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1969

WORLD'S LARGEST PRODUCER OF GENERAL AVIATION AIRCRAFT SINCE 1956

Turbo-System

CENTURION

OWNER'S MANUAL

PERFORMANCE - SPECIFICATIONS

Turbo-System Centurion*

GROSS WEIGHT	3400 lbs
SPEED, BEST POWER MIXTURE:	
Top Speed at 19,000 ft	234 mph
Cruise, 75% Power at 24,000 ft	223 mph
Cruise, 75% Power at 10,000 ft	197 mph
RANGE, NORMAL LEAN MIXTURE:	
Cruise, 75% Power at 24,000 ft	860 mi
64 Gallons, No Reserve	3.9 hrs
	221 mph
Cruise, 75% Power at 10,000 ft	765 mi
64 Gallons, No Reserve	3.9 hrs
	195 mph
Cruise, 75% Power at 24,000 ft	1190 mi
89 Gallons, No Reserve	5.4 hrs
	221 mph
Cruise, 75% Power at 10,000 ft	1065 mi
89 Gallons, No Reserve	5.4 hrs
	195 mph
Optimum Range at 24,000 ft	1035 mi
64 Gallons, No Reserve	6.1 hrs
	170 mph
Optimum Range at 10,000 ft	1010 mi
64 Gallons, No Reserve	7.2 hrs
	141 mph
Optimum Range at 24,000 ft	1450 mi
89 Gallons, No Reserve	8.5 hrs
	170 mph
Optimum Range at 10,000 ft	1405 mi
89 Gallons, No Reserve	10.0 hrs
	141 mph
RATE OF CLIMB AT SEA LEVEL	1115 fpm
SERVICE CEILING	30,200 ft
TAKE-OFF:	
Ground Run	800 ft
Total Distance Over 50-Foot Obstacle	1365 ft
LANDING:	
Landing Roll	625 ft
Total Distance Over 50-Foot Obstacle	1355 ft
EMPTY WEIGHT (Approximate)	2060 lbs
USEFUL LOAD	1340 lbs
WING LOADING: Pounds/Sq Foot	19.3
POWER LOADING: Pounds/HP	11.9
FUEL CAPACITY: Total	90 gal.
OIL CAPACITY: Total	11 qts
PROPELLER: 2-Bladed Constant Speed (Dia)	82 inches
ENGINE:	
Continental Turbocharged Fuel Injection Engine	TSIO-520-H
285 rated BHP at 2700 RPM and 32.5" MP	

Performance with an optional 3-bladed propeller is essentially the same as above.

*This manual covers operation of the Turbo-System Centurion which is certificated as Model T210J under FAA Type Certificate No. 3A21.

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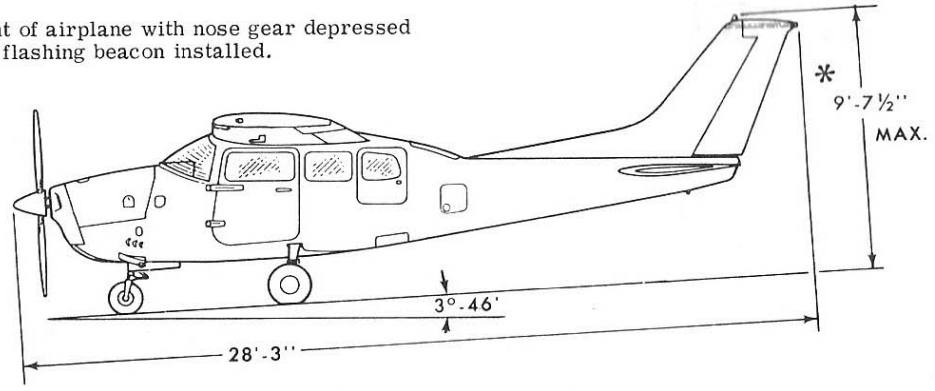
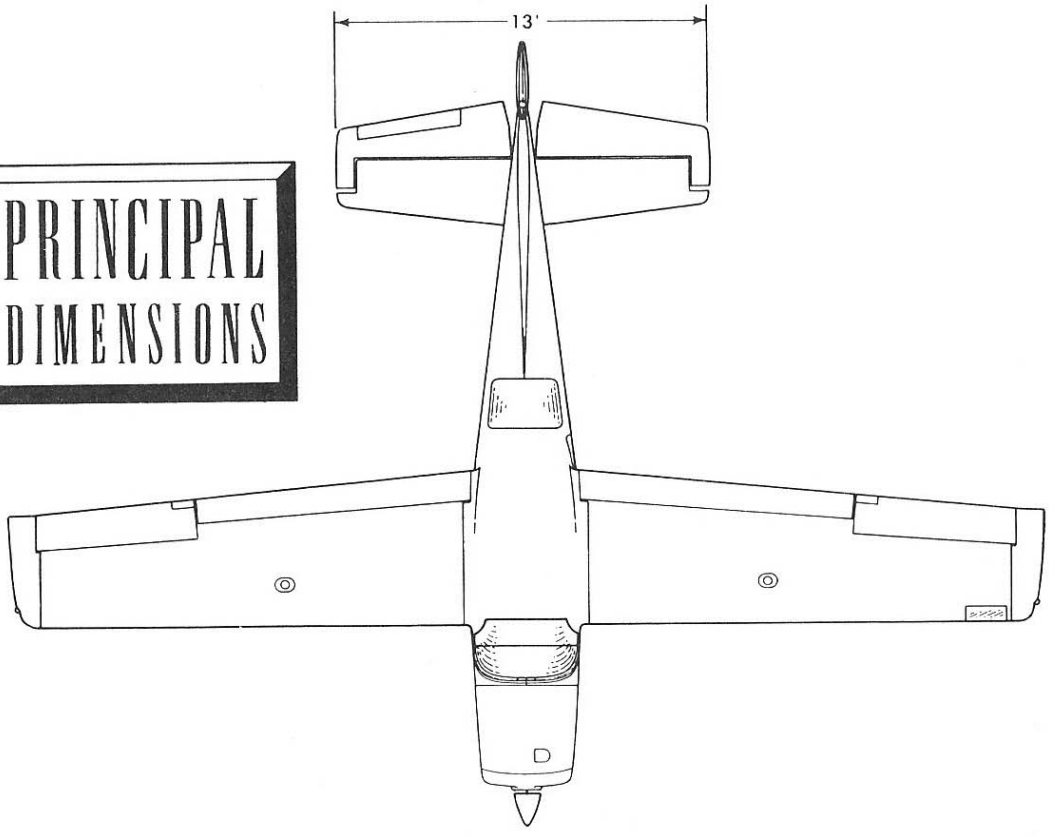
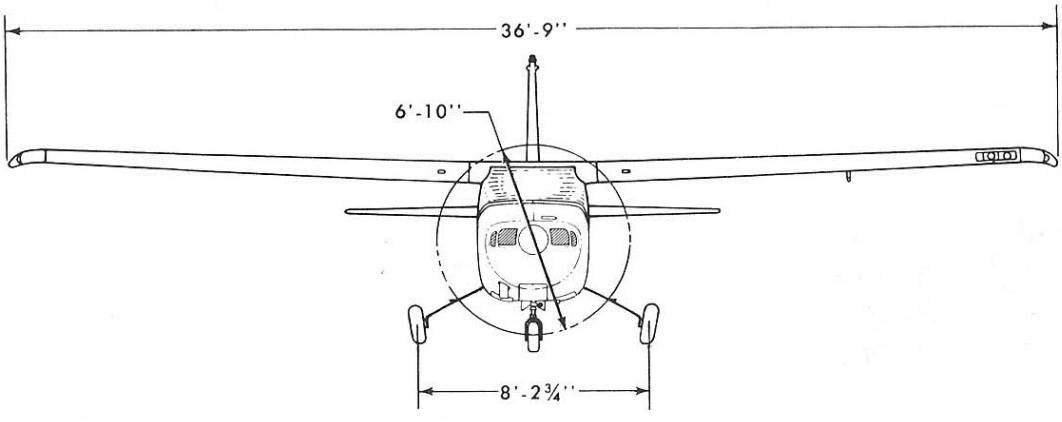
A current Cessna Dealer Directory accompanies your new airplane. The Directory is revised frequently, and a current copy can be obtained from your Cessna Dealer. Make your Directory one of your cross-country flight planning aids; a warm welcome awaits you at every Cessna Dealer.

