Skylane

Your Cessna®

SKYLANE and 182

Owner's Manual

This manual describes the operation and performance of both the Cessna Model 182 and the 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 Skylane model.

P189-13
(RGI-100-7/99)

Congratulations . . . .

Welcome to the ranks of Cessna owners! Your Cessna has been designed and constructed to give you the most in performance, economy, and comfort. You will find flying it, either for business or pleasure, a pleasant and profitable experience.

This Owner's Manual has been prepared as a guide to help you get the most pleasure and utility from your airplane. It contains information about your Cessna's equipment, operating procedures, and performance; and suggestions for its servicing and care. We urge you to read it from cover to cover, and to refer to it frequently.

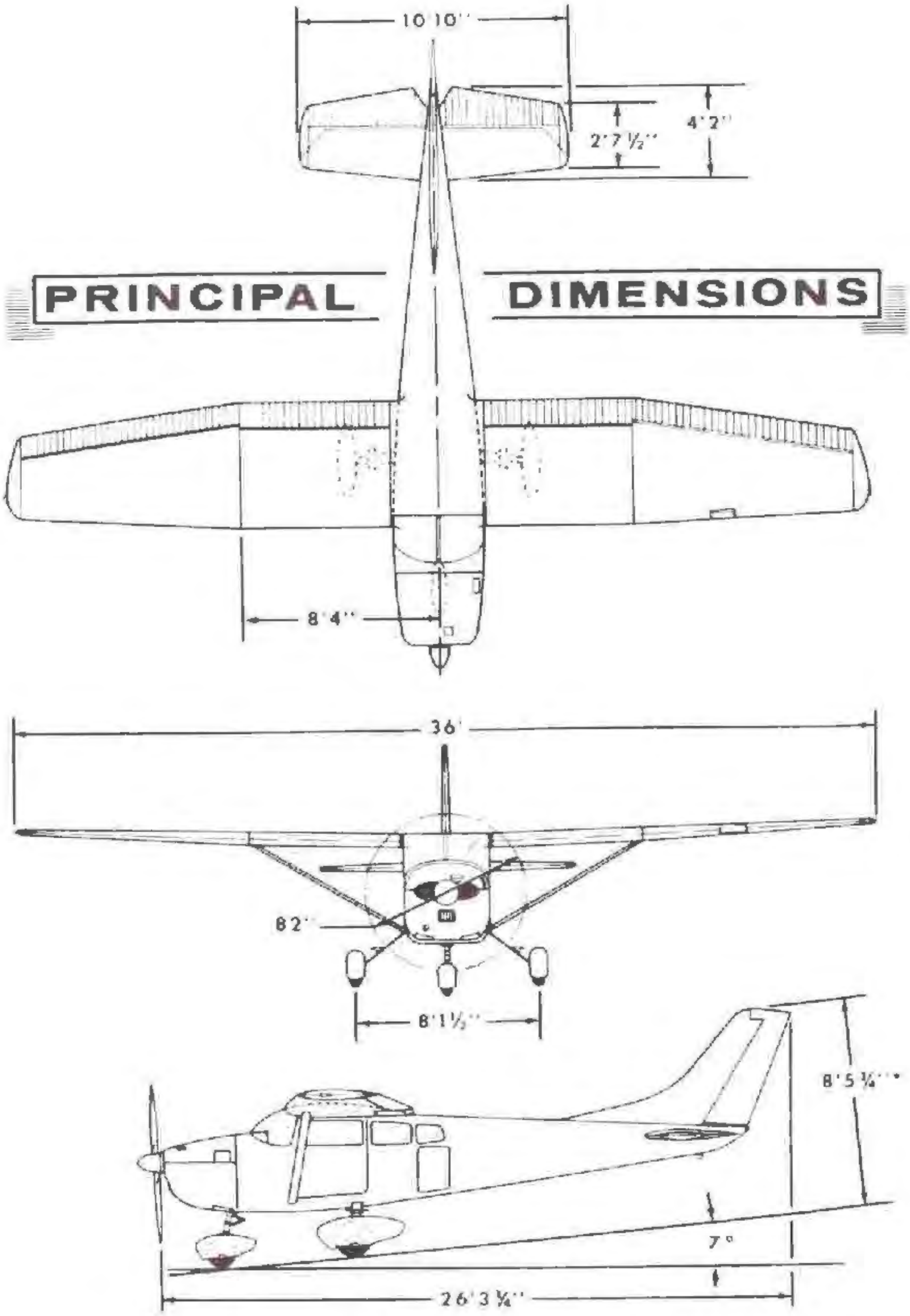
Our interest in your flying pleasure has not ceased with your purchase of a Cessna. World-wide, the Cessna Dealer Organization backed by the Cessna Service Department stands ready to serve you. The following services are offered only by your Cessna Dealer:

1) FACTORY TRAINED MECHANICS to provide you with courteous expert service.
2) FACTORY APPROVED SERVICE EQUIPMENT to provide you with the most efficient and accurate workmanship possible.
3) A STOCK OF GENUINE CESSNA SERVICE PARTS on hand when you need them.
4) THE LATEST AUTHORITATIVE INFORMATION FOR SERVICING CESSNA AIRPLANES, since Cessna Dealers have all of the Service Manuals and Parts Catalogs, kept current by Service Letters and Service News Letters published by Cessna Aircraft Company.

We urge all Cessna owners to use the Cessna Dealer Organization to the fullest.

A current Cessna Dealer Directory accompanies your new airplane. The Directory is revised frequently, and a current copy can be obtained from your Cessna Dealer. Make your Directory one of your cross-country flight planning aids; a warm welcome awaits you at every Cessna Dealer.

PRINCIPAL DIMENSIONS



*WITH OPTIONAL ROTATING BEACON ADD APPROXIMATELY 2½ INCHES

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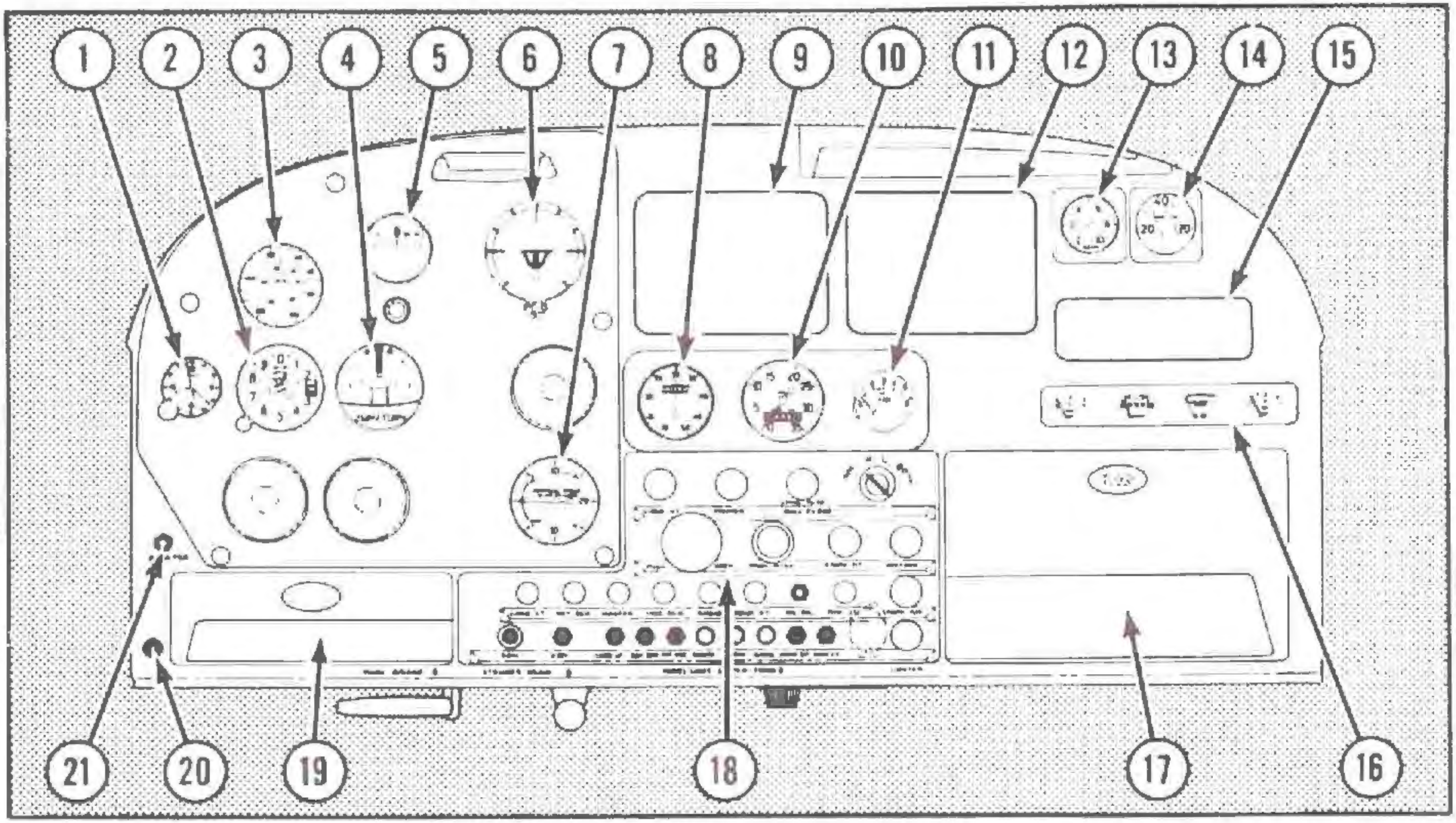


1. Clock
2. Altimeter
3. Airspeed Indicator
4. Turn-and-Bank
5. Directional Gyro
6. Attitude Gyro
7. Vertical Speed Indicator
8. Manifold Pressure Gage
9. Optional Radio Space
10. Tachometer
11. Cylinder Head Temperature Gage
12. Optional Radio Space
13. Suction Gage
14. Carburetor Air Temperature Gage
15. Optional Radio Space
16. Fuel and Oil Gages
17. Map Compartment
18. Control Panel (See Figure 1-2)
19. Map Compartment
20. Headset Jack
21. Starter Button

Figure 1-1. 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.

The Cessna 182 and Skylane are powered by Continental O-470-L horizontally-opposed six-cylinder engines. They develop 230 horsepower at 2600 rpm and full throttle for both take-off and maximum continuous power.

THROTTLE.

The throttle (figure 1-2) incorporates a knurled, friction-type locknut to secure it at any desired setting.

NOTE

Because of the constant-speed propeller mechanism, standard-equipment on the Cessna 182 and Skylane, advancing the throttle will not increase the 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 CONTROL" paragraph on page 1-5 for this procedure.

MIXTURE CONTROL.

The mixture control (figure 1-2) has a double-button knob with a friction lock to prevent inadvertent leaning or shutting off the fuel supply. To operate the control, grasp the knob between the thumb and two fingers and squeeze the buttons together, releasing the lock. Then push the knob in for rich mixture or pull it out for lean mixture. Release pressure on the knob to lock the control.

Pulling the knob all the way out seats the fuel metering valve in the carburetor so that it acts as an idle cutoff for stopping the engine.

Detailed information on leaning the mixture in flight is contained in Section III.

CARBURETOR AIR HEAT CONTROL.

The carburetor air heat control knob (figure 1-2) operates a butterfly valve in the carburetor air intake. The valve proportions cold air from the airscoop and hot air from the exhaust heater muff to maintain proper carburetor air temperature. The push-pull control has a double-button knob with a friction lock, identical to the mixture control. To increase the carburetor air temperature, pull the control out; to decrease it, push the control in. The control may be set in any desired position between full-hot (full out) and full-cold (full in).

Carburetor heat should not be used when taxiing on dirty, dusty or sandy fields, except briefly just before take-off, since the air entering the heater muffs does not pass through the intake filter. After a full-stop landing under these conditions, return the heat control to the full-cold position so the engine will receive filtered air.

Carburetor ice can form during ground operation with the engine idling. Just after the magneto check prior to take-off, pull the carburetor heat knob full on to remove any ice in the carburetor and check the control for proper function. After this short check, be sure to return the knob to the full cold position, so that maximum power will be available for take-off.

During climb, watch the engine for any sign of icing — roughness or loss of manifold pressure. Remember, icing will not produce a drop in rpm after you have set up climb power, since the propeller will change pitch to compensate for the power loss. If the engine begins to ice, apply full carburetor heat at once.

IGNITION SWITCH.

The key-operated ignition switch (figure 1-2) controls the dual-magneto ignition system. The four switch positions are "OFF," "R," "L" and "BOTH." Always operate the engine on both magnetos. Combustion is smoother and more complete when the cylinder charge is fired at two points. The "R" and "L" switch positions are for checking purposes only.

ENGINE PRIMER.

The engine primer knob (figure 1-2) operates a plunger-type pump which injects a charge of raw fuel into the intake port of No. 4 and No. 6 cylinders. An optional six-cylinder priming system is available if climatic conditions necessitate additional priming. Normally, one or two strokes of the primer may be necessary to start the engine even in warm weather, and very cold weather (–20° F) may require three or more strokes.

Prime the engine as follows:

(1) First, unlock the primer 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 it all the way in. This action is termed "one stroke of the primer."

(3) Prime the necessary number of

1. Landing Light Switch
2. Rotating Beacon Switch
3. Master Switch
4. Marker Beacon Switch
5. Radio Switch
6. Throttle
7. Carburetor Heat Knob
8. Pitot Heat Switch
9. Primer Knob
10. Propeller Control Knob
11. Oil Dilution Switch
12. Cowl Flap Control Knob
13. Navigation Lights Switch
14. Cabin Heat Knob
15. Ignition Switch
16. Mixture Control Knob
17. Cigar Lighter
18. Cabin Air Knob
19. Navigation Light Circuit Breaker
20. Pitot Heat Circuit Breaker
21. Radio Circuit Breakers
22. Microphone
23. Instrument Light Circuit Breaker
24. Rotating Beacon Circuit Breaker
25. Landing Light Circuit Breaker
26. Fuel Strainer Drain Knob
27. Generator Circuit Breaker
28. Generator Warning Light
29. Parking Brake Handle

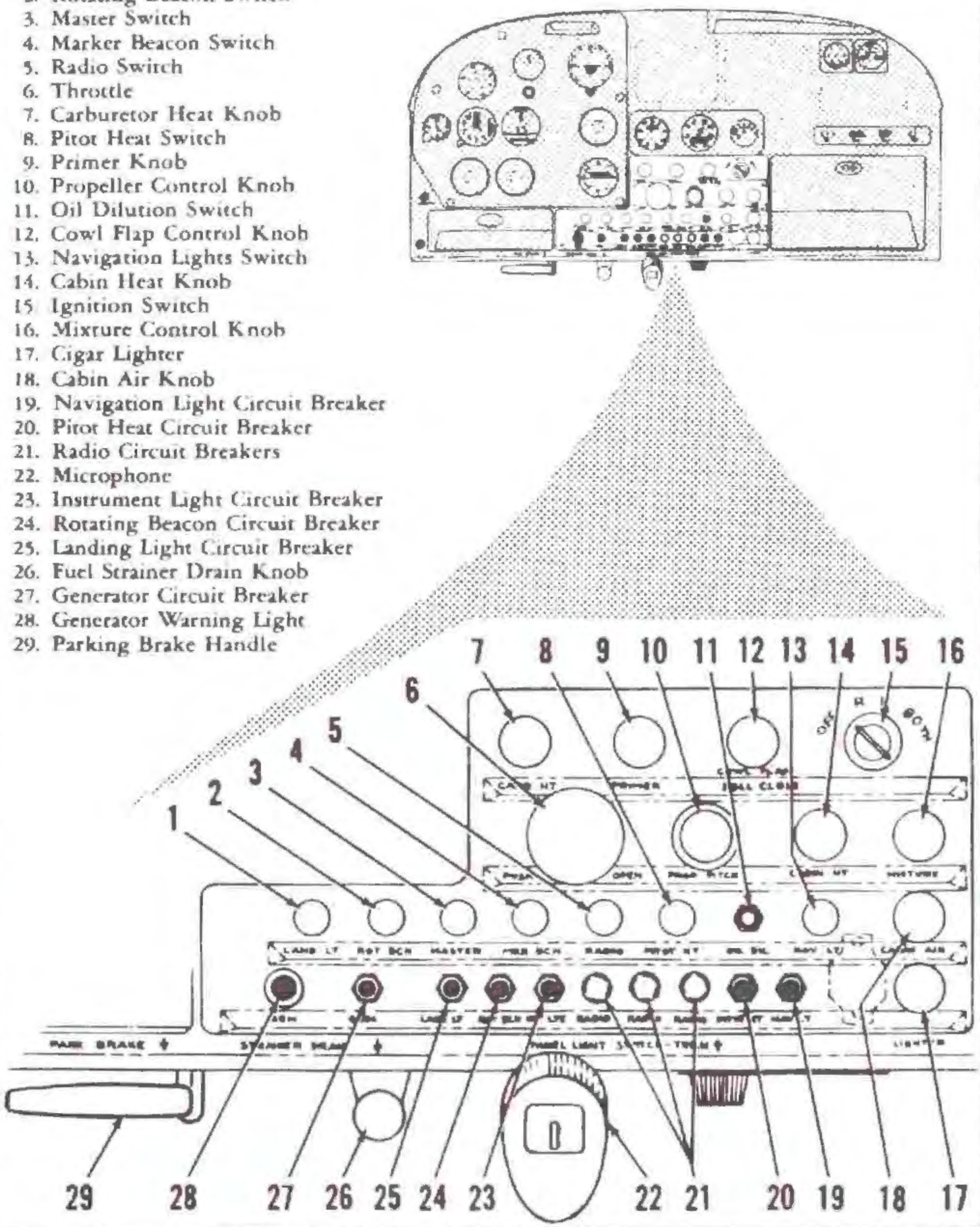


Figure 1–2. Control and Switch Panel

strokes, then push the plunger full in and lock by turning the knob clockwise.

