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1969

WORLD'S LARGEST PRODUCER OF GENERAL AVIATION AIRCRAFT SINCE 1956

MODEL 182 AND SKYLANE

OWNER'S MANUAL

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, 75% Power at 6500 ft	685 miles	695 miles
60 Gallons, No Reserve	4.3 hours	4.3 hours
	159 mph	162 mph
Cruise, 75% Power at 6500 ft	905 miles	925 miles
79 Gallons, No Reserve	5.7 hours	5.7 hours
	159 mph	162 mph
Optimum Range at 10,000 ft	905 miles	925 miles
60 Gallons, No Reserve	7.6 hours	7.6 hours
	119 mph	121 mph
Optimum Range at 10,000 ft	1190 miles	1215 miles
79 Gallons, No Reserve	10.0 hours	10.0 hours
	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)	1580 lbs	1635 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	O-470-R	O-470-R
230 rated BHP at 2600 RPM		

*This manual covers operation of the Model 182/Skylane which is certificated as Model 182M under FAA Type Certificate No. 3A13.

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.

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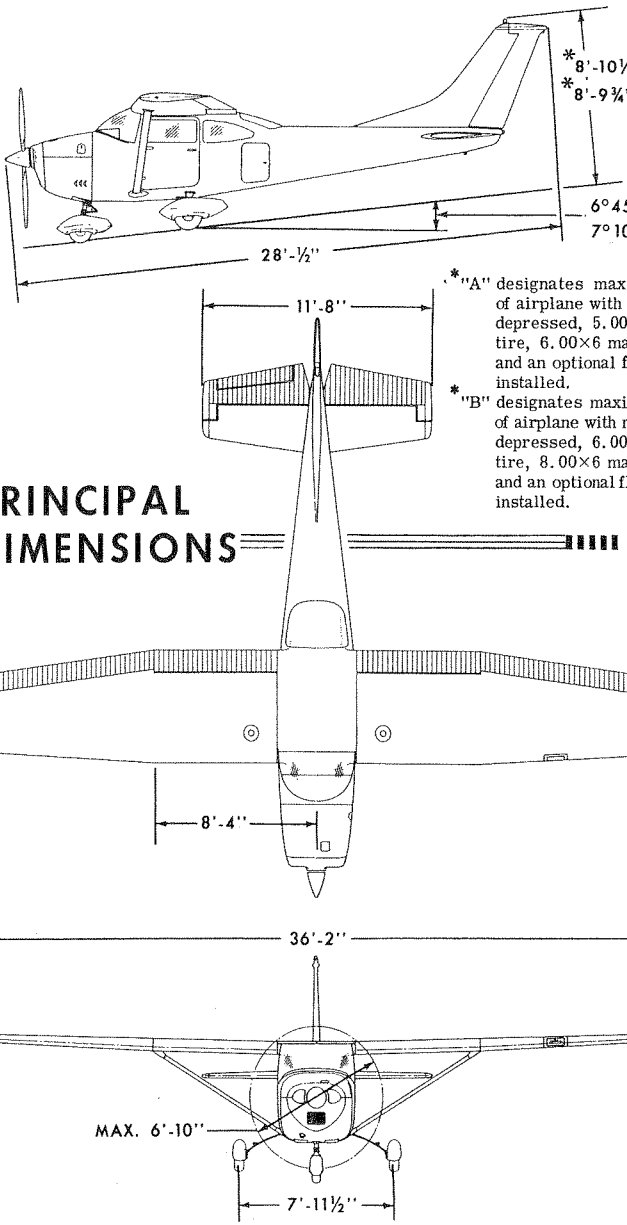
PRINCIPAL DIMENSIONS

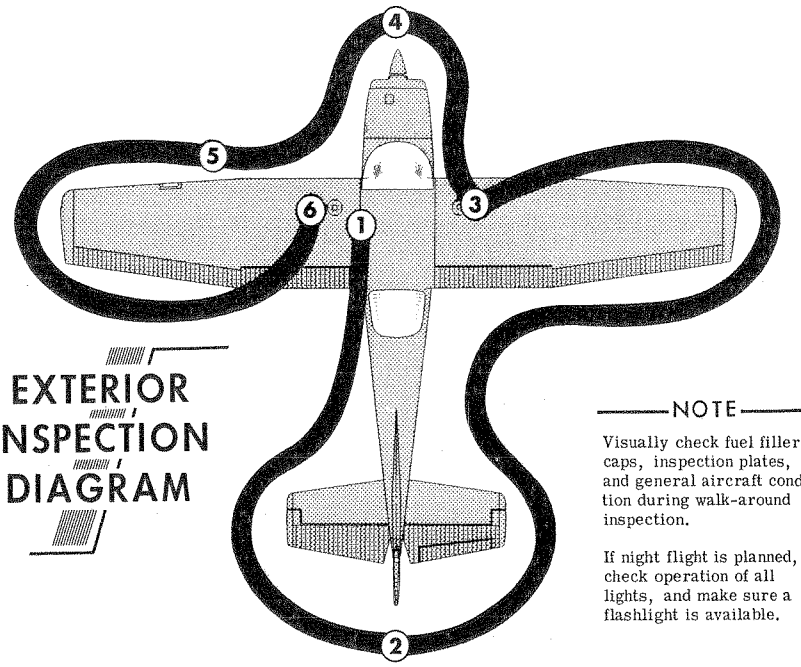


*"A" designates maximum height of airplane with nose strut fully depressed, 5.00×5 nose gear tire, 6.00×6 main gear tires and an optional flashing beacon installed.

*"B" designates maximum height of airplane with nose strut fully depressed, 6.00×6 nose gear tire, 8.00×6 main gear tires and an optional flashing beacon installed.

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.



EXTERIOR INSPECTION DIAGRAM

NOTE

Visually check fuel filler caps, inspection plates, and 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 handle on "BOTH."
d. Remove control wheel lock.
e. 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. Check carburetor air filter for restrictions by dust or other foreign matter.
c. Check nose wheel strut and tire for proper inflation.
d. Disconnect nose tie-down.
e. Check oil level. Do not operate with less than nine quarts. Fill for extended flight.
f. 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. Check strainer drain closed. If water is observed, there is a possiblity that the wing tank sumps contain water. Thus, the wing tank sump drain plugs and fuel line drain plug should be removed to check for the presence of water.

(5) a. Remove pitot tube cover, if installed, and check pitot tube opening for stoppage.
b. Check fuel tank vent opening for stoppage.

(6) Same as (3).

Figure 1-1.

Section 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) Fuel Selector Valve -- "BOTH."
(2) Throttle Setting -- 1700 RPM.
(3) Engine Instruments -- Check.
(4) Carburetor Heat -- Check operation, then set to cold unless icing conditions prevail.
(5) Ammeter -- Check.
(6) Suction Gage -- Check (4.6 to 5.4 inches of mercury).
(7) Magnetos - Check (50 RPM maximum differential between magnetos).
(8) Propeller -- Cycle from high to low RPM; return to high RPM (full in).
(9) Flight Controls -- Recheck.
(10) Wing Flaps -- Check operation and set 0° to 20°.
(11) Cowl Flaps -- Full "OPEN."
(12) Elevator and Rudder Trim -- Recheck "TAKE-OFF" setting.
(13) Cabin Doors -- Closed and locked.
(14) Flight Instruments and Radios -- Set.
(15) Optional Autopilot or Wing Leveler -- "OFF."

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 -- 61 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) Fuel Selector Valve -- "BOTH."
(4) Mixture -- Full rich (unless engine is rough due to excessively rich mixture).
(5) 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) Fuel Selector Valve -- "BOTH."
(4) Mixture -- Full rich (unless engine is rough).
(5) 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.

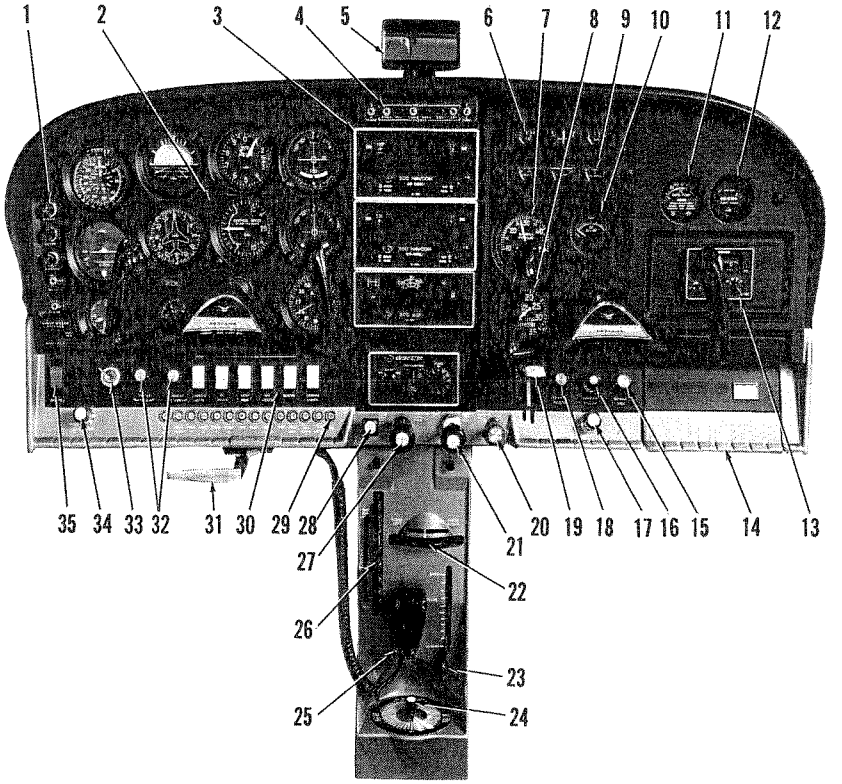
(1) Mixture -- Idle cut-off (pulled full out).