PRINCIPAL DIMENSIONS



* Maximum height of airplane with nose gear depressed and an optional flashing beacon installed.





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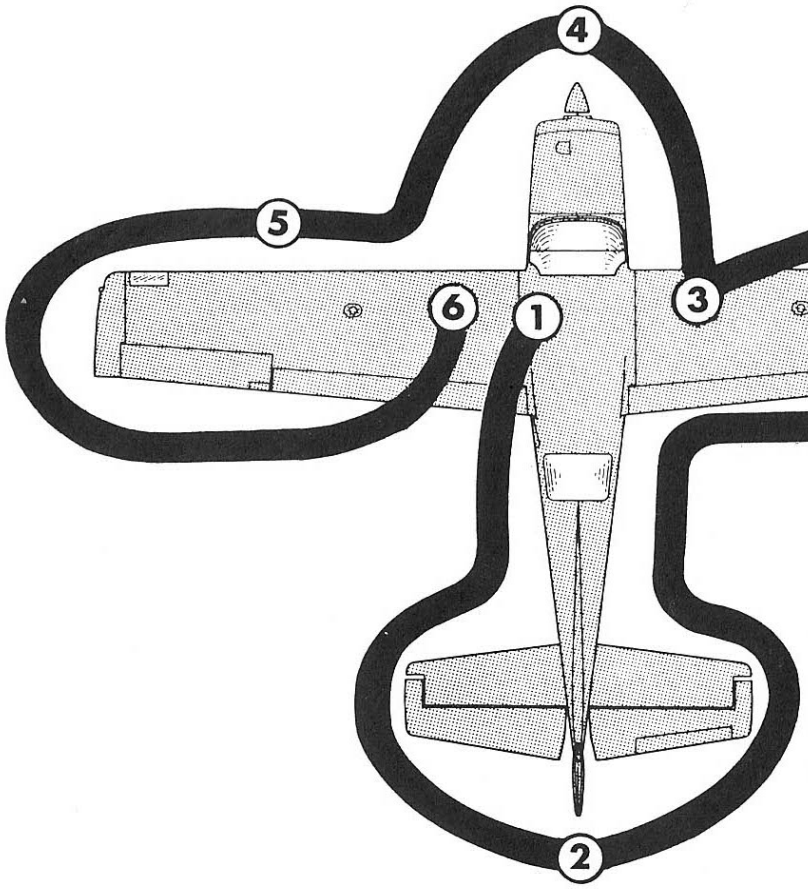


NOTE

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.

EXTERIOR INSPECTION

(1)
- a. Turn on master switch and check fuel quantity indicators, then turn master switch "OFF."
- b. Check ignition switch "OFF."
- c. Check that fuel bay selector valve handle is on fullest bay.
- d. Remove control wheel lock.
- e. Check oxygen supply pressure.
- f. Check that oxygen masks are available.
- g. Check baggage door for security.

(2)
- a. Inspect airspeed static source holes on sides of fuselage tailcone for stoppage.
- b. Remove rudder gust lock, if installed.
- c. Disconnect tail tie-down.

(3)
- a. Check fuel bay vent opening (at wing tip trailing edge) for stoppage.
- b. Disconnect wing tie-down.
- c. Check main wheel tire for proper inflation.

(4)
- a. Check propeller and spinner for nicks and security, and propeller for oil leaks.
- b. Check engine induction air inlet and cabin heating air inlet for restrictions.
- 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 seven quarts. Fill for extended flight.
- f. Before the first flight of the 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 fuel bay sumps contain water. Thus, the fuel bay sump drain plugs and fuel reservoir drain plugs 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.

(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, II, and III are indicated airspeeds unless otherwise noted. Corresponding calibrated airspeeds may be obtained from the Airspeed Correction Table in Section VI.

BEFORE ENTERING THE AIRPLANE.

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

BEFORE STARTING THE ENGINE.

(1) Pilot's Check List -- Review check list on left front doorpost.
(2) Seats and Seat Belts -- Adjust and lock.
(3) Brakes -- Test and set.
(4) Master Switch -- "ON."
(5) Landing Gear -- Handle neutral and down light green.

(6) Landing Gear Lights and Horn -- Push to test.
(7) Cowl Flaps -- "OPEN." (Move lever out of locking hole to reposition.)
(8) Fuel Selector -- Fullest bay.
(9) Turn all radio switches "OFF."

STARTING ENGINE.

(1) Mixture -- Full Rich.
(2) Propeller -- High RPM.
(3) Throttle -- Closed.
(4) Auxiliary Fuel Pump Switch -- On "LO."

NOTE

The auxiliary fuel pump will not operate until the ignition switch is turned to the "START" position.

(5) Ignition Key -- "START."
(6) Slowly advance throttle.
(7) Release ignition key when engine starts.

NOTE

If engine fails to continue running, start again from step (3) or use "HI" position of auxiliary fuel pump momentarily to clear vapor from lines.

(8) Reset throttle to desired idle speed.
(9) Auxiliary Fuel Pump Switch -- Off.

BEFORE TAKE-OFF.

(1) Parking Brake -- Set.
(2) Cowl Flaps -- Check full "OPEN."
(3) Flight Controls -- Check.
(4) Elevator and Rudder Trim -- "TAKE-OFF" settings.
(5) Throttle Setting -- 1700 RPM.
(6) Magnetos -- Check (50 RPM maximum differential between magnetos).

(7) Propeller -- Cycle from high to low RPM; return to high RPM (full in).
(8) Engine Instruments -- Check.
(9) Ammeter -- Check.
(10) Suction Gage -- Check (4.6 to 5.4 inches of mercury).
(11) Flight Instruments and Radios -- Set.
(12) Optional Autopilot or Wing Leveler -- Off.
(13) Cabin Doors and Window -- Closed and locked.

TAKE-OFF.

NORMAL TAKE-OFF.

(1) Wing Flaps -- 0° to 20°.
(2) Power -- Full throttle and 2700 RPM.
(3) Elevator Control -- Lift nosewheel at 60 MPH.
(4) Climb Speed -- 105 MPH until all obstacles are cleared, then set up climb speed as shown in "NORMAL CLIMB" check list.
(5) Brakes -- Apply momentarily (when airborne).
(6) Landing Gear -- Retract (in climb-out).
(7) Wing Flaps -- Retract (if extended) after obstacles are cleared.

MAXIMUM PERFORMANCE TAKE-OFF.

(1) Wing Flaps -- 20°
(2) Brakes -- Apply.
(3) Power -- Full throttle, 2700 RPM and 28 gal/hr. fuel flow.
(4) Brakes -- Release.
(5) Elevator Control -- Maintain slightly tail-low attitude.
(6) Climb Speed -- 72 MPH until all obstacles are cleared, then set up climb speed as shown in "MAXIMUM PERFORMANCE CLIMB" check list.
(7) Landing Gear and Wing Flaps -- Retract after obstacles are cleared.

CLIMB.

NORMAL CLIMB.

(1) Airspeed -- 120 to 140 MPH.