Normally, the engine is started immediately after priming. In very cold weather turn engine over while priming, and if necessary, continue priming until the engine runs smoothly.

STARTER BUTTON.

A push-button switch (figure 1-1) energizes the starter relay. Engagement of the starter is automatic, taking place with the first rotation of the starter motor. Never press the starter button while the propeller is in motion; if the starter drive is engaged while the engine is turning, the drive mechanism may be damaged.

MANIFOLD PRESSURE GAGE.

A manifold pressure gage (figure 1-1) 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 the performance charts in Section VI.

CYLINDER HEAD TEMPERATURE GAGE.

The cylinder head temperature gage (figure 1-1) is calibrated in degrees Fahrenheit. By observing the gage, cowl flaps and power settings may be adjusted to keep the cylinder head temperatures within limits. The gage is self-powered, operated by a thermocouple mounted under the lower spark plug on the left rear engine cylinder, which normally will operate at the highest temperature.

COWL FLAPS.

Satisfactory engine performance depends upon operation within temperature limitations, indicated by the green arc on the cylinder head temperature and oil temperature gages. Since engine temperatures depend upon the flow of air passing over the cylinders and through the oil cooler, the control of this air is important. Cowl flaps, adjusted to the need, will meter enough air for the adequate cooling and maximum efficiency of the engine under varying conditions. Opening the cowl flaps, while on the ground, steps up the volume of air necessary for engine cooling. In flight, closing the cowl flaps, as required, restricts the flow of air, thereby reducing the cooling and cowl flap drag to a minimum.

COWL FLAPS CONTROL.

The cowl flaps control (figure 1-2) has a thumb-button lock and may be set in any position required for proper engine cooling. Pulling the control out closes the cowl flaps; pushing it in opens them. The lock releases when the thumb button is pressed in.

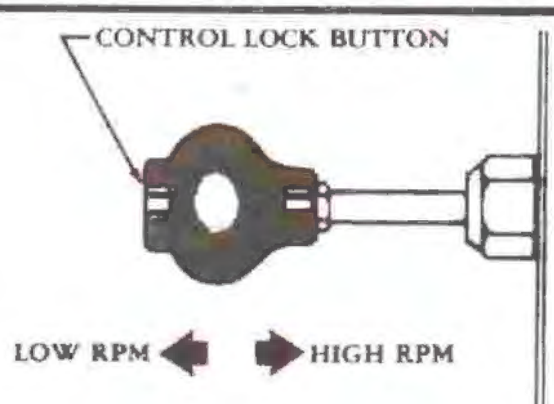
PROPELLER.

A constant speed propeller is standard equipment on your Cessna Skylane or 182, and provides your airplane with maximum performance at take-off, during climb, and while cruising.

PROPELLER CONTROL.

The propeller control knob (figure 1-2) changes the setting of the propeller governor to control engine speed. The knob incorporates a lock and a vernier screw for close adjustments. With the control knob full in, the propeller is in the high rpm position; pulling the control out places the propeller in low rpm. The control may be moved through its full range by depressing the locking button in the center of the knob, while close adjustments are made by rotating the knob, clockwise to increase rpm or counterclockwise to decrease it. The knob may be rotated without depressing the locking button.

For all ground operations, and for take-off, the control should be full in (high rpm). After take-off, reduce throttle first, then reduce rpm. Since a small control movement will produce a considerable rpm change, you should set up climb and cruise rpm by screwing the knob in or out.



PROPELLER PITCH CONTROL

NOTE

When increasing power, increase rpm, then open the throttle. When decreasing power, close the throttle, then reduce rpm. High manifold pressure and low rpm combinations may produce excessive cylinder pressures. This technique will avoid such harmful combinations.

Propeller surging (rpm variation up 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.

OIL SYSTEM.

The Continental O-470-L engine has a wet sump oil system which uses the engine sump 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 170° 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. However, in high outside air temperatures, when the capacity of the cooler is insufficient to maintain normal oil temperatures, the cowl flaps can be opened and set as necessary to provide adequate cooling.

Refer to Servicing Diagram, figure 5-2, for a summary of oil system servicing information.

OIL LEVEL.

The oil capacity of the Continental O-470-L engine is twelve quarts (13 quarts when an oil filter is used). 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 back of the rear engine baffle.

The dipstick incorporates a spring lock which prevents it from working loose in flight. To remove the dipstick, rotate it until the spring lock is disengaged, then pull the dipstick up and out. When replacing the dipstick, make sure that the spring lock is engaged.

NOTE

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

The oil filler is accessible through the top cowl access door. After adding oil, make sure that it is on firmly and turned clockwise as far as it will go to prevent loss of oil through the filler neck.

OIL SPECIFICATION AND GRADE.

Aviation grade engine oil is recommended for your Cessna. Oil should be changed at least 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

NOTE

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

OIL TEMPERATURE GAGE.

The oil temperature gage (figure 1-1) is a capillary-type instrument. Its dial is marked with a green arc to indicate the normal oil temperature operating range. Refer to Section IV for instrument markings.

OIL PRESSURE GAGE.

The oil pressure gage (figure 1-1) is a direct-reading bourdon-type instrument calibrated in pounds per square inch. Refer to Section IV for instrument markings.

OIL FILTER.

Two optional oil filtering systems are available for your Cessna; a Fram filter and a Winslow filter. When either oil filtering system is installed, one additional quart of oil should be added during oil and filter element changes to maintain the engine's nor-

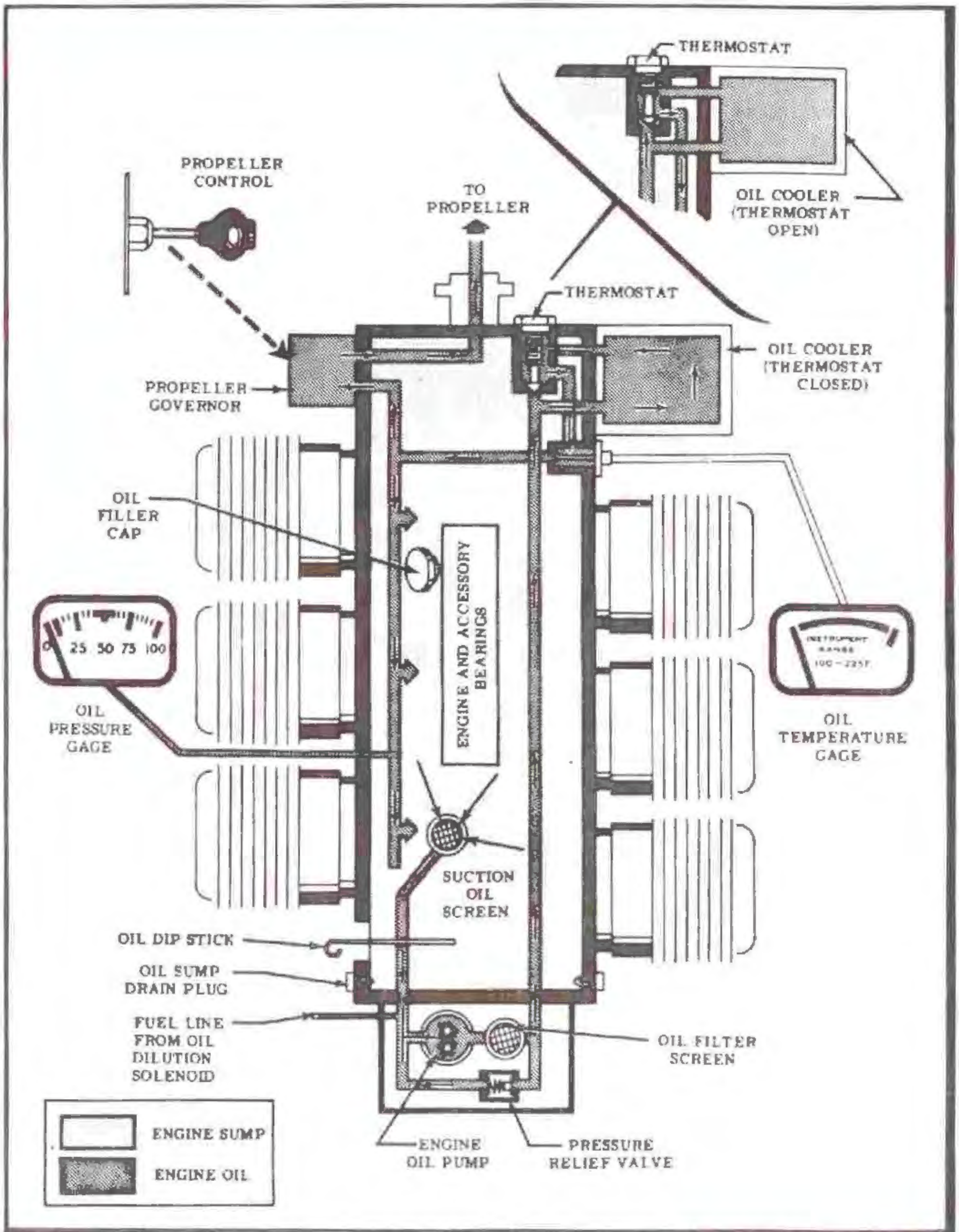


Figure 1-3. Oil System Schematic

mal oil supply.

Refer to Servicing Diagram, figure 5-2, for a listing of the replacement filter elements and servicing instructions.

OIL DILUTION SYSTEM.

To permit easier starting in extremely low temperatures, an optional oil dilution system is available. Used immediately before the engine is shut down, this system injects fuel into the engine oil and reduces its viscosity. When the engine is again operated, the fuel evaporates and is discharged through the breather so the oil resumes its normal viscosity.

The oil dilution system consists of a solenoid valve on the engine firewall, connected to the fuel strainer outlet and to the oil pump inlet. The valve is opened by pressing a push-button switch on the instrument panel.

Detailed operating procedures for the oil dilution system are contained in Section III.

AIR INDUCTION SYSTEM.

Air is ducted to the carburetor from an air scoop located high up on the lower cowl half. 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 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

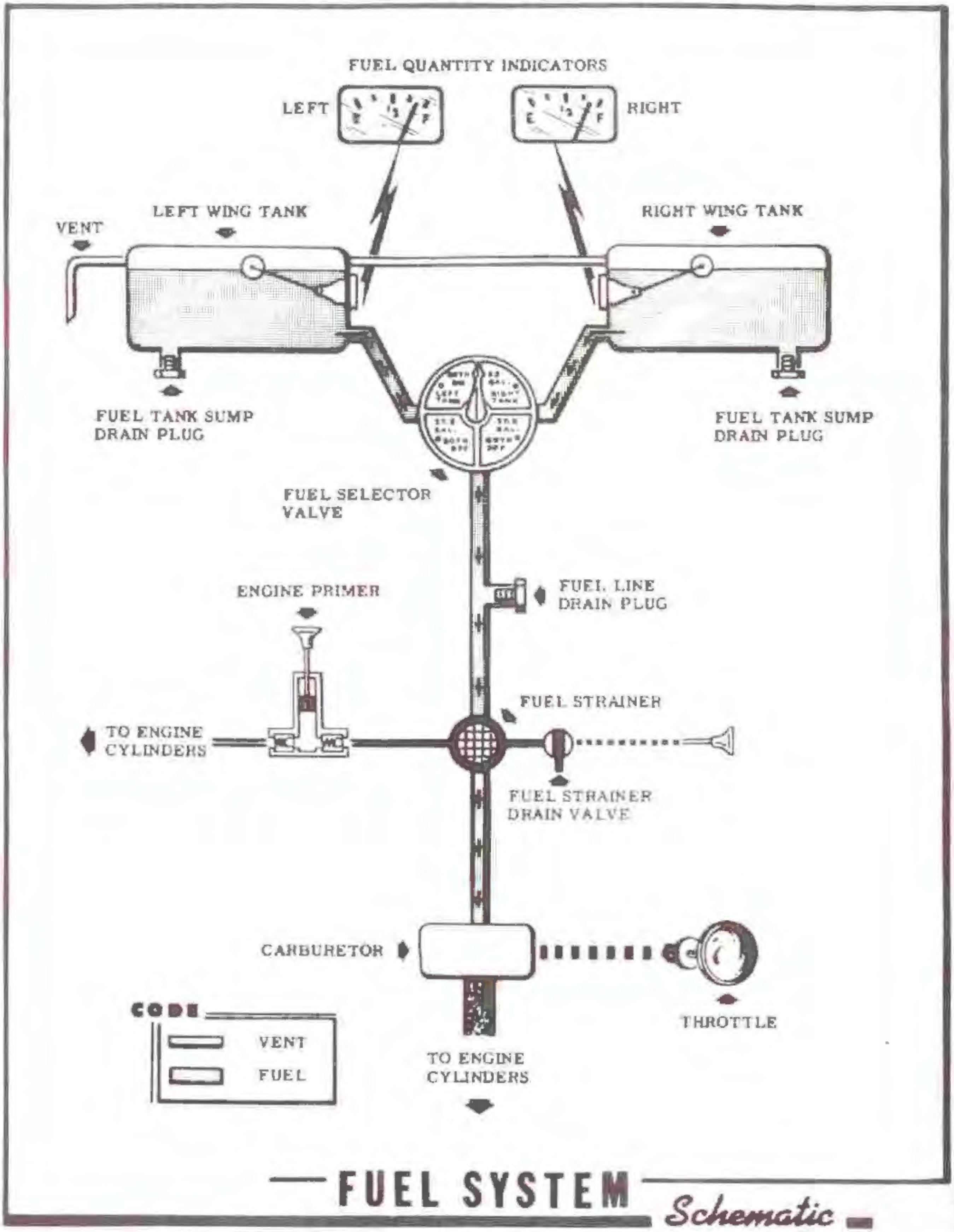

FUEL QUANTITY INDICATORS
LEFT
RIGHT
VENT
LEFT WING TANK
RIGHT WING TANK
FUEL TANK SUMP DRAIN PLUG
FUEL TANK SUMP DRAIN PLUG
FUEL SELECTOR VALVE
ENGINE PRIMER
FUEL LINE DRAIN PLUG
FUEL STRAINER
TO ENGINE CYLINDERS
FUEL STRAINER DRAIN VALVE
CARBURETOR
THROTTLE
CODE
VENT
FUEL
TO ENGINE CYLINDERS
FUEL SYSTEM Schematic

Figure 1–4.

Refer to Servicing Diagram, figure 5-2, for a summary of fuel system servicing information.

FUEL SPECIFICATION AND GRADE.

Only aviation grade fuel should be used except under emergency conditions. The recommended fuel is 80 octane minimum rating. Highly leaded fuels are not recommended. Filling the fuel tanks immediately after flight will reduce the air space and minimize moisture condensation in the fuel tanks.