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.

INSTRUMENT PANEL



1. Marker Beacon Indicator Lights and Switches (Opt.)
2. Flight Instrument Group
3. Radios and Autopilot (Opt.)
4. Radio Selector Switches (Opt.)
5. Rear View Mirror (Opt.)
6. Fuel Quantity Indicators and Ammeter
7. Manifold Pressure Gage
8. Tachometer
9. Cylinder Head Temperature Gage, Oil Temperature Gage, and Oil Pressure Gage
10. Economy Mixture Indicator (Opt.)
11. Carburetor Air Temperature Gage (Opt.)
12. Flight Hour Recorder (Opt.)
13. Radio (Opt.)
14. Map Compartment
15. Defroster Control Knob
16. Cabin Air Control Knob
17. Cigar Lighter
18. Cabin Heat Control Knob
19. Wing Flap Switch
20. Mixture Control Knob
21. Propeller Control Knob
22. Rudder Trim Control Wheel
23. Cowl Flap Control Handle
24. Fuel Selector Valve Handle
25. Microphone (Opt.)
26. Elevator Trim Control Wheel
27. Throttle
28. Carburetor Heat Control Knob
29. Circuit Breakers
30. Electrical Switches
31. Parking Brake Handle
32. Instrument and Radio Dial Lights Rheostats
33. Ignition/Starter Switch
34. Primer
35. Master Switch

Figure 2-1.

Section 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. With the fuel selector valve on "BOTH," the total usable fuel for all flight conditions is 60 gallons for the standard tanks and 79 gallons for optional long range tanks.

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.

IMPORTANT

The fuel selector valve should be in the "BOTH" position for take-off, climb, landing, and maneuvers that involve prolonged slips or skids. Operation from either "LEFT" or "RIGHT" tank is reserved for cruising flight.

NOTE

When the fuel selector valve handle is in the "BOTH" position in cruising flight, unequal fuel flow from each tank may occur 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.

For fuel system servicing information, refer to Lubrication and Servicing Procedures in Section IV.

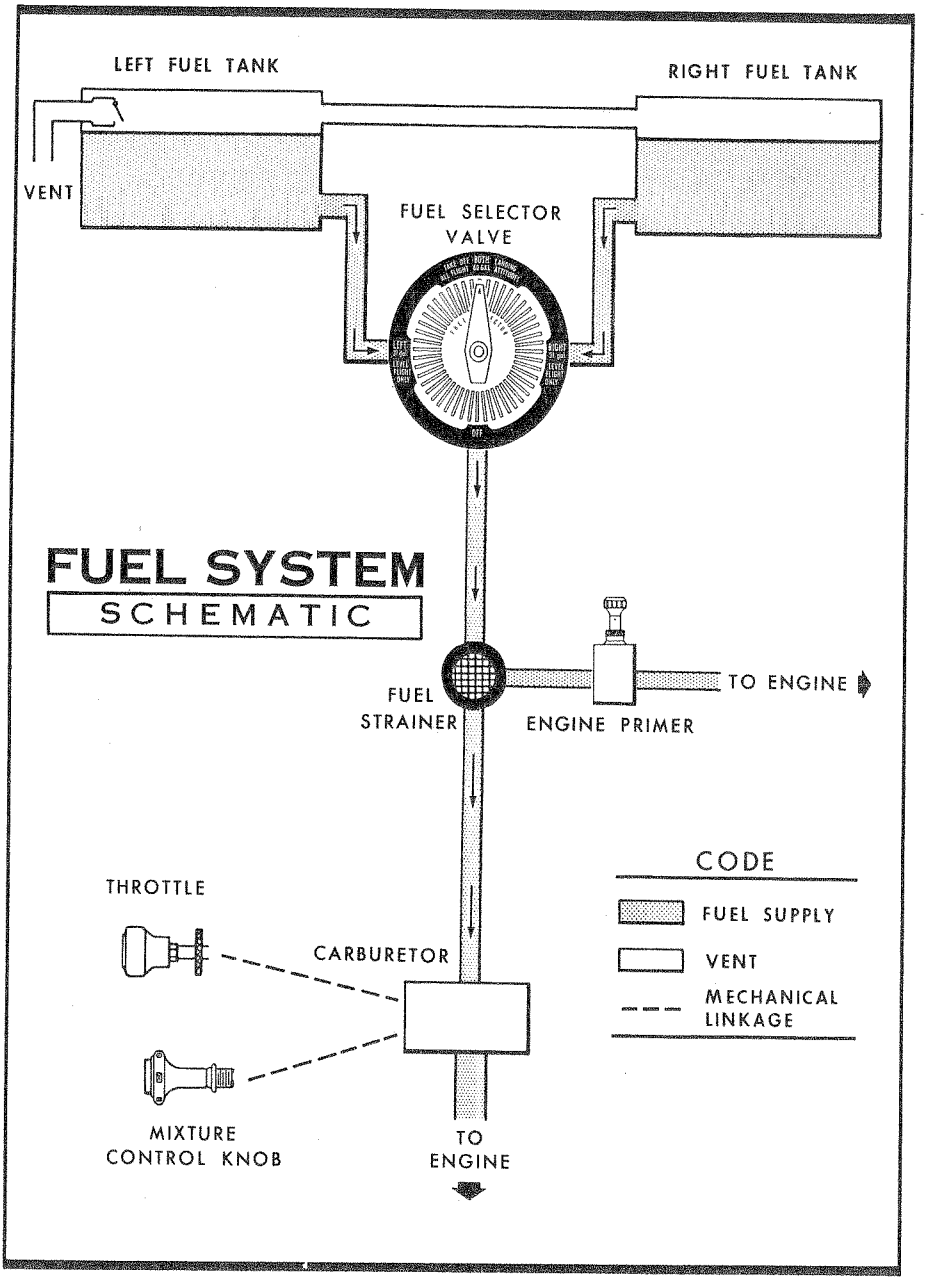

LEFT FUEL TANK
RIGHT FUEL TANK
VENT
FUEL SELECTOR VALVE
FUEL SYSTEM
SCHEMATIC
FUEL STRAINER
ENGINE PRIMER
TO ENGINE
CODE
FUEL SUPPLY
VENT
MECHANICAL LINKAGE
THROTTLE
CARBURETOR
MIXTURE CONTROL KNOB
TO ENGINE

Figure 2-2.

ELECTRICAL SYSTEM.

Electrical energy is supplied by a 14-volt, direct-current system powered by an engine-driven alternator (see figure 2-3). The 12-volt battery is located aft of the rear baggage compartment wall. Power is supplied to all electrical circuits through a split bus bar, one side containing electronic system circuits and the other side having general electrical system circuits. Both sides of the bus are on at all times except when either an external power source is connected or the starter switch is turned on; then a power contactor is automatically activated to open the circuit to the electronics bus. Isolating the electronic circuits in this manner prevents harmful transient voltages from damaging the semiconductors in the electronics equipment.

AMMETER.

The ammeter indicates the flow of current, in amperes, from the alternator to the battery or from the battery to the aircraft electrical system. When the engine is operating and the master switch is "ON," the ammeter indicates the charging rate applied to the battery. In the event the alternator is not functioning or the electrical load exceeds the output of the alternator, the ammeter indicates the discharge rate of the battery.

CIRCUIT BREAKERS AND FUSES.

Most of the electrical circuits in the airplane are protected by "push-to-reset" circuit breakers mounted on the instrument panel. Exceptions to this are the battery contactor closing (external power) circuit, and the optional clock and flight hour recorder circuits which have fuses mounted near the battery. Also, the cigar lighter is protected by a manually-reset type circuit breaker mounted directly on the back of the lighter behind the instrument panel. Two automatically resetting circuit breakers mounted behind the instrument panel protect the stall warning transmitter and horn circuit, the alternator field and wiring, and the optional turn coordinator or turn-and-bank indicator circuit.

ELECTROLUMINESCENT LIGHTING.

Switches and controls on the lower part of the instrument panel are lighted by electroluminescent panels which do not require light bulbs for illumination. This lighting is controlled by the instrument light rheostat.

