normally be its operation. This section lists in check list form the steps necessary to operate your airplane efficiently and safely. All airspeeds mentioned in Sections II and III are indicated airspeeds. Corresponding true indicated airspeeds may be obtained from the airspeed correction table in Section V.

The ground and flight handling characteristics of the airplane are normal in all respects. All control movements, and response, are conventional throughout the entire operational range.

BEFORE ENTERING AIRPLANE.

(1) Perform an exterior inspection of the airplane (See figure10).

BEFORE STARTING THE ENGINE.

(1) Adjust seat to a comfortable position, check to see that seat locking mechanism is secure, and fasten safety belt.
(2) Check all flight controls for free and correct movement.
(3) Check wing flaps at all positions.
(4) Turn fuel selector valve to "Both". (Take-off on less than ¼ tank is not recommended).
(5) Rotate adjustable stabilizer control wheel so that indicator is in "Take-Off" range.
(6) Set altimeter and clock.
(7) Test operate brakes and set parking brake.
(8) Check radio switches "Off".
(9) For night flight, test operate all exterior and interior lights. As a precaution, a flashlight should be on board in a usable condition.

STARTING ENGINE.

(1) Set mixture control to "Full Rich" (full in).
(2) Set carburetor heat to "Cold" (full in).

(3) Set propeller control for "high RPM" (full in).
(4) For an initial start in normal air temperatures, use one stroke of primer. Do not prime a hot engine.
(5) Turn master switch "On".
(6) Open throttle approximately ½ inch.
(7) Turn ignition switch to "Both".
(8) Clear the propeller.
(9) Push starter button until engine fires (but no longer than 30 seconds.

NOTE

If engine has been overprimed, start engine with throttle position ¼ to ½ full open. Be sure to reduce throttle to idle position when engine fires.

WARM-UP AND GROUND TEST.

(1) Do not allow the engine to operate at more than 800 RPM for the first 60 seconds after starting. (Avoid prolonged idling below 800 RPM at all times).
(2) Check for oil pressure indications within 30 seconds in warm temperatures or 60 seconds in cold weather. *If no indication occurs, shut engine down and investigate the cause.*
(3) Avoid the use of carburetor heat unless icing conditions prevail.
(4) Continue the warm-up while taxiing out to the active runway, using care not to over-heat the engine by running at unnecessarily high RPM's on the ground.

NOTE

To avoid propeller tip abrasion, do not run up engine on loose cinders or gravel.

(5) Check the RPM drop on each magneto at 1700 RPM. The maximum allowable drop is 125 RPM.
(6) Check carburetor heat by noticing RPM drop when heat is applied.
(7) a. Hartzell Propeller — Check propeller operation in high and low pitch at 1700 RPM. Return control to low pitch (full in) and reduce power.
b. McCauley Propeller — At 1700 RPM move propeller control out until a slight drop in RPM is noticed. Then return propeller to low pitch (full in) position. This drop in RPM shows that governor operation is satisfactory.
(8) 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.

(5) Moisten another piece of clean cloth with 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.

Spots or stains on the side panels are easily removed using a clean cloth slightly dampened with water. A few light strokes over the area usually remove all dirt. Persistent stains, requiring the use of a cleaning fluid, may be removed as described in the preceding steps, 3 through 6.

PROPELLER.

Maintenance of the constant speed propeller on your Cessna should offer no problem. Standard, periodic inspection and lubrication of the propeller and spinner will discover 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 propeller for oil leakage and check the blades for nicks and cracks. In ground test, follow the recommended procedure of checking the operation of the propeller through its full range. It is advisable to turn the propeller 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.

FLIGHT CONTROL SYSTEMS.

Figures 21 to 27 inclusive outline the control systems, including control travel limits, location of control stops, and the location of turnbuckles. The use of the single wrap method using .040 monel wire for safetying turnbuckles is satisfactory and CAA approved. Rigging methods for the various systems are outlined below:

FLAPS (See figures 21 and 22).

(1) Place the flap handle in the 0° flap position.

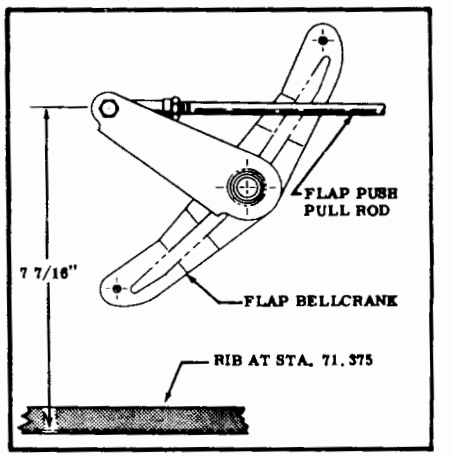


Figure 21. Flap Bellcrank Adjustment

struction of Cessna airplanes requires a minimum in care to keep the surface bright and polished, neat, and trim looking. The airplane may be washed with clear water to remove dirt and with gasoline, carbon tetrachloride or other non-alkaline grease solvents to remove oil, grease and paint. Household type detergent soap powders are effective cleaners, but should be used cautiously since some of them are strongly alkaline. Dulled aluminum surfaces may be cleaned effectively with Bon Ami. A cleaning solution consisting of about two quarts of alcohol, two quarts of water and a package of powdered Bon Ami will be found to be particularly effective in cleaning the airplane to retain the bright appearance.

ENGINE COMPARTMENT.

The engine section should be kept free of an accumulation of oil, grease, and dirt to prevent a fire hazard. The bulkhead between the cabin and the engine section is stainless steel and may be cleaned with recommended solvent cleaners for grease and oil.

The oil filter screen should be cleaned every 25 hours (during the regular oil change). The carburetor air filter should also be serviced every 25 hours or oftener when operating in dusty conditions. Under extremely dusty conditions, daily maintenance of the air filter is recommended. The air filter should be serviced in accordance with the servicing instructions stamped on the filter.

UPHOLSTERY.

Keeping the inside of your airplane clean is no more difficult than taking care of the 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 naphtha 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) *Don't use too much fluid.* The seat cushions are padded with foam rubber and, since volatile cleaners attack rubber, these paddings may be destroyed if the material gets soaked with the 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.

BEFORE TAKE-OFF.

(1) Recheck free and correct movement of flight controls.
(2) Recheck adjustable stabilizer control wheel setting.
(3) Check carburetor heat control "Off" (full in) unless extreme icing conditions prevail.
(4) Recheck propeller in low pitch (full in).

TAKE-OFF.

NORMAL TAKE-OFF.

(1) Apply full throttle smoothly to avoid propeller surging.
(2) Avoid dragging brake by keeping heels on the floor.
(3) Raise nosewheel at 60 MPH and airplane will break ground at approximately 70 MPH.

CAUTION

Do not raise the nose of the airplane excessively high as this will only lengthen the take-off run.

(4) Level off momentarily and accelerate to 100 MPH.

MINIMUM RUN TAKE-OFF.

(1) Wing flaps 20° (second notch).
(2) Hold brakes while applying full throttle.
(3) Release brake and keep heels on floor to avoid dragging brakes.
(4) Take-off slightly tail low.

OBSTACLE CLEARANCE TAKE-OFF.

(1) Wing flaps 20° (second notch).
(2) Hold brakes while applying full throttle.
(3) Release brakes and take-off slightly tail low.
(4) Climb out at best angle of climb speed (60 MPH).

SOFT OR ROUGH FIELD TAKE-OFF WITH NO OBSTACLES.

(1) Wing flaps 20° (second notch).
(2) Apply full throttle and raise nose wheel clear of the ground with elevator control back pressure.
(3) Take-off in this attitude and level off momentarily to accelerate to a safe airspeed.
(4) Retract flaps slowly as soon as a safe altitude is obtained. (See "Take-Off" paragraph on page 3-4).

TAKE-OFF IN STRONG CROSS WIND.

(1) Flaps 0° (retracted).
(2) Apply full throttle and use sufficient aileron into the wind to main-

tain wings level.
(3) Hold nose wheel on ground 5-10 MPH above normal take-off speed.
(4) Take-off abruptly to prevent airplane from settling back to the runway while drifting.

CLIMB.

(1) If no obstacle is ahead, climb out with flaps up at 100-120 MPH with 23 inches manifold pressure and 2450 RPM.
(2) If maximum climb performance is desired, use full throttle, 2600 RPM, and 90 MPH, IAS at sea level (See figure 16). Reduce climb speed about ½ MPH for every 1000 feet of altitude above sea level.
(3) To climb over an obstacle after take-off, the best angle of climb speed (70 MPH, IAS) should be used.
(4) Mixture should be full rich unless engine becomes rough due to rich mixture.

CRUISING.

(1) Select cruising power setting from range charts (Figure 18) for desired range and speed.
(2) Maximum recommended power setting for cruise is 23 inches manifold pressure and 2450 RPM.
(3) After speed has stabilized, trim airplane with adjustable stabilizer control wheel.
(4) Lean mixture as follows: pull mixture control out until engine becomes rough; then, enrichen mixture slightly beyond this point. Any change in altitude, power, or carburetor heat will require a change in lean mixture setting. Do not lean mixture with power setting above 23 inches of manifold pressure and 2450 RPM.
(5) Check engine instruments for indications within their normal operating range (green arcs).

LET-DOWN

(1) Set mixture control "Full Rich" (full in).
(2) Reduce power to obtain let-down rate at cruising speed.
(3) Apply sufficient carburetor heat to prevent icing, if icing conditions exist.

BEFORE LANDING.

(1) Set fuel selector valve to "Both".
(2) Recheck mixture "Full Rich" (full in).
(3) Set the propeller control for at least 2450 RPM so that high power will be available in the event of a go around.

The generator warning light, when on, indicates that the electrical system is receiving current from the battery and the generator is not functioning. Failure of the light to come on, when the master switch is turned on prior to starting the engine, will indicate faulty wiring, a dead battery, or a malfunctioning light. The light should fade out at approximately 700 to 1000 rpm showing that the generator is functioning properly and is supplying the system. If the light should illuminate above this rpm, a malfunctioning generator or voltage regulator, or a short in the generator circuit would be indicated. It is possible, under extreme electrical loads, to draw current from the battery to supplement the current of the generator; however, the generator warning light will not indicate this drain on the battery as long as the generator is functioning properly. Therefore the generator warning light is not to be used as a battery charge indicator.