FUEL 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 with the handle in the "BOTH ON" position to prevent inadvertent take off on an empty tank.*

FUEL STRAINER DRAIN KNOB.

A fuel strainer drain knob marked "STRAINER DRAIN" (figure 1-2) below the instrument panel 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.

About two ounces of fuel (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 QUANTITY INDICATORS.

Electrically-operated fuel quantity indicators (figure 1-1) identified "LEFT" and "RIGHT" indicate the amount of fuel remaining in their respective tanks.

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.

A red arc extending from the empty to ¼ full range on each indicator dial warns the pilot that its respective tank

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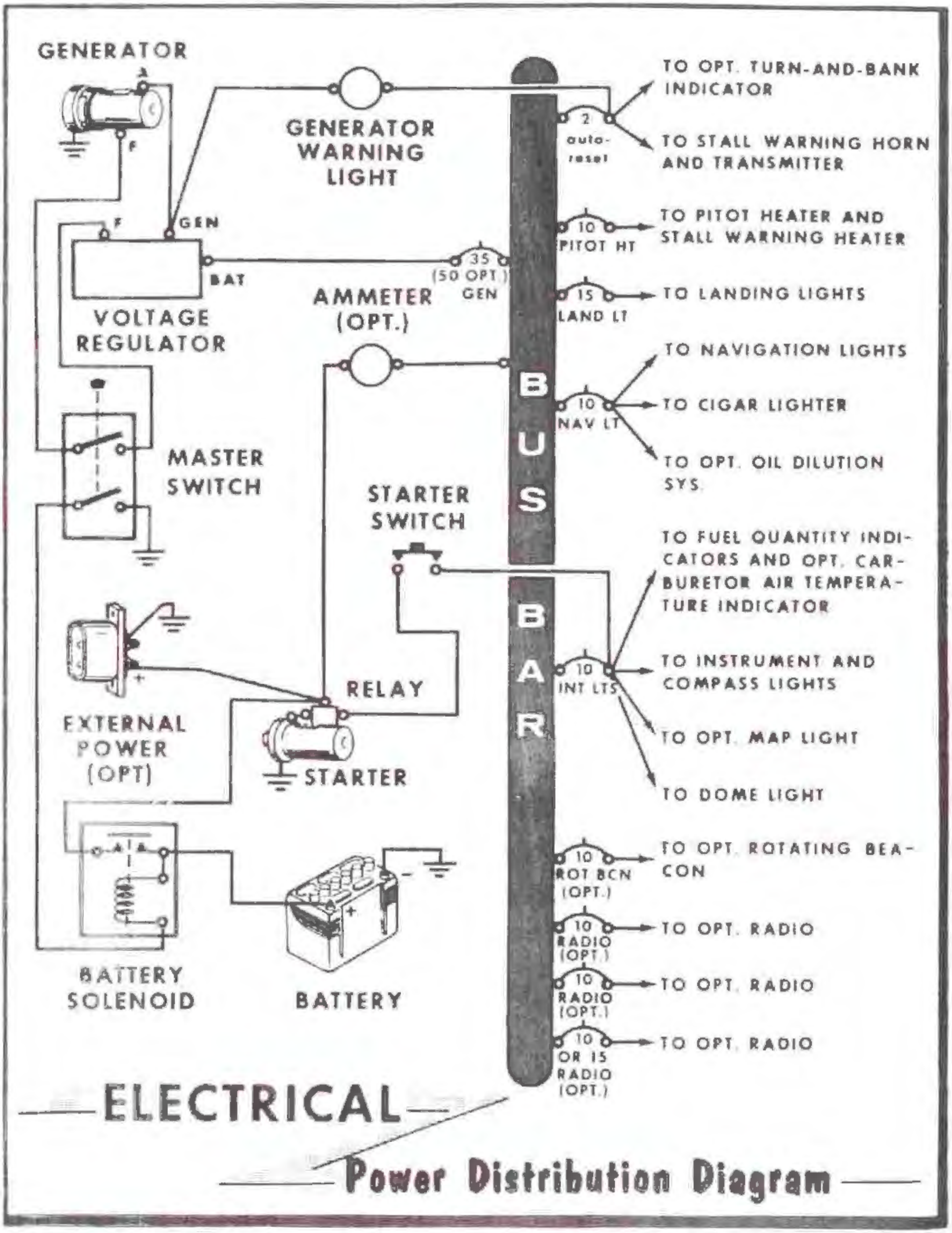

GENERATOR
A
F
GENERATOR WARNING LIGHT
2
auto-reset
TO OPT. TURN-AND-BANK INDICATOR
TO STALL WARNING HORN AND TRANSMITTER
F
GEN
BAT
VOLTAGE REGULATOR
10
PITOT HT
TO PITOT HEATER AND STALL WARNING HEATER
35
(50 OPT.)
GEN
AMMETER (OPT.)
15
LAND LT
TO LANDING LIGHTS
TO NAVIGATION LIGHTS
10
NAV LT
TO CIGAR LIGHTER
TO OPT. OIL DILUTION SYS.
MASTER SWITCH
STARTER SWITCH
BUS BAR
TO FUEL QUANTITY INDICATORS AND OPT. CARBURETOR AIR TEMPERATURE INDICATOR
10
INT LTS
TO INSTRUMENT AND COMPASS LIGHTS
RELAY
EXTERNAL POWER (OPT)
STARTER
TO OPT. MAP LIGHT
TO DOME LIGHT
10
ROT BCN (OPT.)
TO OPT. ROTATING BEACON
10
RADIO (OPT.)
TO OPT. RADIO
10
RADIO (OPT.)
TO OPT. RADIO
10 OR 15
RADIO (OPT.)
TO OPT. RADIO
BATTERY SOLENOID
BATTERY
ELECTRICAL
Power Distribution Diagram

Figure 1–5.

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 a 35-ampere engine-driven generator. A 50-ampere generator is available as optional equipment. The 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 generator voltage is insufficient to close the reverse-current relay.

MASTER SWITCH.

Power to the bus, from which all electrically-operated equipment is supplied, is controlled by the master switch (figure 1-2). The switch opens and closes the operating circuit of the battery solenoid and the field circuit of the generator.

If an electrical malfunction occurs in flight, the master switch may be turned off and the engine will continue to run, since its magneto ignition system is entirely separate from the electrical system. *However, with the master switch off you will not have the benefit of the stall warning indicator, the fuel quantity gages, or the optional turn-and-bank indicator.* If possible, you should isolate and turn off the faulty circuit, then pull on the master switch again.

Whenever the airplane is parked the master switch should be turned off to prevent battery drain.

CIRCUIT BREAKERS.

All electrical circuits in the airplane are protected by circuit breakers. The stall warning, generator warning light, and optional turn-and-bank indicator circuits are safeguarded by an automatically resetting circuit breaker mounted behind the instrument panel. The remaining electrical circuits are protected by "push-to-reset" circuit breakers on the instrument panel (see figure 1-2). The name of the circuit is indicated below each circuit breaker.

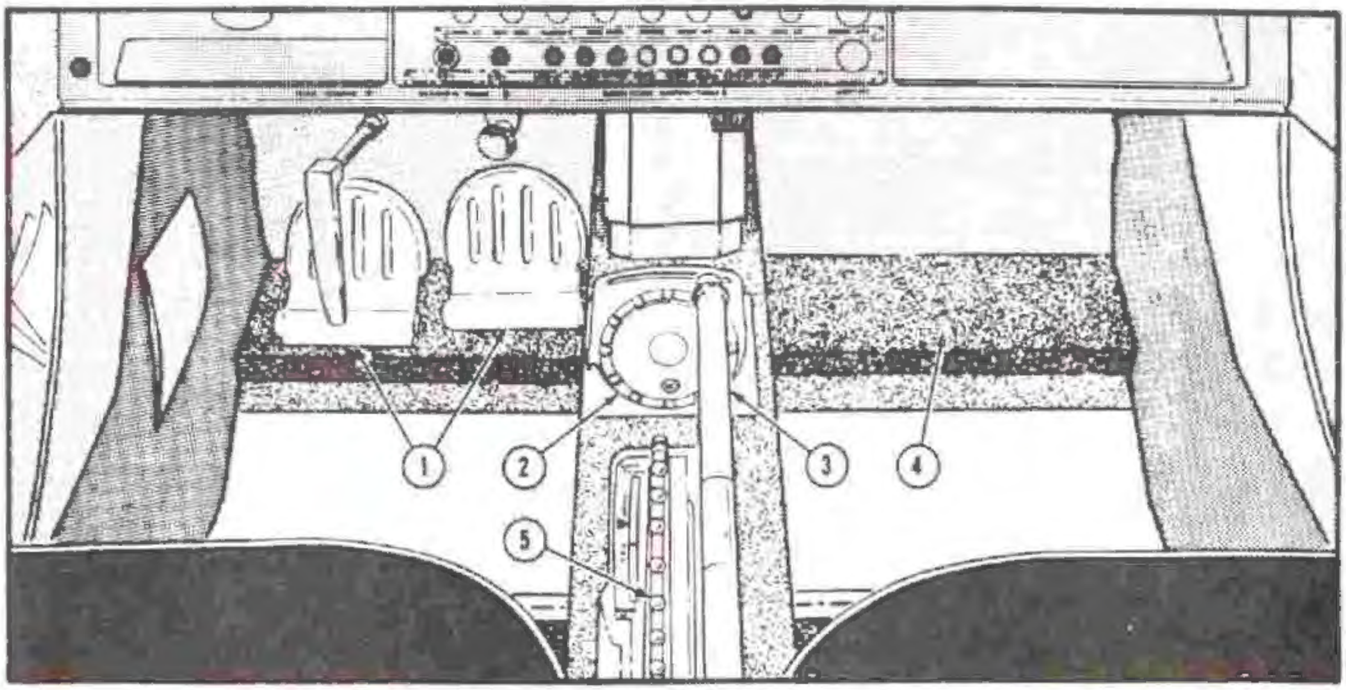
If a circuit is inoperative, press the circuit breaker button to reset the breaker. If this does not restore the circuit, it should be checked for shorts, defective parts, or loosened connections. If a circuit breaker pops out continually, its circuit should be checked.

GENERATOR WARNING LIGHT.

A red generator warning light (figure 1-2) 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 operate the primary flight control surfaces (ailerons, rud-



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

Figure 1–6. Lower Forward Section of Cabin

der and elevators). The wing flaps are controlled by a hand lever mounted between the front seats. The horizontal stabilizer is adjusted manually through the use of the stabilizer trim control wheel located between the front seats. The rudder is also adjusted manually by a trim control wheel located forward of the stabilizer trim control wheel and wing flap handle.

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 has a large red metal flag which covers the airplane master switch as a reminder to remove it before starting the engine.

NOTE

This controls lock is designed for use in moderately-gusty winds up to 30 or 40 MPH. When storm conditions are forecast, additional precautions should be taken.

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 side of the control wheel shaft 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 map compartment.

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 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 mechanism. 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.

Directional trim is provided by a rudder trim system which applies a slight rudder control to increase directional stability and compensate for changes in engine torque.

To adjust the rudder trim, turn the rudder trim control wheel (figure 1-6) in the direction you wish the nose to move: clockwise for nose right or counterclockwise for nose left. A rudder trim position indicator just forward of the trim control wheel, marked "NOSE RIGHT" and "NOSE LEFT", indicates the amount and direction of trim.

For easier steering while taxiing, set the rudder trim wheel so the position indicator pointer aligns with the white neutral mark. Prior to take-off, rotate the trim wheel approximately two turns clockwise for a climb power trim setting.

WING FLAP HANDLE.

The wing flaps are controlled by a wing flap control handle 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.

Wing Flap Settings

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

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

TACTAIR AUTOMATIC FLIGHT CONTROLS.

The optional Tactair automatic flight control system is a pneumatic system consisting of bellows attached to the manual control surface cables, specially-modified gyro instruments and a control head mounted on the instrument panel. The entire system is powered by the engine-driven vacuum pump.

The control surface servo bellows respond to pneumatic signals from the gyro instruments and the control head, to maintain the attitude set on the control head by the pilot. The servos may be overridden at any time, by operating the aileron and elevator controls. The pressure required to overpower the servos is not excessive and no damage to the system will result, even if the servos are overpowered for some time. When the controls are released, the autopilot will return the airplane to the attitude set on the control head.

The pickup units in the gyro instruments automatically change both the amount and the rate of change in their signals in accordance with the amount and rate of deviation of the airplane from the selected attitude. Thus, a large and rapid deviation will produce a large and rapid signal. The servo's response likewise will be large and rapid. However, as the airplane responds, the signals will diminish at a rate exactly proportional to the rate at which the airplane is returning to normal. The servos, in turn, bring the control surfaces back to neutral in the same pattern. The autopilot thus controls the airplane just as the human pilot would. Corrections are smooth and precise and at no time do they produce excessive flight loads on the airplane.

The Tactair system is available in two configurations. The T-2 Roll Stabilizer and Heading Lock system consists of the aileron servos, attitude gyros, directional gyro and control head. The system maintains lateral stability and preset headings. The T-3 Autopilot unit consists of the aileron servos, attitude and directional gyros, control head and an elevator servo for longitudinal control.

The directional gyro used with the T-2 and T-3 systems has an additional compass card placed above the regular card and linked to the heading lock pickups in the gyro. To set a course, the course selector knob to the right of the compass card window is rotated until the desired heading on the upper card falls under the lubber line.

Detailed operation instructions will be found in Sections II and III.

LANDING GEAR.

MAIN LANDING GEAR.

Your airplane is equipped with Cessna's Safety 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.

The nosewheel mounted in an air-oil shock strut, is linked by push-pull rods to the rudder pedals, so that it may be steered by operating the rudder pedals in the usual manner. Operating the rudder pedals moves the nosewheel through an arc of about 12 degrees and it will swivel free through an arc of up to 30 degrees, on either side of center. By using the brakes, you can pivot the airplane about the outer wing strut fitting.

On take-off, extension of the shock strut as the weight is taken off the nosewheel disengages the steering system and centers the wheel automatically.

SPEED FAIRINGS.

Speed fairings over the nose and main gear wheels, to increase the speed and enhance the appearance of your Cessna, are available as optional equipment.

To eliminate drag, the clearances between the wheels and the openings in the fairings have been held to a minimum. Mud, snow and ice accumulating in these openings will have a braking effect on the wheels; if taxiing through them is unavoidable, check the fairings and remove any accumulations before each flight.

BRAKE SYSTEM.

The hydraulic brakes on the main wheels are conventionally operated by applying toe pressure to either the pilot's or copilot's rudder pedals. Master cylinders are connected directly to the pilot's pedals; braking motion from the copilot's pedals is transmitted to the pilot's pedals by mechanical linkage. The brakes also may be set by operating the parking brake control.

PARKING BRAKE HANDLE.

The parking brake handle (figure 1-2) 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. 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 setting the brakes if desired; however, this operation is not necessary.

To release the parking brake, turn the handle clockwise ¼ turn and allow it to return to the stowed position.

INSTRUMENTS.

All flight instruments, and others which require special protection from vibration, are mounted in a shock-mounted section of the instrument panel directly in front of the pilot.

Engine indicators and the fuel and oil gages are arranged on the right side of the instrument panel, which also has provisions for various radio installations. The magnetic compass is mounted on the windshield centerstrip and the optional free air temperature indicator is incorporated in the right cabin ventilator. For accurate free air temperature readings, the ventilator should be opened slightly.

PITOT-STATIC SYSTEM.

The airspeed indicator, altimeter, and vertical speed indicator (figure 1-1) are operated by the pitot-static system. This system measures the difference between impact air pressure picked up by a pitot tube under the left wing and a static port on the left side of the fuselage, just back 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 indicator operation.

PITOT HEATER.

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 on the instrument panel.

TURN-AND-BANK INDICATOR.

The turn-and-bank indicator (figure 1-1) 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.

STALL WARNING INDICATOR.

The stall warning indicator is an electric horn controlled by a transmitter unit in the leading edge of the left wing. This system is in operation whenever the master switch is turned on. The transmitter responds to changes in the airflow over the leading edge of the wing as a stall is approached. Since the same changes in airflow occur with every stall, the unit functions regardless of attitude, altitude, speed, weight and other factors which effect stalling speeds. Thus, it will warn you of an incipient stall under all conditions. In straight-ahead and turning flight, the warning will come 5 to 10 MPH ahead of the stall.