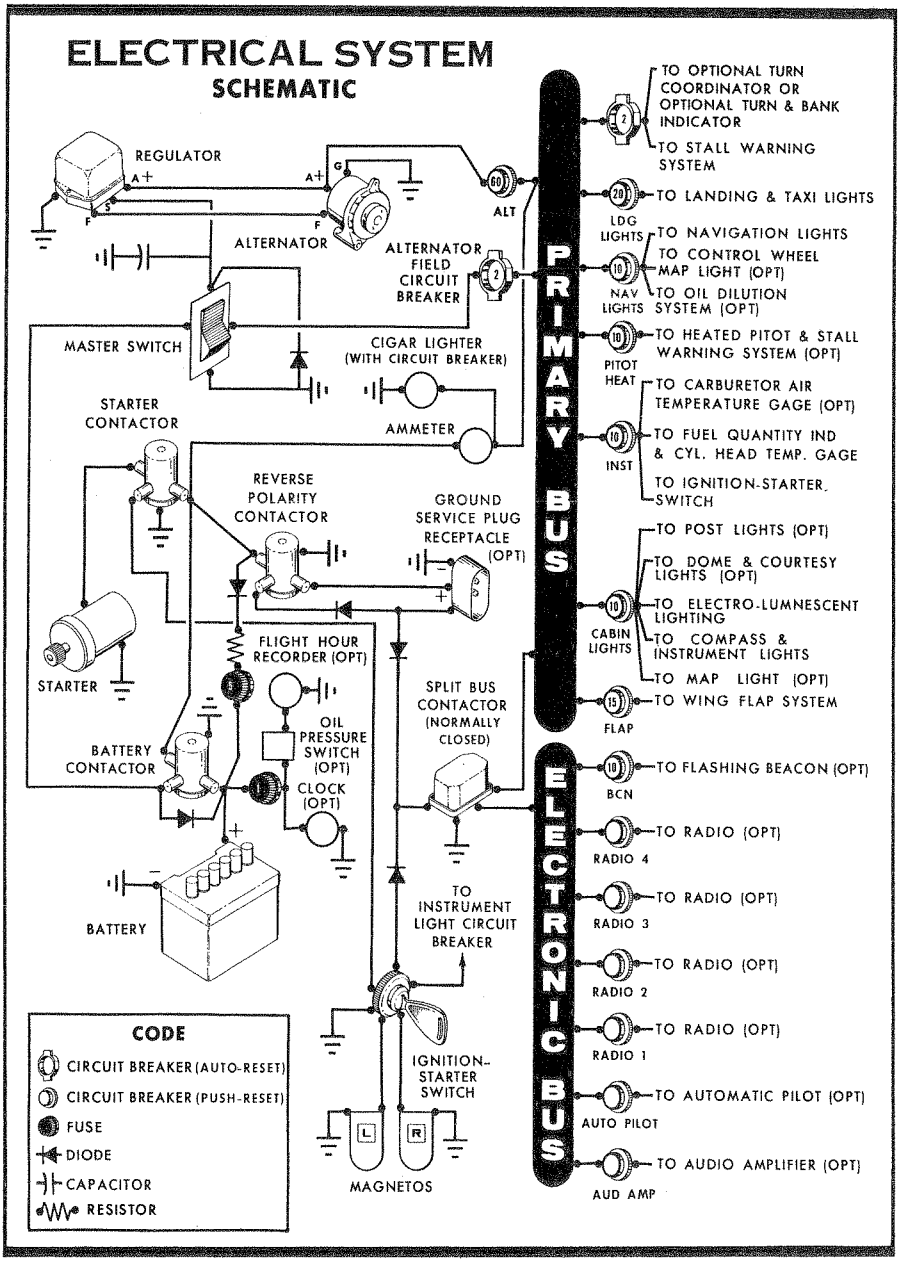

ELECTRICAL SYSTEM
SCHEMATIC
REGULATOR
ALTERNATOR
ALTERNATOR FIELD CIRCUIT BREAKER
ALT
MASTER SWITCH
CIGAR LIGHTER (WITH CIRCUIT BREAKER)
AMMETER
STARTER CONTACTOR
REVERSE POLARITY CONTACTOR
GROUND SERVICE PLUG RECEPTACLE (OPT)
STARTER
FLIGHT HOUR RECORDER (OPT)
OIL PRESSURE SWITCH (OPT)
CLOCK (OPT)
BATTERY CONTACTOR
BATTERY
SPLIT BUS CONTACTOR (NORMALLY CLOSED)
TO INSTRUMENT LIGHT CIRCUIT BREAKER
IGNITION-STARTER SWITCH
MAGNETOS
CODE
CIRCUIT BREAKER (AUTO-RESET)
CIRCUIT BREAKER (PUSH-RESET)
FUSE
DIODE
CAPACITOR
RESISTOR
PRIMARY BUS
ELECTRONIC BUS
TO OPTIONAL TURN COORDINATOR OR OPTIONAL TURN & BANK INDICATOR
TO STALL WARNING SYSTEM
TO LANDING & TAXI LIGHTS
LDG LIGHTS
TO NAVIGATION LIGHTS
TO CONTROL WHEEL MAP LIGHT (OPT)
NAV LIGHTS
TO OIL DILUTION SYSTEM (OPT)
TO HEATED PITOT & STALL WARNING SYSTEM (OPT)
PITOT HEAT
TO CARBURETOR AIR TEMPERATURE GAGE (OPT)
TO FUEL QUANTITY IND & CYL. HEAD TEMP. GAGE
INST
TO IGNITION-STARTER SWITCH
TO POST LIGHTS (OPT)
TO DOME & COURTESY LIGHTS (OPT)
TO ELECTRO-LUMNESCENT LIGHTING
CABIN LIGHTS
TO COMPASS & INSTRUMENT LIGHTS
TO MAP LIGHT (OPT)
TO WING FLAP SYSTEM
FLAP
TO FLASHING BEACON (OPT)
BCN
TO RADIO (OPT)
RADIO 4
TO RADIO (OPT)
RADIO 3
TO RADIO (OPT)
RADIO 2
TO RADIO (OPT)
RADIO 1
TO AUTOMATIC PILOT (OPT)
AUTO PILOT
TO AUDIO AMPLIFIER (OPT)
AUD AMP

Figure 2-3.

FLASHING BEACON (OPT).

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

CONTROL WHEEL MAP LIGHT (OPT).

A map light may be mounted on the bottom of the pilot's control wheel. The light illuminates the lower portion of the cabin just forward of the pilot and is helpful when checking maps and other flight data during night operations. To operate the light, first turn the "NAV LIGHTS" switch on, then adjust the map light's intensity with the knurled rheostat knob located at the bottom of the control wheel.

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.

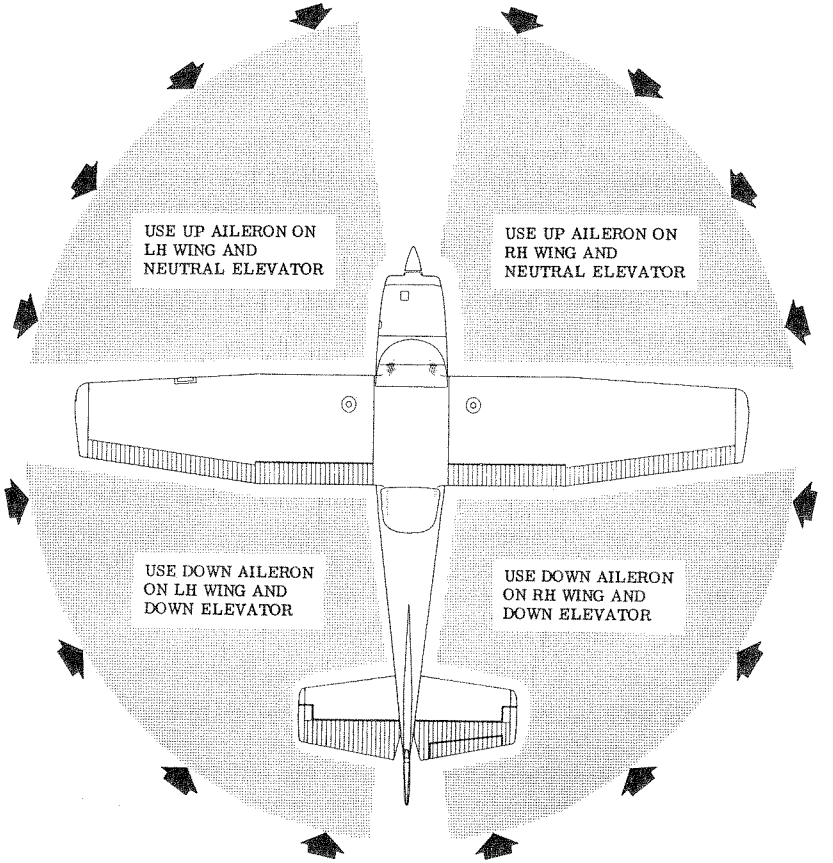
NOTE

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 are supplied by two ducts from the manifold, one extending down each side of the cabin to an outlet at the front door post at floor level. Windshield defrost air is also supplied by a duct leading from the cabin manifold.

TAXIING DIAGRAM



WIND DIRECTION

NOTE

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

Figure 2-4.

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 firing 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.

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 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 climb 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 (61 MPH, IAS) should be used. If no obstructions are ahead, a best "flaps up" rate-of-climb speed (88 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.

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.

The Optimum Cruise Performance table (figure 2-5) 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 at approximately two thirds 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.

The use of full carburetor heat is recommended during flight in very heavy rain to avoid the possibility of engine stoppage due to excessive water ingestion. The mixture setting should be readjusted for smoothest operation.

OPTIMUM CRUISE PERFORMANCE

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

Figure 2-5.

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.

NORMAL LANDING.

Landings should be made on the main wheels first to reduce the landing speed and the subsequent need for braking in the landing roll. The nose wheel 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.

SHORT FIELD LANDING.

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.

CROSSWIND LANDING.

When landing in a strong crosswind, use the minimum flap setting required for the field length. Although the crab or combination method of drift correction may be used, the wing-low method gives the best control. After touchdown, hold a straight course with the steerable nose wheel and occasional braking if necessary.

BALKED LANDING (GO-AROUND).

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.

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 ignition 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 ignition 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 ignition 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 2-7 is appropriate. Avoid prolonged engine operation on the ground.

Section III

OPERATING LIMITATIONS

OPERATIONS AUTHORIZED.