Normally, the airplane should not be operated with the master switch in the "OFF" position nor should it be operated without a battery or with battery disconnected. Damage to the generator and the voltage regulator may be the result.

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

PLEXIGLAS WINDSHIELD AND WINDOWS.

The windshield is a single piece, full floating, "free blown" unit of "Longlife" plastic. To clean plexiglas, 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 electrostatic 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, no great amount of scratching is visible, the plexiglas should be waxed with a good grade of commercial wax. Wax 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.

ALUMINUM SURFACES.

The Alclad 24ST used in the con-

at the brake and refill the hydraulic reservoir at the pedals.

The nose gear air oil shock strut is filled as follows:

1. Remove valve cap and release all air.
2. Remove valve housing assembly.
3. Compress strut completely (stops in contact with outer barrel hub).
4. Oil level.
   a. Fluid used should comply with specification MIL-O-5606.
   b. Fill strut to bottom of valve installation hole.
   c. Maintain oil level at bottom of valve installation hole.
5. Fully extend strut.
6. Replace valve housing assembly.
7. With strut fully extended and nose wheel clear of ground, inflate strut to 35 PSI.

The shimmy dampener fluid level should be checked at least every 25 hours. When filling the shimmy dampener, turn the nose wheel as far as it will go to the right. This eliminates the possibility of entrapping air behind the piston within the dampener assembly. Remove the cap from the reservoir and fill the reservoir with MIL-O-5606 hydraulic fluid. When disassembling the dampener for cleaning or repair it will be noticed that O-rings or wiper rings are never installed on the dampener piston even though provisions are made for such rings. When assembling the dampener, do not install an O-ring or a wiper ring on the piston.

BATTERY.

The battery is located behind the baggage compartment and is accessible by opening the rear baggage compartment wall.

Maintain the level of the battery electrolyte at the level of the horizontal baffle plate (the plate with holes in it), which is approximately two inches below the filler plug, by adding distilled water as required. Obtain 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 and, therefore, approximately the forward one-quarter of the plate should not be covered when the battery is in the airplane with the airplane in three-point position on the ground.

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, spilling of fluid may result. Sponge off any spilled acid and corrosion products with soda water solution to neutralize the acid, then rinse with clear water. Do not use excessive amounts of soda water.

Keep battery connections tight and clean; otherwise excessive voltage may be generated and damage other electrical equipment. Control of the charging current and voltage is accomplished by the voltage regulator mounted on the firewall. *Only those persons familiar with the operation, adjustment, and repair of the control should be permitted to remove the cover of the device.*

(4) Apply carburetor heat before closing throttle.
(5) Glide at 80-90 MPH with flaps up.
(6) Lower flaps as desired below 100 MPH.
(7) Maintain 70-80 MPH with flaps extended.
(8) Trim airplane with adjustable stabilizer for glide.

LANDING.

NORMAL LANDING.

(1) Flare out the approach several feet above the ground.
(2) Endeavor to contact the ground in a slightly nose high attitude, just sufficient to prevent hitting the nose wheel first.
(3) Lower the nose wheel down gently after speed is diminished.

SHORT FIELD LANDING.

(1) Make a power-off approach at 70 MPH with flaps down 40°.
(2) Flare-out several feet above the ground so that the main wheels will contact first.
(3) Lower nose wheel to the ground immediately after touch-down.
(4) Apply heavy braking as required.

CAUTION

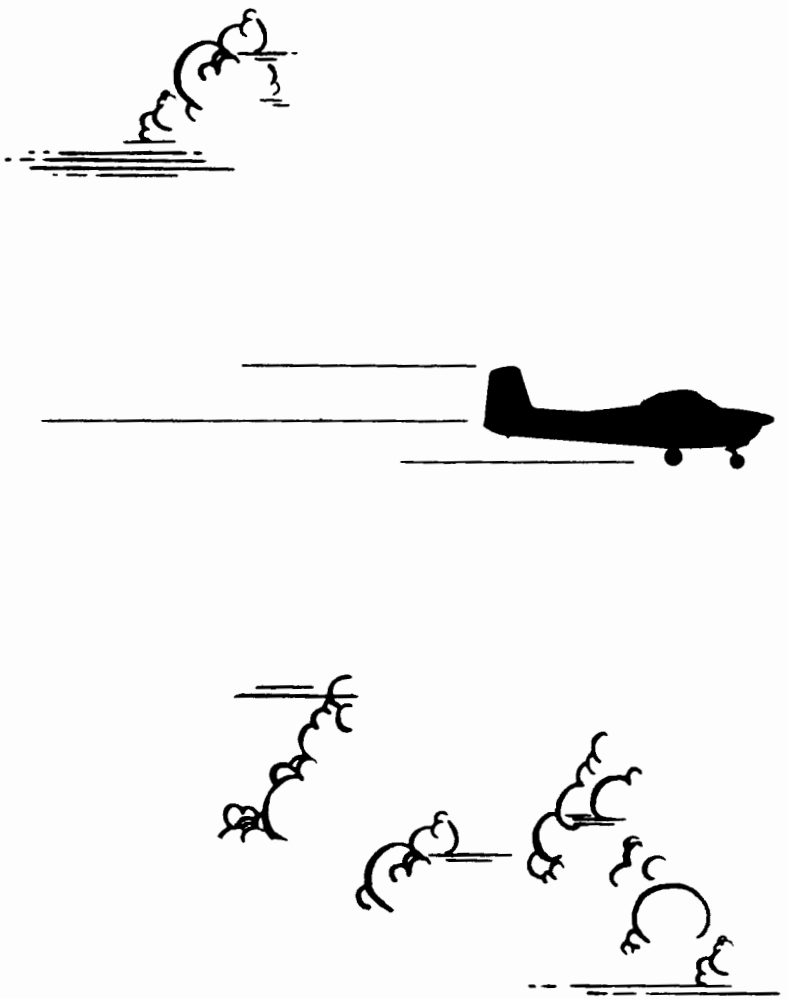
Excessive braking will skid tires, resulting in lengthened ground run and tire damage.

LANDING IN STRONG CROSS WIND.

(1) It is preferable, if field length permits, to land with flaps retracted.
(2) Use wing low, crab, or combination method of drift correction.
(3) Land in a nearly level attitude.
(4) Hold straight course with steerable nose wheel and occasional braking if necessary.

AFTER LANDING.

(1) Raise wing flaps after completion of landing roll.
(2) Carburetor heat "Off".
(3) Stop engine by extending mixture control knob to "Full Lean".
(4) After engine stops, turn ignition switch "Off".
(5) Turn master switch "Off". *Be Sure* — otherwise the battery may run down overnight.
(6) Set parking brakes, if required.



The steerable nose wheel is mounted on an air-oil shock strut which incorporates a shimmy dampener to assure smooth operation. This nose gear makes ground handling, taxiing, and landing both easier and smoother.

Correct tire pressure is essential to realize the full benefit of the landing gear and to obtain maximum tire wear. Correct tire pressure for the main gear is 28 lbs. per sq. inch gage pressure and for the nose gear it is 29 lbs. per sq. inch. An accumulation of oil and grease on tires will have an adverse effect on tire life and should be removed with soap and water.

Tires are easily removed by jacking up the airplane, removing the wheel, and disassembling the two piece wheel. Be sure that all of the air is out of the tire and tube before taking the wheel apart. The tire is reinstalled by reversing the procedure. In removing the wheel, it is necessary to remove the brake disc anti-rattle clips before the wheel can be taken off the axle. The wheel axle nut should be tightened finger tight plus one-half turn.

The Skylane is equipped with wheel "Speed Fairings" which must be removed or disconnected prior to removing the nose or main wheels and tires. To remove the Skylane wheels and tires for repair or replacement, use the following procedure:

Main Wheels And Tires

1. Remove bolt and washers from outboard side of fairing.
2. Remove seven (7) screws and washers from inboard side of fairing.
3. Lift fairing from main wheel.
4. Remove main wheel and tire in the conventional manner.

Nose Wheel And Tires

1. Remove cotter pin, nut and washer from either side of fairing at axle location, and pull axle stud out of nose wheel axle.
2. Remove nut, washers and bolt from top attachment point on fairing.
3. Slide fairing upward to permit removal of wheel.
4. Remove nose wheel and tire in the conventional manner.

NOTE

Removal of the nose wheel fairing from the airplane will require disassembly of the strut.

The wheel alignment has been properly set at the factory. Excessive tire wear indicates an improper wheel setting for the "on the ground" weight at which you are operating. See your dealer for re-alignment.

The brake master cylinders, located in the cabin at the rudder and brake pedals, incorporate a reserve reservoir for brake fluid to replace leakage losses. The reservoir fluid level must be checked periodically, and the reservoir kept full at all times. The brake master cylinders should be serviced, as required, with MIL-O-5606, a petroleum base hydraulic fluid. (Do not use castor oil base hydraulic fluid). Adjustment of the brake is not necessary. Whenever the brakes feel spongy, bleed out the entrapped air from the top of the actuating cylinder

(4) Securely tie the middle of a length of rope to ring at tail. Pull each end of rope away at 45° angle and secure to tie-down rings positioned on each side of tail.
(5) Install surface control locks between the flap and aileron of each wing.
(6) Tie control wheels back with front seat belts if control lock is not available.
(7) Install surface control lock over fin and rudder.

STORAGE.

The all-metal construction of your Cessna makes outside storage of it practical. Inside storage of the plane will increase its life just as inside storage 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 in not only keeping your airplane looking like new but in keeping it new. A later paragraph in this section covers the subject in detail.

Do not neglect the engine when storing the airplane. Turn it over by hand or have it turned over every few days to keep the bearings, cylinder walls, and internal parts lubricated. 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 standing idle for any great length of time is likely to deteriorate more rapidly than if it is flown regularly, and should be carefully checked over before being put back into service.

LIFTING AND JACKING.

The airplane may be lifted by an appropriate sling at the engine mount fuselage attachment fitting and a sling around the aft section of the fuselage. The upper half of the cowl must be removed for application of the sling at the engine mount fuselage attachment fitting.

Jacking point brackets and hoisting rings are available as optional equipment and insure easy, safe handling of the airplane. A block of hardwood sawed at an angle to fit between the fuselage and the main landing gear spring may be used as a jacking point to hold the airplane when working on a main wheel or tire. Do not use the brake casting as a jacking point.