Under safe flight conditions, the only time you may hear the warning horn will be a short beep as you land. Usually there will be no signal on a properly-executed landing because the unit makes allowance for ground effect. The unit automatically cuts out on the ground, although high surface winds may produce signals while taxiing. The unit has no silencing switch which could be left off inadvertently.

A heater can be installed as optional equipment, to remove ice from the transmitter unit. The heater element is installed with the optional pitot heater. Both the pitot and stall warning transmitter heaters are controlled by the pitot heater switch.

VACUUM SYSTEM.

The optional directional gyro and attitude gyro (figure 1-1) are vacuum operated. A suction gage (figure 1-1) is included in the vacuum system to indicate the amount of vacuum being developed by the engine-driven vacuum pump. For proper operation of the gyro instruments, suction gage indications should fall within the range of from 4.0 to 4.5 inches of mercury. An indication of 4.2 inches of mercury is considered normal.

CARBURETOR AIR TEMPERATURE GAGE.

The optional Richter carburetor air temperature system indicates the temperature of the air inside the carburetor, near the throttle butterfly.

The gage will reflect the fluctuations in internal carburetor temperatures which occur with changes in throttle and mixture settings and carburetor heat application. Without carburetor heat, it normally will read below outside air temperature, while the application of heat may bring it considerably above OAT.

The Richter carburetor air temperature system may be used as an aid in applying carburetor heat accurately, avoiding unnecessary power losses due to higher induction air temperatures and loss of ram air pressure. There are many combinations of temperature, humidity and power settings which can cause ice in the carburetor. These combinations vary so much that a specific range of temperatures cannot be defined as an icing range. However, with experience it is possible to determine the approximate limits of a potential icing range for a particular aircraft, when operating in possible icing conditions.

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, pull up on the handle on the left side of the seat and slide the seat to the most comfortable position.

NOTE

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

To make long flights more comfortable by permitting the pilot and front seat passenger to shift their positions, optional reclining front seats are available. The backs of these seats may be rotated through three positions by pulling up on the handle on the right side of the seat and leaning back or forward.

The rear seat accommodates 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.

Optional front and rear seat headrests are available, and are easily installed by inserting the headrest support rods into sockets in the top of the seat backs.

Optional seat covers of either clear plastic or heavy duty canvas are available.

HEATING AND VENTILATING SYSTEM.

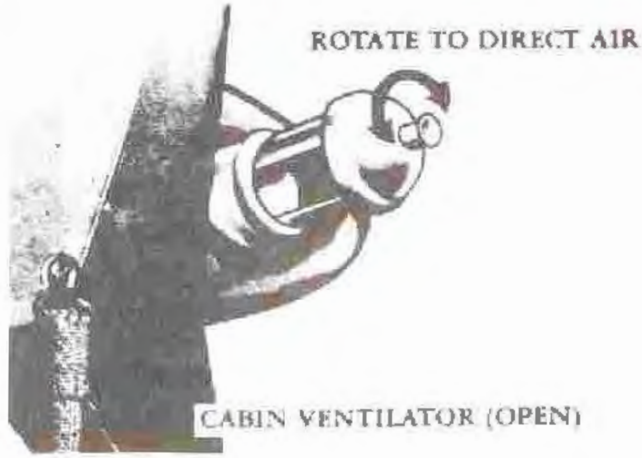
Fresh air for heating and ventilating the cabin is supplied by two sources: a cold air intake in the rear engine baffle and a manifold-type heater. Both sources are connected to a cabin heat valve from which the air is led to outlets above the rudder pedals, at each front doorpost, and to the windshield defroster outlet in the instrument panel deck just behind the left windshield.

The knob marked "CABIN AIR" regulates the volume of air, while the knob marked "CABIN HEAT" proportions the hot and cold air entering the ducts. Two defroster slide valves control the volume of air emitting from the defroster outlet.

For cabin ventilation, push the cabin air knob in. *To raise the air temperature,* pull the cabin heat knob out. *To shut off all airflow,* push the heat knob in and pull the air knob out.

NOTE

Always push the heat knob in before pulling the air knob out, to avoid overheating the heater ducts.



CABIN VENTILATOR (OPEN)

CABIN VENTILATORS.

Ventilation for the cabin area, in addition to that obtained through the heater ducts, is provided by manually-adjusted cabin ventilators. Two ventilators are installed: One on the left side of the cabin in the upper corner of the windshield, and the other in the same position on the right.

To provide a flow of air, pull the 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 airflow, rotate the ventilator tube to the position desired.

CABIN VENTILATOR (CLOSED)

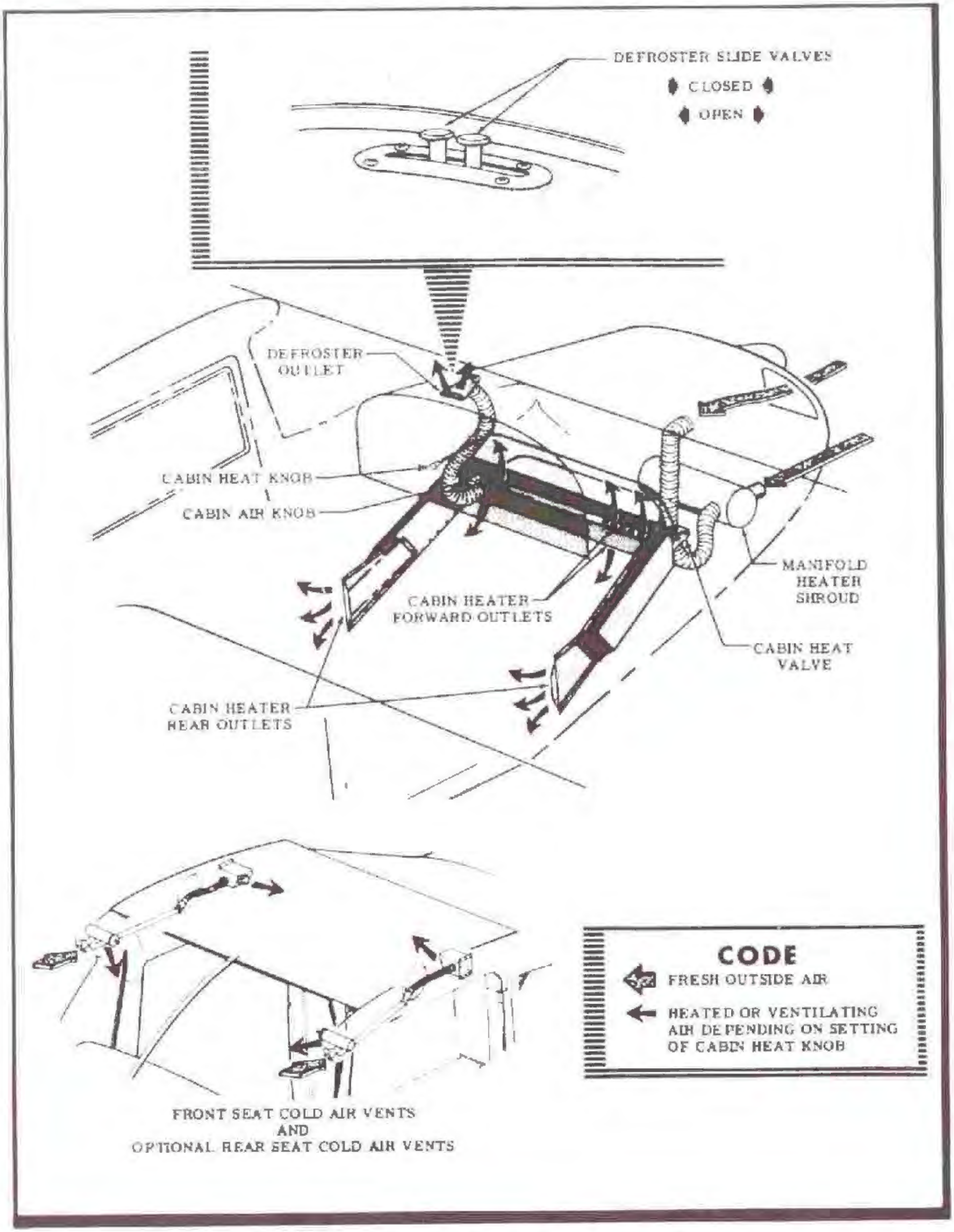


Figure 1-7. Cabin Air Temperature System

REAR SEAT VENTILATORS.

Additional cold air for the rear seat passengers is provided by optional ventilation outlets in the cabin ceiling just forward of each rear doorpost. The outlets are ball-and-socket type and may be turned to direct the flow of air as desired. The volume of air from each outlet is regulated by turning a knurled ring on the rim of the outlet.

LIGHTING EQUIPMENT.

LANDING LIGHTS.

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 takeoff and landing. During taxi, only one lamp should 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 (figure 1-2) is a three-position, push-pull switch. *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.

NAVIGATION LIGHTS.

The conventional navigation lights are controlled by the navigation lights switch (figure 1-2). The optional navigation lights flasher system uses a three-position switch. The middle detent on the switch is the steady position and all the way out is the flashing position.

ROTATING BEACON.

A rotating anti-collision beacon may be mounted on the tip of the vertical fin. In clear weather, its flashing red beam may be seen for several miles in all directions, making it particularly valuable in the high-density traffic around busy airports. It should not be used, however, when flying through clouds or overcast; its moving beam reflected from water droplets or particles in the atmosphere, particularly at night, can produce vertigo and loss of orientation.

The beacon is turned off and on by a push-pull switch (figure 1-2) on the instrument panel.

INSTRUMENT LIGHTS.

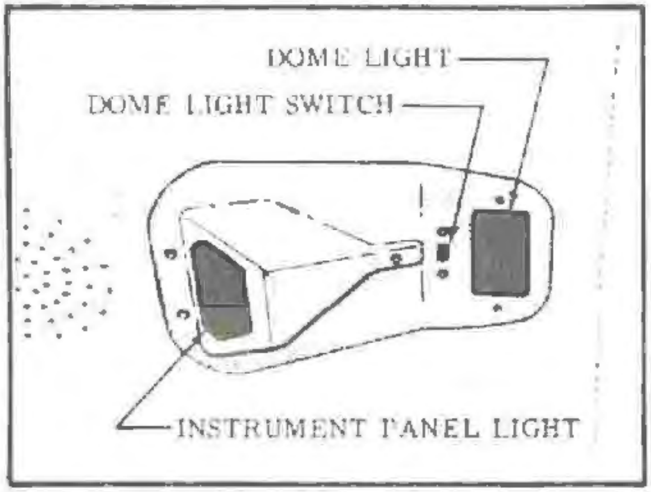
An instrument light with a red lens is mounted in the cabin ceiling. Both the instrument light and the compass light are controlled by a rheostat switch located on the bottom edge of the instrument panel. *To turn the compass and instrument lights on,* rotate the instrument light rheostat knob clockwise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

RADIO DIAL LIGHT.

A rheostat switch is provided with factory-installed radios to control your radio dial 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 lights on, rotate the radio dial light rheostat switch clockwise until the desired illumination is obtained. To turn the lights off, turn the switch counterclockwise as far as it will go.

DOME LIGHT.

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



MAP LIGHT.

An optional map light mounted just under the left cabin ventilator 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, can be used 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 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 up and aft.

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 forward and down as far at it will go, approximately 90 degrees. To unlock, rotate the handle up.

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 also locks the door.

A door stop in the front edge of each cabin door will hold the door open for easy loading of your airplane. *To engage the door stop, swing the door out to the limit of its travel and release.* The stop disengages as the door is pulled shut.

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 the cabin door 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 assembly.

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.

BAGGAGE COMPARTMENT.

The baggage compartment is located immediately aft of the rear seat. To reach the compartment 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 then can be rotated forward and down.

The baggage compartment door on the left side of the fuselage 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.

CARGO TIE-DOWN RINGS.

Six cargo tie-down rings and two tie-down slides are available as optional equipment. Two of the rings are used in conjunction with the slides and may be positioned at any point back of the front seats on the seat rails. There are provisions in the baggage compartment area for the remaining four tie-down rings. A ring is secured to the floor on both sides of the cabin just forward of the baggage door. The remaining two rings secure to the floor just forward of the baggage compartment rear curtain.

COAT HANGER HOOK.

For your convenience, a coat hanger hook has been installed in the cabin ceiling above the back of the rear seat. 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.

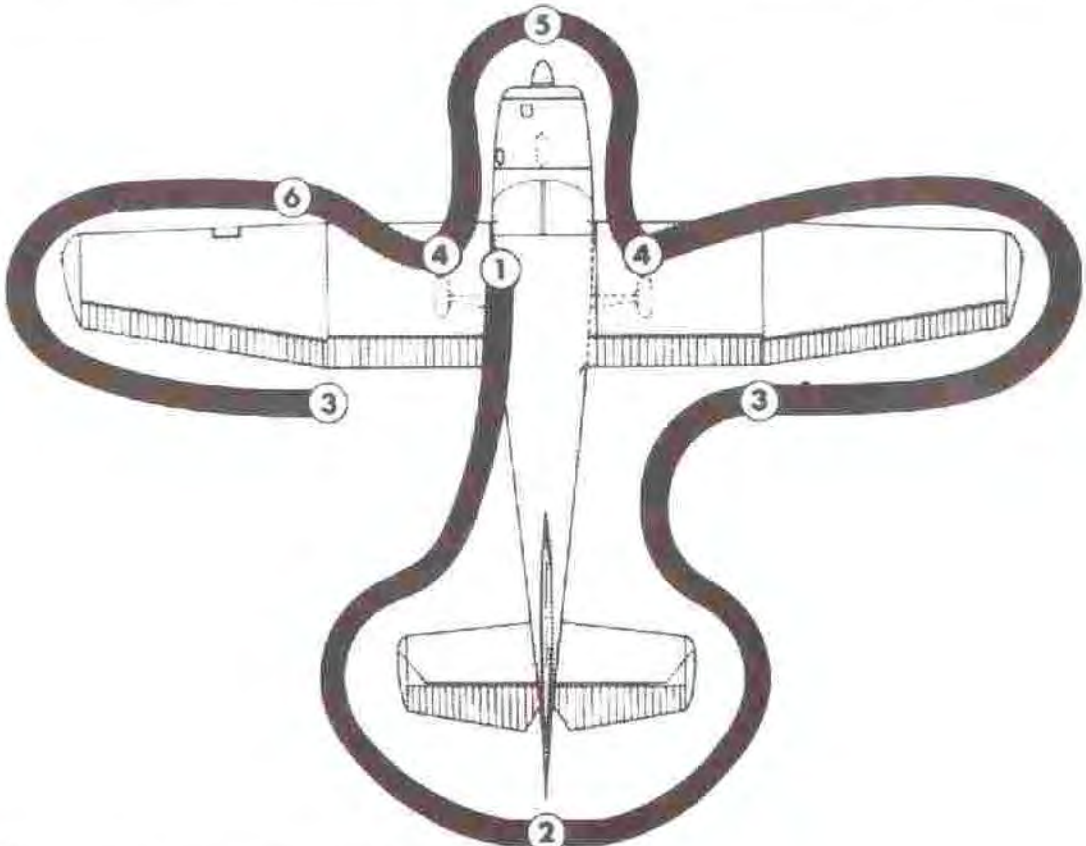
LOADING YOUR CESSNA.

There are several different ways to load your Cessna, all of which are satisfactory. However, from experience, we have found the following sequence to be most convenient under average loading conditions:

First, load your baggage in the baggage compartment.

Next, load the front seats.

Finally, load the rear seat.



1
- a. Turn on master switch and check quantity of fuel (2 gages).
- b. Make sure master and ignition switches are off.
- c. Remove control lock 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. 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.

5
- 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.

6
- a. Remove pitot tube cover, if installed.
- b. Inspect pitot tube opening for stoppage.
- c. Check fuel tank vent opening for stoppage.

Repeat steps 3 and 4.

Figure 2-1. Exterior Inspection Diagram

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 effic. ntly 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 VI.

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 figure 2-1).

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) Push cowl flaps control to full "Open" position.
(5) Turn fuel selector valve to "Both". (Take-off on less than ¼ tank is not recommended).
(6) Rotate adjustable stabilizer control wheel so that indicator is in "Take-Off" range.
(7) Rotate rudder trim control wheel approximately two turns clockwise from neutral for climb power setting (if desired).
(8) Set altimeter and clock.
(9) Test operate brakes and set parking brake.
(10) Check radio switches "Off".
(11) 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 or two strokes of the primer.
(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.

