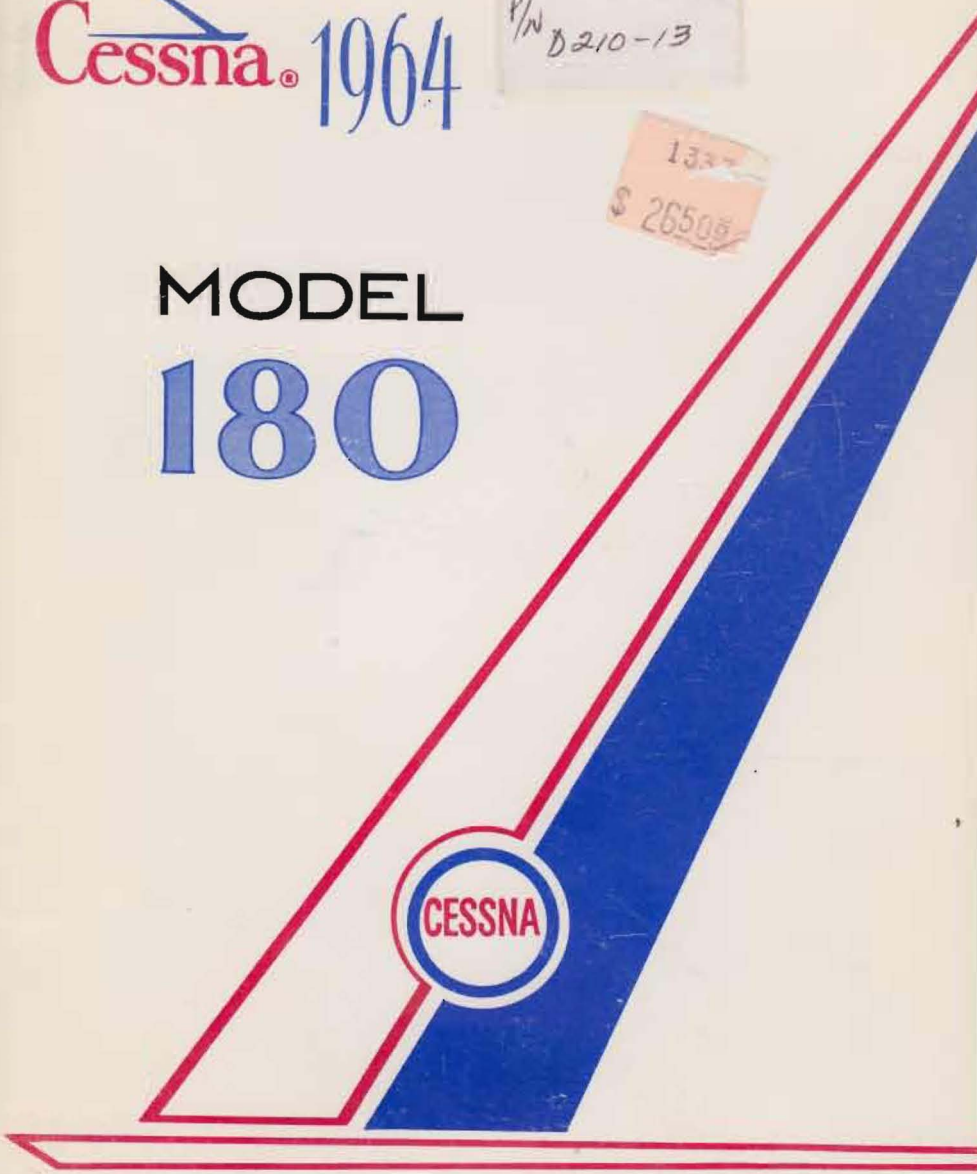
Cessna 1964

MODEL 180



OWNER'S MANUAL

PERFORMANCE - SPECIFICATIONS

	MODEL 180
GROSS WEIGHT	2800 lbs
SPEED:	
Top Speed at Sea Level	170 mph
Cruise, 75% Power at 6500 ft	162 mph
RANGE:	
Cruise, 75% Power at 6500 ft 60 Gallons, No Reserve	695 mi 4.3 hrs 162 mph
Cruise, 75% Power at 6500 ft 79 Gallons, No Reserve	925 mi 5.7 hrs 162 mph
Optimum Range at 10,000 ft 60 Gallons, No Reserve	925 mi 7.6 hrs 121 mph
Optimum Range at 10,000 ft 79 Gallons, No Reserve	1215 mi 10.0 hrs 121 mph
RATE OF CLIMB AT SEA LEVEL	1090 fpm
SERVICE CEILING	19,600 ft
TAKE-OFF:	
Ground Run	625 ft
Total Distance Over 50-Foot Obstacle	1205 ft
LANDING:	
Ground Roll	480 ft
Total Distance Over 50-Foot Obstacle	1365 ft
EMPTY WEIGHT (Approximate)	1525 lbs
BAGGAGE	350 lbs
WING LOADING: Pounds/Sq Foot	16.1 lbs
POWER LOADING: Pounds/HP	12.2 lbs
FUEL CAPACITY: Total	
Standard Tanks	65 gal.
Optional Long Range Tanks	84 gal.
OIL CAPACITY: Total	12 qts
PROPELLER: Constant Speed, Dia	82 inches
POWER:	
Continental Engine 230 rated HP at 2600 RPM	O-470-R

-210-13/A-D/1000/9-63

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. It is our desire that 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 180. 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 by most Cessna Dealers:

FACTORY TRAINED MECHANICS to provide you with courteous expert service.

FACTORY APPROVED SERVICE EQUIPMENT to provide you with the most efficient and accurate workmanship possible.

A STOCK OF GENUINE CESSNA SERVICE PARTS on hand when you need them.

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.

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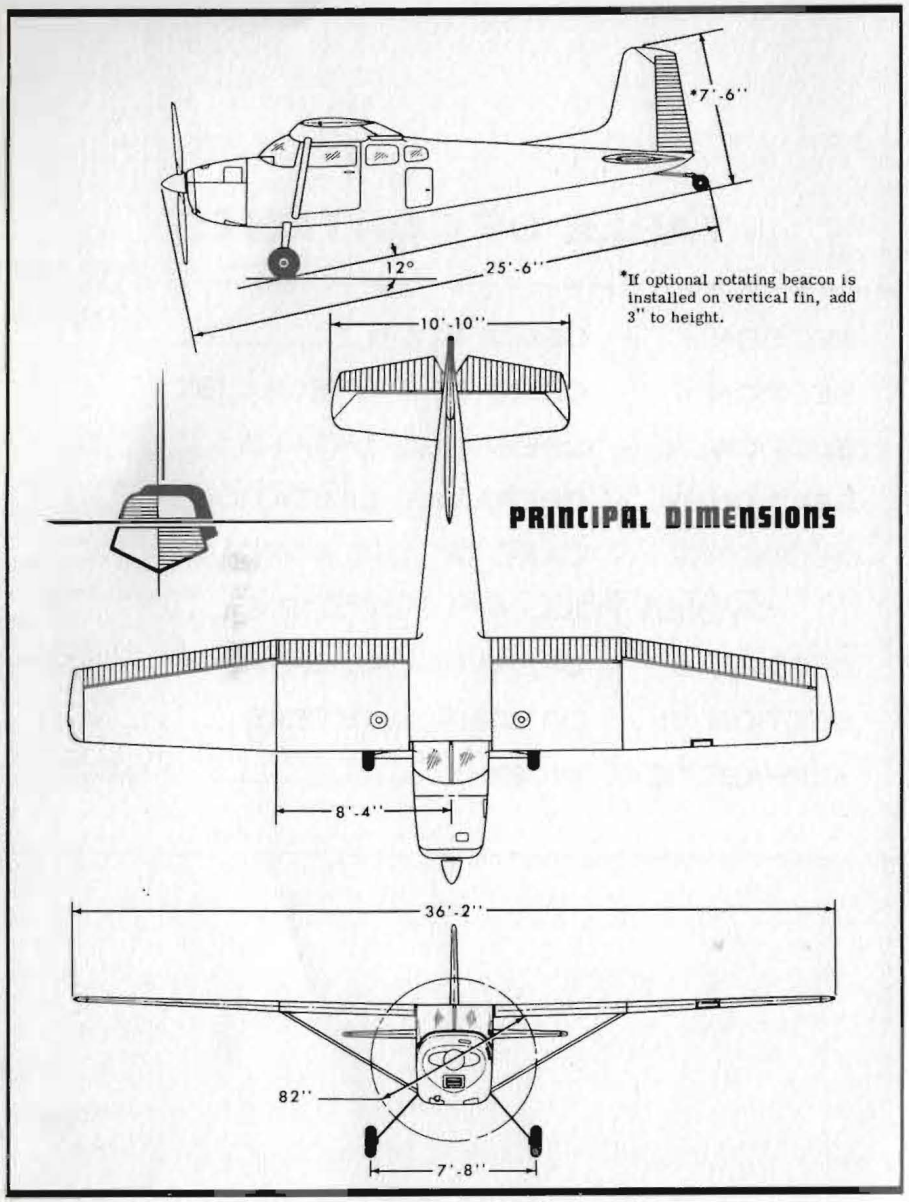


PRINCIPAL DIMENSIONS

Section—1

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 can best be done by reviewing this equipment while sitting in the airplane. Those items whose function and operation are not obvious are covered herein.

ENGINE CONTROLS.

THROTTLE, MIXTURE AND PROPELLER CONTROLS.

The throttle is the push-pull type. A knurled friction-type locknut is incorporated on the throttle to secure it in any desired setting. Clockwise rotation of the locknut increases friction to prevent creeping.

The push-pull mixture control incorporates a lock button to prevent inadvertent leaning or shutting off the fuel supply. To operate the control, depress the lock button, then push the knob in for rich mixture or pull it out for lean mixture. 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. Release pressure on the lock button to lock the control.

The propeller control is the push-pull type and changes the setting of the propeller governor to control engine speed. The control may be moved through its full range by depressing a locking button in the center of the knob. To make minor adjustments simply screw the control in or out without pressing the button. Rotating the knob clockwise increases RPM; counterclockwise rotation decreases RPM.

For all ground operations, and for take-off, the propeller 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 surging (RPM variation up and down several times before engine smooths out and becomes steady) can be prevented by smooth throttle and propeller control knob operation. Do not change the throttle and propeller control settings with jerky and rapid motions.

CARBURETOR AIR HEAT KNOB.

The carburetor air heat knob proportions the hot and cold air entering the carburetor. Pulling the knob out provides heated air for the carburetor, while pushing it in decreases the temperature. The full-hot position is all the way out and full cold is all the way in.

IGNITION-STARTER SWITCH.

A five-position ignition-starter switch controls the dual magneto ignition and starter systems. The switch positions are labeled clockwise as follows: "OFF," "R," "L," "BOTH" and START."

The engine should be operated on both magnetos ("BOTH" position). The "R" and "L" positions are for checking purposes only. When the switch is turned to the spring-loaded "START" position, the starter cranks the engine. As the switch is released, it automatically returns to "BOTH."

Refer to Sections II and III for further discussion on the use of the ignition-starter switch.

COWL FLAPS.

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 through the engine compartment, thereby reducing the cooling and cowl flap drag to a minimum. When changing cowl flap position make sure the control lever moves into the detent notch at the new position.

FUEL SYSTEM.

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

Refer to figure 1-2 for fuel quantity data. See the Servicing Diagram (figure 5-1) for a summary of fuel system servicing information.

FUEL SELECTOR VALVE.

The rotary-type fuel selector valve has four positions, labeled "BOTH OFF," "LEFT," "BOTH ON" and "RIGHT." The "BOTH OFF" position seals both wing tanks off from the rest of the fuel system and allows no fuel to pass beyond the selector valve. The "LEFT" position provides fuel flow from the left tank to the engine. Similarly, the "RIGHT" position provides flow from the right tank to the engine. The "BOTH ON" position allows fuel flow from both tanks simultaneously to provide maximum safety.

