THERE ARE MORE CESSNAS FLYING THAN ANY OTHER MAKE

1965

CESSNA

MODEL 182 AND SKYLANE

OWNER'S MANUAL

WORLD'S LARGEST PRODUCER OF GENERAL AVIATION AIRCRAFT SINCE 1956

PERFORMANCE - SPECIFICATIONS

	MODEL 182	SKYLANE
GROSS WEIGHT	2800 lbs	2800 lbs
SPEED:		
Top Speed at Sea Level	167 mph	170 mph
Cruise, 75% Power at 6500 ft.	159 mph	162 mph
RANGE:		
Cruise,	685 mi	695 mi
75% Power at 6500 ft.	4.3 hrs	4.3 hrs
60 Gallons, No Reserve	159 mph	162 mph
Cruise,	905 mi	925 mi
75% Power at 6500 ft.	5.7 hrs	5.7 hrs
79 Gallons, No Reserve	159 mph	162 mph
Optimum Range at 10,000 ft	905 mi	925 mi
60 Gallons, No Reserve	7.6 hrs	7.6 hrs
	119 mph	121 mph
Optimum Range at 10,000 ft	1190 mi	1215 mi
79 Gallons, No Reserve	10.0 hrs	10.0 hrs
	119 mph	121 mph
RATE OF CLIMB AT SEA LEVEL	980 fpm	980 fpm
SERVICE CEILING	18,900 ft	18,900 ft
TAKE-OFF:		
Ground Run	625 ft	625 ft
Total Distance Over 50-Foot Obstacle	1205 ft	1205 ft
LANDING:		
Ground Roll	590 ft	590 ft
Total Distance Over 50-Foot Obstacle	1350 ft	1350 ft
EMPTY WEIGHT (Approximate)	1550 lbs	1610 lbs
BAGGAGE	120 lbs	120 lbs
WING LOADING: Pounds/Sq Foot	16.1	16.1
POWER LOADING: Pounds/HP	12.2	12.2
FUEL CAPACITY: Total		
Standard Tanks	65 gal.	65 gal.
Optional Long Range Tanks	84 gal.	84 gal.
OIL CAPACITY: Total	12 qts	12 qts
PROPELLER: Constant Speed (Diameter)	82 inches	82 inches
ENGINE: Continental Engine 230 rated HP at 2600 RPM	O-470-R	O-470-R

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 Model 182/Skylane. 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 PERSONNEL 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.

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

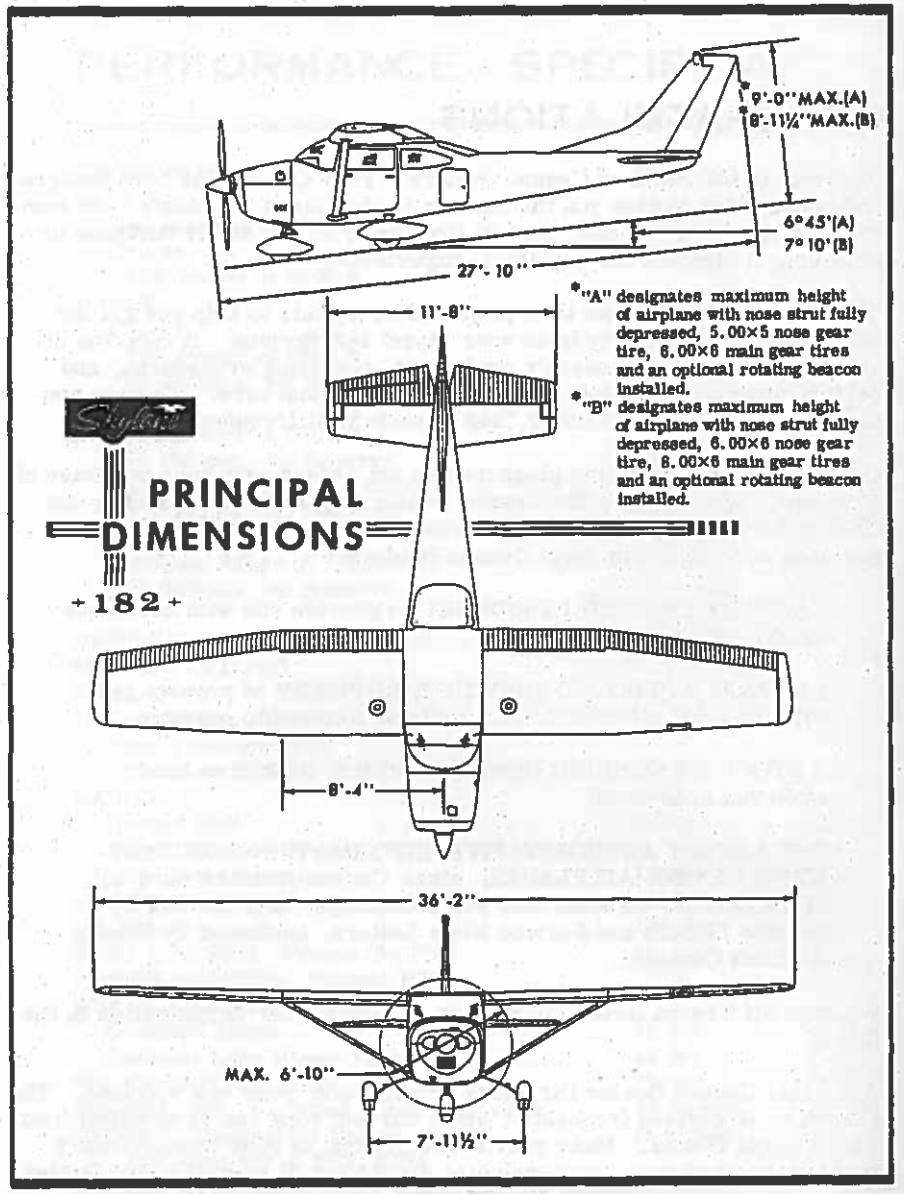
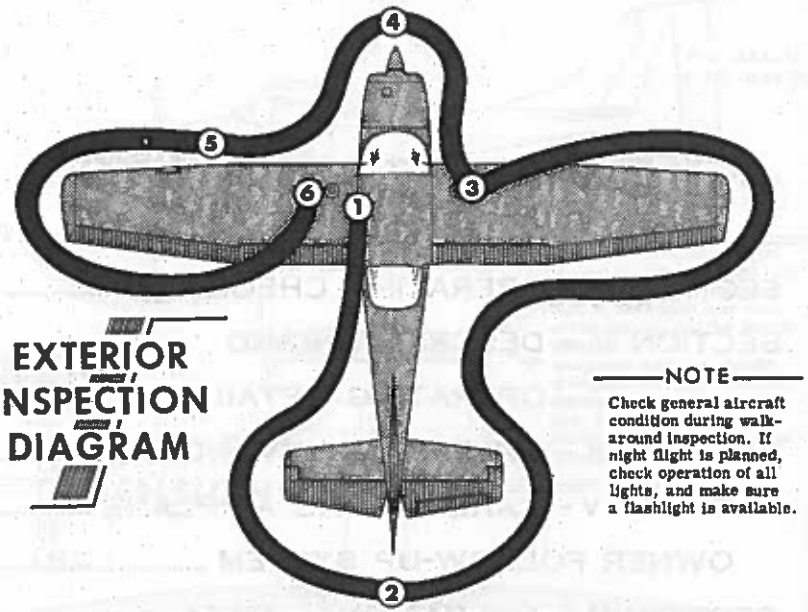


TABLE OF CONTENTS

This manual describes the operation and performance of both the Cessna Model 182 and the Cessna Skylane. Equipment described as "Optional" denotes that the subject equipment is optional on the Model 182. Much of this equipment is standard on the Skylane model.