BEFORE TAKE-OFF.

(1) Recheck free and correct movement of flight controls.
(2) Recheck adjustable stabilizer control wheel setting.
(3) Recheck rudder trim control wheel setting.
(4) Recheck cowl flaps "Open".
(5) Check carburetor heat control "Off" (full in) unless extreme icing conditions prevail.
(6) Recheck propeller in low pitch (full in).
(7) Check autopilot disengaged (if installed).

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 maintain 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 6-2). 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) Cowl flaps should be "Open" for climbs in normal air temperature.
(5) Mixture should be full rich unless engine becomes rough due to rich mixture.

CRUISING.

(1) Close cowl flaps.
(2) Select cruising power setting from range charts (figure 6-3) for desired range and speed.
(3) Maximum recommended power setting for cruise is 23 inches manifold pressure and 2450 RPM.
(4) After speed has stabilized, trim airplane with adjustable stabilizer control wheel and rudder trim control wheel.
(5) 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.

(6) 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.
(4) Check autopilot disengaged before entering traffic pattern.

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.
(4) Check cowl flaps closed.
(5) Apply carburetor heat before closing throttle.
(6) Glide at 80-90 MPH with flaps up.
(7) Lower flaps as desired below 100 MPH.
(8) Maintain 70-80 MPH with flaps extended.
(9) 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) Open cowl flaps.
(2) Raise wing flaps after completion of landing roll.
(3) Carburetor heat "Off".
(4) **Stop engine by pulling out mixture control knob to "Full Lean." Do not open throttle as engine stops since this actuates the accelerator pump.**
(5) **After engine stops, turn ignition switch "Off."**
(6) **Turn master switch "Off."** ***Be Sure*** **— otherwise the battery may run down overnight.**
(7) **Set parking brakes, if required.**

> **NOTE**
>
> A prolonged sideslip in the direction of the fuel tank in use or a prolonged steep descent can cause engine fuel starvation if the fuel quantity is low, since the fuel tank outlet may become uncovered in these attitudes.
>
> The quickest recovery of fuel flow to the engine can be accomplished in the following manner:
>
> (1) Level the aircraft.
> (2) Place fuel selector valve on "BOTH."
> (3) Push mixture control to Full Rich.
> (4) Push throttle full forward.
> (5) Apply full carburetor heat.
>
> Engine operation should resume within 15 seconds if this procedure is executed promptly.

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 operated 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 sediment. Pull the fuel strainer drain knob (figure 1-2) 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 open 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 in Section VI. These ranges are based on flight test data with lean mixture

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 chart, (figure 6-2), be consulted to determine the distance required for take-off. *Do not take off at any time with 30 or 40 degree wing flaps.*

REMEMBER

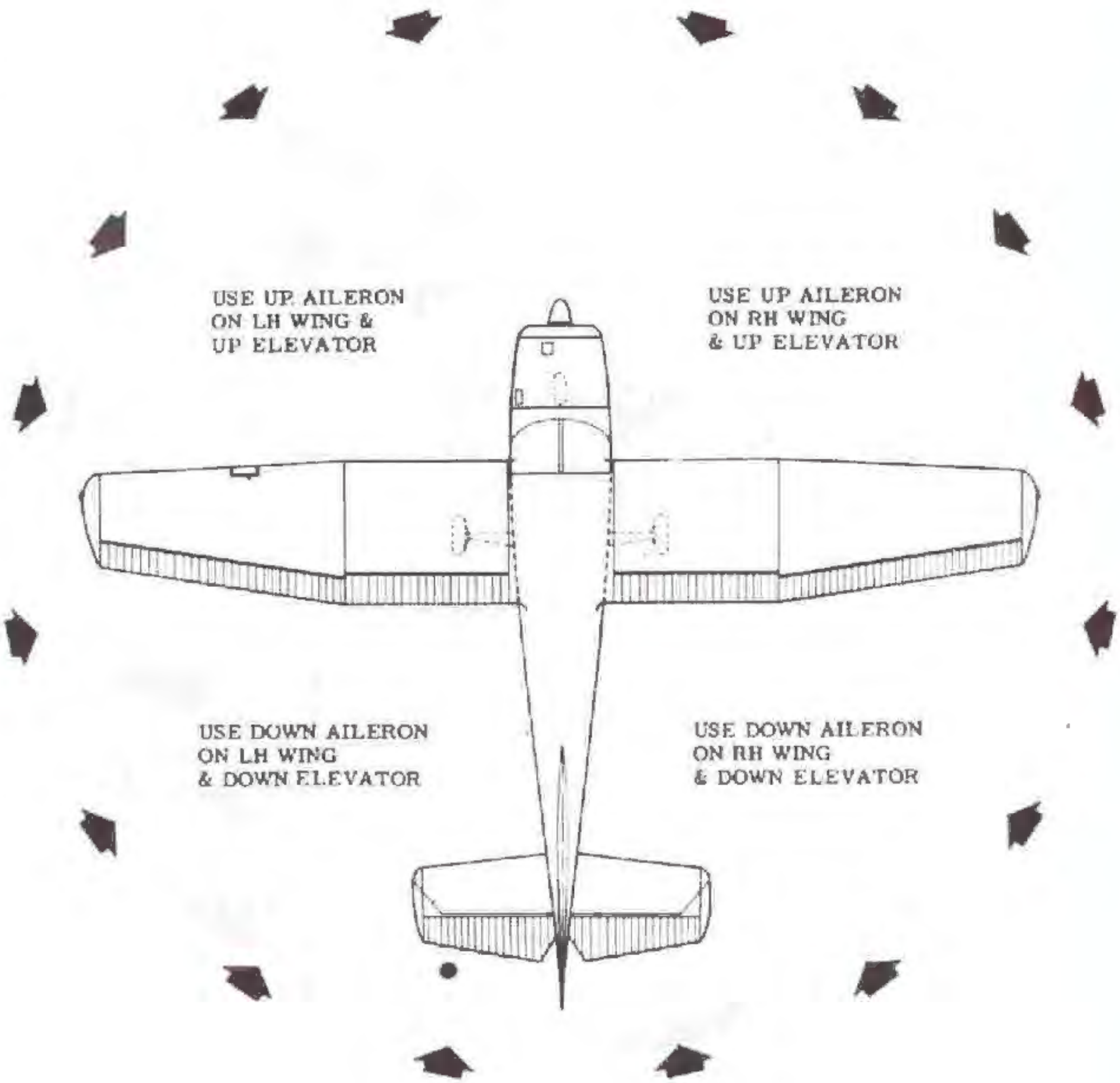
Don't under marginal conditions, leave wing flaps down long enough that you are losing both climb and airspeed.

Don't raise wing flaps with airspeed below "off-flaps" stalling speed. (See stalling speed chart, figure 3-1.)

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



NOTE

Strong quartering tail winds require caution. Avoid sudden bursts of the throttle and sharp braking when the airplane is in this attitude. Use the steerable nose wheel and rudder to maintain direction.

WIND DIRECTION

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 degrees wing flaps are used for take-off, they should be left down 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 VI.

CRUISE.

Cruising charts are presented in Section VI. 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 of 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 with the Skylane at full throttle and 2450 RPM the following speeds are obtainable:

%BHP	*Altitude*	*True Airspeed*
75	6400	162
70	8000	160
65	10,000	158

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 3-1, 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.

TACTAIR AUTOMATIC FLIGHT CONTROLS.

Although it is possible to take off and land with the Tactair units engaged, merely by overpowering them, you will find that control forces are greater and your feel of the airplane

STALLING SPEEDS

POWER OFF, MPH T.I.A.S.

Gross Weight 2650 lbs.	ANGLE OF BANK		
CONDITION	0°	30°	60°
Flaps Up	62	67	88
Flaps Down 20°	57	61	81
Flaps Down 40°	56	60	79

Figure 3-1. Stall Chart

is diminished. *Before taking off or landing make sure the master valve knob is off (pushed in).*

Since it is entirely pneumatic and operated by the engine-driven vacuum pump, the Tactair system needs no warm-up period before engagement. It may be used at any altitude up to 20,000 feet; above 20,000 feet, atmospheric pressure is insufficient to supply the necessary control forces.

Before engaging the system, trim the airplane straight and level and center the knobs on the control head. Then pull out the master valve control knob. If the airplane is not trimmed, or the knobs are not centered, as soon as the unit is engaged the airplane's attitude will change. The change will not be abrupt and no excessive loads will be imposed on the airframe, but operation will be smoother if both airplane and control head knobs are trimmed before engagement.

T-2 ROLL STABILIZER AND HEADING LOCK OPERATION.

To operate the T-2 unit, center the trim knob, cage and set the directional gyro, set the course selector card, and pull on the master valve knob. With the roll trim knob centered, the unit will immediately level the wings from any attitude within the limits of the gyro. The trim knob may be rotated to obtain up to 10 degrees of bank. Turns to a new heading may be made merely by turning the course selector knob to the new heading. If the new heading is within 80 degrees of the former heading, the unit will make a one-degree-per-second turn to the new heading. (If the new heading is more than 80 degrees from the original, the autopilot will turn to the reciprocal of the new heading.) If the airplane hunts or oscillates, adjust the roll trim knob until the selector card and directional gyro are aligned. The airplane may be slightly wing-low; it is in this manner that the unit trims out torque effects.

Turns may be made by overriding the stabilizer unit. When you release the controls, the airplane will return to the course selector heading if it is within 80 degrees, or to its reciprocal.

Caging the directional gyro eliminates the heading lock feature; however, the relation of the two compass cards will send a continuous signal to the control head. If the cards are aligned, the signal will be balanced and the wing will remain level. If the cards are not aligned, a continuous bank signal will be sent, attempting to match the compass cards. As soon as the gyro is uncaged, the heading lock will function as usual.

T-3 AUTOPILOT OPERATION.

To engage the T-3 autopilot, trim the airplane straight and level, hands-off. Set the autopilot pitch and turn knobs to center and the course selector card to coincide with the heading on the directional gyro. Then pull on the master valve knob.

The roll and heading lock functions of the T-3 unit are identical to the T-2, except that the heading lock knob on the control head must be pulled on to engage the heading lock. In addition, the turn knob on the control head may be used to make turns up to 30 degrees of bank. Displacing the turn knob automatically disengages the heading lock; after the turn knob is returned to center, the heading lock may be engaged once more and the airplane will return to the heading set on the course selector, or to its reciprocal, whichever is closer.

The tab under the turn knob can be moved left or right to change the roll zero point up to two degrees, if necessary, to trim out torque effects and prevent hunting. Move the tab until the course selector card and directional gyro card are aligned. Changes in power settings may require readjustment of the tab.

The pitch control knob on the right side of the control head may be set to maintain a nose-up or nose-down attitude up to approximately 10 degrees down or 15 degrees up. For best results, the stabilizer should be adjusted with changes in attitude, power or center of gravity, just as you would in manual-control flight. The pitch control unit can overcome an out-of-trim condition, but it may produce oscillations in doing so since there is no automatic trim tab control. Your ride will be smoother if you adjust the trim manually.

EMERGENCY PROCEDURES.

If a malfunction should occur in any of the autopilot units, it can be overridden merely with pressure on the normal flight controls and the entire autopilot may be disengaged by pushing in the master control valve knob. Leaks in the system will produce only a loss of suction. If the suction gage reading falls below 3.5 in. Hg, push in the master control knob to disengage the autopilot. All the available suction then will be directed to the instruments.

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 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 3-6 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.

When operating in sub-zero temperatures, avoid using partial carburetor heat. Partial heat may raise the carburetor air temperature to the 32-degree to 80-degree range where icing is critical under certain atmospheric conditions.

For continuous operation in temperatures consistently below 20° F the Cessna winterization kit should be installed. The kit consists of two cowl opening covers, an intake manifold cross-over tube cover and a carburetor air intake restrictor cover. Installation of these components will greatly improve engine operation. Winterization kits are available at your dealer for a nominal charge.

OIL DILUTION SYSTEM.

If your airplane is equipped with an oil dilution system, and very low temperatures are expected, dilute the oil before stopping the engine. Determine the dilution time required for the anticipated temperature, from the Oil Dilution Table. With the engine operating at 1,000 rpm, hold down the oil dilution switch button the necessary time. Fuel will flow into the oil pump at the rate of 1 quart every 90 seconds. If more than four quarts of fuel appears necessary to dilute the oil for the anticipated temperature, check the oil level before starting to dilute. With a full sump, only four quarts may be added without risk of overflow and its attendant fire hazard. To make room for the additional fuel some oil must be drained before dilution. The total volume of fuel and oil must not exceed 16 quarts.

During the dilution period, watch the oil pressure closely. A slight, gradual pressure drop is to be expected as the oil is thinned. Stop the engine, however, if any sharp fluctuation in pressure is observed; it may be caused by an oil screen clogged with sludge washed down by the fuel.

NOTE

When the dilution system is used for the first time each season, the oil should be changed and the oil screens cleaned to remove sludge accumulations washed down by the fuel. Use the full dilution period, drain the oil, clean the screens, refill with fresh oil and redilute as required for the anticipated temperature before the engine has cooled completely.

On starting and warm-up after diluting the oil, again watch the oil pressure closely for an indication of sludge blocking the screens. If the full dilution time was used, starting with a full sump, run the engine long enough to evaporate some of the fuel and lower the sump level before take-off. Otherwise, the sump may overflow when the airplane is nosed up for climb.

OIL DILUTION TABLE

	TEMPERATURE		
	0° F	−10° F	−20° F
Dilution Time..........	1½ min.	3¾ min.	6 min.
Fuel Added............	1 qt.	2½ qt.	4 qt.

NOTE: *Maximum fuel and oil in sump for take-off is 13 quarts.*

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 duration of operation shown in figure 3-3.

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

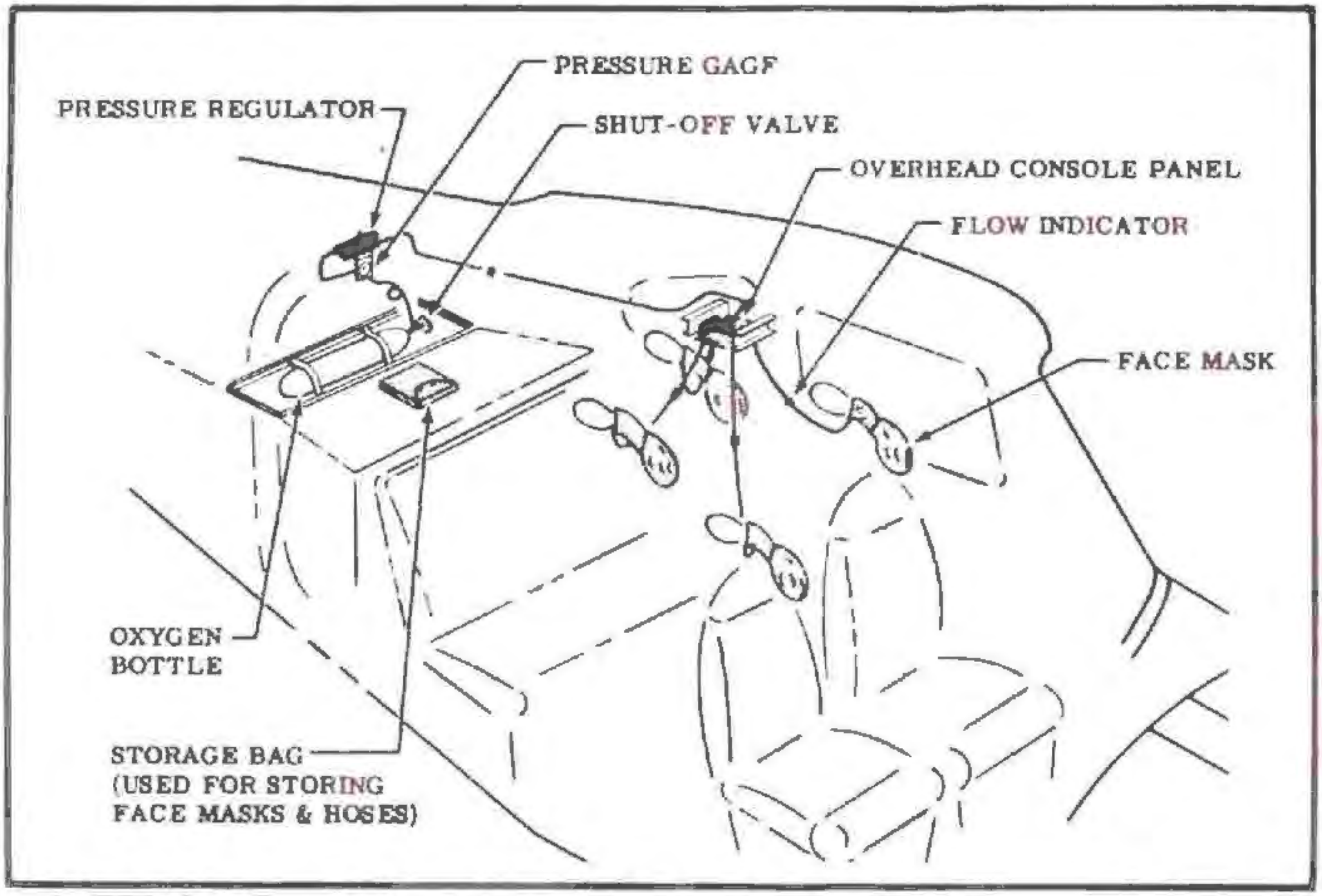


Figure 3-2. Oxygen System Diagram

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 cylinder 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 3-3).