NOTE

The fuel selector valve handle indicates the setting of the valve by

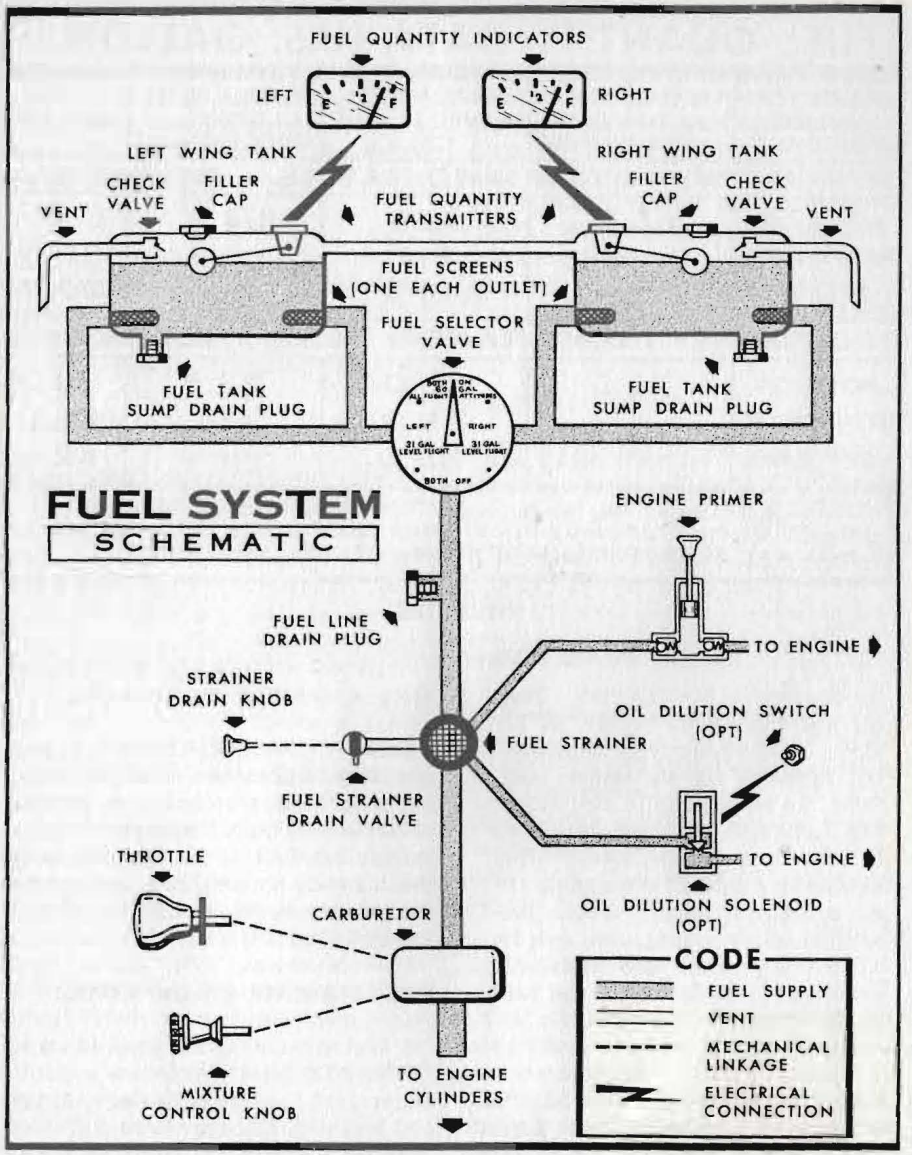


Figure 1-1.

FUEL QUANTITY DATA (U.S. GALLONS)

SELECTOR VALVE POSITION	USABLE FUEL (ALL FLIGHT CONDITIONS)	USABLE FUEL (LEVEL FLIGHT ONLY)	USABLE FUEL (CLIMBING — DESCENDING)	TOTAL VOLUME
STANDARD TANKS				
BOTH ON	60.0	62.5	64.5	65.0
RIGHT TANK	——	31.0	——	32.5
LEFT TANK	——	31.0	——	32.5
LONG RANGE TANKS				
BOTH ON	79.0	81.0	83.5	84.0
RIGHT TANK	——	39.0	——	42.0
LEFT TANK	——	39.0	——	42.0

DECREASE IN USABLE FUEL IN ALL FLIGHT CONDITIONS IS DUE TO DETRIMENTAL EFFECTS OF UNCOORDINATED FLIGHT (SLIPS OR SKIDS) OR TURBULENT AIR THAT MAY BE ENCOUNTERED IN NORMAL FLYING CONDITIONS.

Figure 1-2.

its position above the dial. Take off with the handle in the "BOTH ON" position to prevent inadvertent take-off on an empty tank. When the selector is in the "BOTH ON" position, unequal fuel flow from each tank may occur after extended flight if the wings are not maintained exactly level. Resulting wing heaviness can be alleviated gradually by turning the selector valve handle to the tank in the "heavy" wing.

The recommended cruise fuel management procedure for extended flight is to use the left and right tank alternately.

FUEL QUANTITY INDICATORS.

Two electrically-operated fuel quantity indicators are provided, each working in conjunction with an electric fuel level transmitter in its respective fuel tank. Turned on by the master switch, the indicators continue to function until the master switch is turned off.

FUEL STRAINER DRAIN KNOB.

A fuel strainer drain knob marked "STRAINER DRAIN" provides a quick, convenient method of draining water and sediment that may have collected in the fuel strainer. The strainer is located on the lower front side 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 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 valve automatically closes when the knob is released.

ELECTRICAL SYSTEM.

Electrical energy is supplied by a 14-volt, direct-current system powered by an engine-driven generator. The 12-volt battery is located aft of the rear baggage compartment wall.

GENERATOR WARNING LIGHT.

A red generator warning light, labeled "GEN LT," 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, and when there is insufficient engine RPM to produce generator current. Also, it will illuminate if the generator becomes defective.

CIRCUIT BREAKERS.

All electrical circuits in the airplane, except the clock circuit, are protected by circuit breakers. The clock has a separate fuse mounted adjacent to the battery. The stall warning, generator warning light, and optional turn-and-bank indicator circuits are protected by a single automatically resetting circuit breaker mounted behind the instrument panel. The remaining electrical circuits are protected by "push-to-reset" breakers on the instrument panel. The name of the circuit is indicated above each circuit breaker.

LANDING LIGHTS.

The landing light switch 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 navigation light switch on airplanes equipped with an optional flasher system is a three-position, push-pull switch. To turn the navigation lights on steady, pull the switch out to the first stop. For flashing operation, pull the switch out to the second stop.

ROTATING BEACON.

The optional rotating beacon should not be used when flying through clouds or overcast; the moving beams reflected from water droplets or particles in the atmosphere, particularly at night, can produce vertigo and loss of orientation.

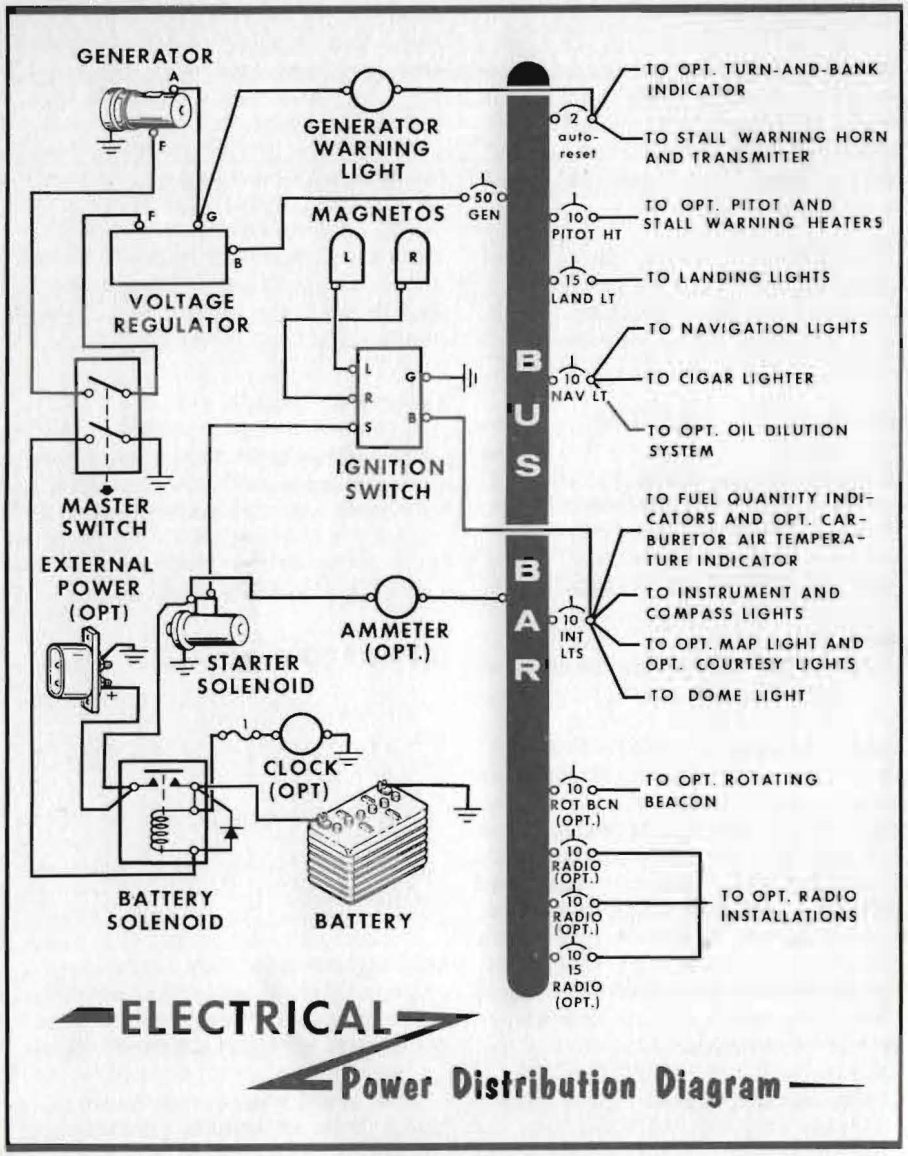


Figure 1-3.

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. In straight-ahead and turning flight, the warning horn will sound 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.

CABIN HEATING AND VENTILATING SYSTEM.

Fresh air for heating and ventilating the cabin is supplied by two sources, a manifold cabin heater and a ventilating air scoop on the right side of the fuselage.

The temperature and amount of air entering the cabin is controlled by two knobs on the instrument panel. The "CABIN AIR" knob operates the air scoop on the right side of the fuselage and controls cool fresh air entering the manifold on the firewall. The "CABIN HT" knob regulates the amount of heat entering the cabin. The "CABIN HT" knob is the double-button type with a friction lock to permit intermediate settings. To operate the knob, squeeze the buttons together, releasing the lock, then adjust the knob.

For cabin ventilation, pull the "CABIN AIR" knob out. To raise the air temperature, pull the "CABIN HT" knob out approximately 1/4" to 1/2" for a small amount of cabin heat. Adjust the knob as desired from this position to the full out (maximum heat) position.

NOTE

Always pull out the "CABIN AIR" knob slightly when the "CABIN HT" knob is out. This action increases the airflow through the system, increasing efficiency, and blends cool outside air with the manifold heated air, thus eliminating the possibility of overheating the system ducting.

When no heat is desired in the cabin, push the "CABIN HT" knob full in.

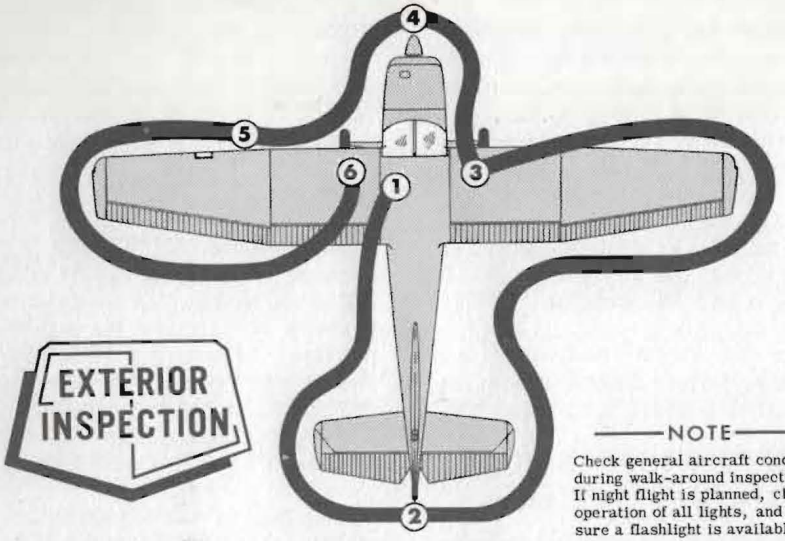
VENTILATORS.

Two ventilators, one in each upper corner of the windshield, are provided to supply additional ventilating air. To operate, pull the ventilator out and rotate to desired position.

Two additional ball and socket ventilators are installed just forward of each rear door post in the ceiling, for rear seat passengers. To regulate the air, turn the knurled ring on the rim of the ventilator.

REMOVABLE CABIN DOOR.

The right cabin door has removable hinge pins and a detachable door stop permitting door removal when large or bulky cargo must be loaded.



NOTE

Check general aircraft condition during walk-around inspection. If night flight is planned, check operation of all lights, and make sure a flashlight is available.

(1) a. Turn on master switch and check fuel quantity indicators, then turn master switch off.
b. Check ignition switch "OFF."
c. Check fuel tank selector valve on "BOTH ON."
d. On first flight of day and after each refueling, pull out strainer knob for about four seconds, to clear fuel strainer of possible water and sediment.
e. Remove control wheel lock.
f. Check baggage door for security.

(2) a. Remove rudder gust lock, if installed.
b. Disconnect tail tie-down.
c. Check tailwheel tire for proper inflation.

(3) a. Check main wheel tire for proper inflation.
b. Inspect airspeed static source hole on side of fuselage for stoppage.
c. Disconnect wing tie-down.
d. Check fuel tank vent opening for stoppage.

(4) a. Check oil level. Do not operate with less than nine quarts. Fill for extended flight.
b. Check propeller and spinner for nicks and security, and propeller for oil leaks.
c. Make visual check to insure that fuel strainer drain valve is closed after draining operation.
d. Check carburetor air filter for restrictions by dust or other foreign matter.

(5) a. Remove pitot tube cover, if installed, and check pitot tube opening for stoppage.

(6) Same as (3).

Figure 2-1.