(2) Power -- 27.5 inches and 2500 RPM.
(3) Mixture -- Lean to 20 gal/hr. fuel flow.
(4) Cowl Flaps -- Open as required.

MAXIMUM PERFORMANCE CLIMB—SEA LEVEL TO 19,000 FEET.

(1) Airspeed -- 110 MPH.
(2) Power -- Full throttle and 2700 RPM.
(3) Mixture -- Adjust to 28 gal/hr. fuel flow.

NOTE

See power and fuel flow placard for maximum manifold pressure and fuel flow above 19,000 feet.

(4) Cowl flaps -- Full "OPEN."

CRUISING.

(1) Power -- 15-27.5 inches of manifold pressure and 2200-2500 RPM. Select combination to give no more than 75% power.
(2) Cowl Flaps -- Open as required.
(3) Elevator and Rudder Trim -- Adjust.
(4) Mixture -- Lean for cruise fuel flow as determined from your Cessna Power Computer or the OPERATIONAL DATA in Section VI.

LET-DOWN.

(1) Power -- As desired.
(2) Mixture -- Lean for smoothness in power descents. Use full rich mixture for idle power.

BEFORE LANDING.

(1) Fuel Selector -- Fullest bay.
(2) Landing Gear Lever -- "DOWN" (below 160 MPH).
(3) Landing Gear Light -- Green.
(4) Mixture -- Rich.

(5) Propeller -- High RPM.
(6) Wing Flaps -- Down 0° -10° (below 160 MPH), 10° -30° (below 110 MPH).
(7) Airspeed -- 90-100 MPH (flaps retracted), 80-90 MPH (flaps extended).
(8) Elevator Trim -- Adjust.

NORMAL LANDING.

(1) Touch Down -- Main wheels first.
(2) Landing Roll -- Lower nose wheel gently.
(3) Braking -- Minimum required.

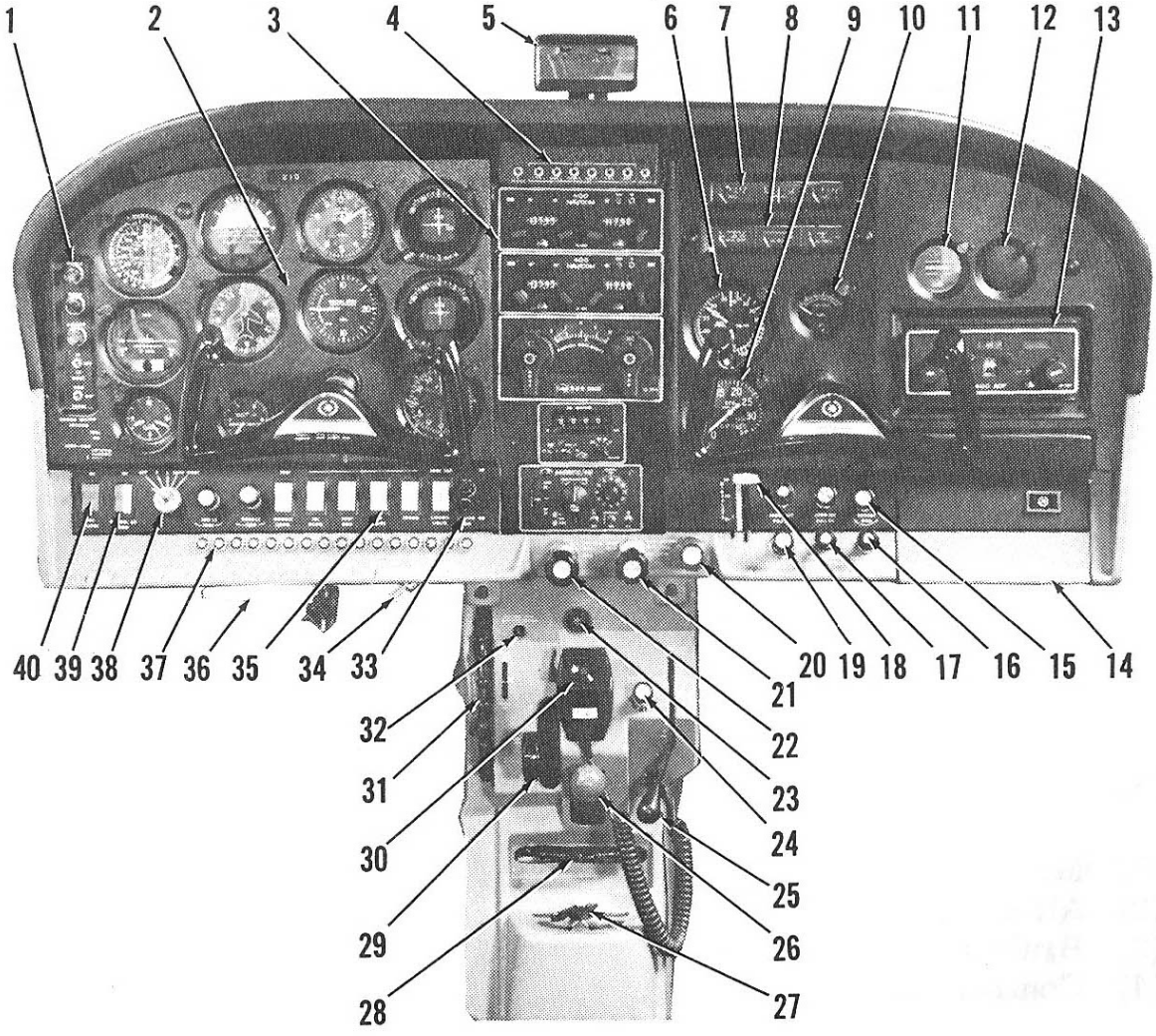
AFTER LANDING.

(1) Cowl Flaps -- "OPEN."
(2) Wing Flaps -- Retract.

SECURE AIRCRAFT.

(1) Mixture -- Idle cut-off.
(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 (Opt.)
4. Radio Selector Switches (Opt.)
5. Rear View Mirror (Opt.)
6. Manifold Pressure/Fuel Flow Indicator
7. Fuel Quantity Indicators and Ammeter
8. Cylinder Head Temperature, Oil Temperature and Oil Pressure Gages
9. Tachometer
10. Economy Mixture Indicator (Opt.)
11. Flight Hour Recorder (Opt.)
12. Optional Instrument Space
13. Radio (Opt.)
14. Map Compartment
15. Cabin Heat, Cabin Air, and Defrost Control Knobs
16. Auxiliary Cabin Air Control Knob
17. Rudder Pedal Stowage Control Knob (Opt.)
18. Wing Flap Switch
19. Cigar Lighter
20. Mixture Control Knob
21. Propeller Control Knob
22. Throttle
23. Reservoir Sight Window
24. Manual Engine Primer (Opt.)
25. Cowl Flap Control Handle
26. Emergency Landing Gear Hand Pump
27. Fuel Selector Valve Handle
28. Rudder Trim Control Wheel
29. Landing Gear Position Handle
30. Microphone (Opt.)
31. Elevator Trim Control Wheel
32. Electric Elevator Trim Circuit Breaker Switch (Opt.)
33. Landing Gear Position Lights
34. Static Pressure Alternate Source Valve (Opt.)
35. Electrical Switches
36. Parking Brake Handle
37. Circuit Breakers
38. Ignition/Starter Switch
39. Auxiliary Fuel Pump Switch
40. 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 integral fuel bays, one in each wing. Usable fuel in each bay, for all flight conditions, is 44.5 gallons when completely filled.