Your Cessna exceeds the requirements for airworthiness as set forth by the United States Government, and is certificated under FAA Type Certificate No. 3A13 as Cessna Model No. 182M.

With standard equipment, the airplane 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 is certificated in the normal category. The normal category is applicable to airplanes intended for non-aerobatic operations. These include any maneuvers incidental to normal flying, stalls (except whip stalls) and turns in which the angle of bank is not more than 60°. In connection with the foregoing, the following gross weight and flight load factors apply:

Gross Weight.	2800 lbs	
Flight Load Factor		
*Flaps Up	+3.8	-1.52
*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 infor-

mation in this section which contradicts the FAA-approved markings, placards and check lists, it is to be disregarded.

AIRSPEED LIMITATIONS (CAS).

The following is a list of the certificated calibrated airspeed (CAS) limitations for the airplane.

Never Exceed Speed (glide or dive, smooth air)	193 MPH
Maximum Structural Cruising Speed	160 MPH
Maximum Speed, Flaps Extended	
Flaps 10°	160 MPH
Flaps 10° - 40°	110 MPH
*Maximum Maneuvering Speed	128 MPH

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

AIRSPEED INDICATOR MARKINGS.

The following is a list of the certificated calibrated airspeed markings (CAS) for the airplane.

Never Exceed (glide or dive, smooth air)	193 MPH (red line)
Caution Range	160-193 MPH (yellow arc)
Normal Operating Range	67-160 MPH (green arc)
Flap Operating Range	60-110 MPH (white arc)

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)

FUEL QUANTITY INDICATORS.

Empty . . . . . E (red line)
(2.5 gallons unusable each tank in normal flight maneuvers with fuel selector valve on "BOTH.")

CYLINDER HEAD TEMPERATURE GAGE.

Normal Operating Range . . . . . 200-460°F (green arc)
Do Not Exceed . . . . . 460°F (red line)

TACHOMETER.

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

MANIFOLD PRESSURE GAGE.

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

CARBURETOR AIR TEMPERATURE GAGE (OPT).

Icing Range . . . . . -15° to 5°C (yellow arc)

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:

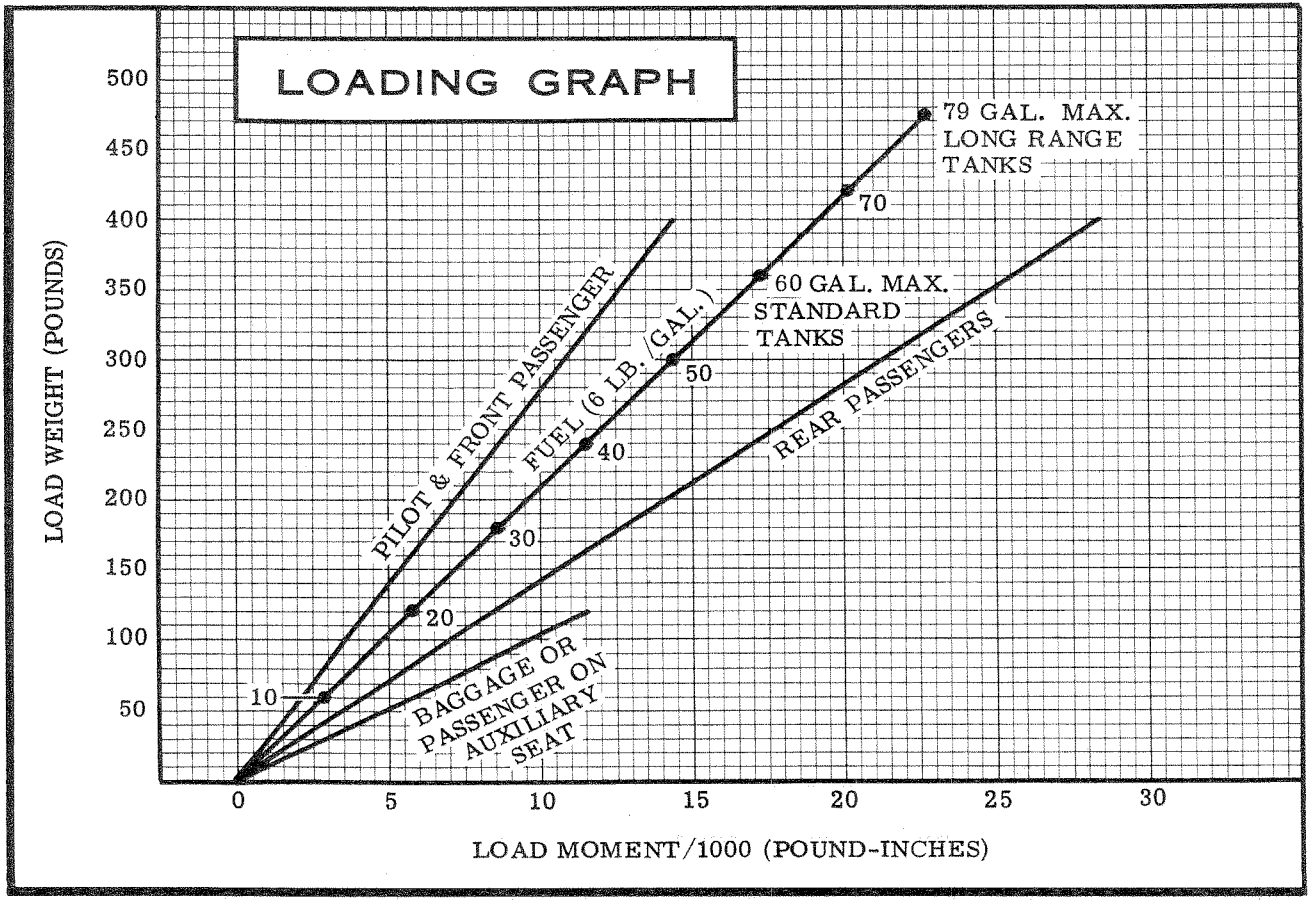
Take the licensed Empty Weight and Moment/1000 from the Weight and Balance Data sheet, plus any changes noted on forms FAA-337 carried in your airplane, and write them down in the proper columns. Using the Loading Graph, determine the moment/1000 of each item to be carried. Total the weights and moments/1000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

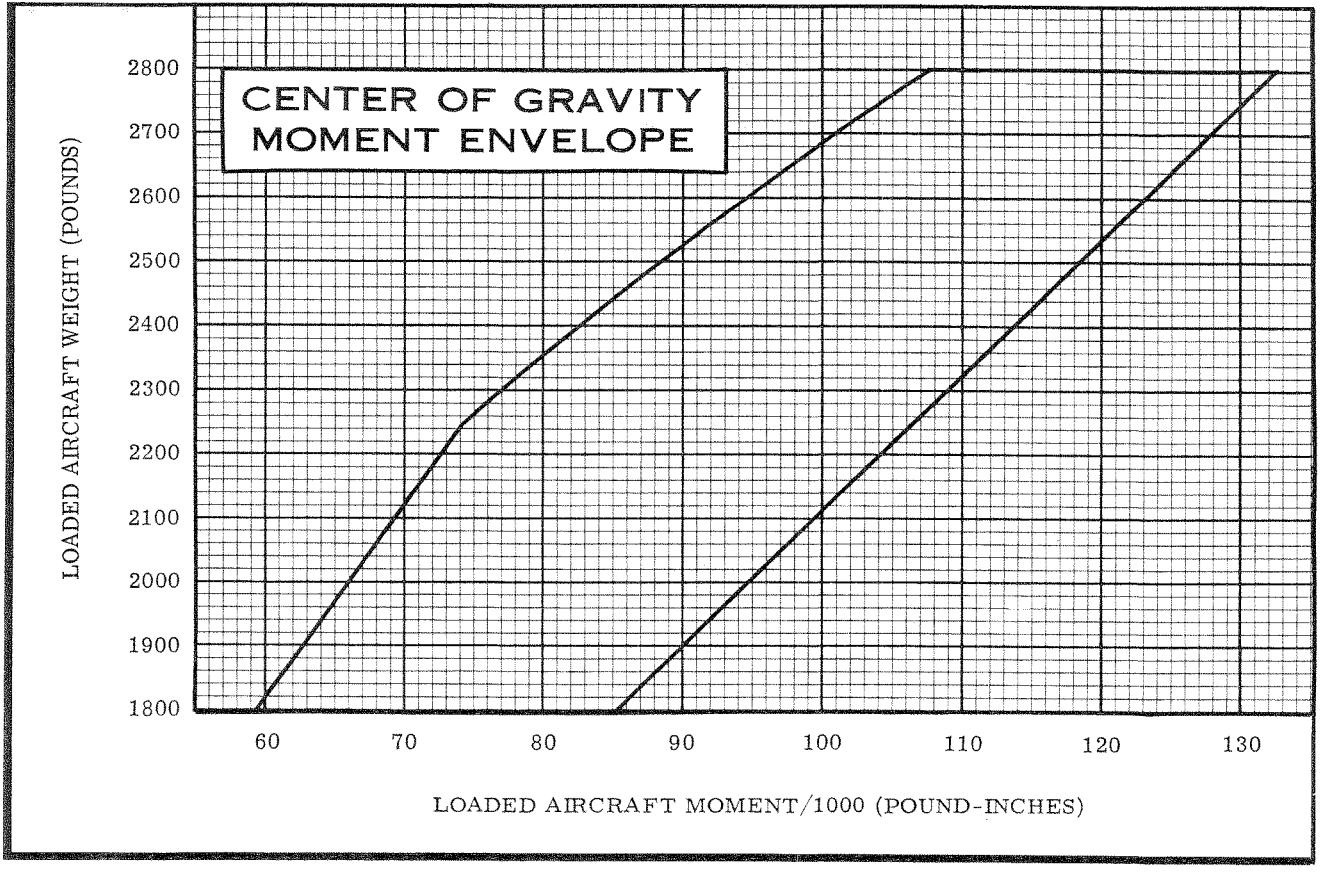
NOTE

The Weight and Balance Data Sheet noted above is included in the aircraft file. The Loading Graph and Center of Gravity Moment Envelope shown in this section are also on the sheet titled Loading/Center of Gravity Charts and Weighing Procedures which is provided in the aircraft file.