Section-2

OPERATING CHECK LIST

This section lists, in Pilot's Check List form, the steps necessary to operate your airplane efficiently and safely. It is not a check list in its true form as it is considerably longer, but it does cover briefly all of the points that you would want to or should know concerning the information you need for a typical flight.

The flight and operational characteristics of your airplane are normal in all respects. There are no "unconventional" characteristics or operations that need to be mastered. All controls respond in the normal way within the entire range of operation of the airplane. All airspeeds mentioned in Sections II and III are indicated airspeeds. Corresponding calibrated airspeeds may be obtained from the Airspeed Correction Table in Section VI.

BEFORE ENTERING THE AIRPLANE.

(1) Make an exterior inspection in accordance with figure 2-1.

BEFORE STARTING THE ENGINE.

(1) Seats and Seat Belts -- Adjust and lock.
(2) Flight Controls -- Check.
(3) Wing Flaps -- Check all positions.
(4) Brakes -- Test and set.
(5) Master Switch -- On.
(6) Cowl Flaps -- "OPEN."
(7) Stabilizer Trim Control Wheel -- "TAKE-OFF" setting.
(8) Fuel Selector Valve -- "BOTH ON."

STARTING ENGINE.

(1) Carburetor Heat -- Cold.
(2) Mixture -- Rich.
(3) Propeller -- High RPM.

(4) Throttle -- Cracked (one-half inch).
(5) Primer -- As required.
(6) Ignition Switch -- "START." Hold until engine fires, but not longer than 30 seconds.
(7) Ignition Switch -- Release to "BOTH" (immediately after engine fires).

NOTE

If engine has been overprimed, start with throttle open 1/4 to 1/2 full open. Reduce throttle to idle when engine fires.

NOTE

After starting, check for oil pressure indication within 30 seconds in normal temperatures and 60 seconds in cold temperatures. If no indication appears, shut off engine and investigate.

BEFORE TAKE-OFF.

(1) Throttle Setting -- 1700 RPM.
(2) Engine Instruments -- Within green arc.
(3) Carburetor Heat -- Check operation, then set to cold unless icing conditions prevail.
(4) Generator Warning Light -- Check not illuminated.
(5) Magnetos -- Check (50 RPM maximum differential between magnetos).
(6) Propeller -- Cycle from high to low RPM; return to high RPM (full in).
(7) Flight Controls -- Recheck.
(8) Wing Flaps -- Set 0° to 20°.
(9) Cowl Flaps -- Full "OPEN."
(10) Stabilizer Trim Control Wheel -- Recheck setting.
(11) Cabin Doors -- Closed and locked.
(12) Flight Instruments and Radios -- Set.

TAKE-OFF.

NORMAL TAKE-OFF.

(1) Wing Flaps -- Up.
(2) Carburetor Heat -- Cold.
(3) Power -- Full throttle and 2600 RPM.
(4) Elevator Control -- Maintain moderately tail low attitude.
(5) Climb Speed -- 95 MPH until all obstacles are cleared, then set up climb speed as shown in "NORMAL CLIMB" paragraph.

MAXIMUM PERFORMANCE TAKE-OFF.

(1) Wing Flaps -- 20°.
(2) Carburetor Heat -- Cold.
(3) Brakes -- Apply.
(4) Power -- Full throttle and 2600 RPM.
(5) Brakes -- Release.
(6) Elevator Control -- Maintain slightly tail-low attitude.
(7) Climb Speed -- 64 MPH until all obstacles are cleared, then set up climb speed as shown in "MAXIMUM PERFORMANCE CLIMB."
(8) Flaps -- Up after obstacles are cleared.

CLIMB.

NORMAL CLIMB.

(1) Air Speed -- 100 to 120 MPH.
(2) Power -- 23 inches and 2450 RPM.
(3) Mixture -- Full rich (unless engine is rough).
(4) Cowl Flaps -- "OPEN," as required.

MAXIMUM PERFORMANCE CLIMB.

(1) Air Speed -- 95 MPH (sea level) to 87 MPH (10, 000 feet).
(2) Power -- Full throttle and 2600 RPM.
(3) Mixture -- Full rich (unless engine is rough).
(4) Cowl Flaps -- Full "OPEN."

CRUISING.

(1) Engine Power -- 15 - 23 inches of manifold pressure and 2200-2450 RPM.
(2) Cowl Flaps -- Adjust to maintain normal cylinder head temperature.
(3) Stabilizer Trim Control Wheel -- Adjust.
(4) Mixture -- Lean.

LET-DOWN.

(1) Mixture -- Rich.
(2) Power -- As desired.
(3) Carburetor Heat -- Apply (if icing conditions exist).

BEFORE LANDING.

(1) Fuel Selector -- "BOTH ON."
(2) Mixture -- Rich.
(3) Propeller -- High RPM.
(4) Cowl Flaps -- Closed.
(5) Carburetor Heat -- Apply before closing throttle.
(6) Airspeed -- 80 - 90 MPH (flaps retracted).
(7) Flaps -- 0° to 40° (below 110 MPH).
(8) Airspeed -- 70 to 80 MPH (flaps extended).
(9) Stabilizer Trim Control Wheel -- Adjust for glide.

NOTE

The ability of the airplane to land three-point is dependent upon the stabilizer being adjusted for hands-off trim in the glide.

NORMAL LANDING.

(1) Landing Technique -- Conventional for all flap settings.

AFTER LANDING.

(1) Cowl Flaps -- "OPEN."
(2) Wing Flaps -- Retract.
(3) Carburetor Heat -- Cold.

SECURE AIRCRAFT.

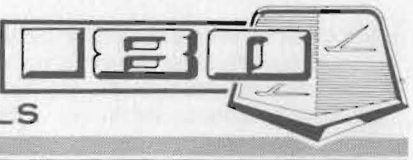
(1) Mixture -- Idle cut-off.

NOTE

Do not open throttle as engine stops since this actuates the accelerator pump.

(2) All Switches -- Off.
(3) Brakes -- Set.
(4) Control Lock -- Installed.

Section 3



OPERATING DETAILS

The following paragraphs cover in somewhat greater detail the items entered as a Check List in Section II. Not every item in the list is discussed here. Only those items of the Check List that require further explanation will be found in this section.

PREFLIGHT CHECK.

The exterior inspection described in Section II is recommended for the first flight of the day. Inspection procedures for subsequent flights normally are limited to brief checks of the tail surface hinges, fuel and oil quantity, and security of fuel and oil filler caps. If the airplane has been subjected to long-term storage, recent major maintenance, or operation from marginal airports, a more extensive exterior inspection is recommended.

After major maintenance has been performed, the flight and trim controls should be double-checked for free and correct movement.

The security of all inspection plates on the airplane should be checked following periodic inspections. If the airplane has been waxed and polished, it is a good practice to check the external static pressure source holes for stoppage.

If the airplane has been exposed to much ground handling in a crowded hangar, it should be checked for dents and scratches on wings, fuselage, and tail surfaces, as well as damage to navigation and landing lights, and radio antennas. Outside storage for long periods may result in water and obstructions in the airspeed system lines, condensation in fuel tanks, and dust and dirt on the intake air filter and engine cooling fins.

Operation from a gravel or cinder field will require extra attention to propeller tips and abrasion on leading edges of the horizontal tail. Stone damage to the outer six inches of the propeller tips can seriously reduce the fatigue life of the blades.

Airplanes that are operated from rough fields, especially at high altitudes, are subjected to abnormal landing gear abuse. A frequent check of the tires and all components of the landing gear and brakes is important.

The interior inspection will vary according to the mission and the

optional equipment installed. Before high altitude flights, it is important to check the condition and quantity of oxygen face masks and hoses. The oxygen supply system should be functionally checked to insure that it is in working order. The oxygen pressure gage should indicate between 300 and 1800 psi, depending upon the anticipated requirements.

Satisfactory operation of the pitot tube and stall warning transmitter heating elements is determined by turning on the heater and cautiously feeling the heat of both devices.

If night flying is anticipated, all exterior and interior lights should be checked for proper illumination.

STARTING ENGINE.

The use of an external power source is recommended for starting in cold weather. Before connecting a generator type external power source it is important that the master switch be turned on. This will enable the battery to absorb transient voltages which might otherwise damage the transistors in the audio amplifier. When using a battery type cart, the master switch should be turned off.

Ordinarily the engine starts easily with one or two strokes of the primer in warm temperatures to six strokes in cold weather, with the throttle open approximately 1/2 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 indicate overpriming or flooding. Excess fuel can be cleared from the combustion chambers by the following procedure: Set the mixture control full lean and the throttle full open; then crank the engine through several revolutions with the starter. Repeat the starting procedure without any additional priming.

If the 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.

If prolonged cranking is necessary, allow the starter motor to cool at frequent intervals, since excessive heat may damage the armature.

TAXIING.

Release the parking brake before taxiing and use the minimum amount of power necessary to start the airplane moving. Most of the engine warm-up should be done during taxiing, however, engine speed should not exceed 1600 RPM while the oil is cold.

During taxi, and especially when taxiing downwind, the RPM should be held down to prevent excessive taxi speeds.

In addition to the steerable tailwheel, which is preferred whenever practical, the rudder and differential braking on the main wheels will aid in steering. These aids are listed in the preferred order of use. Also, in crosswinds, it is important that speed and use of brakes be held to a minimum and that all controls be utilized to maintain directional control and balance. Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller tips.

The carburetor air heat knob should be pushed full in during all ground operations unless heat is absolutely necessary for smooth engine operation. When the knob is pulled out to the heat position, air entering the engine is not filtered.

Operation of the turn-and-bank indicator and directional gyro also should be checked during taxiing.

BEFORE TAKE-OFF.

Most of the warm-up will have been conducted during taxi, and additional warm up before take-off should be restricted to the checks outlined in Section II. Since the engine is closely cowled for efficient in-flight cooling, precautions should be taken to avoid overheating on the ground. Full throttle checks on the ground are not recommended unless the pilot has good reason to suspect that the engine is not turning up properly.

Engine run-ups should not be performed over loose gravel or cinders because of possible stone damage or abrasion to the propeller tips and stabilizer leading edge. 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.

An operational check of the magneto ignition system is important before take-off. An RPM drop on single ignition is a natural characteristic of dual ignition design in modern engines. The purpose of the magneto check is to determine that all cylinders are firing. If all cylinders are not firing, the engine will run extremely rough and cause for investigation will be quite apparent.

The amount of RPM drop is not necessarily significant and will be influenced by ambient air temperature, humidity, airport altitude, and other factors. An absence of RPM drop may be an indication of faulty grounding of one side of the ignition system or should be cause for suspicion that the magneto timing has been "bumped-up" and is set in advance of the setting specified. Magneto checks should be performed on a comparative basis between individual right and left magneto performance.

The magneto check should be made at 1700 RPM with the propeller in flat pitch as follows: Move the ignition switch first to "R" position and note RPM. Then move switch back to "BOTH" position to clear the other set of plugs. Then move switch

to "L" position and note RPM. The difference between the two magnetos operated singly should not be more than 50 RPM. If there is a doubt concerning the operation of the ignition system, RPM checks at a higher engine speed will usually confirm whether a deficiency exists.

If instrument or night flights are contemplated, a careful check should be made of vacuum pump operation. A suction of 4.5 inches of mercury is desirable for gyro instruments. However, a range of 3.75 to 5.0 inches of mercury is considered acceptable. On aircraft having an optional pictorial gyro horizon and azimuth card directional gyro, a suction gage is not installed. The suction gage is unnecessary since the gyro horizon incorporates two lights used for warning of high or low suction. When neither light is on, the suction rate is acceptable. A vacuum lights test switch in the system provides a means of testing the lights electrically.

The condition of the generator is also important since satisfactory operation of all radio equipment and electrical instruments is essential to instrument flight. The generator is checked by noting that the warning light is out with the engine speed above 1000 RPM.

A simple last-minute recheck of important items should include a glance to see that the mixture and propeller pitch knobs are full in, all flight controls have free and correct movement, and the fuel selector valve handle is in the "BOTH ON" position.

TAKE-OFF.

It is important to check full-throttle engine operation early in the take-off run. Any signs of rough engine operation or sluggish engine acceleration is good cause for discontinuing the 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.

Normal take-offs are accomplished with wing flaps up, cowl flaps open, full throttle, and 2600 RPM. Reduce power to 23 inches of manifold pressure and 2450 RPM as soon as practical to minimize engine wear.

Using 20° wing flaps reduces the total distance over an obstacle by approximately 20 per cent. Soft field take-offs are performed with 20° flaps by lifting the airplane off the ground as soon as practical in a slightly tail-low attitude. However, the airplane should be leveled off immediately to accelerate to a safe climb speed.

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 (64 MPH) should be used. If no obstructions are ahead, a best "flaps up" rate-of-climb speed (95 MPH) would be most efficient. These speeds vary slightly with altitude, but they are close enough for average field elevations.

Flap deflections of 30° and 40° are not recommended for take-off.

Take-offs into strong crosswinds normally are performed with the minimum flap setting necessary for the field length, to minimize the drift angle immediately after take-off. The airplane is accelerated to a speed slightly higher than normal, then pulled off abruptly to prevent possible settling back to the runway while drifting. When clear of the ground, make a coordinated turn into the wind to correct for drift.

AFTER TAKE-OFF.

To set up the airplane in climb configuration, adjust power for climb and retract the wing flaps at a safe altitude and airspeed. The mixture should be full rich unless the engine is rough due to too rich a mixture.