OXYGEN REGULATOR.

The oxygen regulator, located behind 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

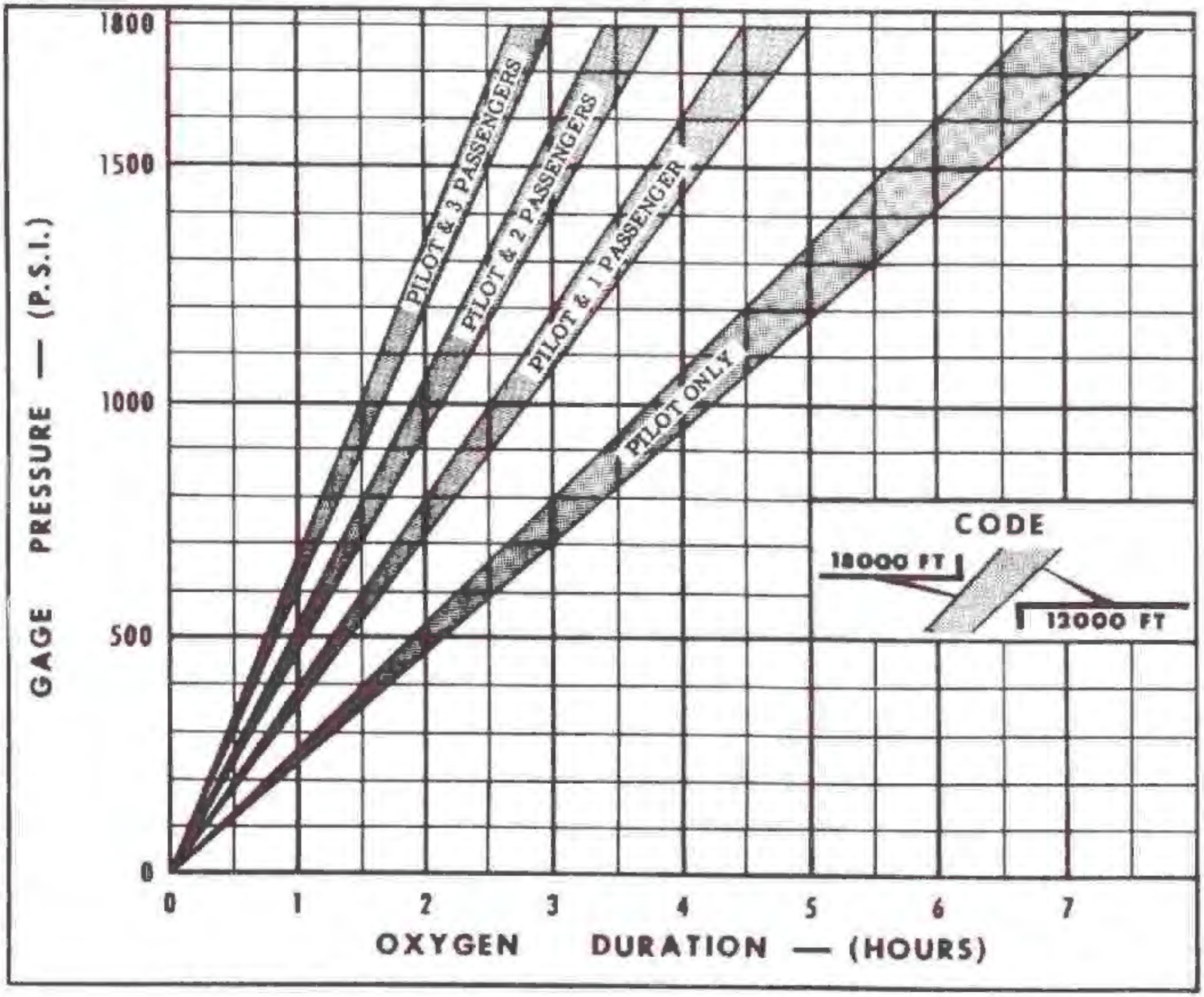


Figure 3-3. Oxygen Duration Chart

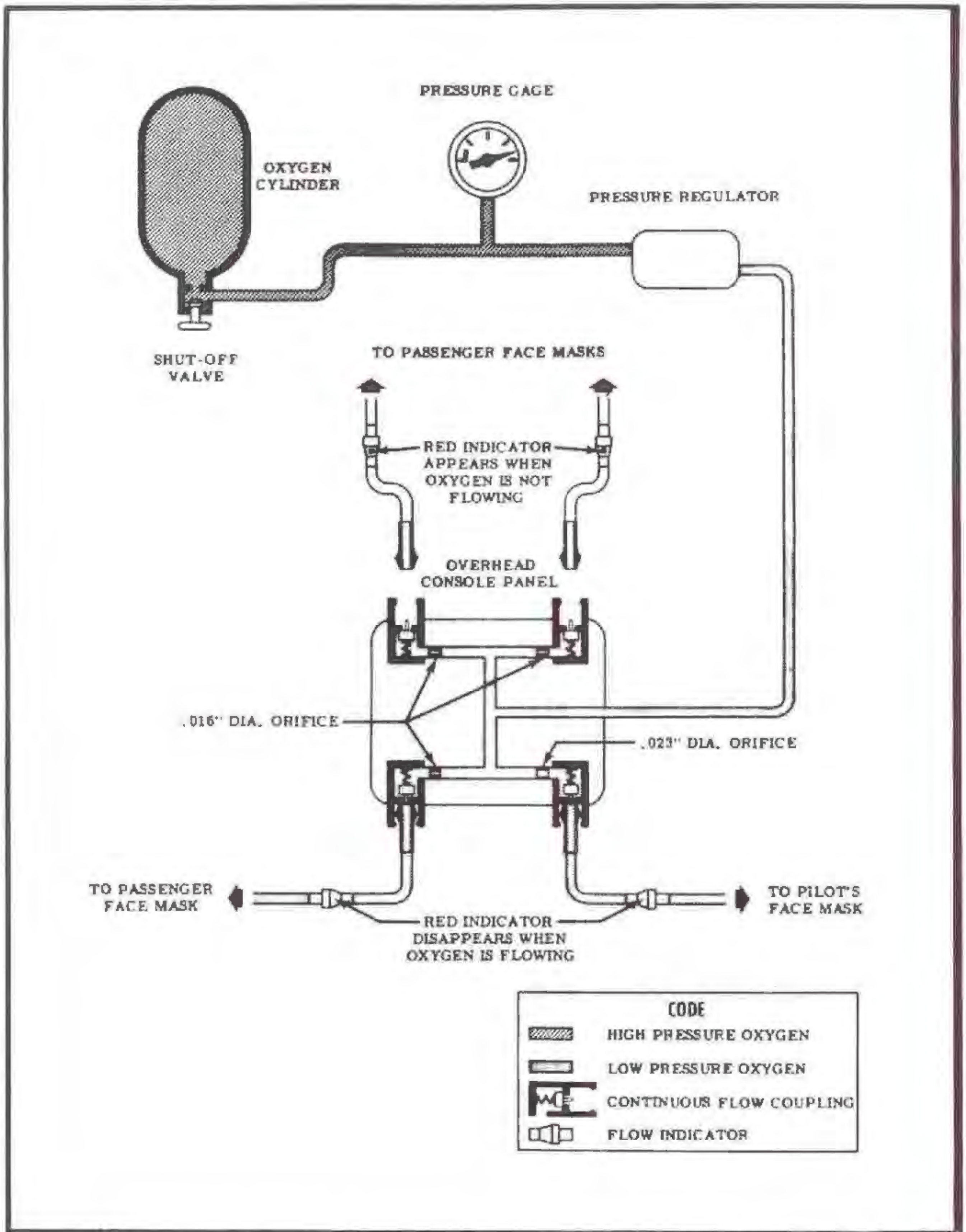


Figure 3-4. Oxygen System Schematic

prevents entry of foreign particles.

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.

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.

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.

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 FAA 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. 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 FAA approved markings, placards and check lists in the airplane. If there is any information in this section which contradicts the FAA 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 .... 160 mph
(Level flight or climb)

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)

FUEL QUANTITY INDICATORS

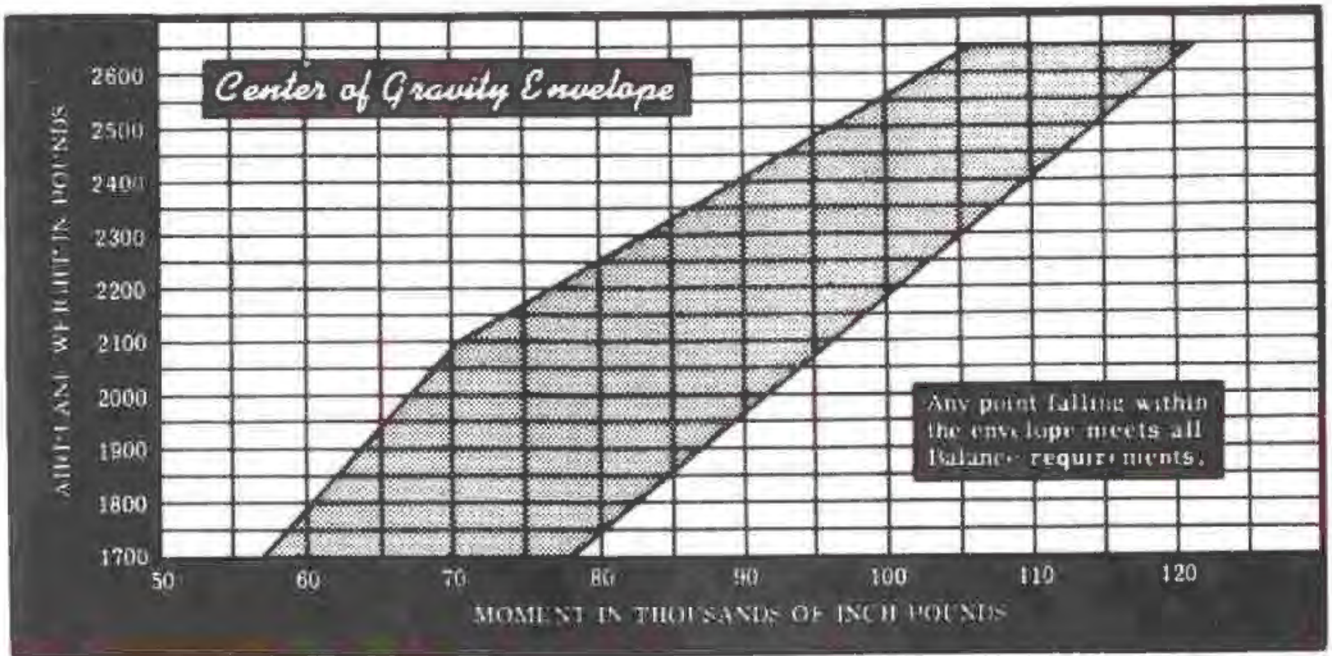
Empty (5 gallons each tank unusable in normal flight maneuvers)..................................E (red line)
*Not recommended for take-off.........................E to ¼ (red arc)

*This fuel available for all normal operations.

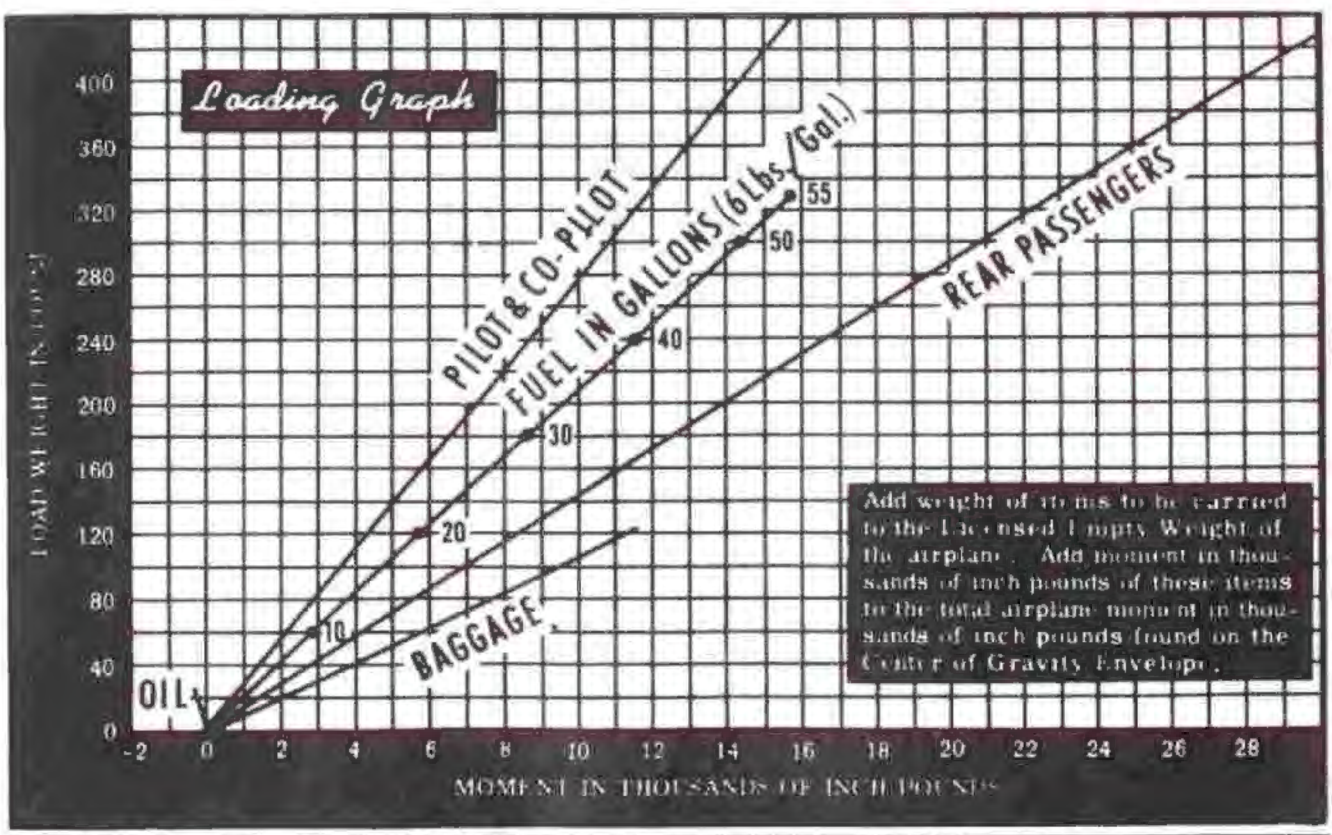
WEIGHT AND BALANCE.

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


Center of Gravity Envelope
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
50
60
70
80
90
100
110
120
MOMENT IN THOUSANDS OF INCH POUNDS
Any point falling within the envelope meets all Balance requirements.

Cessna


Loading Graph
400
360
320
280
240
200
160
120
80
40
0
-2
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
MOMENT IN THOUSANDS OF INCH POUNDS
PILOT & CO-PILOT
FUEL IN GALLONS (6 Lbs./Gal.)
10
20
30
40
50
55
REAR PASSENGERS
BAGGAGE
OIL
Add weight of items to be carried to the Licensed Empty Weight of the airplane. Add moment in thousands of inch pounds of these items to the total airplane moment in thousands of inch pounds found on the Center of Gravity Envelope.

the original equipment affecting weight empty c.g. are required by the FAA 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 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.