To remove the nose wheel, the airplane may be held in a nose high attitude by holding the tail down or by placing a padded support under the aft end of the nose gear support forging. Brake or block the main wheels when the nose wheel is being raised for removal.

LANDING GEAR, WHEELS, AND TIRES.

The main landing gear consists of a single tapered spring leaf for each main gear. This spring is made from the highest quality chrome vanadium steel, heat treated and shot peened for added fatigue resistance. No maintenance of this spring is necessary other than paint to prevent rusting.

Section III

operating details

The following information elaborates on the more important items discussed in the check list on Section II. Not all items in that section are covered, as only a few require further discussion.

CLEARING THE PROPELLER

"Clearing" the propeller should become a habit with every pilot. "LOOK, YELL, AND LISTEN" should be prestarting procedure. "Look" — visually determine that no one is near the propeller; "Yell" — yelling "CLEAR" in loud tones warns anyone from stepping into the propeller; "Listen" — listen for an answering "clear" from ground personnel reconfirming that everyone knows of your intention of starting the engine, and that they should stand clear.

ENGINE OPERATING PROCEDURE.

You have a new Continental engine made to the highest standards available. This engine has been carefully operating in its run-in and flight tests, so that you receive the engine in its best possible condition. Proper engine operation will pay rich dividends in increased engine life. The following items are important in providing the maximum trouble-free operation and low maintenance cost.

1. *Before Starting* — It is advisable to make a precautionary ground inspection of the engine and its controls before starting each day. Visually check the fuel strainer bowl for water or dirt. Pull the fuel strainer drain control knob (26, figure 1) and drain a small amount of fuel from the fuel strainer. Check for leaks in the fuel supply lines which are visible thru the cowl access door. (Leaks will be visible from the dye stains left from the evaporating fuel).

Inspect the carburetor air filter to determine that it is not restricted by dust and other foreign matter.

Check for oil leaks visible thru the cowl access door. Check for proper oil quantity desired.

If everything is satisfactory, place carburetor heat in "cold" position, propeller governor control at "High RPM" and close throttle.

2. *Starting Engine* — Ordinarily the engine starts easily with one or two strokes of primer in warm tempera-

tures to six strokes in cold weather, with the throttle"In"approximately ½ inch. In extremely cold temperatures it may be necessary to continue priming while cranking. Weak intermittent explosions followed by puffs of black smoke from the exhaust stack indicates overpriming or flooding. Excess fuel can be cleared from the carburetor chambers by the following procedure: Set the mixture control in "full lean" position, throttle "full open", ignition switch "Off", and crank the engine through several revolutions with the starter. Repeat the starting procedure without any additional priming.

If engine is underprimed (most likely in cold weather with a cold engine) it will not fire at all, and additional priming will be necessary.

As soon as the cylinders begin to fire open the throttle slightly to keep it running.

3. *Warm-Up* — The engine should be warmed up at approximately 800 RPM for at least one minute in warm weather and three minutes in cold weather. The remaining warm-up time can be conducted while taxiing to the take-off position, preferably limiting RPM to 1200 RPM.

During the pre-take-off check, engine speeds can be increased to 1700 RPM only long enough to perform magneto, propeller, and carburetor heat checks. The magneto should be switched first to the "L" position, the RPM drop noticed and then returned to "both" until the speed returns to the original value. Similarly check drop on "R" and switch back to "both". The maximum allowable magneto drop is 125 RPM.

If there is any uncertainty in engine operation, a full power run up can be made for short duration. Engine operation should be smooth, and full throttle, high engine speed should be approximately 2550 RPM.

4. *Take-Off* — Most engine wear occurs from improper operation before the engine is up to normal operating temperatures, and operating at high powers and RPM's. For this reason the use of maximum power for take-off should be limited to that absolutely necessary for safety. Whenever possible, reduce take-off power to normal climb power.

5. *Climb* — The same comments concerning engine operation during "Take-Off" apply to climb at low altitudes where high engine power is available. At high altitudes where relatively low power is obtainable full throttle operation is permissible if the engine is warmed up sufficiently.

Engine speeds above 2450 RPM do not increase the rate-of-climb sufficiently to off-set the added fuel consumption and engine wear encountered, for normal operations. The maximum power available should be used when essential, but should not become a normal operating procedure.

6. *Engine Operation During Cruise* — The maximum recommended power for cruise is 23 inches manifold pressure and 2450 RPM. Greater range can be obtained at lower power settings as shown in the range charts (Figure 18). These ranges are based on flight test data with lean mixture

Section VI

care of the airplane — owner's responsibilities

IF YOUR AIRPLANE is to retain that new plane performance, stamina, and dependability, certain requirements in its care, inspection, and maintenance 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.

The airplane is most easily and safely maneuvered, during ground handling, by the use of a tow-bar attached to the nose wheel. Always use a tow-bar when one is available. When moving the airplane by hand and no tow-bar is available, push down at the front edge of the stabilizer adjacent to the fuselage to raise the nose wheel off the ground. When the nose wheel is held clear of the ground the airplane can be readily turned in any direction by pivoting it about the main gear. *Do not push down on the empennage by the tip of the elevator; likewise, do not shove sidewise on the upper portion of the fin.* When moving the airplane forward or backwards, push at the wing strut root fitting or at the main gear strut.

MOORING YOUR AIRPLANE. (See figure 20.)

Proper tie-down procedure is your best precaution 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 at the upper end of each wing strut.

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

(3) Tie a rope or chain thru the tie-down ring located in the nose gear attachment forging and secure the opposite end to a tie-down ring in the ground.

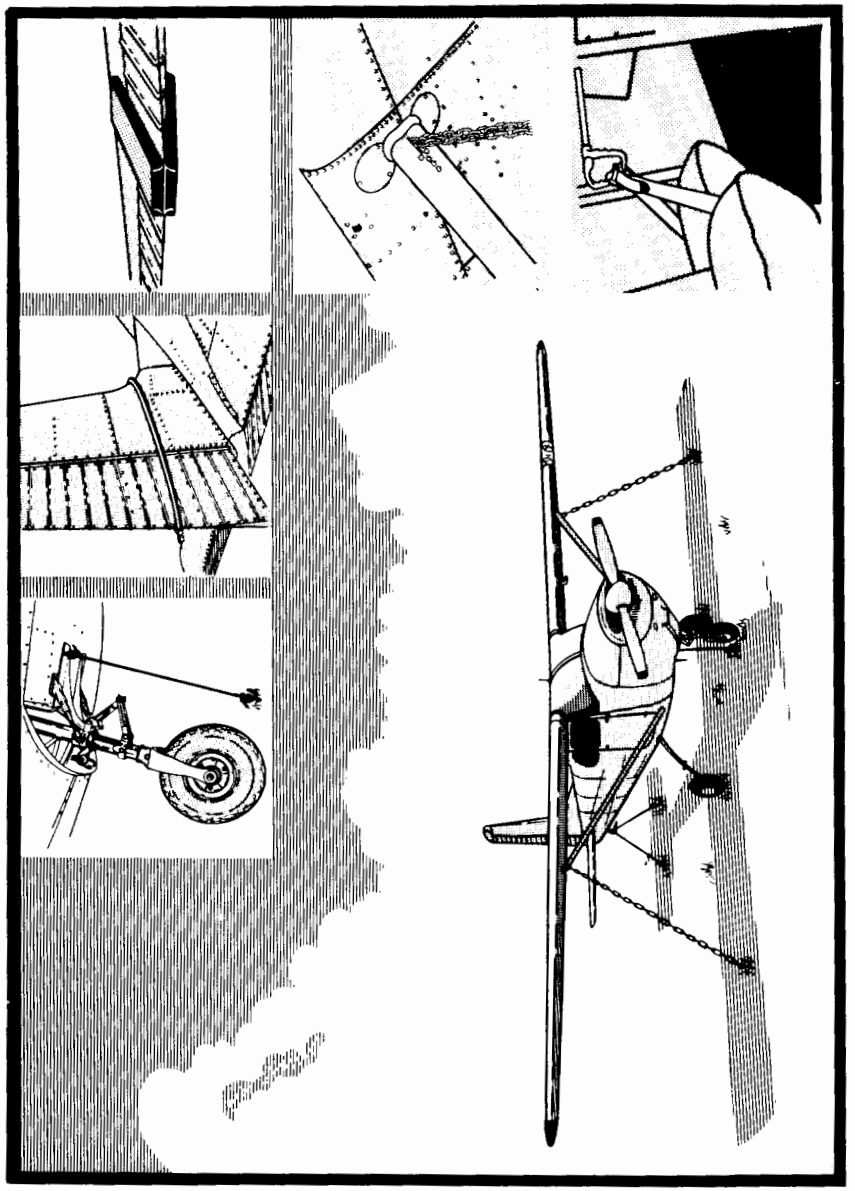


Figure 20. Airplane Tie-Down Procedure

at all altitudes. Mixture leaning is accomplished as follows: pull mixture control out until engine becomes rough; then enrichen mixture slightly beyond this point. Any change in altitude, power, or carburetor heat will require a change in lean mixture setting. Do not lean mixture with power setting above 23 inches of manifold pressure and 2450 RPM.

Application of full carburetor heat may enrichen the mixture to the point of engine roughness. To avoid this, lean the mixture as instructed in the preceding paragraph.

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 temperatures which lead to detonation and consequently rough engine operation.

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

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.

7. *Engine Operation During Let-Down* — Let-down should be performed with mixture "Rich" and sufficient power to keep the engine warm and cylinders clean. To maintain a constant rate of descent, it will be necessary to periodically reduce the throttle since the manifold pressure increases as altitude is lost. The propeller control may be left in a low RPM position for efficiency and low noise level.

On some let-downs, it may be found that continual operation at low manifold pressure may cause spark plug fouling. It is advisable to apply power occasionally during the descent to increase cylinder heat and to burn oil from the spark plug electrodes.

8. *Stopping Engine* — Allow sufficient iding time after landing to reduce cylinder temperature below the operating range before stopping the engine. The engine should be stopped by moving the mixture control to lean position (control full out). After the propeller has stopped, turn the ignition switch "Off", and leave the mixture control full out.