Power reduction will vary according to the requirements of the traffic pattern, surrounding terrain, gross weight, field elevation, temperature, and engine condition. However, a normal "after take-off" power setting is 23 inches of manifold pressure and 2450 RPM.

CLIMB.

A cruising climb at 23 inches of manifold pressure, 2450 RPM (approximately 75% power) and 100 to 120 MPH is recommended to save time and fuel for the overall trip. In addition, this type of climb provides better engine cooling, less engine wear, and more passenger comfort due to lower noise level.

If it is necessary to climb rapidly to clear mountains or reach favorable winds at high altitudes, the best rate-of-climb speed should be used with maximum power. This speed is 95 MPH at sea level, decreasing uniformly to 87 MPH at 10,000 feet.

If an obstruction ahead requires a steep climb angle, the airplane should be flown at the best angle of climb with flaps up and maximum power. This speed is approximately 70 MPH.

CRUISE.

Tabulated cruising information for normal cruising power and altitudes is presented in Section VI. These charts are based on both 60 gallons and 79 gallons (optional) of fuel for cruise, lean mixture, 2800 pounds gross weight, zero wind, and no fuel reserve. Allowances for warm-up, take-off, and climb (see figure 6-3), headwinds, variations in mixture leaning technique, and fuel reserve should be estimated, and the endurance and range in the charts should be modified accordingly.

Since the main advantage of the air-

plane over ground transportation is speed, you usually will prefer high cruising speeds. However, if a destination is slightly out of reach in one flight at normal cruising speeds, it may save time and money to make the trip non-stop at lower speed. The cruising charts show the long ranges obtainable with lower cruising speeds.

Normal cruising is done between 65% and 75% power. Cruising power of approximately 75% is obtained 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, a constant engine speed and a standard air temperature, a specific power may be obtained at only one altitude. For example, at full throttle, 2450 RPM and lean mixture, the speed and range figures for various powers and optimum altitudes are shown on figure 3-1.

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 a saving in fuel consumption and engine wear.

To achieve level-flight performance shown in the cruising charts in Section VI, the mixture should be leaned as follows: pull mixture control out until engine becomes rough; then enrich 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 except when engine is rough due to excessive richness.

OPTIMUM CRUISE PERFORMANCE

%BHP	ALTITUDE	TRUE AIRSPEED	RANGE (Std. Tanks)
75	6500	162	695
70	8000	160	735
65	10,000	158	785

Figure 3-1.

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

The cowl flaps should be adjusted to maintain the cylinder head temperature near the middle of the normal operating (green arc) range to assure prolonged engine life.

For a given throttle setting, select the lowest engine speed in the green arc range that will give smooth engine operation.

STALLS.

The stall characteristics are conventional and aural warning is provided by a stall warning horn which sounds between 5 and 10 MPH above the stall in all configurations.

Power-off stall speeds at maximum gross weight and aft c.g. position are presented in figure 6-2 as calibrated airspeeds, since indicated airspeeds are inaccurate near stall.

SPINS.

Intentional spins are prohibited in this airplane. Should an inadvertent spin occur; standard light plane recovery techniques should be employed.

LET-DOWN.

Let-downs should be initiated sufficiently before the destination is reached to permit a gradual rate of descent at cruising speed, using just enough power to hold engine temperature in the green arc range.

LANDING.

Landings are simple and conventional in all respects. Either power-off or power-approach type landings can be executed with any flap setting. Although power-off approaches with full flaps are adequately steep, slips are permissible if necessary.

Approach speeds should be approximately 80 - 90 MPH with flaps up and 70 - 80 MPH with flaps extended.

Since the ability of the elevator to produce a stall is dependent upon the adjustable stabilizer being set "NOSE UP," it is important that the airplane be completely trimmed in the approach glide. If the airplane fails to land three point with the control wheel fully back, it is probable that the adjustable stabilizer is not adjusted for the landing condition.

For short field landings, make a power off approach at 70 MPH IAS with 40° flaps and land three point. Immediately after touchdown, apply heavy breaking as required. For maximum brake effectiveness, retract the flaps, hold full nose up elevator and apply maximum possible brake pressure without sliding the tires.

COLD WEATHER OPERATION.

Prior to starting on cold mornings,

it is advisable to pull the propeller through several times by hand to "break loose" or "limber" the oil, thus conserving battery energy. In extremely cold (0°F and lower) weather the use of an external preheater for both the engine and battery is recommended whenever possible to reduce wear and abuse to the engine and the electrical system. Whenever very cold temperatures are anticipated, the oil should be diluted before stopping the engine if external preheat is not available.

Cold weather starting with preheat is normal except that carburetor heat should be used as necessary for smooth engine operation.

Starting without preheat, prime the engine 4-8 strokes while the propeller is being turned by hand and use carburetor heat as necessary for smooth engine operation. Under extreme conditions it may even be necessary to keep the engine running on the primer until the engine warms up slightly.

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 and non-congealing oil cooler available from your Cessna Dealer, should be installed to improve engine operation.

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 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 di-

OIL DILUTION TABLE

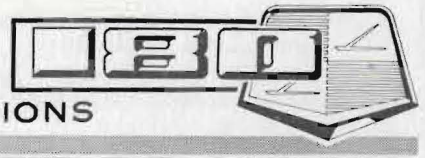
	TEMPERATURE		
	0°F	−10°F	−20°F
Dilution Time	1½ min.	3¾ min.	6 min.
Fuel Added	1 qt.	2½ qt.	4 qt.

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

Figure 3-2.

luting 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.

Section—4



OPERATING LIMITATIONS

OPERATIONS AUTHORIZED.

Your Cessna, with standard equipment, as certificated under FAA Type Certificate No. 5A6, 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 under VFR. Your Cessna Dealer will be happy to assist you in selecting equipment best suited to your needs.

MANEUVERS — NORMAL CATEGORY.

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

Maximum Gross Weight	2800 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 calibrated airspeed limits for your Cessna.

Never Exceed (Glide or dive, smooth air)	192 MPH (red line)
Caution Range	160-192 MPH (yellow arc)

Maximum Structural Cruising Speed . . . . . .160 MPH
(Level flight or climb)
Normal Operating Range. . . . . .68-160 MPH (green arc)
Maximum Speed, Flaps Extended. . . . . 110 MPH
Flap Operating Range . . . . . .60-110 MPH (white arc)
Maneuvering Speed * . . . . . 128 MPH

*The maximum speed at which abrupt control travel can be used without exceeding the design load factor.

ENGINE OPERATION LIMITATIONS.

Power and Speed . . . . . .230 BHP at 2600 RPM

ENGINE INSTRUMENT MARKINGS.

OIL TEMPERATURE GAGE

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)

CARBURETOR AIR TEMPERATURE GAGE (OPT)

Under possible icing conditions:
Normal Operating Range . . . . . .5° to 20°C (green arc)
Cautionary Range. . . . . .0° to 5°C (yellow arc)
Icing Range . . . . . -20° to 0°C (red arc)

MANIFOLD PRESSURE GAGE

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

CYLINDER HEAD TEMPERATURE GAGE

Normal Operating Range . . . . . .300-500°F (green arc)
Do Not Exceed . . . . . 500°F (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. . . . . E (red line)
(2.5 gallons each tank unusable in normal flight maneuvers)

WEIGHT AND BALANCE.

The information presented in this section will enable you to operate your Cessna within the prescribed weight and center of gravity limitations.

In figuring your loading problems, be certain that you use the Licensed Empty Weight of your particular airplane as shown on its Weight and Balance Data sheet. This sheet, plus an Equipment List, is included with each airplane as it leaves the factory. The FAA requires that any change in the original equipment affecting the empty weight center of gravity be recorded on a Repair and Alteration Form FAA-337.

READ BEFORE WORKING LOADING PROBLEM FOR YOUR AIRPLANE

To figure the weight for your airplane in the same manner as the sample problem on page 4-6, proceed as follows:

Step 1. Take the licensed Empty Weight and Moment/1000 from the Weight and Balance Data sheet, plus any changes noted on forms FAA-337, carried in your airplane and write them down in the weight and moment columns for your airplane in the manner shown in the sample problem.

Step 2. In the weight column add the 22 pounds of oil to the licensed empty weight of your airplane. In the moment column subtract 0.3 from the licensed moment/1000 for your airplane. Since you usually have a full load of oil (12 qts.) for a trip, the weight and moment/1000 of the oil may be assumed as constant for all flights. The resulting figures are the new adjusted empty weight and moment which may be considered as non-variables and unless your airplane or equipment is modified, these figures may be used every time you figure your weight and balance.

Step 3. Enter these figures opposite line 3 in the Weight and Balance columns for "YOUR AIRPLANE."

Step 4. Determine the number of gallons of fuel to be carried. Refer to the "FUEL" line which is found on the Loading Graph on page 4-6. The line labeled "FUEL" is graduated in 10-gallon increments. To compute the fuel weight; locate a point on the "FUEL" line equal to the number of gallons of fuel on board, then move horizontally across the graph to the left, and read the weight. To

locate the fuel moment/1000, move down on a vertical line, from the point on the "FUEL" line, to the bottom of the graph and read the moment/1000. Now write down this weight and moment/1000 for the fuel in the proper Weight and Balance columns for "YOUR AIRPLANE."

Step 5. Find a point equal to the pilot's and copilot's total weight on the left side of the Loading Graph. From this point, proceed horizontally along a line on the graph until you intersect the line labeled "PILOT & COPILOT"; then drop down from this point along a vertical line to the bottom of the graph and read the moment/1000. Enter the weight and moment for the pilot and copilot in the proper columns.

NOTE

For all practical purposes the pilot's and copilot's and other passengers' weights can be assumed to be 170 pounds. If greater accuracy is desired, the exact weight of each person can be used. However, for practical considerations, use 170 pounds.

Step 6. To figure rear seat passengers, use the same method outlined in step 5 but be sure to use the proper line on the graph for the seat being figured.

NOTE

No passengers are shown on the sample problem, page 4-6.

Step 7. When used as a cargo airplane, the cargo should be loaded with the center of the cargo weight about the center of one of the four cargo areas. If this method is used, use the loading graph on page 4-6 to determine moment/1000 values. Enter the weight and moment in the proper columns opposite the cargo area being figured.

NOTE

If it is impractical to locate the center of a load near the center of a cargo area, you may determine the station location from the Cabin Stations Diagram on page 4-8 (the station is the same as the c.g. arm) and multiply the weight by the arm and divide by 1000 to get the moment/1000.

NOTE

The weight and moment of baggage may be determined by the same procedure used for cargo.

Step 8. Add the weight column (under "YOUR AIRPLANE") to find the total loaded weight of your airplane. This total loaded weight should include the airplane adjusted empty weight (includes full oil), fuel, pilot, passengers, baggage and cargo. Also, add the moment column.

Step 9. Refer to the Center of Gravity Moment Envelope. Locate the total weight on the scale on the left hand side of the graph and, from this point, follow a line horizontally to the right. Locate the total moment/1000 on the scale running across the bottom of the graph, and, from this point, follow a line vertically up until you intersect the line running horizontally from your total weight. If the point where the two lines intersect is within the envelope, your airplane is loaded within approved limits. If the point of intersection falls outside the envelope, your load must be adjusted before flight.

To avoid time consuming delays in cargo and/or passenger shifting, plan your load so that the heaviest cargo and/or passengers are in the forward part of the aircraft, and the lightest in the rear. Always plan to have any vacant space at the rear of the aircraft. For example, do not have passengers occupy the rear seat unless the front and center seats are to be occupied.

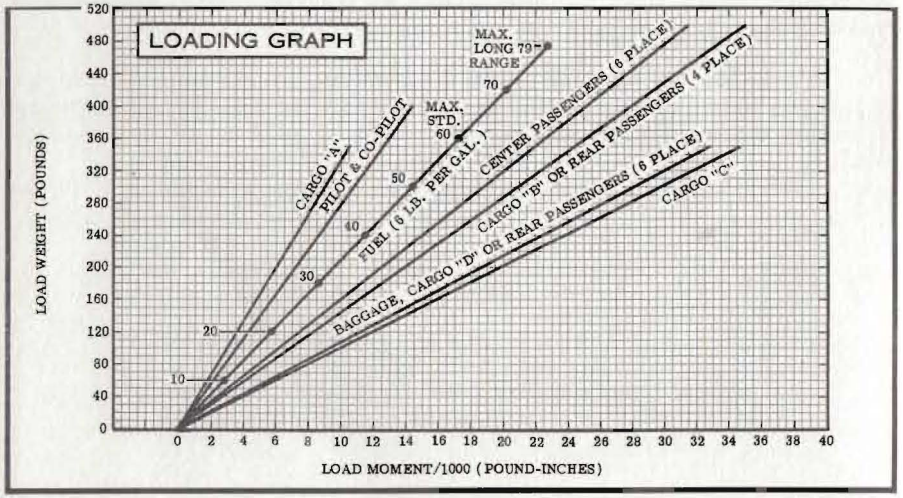
The arm for any location in the aircraft can be determined from the diagram on page 4-8 (the station is the same as the c.g. arm). Multiply the weight of the object by the arm and divide by 1000 to get the moment/1000.