(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 handle on "BOTH."
d. On first flight of day and after each refueling, pull out strainer drain 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.

(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.

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

(5) a. Remove pitot tube cover, if installed, and check pitot tube opening for stoppage.
b. Check fuel tank vent opening for stoppage. Also, check fuel tank vent opening provided in right wing when optional long range fuel tanks are installed.

(6) Same as (3).

Figure 1-1.

Section 182 I

OPERATING CHECK LIST

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 in Section II.

Section I 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 should know 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. All airspeeds mentioned in Sections I and II are indicated airspeeds. Corresponding calibrated airspeeds may be obtained from the Airspeed Correction Table in Section V.

BEFORE ENTERING THE AIRPLANE.

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

BEFORE STARTING THE ENGINE.

(1) Seats and Seat Belts -- Adjust and lock.
(2) Flight Controls -- Check.
(3) Brakes -- Test and set.
(4) Master Switch -- "ON."
(5) Cowl Flaps -- "OPEN." (Move lever out of locking hole to reposition.)
(6) Elevator and Rudder Trim -- "TAKE-OFF" setting.
(7) Fuel Selector Valve -- "BOTH."
(8) Turn all radio switches "OFF."

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 -- Check.
(3) Carburetor Heat -- Check operation, then set to cold unless icing conditions prevail.
(4) Ammeter -- Check.
(5) Suction Gage -- Check (4.5 inches of mercury desired, 3.75 to 5.0 acceptable).
(6) Magnetos -- Check (50 RPM maximum differential between magnetos).
(7) Propeller -- Cycle from high to low RPM; return to high RPM (full in).
(8) Flight Controls -- Recheck.
(9) Wing Flaps -- Check operation and set 0° to 20°.
(10) Cowl Flaps -- Full "OPEN."
(11) Elevator and Rudder Trim -- Recheck "TAKE-OFF" setting.
(12) Cabin Doors -- Closed and locked.
(13) 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 -- Raise nosewheel at 60 MPH.
(5) Climb Speed -- 90 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 -- 60 MPH until all obstacles are cleared, then set up climb speed as shown in "MAXIMUM PERFORMANCE CLIMB."
(8) Wing 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 due to excessively rich mixture).
(4) Cowl Flaps -- Open as required.

MAXIMUM PERFORMANCE CLIMB.

(1) Air Speed -- 88 MPH (sea level) to 84 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 to 23 inches of manifold pressure and 2200 - 2450 RPM.
(2) Cowl Flaps -- Open as required.
(3) Elevator and Rudder Trim -- 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 Valve -- "BOTH."
(2) Mixture -- Rich.
(3) Propeller -- High RPM.
(4) Cowl Flaps -- Closed.
(5) Carburetor Heat -- Apply before closing throttle.
(6) Airspeed -- 80 to 90 MPH (flaps retracted).
(7) Wing Flaps -- 0° to 40° (below 110 MPH).
(8) Airspeed -- 70 to 80 MPH (flaps extended).
(9) Elevator and Rudder Trim -- Adjust.

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 (pulled full out).

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 +182+ II

DESCRIPTION AND OPERATING DETAILS

The following paragraphs describe the systems and equipment whose function and operation is not obvious when sitting in the airplane. This section also covers in somewhat greater detail some of the items listed in Check List form in Section I that require further explanation.

FUEL SYSTEM.

Fuel is supplied to the engine from two tanks, one in each wing. The total usable fuel, for all flight conditions, is 60 gallons for standard tanks and 79 gallons for optional long range tanks.

NOTE

Unusable fuel is at a minimum due to the design of the fuel system. However, with 1/4 tank or less, prolonged uncoordinated flight such as slips or skids can uncover the fuel tank outlets, causing fuel starvation and engine stoppage when operating on a single tank. Therefore, to avoid this problem with low fuel reserves, the fuel selector should be set at "BOTH" position.

Fuel from each wing tank flows by gravity to a selector valve. Depending upon the setting of the selector valve, fuel from the left, right, or both tanks flows through a fuel strainer and carburetor to the engine induction system.

NOTE

Take off with the fuel selector valve handle in the "BOTH" position to prevent inadvertent take-off on an empty tank. However, when the selector is in the "BOTH" position, unequal fuel flow from each tank may occur after extended flight if the wings are not maintained exactly level. Re-