The fuel capacity of this aircraft has been designed to provide the owner with a choice of long range capability with partial cabin loading or reduced range with full cabin loading. For example, with full cabin loading, it normally will be necessary to reduce the fuel load to keep the aircraft within approved weight and balance limits. (Refer to Section IV for weight and balance control procedures.) For a reduced fuel load of 32 gallons of usable fuel in each bay, fill each bay to bottom edge of fuel filler collar.

NOTE

Unusable fuel is at a minimum due to the design of the fuel system. However, when the fuel bays are 1/4 full or less, prolonged uncoordinated flight such as slips or skids can uncover the fuel bay outlets, causing fuel starvation and engine stoppage. Therefore, with low fuel reserves, do not allow the aircraft to remain in uncoordinated flight for periods in excess of one minute.

Fuel from each wing fuel bay flows through a reservoir tank to the fuel selector valve. Depending upon the setting of the selector valve, fuel from the left or right fuel bay and reservoir tank flows through a strainer and by-pass in the electric auxiliary fuel pump (when it is not operating)

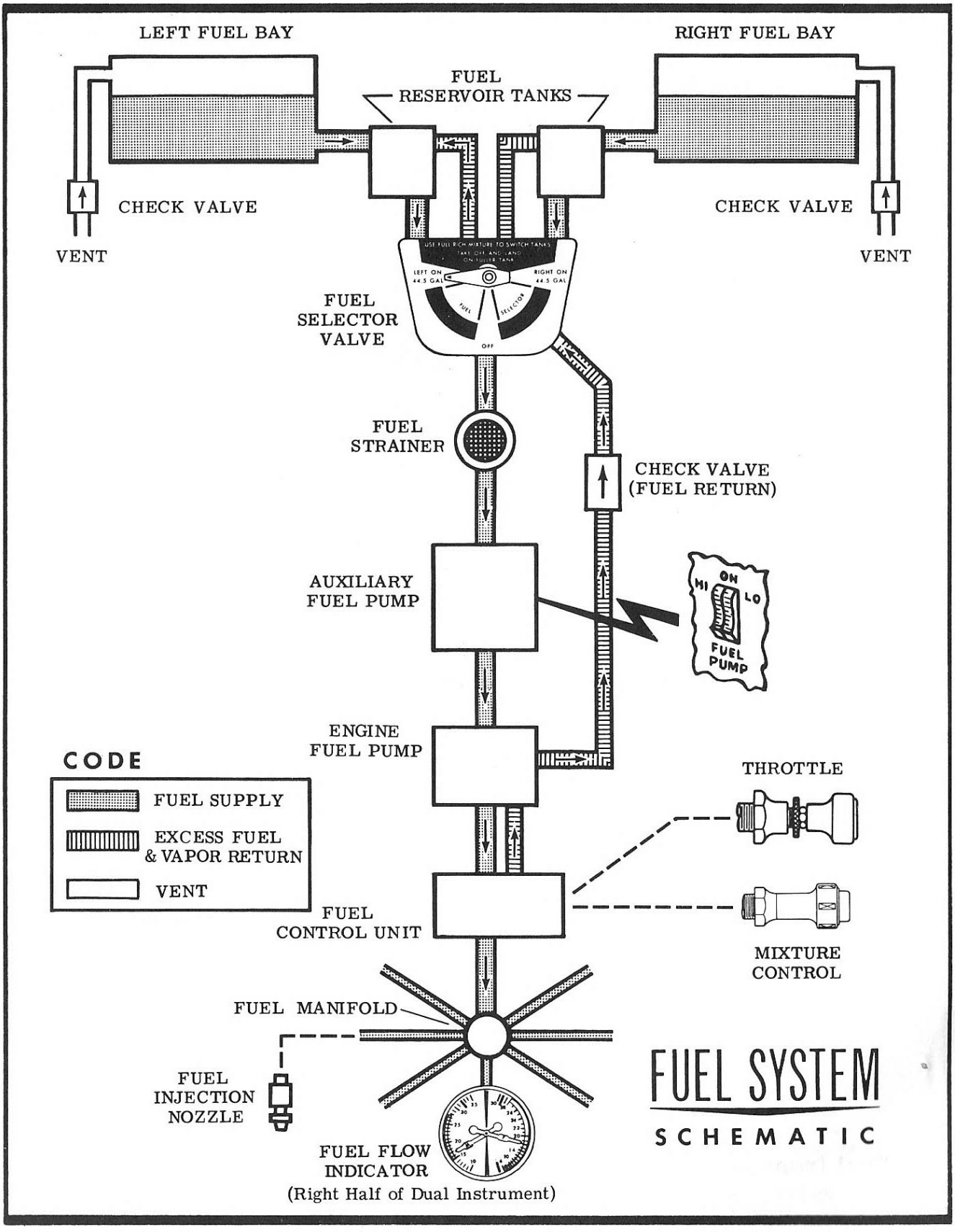

LEFT FUEL BAY
RIGHT FUEL BAY
FUEL
RESERVOIR TANKS
CHECK VALVE
CHECK VALVE
VENT
VENT
FUEL
SELECTOR
VALVE
FUEL
STRAINER
CHECK VALVE
(FUEL RETURN)
AUXILIARY
FUEL PUMP
HI
ON
LO
FUEL
PUMP
ENGINE
FUEL PUMP
CODE
FUEL SUPPLY
EXCESS FUEL
& VAPOR RETURN
VENT
THROTTLE
FUEL
CONTROL UNIT
MIXTURE
CONTROL
FUEL MANIFOLD
FUEL
INJECTION
NOZZLE
FUEL FLOW
INDICATOR
(Right Half of Dual Instrument)
FUEL SYSTEM
SCHEMATIC

Figure 2-2.

to the engine-driven fuel pump. From here fuel is distributed to the engine cylinders via a control unit and manifold.

NOTE

Fuel cannot be used from both fuel bays simultaneously.

Vapor and excess fuel from the engine-driven fuel pump and fuel control unit are returned by way of the selector valve to the reservoir tank of the wing fuel bay system being used.

AUXILIARY FUEL PUMP SWITCH.

The right half of the auxiliary fuel pump switch, labeled "LO," is used for starting. With the switch in the "LO" position, and the ignition-starter switch turned to "START," the auxiliary fuel pump will operate at a low flow rate (providing proper fuel mixture for starting) as the engine is being turned over with the starter.

NOTE

The auxiliary fuel pump will not operate in the "LO" position until the ignition switch is turned to "START".

The left half of the switch, labeled "HI," is used for engine operation if the engine-driven pump should fail. When the switch is in this position, the pump operates at one of two flow rates depending upon the setting of the throttle. With the throttle at a cruise setting, the pump is operating at maximum capacity, supplying sufficient fuel flow to maintain flight. When the throttle is moved toward the closed position (as during let-down, landing and taxiing), the auxiliary fuel pump flow rate is automatically reduced, preventing an excessively rich mixture during these periods of reduced engine speed.

Operation with the auxiliary fuel pump switch in the "HI" position is also used for fuel vapor control during hot engine starting and high altitude climbs in warm temperatures. When the auxiliary fuel pump switch is turned on "HI" during a climb, the fuel flow will increase and the mixture should be manually leaned to obtain the desired fuel flow.

NOTE

If the auxiliary fuel pump switch is accidentally turned on "HI" (with master switch on) with the engine stopped, the intake manifolds will be flooded.