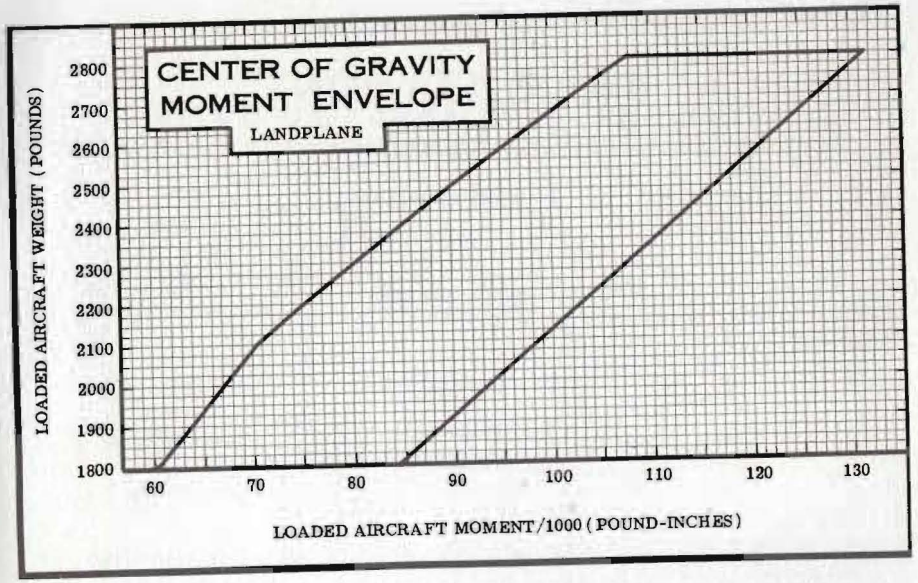
SAMPLE LOADING PROBLEM

	WEIGHT & BALANCE SAMPLE AIRPLANE		WEIGHT & BALANCE YOUR AIRPLANE	
	Weight (lbs.)	Moment (lb.-ins. /1000)	Weight (lbs.)	Moment (lb.-ins. /1000)
1. Licensed Empty Weight	1596	57.7		
2. Oil (12 qts. - Full oil may be assumed for all flights.)	22	-0.3	22	-0.3
3. TOTAL (empty weight plus oil)	1618	57.4		
4. Fuel (Standard - 60 gal. @ 6 lbs./gallon)	360	17.3		
Fuel (Long Range - 79 gal. @ 6 lbs./gallon)				
5. Pilot and Copilot	170	6.1		
6. Center Passengers (6-place version)				
Rear Passengers IV (6-place version)				
Rear Passengers V (4-place version)				
7. Baggage V *				
Cargo "A" *	100	3.0		
Cargo "B" *	420	29.4		
Cargo "C" *	132	13.1		
Cargo "D" *				
8. TOTAL WEIGHT AND MOMENT	2800	126.3		

9. Locate this point (2800 at 126.3) on the center of gravity moment envelope on page 4-7, and since this point falls within the envelope, the loading is acceptable.

* Refer to the seating and cargo arrangements diagram on page 4-7 for maximum allowable weights in these areas.



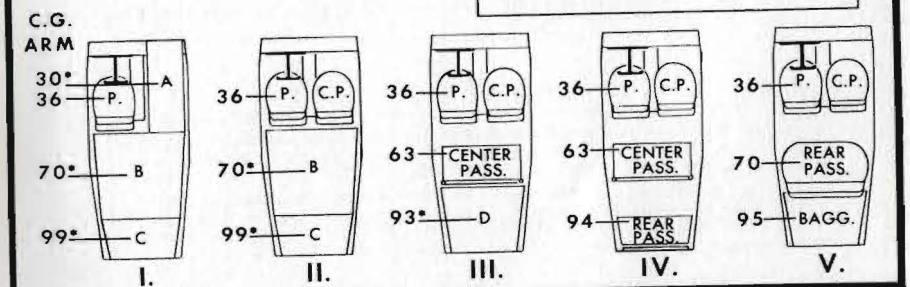


SEATING-CARGO ARRANGEMENTS

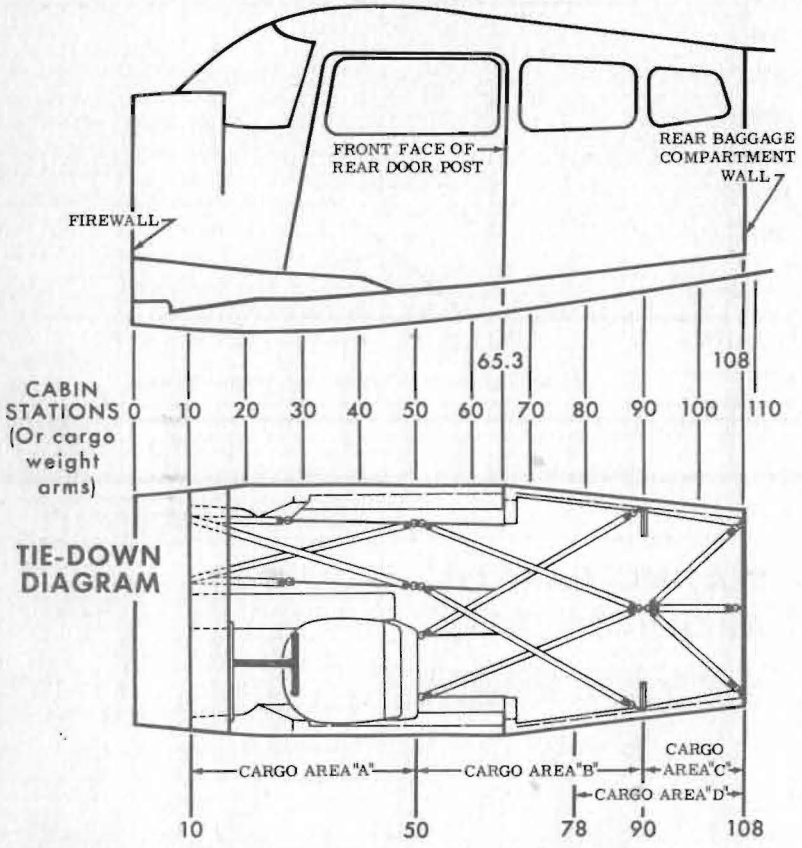
LOADING TABLE: MAXIMUM ALLOWABLE WTS.

ITEM	WT. (LBS)	ARM (INS.)
Oil (12 qts.)	22	15.0
Fuel (60 Gal.) - Std. Tanks	360	48.0
Fuel (79 Gal.) - Opt. Tanks	474	48.0
Pilot &/or Copilot	-	36.0
Cargo "A" (Station 10 to 50)	350	30.0*
Cargo "B" (Station 50 to 90)	1000	70.0*
Cargo "C" (Station 90 to 108)	350	99.0*
Cargo "D" (Station 78 to 108)	350	94.0*
Center Passengers	-	63.0
Rear Passengers IV	-	94.0
Rear Passengers V	-	70.0
Baggage V	350	94.0

*Arms measured to center of cargo areas shown.



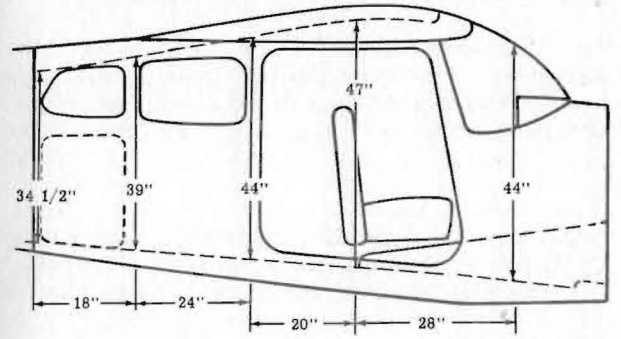
CABIN STATIONS
(C.G. ARMS)



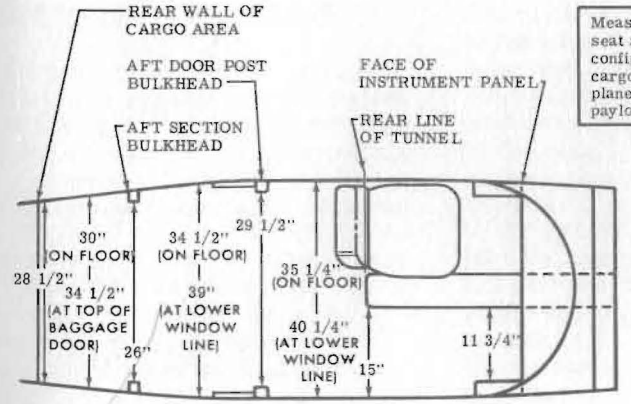
NOTES:

1. Use the forward face of the rear door post as a reference point to locate C.G. arms. For example, a box with its center of weight located 13 inches forward of the rear door post would have a C.G. arm of (65.3-13.0 = 52.3) 52.3 inches.
2. Maximum allowable floor loading: 200 pounds/square foot. However, when items with small or sharp support areas are carried, the installation of a 1/4" spruce or fir plywood floor is highly recommended to protect the aircraft structure.

INTERNAL CABIN DIMENSIONS



CABIN HEIGHT MEASUREMENTS



FLOOR WIDTH MEASUREMENTS

NOTE

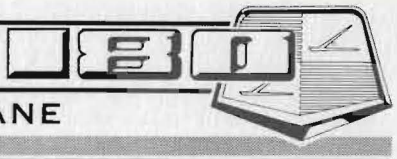
Measurements are with standard seat arrangement. This utility configuration provides maximum cargo area and reduces the airplane empty weight for greater payloads.

DOOR OPENING DIMENSIONS

	WIDTH (TOP)	WIDTH (BOTTOM)	HEIGHT (FRONT)	HEIGHT (REAR)
CABIN DOOR	32"	37"	41"	38½"
BAGGAGE DOOR	15¼"	15½"	22¼"	21"

NOTES

Section—5



CARE OF THE AIRPLANE

If your airplane is to retain that new-plane performance and dependability, certain inspection and maintenance requirements must be followed. It is wise to follow a planned schedule of lubrication and preventative maintenance based on the climatic and flying conditions encountered in your locality.

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

GROUND HANDLING.

Proper ground handling will prevent costly repairs due to careless methods of moving the airplane about on the ground. When maneuvering the airplane by hand, push at the front spar of the stabilizer adjacent to the fuselage, at the root of the dorsal fin, and at the landing gear or the strut root fitting. Do not lift the empennage by the tip of the elevator; likewise, do not shove sidewise on the upper portion of the fin.

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 rope or chain (700 pounds tensile strength) to the wing tie-down fittings at the upper end of each wing strut. (The rings retract into the struts; to extend them, press in the exposed tip of the ring.) Secure the opposite ends of these ropes or chains to tie-down rings suitably anchored to the ground.

(2) Tie a rope or chain around the tail gear spring and secure the opposite end to a tie-down ring in the ground.

(3) Install surface control locks between the flap and aileron of each wing.

(4) Install the controls lock on the control wheel shaft.

(5) Install a surface control lock over the fin and rudder.

STORAGE.

The all-metal construction of your

Cessna makes outside storage of it practical, although inside storage will increase its life just as it increases the life of your car. If your airplane must remain inactive for a time, cleanliness is probably the most important consideration — whether your airplane is inside or out. 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. Filling the fuel tanks will help prevent condensation.

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 active service.

WINDSHIELD - WINDOWS.

The plastic windshield and windows should be kept clean and waxed at all times. To prevent scratches and crazing, wash them carefully with plenty of soap and water, using the palm of the hand to feel and dislodge dirt and mud. A soft cloth, chamois or sponge may be used, but only to carry water to the surface. Rinse thoroughly, then dry with a clean, moist chamois. Rubbing the surface of the plastic with a dry cloth builds up an electrostatic charge so that it attracts dust particles in the air. Wiping with a moist chamois will remove both the dust and this charge.

Remove oil and grease with a cloth moistened with kerosene. Never use gasoline, benzine, alcohol, acetone, carbon tetrachloride, fire extinguisher or anti-ice fluid, lacquer thinner or glass cleaner. These materials will soften the plastic and may cause it to craze.

After removing dirt and grease, if the surface is not badly scratched it should be waxed with a good grade of commercial wax. The wax will fill in minor scratches and help prevent further scratching. Apply a thin, even coat of wax and bring it to a high polish by rubbing lightly with a clean, dry, soft flannel cloth. Do not use a power buffer; the heat generated by the buffing pad may soften the plastic.

Do not use a canvas cover on the windshield unless freezing rain or sleet is anticipated. Canvas covers may scratch the plastic surface.

ALUMINUM SURFACES.

The clad aluminum surfaces of your Cessna require only a minimum of care to keep them bright and clean. The airplane may be washed with clear water to remove dirt; oil and grease may be removed with gasoline, naphtha, carbon tetrachloride or other non-alkaline solvents. Dulled aluminum surfaces may be cleaned effectively with an aircraft aluminum polish.

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.

The painted exterior surfaces of your new Cessna have been finished with high grade materials selected for their toughness, elasticity, and excellent adhesion. With a minimum of care, they will retain their original beauty for many years.

As with any paint applied to a metal surface, the desired qualities of the paint develop slowly throughout an initial curing period which may be as long as 90 days after the finish is applied. During this curing period some precautions should be taken to avoid damaging the finish or interfering with the curing process. The finish should be cleaned only by washing with clean water and mild soap, followed by a rinse with water and drying with cloths or a chamois. Do not use polish or wax, which would exclude air from the surface, during this 90 day curing period. Do not rub or buff the finish and avoid flying through rain, hail or sleet.