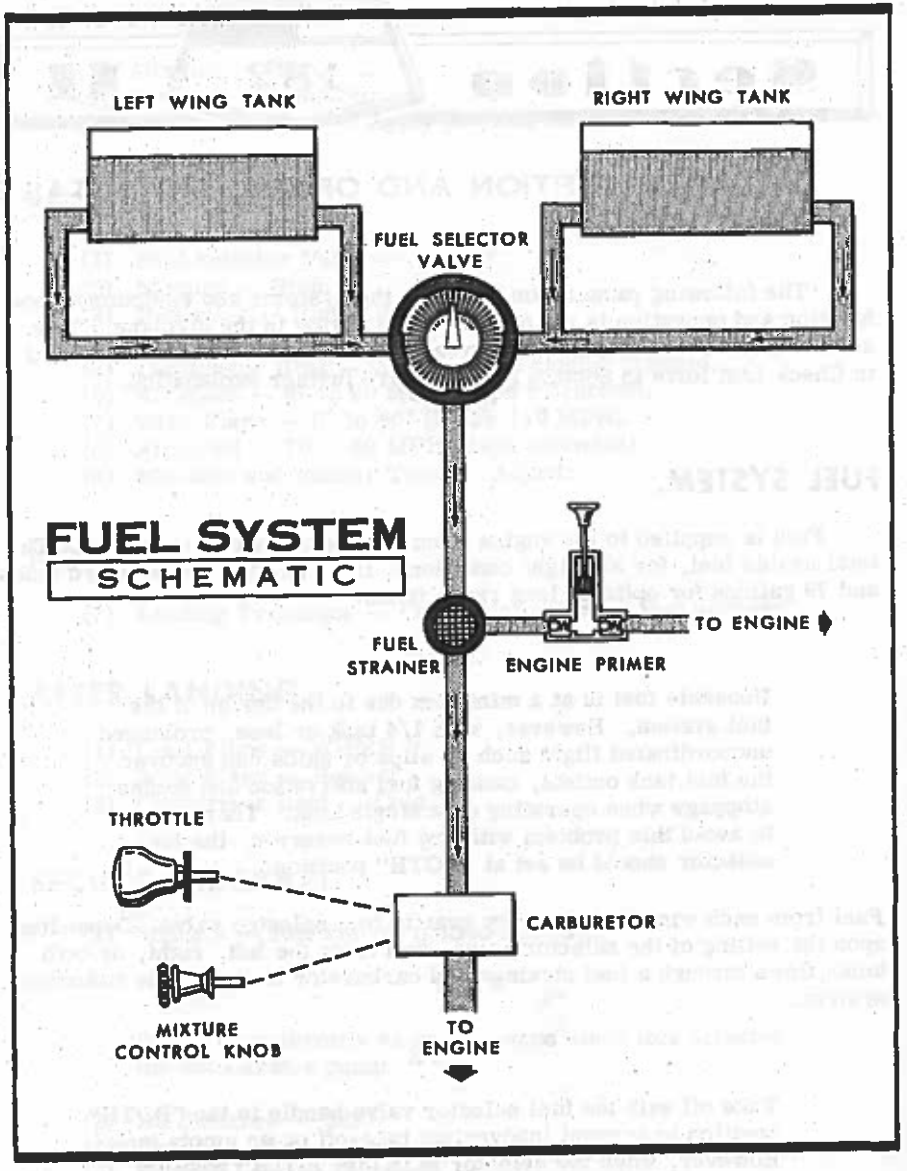


Figure 2-1.

sulting 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.

ELECTRICAL SYSTEM.

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

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 transmitter and horn circuit and the optional turn-and-bank indicator circuit are protected by a single automatically resetting circuit breaker mounted behind the instrument panel. The cigar lighter is protected by a manually reset type circuit breaker mounted directly on the back of the lighter behind the instrument panel. The remaining circuits are protected by "push-to-reset" circuit breakers on the instrument panel.

ROTATING BEACON (OPT).

The 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.

CABIN HEATING, VENTILATING AND DEFROSTING SYSTEM.

The temperature and volume of airflow into the cabin can be regulated to any degree desired by manipulation of the push-pull "CABIN HEAT" and "CABIN AIR" knobs. Both control knobs are the double-button type with friction locks to permit intermediate settings.

NOTE

Always pull out the "CABIN AIR" knob slightly when the

"CABIN HEAT" knob is out. This action increases the airflow through the system, increasing efficiency, and blends cool outside air with the exhaust manifold heated air, thus eliminating the possibility of overheating the system ducting.

The rotary type "DEFROST" knob regulates the airflow for windshield defrosting.

Front cabin heat and ventilating air is supplied by outlet holes spaced across a cabin manifold just forward of the pilot's and copilot's feet. Rear cabin heat and air is supplied by two ducts from the manifold, one extending down each side of the cabin. Windshield defrost air is also supplied by a duct leading from the cabin manifold.

Separate adjustable ventilators supply additional air; one near each upper corner of the windshield supplies air for the pilot and copilot, and two in the rear cabin ceiling supply air to the rear seat passengers.

STARTING ENGINE.

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. Additional priming will be necessary for the next starting attempt.

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.

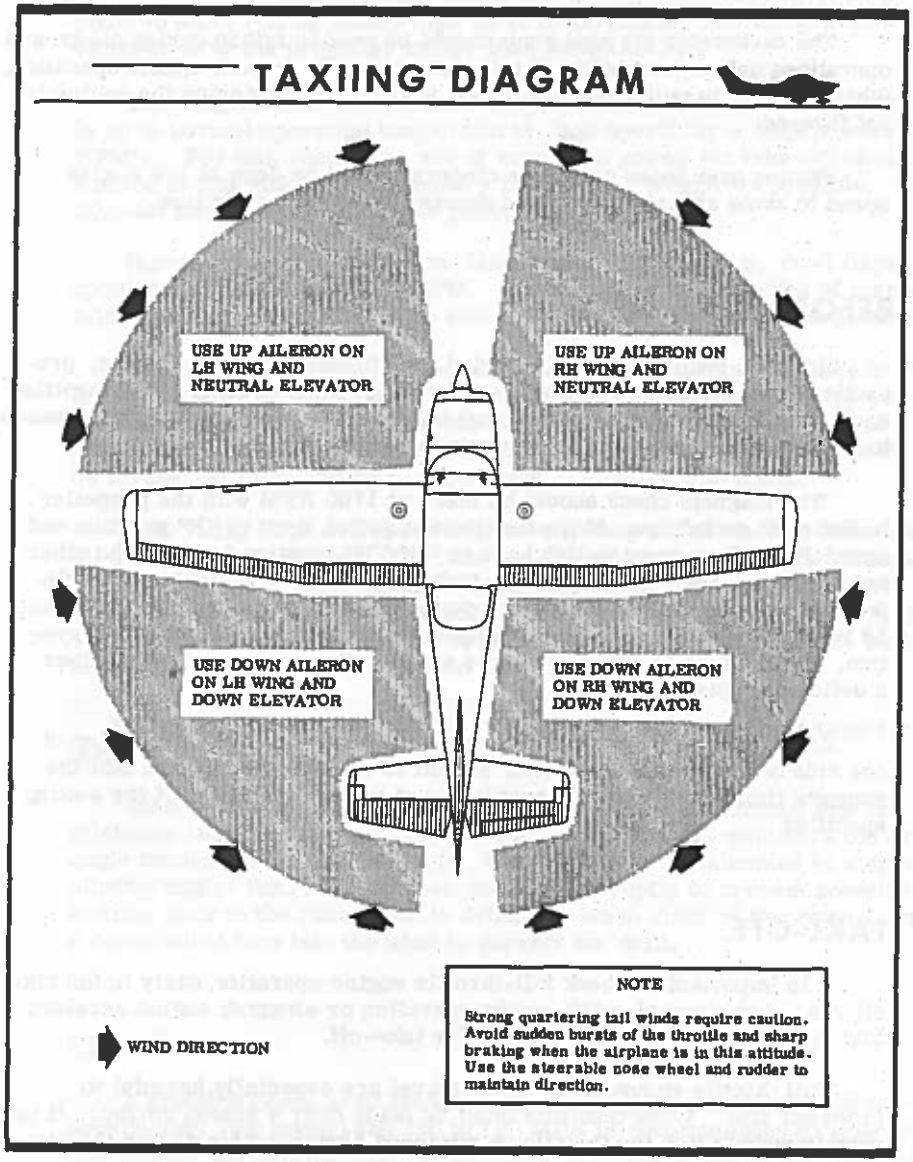


Figure 2-2.

TAXIING.

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.

Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller tips.

BEFORE TAKE-OFF.

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.

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.

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.

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.

Full throttle runups over loose gravel are especially harmful to propeller tips. When take-offs must be made over a gravel surface, it is very important that the throttle be advanced slowly. This allows the airplane to start rolling before high RPM is developed, and the gravel will be blown back of the propeller rather than pulled into it.

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

Flap deflections of 30° to 40° are not recommended at any time 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.

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 88 MPH at sea level, decreasing 2 MPH for each 5000 feet above sea level.

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 70 MPH.

In a balked landing (go-around) climb, the wing flap setting should be reduced to 20° immediately after full power is applied. After all obstacles are cleared and a safe altitude and airspeed are obtained, the wing flaps should be retracted.

CRUISE.

Normal cruising is done between 65% and 75% power. The power settings required to obtain these powers at various altitudes and outside air temperatures can be determined by using your Cessna Power Computer or the OPERATIONAL DATA, Section V.