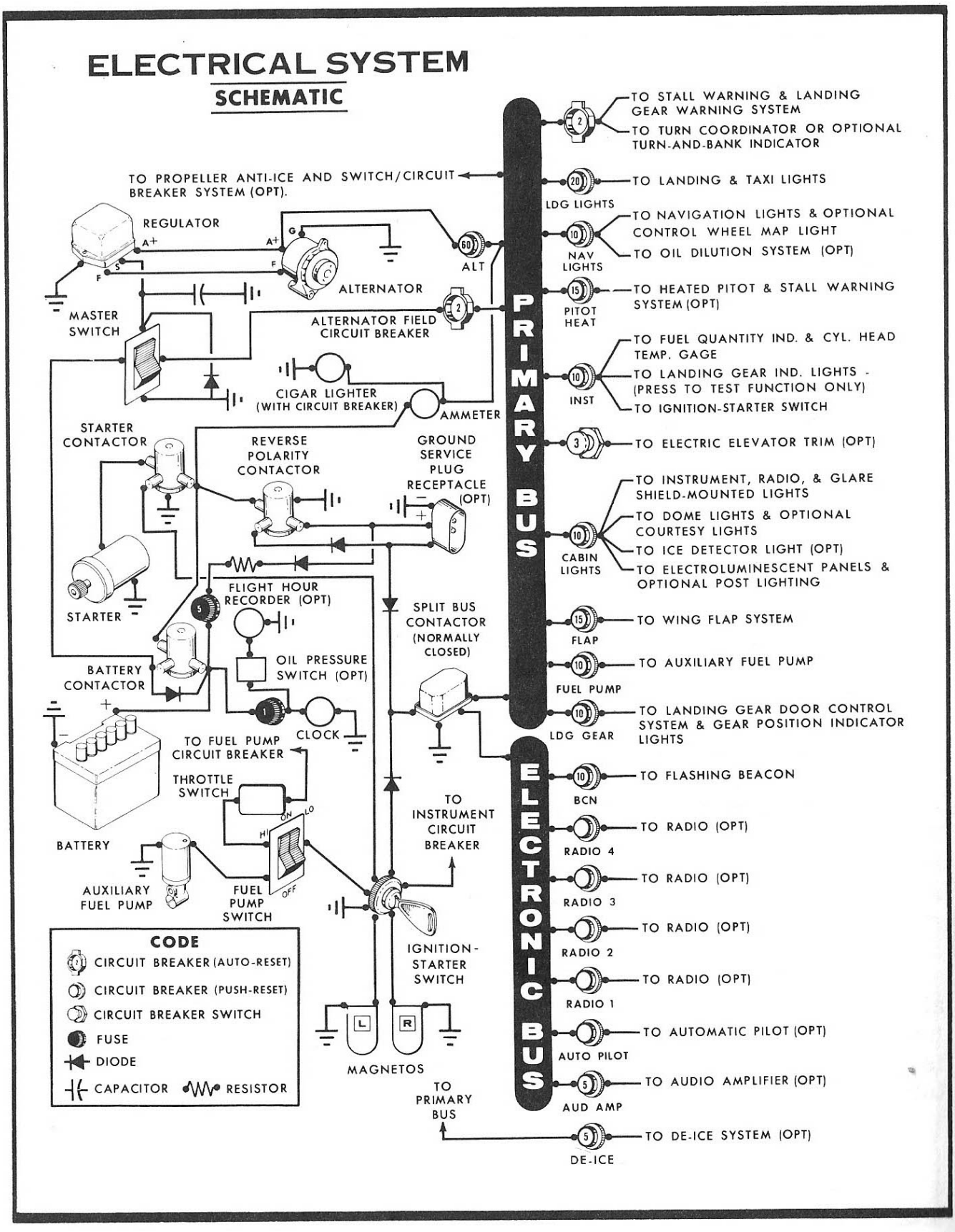

ELECTRICAL SYSTEM
SCHEMATIC
TO PROPELLER ANTI-ICE AND SWITCH/CIRCUIT BREAKER SYSTEM (OPT).
REGULATOR
A+
S
F
G
ALTERNATOR
ALT
MASTER SWITCH
ALTERNATOR FIELD CIRCUIT BREAKER
CIGAR LIGHTER (WITH CIRCUIT BREAKER)
AMMETER
STARTER CONTACTOR
REVERSE POLARITY CONTACTOR
GROUND SERVICE PLUG RECEPTACLE (OPT)
STARTER
FLIGHT HOUR RECORDER (OPT)
SPLIT BUS CONTACTOR (NORMALLY CLOSED)
BATTERY CONTACTOR
OIL PRESSURE SWITCH (OPT)
CLOCK
TO FUEL PUMP CIRCUIT BREAKER
THROTTLE SWITCH
BATTERY
TO INSTRUMENT CIRCUIT BREAKER
AUXILIARY FUEL PUMP
FUEL PUMP SWITCH
HI
LO
ON
OFF
IGNITION-STARTER SWITCH
L
R
MAGNETOS
TO PRIMARY BUS
CODE
CIRCUIT BREAKER (AUTO-RESET)
CIRCUIT BREAKER (PUSH-RESET)
CIRCUIT BREAKER SWITCH
FUSE
DIODE
CAPACITOR
RESISTOR
PRIMARY BUS
ELECTRONIC BUS
TO STALL WARNING & LANDING GEAR WARNING SYSTEM
TO TURN COORDINATOR OR OPTIONAL TURN-AND-BANK INDICATOR
TO LANDING & TAXI LIGHTS
LDG LIGHTS
TO NAVIGATION LIGHTS & OPTIONAL CONTROL WHEEL MAP LIGHT
TO OIL DILUTION SYSTEM (OPT)
NAV LIGHTS
TO HEATED PITOT & STALL WARNING SYSTEM (OPT)
PITOT HEAT
TO FUEL QUANTITY IND. & CYL. HEAD TEMP. GAGE
TO LANDING GEAR IND. LIGHTS - (PRESS TO TEST FUNCTION ONLY)
INST
TO IGNITION-STARTER SWITCH
TO ELECTRIC ELEVATOR TRIM (OPT)
TO INSTRUMENT, RADIO, & GLARE SHIELD-MOUNTED LIGHTS
TO DOME LIGHTS & OPTIONAL COURTESY LIGHTS
TO ICE DETECTOR LIGHT (OPT)
CABIN LIGHTS
TO ELECTROLUMINESCENT PANELS & OPTIONAL POST LIGHTING
TO WING FLAP SYSTEM
FLAP
TO AUXILIARY FUEL PUMP
FUEL PUMP
TO LANDING GEAR DOOR CONTROL SYSTEM & GEAR POSITION INDICATOR LIGHTS
LDG GEAR
TO FLASHING BEACON
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
TO DE-ICE SYSTEM (OPT)
DE-ICE

Figure 2-3.

To ensure a prompt engine restart in flight after running a fuel bay dry, switch to the bay containing fuel and place the auxiliary fuel pump in the "HI" position momentarily (3 to 5 seconds) with the throttle at least 1/2 open. Excessive use of the "HI" position of the auxiliary fuel pump can cause flooding of the engine as indicated by a short (1 to 2 second) period of power followed by a loss of power. This can later be detected by a fuel flow indication accompanied by a lack of power. If flooding does occur, turn off the auxiliary fuel pump switch and normal propeller windmilling should start the engine in 1 to 2 seconds.

If the windmilling speed is 1000 rpm or greater when switching from a dry fuel bay, the engine will usually start within 10 to 12 seconds without using the auxiliary fuel pump. This restart time can be reduced to approximately 4 to 6 seconds by proper use of the auxiliary fuel pump.

If the propeller should stop (possible at very low airspeeds) before the bay containing fuel is selected, place the auxiliary fuel pump switch in the "HI" position and advance the throttle promptly until the fuel flow indicator registers approximately 1/2 way into the green arc for 1 to 2 seconds duration. Then retard the throttle, turn off the auxiliary fuel pump, and use the starter to turn the engine over until a start is obtained.

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 on the upper left-hand forward portion of the firewall. 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 semi-conductors in the electronics equipment.

AMMETER.