TAXIING.

Release the parking brake before taxiing and use the minimum amount of power necessary to start the airplane moving. During taxi, and especially when taxiing downwind, the rpm should be held down to prevent excessive taxi speeds. Taxiing should be done at a speed slow enough to make the use of brakes almost entirely unnecessary. Using the brakes as sparingly as possible will prevent undue wear and strain on tires, brakes, and

landing gear. Normal steering is accomplished by applying pressure to the rudder pedal in the direction the airplane is to be turned. For smaller radius turns, at slow speed, the brakes may be used on the inside wheel. At slow taxi speed, this airplane may be pivoted about the outboard strut fitting without sliding the tires. When taxiing in crosswinds it is important that speed and use of brakes be held to a minimum and that all controls be utilized (see taxiing diagram on page 3-5) to maintain directional control and balance.

NOTE

Caution should be used when taxiing over rough fields to avoid excessive loads on the nosewheel. Rough use of brakes and power also add to nosewheel load. A good rule of thumb: "Use minimum speed, power, and brakes."

Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller tips. Full throttle run-ups over loose gravel are especially harmful to propeller tips. When take-offs must be made over a gravel surface, it is very important that the throttle be advanced slowly. This allows the airplane to start rolling before high rpm is developed, and the gravel will be blown back of the propeller rather than pulled into it.

TAKE-OFF.

1. *Normal Take-Off* — Normal take-offs are accomplished with wing flaps up, full throttle, and 2600 RPM. Reduce power to 23 inches manifold pressure and 2450 RPM as soon as practical to minimize engine wear.

2. *Use of Wing Flaps for Take-off* — The use of 20 degrees wing flaps reduces the total distance over a 50-foot obstacle by approximately 20%. This is a result of slower forward speeds even though the use of wing flaps lessens the rate of climb. Therefore, for increased take-off performance, the recommended technique is to lower wing flaps 20 degrees (second notch).

It is recommended that the take-off charts, (figures 16 and 17), be consulted to determine the distance required for take-off. 30 and 40 degree wing flaps are not recommended at any time for take-off.

REMEMBER

Don't under marginal conditions, leave wing flaps on long enough that you are losing both climb and airspeed.

Don't raise wing flaps with airspeed below "off-flaps" stalling speed. (See stalling speed chart, figure 11.)

Do slowly release the wing flaps as soon as you reasonably can after take-off, preferably 50 feet or more over terrain or obstacles.

CLIMB.

Normal climbs are conducted at 100-120 MPH with wing flaps up, 23 inches manifold pressure and 2450 RPM. For maximum climb performance use full throttle and 2600 RPM. The sea level best rate of climb speed is 90 MPH, IAS at sea level, and is reduced ½ MPH for every 1,000 feet

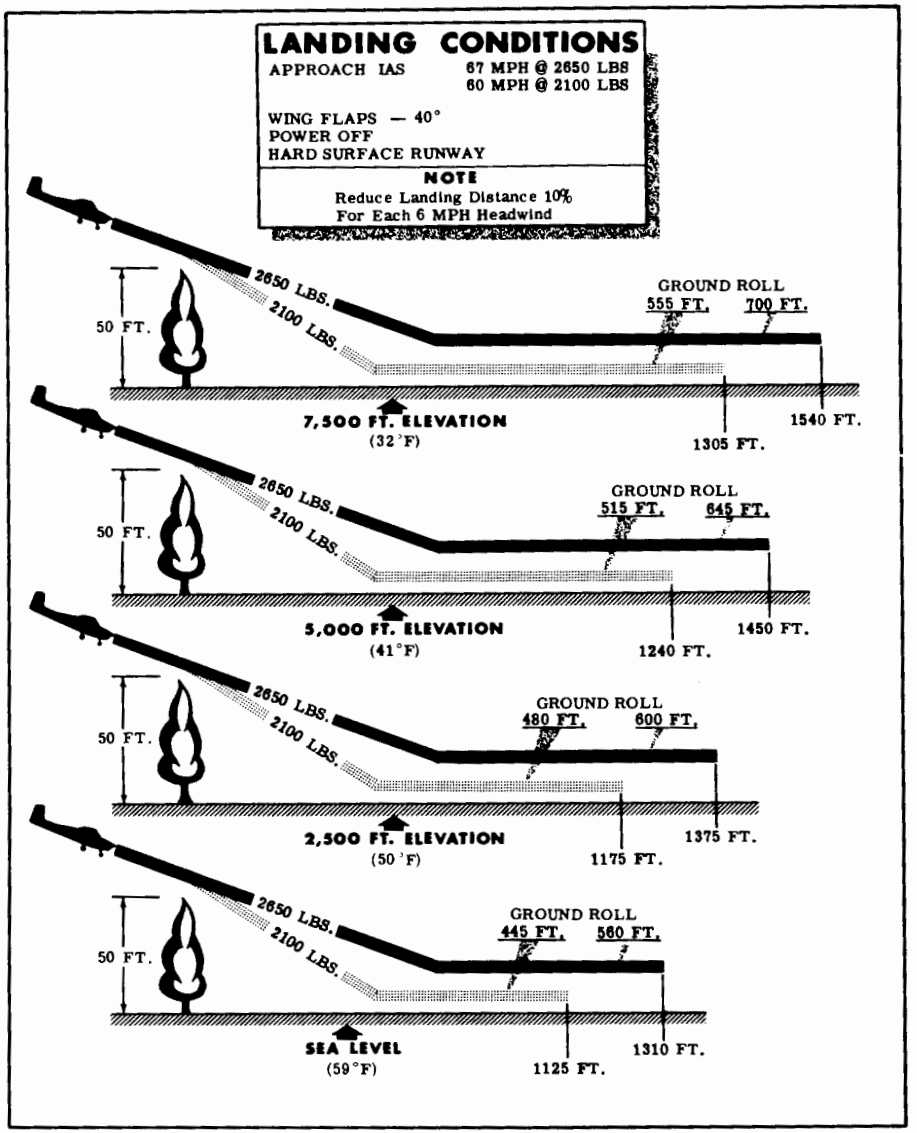
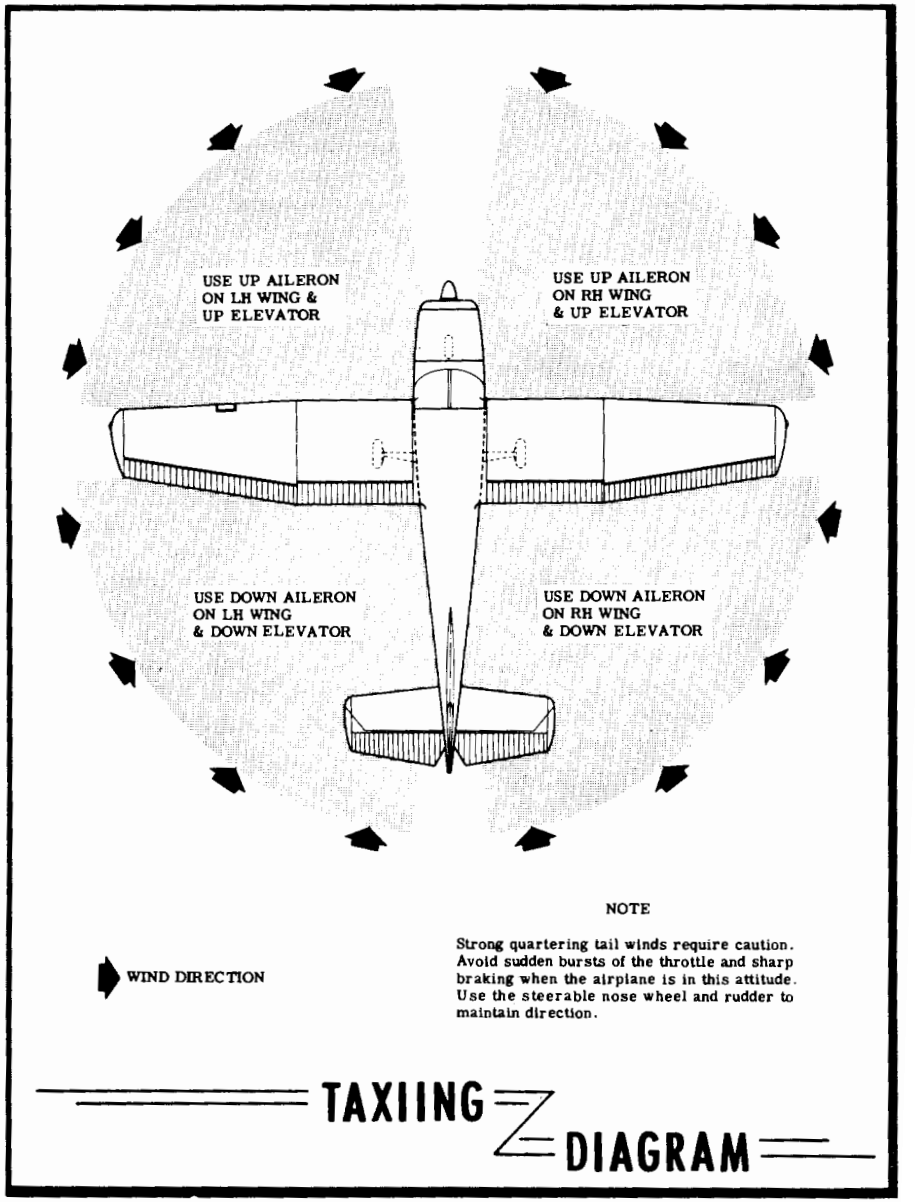


Figure 19. Landing Diagram



TAXIING DIAGRAM

of altitude above sea level.

If an obstruction dictates using a steep climb angle, the best angle-of-climb speed should be used with wing flaps up, full throttle and 2600 RPM.

This best angle-of-climb speed is 70 MPH, IAS.

NOTE

Steep climbs at low speeds should be of short duration due to reduced engine cooling.

If twenty (20) degrees wing flaps are used for take-off, they should be left on until all obstacles are cleared. To clear an obstacle with wing flaps 20 degrees, the best angle-of-climb speed (60 MPH, IAS) should be used. If no obstructions are ahead, a best "flaps up" rate-of-climb speed (90 MPH, IAS) would be most efficient. These speeds vary slightly with altitude, but they are close enough for average field elevations.