SAMPLE LOADING PROBLEM	SAMPLE AIRPLANE		YOUR AIRPLANE	
	Weight (lbs.)	Moment (lb. - ins. /1000)	Weight (lbs.)	Moment (lb. - ins. /1000)
1. Licensed Empty Weight (Sample Airplane)	1672	59.4		
2. Oil (12 qts. - Full oil may be assumed for all flights.)	22	-0.3	22	-0.3
3. Pilot and Front Passenger.....	340	12.2		
4. Fuel (Standard-60 Gal at 6#/Gal).....	360	17.3		
Fuel (Long Range-79 Gal at 6#/Gal)				
5. Rear Passengers	340	24.1		
6. Baggage (or Passenger on Auxiliary Seat).....	66	6.4		
7. TOTAL WEIGHT AND MOMENT.....	2800	119.1		

8. Locate this point (2800 at 119.1) on the center of gravity moment envelope, and since this point falls within the envelope the loading is acceptable.


LOADING GRAPH
LOAD WEIGHT (POUNDS)
500
450
400
350
300
250
200
150
100
50
0
5
10
15
20
25
30
LOAD MOMENT/1000 (POUND-INCHES)
79 GAL. MAX. LONG RANGE TANKS
60 GAL. MAX. STANDARD TANKS
PILOT & FRONT PASSENGER
FUEL (6 LB./GAL.)
REAR PASSENGERS
BAGGAGE OR PASSENGER ON AUXILIARY SEAT
10
20
30
40
50
70


CENTER OF GRAVITY
MOMENT ENVELOPE
LOADED AIRCRAFT WEIGHT (POUNDS)
2800
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
60
70
80
90
100
110
120
130
LOADED AIRCRAFT MOMENT/1000 (POUND-INCHES)

Section 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 cleaned with an aircraft windshield cleaner. Apply the cleaner sparingly with soft cloths, and rub with moderate pressure until all dirt, oil scum and bug stains are removed. Allow the cleaner to dry, then wipe it off with soft flannel cloths.

If a windshield cleaner is not available, the plastic can be cleaned with soft cloths moistened with Stoddard solvent to remove oil and grease.

NOTE

Never use gasoline, benzine, alcohol, acetone, carbon tetrachloride, fire extinguisher or anti-ice fluid, lacquer thinner or glass cleaner to clean the plastic. These materials will attack the plastic and may cause it to craze.

Follow by carefully washing with a mild detergent and plenty of water. Rinse thoroughly, then dry with a clean moist chamois. Do not rub the plastic with a dry cloth since this builds up an electrostatic charge which attracts dust. Waxing with a good commercial wax will finish the cleaning job. A thin, even coat of wax, polished out by hand with clean soft flannel cloths, will fill in minor scratches and help prevent further scratching.

Do not use a canvas cover on the windshield unless freezing rain or sleet is anticipated since the cover 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 have a durable, long lasting finish and, under normal conditions, require no polishing or buffing. Approximately 15 days are required for the paint to cure completely; in most cases, the curing period will have been completed prior to delivery of the airplane. In the event that polishing or buffing is required within the curing period, it is recommended that the work be done by someone experienced in handling uncured paint. Any Cessna Dealer can accomplish this work.

Generally, the painted surfaces can be kept bright by washing with water and mild soap, followed by a rinse with water and drying with cloths or a chamois. Harsh or abrasive soaps or detergents which cause corrosion or make scratches should never be used. Remove stubborn oil and grease with a cloth moistened with Stoddard solvent.

Waxing is unnecessary to keep the painted surfaces bright. However, if desired, the airplane 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 engine nose cap and propeller spinner will help reduce the abrasion encountered in these areas.

When the airplane is parked outside in cold climates and it is necessary to remove ice before flight, care should be taken to protect the painted surfaces during ice removal with chemical liquids. A 50-50 solution of isopropyl alcohol and water will satisfactorily remove ice accumulations without damaging the paint. A solution with more than 50% alcohol is harmful and should be avoided. While applying the de-icing solution, keep it away from the windshield and cabin side windows since the alcohol will attack the plastic and may cause it to craze.

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 Stoddard solvent. 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.

AIRCRAFT FILE.

There are miscellaneous data, information and licenses that are a part of the aircraft 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 aircraft at all times:
   (1) Aircraft Airworthiness Certificate (Form FAA-1362B).
   (2) Aircraft Registration Certificate (Form FAA-500A).
   (3) Aircraft Radio Station License (Form FCC-404, if transmitter installed).

B. To be carried in the aircraft at all times:
   (1) Weight and Balance, and associated papers (latest copy of the Repair and Alteration Form, Form-337, if applicable).
   (2) Aircraft Equipment List.

C. To be made available upon request:
   (1) Aircraft Log Book.
   (2) Engine Log Book.

NOTE

Cessna recommends that these items, plus the Owner's Manual, "Cessna Flight Guide" (Flight Computer), and Service Policies, be carried in the aircraft 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 aircraft 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:

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. Check strainer drain closed. If water is observed, there is a possibility that the wing tank sumps contain water. Thus, the wing tank sump drain plugs and fuel line drain plug should be removed to check for the presence of water.

OIL FILLER:

When preflight check shows low oil level, service with aviation grade engine oil; SAE 50 above 40°F and SAE 10W30 or SAE 30 below 40°F. (Multi-viscosity oil with a range of SAE 10W30 is recommended for improved starting in cold weather.) Detergent or dispersant oil, conforming to Continental Motors Specification MHS-24A, must be used. Your Cessna Dealer can supply approved brands of oil.

NOTE

To promote faster ring seating and improved oil control, your Cessna was delivered from the factory with straight mineral oil (non-detergent). This "break-in" oil should be used only for the first 20 to 30 hours of operation, at which time it must be replaced with detergent oil.

LUBRICATION AND SERVICING PROCEDURES

DAILY (Continued)

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.

OXYGEN CYLINDER AND FILLER VALVE (OPT):

Check oxygen pressure gage for anticipated requirements before each flight. Use filler valve on left side of rear baggage compartment wall to refill cylinder with aviator's breathing oxygen (Spec. No. MIL-O-27210). Maximum pressure (cylinder temperature stabilized after filling), 1800 psi at 70°F. Refer to page 6-9 for filling pressures.

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.

NOTE

After first 20 to 30 hours of engine operation, an initial oil change should be made to remove "break-in" oil and change the filter, if installed.

CARBURETOR AIR FILTER -- Clean or replace. Under extremely dusty conditions, daily maintenance of the filter is recommended.

NOSE GEAR TORQUE LINKS -- Lubricate. When operating under dusty conditions, more frequent lubrication is recommended.

SHIMMY DAMPENER -- Refer to Service Manual for detailed instructions on checking and filling.

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.

VACUUM SYSTEM OIL SEPARATOR (OPT) -- Clean.

SUCTION RELIEF VALVE INLET SCREEN (OPT) -- Clean.

SPARK PLUGS -- Clean, test and regap.

SERVICING INTERVALS CHECK LIST

(Continued)

EACH 500 HOURS

WHEEL BEARINGS -- Lubricate at first 100 hours and at 500 hours thereafter. Reduce lubrication interval to 100 hours when operating in dusty or seacoast areas, during periods of extensive taxiing, or when numerous take-offs and landings are made.

VACUUM SYSTEM AIR FILTER (OPT) -- Replace filter element. Replace sooner if suction gage reading drops to 4.6 in. Hg.

AS REQUIRED

NOSE GEAR SHOCK STRUT -- Keep filled with fluid and inflated to 55-60 psi.

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 aircraft 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.

PUBLICATIONS

Various publications and flight operation aids are furnished in the aircraft when delivered from the factory. These items are listed below.

- OWNER'S MANUALS FOR YOUR
  AIRCRAFT
  ELECTRONICS AND AUTOPILOT
- CESSNA FLIGHT GUIDE (FLIGHT COMPUTER)
- SALES AND SERVICE DEALER DIRECTORY
- DO'S AND DON'TS ENGINE BOOKLET

The following additional publications, plus many other supplies that are applicable to your aircraft, are available from your Cessna Dealer.

- SERVICE MANUALS AND PARTS CATALOGS FOR YOUR
  AIRCRAFT
  ENGINE AND ACCESSORIES
  ELECTRONICS AND AUTOPILOT

Your Cessna Dealer has a current catalog of all available Customer Services Supplies, many of which he keeps on hand. If supplies are not in stock, your Cessna Dealer will be happy to order for you.