OPTIMUM CRUISE PERFORMANCE

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

Figure 2-3.

The Optimum Cruise Performance table (figure 2-3), 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.

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

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.

To achieve the range figures shown in Section V, 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 the lean mixture setting.

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.

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 5-2 as calibrated airspeeds since indicated airspeeds are unreliable near the stall.

SPINS.

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

LANDING.

Landings are usually made on the main wheels first to reduce the

landing speed and the subsequent need for braking in the landing roll. The nosewheel is lowered gently to the runway after the speed has diminished to avoid unnecessary nose gear load. This procedure is especially important in rough field landings.

For short field landings, make a power off approach at 69 MPH, IAS with 40° flaps and land on the main wheels first. Immediately after touchdown, lower the nose gear to the ground and apply heavy braking as required. For maximum brake effectiveness after all three wheels are on the ground, retract the flaps, hold full nose up elevator and apply maximum possible brake pressure without sliding the tires.

COLD WEATHER OPERATION.

STARTING.

Prior to starting on a cold morning, 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) and an external power source is recommended whenever possible to obtain positive starting and to reduce wear and abuse to the engine and the electrical system.

Pre-heat will thaw the oil trapped in the oil cooler, which probably will be congealed prior to starting in extremely cold temperatures. When using an external power source, the position of the master switch is important. Refer to Section VI, paragraph GROUND SERVICE PLUG RECEPTACLE, for operating details.

Cold weather starting procedures are as follows:

With Preheat:

(1) With magneto switch "OFF" and throttle open 1/2", prime the engine four to eight strokes as the propeller is being turned over by hand.

NOTE

Use heavy strokes of primer for best atomization of fuel. After priming, push primer all the way in and

turn to locked position to avoid possibility of engine drawing fuel through the primer.

(2) Clear propeller.
(3) Turn master switch "ON."
(4) Turn magneto switch to "BOTH."
(5) Open throttle 1/2" and engage starter.
(6) Pull carburetor heat on after engine has started, and leave on until engine is running smoothly.

Without Preheat:

(1) Prime the engine six to eight strokes while the propeller is being turned by hand with throttle open 1/2". Leave primer charged and ready for stroke.
(2) Clear propeller.
(3) Turn master switch "ON."
(4) Turn magneto switch to "BOTH."
(5) Pump throttle rapidly to full open twice. Return to 1/2" open position.
(6) Engage starter and continue to prime engine until it is running smoothly, or alternately, pump throttle rapidly over first 1/4 of total travel.
(7) Pull carburetor heat on after engine has started. Leave on until engine is running smoothly.
(8) Lock primer.

NOTE

If the engine does not start during the first few attempts, or if engine firing diminishes in strength, it is probable that the spark plugs have been frosted over. Preheat must be used before another start is attempted.

IMPORTANT

Excessive priming and pumping throttle may cause raw fuel to accumulate in the intake air duct, creating a fire hazard in the event of a backfire. If this occurs, maintain a cranking action to suck flames into the engine. An outside attendant with a fire extinguisher is advised for cold starts without preheat.

OPERATION.

During cold weather operations, no indication will be apparent on the oil temperature gage prior to take-off if outside air temperatures are very cold. After a suitable warm-up period (2 to 5 minutes at 1000 RPM), accelerate the engine several times to higher engine RPM. If the engine accelerates smoothly and the oil pressure remains normal and steady, the airplane is 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° 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° to 70° range where icing is critical under certain atmospheric conditions.

Refer to Section VI for cold weather equipment and operating details for the OIL DILUTION SYSTEM.

HOT WEATHER OPERATION.

The general warm temperature starting information on page 2-4 is appropriate. Avoid prolonged engine operation on the ground.

OPERATING LIMITATIONS

OPERATIONS AUTHORIZED.

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

Additional optional equipment is available to increase its utility and to make it authorized for use under IFR day and night. An owner of a properly equipped Cessna is eligible to obtain approval for its operation on single engine scheduled airline service 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 Federal Aviation 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)	193 MPH (red line)
Caution Range	160-193 MPH (yellow arc)
Maximum Structural Cruising Speed (Level flight or climb)	160 MPH
Normal Operation Range	67-160 MPH (green arc)
Maximum Speed, Flaps Extended	110 MPH
Flap Operation 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	225° F (red line)

OIL PRESSURE GAGE.

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

MANIFOLD PRESSURE GAGE.

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

CYLINDER HEAD TEMPERATURE GAGE.

Normal Operating Range	275-450°F (green arc)
Do Not Exceed	450°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)

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)

FUEL QUANTITY INDICATORS.

Empty	E (red line)

WEIGHT AND BALANCE.

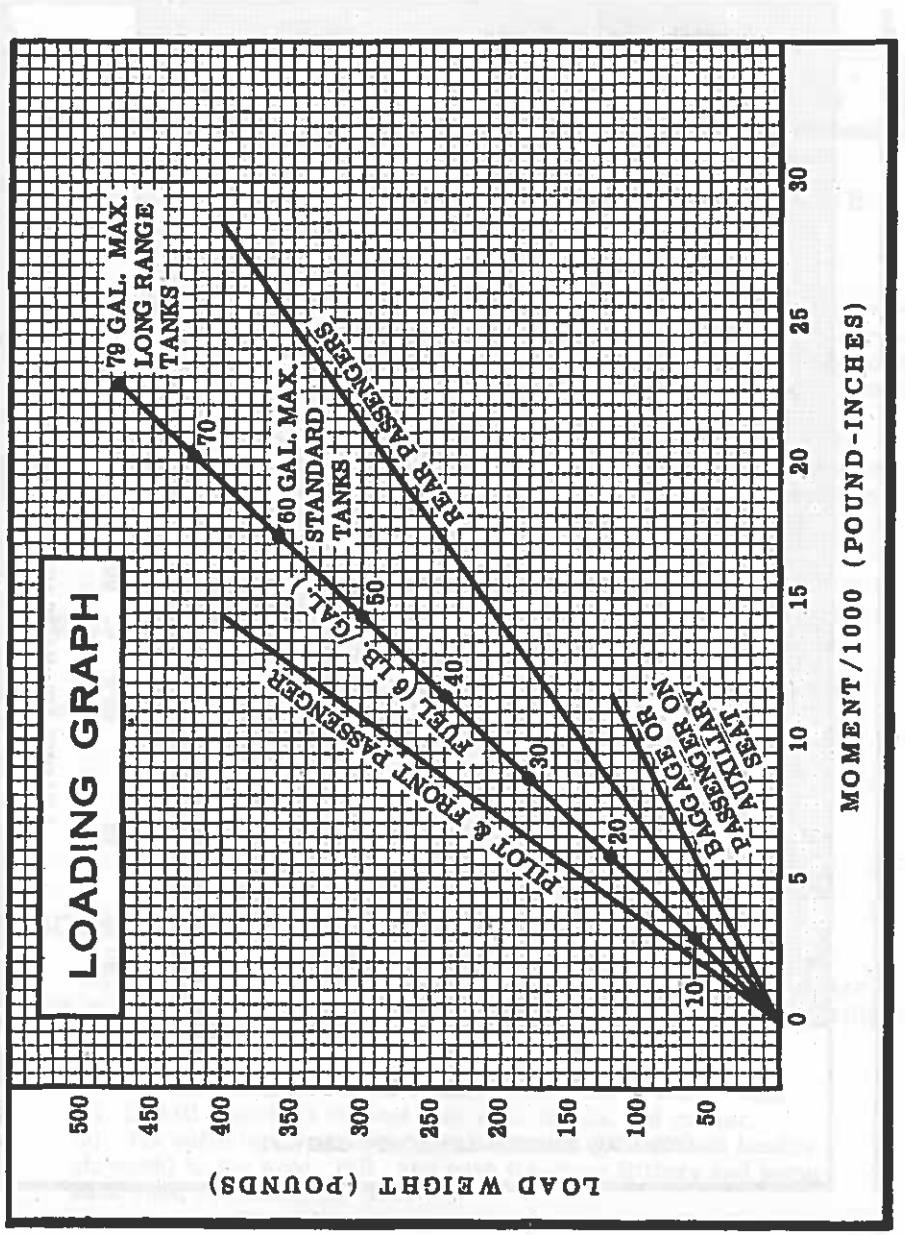
The following information will enable you to operate your Cessna within the prescribed weight and center of gravity limitations. To figure the weight and balance for your particular airplane, use the Sample Problem, Loading Graph, and Center of Gravity Moment Envelope as follows:

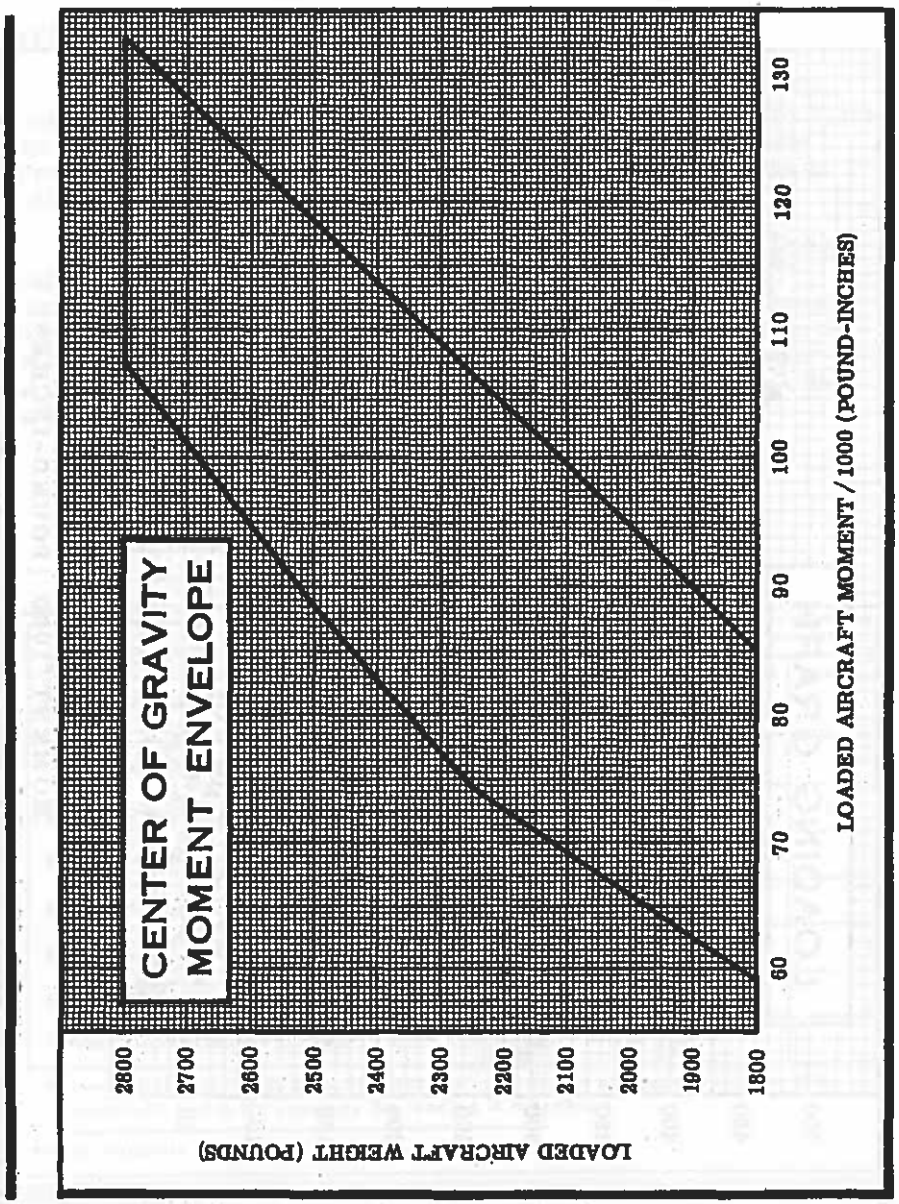
Take the licensed Empty Weight and Moment/1000 from the Weight and Balance Data sheet, plus any changes noted on forms FAA-337 carried in your airplane, and write them down in the proper columns. Using the Loading Graph, determine the moment/1000 of each item to be carried. Total the weights and moments/1000 and use the Center of Gravity Moment Envelope to determine whether the point falls within the envelope, and if the loading is acceptable.

SAMPLE LOADING PROBLEM	Sample Airplane			Your Airplane	
	Weight (lbs)	Moment (lb - ins. /1000)		Weight	Moment
1. Licensed Empty Weight (Sample Airplane) ...	1660	57.9			
2. Oil - 12 Qts.*	22	-0.3		22	-0.3
3. Pilot & Front Passenger	340	12.2			
4. Fuel - (60.0 Gal at 6#/Gal)	360	17.3			
5. Rear Passengers	340	24.1			
6. Baggage (or Passenger on Auxiliary Seat) ...	78	7.6			
7. Total Aircraft Weight (Loaded)	2800	118.8			

8. Locate this point (2800 at 118.8) on the center of gravity envelope, and since this point falls within the envelope the loading is acceptable.

*Note: Normally full oil may be assumed for all flights.





Section +182+ IV

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 climatic and flying conditions encountered in your locality.

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

GROUND HANDLING.

The airplane is most easily and safely maneuvered during ground handling by a tow-bar attached to the nosewheel.

NOTE

When using the tow-bar, do not exceed the nosewheel turning angle of 29° either side of center.

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) Set the parking brake and install the control wheel lock.
(2) Install a surface control lock over the fin and rudder.
(3) Tie sufficiently strong ropes or chains (700 pounds tensile strength) to the wing, tail, and nose tie-down fittings and secure each rope to a ramp tie-down.
(4) Install a pitot tube cover.

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 may be washed with clear water to remove dirt; oil and grease may be removed with gasoline, naptha, 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 require 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.

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.

INTERIOR CARE.

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

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

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

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

The plastic trim, headliner, instrument panel and control knobs need only be wiped off with a damp cloth. 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.

INSPECTION SERVICE AND 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 180 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.