Upon reaching a safe altitude and airspeed, the wing flaps should be retracted slowly, and power adjusted for climb.

In normal cross-country flying, "cruising climb" procedure is generally the most efficient in respect to overall trip speed and fuel consumption. This type of climb (100-120 MPH) provides good engine cooling, better visibility, and less engine wear than maximum performance operation.

For detailed climb performance, see climb performance charts in Section V.

CRUISE.

Cruising charts are presented in Figure 18, Section V . It can be seen that the speeds for maximum range are much lower than normal cruise speed. 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 hop 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 charts shows the long ranges obtainable at lower cruising speeds.

These charts are based on flight tests with lean mixture and 55 gallons of fuel for cruising. Allowances for fuel reserve, headwinds, take-offs and climb or variations in mixture leaning technique should be made and are in addition to those shown in the charts.

Normal cruising is done at 60% to 70% power. A maximum cruising power of approximately 75% is allowable with 23 inches (mercury) manifold pressure and 2450 RPM. Various percent powers can be obtained with an infinite number of combinations of manifold pressures, engine speeds, altitudes, and outside air temperatures. However, at full throttle and a constant engine speed and a standard air temperature, a specific power may be obtained at only one altitude. For example at full throttle and 2450 RPM the following speeds are obtainable at various % powers and altitudes:

% BHP	*Altitude*	*True Airspeed*
75	6400	155
70	8000	154
65	10,000	152

CRUISE & RANGE PERFORMANCE

Altitude	RPM	M.P.	BHP	%BHP	TAS MPH	Gal/Hr.	End. Hours	Mi/Gal.	Range Miles
10,000	2450	19	146	63	150	11.9	4.6	12.6	690
		18	137	60	146	11.2	4.9	13.0	715
		17	127	55	140	10.6	5.2	13.3	730
		16	118	51	134	10.0	5.5	13.4	735
	2300	19	137	60	146	11.1	5.0	13.1	720
		18	128	56	140	10.5	5.2	13.4	735
		17	118	51	134	9.8	5.6	13.6	750
		16	109	47	128	9.2	6.0	14.0	770
	2200	19	129	56	141	10.4	5.3	13.6	745
		18	120	52	135	9.8	5.6	13.7	755
		17	112	49	130	9.3	5.9	13.9	765
		16	103	45	122	8.7	6.3	14.0	770
Maximum Range Settings	2000	18	102	44	122	8.4	6.5	14.5	795
		17	93	40	114	7.8	7.1	14.6	805
		16	87	38	106	7.4	7.4	14.4	790
		15	80	35	99	6.9	8.0	14.4	790
15,000	2450	16	134	54	142	10.4	5.3	13.6	750
		15	114	50	135	9.8	5.6	13.7	755
		14	105	46	127	9.2	6.0	13.8	760
	2300	16	115	50	136	9.6	5.7	14.0	770
		15	107	47	129	9.1	6.0	14.1	775
		14	98	42	120	8.5	6.5	14.1	775
	2200	16	109	47	131	9.1	6.0	14.3	785
		15	101	44	124	8.6	6.4	14.5	795
		14	92	40	114	8.0	6.9	14.3	785
Maximum Range Settings	2000	16	93	40	115	7.8	7.1	14.8	815
		15	86	37	105	7.3	7.5	14.4	790
		14	78	34	92	6.8	8.1	13.5	745
20,000	2450	13	102	44	125	9.0	6.1	13.9	765
		12	93	40	114	8.3	6.6	13.6	750
	2300	13	96	42	118	8.4	6.6	14.1	775
		12	87	38	105	7.7	7.1	13.5	745
	2200	13	90	39	109	7.8	7.0	13.9	765
		12	81	35	89	7.2	7.7	12.4	880

Cruise performance is based on standard conditions, zero wind, lean mixture, 55 gallons of fuel, no fuel reserve, and 2650 pounds gross weight. For Skylane performance, add approximately 3 miles per hour to the maximum cruise speeds shown.

Range Chart

CRUISE & RANGE PERFORMANCE

Altitude	RPM	M. P.	BHP	%BHP	TAS MPH	Gal/Hr.	End. Hours	Mi/Gal.	Range Miles
2500	2450	23	175	76	152	14.2	3.9	10.6	585
		22	166	72	148	13.4	4.1	11.0	605
		21	157	68	145	12.7	4.3	11.4	625
		20	148	63	142	12.0	4.6	11.6	650
	2300	23	164	71	148	13.1	4.2	11.3	620
		22	153	67	144	12.2	4.5	11.8	650
		21	143	62	140	11.5	4.8	12.2	670
		20	135	59	136	11.0	5.0	12.4	680
	2200	23	153	67	144	12.1	4.6	11.9	655
		22	144	63	140	11.4	4.8	12.2	670
		21	135	59	136	10.6	5.1	12.6	695
		20	126	55	132	10.2	5.4	12.9	710
Maximum Range Settings	2000	20	107	47	120	8.7	6.3	13.7	755
		19	99	43	115	8.2	6.7	14.0	770
		18	89	39	107	7.5	7.3	14.3	785
		17	81	35	99	7.0	7.9	14.2	780
5000	2450	23	179	78	157	14.5	3.8	10.8	595
		22	169	73	153	13.6	4.0	11.3	620
		21	161	70	150	13.0	4.2	11.5	630
		20	150	65	146	12.2	4.5	11.9	655
	2300	23	167	73	152	13.4	4.1	11.4	625
		22	158	69	149	12.6	4.4	11.8	650
		21	148	64	144	11.9	4.6	12.0	660
		20	139	60	140	11.2	4.9	12.4	685
	2200	23	157	68	149	12.4	4.4	12.1	665
		22	148	64	144	11.7	4.7	12.3	675
		21	138	60	140	11.0	5.0	12.7	700
		20	131	57	137	10.5	5.2	13.1	720
Maximum Range Settings	2000	19	103	45	120	8.5	6.5	14.1	775
		18	94	41	112	7.9	7.0	14.2	780
		17	86	37	105	7.3	7.5	14.4	790
		16	79	34	98	6.8	8.0	14.4	790
7500	2450	21	163	71	154	13.1	4.2	11.8	650
		20	153	67	150	12.4	4.4	12.0	660
		19	143	62	146	11.7	4.7	12.4	685
		18	133	58	140	11.0	5.0	12.7	700
	2300	21	151	66	149	12.2	4.5	12.2	670
		20	142	62	145	11.6	4.7	12.4	680
		19	133	58	140	11.0	5.0	12.7	700
		18	125	54	136	10.5	5.2	12.9	710
	2200	21	143	62	146	11.4	4.8	12.7	700
		20	134	58	141	10.7	5.1	13.1	720
		19	126	54	136	10.2	5.4	13.4	735
		18	118	51	132	9.7	5.7	13.6	750
Maximum Range Settings	2000	19	107	47	124	8.7	6.3	14.2	780
		18	98	43	117	8.1	6.8	14.4	790
		17	90	39	110	7.6	7.2	14.4	790
		16	82	36	101	7.0	7.8	14.4	790

Cruise performance is based on standard conditions, zero wind, lean mixture, 55 gallons of fuel, no fuel reserve, and 2650 pounds gross weight. For Skylane performance, add approximately 3 miles per hour to the maximum cruise speeds shown.

Figure 18.

This table shows that cruising can be done most efficiently at higher altitudes because very nearly the same cruising speed can be maintained at much less power. This means savings in fuel consumption and engine wear.

STALLS

The stalling speeds shown in figure 11, are for aft C.G. and full gross weight conditions. Speeds are given as true indicated airspeeds because indicated airspeeds are inaccurate in the low speed range. Other loadings may result in minimum flying speeds rather than stalling speeds. The stall warning indicator produces a steady signal approximately 5 MPH before the actual stall is reached and remains on until the airplane flight attitude is changed. Fast landings will not produce a signal.

The stall characteristics are conventional for the flaps up and flaps down condition. Slight elevator buffeting may occur just before the stall with flaps down.

LANDING.

Normal landings are made power-off with any flap setting. The approach is adequately steep with full flaps, but slips are permissible with wing flaps extended if necessary.

Approach glides should be made at 80-90 MPH with flaps up, or 70-80

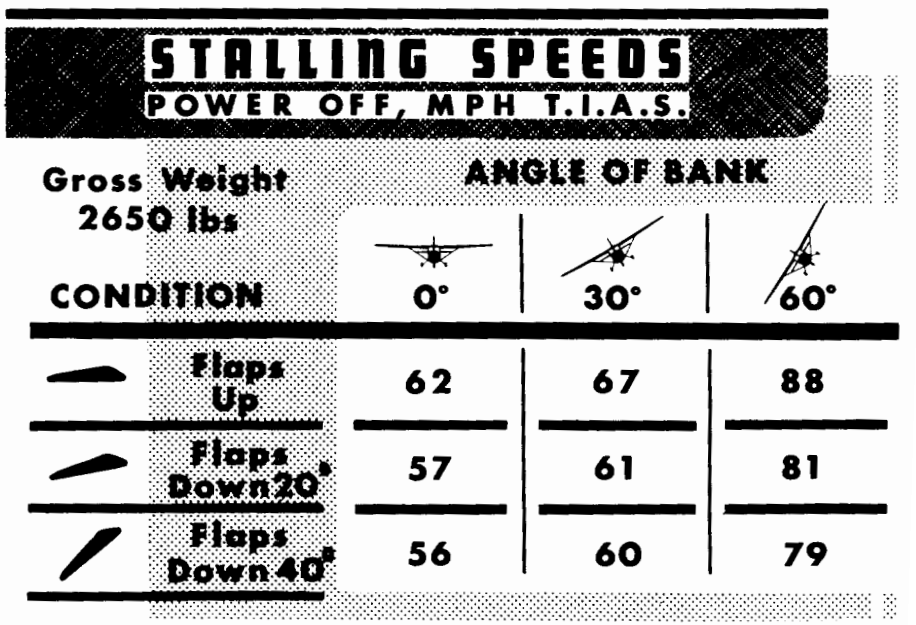


Figure 11. Stall Chart

MPH with flaps down, depending upon the turbulence of the air. The adjustable stabilizer is normally adjusted in the glide to relieve elevator control force.