Section 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

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.		AT 2500 FT. & 50°F.		AT 5000 FT. & 41°F.		AT 7500 FT. & 32° F.	
			GROUND RUN	TOTAL TO CLEAR 50' OBS	GROUND RUN	TOTAL TO CLEAR 50' OBS	GROUND RUN	TOTAL TO CLEAR 50' OBS	GROUND RUN	TOTAL TO CLEAR 50' OBS
2800	61	0	625	1205	745	1420	895	1695	1095	2090
		15	380	830	460	990	565	1200	700	1505
		30	190	515	240	630	305	780	390	1000
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
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

NOTES: 1. Increase distances 10% for each 25°F above standard temperature for particular altitude.
2. For operation on a dry, grass runway, increase distances (both "ground run" and "total to clear 50 ft. obstacle") by 7% of the "total to clear 50 ft. obstacle" figure.

MAXIMUM RATE-OF-CLIMB DATA

GROSS WEIGHT LBS.	AT SEA LEVEL & 59°F.			AT 5000 FT. & 41°F.			AT 10,000 FT. & 23°F.			AT 15,000 FT. & 5°F.			AT 20,000 FT. & -12°F.		
	IAS MPH	RATE OF CLIMB FT/MIN	GAL. OF FUEL USED	IAS MPH	RATE OF CLIMB FT/MIN	FromSL FUEL USED	IAS MPH	RATE OF CLIMB FT/MIN	FromSL FUEL USED	IAS MPH	RATE OF CLIMB FT/MIN	FromSL FUEL USED	IAS MPH	RATE OF CLIMB FT/MIN	From SL FUEL USED
2800	88	980	1.5	86	745	3.7	84	510	6.3	82	280	10.2	80	50	20.5
2400	86	1295	1.5	84	1005	3.1	82	720	5.0	79	435	7.6	77	150	12.9
2000	84	1710	1.5	82	1350	2.7	79	995	4.1	76	640	5.9	74	280	9.2

NOTES: 1. Flaps up, full throttle, 2600 RPM, mixture leaned for smooth operation above 5000 ft.
2. Fuel used includes warm-up and take-off allowance.
3. For hot weather, decrease rate of climb 30 ft./min. for each 10°F above standard day temperature for particular altitude.

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	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 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		@ 2500 FEET & 50° F		@ 5000 FEET & 41° F		@ 7500 FEET & 32° F	
		GROUND ROLL	TOTAL TO CLEAR 50 FT. OBS.	GROUND ROLL	TOTAL TO CLEAR 50 FT. OBS.	GROUND ROLL	TOTAL TO CLEAR 50 FT. OBS.	GROUND ROLL	TOTAL TO CLEAR 50 FT. OBS.
2800	69	590	1350	640	1430	680	1505	740	1595

NOTES:
1. Distances shown are based on zero wind, power off and heavy braking.
2. Reduce landing distances 10% for each 6 MPH headwind.
3. For operation on a dry, grass runway, increase distances (both "ground roll" and "total to clear 50 ft. obstacle") by 20% of the "total to clear 50 ft. obstacle" figure.

Figure 5-5.

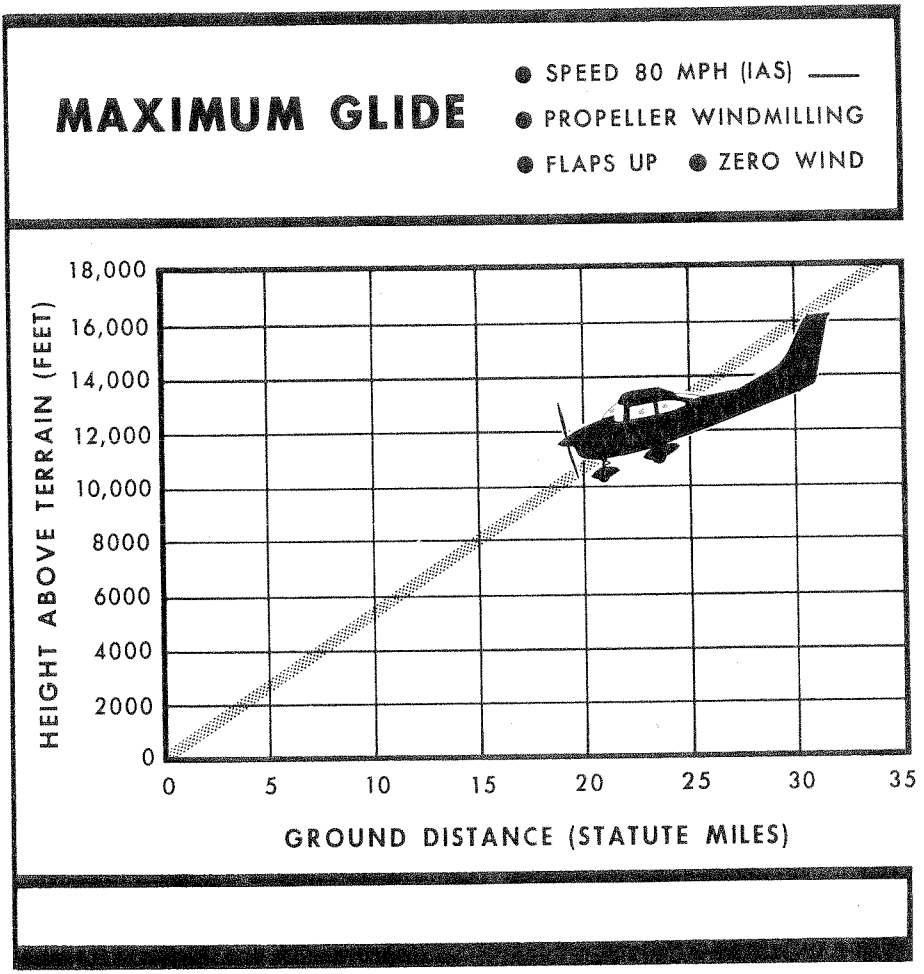

MAXIMUM GLIDE
SPEED 80 MPH (IAS)
PROPELLER WINDMILLING
FLAPS UP
ZERO WIND
HEIGHT ABOVE TERRAIN (FEET)
18,000
16,000
14,000
12,000
10,000
8000
6000
4000
2000
0
0
5
10
15
20
25
30
35
GROUND DISTANCE (STATUTE MILES)

Figure 5-6.

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 should be installed to improve engine operation. The winterization kit consists of two shields to partially cover the cowl nose cap opening, one shield to cover the carburetor air intake, and insulation for the crankcase breather line. Once installed, the crankcase breather insulation is approved for permanent use in both cold and hot weather. The non-congealing oil cooler replaces the standard oil cooler and provides improved oil flow through the cooler in cold weather.

GROUND SERVICE PLUG RECEPTACLE.

A ground service plug receptacle may be installed to permit use of an external power source for cold weather starting and during lengthy maintenance work on the airplane electrical system (with the exception of electronic equipment).

NOTE

Electrical power for the airplane electrical circuits is provided through a split bus bar having all electronic circuits on one side of the bus and other electrical circuits on the other side of the bus. When an external power source is connected, a contactor automatically opens the circuit to the electronic portion of the split bus bar as a protection against damage to the semi-conductors in the electronic equipment by transient voltages from the power source. Therefore, the external power source can not be used as a source of power when checking electronic components.

Just before connecting an external power source (generator type or battery cart), the master switch should be turned "ON."

The ground service plug receptacle circuit incorporates a polarity reversal protection. Power from the external power source will flow only if the ground service plug is correctly connected to the airplane. If the plug is accidentally connected backwards, no power will flow to the airplane's electrical system, thereby preventing any damage to electrical equipment.

The battery and external power circuits have been designed to completely eliminate the need to "jumper" across the battery contactor to close it for charging a completely "dead" battery. A special fused circuit in the external power system supplies the needed "jumper" across the contacts so that with a "dead" battery and an external power source applied, turning the master switch "ON" will close the battery contactor.

OIL DILUTION SYSTEM.

If your airplane is equipped with oil dilution, and very low temperatures are anticipated, dilute oil prior to engine shutdown 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 oil, the oil pressure should be watched for any unusual fluctuations that might indicate a screen being clogged with sludge washed down by the fuel.

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.

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 hours' 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 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. The up position selects the upper transmitter and the down position selects the lower transmitter.

The installation of Cessna radio equipment provides certain audio

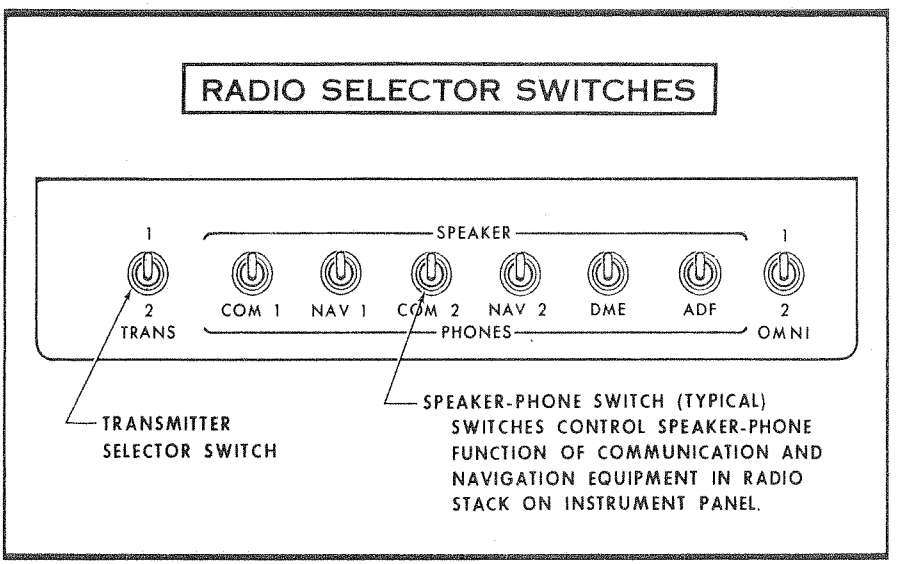


Figure 6-2.

back-up capabilities and transmitter selector switch functions that the pilot should be familiar with. When the transmitter selector switch is placed in position 1 or 2, the audio amplifier of the corresponding transceiver is utilized to provide the speaker audio for all radios. If the audio amplifier in the selected transceiver fails, as evidenced by loss of speaker audio for all radios, place the transmitter selector switch in the other transceiver position. Since an audio amplifier is not utilized for headphones, a malfunctioning amplifier will not affect headphone operation.