Section V

care of the airplane — owner's responsibilities

IF YOUR AIRPLANE is to retain that new plane performance, stamina, and dependability, certain inspection and maintenance requirements 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 a tow-bar attached to the nosewheel. 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 beside the fuselage to raise the nosewheel off the ground. With the nosewheel clear of the ground the airplane can be turned readily in any direction by pivoting it about the main gear. *Do not push down on the empennage by the tip of the elevator; nor 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.

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 ropes or chains (700 pounds tensile strength) to the wing tie-down fittings at the upper end of each wing strut. Secure the opposite ends of these ropes or chains to tie-down rings in the ground.

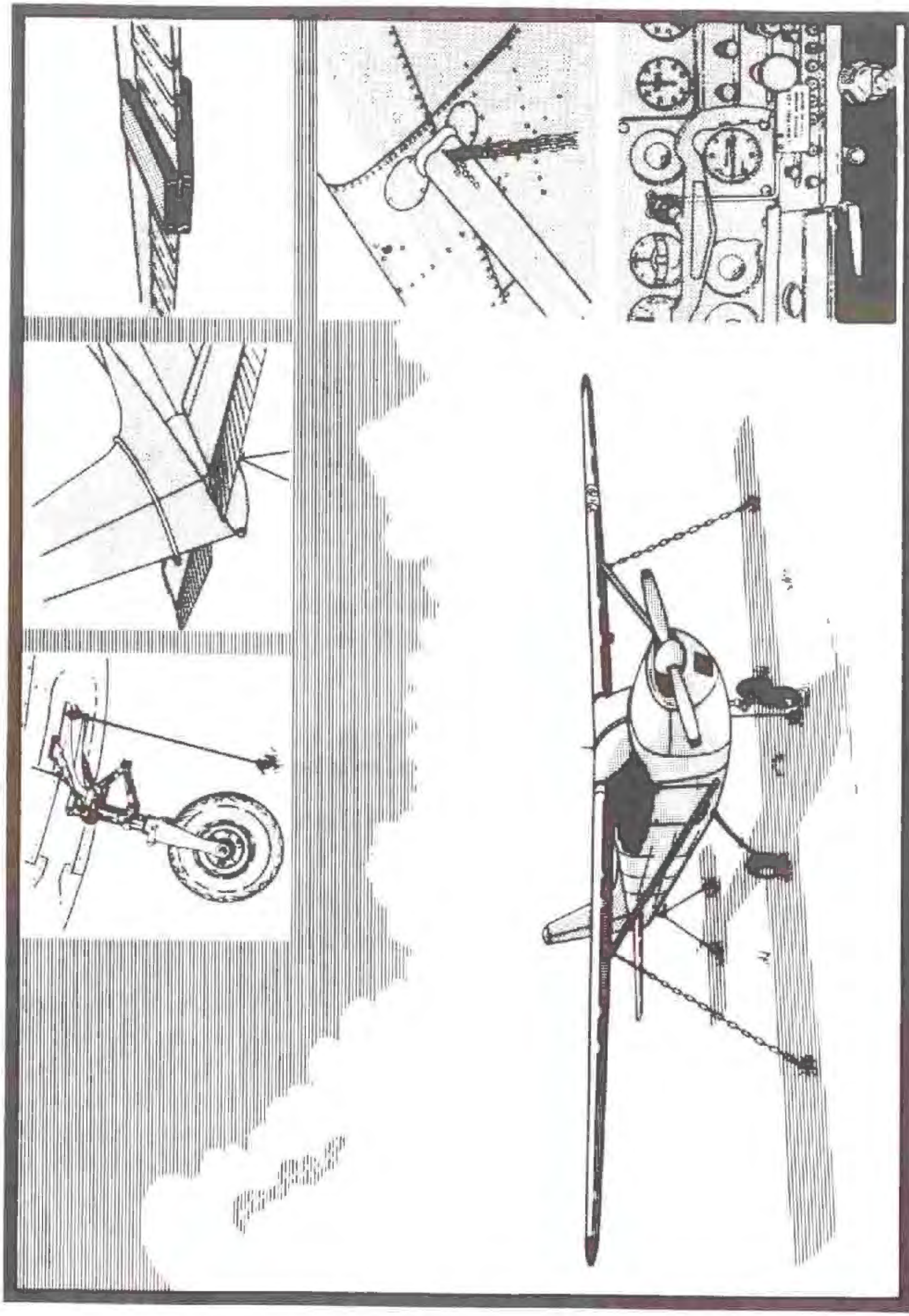


Figure 5–1. Airplane Tie-Down Procedure

(2) Tie a rope or chain through the nose gear tie-down ring and secure the opposite end to a tie-down ring in the ground.
(3) Securely tie the middle of a length of rope to the ring at the tail. Pull each end of the rope away at a 45° angle and secure it to tie-down rings positioned on each side of the tail.
(4) Install surface control locks between the flap and aileron of each wing.
(5) Install the control lock in the control wheel shaft.
(6) Install a surface control lock over the fin and rudder.

STORAGE.

The all-metal construction of your Cessna makes outside storage of it practical. However, inside storage of the plane will increase its life just as inside storage does for your car. If your airplane must remain inactive for a time, cleanliness is probably the most important consideration — whether it is stored inside or outside. A small investment in cleanliness will repay you many times, not only in keeping your airplane looking like new but in keeping it new. A later paragraph in this section covers the subject in greater detail.

Do not neglect the engine when storing the airplane. Turn the propeller over by hand or have it turned over every few days to keep the engine bearings, cylinder walls and internal parts lubricated. If storage is to be for an extended period, and turning the propeller is impractical, see your Cessna Dealer for suggestions on preserving the engine. If the airplane is stored outside, leave the propeller in a horizontal position to prevent water seepage into the hub mechanism. Full fuel tanks will help prevent condensation and increase fuel tank life.

Regular use helps keep airplanes 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.

Your Cessna Dealer has special hoisting rings and jacking point brackets to jack your Cessna properly. Do not use the brake casting as a jacking point.

WHEEL ALIGNMENT.

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 Cessna Dealer for realignment.

PLASTIC WINDSHIELD AND WINDOWS.

The windshield is a single piece, full floating, "free-blown" unit of "Longlife" plastic. To clean the plastic windshield and windows, wash with plenty of soap and water, using the palm of the hand to feel and dislodge any caked dirt or mud. A soft cloth, sponge, or chamois may be used, but only as a means of carrying water to the plastic. Dry with a clean, damp chamois. Rubbing with a dry cloth builds up an electrostatic charge on the plastic that attracts dust particles from the air. Wiping with a damp chamois will remove this charge as well as the dust.

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 deicing fluids, lacquer thinner or glass window cleaning spray as they will soften the plastic and cause crazing.

After cleaning, if no great amount of scratching is visible, wax the surface with a good grade of commercial wax. Waxing will fill in minor scratches and help avoid further scratching. Apply the wax in a thin, even coat and bring it to a high polish by rubbing lightly with a clean, dry, soft flannel cloth.

Do not use a canvas cover to protect the windshield when the airplane is tied out, unless freezing rain or snow is expected. Canvas covers may cause crazing.

ALUMINUM SURFACES.

The clad aluminum used for the external parts of Cessna airplanes needs a minimum of 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 mixture of 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. After cleaning, and periodically thereafter, waxing with a good automotive wax will preserve the bright appearance and retard corrosion. Regular waxing is especially recommended for airplanes operated in salt water areas as a protection against corrosion.

PAINTED SURFACES.

With only a minimum of care, the lacquered exterior of your Cessna will retain its brilliant gloss and rich color for many years. The lacquer should not be waxed or polished for approximately 30 days after it is applied, so that any solvent remaining in the paint may escape. After this initial curing period, regular waxing with a good automotive wax will help preserve the lacquer's luster and will afford a measure of protection from damage and corrosion, especially in salt water areas.

Spilled fluids containing dyes, such as fuel and hydraulic oil if accidentally spilled on the surface should be flushed away at once to avoid a permanent stain. Battery electrolyte must be flushed off at once, and the area neutralized with an alkali such as baking soda solution, followed by a thorough rinse with clear water.

METAL PROPELLER.

Little maintenance is required to keep the propeller in airworthy condition. The blades should be thoroughly inspected at least every 25 hours, for dents, nicks and scratches. When small dents and nicks appear, they should be carefully dished and shallowed out using a fine-cut file, sandpaper and crocus cloth. An occasional wiping of the metal propeller with an oily cloth will clean off grass and bug stains and help prevent corrosion of the propeller in salt water areas.

INTERIOR CARE.

To remove dust and loose dirt from the upholstery and carpet, clean the interior regularly with a vacuum cleaner.

Blot up any spilled liquid promptly, with cleansing tissue or rags. Don't pat the spot — press the blotting material firmly and hold it for several seconds. Continue blotting until no more liquid is taken up. Scrape off sticky materials with a dull knife, then spot clean the area.

Oily spots may be cleaned with household spot removers, used sparingly. Before using any solvent read the instructions on the container and test it on an obscure place in the fabric to be cleaned. Never saturate the fabric with a volatile solvent; it may damage the padding and backing materials.

Soiled upholstery and carpet may be cleaned with a foam-type detergent, used according to the manufacturer's instructions. Keep the foam as dry as possible and remove it with a vacuum cleaner, to minimize wetting the fabric.

The plastic trim, headliner, instrument panel and control knobs, need only be wiped off with a damp cloth. Never use a volatile solvent on plastic.

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 (Form ACA 1362).
(3) Airplane Radio Station License (if transmitter installed).
(4) Airplane Log Book.
(5) Engine Log Book.

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

(1) Weight and Balance Report or 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, Engine Number and

Key Numbers. (Duplicate keys are available through your Cessna dealer).

Most of the requirements listed under items A and B are requirements of the United States Civil Air Regulations. Since the requirements of other nations may differ from this list, owners of exported airplanes should check with their own aviation officials to determine their individual requirements.

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 a no-charge 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 on it. This will permit him to check it over and to make any 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.

Civil Air Regulations require all airplanes to have a periodic (annual) inspection as required by the administrator, made by a person designated by the administrator, and in addition, 100 hour periodic inspections made by an "appropriately rated mechanic" 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 Cessna 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 require modification or repairs will be brought to your attention by the Dealer and quotations or charges will be made accordingly. The inspection charge does not include the oil required for the oil change.

Every effort is made to attract the best mechanics in each community to Cessna service facilities. Many 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 when you have your Cessna inspected and serviced by a Cessna Dealers' mechanic the work will be complete and done in accordance with the latest approved methods.

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.

LUBRICATION AND SERVICING.

Specific lubrication and servicing information is presented in the Servicing Diagram, figure 5-2. In addition, all pulleys, control surface hinge bearings, bellcrank clevis bolts, flap handle, brake pedal pivots, rudder pedal crossbars, shimmy dampener pivots, door hinges and latches, Bowden controls (with the exception of their friction locking devices), and the throttle and control rod universals should be lubricated every 1000 hours or oftener, with SAE 20 general-purpose oil. Do not lubricate friction locks.

Generally, roller chains (aileron, stabilizer wheel and stabilizer actuator) and control cables collect dust, sand and grit if they are greased or oiled. Except under seacoast conditions, chains and cables should be merely wiped clean occasionally with a dry cloth.

NOSE GEAR SHOCK STRUT SERVICING.

The nose gear shock strut should be kept clean, filled with fluid and correctly inflated. The exposed portion of the strut piston, particularly, should be wiped off with a cloth moistened in hydraulic fluid, to remove dust and grit which may cut the O-ring seals in the strut barrel.

Inflation of the nose strut should be checked whenever tire pressures are checked. The fluid level should be checked on periodic inspections, and oftener if there is evidence of leakage on the piston or around the filler valve. If the leakage is appreciable or persistent, the strut should be serviced and repaired as necessary by your Cessna Dealer.

To check the strut inflation, jack the nose or lower the tail until the strut is fully extended and the wheel is clear of the ground. Remove the cap on the filler valve and check the pressure with a tire gage, adding or removing air as necessary to obtain 35 psi. Air may be bled out by depressing the stem of the valve core.

Use the following procedure for checking the strut fluid level:

(1) Working through the cowl access door (if necessary, disconnect left cowl flap from control linkage and work through cowl flap opening in lower cowl), remove the valve cap and depress the valve core stem to release all air pressure.
(2) Using a ¾-inch box end or deep socket wrench, unscrew the filler valve and remove it.
(3) Completely compress the strut, so the stops contact the outer barrel. The fluid level should be even with the bottom of the valve hole. If it is not, add MIL-H-5606 (red) hydraulic fluid.
(4) Completely extend the strut and replace the filler valve.
(5) With the strut fully extended and the wheel clear of the ground, inflate the strut to 35 psi. Replace the valve cap.

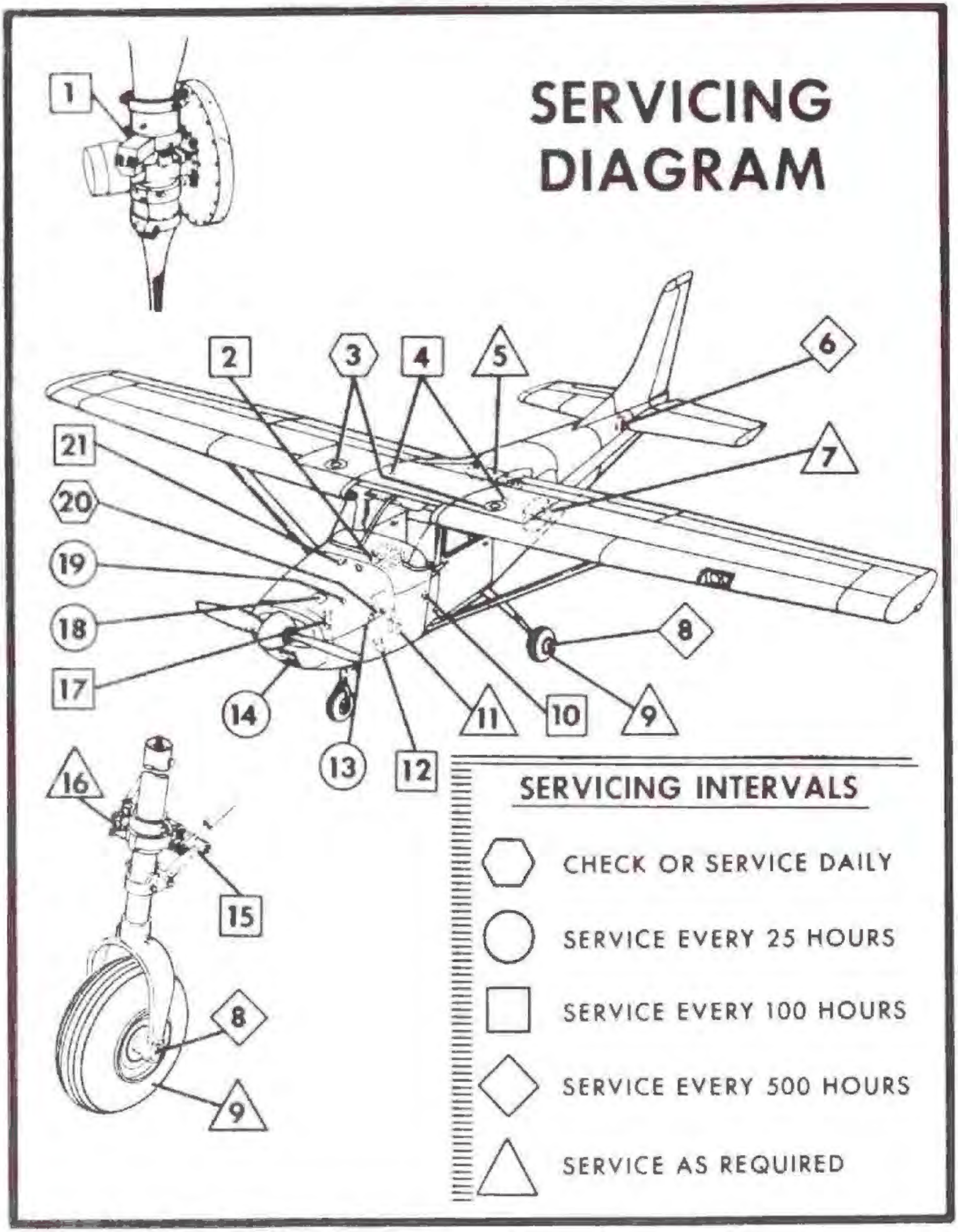


Figure 5-2 (Sheet 1 of 4).