Landings are usually made on the main wheels first to reduce the landing speed and the subsequent need for braking in the landing roll. The nosewheel is lowered gently to the runway after the speed has diminished to avoid unnecessary nose gear load. This procedure is especially important in rough field landings.

Heavy braking in the landing roll is not recommended because of the probability of skidding the main wheels, with resulting loss of braking effectiveness and damage to the tires.

COLD WEATHER OPERATION.

Prior to starting in cold weather, it is advisable to pull the propeller through several times by hand to "limber" the partially congealed oil, thus conserving battery energy. Precautions which should be taken prior to pulling the propeller through are to check that the mixture is in "Full Lean," the ignition switch is "Off," and the throttle is "Closed" (full out position).

Approximately 4-8 strokes of the primer will be required to start a cold engine. Under extreme conditions it may even be necessary to keep the engine running on the primer until the engine warms up slightly.

Under cold conditions, the warm-up and pre-take-off checks should be lengthened to provide more time to bring the engine up to temperature. This will usually require approximately three minutes warm-up at 800 RPM and an equal amount of time for pre-take-off checks.

During cold weather operations, no indication will be apparent on the oil temperature gage prior to take-off. If the engine accelerates smoothly and the oil pressure remains normal, the engine should be ready for take-off.

Rough engine operation in cold weather can be caused by a combination of an inherently leaner mixture due to the dense air and poor vaporization and distribution of the fuel-air mixture to the cylinders. The effects of these conditions are especially noticeable during operation on one magneto in ground checks where only one spark plug fires in each cylinder.

To operate the engine without a winterization kit in occasional outside air temperatures from 10° F to 20° F, the following procedure is recommended:

(1) Use full carburetor heat during engine warm-up and ground check.

(2) Use minimum carburetor heat required for smooth operation in take-off, climb, and cruise.

(3) Select relatively high manifold pressure and RPM settings for optimum mixture distribution, and avoid excessive manual leaning in cruising flight.

(4) Avoid sudden throttle movements during ground and flight operation.

For continuous operation in temper-

TAKE-OFF DATA

TAKE-OFF DISTANCE WITH 20° FLAPS FROM HARD SURFACE RUNWAY.

GROSS WEIGHT LBS.	HEAD WIND MPH	AT SEA LEVEL & 59°F. GROUND RUN	AT SEA LEVEL & 59°F. TO CLEAR 50' OBSTACLE	AT 2500 FT. & 50°F. GROUND RUN	AT 2500 FT. & 50°F. TO CLEAR 50' OBSTACLE	AT 5000 FT. & 41°F. GROUND RUN	AT 5000 FT. & 41°F. TO CLEAR 50' OBSTACLE	AT 7500 FT. & 32°F. GROUND RUN	AT 7500 FT. & 32°F. TO CLEAR 50' OBSTACLE
2100	0	335	715	390	810	465	935	560	1100
	15	185	465	225	540	270	625	330	745
	30	75	280	95	305	125	365	160	450
2400	0	440	895	525	1040	630	1210	770	1465
	15	255	600	310	700	380	835	475	1020
	30	115	350	150	420	190	510	245	640
2650	0	555	1080	665	1260	790	1500	965	1835
	15	330	735	405	865	490	1050	655	1345
	30	160	445	205	535	255	665	335	845

Note: Increase distances 10% for each 25°F above standard temperature for particular altitude.

CLIMB DATA

GROSS WEIGHT LBS.	AT SEA LEVEL & 59°F. BEST CLIMB IAS MPH	AT SEA LEVEL & 59°F. RATE OF CLIMB FT/MIN	AT SEA LEVEL & 59°F. GAL. OF FUEL USED	AT 5000 FT. & 41°F. BEST CLIMB IAS MPH	AT 5000 FT. & 41°F. RATE OF CLIMB FT/MIN	AT 5000 FT. & 41°F. From SL FUEL USED	AT 10000 FT. & 23° F. BEST CLIMB IAS MPH	AT 10000 FT. & 23° F. RATE OF CLIMB FT/MIN	AT 10000 FT. & 23° F. From SL FUEL USED	AT 15000 FT. & 5°F. BEST CLIMB IAS MPH	AT 15000 FT. & 5°F. RATE OF CLIMB FT/MIN	AT 15000 FT. & 5°F. From SL FUEL USED	AT 20000 FT. & -12°F. BEST CLIMB IAS MPH	AT 20000 FT. & -12°F. RATE OF CLIMB FT/MIN	AT 20000 FT. & -12°F. From SL FUEL USED
2100	87	1470	1.5	82	1200	2.8	78	925	4.3	73	655	6.2	68	385	9.0
2400	88	1210	1.5	84	960	3.1	80	710	5.0	76	460	7.6	71	210	12.0
2650	90	1030	1.5	86	795	3.5	83	560	5.9	78	325	9.3	74	90	17.1

Note: Flaps up, full throttle and 2600 RPM. Mixture leaned for smooth operation above 5000 ft. Fuel used includes warm-up and take-off allowance.

Figure 17. Take-Off & Climb Chart

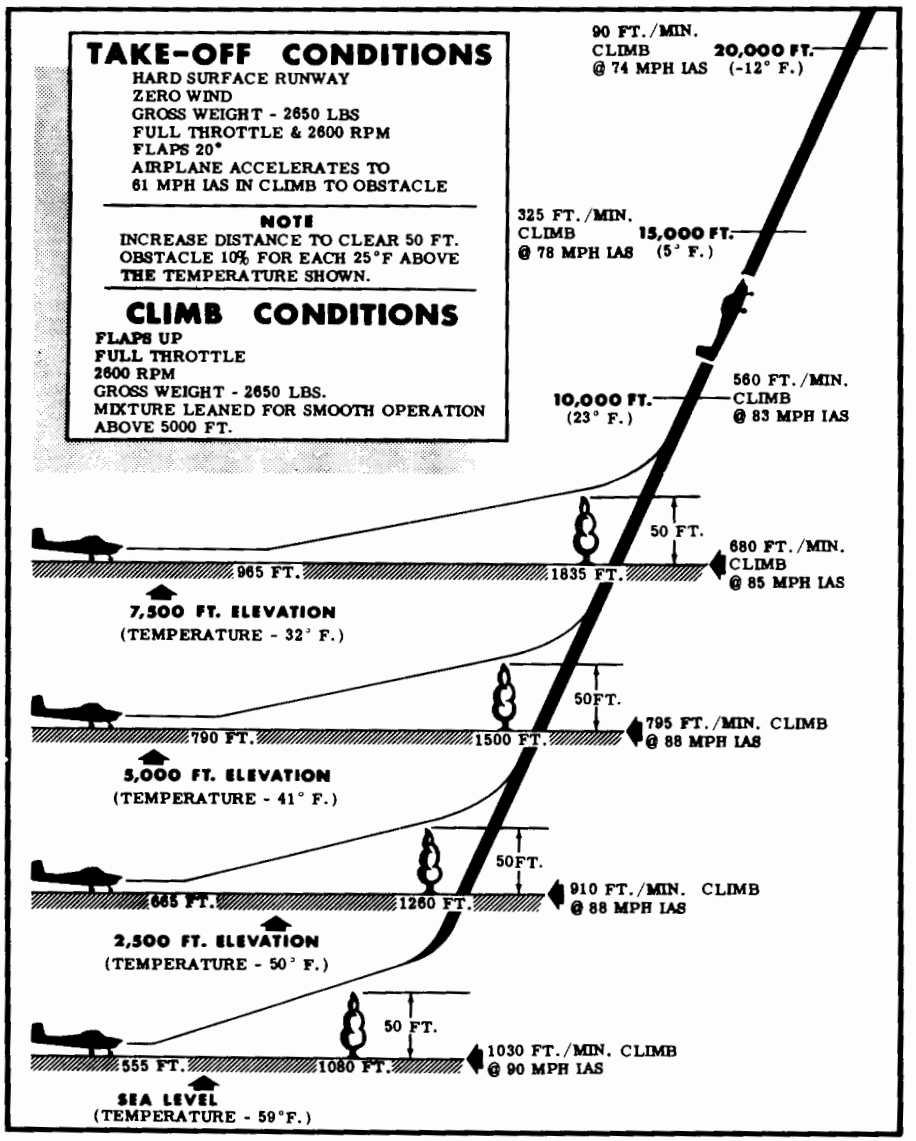


Figure 16. Take-Off Diagram

atures consistently below 20° F the Cessna winterization kit should be installed. This kit consists of an oil cooler shutter, a shutter control, oil cooler cover plate, intake manifold cross-over tube cover and carburetor air intake restrictor cover. The installation of these components will greatly improve engine operation. Winterization kits are available at your dealer for a nominal charge.

OIL DILUTION SYSTEM (OPTIONAL EQUIPMENT)

Cold climate 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 engine is shut off, allows gasoline to flow into the engine oil — thinning the oil to make the next starting easier. The gasoline-diluted oil is not deteriorative to the engine, because the gasoline evaporates away as the engine is warmed up, leaving only the oil for lubrication.

Basically, the oil dilution system consists of an electrically-operated solenoid valve connected by hoses to the fuel and oil systems. Pressing a push-button switch on the instrument panel operates the valve, allowing gasoline to flow to the inlet side of the oil pump. Here the gasoline mixes with the engine oil and is pumped to all the moving parts of the engine.

During oil dilution the engine should be idled at 1000 RPM. At this speed, when the switch is pressed, gasoline will flow into the oil pump at the rate of one quart every 90 seconds. Pressing 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 depressed for a maximum of four minutes — further dilution will cause an overflow of the oil sump, resulting in a fire hazard. When severely cold conditions are anticipated, and it is desirable to dilute the oil for longer than four minutes, it will be necessary to drain oil from engine — unless the oil is already below the twelve quart level. Drain one quart of oil for each 90 seconds of oil dilution time required over four minutes.

NOTE

Change engine oil and clean oil screens after the first oil dilution of the season before operating the engine. This will remove any dirt and sludge which have been loosened by the dilution process.

OXYGEN SYSTEM.

An oxygen system, capable of supplying oxygen for a pilot and three passengers is available as optional equipment for your airplane. It is completely automatic and requires no manual regulations.

The system consists of an oxygen cylinder, a pressure gage, pressure regulator, outlet couplings, and four disposable type oxygen masks, complete with rubber hoses and position indicators. The face masks and hoses are stored in a plastic bag on the baggage shelf when not in use.