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.

POST LIGHTS

The instrument panel and control pedestal may be equipped with optional post lights to further increase night lighting. The post lights are located at the edge of each instrument or control to be lighted, and are controlled by a rocker-type switch labeled "POST-CONSOLE LIGHTS" and the instrument light rheostat. To operate the post lights, place the switch in the "POST" (top) position and use the instrument light rheostat to control light intensity. When optional post lighting is installed, a door post mounted map light is added to the right hand door post.

OXYGEN SYSTEM

A four-place oxygen system is available for your airplane. In this system, an oxygen cylinder, located behind the rear baggage compartment wall, supplies the oxygen. 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.

Four oxygen outlets are provided in the cabin ceiling just above the side windows; one at each of the seating positions. One permanent, microphone equipped mask is provided for the pilot, and three disposable type masks are provided for the passengers. All masks are the partial-rebreathing type equipped with vinyl plastic hoses and flow indicators.

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 Chart (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:

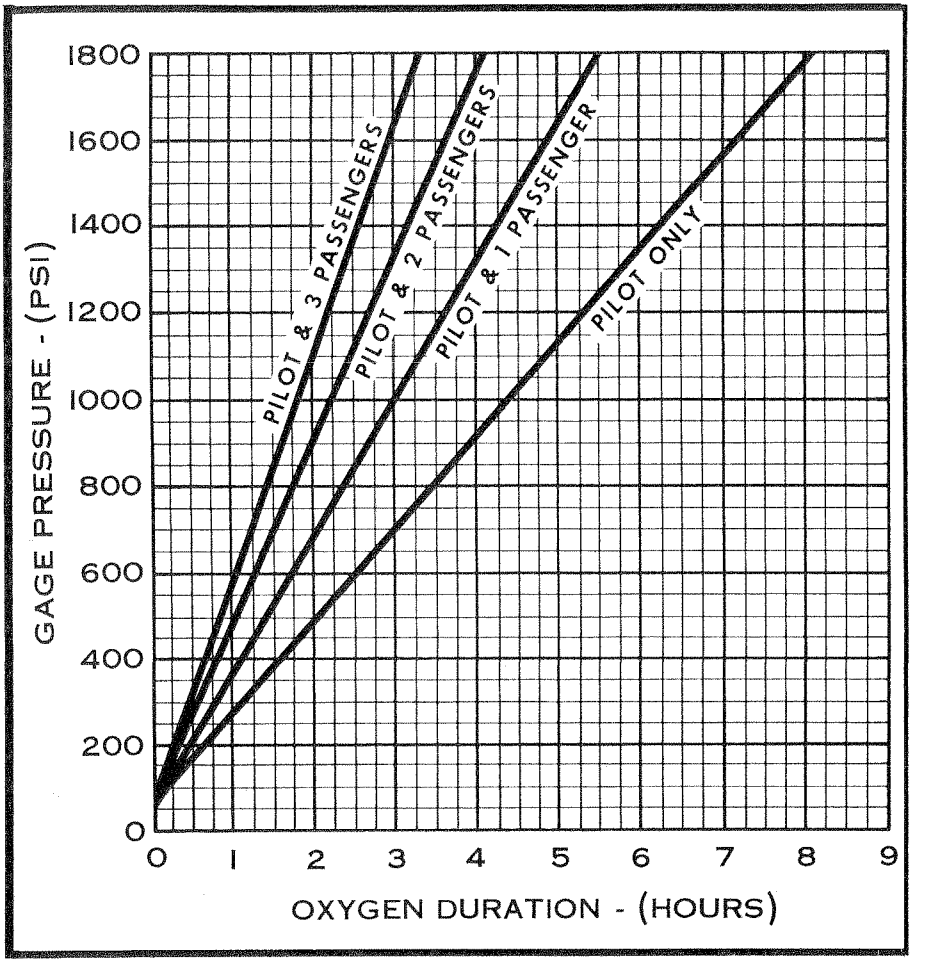
NOTE

Permit no smoking when using oxygen.

(1) Select mask and hose.

OXYGEN DURATION CHART

(48 CUBIC FEET CAPACITY)



NOTE: This chart is based on a pilot with an orange color-coded oxygen line fitting and passengers with green color-coded line fittings.

Figure 6-3.

NOTE

The hose assembly provided for the pilot is of a higher flow rate than those for the passengers; it 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, he may provide higher flow rate hoses for all passengers. In any case, it is recommended that the pilot use the larger capacity hose. The pilot's mask is equipped with a microphone to facilitate the use of the radio while using oxygen.

(2) Attach mask to face and adjust metallic nose strap for snug mask fit.
(3) Select oxygen outlet located nearest to the seat you are occupying, and plug delivery hose into it. When the oxygen supply is turned on, oxygen will flow continuously at the proper rate of flow for any altitude without any manual adjustments.
(4) Position oxygen supply control knob "ON."
(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.
(7) Position oxygen supply control knob "OFF."

OXYGEN DURATION CALCULATION.

The Oxygen Duration Chart (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 chart.

(1) Note the available oxygen pressure shown on the pressure gage.
(2) Locate this pressure on the scale on the left side of the chart, then go across the chart horizontally to the right until you intersect the line representing the number of persons making the flight. After intersecting the line, drop down vertically to the bottom of the chart and read the duration in hours given on the scale.
(3) As an example of the above procedure, 1400 psi of pressure will safely sustain the pilot only for nearly 6 hours and 15 minutes. The same pressure will sustain the pilot and three passengers for approximately 2 hours and 30 minutes.

NOTE

The Oxygen Duration Chart is 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 pilot and passengers, it will be necessary to compute new oxygen duration figures due to the greater consumption of oxygen with these hoses. This is accomplished by computing the total duration available to the pilot only (from "PILOT ONLY" line on chart), then dividing this duration by the number of persons (pilot and passengers) using oxygen.

OXYGEN SYSTEM SERVICING.

The oxygen cylinder, when fully charged, contains approximately 48 cubic feet of oxygen, under a pressure of 1800 psi at 70°F. Filling pressures will vary, however, due to the ambient temperature in the filling area, and because of the temperature rise resulting from compression of the oxygen. Because of this, merely filling to 1800 psi will not result in a properly filled cylinder. Fill to the pressures indicated in the following table for the ambient temperature.

IMPORTANT

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

AMBIENT TEMPERATURE °F	FILLING PRESSURE PSIG	AMBIENT TEMPERATURE °F	FILLING PRESSURE PSIG
0	1600	50	1825
10	1650	60	1875
20	1700	70	1925
30	1725	80	1975
40	1775	90	2000

CESSNA ECONOMY MIXTURE INDICATOR

The Cessna Economy Mixture Indicator is an exhaust gas temperature (EGT) sensing device which visually aids the pilot in obtaining either an efficient maximum power mixture or a desired cruise mixture. Exhaust gas temperature varies with cylinder fuel-to-air ratio, power, and RPM.

OPERATING INSTRUCTIONS.

The reference EGT must be known before the EGT indicator can be used for take-off and climb. Determine the reference EGT periodically as follows:

(1) Establish 65% power in level flight at 2450 RPM and part throttle.

(2) Carefully lean to peak EGT. This is the reference EGT.

FLIGHT CONDITION	POWER SETTING	EGT	REMARKS
TAKE-OFF AND CLIMB	Full throttle and 2600 RPM	200° richer than REFERENCE EGT	Use FULL RICH mixture below 3000'
NORMAL CLIMB	23" MP and 2450 RPM	125° richer than REFERENCE EGT	Above 10,000' use BEST POWER mixture
MAXIMUM CRUISE SPEED	75% or less	Peak minus 125° F (ENRICHEN)	BEST POWER mixture, 1 MPH TAS increase and 10% range loss from NORMAL LEAN
NORMAL CRUISE	75% or less	Peak minus 75° (ENRICHEN)	NORMAL LEAN mixture-Owner's Manual and Power Computer performance
MAXIMUM RANGE	65% or less	Peak minus 25° (ENRICHEN)	2 MPH TAS loss and 10% range increase from NORMAL LEAN

NOTE

Operation at peak EGT is not authorized for continuous operation, except to establish peak EGT for reference at 75% power or less. Operation on the lean side of peak EGT or within 25° of peak EGT is not approved.

The chart on page 6-10 should be used to establish mixture settings in take-off, climb and cruise conditions.

The yellow index pointer may be set at the reference point, or to a specific point to lean to. It can be positioned manually by turning the screw adjustment on the face of the instrument.

For maximum performance take-off, mixture may be set during static full power run-up, if feasible, or during the ground roll.

NOTE

Enrichen mixture during climb if excessive cylinder head temperatures occur.