Federal Aviation 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 Federal Aviation 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-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 Federal Aviation 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 PROCEDURES

Specific servicing information is provided here for items requiring daily attention. A Servicing Intervals Check List is included to inform the pilot when to have other items checked and serviced.

DAILY

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.

FUEL STRAINER:
Drain approximately two ounces of fuel before initial flight and after refueling to remove water and sediment. Make sure drain valve is closed after draining.

OIL DIPSTICK:
Check oil level before each flight. Do not operate on less than 9 quarts. To minimize loss of oil through breather, fill to 10 quart level for normal flights of less than 3 hours. For extended flight, fill to 12 quarts. If optional oil filter is installed, one additional quart is required when the filter element is changed.

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.

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 left side of rear baggage compartment wall and refill cylinder with aviator's breathing oxygen (Spec. No. MIL-O-27210). Maximum pressure, 1800 psi.

SERVICING INTERVALS CHECK LIST

EACH 50 HOURS

BATTERY -- Check and service. Check oftener (at least every 30 days) if operating in hot weather.
ENGINE OIL AND OIL FILTER -- Change engine oil and replace filter element. If optional oil filter is not installed, change oil and clean screen every 25 hours. Change engine oil at least every four months even though less than 50 hours have been accumulated. Reduce periods for prolonged operation in dusty areas, cold climates, or when short flights and long idle periods result in sludging conditions.
CARBURETOR AIR FILTER -- Clean or replace. Under extremely dusty conditions, daily maintenance of the filter is recommended.
NOSE GEAR TORQUE LINKS -- Lubricate.

EACH 100 HOURS

FUEL STRAINER -- Disassemble and clean.
FUEL TANK SUMP DRAIN PLUGS -- Remove and drain.
FUEL LINE DRAIN PLUG -- Remove and drain.
BRAKE MASTER CYLINDERS -- Check and fill.
SHIMMY DAMPENER -- Check and fill.
VACUUM SYSTEM OIL SEPARATOR (OPT) -- Clean.
SUCTION RELIEF VALVE INLET SCREEN (OPT) -- Clean.

EACH 500 HOURS

WHEEL BEARINGS -- Lubricate. Lubricate at first 100 hours and at 500 hours thereafter.
VACUUM SYSTEM AIR FILTER (OPT) -- Replace filter element. Replace sooner if suction gage reading drops below 3.75 in. Hg.

AS REQUIRED

NOSE GEAR SHOCK STRUT -- Keep inflated and filled.
GYRO INSTRUMENT AIR FILTERS (OPT) -- Replace at instrument overhaul.

OWNER FOLLOW-UP SYSTEM

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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 +182+ V

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.

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.

Remember that the charts contained herein are based on standard day conditions. For more precise power, fuel consumption, and endurance information, consult the Cessna Flight Guide (Power Computer) supplied with your aircraft. With the Flight Guide, you can easily take into account temperature variations from standard at any flight altitude.

AIRSPEED CORRECTION TABLE

FLAPS UP	IAS	60	80	100	120	140	160	180	—
	CAS	68	83	100	118	137	156	175	—
*FLAPS DOWN 20°-40°	IAS	40	50	60	70	80	90	100	110
	CAS	58	63	68	75	84	92	101	110

*Maximum Flap Speed 110 MPH, CAS

Figure 5-1.

STALL SPEED, POWER OFF

Gross Weight 2800 LBS. CONFIGURATION	ANGLE OF BANK 0°	30°	60°
FLAPS UP	64	69	91
FLAPS 20°	57	61	81
FLAPS 40°	55	59	78

SPEEDS ARE MPH, CAS

Figure 5-2.

TAKE-OFF DATA

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

GROSS WEIGHT LBS.	IAS @ 50' MPH	HEAD WIND MPH	AT SEA LEVEL & 59°F. GROUND RUN	TOTAL TO CLEAR 50' OBS.	•AT 2500 FT. & 50°F. GROUND RUN	TOTAL TO CLEAR 50' OBS.	AT 5000 FT. & 41°F. GROUND RUN	TOTAL TO CLEAR 50' OBS.	AT 7500 FT. & 32°F. GROUND RUN	TOTAL TO CLEAR 50' OBS.
2000	52	0	295	655	350	745	415	855	500	1005
		15	160	425	195	490	235	570	290	680
		30	65	235	80	280	105	335	135	405
2400	57	0	440	895	525	1035	630	1210	765	1460
		15	255	600	310	705	380	835	470	1020
		30	115	355	150	425	190	515	245	645
2800	61	0	625	1205	745	1420	895	1695	1095	2090
		15	380	830	460	990	585	1200	700	1505
		30	190	515	240	630	305	780	390	1000

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

MAXIMUM RATE-OF-CLIMB DATA

GROSS WEIGHT LBS.	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 SL FUEL USED	AT 10000 FT. & 23°F. IAS MPH	RATE OF CLIMB FT/MIN	From SL FUEL USED	AT 15000 FT. & 5°F. IAS MPH	RATE OF CLIMB FT/MIN	From SL FUEL USED	AT 20000 FT. & -12°F. IAS MPH	RATE OF CLIMB FT/MIN	From SL FUEL USED
2000	84	1710	1.5	82	1350	2.7	79	995	4.1	76	640	5.9	74	280	9.2
2400	86	1295	1.5	84	1005	3.1	82	720	5.0	79	435	7.6	77	150	12.9
2800	88	980	1.5	86	745	3.7	84	510	6.3	82	280	10.2	80	50	20.5

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

Figure 5-3.

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 5-4 (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 5-4 (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 15 14	54 50 46	10.4 9.8 9.2	150 142 135	5.8 6.1 6.5	865 875 880	7.6 8.1 8.6	1135 1155 1160
2300	16 15 14	50 47 42	9.6 9.1 8.5	143 136 127	6.2 6.6 7.1	890 900 900	8.2 8.7 9.3	1170 1185 1185
2200	16 15 14	47 44 40	9.1 8.6 8.0	138 130 120	6.6 7.0 7.5	910 910 905	8.7 9.2 9.9	1200 1200 1190
2000 MAXIMUM RANGE SETTINGS	16 15 14	40 37 34	7.8 7.3 6.8	122 112 101	7.7 8.2 8.8	940 920 895	10.1 10.8 11.6	1240 1210 1175
20,000 FEET								
2450	13 12	44 40	9.0 8.3	133 122	6.7 7.2	895 875	8.8 9.5	1175 1155
2300	13 12	42 38	8.4 7.7	126 113	7.1 7.8	905 875	9.4 10.3	1190 1155
2200	13 12	39 35	7.8 7.2	118 103	7.7 8.3	905 865	10.1 11.0	1190 1135

Figure 5-4 (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	69	590	1350	640	1430	680	1505	740	1595

NOTE: Distances are based on zero wind, power off and heavy braking. Reduce landing distances 10% for each 6 MPH headwind.

Figure 5-5.

Section VI

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 Cessna. 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 optional equipment.

LONG RANGE FUEL TANKS

Special wings with long range fuel tanks are available to replace the standard wings and fuel tanks for greater endurance and range. When these tanks are installed, the total usable fuel, for all flight conditions, is 79 gallons.

COLD WEATHER EQUIPMENT

WINTERIZATION KIT AND NON-CONGEALING OIL COOLER.