Once the finish has cured completely, it may be waxed with a good automotive wax. A heavier coating of wax on the leading edges of the wings and tail and on the nose cap and propeller spinner will help reduce the abrasion encountered in these areas.

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

An automotive paint cleaner may be used to clean the painted surfaces. Always wash and wax your airplane in a shaded area.

PROPELLER CARE.

Preflight inspection of propeller blades for nicks, and wiping them occasionally with an oily cloth to clean off grass and bug stains will assure long, trouble-free service. It is vital that small nicks on the propeller, particularly near the tips and on the leading edges, are dressed out as soon as possible since these nicks produce stress concentrations, and if ignored, may result in cracks. Never use an alkaline cleaner on the blades; remove grease

and dirt with carbon tetrachloride or Stoddard solvent.

Your Cessna Dealer should be consulted about other repair and maintenance work. Civil Air Regulations require that all maintenance except dressing small blade nicks, cleaning, minor repairs to the spinner, and lubrication which does not require disassembly, be done by an FAA - authorized propeller repair station.

INTERIOR CARE.

The interior of your airplane is furnished with wear-resistant, hard surface materials designed for maximum usage with minimum upkeep. However, as with any furnishing, the measure of lasting appearance and endurance afforded by the interior is dependent upon the degree of care.

Materials used on the cabin floor and sidewalls are impervious to absorption and, therefore, are not easily soiled or stained. Dust and loose dirt should be picked up with a vacuum cleaner. Stubborn dirt can be wiped off with a cloth moistened in clean water. Mild soap suds, used sparingly, will remove grease. The soap should be removed with a clean damp cloth. The headliner, instrument panel, plastic trim and control knobs need only be wiped off with a damp cloth.

Oil and grease on the control wheel and control knobs can be removed with a cloth moistened with kerosene. Volatile solvents, such as mentioned in paragraphs on care of the windshield, must never be used since they soften and craze the plastic.

If your airplane is equipped with deluxe seating, care of these materials is identical to care of the furnishings in your home. Vacuum clean regularly to remove dust and loose dirt.

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 on the fabric to be cleaned. Never saturate the fabric with a volatile solvent; it may damage the padding and backing materials.

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

INSPECTION SERVICE — INSPECTION PERIODS.

With your airplane you will receive an Owner's Service Policy. Coupons attached to the policy entitle you to an initial inspection and the first 100-hour inspection at no charge. 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 it 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 purchased the airplane accomplish this work.

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

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. In addition, a periodic check should be made of the latest Civil Air Regulations to insure that all data requirements are met.

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

(1) Aircraft Airworthiness Certificate (Form FAA-1362).
(2) Aircraft Registration Certificate (Form FAA-500A).
(3) Airplane Radio Station License (Form FCC-404, if transmitter installed).

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

(1) Weight and Balance, and associated papers (latest copy of the Repair and Alteration Form, Form FAA-337, if applicable).
(2) Airplane Equipment List.

C. To be made available upon request:

(1) Airplane Log Book.
(2) Engine Log Book.

NOTE

Cessna recommends that these items plus the Owner's Manual and the "Cessna Flight Guide" (Flight Computer) be carried in the airplane at all times.

Most of the items listed are required by the United States Civil Air Regulations. Since the regulations of other nations may require other documents and data, owners of exported airplanes should check with their own aviation officials to determine their individual requirements.

LUBRICATION AND SERVICING

Specific lubrication and servicing information is presented in the Servicing Diagram (figure 5-1). For quick reference, specifications and quantities of fuel, oil, etc., are contained in a table on the inside back cover. In addition to those items specified in the Servicing Diagram, all pulleys, bellcrank clevis bolts, flap handle, brake pedal pivots, rudder pedal crossbars, door hinges and latches, Bowden controls (with the exception of their friction locking devices), the engine control and cowl flap control rod ends, control wheel shaft universals and any other friction points should be lubricated every 1000 hours, or oftener, with SAE 20 engine 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.

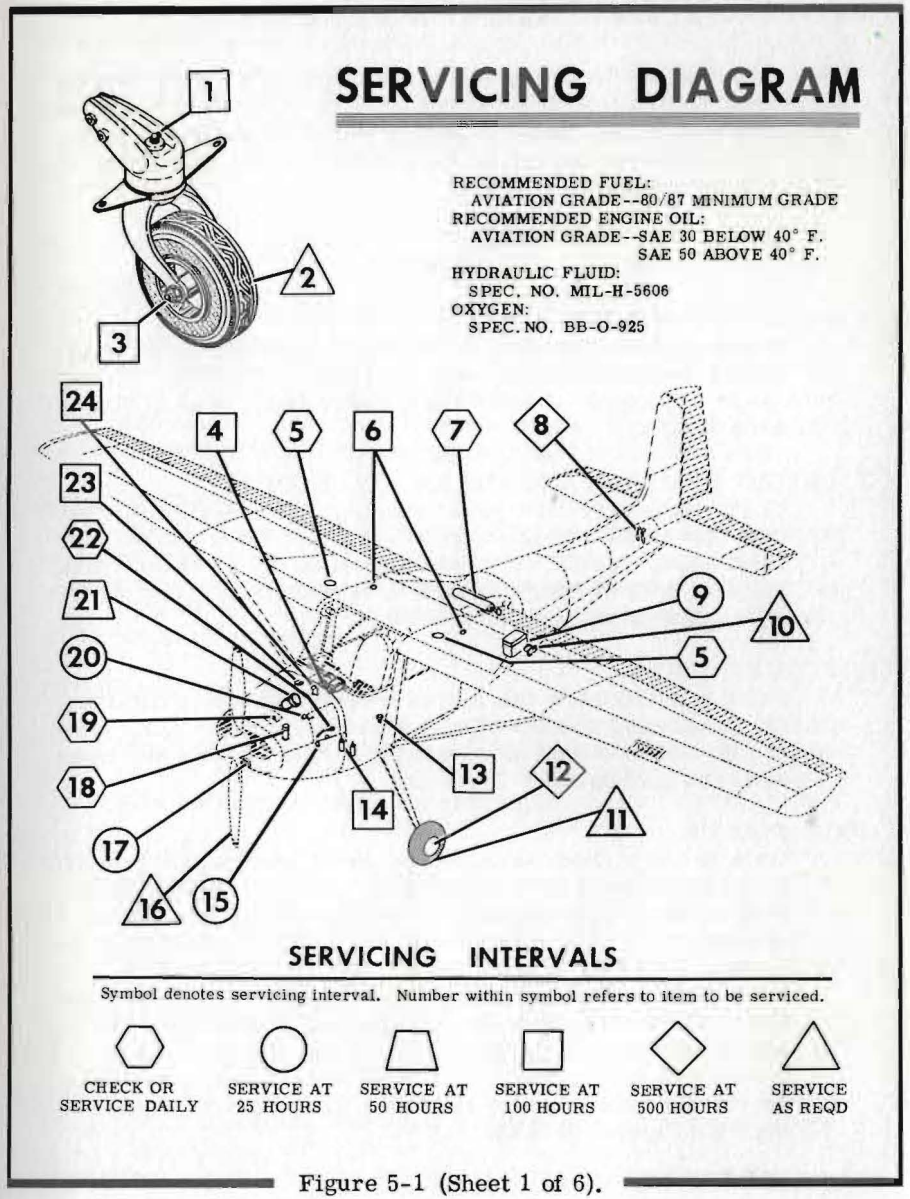


Figure 5-1 (Sheet 1 of 6).

SERVICING PROCEDURES

For convenience, the items below are segregated into servicing intervals; that is, all items which must be checked or serviced daily are listed, then items requiring 25 hour service are listed, etc. The numbered symbol at each item refers to the item as shown in the Servicing Diagram.

⬡ DAILY

(5) FUEL TANK FILLERS:
Service after each flight with 80/87 minimum grade fuel. The capacity of each tank is 32.5 gallons. When optional long range fuel tanks are installed, the capacity of each tank is 42.0 gallons.

(7) OXYGEN CYLINDER AND FILLER VALVE (OPT):
Check oxygen pressure gage for anticipated requirements before each flight. Whenever pressure drops below 300 psi, use filler valve on rear cabin wall above utility shelf and refill cylinder with aviator's breathing oxygen (Spec. No. BB-O-925). Maximum pressure, 1800 psi.

(18) FUEL STRAINER:
Drain approximately two ounces of fuel before each flight and after refueling to remove water and sediment. Make sure drain valve is closed after draining. Disassemble and clean bowl and screen every 100 hours.

(19) OIL FILLER:
When preflight check shows low oil level, service with aviation grade engine oil; SAE 30 below 40°F. and SAE 50 above 40° F. Your Cessna was delivered from the factory with straight mineral oil (non-detergent) and should be operated with straight mineral oil for the first 25 hours. The use of mineral oil during the 25-hour break-in period will help seat the piston rings and will result in less oil consumption. After the first 25 hours, either mineral oil or detergent oil may be used. If a detergent oil is used, it must conform to Continental Motors Corporation Specification MHS-24. Your Cessna Dealer can supply an approved brand.

Figure 5-1 (Sheet 2 of 6).

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

○ 25 HOURS

(9) BATTERY:
Check level of electrolyte every 25 hours (or 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.

(15) OIL SUMP DRAIN:
Every 25 hours, change engine oil. Drain oil by removing plug in oil sump. Remove lower cowling and provide protection for lower engine components when draining. (See item 21 for servicing interval on aircraft equipped with optional oil filter.)

(17) CARBURETOR AIR FILTER:
Service every 25 hours or oftener when operating in dusty conditions. Under extremely dusty conditions, daily maintenance of the filter is recommended. Service in accordance with instructions on the filter frame.

(20) ENGINE OIL SCREEN:
Remove and wash screen (located on right rear side of engine accessory section) with Stoddard solvent (Fed. Spec. P-S-661) whenever engine oil is changed. (On aircraft equipped with an optional oil filter, the engine oil screen has been removed and replaced with an adapter unit for oil filtration.)

⏢ 50 HOURS

(21) OIL FILTER (OPT):
Change engine oil and replace filter element every 50 hours.

Figure 5-1 (Sheet 3 of 6).

Oil should be changed at least every four months even though less than 50 hours have accumulated. If the engine is operated in extremely dusty areas, in cold climates where sludging conditions exist, or where short flights and long idle periods are encountered which cause sludging conditions, the interval for changing oil should be reduced from the 50 hour interval outlined above.

□ 100 HOURS

1 TAILWHEEL PIVOT:
Lubricate with MIL-G-7711 grease through fitting every 100 hours, oftener if more than the usual amount of water, mud, ice or snow is encountered.

3 TAILWHEEL BEARINGS:
Lubricate with MIL-G-7711 grease through fitting every 100 hours, oftener if more than the usual amount of water, mud, ice or snow is encountered.

4 GYRO INSTRUMENT AIR FILTERS (OPT):
Replace every 100 hours and when erratic or sluggish responses are noted with normal suction gage readings.

6 FUEL TANK SUMP DRAINS:
Every 100 hours, remove drain plugs, drain off water and sediment, and reinstall plugs. Safety wire plugs to adjacent safety screws.

13 FUEL LINE DRAIN PLUG:
Every 100 hours, remove drain plug, drain off water and sediment and reinstall plug. Safety wire plug to adjacent fuselage structure.

14 BRAKE MASTER CYLINDERS:
Every 100 hours, check fluid level in brake master cylinders. Fill with MIL-H-5606 hydraulic fluid.

23 VACUUM SYSTEM OIL SEPARATOR (OPT):
Every 100 hours, remove separator and flush with Stoddard

Figure 5-1 (Sheet 4 of 6).

solvent (Fed. Spec. P-S-661), then dry with compressed air and reinstall.

24 SUCTION RELIEF VALVE INLET SCREEN (OPT):
Every 100 hours, check inlet screen for dirt or obstructions. Remove screen and clean with compressed air or wash with Stoddard solvent (Fed. Spec. P-S-661).

◇ 500 HOURS

8 ADJUSTABLE STABILIZER JACKSCREWS:
Every 500 hours, disconnect rubber boot, grease actuator threads with MIL-G-7711 grease and reinstall boot. Operate stabilizer system through several cycles to insure proper operation.

12 MAIN WHEEL BEARINGS:
Repack with MIL-G-7711 or a good grade of wheel bearing grease at first 100 hours, 500 hours thereafter; oftener if more than usual amount of water, mud, ice or snow is encountered.

△ AS REQUIRED

2 TAILWHEEL TIRE:
Maintain pressure of 55 psi to 65 psi maximum (2300 lbs to 2800 lbs normal operating loads). Remove oil and grease from tire with soap and water; periodically inspect for cuts, bruises and wear.

10 GROUND SERVICE RECEPTACLE (OPT):
Connect to 12-volt, DC, negative-ground power unit for cold weather starting and lengthy ground maintenance of the electrical system. Review Section III, paragraph "STARTING ENGINE" for position of master switch when using various external power sources.

11 MAIN WHEEL TIRES:
Maintain pressure of 28 psi in standard 6.00×6 tires and 23

Figure 5-1 (Sheet 5 of 6).

psi in optional 8.00×6 tires. Remove oil and grease from tires with soap and water; periodically inspect them for cuts, bruises and wear.