When leaning the mixture under some cruise conditions, engine roughness may occur before peak EGT is reached. In this case, use the EGT corresponding to the onset of roughness as the reference point instead of peak EGT.

Changes in altitude or power setting require the EGT to be rechecked. Mixture may be controlled in cruise descent by simply enriching to avoid engine roughness. During prolonged descents, maintain sufficient power to keep the EGT needle on scale. In idle descents or landing approaches use full rich mixture. For idle descents or landing approaches at high elevations, the mixture control may be set in a position to permit smooth engine acceleration to maximum power.

WING LEVELER

A wing leveler may be installed to augment the lateral stability of the airplane. The system uses the Turn Coordinator for roll and yaw sensing. Vacuum pressure, from the engine-driven vacuum pump, is routed from the Turn Coordinator to cylinder-piston servo units attached to the aileron control system. As the airplane deviates from a wing level attitude, vacuum pressure in the servo units is increased or relieved as needed to actuate the ailerons to oppose the deviations.

A separately mounted push-pull control knob, labeled "WING LVLR", is provided on the left side of the instrument panel to turn the system on and off. A "ROLL TRIM" control knob on the Turn Coordinator is used for manual roll trim control to compensate for asymmetrical loading of fuel and passengers, and to optimize system performance in climb, cruise and let-down.

OPERATING CHECK LIST

TAKE-OFF.

(1) "WING LVLR" Control Knob -- Check in off position (full in).

CLIMB.

(1) Adjust elevator and rudder trim for climb.
(2) "WING LVLR" Control Knob -- Pull control knob "ON."
(3) "ROLL TRIM" Control Knob -- Adjust for wings level attitude.

CRUISE.

(1) Adjust power and elevator and rudder trim for level flight.
(2) "ROLL TRIM" Control Knob -- Adjust as desired.

DESCENT.

(1) Adjust power and elevator and rudder trim for desired speed and rate of descent.
(2) "ROLL TRIM" Control Knob -- Adjust as desired.

LANDING.

(1) Before landing, push "WING LVLR" control knob full in to the off position.

EMERGENCY PROCEDURES

If a malfunction should occur, the system is easily overpowered with pressure on the control wheel. The system should then be turned off. In the event of partial or complete vacuum failure, the wing leveler will automatically become inoperative. However, the Turn Coordinator used with the wing leveler system will not be affected by loss of vacuum since it is designed with a "back-up" system enabling it to operate from either vacuum or electrical power in the event of failure of one of these sources.

OPERATING NOTES

(1) The wing leveler system may be overpowered at any time without damage or wear. However, for extended periods of maneuvering it may be desirable to turn the system off.

(2) It is recommended that the system not be engaged during take-off and landing. Although the system can be easily overpowered, servo forces could significantly alter the manual "feel" of the aileron control, especially should a malfunction occur.

FUEL TANK QUICK-DRAIN VALVE KIT

Two fuel tank quick-drain valves and a fuel sampler cup are available as a kit to facilitate daily draining and inspection of fuel in the main tanks for the presence of water and sediment. The valves replace existing fuel tank drain plugs located at the lower inboard area of the wing. The fuel sampler cup, which may be stowed in the map compartment, is used to drain the valves. The sampler cup has a probe in the center of the cup. When the probe is inserted into the hole in the bottom of the drain valve and pushed upward, fuel flows into the cup to facilitate visual inspection of the fuel. As the cup is removed, the drain valve seats, stopping the flow of fuel.

CARBURETOR AIR TEMPERATURE GAGE

A carburetor air temperature gage may be installed in the airplane to help detect carburetor icing conditions. The gage is marked with a yellow arc between -15° and +5°C. The yellow arc indicates the carburetor temperature range where carburetor icing can occur; a placard on the gage reads "KEEP NEEDLE OUT OF YELLOW ARC DURING POSSIBLE ICING CONDITIONS."

Visible moisture or high humidity can cause carburetor ice formation, especially in idle or low power conditions. Under cruising conditions, the formation of ice is usually slow, providing time to detect the loss of RPM caused by the ice. Carburetor icing during take-off is rare since the full-open throttle condition is less susceptible to ice obstruction.

If the carburetor air temperature gage needle moves into the yellow arc during potential carburetor icing conditions, or there is an unexplained drop in RPM, apply full carburetor heat. Upon regaining the original RPM (with heat off), determine by trial and error the minimum amount of carburetor heat required for ice-free operation.

NOTE

Carburetor heat should not be applied during take-off unless absolutely necessary to obtain smooth engine acceleration (usually in sub-zero temperatures).

TRUE AIRSPEED INDICATOR

A true airspeed indicator is available to replace the standard airspeed indicator in your airplane. The true airspeed indicator has a calibrated rotatable ring which works in conjunction with the airspeed indicator dial in a manner similar to the operation of a flight computer.

TO OBTAIN TRUE AIRSPEED, rotate ring until pressure altitude is aligned with outside air temperature in degrees Fahrenheit. Then read true airspeed on rotatable ring opposite airspeed needle.

NOTE

Pressure altitude should not be confused with indicated altitude. To obtain pressure altitude, set barometric scale on altimeter to "29.92" and read pressure altitude on altimeter. Be sure to return altimeter barometric scale to original barometric setting after pressure altitude has been obtained.

ALPHABETICAL INDEX

A

B

C

D

E

F

G

H

I

L

M

N

O

P

R

S

T

V

W

WARRANTY

The Cessna Aircraft Company ("Cessna") warrants each new aircraft manufactured by it, and all new aircraft equipment and accessories, including Cessna-Crafted Electronics (as herein defined), and all new service parts for such aircraft, aircraft equipment and accessories sold by it, to be free from defects in material and workmanship under normal use and service for a period of six (6) months after delivery to the original retail purchaser or first user in the case of aircraft, aircraft equipment and accessories (except Cessna-Crafted Electronics as herein defined) and service parts therefor, and for a period of one (1) year after such delivery in the case of Cessna-Crafted Electronics (which term includes all communication, navigation and autopilot systems bearing the name "Cessna", beginning at the connection to the aircraft electrical system (bus bar) and including "black boxes", antennas, microphones, speakers and other components and associated wiring but excluding gyro instruments used in connection with autopilot and navigation systems) and service parts therefor.

Cessna's obligation under this warranty is limited to repairing or replacing, at its option, any part or parts which, within the applicable six (6) or twelve (12) months period as above set forth, shall be returned transportation charges prepaid to Cessna at Wichita, Kansas, or to any Cessna appointed or Cessna Distributor appointed dealer authorized by such appointment to sell the aircraft, equipment, accessories and service parts of the type involved and which upon examination shall disclose to Cessna's satisfaction to have been thus defective. (A new warranty period is not established for replacements. Replacements are warranted for the remainder of the applicable six (6) or twelve (12) months original warranty period). The repair or replacement of defective parts under this warranty will be made by Cessna or the dealer without charge for parts, or labor for removal, installation and/or actual repair of such defective parts. (Locations of such dealers will be furnished by Cessna on request).

The provisions of this warranty do not apply to any aircraft, equipment, accessories (including Cessna-Crafted Electronics) or service parts therefor manufactured or sold by Cessna 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 and reliability, nor to normal maintenance services (such as engine tune up, cleaning, control rigging, brake and other mechanical adjustments, maintenance inspections, etc.) and the replacement of service items (such as spark plugs, brake linings, filters, hoses, belts, tires, etc.) made in connection with such services or required as maintenance, nor to normal deterioration of soft trim and appearance items (such as paint, upholstery, rubber-like items, etc.) due to wear and exposure.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED IN FACT OR BY LAW, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ANY OTHER OBLIGATION OR LIABILITY ON THE PART OF CESSNA TO ANYONE OF ANY NATURE WHATSOEVER BY REASON OF THE MANUFACTURE AND/OR SALE OR THE USE OF SUCH AIRCRAFT PRODUCTS, INCLUDING LIABILITY FOR CONSEQUENTIAL OR SPECIAL DAMAGES, AND CESSNA NEITHER ASSUMES NOR AUTHORIZES ANYONE TO ASSUME FOR IT ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH SUCH AIRCRAFT PRODUCTS.

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 50 ABOVE 40° F.
SAE 10W30 OR SAE 30 BELOW 40°F.
(MULTI-VISCOSITY OIL WITH A RANGE OF SAE 10W30 IS RECOMMENDED FOR IMPROVED STARTING IN COLD WEATHER. DETERGENT OR DISPERSANT OIL, CONFORMING TO CONTINENTAL MOTORS SPECIFICATION MHS-24A, MUST BE USED.)

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 AT 70°F.
(CYLINDER TEMPERATURE STABILIZED AFTER FILLING)
REFER TO PAGE 6-9 FOR FILLING PRESSURES.

TIRE PRESSURE:

MAIN WHEELS -- 32 PSI ON 6.00 × 6 TIRES
-- 25 TO 35 PSI ON 8.00 × 6 TIRES (OPT)
NOSE WHEEL -- 50 PSI ON 5.00 × 5 TIRE
-- 30 PSI ON 6.00 × 6 TIRE (OPT)

NOSE GEAR SHOCK STRUT:

KEEP FILLED WITH FLUID AND INFLATED TO 55-60 PSI.

CESSNA

"TAKE YOUR CESSNA HOME
FOR SERVICE AT THE SIGN
OF THE CESSNA SHIELD".

CESSNA AIRCRAFT COMPANY

WICHITA, KANSAS