The system will provide the dura-

tion of operation shown in Figure 13.

The supply of oxygen for the system is stored, under high pressure, in an oxygen cylinder located just aft of the baggage compartment. High pressure oxygen flows from the cylinder and is carried through stainless steel tubing through an oxygen pressure gage to an automatic, continuous-flow oxygen regulator. The oxygen is reduced to low pressure by the regulator and is carried through aluminum tubing to four continuous-flow couplings which are mounted in a console panel located in the cabin ceiling. When the oxygen mask hoses are plugged into the couplings, oxygen is permitted to flow through rubber tubing to the oxygen masks. A flow indicator in each hose line shows if oxygen is flowing.

WARNING

USE NO OIL! Keep oil and grease away from all oxygen equipment. Also keep equipment free of organic material (dust, lint, etc.). Be sure hands and clothing are free of oil before handling equipment.

OXYGEN SYSTEM OPERATION.

Prior to flight, check to see that valve on the oxygen cylinder is full open (full counterclockwise). Note oxygen pressure gage reading to be sure that there is an adequate supply of oxygen for the trip.

To use oxygen system, proceed as follows:

a. Select mask and hose from plastic bag on baggage shelf.
b. If mask is not connected to hose, attach by inserting short plastic tube securely into oxygen delivery hose.
c. Attach mask to face.
d. Select oxygen coupling in overhead console panel. Push dust cover to one side and insert end of mask hose into coupling. Oxygen will start to flow and no further adjustments are necessary.

NOTE

If the red oxygen flow indicator for the face mask hose line is out of sight, oxygen is flowing.

OXYGEN CYLINDER.

The oxygen cylinder is equipped with a shut-off valve and can be easily removed and recharged by any commercial supplier of breathing grade or aviation (dry) grade oxygen.

When fully charged, the oxygen cylinder is filled to 1800 psi at 70°F and contains 48 cubic feet of oxygen. The oxygen cylinder should be refilled whenever the oxygen system pressure drops below 300 psi.

To remove the oxygen cylinder for servicing, proceed as follows:

a. Open baggage door and unfasten rear baggage compartment upholstery panel on the right side of the airplane.
b. Turn the oxygen cylinder valve off by turning clockwise as far as it will go.
c. Disconnect oxygen line from oxygen cylinder.
d. Loosen the two cylinder mounting clamps and slide oxygen cyl-

Section V

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 lean 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 charts 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 Cessna, take advantage of the power your engine can develop. For normal cruising, choose a cruising power setting which gives you a fast cruising speed. If your destination is over 600 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.

Airspeed Correction Table

FLAPS UP	IAS	60	80	100	120	140	160	180
	TIAS	68	82	100	118	138	157	176
FLAPS DOWN	IAS	40	50	60	70	80	90	100
	TIAS	56	60	67	74	83	92	101

Figure 15. Airspeed Correction Table

moment values of items to be carried.

EXAMPLE FOR AN AIRPLANE WITH A LICENSED EMPTY WEIGHT OF 1621 LBS. AND A MOMENT OF 57,047 IN. LBS.

	WT.	MOMENT 1000
EMPTY WEIGHT (LICENSED)	1621.0*	+57.0
OIL (12 QTS.)	22.5	− 0.3
PILOT & PASSENGER (1)	340.0	+12.2
REAR PASSENGERS (2)	290.0	+20.3
FUEL (MAXIMUM) 55 GAL.	330.0	+15.8
BAGGAGE (TO MAKE GR. WT.)	46.5	+ 4.4
Total	2650.0	109.4

Locate this point (2650.0-109.4) on the center of gravity envelope graph, and, since the point falls within the envelope, the above loading meets all balance requirements.

*Includes 10 gallons of unusable fuel, 7 gallons of which are usable in level flight only.

NOTE

The above problem is an example of only one of many different loading configurations. To best utilize the available payload for *your* airplane, the loading charts should be consulted to determine proper load distribution.

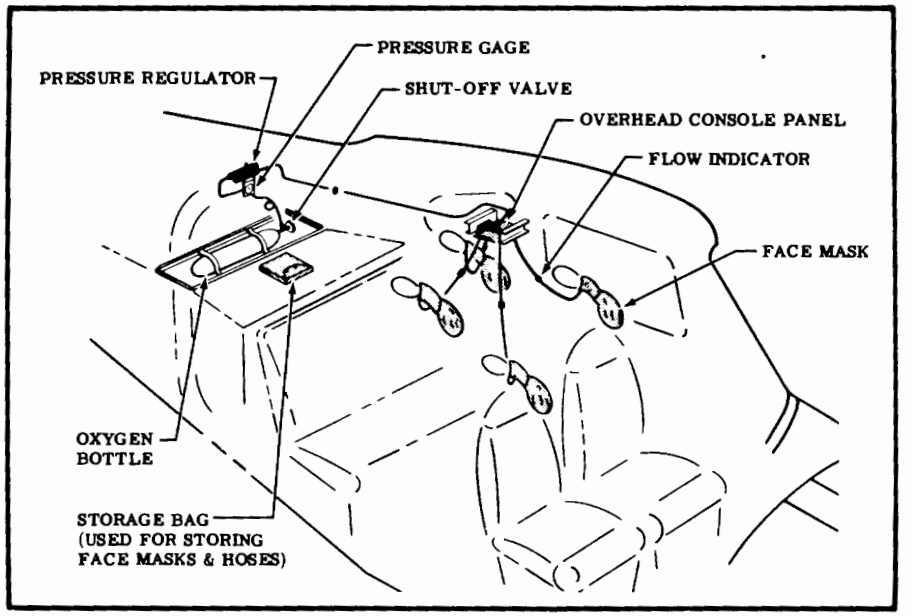


Figure 12. Oxygen System Diagram

inder forward and out of the airplane.

To reinstall oxygen cylinder, reverse the above procedure.

WARNING

Lubricants or sealing compounds on the flared tube or compression fittings must not be used. No sealing compound should be used on either the flares or threads to prevent leakage. Oil, grease, soap, or other fatty materials in contact with oxygen constitutes a very serious fire hazard and such contact is to be avoided. Only antiseize and sealing compounds which have been approved under Spec. MIL-C-5542 can be used safely.

OXYGEN SYSTEM PRESSURE GAGE.

An oxygen system pressure gage is installed in the rear cabin wall just above the baggage shelf and is easily read by the cabin occupants. The gage indicates the pressure of oxygen entering the system from the cylinder. The recommended operating pressure range for the system is from 1800 to 300 psi. The gage-pressure reading also can be used to determine the amount of oxygen left in the system (see figure 13).

OXYGEN REGULATOR.

The oxygen regulator, located be-

hind the rear cabin wall, automatically reduces the oxygen high pressure, supplied by the oxygen cylinder, to a low pressure of practical magnitude for line distribution. The regulator contains a fine mesh screen which prevents entry of foreign particles into the system.

To relieve the users of the necessity for making periodic adjustments while in flight, the regulator automatically compensates for changes in altitudes and furnishes the required oxygen distribution pressures at all times.

QUICK DISCONNECT COUPLINGS.

Four, continuous-flow couplings, flush mounted in the ceiling console panel, provide individual outlets for the oxygen system. Spring loaded covers are provided to keep out dust when the couplings are not in use. Insertion of the oxygen mask hoses into the couplings effect leak-proof connections and automatically open the couplings to allow free flow of oxygen to the masks. Withdrawal of the hoses automatically cuts off the oxygen flow.

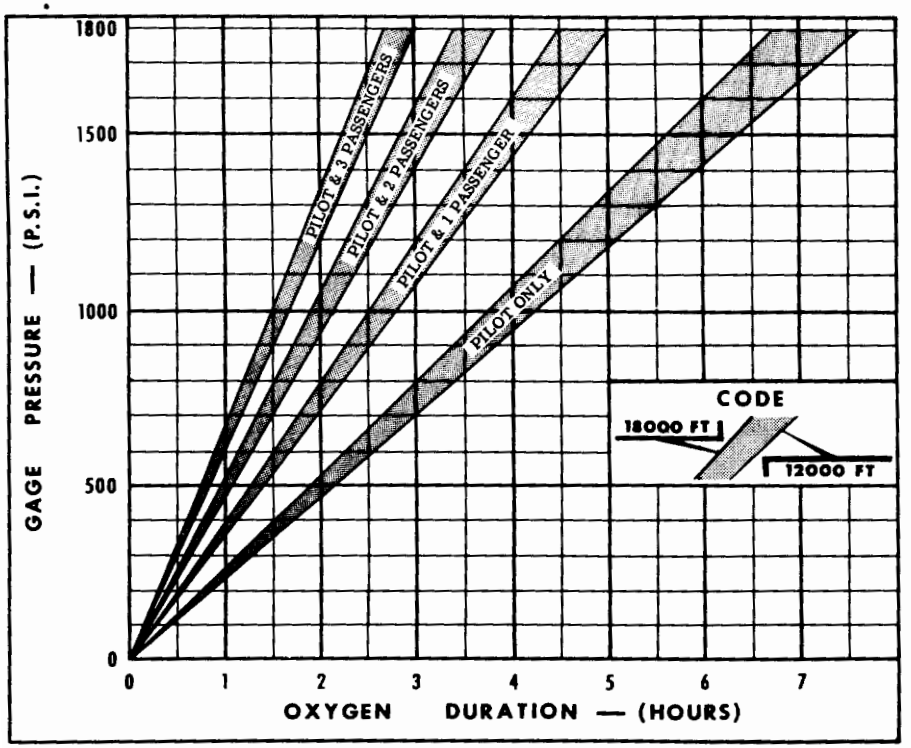
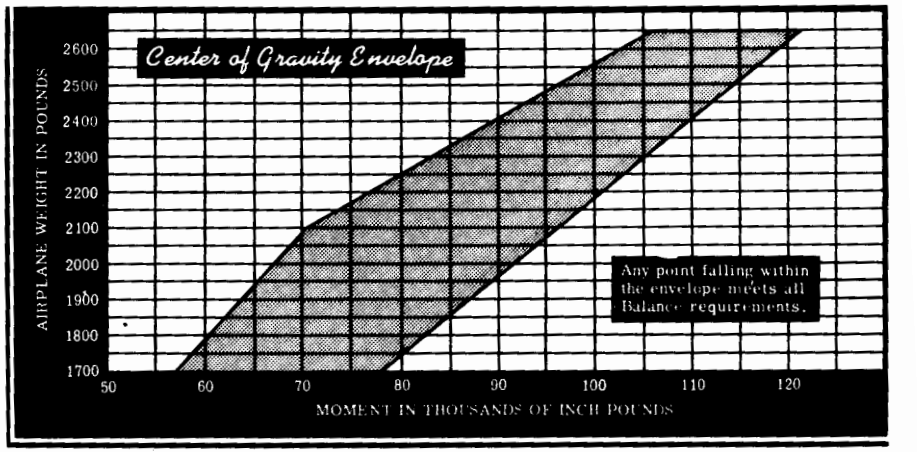
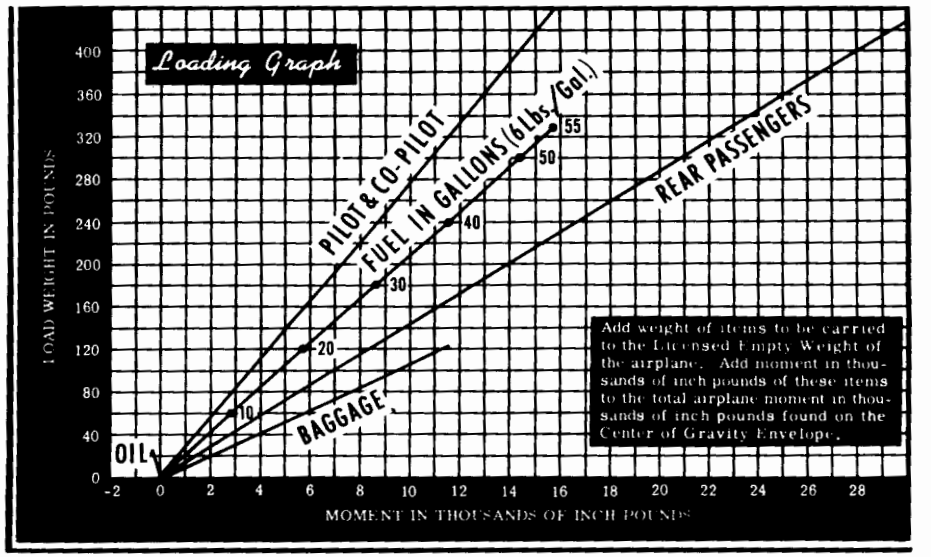