16 PROPELLER:
The McCauley propeller mechanism is sealed and does not require lubrication between overhauls.

The military specifications listed are not mandatory, but are intended as guides in choosing satisfactory materials. Products of most reputable manufacturers meet or exceed these specifications.

Figure 5-1 (Sheet 6 of 6).

OWNER 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 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 6
OPERATIONAL DATA

The operational data charts on the following pages are presented for two purposes; first, so that you may know what to expect from your airplane under various conditions, and second, to enable you to plan your flights in detail and with reasonable accuracy.

A power setting selected from the range charts usually will be more efficient than a random setting, since it will permit you to estimate your fuel consumption more accurately. You will find that using the charts and your Power Computer will pay dividends in overall efficiency.

The data in the charts has been compiled from actual flight tests with the airplane and engine in good condition and using average piloting techniques. Note also that the range charts make no allowances for wind, navigational errors, warm-up, take-off, climb, etc. You must estimate these variables for yourself and make allowances accordingly.

AIRSPEED CORRECTION TABLE
(LANDPLANE)

FLAPS UP								
IAS	60	80	100	120	140	160	180	
CAS	68	82	100	118	136	155	175	
* FLAPS DOWN								
IAS	40	50	60	70	80	90	100	110
CAS	56	61	67	74	82	91	101	111

* MAXIMUM FLAP SPEED 110 MPH, CAS

Figure 6-1.

STALL SPEED, POWER OFF

Gross Weight 2800 LBS.

CONFIGURATION	ANGLE OF BANK 0°	20°	40°	60°
FLAPS UP	65	67	75	92
FLAPS 20°	59	61	67	83
FLAPS 40°	58	60	66	82

LANDPLANE SPEEDS ARE MPH, CAS LANDPLANE

Figure 6-2.

LANDPLANE — TAKE-OFF DATA — LANDPLANE

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

GROSS WEIGHT POUNDS	IAS @ 50 FT	HEAD WIND KNOTS	AT SEA LEVEL & 59° F GROUND RUN	AT SEA LEVEL & 59° F TOTAL TO CLEAR 50 FT OBS	AT 2500 FT & 50° F GROUND RUN	AT 2500 FT & 50° F TOTAL TO CLEAR 50 FT OBS	AT 5000 FT & 41° F GROUND RUN	AT 5000 FT & 41° F TOTAL TO CLEAR 50 FT OBS	AT 7500 FT & 32° F GROUND RUN	AT 7500 FT & 32° F TOTAL TO CLEAR 50 FT OBS
2000	52	0	295	655	350	745	415	855	505	1005
		10	190	475	225	545	275	630	340	750
		20	105	315	130	370	160	435	205	525
2400	57	0	440	895	525	1040	630	1215	765	1465
		10	295	665	355	775	435	920	535	1120
		20	175	460	215	545	270	655	340	810
2800	61	0	625	1205	750	1425	900	1700	1100	2110
		10	430	915	525	1085	635	1310	790	1645
		20	270	650	335	785	420	965	530	1230

NOTE: Increase distance 10% for each 25° F above standard temperature for particular altitude.

LANDPLANE — MAXIMUM RATE-OF-CLIMB DATA — LANDPLANE

GROSS WEIGHT POUNDS	AT SEA LEVEL & 59°F IAS MPH	RATE OF CLIMB FT/MIN.	GAL. OF FUEL USED	AT 5000 FT & 41°F IAS MPH	RATE OF CLIMB FT/MIN.	FROM S. L. FUEL USED	AT 10,000 FT & 23°F IAS MPH	RATE OF CLIMB FT/MIN.	FROM S. L. FUEL USED	AT 15,000 FT & 5°F IAS MPH	RATE OF CLIMB FT/MIN.	FROM S. L. FUEL USED	AT 20,000 FT & -12°F IAS MPH	RATE OF CLIMB FT/MIN.	FROM S. L. FUEL USED
2000	91	1765	1.5	87	1450	2.6	82	1125	3.9	76	805	5.4	72	480	7.6
2400	93	1380	1.5	89	1105	2.9	85	825	4.6	79	550	6.8	75	270	10.5
2800	95	1090	1.5	91	840	3.4	87	590	5.6	82	335	8.9	78	80	16.9

NOTES: 1. Full throttle, 2600 RPM, flaps up, mixture leaned for smooth operation above 5000 ft.
2. Fuel used includes warm-up and take-off allowance.

Figure 6-3.

CRUISE PERFORMANCE

LEAN MIXTURE

Standard Conditions — Zero Wind — Gross Weight - 2800 Pounds

RPM	MP	% BHP	GAL/ HOUR	TAS MPH	60 GAL (NO RESERVE) ENDR. HOURS	60 GAL (NO RESERVE) RANGE MILES	79 GAL (NO RESERVE) ENDR. HOURS	79 GAL (NO RESERVE) RANGE MILES
2500 FEET								
2450	23	76	14.2	158	4.2	670	5.6	885
	22	72	13.4	154	4.5	690	5.9	910
	21	68	12.7	151	4.7	715	6.2	940
	20	63	12.0	148	5.0	730	6.6	965
2300	23	71	13.1	154	4.6	700	6.0	925
	22	67	12.2	149	4.9	740	6.5	970
	21	62	11.5	145	5.2	760	6.9	1005
	20	59	11.0	142	5.5	775	7.2	1020
2200	23	67	12.1	149	5.0	745	6.5	980
	22	63	11.4	146	5.3	770	6.9	1010
	21	59	10.8	142	5.6	790	7.3	1040
	20	55	10.2	138	5.9	810	7.7	1065
2000 MAXIMUM RANGE SETTINGS	20	47	8.7	126	6.9	865	9.1	1135
	19	43	8.2	121	7.3	890	9.6	1170
	18	39	7.5	113	8.0	900	10.5	1185
	17	35	7.0	105	8.6	905	11.3	1190
5000 FEET								
2450	23	78	14.5	163	4.1	670	5.4	885
	22	73	13.6	159	4.4	700	5.8	925
	21	70	13.0	156	4.6	720	6.1	950
	20	65	12.2	151	4.9	750	6.5	985
2300	23	73	13.4	158	4.5	710	5.9	930
	22	69	12.6	155	4.7	730	6.3	965
	21	64	11.9	151	5.0	760	6.6	1005
	20	60	11.2	146	5.4	785	7.1	1035
2200	23	68	12.4	155	4.8	750	6.4	985
	22	64	11.7	151	5.1	775	6.8	1020
	21	60	11.0	146	5.5	800	7.2	1050
	20	57	10.5	143	5.7	815	7.5	1075
2000 MAXIMUM RANGE SETTINGS	19	45	8.5	126	7.1	895	9.3	1175
	18	41	7.9	118	7.6	905	10.0	1190
	17	37	7.3	111	8.2	910	10.8	1200
	16	34	6.8	103	8.8	905	11.6	1190

Figure 6-4 (Sheet 1 of 3).

CRUISE PERFORMANCE

LEAN MIXTURE

Standard Conditions — Zero Wind — Gross Weight - 2800 Pounds

RPM	MP	% BHP	GAL/ HOUR	TAS MPH	60 GAL (NO RESERVE) ENDR. HOURS	60 GAL (NO RESERVE) RANGE MILES	79 GAL (NO RESERVE) ENDR. HOURS	79 GAL (NO RESERVE) RANGE MILES
7500 FEET								
2450	21	71	13.1	161	4.6	730	6.0	960
	20	67	12.4	157	4.8	760	6.4	1005
	19	62	11.7	152	5.1	780	6.8	1025
	18	58	11.0	147	5.5	805	7.2	1055
2300	21	66	12.2	156	4.9	760	6.5	1005
	20	62	11.6	151	5.2	780	6.8	1025
	19	58	11.0	147	5.5	800	7.2	1050
	18	54	10.5	142	5.7	810	7.5	1065
2200	21	62	11.4	152	5.3	805	6.9	1055
	20	58	10.7	148	5.6	830	7.4	1090
	19	54	10.2	143	5.9	840	7.7	1105
	18	51	9.7	138	6.2	860	8.1	1130
2000 MAXIMUM RANGE SETTINGS	19	47	8.7	131	6.9	900	9.1	1185
	18	43	8.1	123	7.4	910	9.8	1200
	17	39	7.6	116	7.9	920	10.4	1210
	16	36	7.0	107	8.6	920	11.3	1210
10,000 FEET								
2450	19	63	11.9	156	5.0	785	6.6	1035
	18	60	11.2	152	5.3	810	7.1	1065
	17	55	10.6	146	5.7	830	7.5	1090
	16	51	10.0	141	6.0	840	7.9	1105
2300	19	60	11.1	152	5.4	820	7.1	1080
	18	56	10.5	147	5.7	840	7.5	1105
	17	51	9.8	141	6.1	860	8.1	1130
	16	47	9.2	134	6.5	870	8.6	1145
2200	19	56	10.4	148	5.7	850	7.6	1120
	18	52	9.8	142	6.1	875	8.1	1155
	17	49	9.3	136	6.5	880	8.5	1160
	16	45	8.7	129	6.9	895	9.1	1175
2000 MAXIMUM RANGE SETTINGS	18	44	8.4	128	7.1	910	9.4	1200
	17	40	7.8	120	7.7	925	10.1	1215
	16	38	7.4	114	8.1	925	10.7	1215
	15	35	6.9	105	8.7	910	11.4	1200

Figure 6-4 (Sheet 2 of 3).

CRUISE PERFORMANCE

LEAN MIXTURE

Standard Conditions — Zero Wind — Gross Weight-2800 Pounds

RPM	MP	% BHP	GAL/ HOUR	TAS MPH	60 GAL (NO RESERVE) ENDR. HOURS	60 GAL (NO RESERVE) RANGE MILES	79 GAL (NO RESERVE) ENDR. HOURS	79 GAL (NO RESERVE) RANGE MILES
15,000 FEET								
2450	16	54	10.4	150	5.8	865	7.6	1135
	15	50	9.8	142	6.1	875	8.1	1155
	14	46	9.2	135	6.5	880	8.6	1160
2300	16	50	9.6	143	6.2	890	8.2	1170
	15	47	9.1	136	6.6	900	8.7	1185
	14	42	8.5	127	7.1	900	9.3	1185
2200	16	47	9.1	138	6.6	910	8.7	1200
	15	44	8.6	130	7.0	910	9.2	1200
	14	40	8.0	120	7.5	905	9.9	1190
2000 MAXIMUM RANGE SETTINGS	16	40	7.8	122	7.7	940	10.1	1240
	15	37	7.3	112	8.2	920	10.8	1210
	14	34	6.8	101	8.8	895	11.6	1175
20,000 FEET								
2450	13	44	9.0	133	6.7	895	8.8	1175
	12	40	8.3	122	7.2	875	9.5	1155
2300	13	42	8.4	126	7.1	905	9.4	1190
	12	38	7.7	113	7.8	875	10.3	1155
2200	13	39	7.8	118	7.7	905	10.1	1190
	12	35	7.2	103	8.3	865	11.0	1135

Figure 6-4 (Sheet 3 of 3).

LANDING DISTANCE TABLE

LANDING DISTANCE WITH 40° FLAPS ON HARD SURFACED RUNWAY

GROSS WEIGHT POUNDS	APPROACH IAS MPH	@ SEA LEVEL & 59° F GROUND ROLL	@ SEA LEVEL & 59° F TOTAL TO CLEAR 50 FT OBS	@ 2500 FEET & 50° F GROUND ROLL	@ 2500 FEET & 50° F TOTAL TO CLEAR 50 FT OBS	@ 5000 FEET & 41° F GROUND ROLL	@ 5000 FEET & 41° F TOTAL TO CLEAR 50 FT OBS	@ 7500 FEET & 32° F GROUND ROLL	@ 7500 FEET & 32° F TOTAL TO CLEAR 50 FT OBS
2800	70	480	1365	505	1445	540	1535	570	1625

NOTE: Distances shown are based on zero wind, power off, and heavy braking. Reduce landing distances 10% for each 4 knots head wind.

Figure 6-5.

NOTES

Section 7

OPTIONAL SYSTEMS

This section contains a description, operating procedures, and performance data (when applicable) for some of the optional equipment which may be installed in your 180. Owner's Manual Supplements are provided to cover operation of other optional equipment systems when installed in your airplane. Contact your Cessna Dealer for a complete list of available 180 Optional Equipment.

RADIO SELECTOR SWITCHES

RADIO SELECTOR SWITCH OPERATION.

Operation of the radio equipment is normal as covered in the respective radio manuals. When more than one radio is installed, an audio switching system is necessary. The operation of this switching system is described below.

TRANSMITTER SELECTOR SWITCH.

The transmitter selector switch has two positions. When two transmitters are installed, it is necessary to switch the microphone to the radio unit the pilot desires to use for transmission. This is accomplished by placing the transmitter selector switch in the position corresponding to the radio unit which is to be used. As illustrated in figure 7-1, the transmitter selector switch may be labeled 1, 2, 3 or 4, depending upon the position of the radio units on the instrument panel.

SPEAKER - PHONE SWITCHES.

The speaker-phone switches determine whether the output of the receiver in use is fed to the headphones or through the audio amplifier to the speaker. Place the switch for the desired receiving system either in the up position for speaker operation or in the down position for headphones.