The ammeter indicates 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 electrical circuits in the airplane are protected by "push-to-reset" circuit breakers mounted on the left side of the instrument panel. Exceptions to this are the battery contactor closing (external power) circuit which has a fuse mounted near the ground service plug receptacle, and the clock and optional flight hour recorder circuits which have a fuse 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. Automatically resetting circuit breakers mounted behind the instrument panel protect the stall warning and landing gear warning horn circuits, the turn coordinator or optional turn-and-bank indicator circuit, and the alternator field and wiring circuit. The optional electric elevator trim system is protected by a switch type circuit breaker mounted on the control pedestal by the elevator trim wheel. Optional propeller anti-icing circuitry is protected by an automatic resetting circuit breaker built into the back of the anti-ice switch on the instrument panel.

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.

GLARE SHIELD MOUNTED LIGHTS.

Four lights are located in the glare shield above the instrument panel, and are covered by red lenses. (When optional post lights are installed, the light above the radio selector switches is changed to a white lens.) The light above the radio selector switches is controlled by the radio light rheostat, and the remaining three lights are controlled by the instrument light rheostat when used with console lighting. When post lights are turned on, all of the glare shield lights will turn off except the light above the radio selector switches.

POST LIGHTS (OPT).

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.

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.

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.

LANDING GEAR SYSTEM.

The retractable tricycle landing gear is extended and retracted by hydraulic actuators, powered by an engine-driven hydraulic pump. Both the nose and main gears have positive mechanical up and down locks, operated by separate hydraulic actuators. The nose gear also has a hydraulic safety lock within its actuator and is actuated in the nose gear down position only.

Two position-indicator lights show that the gear is either up or down and locked. The lights are the press-to-test type. The gear-down indicator light (green) has two test positions; with the light pushed in half-way (throttle pulled out) the gear warning horn should sound intermittently, and with the light pushed full in, the light should illuminate. The gear-up indicator light (amber) has only one test position; with the light pushed full in, it should illuminate. The indicator lights contain dimming shutters for night operation.

As an additional reminder that the gear is retracted, a warning horn sounds intermittently whenever the throttle is retarded with the gear up.

LANDING GEAR POSITION HANDLE.

The gear position handle has two neutral positions (slightly above center for gear up, and slightly below center for gear-down) which give a mechanical indication of gear position. From either position, the handle must be pulled out to clear a detent before it can be repositioned; operation of the gear and doors will not begin until the handle has been repositioned.

To reposition the gear, the handle is pulled out and moved to the desired position, then released. Pressure is created in the system by the engine-driven hydraulic pump and the gear is actuated to the selected position. A detent in the gear handle system holds the handle in the operating position until the cycle is completed; then the handle automatically returns to neutral and pressure in the system is relieved.

IMPORTANT

> The landing gear position handle should be returned to neutral manually if a malfunction occurs in the hydraulic system which prevents the gear position handle from returning to neutral after a cycle has been completed. Continuous operation with the handle out of neutral keeps the system pressurized and will eventually result in overheating and damage.

During a normal cycle, the gear locks up or down and the position indicator light comes on. When the light illuminates, hydraulic pressure is switched from the gear actuators to the door actuators to close the gear doors. When the doors are closed, the gear handle returns to neutral and the cycle is complete. The normal time interval between the indicator lighting and the handle returning to neutral is 3-9 seconds. If the position indicator light does not light, the gear doors will not close and hydraulic pressure will be retained on the landing gear actuators.

A safety switch, actuated by the nose gear strut, restricts the gear position handle to prevent inadvertent retraction whenever the nose gear strut is compressed by the weight of the airplane.

EMERGENCY HAND PUMP.

For emergency use, if the hydraulic pump fails, the hydraulic control unit contains a manual pump which may be used to extend the gear. The system reservoir is arranged to retain sufficient fluid to extend the gear with the hand pump if a failure between the engine-driven pump and reser-

voir results in fluid loss. See Section III for emergency operation of the hand pump.

OPERATION OF LANDING GEAR DOORS (AIRPLANE ON THE GROUND).

For inspection purposes, the landing gear doors may be opened and closed while the airplane is on the ground with the engine stopped. Operate the doors with the landing gear handle in the "down-neutral" position. To open the doors, turn off the master switch and operate the hand pump until the doors open. To close the doors, turn the master switch on and operate the hand pump.

NOTE

The position of the master switch for gear door operation is easily remembered by the following rule:
OPEN circuit = OPEN doors
CLOSED circuit = CLOSED doors

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. When partial cabin heat is desired, blending warm and cold air will result in improved ventilation and heat distribution throughout the cabin. Additional outside air for summer ventilation is provided through the heat and vent system by operation of the push-pull "AUX CABIN AIR" knob. 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 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.

Separate adjustable ventilators supply additional air; two mounted side by side in the top of the cabin ceiling just aft of the windshield supply air to the pilot and copilot, and one above each rear doorpost in the rear cabin ceiling supplies air to the rear seat passengers.

OXYGEN SYSTEM.

An oxygen cylinder, located in the fuselage tailcone behind an access panel on the left side of the tailcone, 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 fuselage tailcone under a round cover plate. Cylinder pressure is indicated by a pressure gage located in the overhead oxygen console above the pilot's and front seat passenger's seats.

Six oxygen outlets are provided; two in the overhead oxygen console and four in the cabin ceiling just above the side windows, one at each of the rear seating positions. One permanent, microphone equipped mask is provided for the pilot, and five 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.

The oxygen system (with the continuous flow masks and color-coded lines noted below) is satisfactory for operation to 25, 000 feet. Above 25, 000 feet, diluter-demand masks are recommended in lieu of the continuous flow masks and color-coded lines.

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 2-4). Also, check that the face masks and hoses are accessible and in good condition.

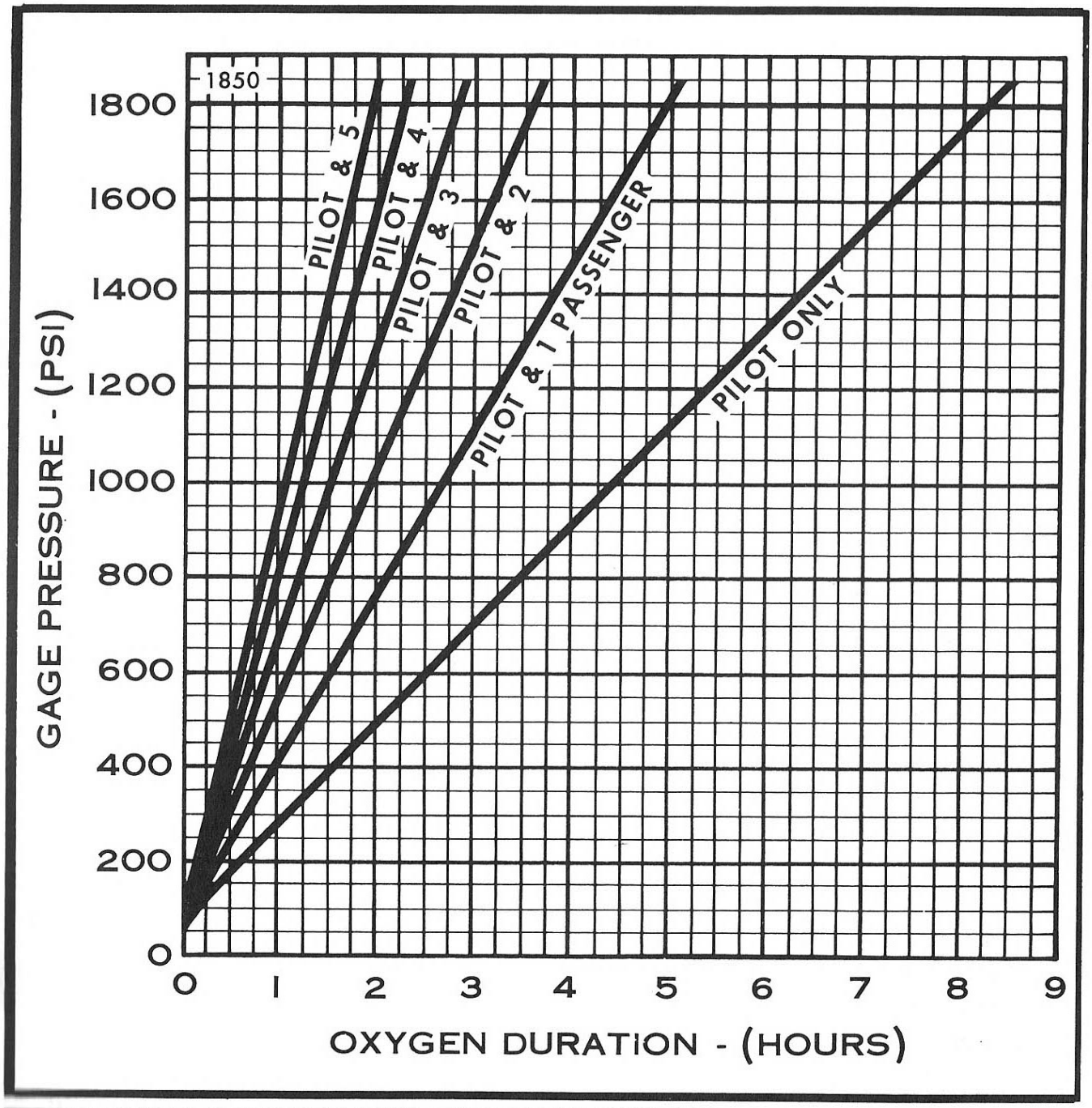
To use the oxygen system, proceed as follows:

NOTE

Permit no smoking when using oxygen.

OXYGEN DURATION CHART

(76 CUBIC FEET CAPACITY)



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

Figure 2-4.

(1) Select mask and hose.

NOTE

The hose assembly provided for the pilot is of a higher flow rate than those for the passengers; it is color-coded with a red band adjacent to the plug-in fitting. The hoses provided for the passengers are color-coded with an orange 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 use of the radio while using oxygen. A switch is incorporated on the left hand control wheel to operate the microphone.

(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 2-4) 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, 1800 psi of pressure will

safely sustain the pilot only for 8 hours and 15 minutes. The same pressure will sustain the pilot and three passengers for approximately 2 hours and 50 minutes.

NOTE

The Oxygen Duration Chart is based on a standard configuration oxygen system having one red color-coded hose assembly for the pilot and orange color-coded hoses for the passengers. If red 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.

TURBOCHARGED ENGINE SYSTEM.

Your Turbo-System Centurion is equipped with a turbocharged engine which makes it possible to maintain 75% cruise power to 24,000 feet.

Except for being turbocharged, the Turbo-System Centurion engine works and acts just like any normally aspirated engine. However, because the engine is turbocharged, some of the engine characteristics are different. The intent of this section is to point out some of the items that are affected by turbocharging, and outline the correct procedures to be followed so that operation becomes easier and simpler for Turbo-System Centurion owners.

For a better understanding of the Centurion Turbo-System, let's follow the induction air through the engine until it is expelled as exhaust gases. Reference should be made to the schematic of the turbocharger system shown in figure 2-5 as you read through the following steps:

(1) Engine induction air is taken in through an opening in the nose cap, ducted through a filter and into the compressor where it is compressed to near sea level pressure.

(2) The pressurized induction air then passes through the throttle body and induction manifold into the cylinders.

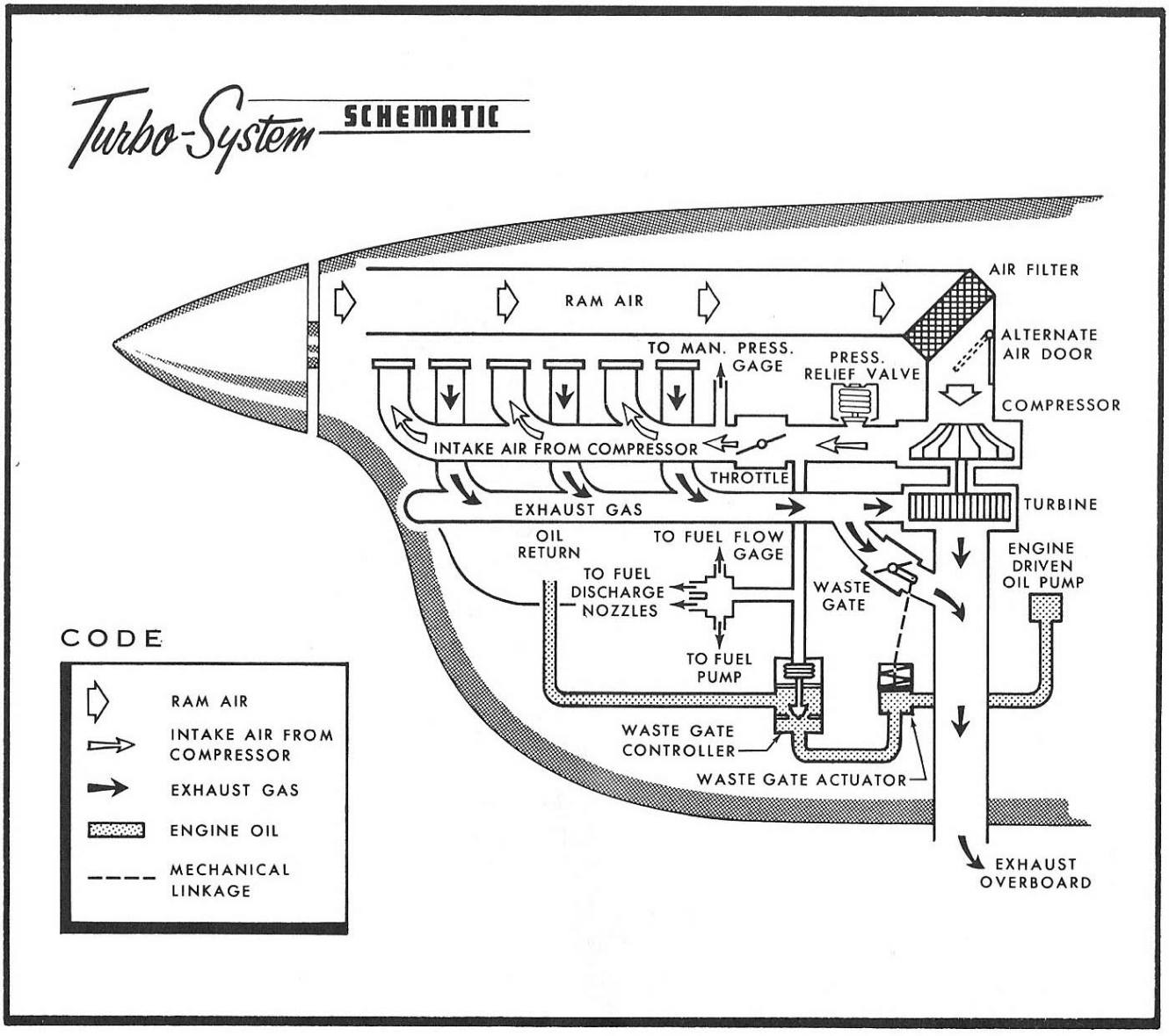


Figure 2-5.

(3) The air and fuel are burned and exhausted to the supercharger turbine.