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 in improve engine operation.

GROUND SERVICE PLUG RECEPTACLE.

A ground service plug receptacle may be installed to permit the use of an external power source for cold weather starting and during lengthy

maintenance work on the electrical system.

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 otherwise might damage the semiconductors in the electronic equipment. When using a battery type external power source, the master switch should be turned off to prevent an unnecessary power drain from the power source batteries to the airplane's battery.

IMPORTANT

Be certain that the polarity of any external power source or batteries is correct (positive to positive and negative to negative). A polarity reversal will result in immediate damage to semiconductors in the airplane's electronic equipment.

OIL DILUTION SYSTEM.

If your airplane is equipped with an oil dilution system, and very low temperatures are anticipated, dilute the oil prior to engine shut down by energizing the oil dilution switch with the engine operating at 1000 RPM. (Refer to figure 6-1 for dilution time for the anticipated temperature.) While diluting the oil, the oil pressure should be watched for any unusual

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 6-1.

fluctuations that might indicate a screen being clogged with sludge washed down by the fuel.

NOTE

On the first operation of the oil dilution system each season, use the full dilution period, drain the oil, clean the screen, refill with new oil and redilute as required.

If the full dilution time was used, beginning with a full oil sump (12 quarts), subsequent starts and engine warm-up should be prolonged to evaporate enough of the fuel to lower the oil sump level to 13 quarts prior to take-off. Otherwise, the sump may overflow when the airplane is nosed up for climb.

To avoid progressive dilution of the oil, flights of at least two hour's duration should be made between oil dilution operations.

STATIC-PRESSURE ALTERNATE-SOURCE VALVE.

A static-pressure alternate-source valve may be installed in the static system for use when the external static sources are malfunctioning. This valve also permits draining condensate from the static lines.

If erroneous instrument readings are suspected due to water or ice in the static-pressure lines, the static-pressure alternate-source valve should be opened, thereby supplying static pressure from the cabin. Cabin pressures will vary, however, with open cabin ventilators or windows. The most adverse combinations will result in airspeed and altimeter variations of no more than 2 MPH and 20 feet, respectively.

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

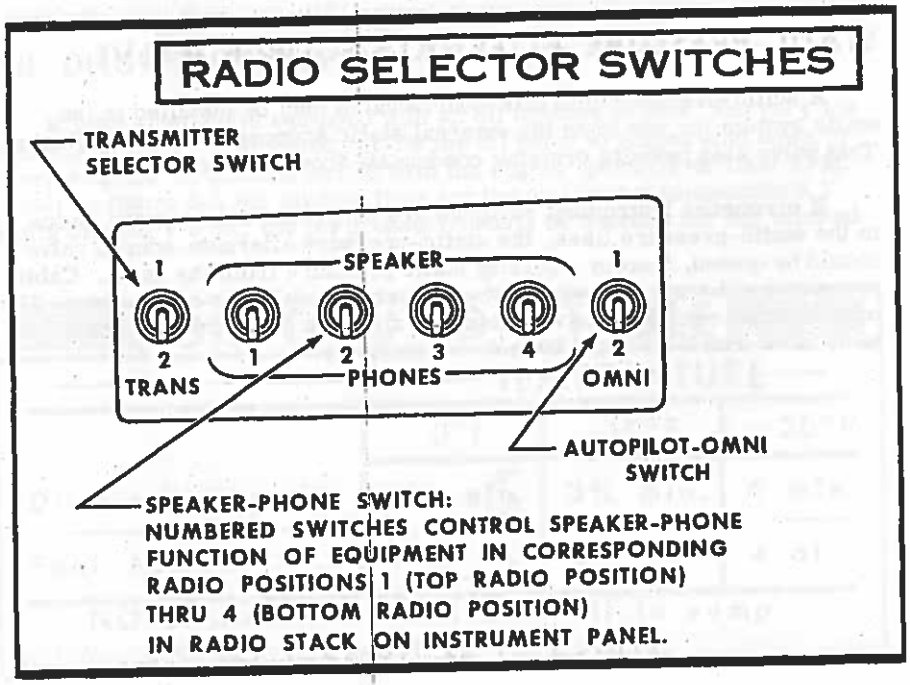

Figure 6-2.

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.

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.

AUTOPILOT-OMNI SWITCH.

When a Nav-O-Matic autopilot is installed with two compatible omni receivers, an autopilot-omni switch is utilized. 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

Your airplane may be equipped with either a four-place or six-place oxygen system. An oxygen cylinder, located behind the rear baggage compartment wall, supplies oxygen for the system. Cylinder pressure is reduced to an operating pressure of 70 psi by a pressure regulator attached to the cylinder. A shut-off valve is included as part of the regulator assembly. An oxygen cylinder filler valve is located on the left side of the rear baggage compartment wall. Cylinder pressure is indicated by a pressure gage located on the wall above the filler valve.

Depending upon the type of system installed, either four or six oxygen outlets are provided in the cabin ceiling just above the side windows; one at each of the seating positions. Partial-rebreathing type oxygen masks, complete with vinyl plastic hoses and flow indicators, are provided.

A remote shut-off valve control, located adjacent to the pilot's oxygen outlet, is used to shut off the supply of oxygen to the system when not in use. The control is mechanically connected to the shut-off valve at the cylinder. With the exception of the shut-off function, the system is completely automatic and requires no manual regulation for change of altitude.

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 paragraph OXYGEN DURATION CALCULATION, and to the Oxygen Duration Table (figure 6-3). Also, check that the face masks and hoses are accessible and in good condition.

To use the oxygen system, proceed as follows:

NOTE

Permit no smoking when using oxygen.

(1) Pull oxygen supply control knob "ON."
(2) Select mask and hose.

OXYGEN DURATION (HOURS)

GAGE PRESSURE	PILOT ONLY				PILOT PLUS ONE (1) PASSENGER			
	PRESSURE ALTITUDE				PRESSURE ALTITUDE			
	8000	10,000	15,000	20,000	8000	10,000	15,000	20,000
1800	14.6	13.0	10.2	8.4	8.0	7.2	5.7	4.7
1600	12.9	11.4	9.0	7.4	7.1	6.3	5.0	4.1
1400	11.2	9.9	7.8	6.4	6.2	5.5	4.3	3.6
1200	9.4	8.4	6.6	5.4	5.2	4.6	3.7	3.0
1000	7.7	6.9	5.4	4.4	4.3	3.8	3.0	2.5
800	6.0	5.3	4.2	3.4	3.3	2.9	2.3	1.9
600	4.3	3.8	3.0	2.4	2.4	2.1	1.7	1.3
400	2.6	2.3	1.8	1.4	1.4	1.2	1.0	.8
200	.9	.7	.6	.4	.4	.4	.3	.2