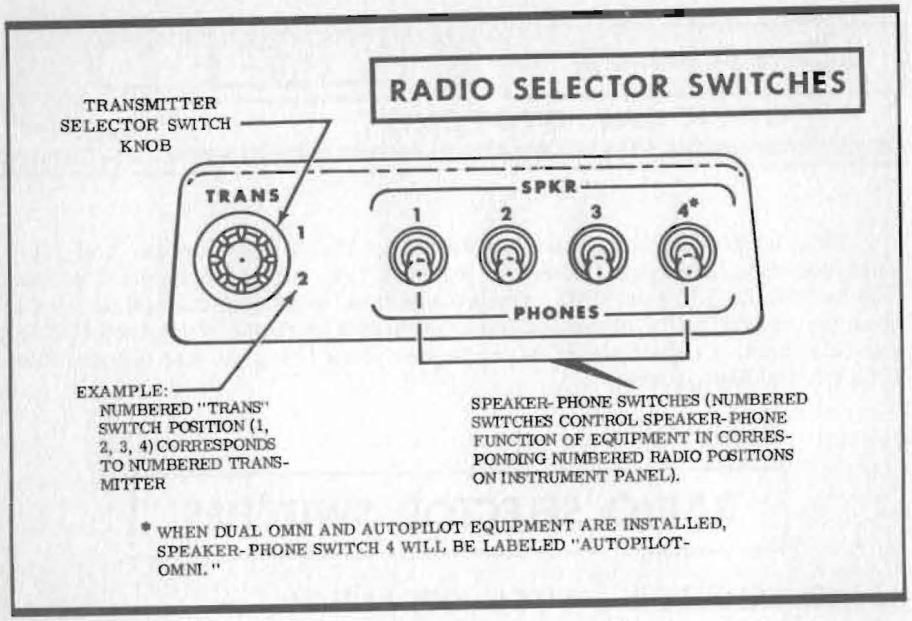


Figure 7-1.

AUTOPILOT-OMNI SWITCH.

When a Nav-O-Matic autopilot is installed with two compatible omni receivers, an autopilot-omni switch is installed in speaker-phone switch position No. 4. This switch selects the omni receiver to be used for the omni course sensing function of the autopilot. The up position selects the upper omni receiver in the radio panel stack and the down position selects the lower omni receiver.

OXYGEN SYSTEM

OXYGEN SYSTEM.

The oxygen system in your airplane, supplying oxygen through five individual outlets, is completely automatic. It requires no manual regulation for change of altitude or flow shut-off when the system is not in use.

The system consists of an oxygen cylinder, filler valve, pressure gage, pressure regulator, outlet couplings, and five disposable oxygen face masks, complete with vinyl plastic hoses and flow indicators. The face masks and hoses are stored in a plastic bag, normally stowed on the utility shelf when not in use.

The oxygen cylinder and shut-off valve are located aft of the baggage compartment. Oxygen, under high pressure, flows from the cylinder to an automatic pressure regulator which supplies filtered, low pressure oxygen to five individual outlets. The outlets, regulator, and a pressure gage that indicates oxygen cylinder pressure, are located in the overhead console panel. When the oxygen mask hoses are plugged into the quick-disconnect outlet couplings, a continuous flow of oxygen is supplied to each face mask. A flow indicator in each mask supply line shows if oxygen is flowing.

IMPORTANT

Permit no smoking when using oxygen. Oil, grease, soap, and other fatty materials in contact with oxygen constitute a serious fire hazard. Be sure hands and clothing are oil-free before handling oxygen equipment.

OXYGEN SYSTEM OPERATION.

Prior to flight, check to be sure that there is an adequate oxygen supply for the trip, by noting the oxygen pressure gage reading. Refer to the Oxygen Duration Chart (figure 7-3). See that the plastic bag containing the face masks and hoses is accessible, and that the masks and hoses are in good condition.

To use the oxygen system, proceed as follows:

(1) Select mask and hose from plastic bag.
(2) If mask is not connected to hose, attach by inserting plastic tube on mask into rubber hose connector on delivery hose.
(3) Attach mask to face.
(4) Select oxygen outlet coupling in overhead console panel and plug delivery hose into it. Oxygen will flow continuously at the proper rate of flow for any altitude without any manual adjustments.
(5) Check the flow indicator in the face mask hose. Oxygen is flowing if the red indicator compresses its return spring.

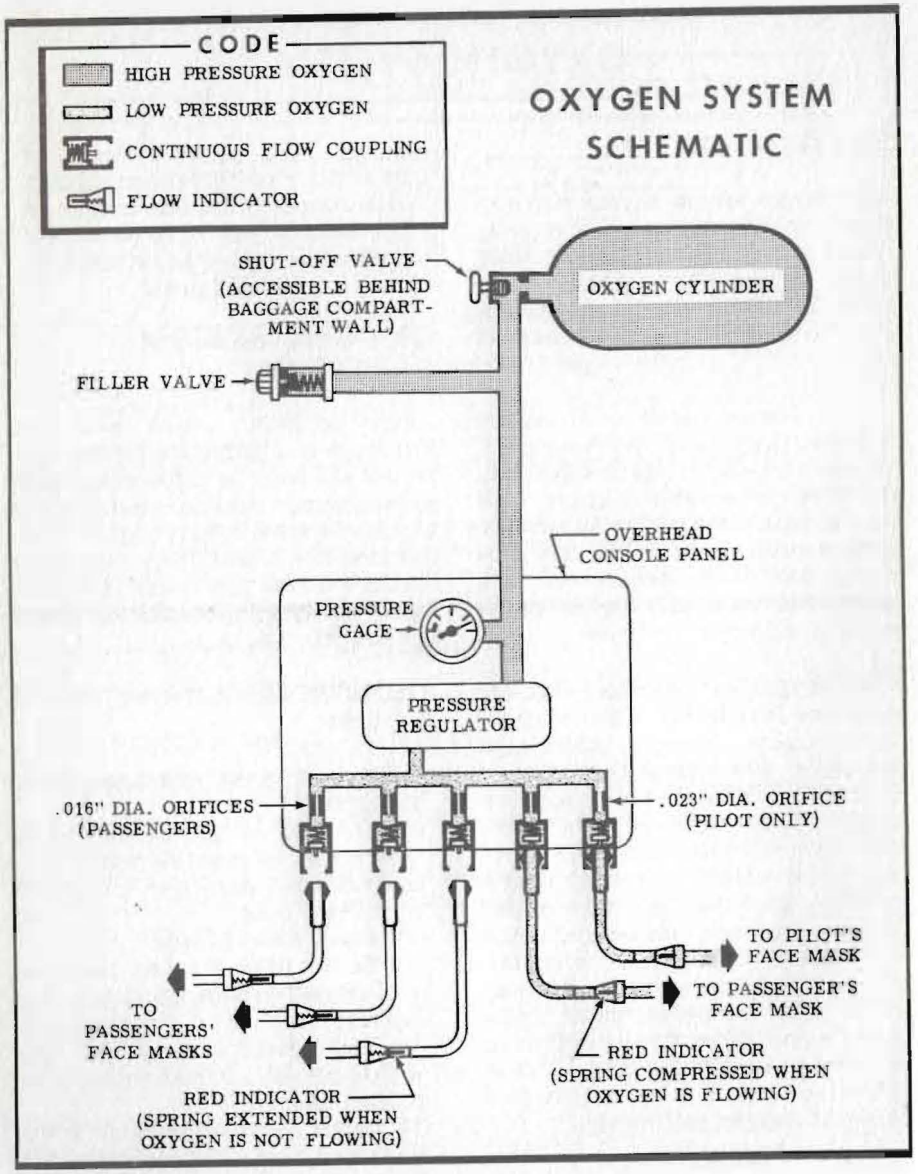


Figure 7-2.

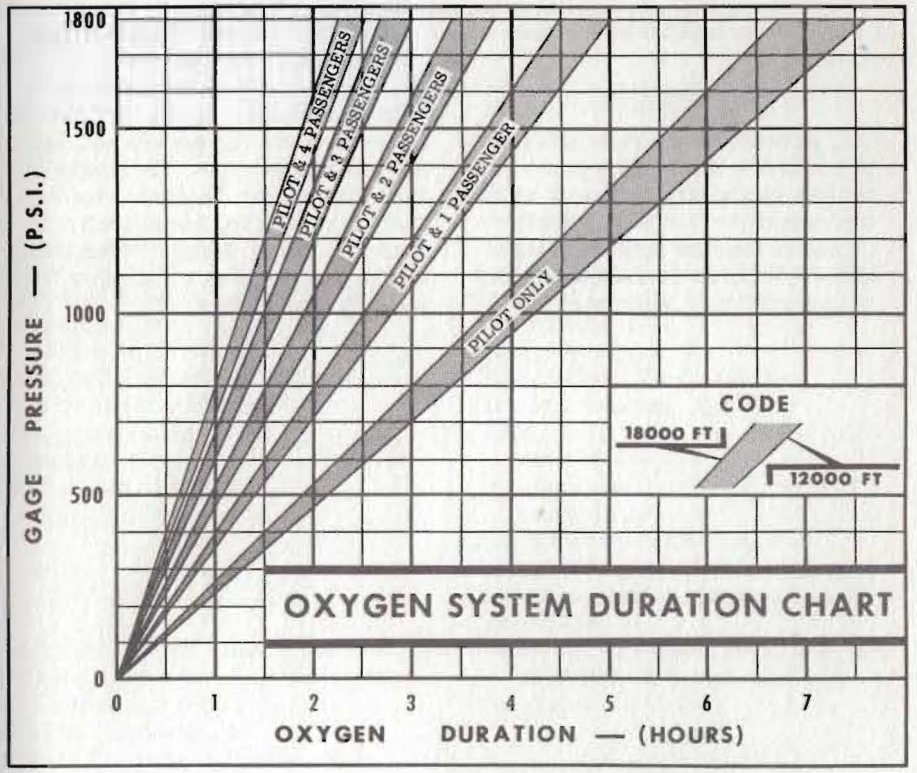


Figure 7-3.

NOTE

The left console outlet (labeled "PILOT") meters approximately twice the volume of oxygen metered by the other outlets.

(6) Unplug the delivery hose from the overhead console when discontinuing use of the oxygen system. This automatically stops the flow of oxygen.

OXYGEN SYSTEM SERVICING.

The oxygen cylinder, when fully charged, contains 48 cubic feet of oxygen, under a pressure of 1800 psi at 70°F. It should be refilled, whenever the oxygen pressure gage indicates less than 300 psi, with aviators' breathing oxygen (Fed. Spec. No. BB-O-925, or equivalent). For servicing convenience, a filler valve

is readily accessible at the rear of the cabin.

IMPORTANT

Oil, grease, or other lubricants in contact with oxygen create a serious fire hazard, and such contact must be avoided. Only a thread compound approved under MIL-T-5542 can be used safely on oxygen systems. Apply only to the first three threads of male fittings to prevent thread seizure.

The face masks used with the oxygen system are the partial-rebreathing, disposable type. The masks are durable and the frequent user can mark his mask for identification and reuse it many times. Additional masks and hoses are available from your Cessna Dealer.

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WARRANTY

■ The Cessna Aircraft Company (Cessna) warrants each new aircraft, including factory installed equipment and accessories, and warrants all new aircraft equipment and accessories bearing the name "Cessna," to be free from defects in material and workmanship under normal use and service. Cessna's obligation under this warranty is limited to supplying a part or parts to replace any part or parts which, within six (6) months after delivery of such aircraft or such aircraft equipment or accessories to the original retail purchaser or first user, shall be returned transportation charges prepaid to Cessna at Wichita, Kansas, or such other place as Cessna may designate and which upon examination shall disclose to Cessna's satisfaction to have been thus defective.

■ The provisions of this warranty shall not apply to any aircraft, equipment or accessories which have been subject to misuse, negligence or accident, or which shall have been repaired or altered outside of Cessna's factory in any way so as in the judgment of Cessna to affect adversely its performance, stability or reliability. This warranty is expressly in lieu of any other warranties, expressed or implied, including any implied warranty of merchantability or fitness for a particular purpose, and of any other obligation or liability on the part of Cessna of any nature whatsoever and Cessna neither assumes nor authorizes any one to assume for it any other obligation or liability in connection with such aircraft, equipment and accessories.

SERVICING REQUIREMENTS

FUEL:

AVIATION GRADE -- 80/87 MINIMUM GRADE
CAPACITY EACH STANDARD TANK -- 32.5 GALLONS
CAPACITY EACH LONG RANGE TANK -- 42.0 GALLONS

ENGINE OIL:

AVIATION GRADE -- SAE 30 BELOW 40° F.
SAE 50 ABOVE 40° F.
CAPACITY OF ENGINE SUMP -- 12 QUARTS
(DO NOT OPERATE ON LESS THAN 9 QUARTS AND FILL IF EXTENDED FLIGHT IS PLANNED)

HYDRAULIC FLUID:

MIL-H-5606 HYDRAULIC FLUID

OXYGEN:

AVIATOR'S BREATHING OXYGEN -- SPEC. NO. BB-O-925
MAXIMUM PRESSURE -- 1800 PSI

TIRE PRESSURE:

MAIN WHEELS -- 28 PSI ON 6.00×6 TIRES
23 PSI ON 8.00×6 TIRES (OPTIONAL)
TAIL WHEEL -- 55 PSI TO 65 PSI MAXIMUM
(2300 LBS TO 2800 LBS NORMAL OPERATING LOADS)