SERVICING PROCEDURES

DAILY

FUEL TANK FILLERS ⟨3⟩ — Service after each flight with 80 octane (minimum) aviation grade fuel. Tank capacity is 32.5 gallons each. Keep full to retard condensation in fuel tanks.

OIL DIPSTICK ⟨20⟩ — Check oil level before each flight. Do not operate on less than 9 quarts and fill if extended flight is planned. The oil capacity is 12 quarts (13 quarts capacity if optional oil filter is installed).

25 HOURS

OIL SUMP DRAIN (13) — Cut safety and loosen drain plug but do not remove. Oil will drain through plug fitting. Provide suitable drain trough and container to keep oil off nose gear tire and fairing. Tighten drain plug and re-safety. Drain every 25 hours.

CARBURETOR AIR FILTER (14) — Service every 25 hours or oftener when operating in dusty conditions. Under extremely dusty conditions, daily maintenance of air filter is recommended. Service filter in accordance with instructions stamped on it.

OIL FILLER (18) — Use aircraft grade engine oil, SAE 30 below 40° F and SAE 50 above 40° F.

OIL PRESSURE SCREEN (19) — At each oil change, remove and clean screen (wash in Stoddard solvent).

100 HOURS

PROPELLER [1] — Grease Hartzell propeller every 100 hours. To prevent entrapping air and high pressures, remove grease fitting adjacent to fitting being greased. Fill each fitting until grease oozes from adjacent fitting hole. Add equal amounts of grease at each clamp to retain propeller balance. Refer to Cessna Single-Engine Service Manual or see your Cessna Dealer for a list of approved greases for

(Continued on next page)

Figure 5-2 (Sheet 2 of 4).

Hartzell propellers. In McCauley propeller (if installed), mechanism is sealed and requires no lubrication between overhauls.

GYRO INSTRUMENT AIR FILTERS [2] — Replace if erratic or sluggish instrument responses are noted with normal suction gage readings.

FUEL TANK SUMP DRAIN PLUGS [4] — Remove drain plugs, drain off water and sediment, and replace plugs. Safety drain plugs to wing structure.

FUEL LINE DRAIN PLUG [10] — Remove plug, drain off water and sediment, and reinstall plug. Safety plug to fuselage structure.

OIL FILTER [12] — Replace either of two optional oil filters whenever oil on dipstick appears dirty. The maximum replacement interval is 100 hours, under average conditions. Use either FRAM PB55 or WINSLOW 1A0235 replacement filters.

NOSE GEAR TORQUE LINKS [15] — Lubricate through fittings with MIL-L-7711 grease.

FUEL STRAINER [17] — Drain approximately two ounces of fuel to remove water and sediment. Disassemble and clean screen and bowl at 100 hours.

VACUUM PUMP OIL SEPARATOR AND SUCTION RELIEF VALVE [21] — Remove separator, wash with Stoddard solvent, dry with compressed air and reinstall. Check suction relief valve screen for dirt or obstructions if suction gage readings appear high. Remove screen and clean with compressed air or solvent and reinstall.

500 HOURS

ADJUSTABLE STABILIZER JACKSCREWS ⟨6⟩ — Disconnect rubber boot, grease actuator threads with MIL-L-7711 grease and reinstall boot. Operate stabilizer system through several cycles to insure proper operation.

(Continued on next page)

Figure 5-2 (Sheet 3 of 4).

WHEEL BEARINGS ⟨8⟩ — Repack with MIL-L-3545 wheel bearing grease at least every 500 hours, oftener if more than the usual amount of water, mud, ice or snow is encountered.

AS REQUIRED

OXYGEN CYLINDER △5 — Check pressure for anticipated requirements before take-off. Refill cylinder with aviators breathing oxygen (Fed. Spec. No. BB-O-925) whenever pressure drops below 300 psi. Maximum pressure, 1800 psi.

BATTERY △7 — Check level of electrolyte at least every 30 days, oftener in hot weather. Maintain level by adding distilled water. DO NOT overfill. Immediately neutralize spilled electrolyte with baking soda solution, then flush with water. Keep battery clean and connections tight. Neutralize corrosion deposits with baking soda solution, then rinse thoroughly.

TIRES △9 — Maintain 29 psi pressure on nosewheel and 28 psi on main wheels. Inflate tires with needle stowed in map compartment, following instructions on needle container. Remove oil and grease from tires with soap and water; periodically inspect them for cuts, bruises and wear.

BRAKE MASTER CYLINDERS △11 — Fill with MIL-H-5606 hydraulic fluid (red). Filling with a pressure pot connected to wheel cylinders bleeder ports is preferable but fluid may be added through the plugs in top of master cylinders.

SHIMMY DAMPENER △16 — Check fluid level at least every 25 hours. When filling shimmy dampener, turn nose wheel as far as it will go to the right to eliminate possibility of entrapping air behind the piston within the dampener. Fill with MIL-H-5606 hydraulic fluid through plug on top of shimmy dampener barrel.

Figure 5-2 (Sheet 4 of 4).

DEALER FOLLOW-UP SYSTEM

Your Cessna Dealer has an owner follow-up system to notify you when he receives information that applies to your Cessna. In addition, if you wish, you may choose to receive similar notification directly from the Cessna Service Department. A subscription card is supplied to you in your airplane file for your use, should you choose to request this service. Your Cessna Dealer will be glad to supply you with details concerning these follow-up programs, and stands ready through his Service Department to supply you with fast, efficient, low cost service.

Section VI

operational data

The operational data shown on the following pages are compiled from actual tests with airplane and engine in good condition and using average piloting technique and 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 6-1. Airspeed Correction Table

TAKE - OFF DATA

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

GROSS WEIGHT LBS.	HEAD WIND MPH	AT SEA LEVEL & 59 F.		AT 2500 FT. & 50 F.		AT 5000 FT. & 41 F.		AT 7500 FT. & 32 F.	
		GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	TO CLEAR 50' OBSTACLE	GROUND RUN	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	260	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.			AT 5000 FT. & 41°F.			AT 10000 FT. & 23°F.			AT 15000 FT. & 5 F.			AT 20000 FT. & -12°F.		
	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	GAL. OF FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	From SL FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	From SL FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	From SL FUEL USED	BEST CLIMB IAS MPH	RATE OF CLIMB FT/MIN	From SL FUEL USED
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 6-2. Take-Off and Climb Chart

SKYLANE CRUISE AND RANGE PERFORMANCE

Altitude	RPM	M. P.	BHP	% BHP	TAS MPH	Gal/Hr.	End. Hours	Mi/Gal.	Range Miles
2500	2450	23	175	76	158	14.2	3.9	11.2	615
		22	166	72	154	13.4	4.1	11.5	635
		21	157	68	151	12.7	4.3	11.9	655
		20	148	63	148	12.0	4.6	12.2	670
	2300	23	164	71	154	13.1	4.2	11.7	645
		22	153	67	149	12.2	4.5	12.3	660
		21	143	62	145	11.5	4.8	12.7	695
		20	135	59	142	11.0	5.0	12.9	710
	2200	23	153	67	149	12.1	4.6	12.4	680
		22	144	63	146	11.4	4.8	12.8	700
		21	135	59	142	10.8	5.1	13.2	725
		20	126	55	138	10.2	5.4	13.5	740
Maximum Range Settings	2000	20	107	47	126	8.7	6.3	14.4	795
		19	99	43	121	8.2	6.7	14.8	810
		18	89	39	113	7.5	7.3	15.0	825
		17	81	35	105	7.0	7.9	15.1	830
5000	2450	23	179	78	163	14.5	3.8	11.2	615
		22	169	73	159	13.6	4.0	11.7	640
		21	161	70	156	13.0	4.2	12.0	660
		20	150	65	151	12.2	4.5	12.5	685
	2300	23	167	73	158	13.4	4.1	11.8	650
		22	158	69	155	12.6	4.4	12.2	675
		21	148	64	151	11.9	4.6	12.7	700
		20	139	60	146	11.2	4.9	13.1	720
	2200	23	157	68	155	12.4	4.4	12.5	685
		22	148	64	151	11.7	4.7	12.9	710
		21	138	60	146	11.0	5.0	13.3	730
		20	131	57	143	10.5	5.2	13.6	750
Maximum Range Settings	2000	19	103	45	126	8.5	6.5	14.9	820
		18	94	41	118	7.9	7.0	15.1	830
		17	86	37	111	7.3	7.5	15.2	835
		16	79	34	103	6.8	8.0	15.1	830
7500	2450	21	163	71	161	13.1	4.2	12.2	670
		20	153	67	157	12.4	4.4	12.7	700
		19	143	62	152	11.7	4.7	13.0	715
		18	133	58	147	11.0	5.0	13.4	735
	2300	21	151	66	156	12.2	4.5	12.7	700
		20	142	62	151	11.6	4.7	13.0	715
		19	133	58	147	11.0	5.0	13.3	735
		18	125	54	142	10.5	5.2	13.5	745
	2200	21	143	62	152	11.4	4.8	13.4	735
		20	134	58	148	10.7	5.1	13.8	760
		19	126	54	143	10.2	5.4	14.0	770
		18	118	51	138	9.7	5.7	14.3	790
Maximum Range Settings	2000	19	107	47	131	8.7	6.3	15.0	825
		18	98	43	123	8.1	6.8	15.2	835
		17	90	39	116	7.6	7.2	15.3	840
		16	82	36	107	7.0	7.8	15.3	840

Cruise performance shown is based on standard conditions, zero wind, lean mixture, 55 gallons of fuel, no fuel reserve, and 2650 pounds gross weight. For 182 performance, subtract approximately 3 miles per hour from the maximum cruise speeds shown.

Figure 6-3. Range Chart (Sheet 1)

SKYLANE CRUISE AND RANGE PERFORMANCE

Altitude	RPM	M. P.	BHP	%BHP	TAS MPH	Gal/Hr.	End. Hours	Mi/Gal.	Range Miles
10,000	2450	19	146	63	156	11.9	4.6	13.1	735
		18	137	60	152	11.2	4.9	13.5	745
		17	127	55	146	10.6	5.2	13.8	755
		16	118	51	141	10.0	5.5	14.0	770
	2300	19	137	60	152	11.1	5.0	13.7	750
		18	128	56	147	10.5	5.2	14.0	770
		17	118	51	141	9.8	5.6	14.3	790
		16	109	47	134	9.2	6.0	14.5	795
	2200	19	129	56	148	10.4	5.3	14.2	780
		18	120	52	142	9.8	5.6	14.6	800
		17	112	49	136	9.3	5.9	14.7	805
		16	103	45	129	8.7	6.3	14.9	815
Maximum Range Settings	2000	18	102	44	128	8.4	6.5	15.2	835
		17	93	40	120	7.8	7.1	15.4	845
		16	87	38	114	7.4	7.4	15.4	845
		15	80	35	105	6.9	8.0	15.2	835
15,000	2450	16	124	54	150	10.4	5.3	14.4	790
		15	114	50	142	9.8	5.6	14.6	805
		14	105	46	135	9.2	6.0	14.7	810
	2300	16	115	50	143	9.6	5.7	14.8	815
		15	107	47	136	9.1	6.0	15.0	825
		14	98	42	127	8.5	6.5	15.0	825
	2200	16	109	47	138	9.1	6.0	15.2	835
		15	101	44	130	8.6	6.4	15.2	835
		14	92	40	120	8.0	6.9	15.1	830
Maximum Range Settings	2000	16	93	40	122	7.8	7.1	15.7	865
		15	86	37	112	7.3	7.5	15.3	855
		14	78	34	101	6.8	8.1	14.9	820
20,000	2450	13	102	44	133	9.0	6.1	14.9	820
		12	93	40	122	8.3	6.6	14.6	805
	2300	13	96	42	126	8.4	6.6	15.1	830
		12	87	38	113	7.7	7.1	14.5	805
	2200	13	90	39	118	7.8	7.0	15.1	830
		12	81	35	103	7.2	7.7	14.4	790

Cruise performance shown is based on standard conditions, zero wind, lean mixture, 55 gallons of fuel, no fuel reserve, and 2650 pounds gross weight. For 182 performance, subtract approximately 3 miles per hour from the maximum cruise speeds shown.

Figure 6-3. Range Chart (Sheet 2)

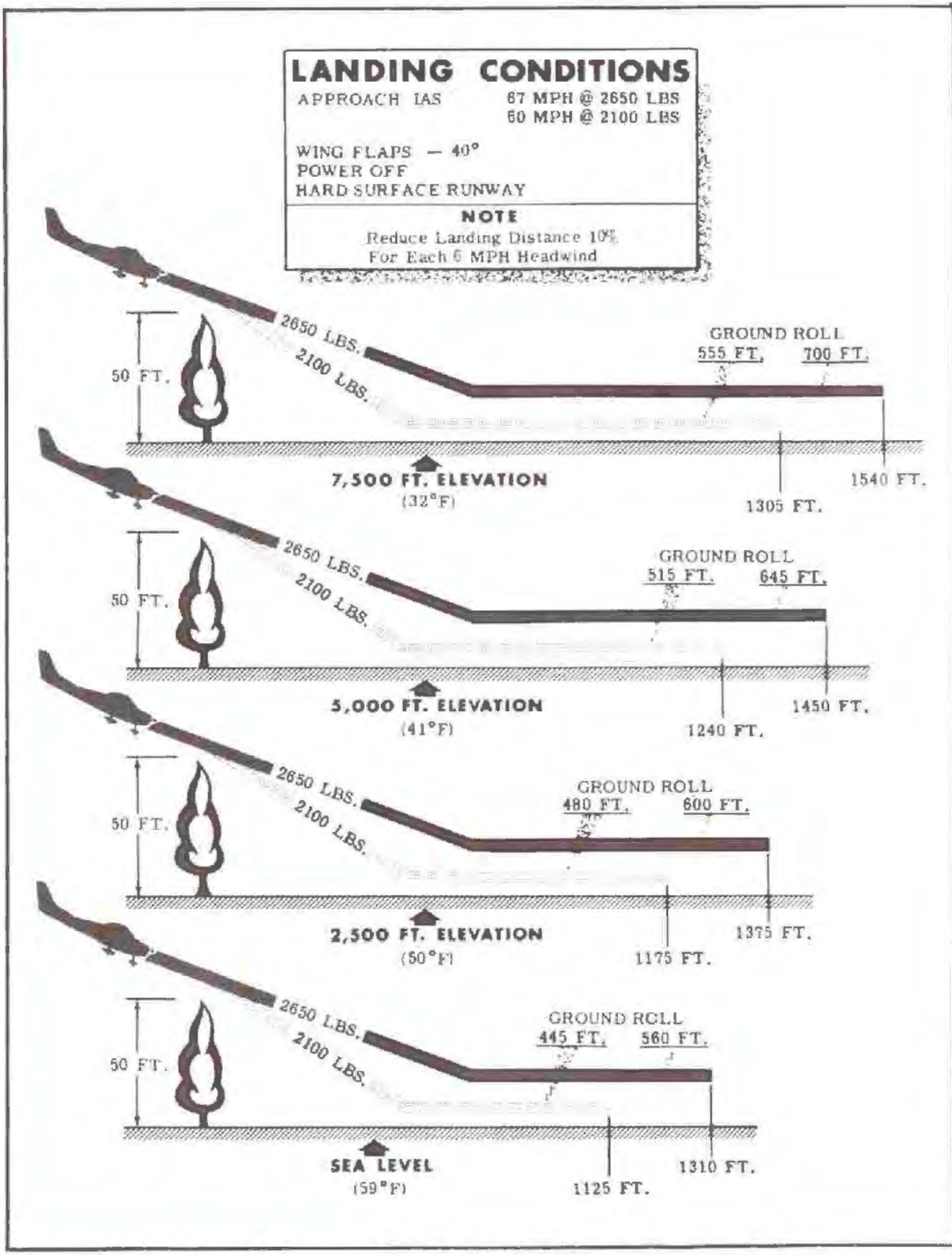


Figure 6-4. Landing Diagram

ALPHABETICAL INDEX