Figure 13. Oxygen Duration Chart



Cessna



Normal Operation Range.....64-160 mph (green arc)
Maximum Speed Flaps Extended.....100 mph
Flap Operation Range.....55-100 mph (white arc)
Maneuvering Speed*.....122 mph

*(The maximum speed at which you can use abrupt control travel without exceeding the design load factor.)

ENGINE OPERATION LIMITATIONS.

Power and Speed.....230 bhp at 2600 rpm

ENGINE INSTRUMENT MARKINGS.

OIL TEMPERATURE INDICATOR

Normal Operating Range.....Green Arc
Do Not Exceed.....Red Line

OIL PRESSURE GAGE

Idling Pressure.....10 psi (red line)
Normal Operating Range.....30-60 psi (green arc)
Maximum Pressure.....100 psi (red line)

MANIFOLD PRESSURE GAGE

Normal Operating Range.....15-23 in. Hg (green arc)

CYLINDER HEAD TEMPERATURE

Normal Operating Range.....300-425° F (green arc)
Do Not Exceed.....500° (red line)

TACHOMETER

Normal Operating Range.....2200-2450 rpm (green arc)
Cautionary Range.....2450-2600 rpm
Do Not Exceed (Engine rated speed).....2600 rpm (red line)

WEIGHT AND BALANCE.

All aircraft are designed for certain limit loads and balance conditions. These specifications for your Cessna are charted on page 4-3.

A weight and balance report and equipment list is furnished with each airplane. All the information on empty weight c.g. and allowable limits for your particular airplane, as equipped when it left the factory, is shown. Changes in the original equipment affecting weight empty c.g. are required by the C.A.A. 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 *for your airplane* and following the example, 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. Refer to the loading graph for

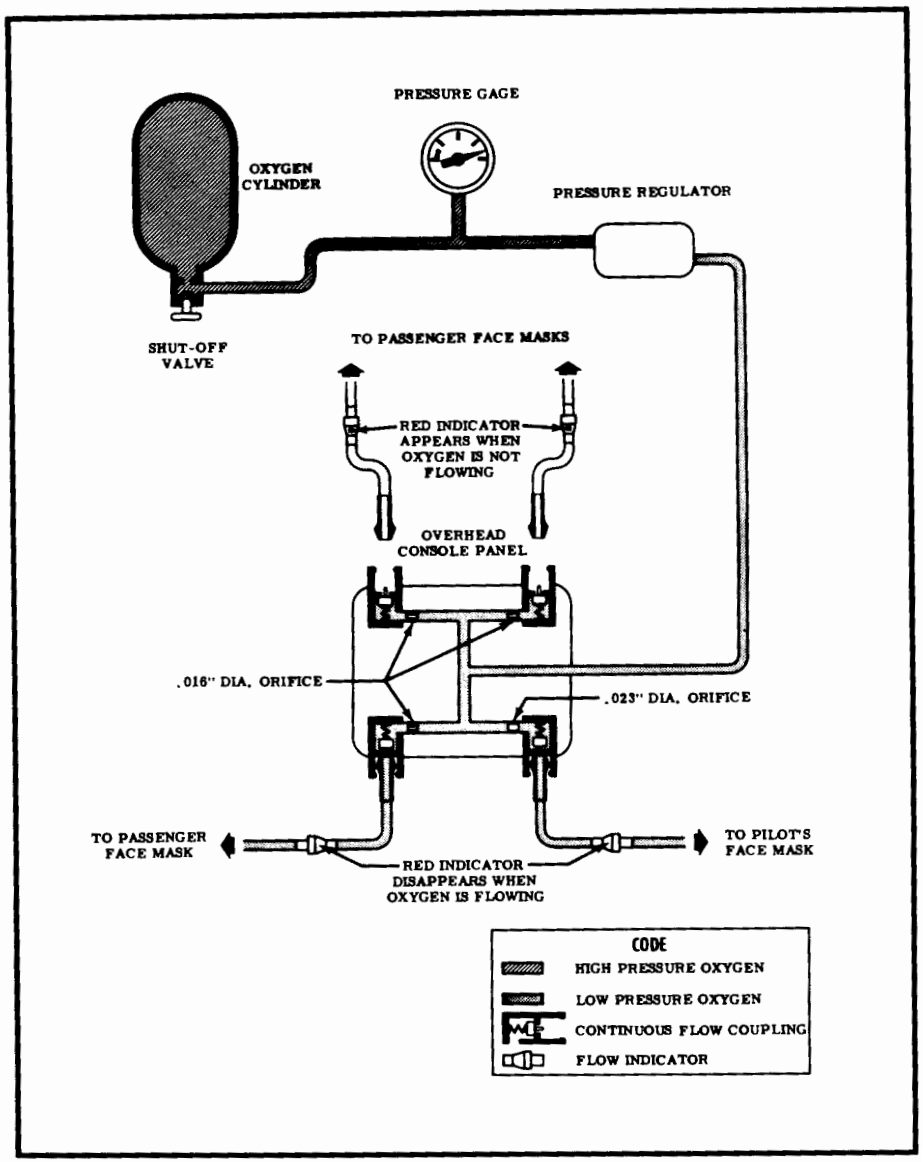


Figure 14. Oxygen System Schematic

The oxygen rate-of-flow to the user is determined by an orifice installed in the inlet side of each coupling. The passenger coupling orifices are .016 inch diameter and the pilot coupling orifice is .023 inch diameter. The .023 inch diameter orifice provides approximately double the rate-of-flow as that delivered through the .016 inch diameter orifices. The larger rate-of-flow is provided primarily for the pilot, but can be used for any of the cabin occupants who desire additional oxygen.

FACE MASKS.

The face masks used with the oxygen system are of the disposable partial-rebreathing type and are stored in a plastic bag on the baggage shelf. The face masks have the advantage of low cost, feather lightness, comfort and the elimination of the necessity of cleaning and sterilizing. Their users can carry on normal conversations including normal use of the microphone. The masks are durable and the frequent user can mark his mask for identification and reuse it many times.

The face mask receives oxygen through a rubber tube into the rebreather bag. On exhalation, the first air exhaled (which is rich in oxygen because it never reaches the lungs) is exhaled into the bag, combining with the oxygen. As soon as the bag is filled, the remainder of the exhaled breath (which is low in oxygen, because it has been in the lungs) is exhaled to the atmosphere through upper sides of the bag.

On inhalation, the user inhales the oxygen-enriched contents of the bag. When the bag is emptied, air is drawn through the upper sides of the mask to finish satisfying the inhalation volume of the user. Additional masks are available at Cessna dealers.

OXYGEN FLOW INDICATOR.

An oxygen flow indicator is provided in each face mask hose line. It provides visual proof of oxygen flow and operates in any position. A red indicator disappears when oxygen is flowing.

Section IV

operating limitations

OPERATIONS AUTHORIZED.

Your Cessna with standard equipment as certificated under CAA Type Certificate No. 3A13 is approved for day and night operation under VFR.

Additional optional equipment is available to increase its utility and to make it authorized for use under IFR day and night. When operated for hire at night, certificated flares are required. An owner of a properly equipped Cessna is eligible to obtain approval for its operation on single engine scheduled airline service on VFR.

MANEUVERS — NORMAL CATEGORY.

The airplane 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	2650 lbs.	
Flight Load Factor* Flaps Up	+3.8	−1.52
Flight Load Factor* Flaps Down	+3.5	

*The design load factors are 150% of the above and in all cases the structure meets or 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 check lists, it is to be disregarded.

AIRSPEED LIMITATIONS.

The following are the certificated true indicated airspeed limits:

Never Exceed (Glide or dive, smooth air)	184 mph (red line)
Caution Range	160-184 mph (yellow arc)
Maximum Structural Cruising Speed (Level flight or climb)	160 mph