GAGE PRESSURE	PILOT PLUS TWO (2) PASSENGERS				PILOT PLUS THREE (3) PASSENGERS			
	PRESSURE ALTITUDE				PRESSURE ALTITUDE			
	8000	10,000	15,000	20,000	8000	10,000	15,000	20,000
1800	5.6	5.0	3.9	3.2	4.2	3.8	3.0	2.5
1600	4.9	4.4	3.5	2.8	3.7	3.3	2.6	2.2
1400	4.2	3.8	3.0	2.5	3.2	2.9	2.3	1.9
1200	3.6	3.2	2.6	2.1	2.7	2.5	1.9	1.6
1000	2.9	2.6	2.1	1.7	2.2	2.0	1.6	1.3
800	2.3	2.1	1.6	1.3	1.7	1.6	1.2	1.0
600	1.6	1.5	1.2	.9	1.2	1.1	.9	.7
400	1.0	.9	.7	.6	.7	.7	.5	.4

GAGE PRESSURE	PILOT PLUS FOUR (4) PASSENGERS				PILOT PLUS FIVE (5) PASSENGERS			
	PRESSURE ALTITUDE				PRESSURE ALTITUDE			
	8000	10,000	15,000	20,000	8000	10,000	15,000	20,000
1800	3.4	3.1	2.4	2.0	2.9	2.6	2.0	1.7
1600	3.0	2.7	2.2	1.7	2.5	2.3	1.8	1.5
1400	2.6	2.4	1.9	1.5	2.2	2.0	1.5	1.3
1200	2.2	2.0	1.6	1.3	1.8	1.7	1.3	1.1
1000	1.8	1.6	1.3	1.0	1.5	1.4	1.1	.9
800	1.4	1.3	1.0	.8	1.2	1.1	.8	.7
600	1.0	.9	.7	.6	.8	.7	.6	.5

NOTES:
1. All figures based on pilot with orange color - coded oxygen line fitting and passengers with green color - coded line fittings.
2. Duration figures are averages --- actual duration will depend upon accuracy of setting altitude and ambient temperature.
3. Duration times are based on pressure altitude.

Figure 6-3.

NOTE

In a standard four-place or six-place oxygen system installation, the hose assembly provided for the pilot is of a higher flow rate than those for the passengers. The pilot's hose assembly is color-coded with an orange band adjacent to the plug-in fitting. The hoses provided for the passengers are color-coded with a green band. If the aircraft owner prefers to do so, he may provide the higher flow rate hoses for all passengers; these hoses would also be color-coded with an orange band. In any case, it is recommended that the pilot use the larger capacity hose. All masks are identical.

(3) Attach mask to face and adjust metallic nose strap for snug mask fit.
(4) Select oxygen outlet located nearest to the seat you are occupying, 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 indicator is being forced toward the mask.
(6) Unplug the delivery hose from the outlet coupling when discontinuing use of oxygen system. This automatically stops the flow of oxygen.

OXYGEN DURATION CALCULATION.

The Oxygen Duration Table (figure 6-3) should be used in determining the usable duration (in hours) of the oxygen supply in your airplane. The following procedure outlines the method of finding the duration from the table.

(1) Note the available oxygen pressure shown on the pressure gage.
(2) Find this figure in the "GAGE PRESSURE" column adjacent to the block of figures applicable to the number of occupants in the airplane.
(3) Locate the pressure altitude at which you intend to fly; then, read down this column until you intersect the number in line with the gage pressure reading. The resulting number is the usable duration (in hours) of the existing oxygen supply.
(4) As an example of the above procedure, 1400 psi of pressure will safely sustain the pilot only for 9.9 hours at a 10,000 foot pressure

altitude. The same pressure will sustain the pilot and three (3) passengers for 2.9 hours at 10,000 feet.

NOTE

Oxygen Duration Table figures are based on a standard configuration oxygen system having one orange color-coded hose assembly for the pilot and green color-coded hoses for the passengers. If orange color-coded hoses are provided for the passengers in your airplane, it will be necessary to compute new duration figures due to the greater consumption of oxygen with these hoses.

OXYGEN SYSTEM SERVICING.

The oxygen cylinder, when fully charged, contains 48 cubic feet of oxygen, under a pressure of 1800 psi at 70° F. Refer to servicing procedures, page 4-6, for oxygen system servicing requirements.

IMPORTANT

Oil, grease, or other lubricants in contact with oxygen create a serious fire hazard, and such contact must be avoided.

CESSNA ECONOMY MIXTURE INDICATOR

The Cessna Economy Mixture Indicator is an exhaust gas temperature sensing device which is used to aid the pilot in selecting the most desirable fuel-air mixture for cruising flight at less than 75% power. Exhaust gas temperature (EGT) varies with the ratio of fuel-to-air mixture entering the engine cylinders. The EGT will peak at a value that is approximately maximum range mixture.

Operation at peak EGT is not authorized, except to establish peak EGT for reference. A richer mixture which provides a drop of approximately 100°F from peak EGT is recommended for normal cruise at less than 75% power. Leaning in this manner will provide fuel consumption very close to the Cessna Flight Computer and Owner's Manual values and will result in a decrease of only 1 MPH in airspeed from that obtainable with the same power setting and best power mixture.

OPERATING INSTRUCTIONS.

(1) In take-off and full power climb, use full rich mixture.

(2) In level flight (or cruising climb at less than 75% power), lean the mixture to peak EGT, then enrichen one large division (-100°F) below peak EGT. While leaning the mixture under some operating conditions, engine roughness may occur before peak EGT is reached. In this case, enrichen the mixture approximately 100°F from the EGT corresponding to the onset of roughness.

NOTE

Changes in altitude or power setting require the EGT to be re-checked and the mixture re-set.

(3) Use rich mixture (or mixture appropriate for field elevation) in idle descents or landing approaches. Leaning technique for cruise descents may be with EGT reference method (at least every 5000 feet) or by simply enriching to avoid engine roughness, if numerous power reductions are made.

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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.
(AIRCRAFT DELIVERED WITH STRAIGHT MINERAL OIL. EITHER MINERAL OIL OR DETERGENT OIL MAY BE USED. IF DETERGENT OIL IS USED, IT MUST CONFORM TO CONTINENTAL MOTORS SPECIFICATION MHS-24.)
CAPACITY OF ENGINE SUMP -- 12 QUARTS
(DO NOT OPERATE ON LESS THAN 9 QUARTS. TO MINIMIZE LOSS OF OIL THROUGH BREATHER, FILL TO 10 QUART LEVEL FOR NORMAL FLIGHTS OF LESS THAN 3 HOURS. FOR EXTENDED FLIGHT, FILL TO 12 QUARTS. IF OPTIONAL OIL FILTER IS INSTALLED, ONE ADDITIONAL QUART IS REQUIRED WHEN THE FILTER ELEMENT IS CHANGED.)

HYDRAULIC FLUID:

MIL-H-5606 HYDRAULIC FLUID

OXYGEN:

AVIATOR'S BREATHING OXYGEN -- SPEC. NO. MIL-O-27210
MAXIMUM PRESSURE -- 1800 PSI

TIRE PRESSURE:

MAIN WHEELS -- 32 PSI ON 6.00 × 6 TIRES
-- 25 TO 35 PSI ON 8.00 × 6 TIRES (OPT)
NOSE WHEEL -- 32 PSI ON 5.00 × 5 TIRE
-- 20 TO 29 PSI ON 6.00 × 6 TIRE (OPT)

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OF THE CESSNA SHIELD".

CESSNA AIRCRAFT COMPANY

WICHITA, KANSAS