(4) The exhaust gases drive the turbine which, in turn, drives the compressor, thus completing the cycle.

At altitudes below 24,000 feet, the turbine has the capability of producing manifold pressures in excess of the maximum allowable 32.5 in. Hg. In order not to exceed 32.5 inches of manifold pressure, a by-pass or waste gate is used so that some of the exhaust will be diverted overboard before it passes through the turbine.

It can be seen from studying Steps 1 through 4 that anything that affects the flow of induction air into the compressor or the flow of exhaust gases into the turbine will increase or decrease the speed of the turbocharger. This resultant change in flow will have no effect on the engine if the waste gate is still open because the waste gate position is changed to hold compressor discharge pressure constant. A waste gate controller automatically maintains maximum allowable compressor discharge pressure any time the turbine and compressor are capable of producing that pressure.

At high altitude, part throttle, or low RPM, the exhaust flow is not capable of turning the turbine and compressor fast enough to maintain maximum compressor discharge pressure, and the waste gate will close to force all of the exhaust flow through the turbine.

When the waste gate is fully closed, any change in turbocharger speed will mean a change in engine operation. Thus, any increase or decrease in turbine speed will cause an increase or decrease in manifold pressure and fuel flow. If turbine speed increases, the manifold pressure increases; if the turbine speed decreases, the manifold pressure decreases. Since the compression ratio approaches 3 to 1 at high altitude, any change in exhaust flow to the turbine or ram induction air pressure will be magnified proportionally by the compression ratio and the change in flow through the exhaust system.

TURBOCHARGED ENGINE OPERATING CHARACTERISTICS.

MANIFOLD PRESSURE VARIATION WITH ENGINE RPM.

When the waste gate is open, the turbocharged engine will react the same as a normally aspirated engine when the engine RPM is varied. That is, when the RPM is increased, the manifold pressure will decrease slightly. When the engine RPM is decreased, the manifold pressure will increase slightly.

However, when the waste gate is closed, manifold pressure variation with engine RPM is just the opposite of the normally aspirated engine. An increase in engine RPM will result in an increase in manifold pressure, and a decrease in engine RPM will result in a decrease in manifold pressure.

MANIFOLD PRESSURE VARIATION WITH ALTITUDE.

At full throttle, your turbocharger is capable of maintaining the maximum allowable manifold pressure of 32.5 in. Hg to well above 19,000 feet. However, engine operating limitations establish the maximum manifold pressure that may be used. Manifold pressure should be reduced with the throttle above 19,000 feet, as noted on the operating placard in the airplane (subtract 1 in. Hg from 32.5 for each 1000 feet above 19,000 feet).

At part throttle, the turbocharger is capable of maintaining cruise climb power of 2500 RPM and 27.5 in. Hg from sea level to 24,000 feet in standard temperatures, and from sea level to 12,000 feet under hot day conditions without changing the throttle position, once the power setting is established after take-off. Under hot day conditions, this climb power setting is maintained above 12,000 feet by advancing the throttle as necessary to maintain 27.5 inches of manifold pressure just as you would a normally aspirated engine during climb.

MANIFOLD PRESSURE VARIATION WITH AIRSPEED.

When the waste gate is closed, manifold pressure will vary with variations in airspeed. This is because the compressor side of your turbocharger operates at pressure ratios of up to 3 to 1 and any change in pressure at the compressor inlet is magnified at the compressor outlet with a resulting effect on the exhaust flow and turbine side of the turbocharger.

FUEL FLOW VARIATIONS WITH CHANGES IN MANIFOLD PRESSURE.

The engine-driven fuel pump output is regulated by engine speed and compressor discharge pressure. Engine fuel flow is regulated by fuel pump output and the metering effects of the throttle and mixture control. When the waste gate is open, fuel flow will vary directly with manifold pressure, engine speed, mixture, or throttle control position. In this case, manifold pressure is controlled by throttle position and the waste gate controller, while fuel flow varies with throttle movement and manifold pressure.

When the waste gate is closed and manifold pressure changes are due to turbocharger output, as discussed previously, fuel flow will follow manifold pressure even though the throttle position is unchanged. This means that fuel flow adjustments required of the pilot are minimized to

(1) small initial adjustments on take-off or climb-out for the proper rich climb setting, (2) lean-out in cruise to the recommended normal lean cruise setting, and (3) return to the full rich position for approach and landing.

MANIFOLD PRESSURE VARIATION WITH INCREASING OR DECREASING FUEL FLOW.

When the waste gate is open, movement of the mixture control has little or no effect on the manifold pressure of the turbocharged engine.

When the waste gate is closed, any change in fuel flow to the engine will have a corresponding change in manifold pressure. That is, increasing the fuel flow will increase the manifold pressure and decreasing the fuel flow will decrease the manifold pressure. This is because an increased fuel flow to the engine increases the mass flow of the exhaust. This turns the turbocharger faster, increasing the induction air flow and raising the manifold pressure.

MOMENTARY OVERSHOOT OF MANIFOLD PRESSURE.

Under some circumstances (such as rapid throttle movement, especially with cold oil) it is possible that the engine can be overboosted slightly above the maximum allowable manifold pressure of 32.5 inches. This would most likely be experienced during the take-off roll or during a change to full throttle operation in flight. The induction air pressure relief valve will normally limit the overboost to 2 to 3 inches.

A slight overboost of 2 to 3 inches of manifold pressure is not considered detrimental to the engine as long as it is momentary. No corrective action is required when momentary overboost corrects itself and is followed by normal engine operation. However, if overboosting of this nature persists when oil temperature is normal or if the amount of overboost tends to exceed 3 inches or more, the throttle should be retarded to eliminate the overboost and the controller system including the waste gate and relief valve should be checked for necessary adjustment or replacement of components.

ALTITUDE OPERATION.

Because your "Turbo-System Centurion" will climb faster and higher

than a normally aspirated airplane, fuel vaporization may be encountered. When fuel flow variations of ± 1 gal/hr or more are observed (as a "nervous" fuel flow needle), turning the auxiliary fuel pump on "HI" will control vapor. However, it will also increase fuel flow, making it necessary to adjust the mixture control for the desired fuel flow. The auxiliary fuel pump should be left on for the remainder of the climb. It can be turned off whenever fuel flow will remain steady with it off, and the mixture must be adjusted accordingly.

HIGH ALTITUDE ENGINE ACCELERATION.

Your engine will accelerate normally from idle to full throttle with full rich mixture at any altitude below 20,000 feet. At higher altitudes, it is usually necessary to lean the mixture to get smooth engine acceleration from idle to maximum power. At altitudes above 25,000 feet, and with temperatures above standard, it takes one to two minutes for the turbine to accelerate from idle to maximum RPM although adequate power is available in 20 to 30 seconds.

STARTING ENGINE.

Proper fuel management and throttle adjustments are the determining factors in securing an easy start from your turbocharged continuous-flow fuel-injection engine. The procedure outlined in Section I should be followed closely as it is effective under nearly all operating conditions.

Conventional full rich mixture and high RPM propeller settings are used for starting; the throttle, however, should be fully closed initially. When ready to start, depress the right half of the auxiliary fuel pump switch to "LO" and turn the ignition-starter switch to "START" position. At the same time the starter engages and turns the engine, the auxiliary fuel pump will operate at a low flow rate, supplying fuel for starting. While cranking, slowly advance the throttle until the engine starts. Slow throttle advancement is essential since the engine will start readily when the correct fuel/air ratio is obtained. On the other hand, fast throttle movement may prevent starting since an excessively rich mixture will be obtained due to greater fuel flow metered by the throttle position. In this case, another starting attempt must be made. When the engine has

started, reset the throttle to the desired idle speed and turn the fuel pump switch off.

When the engine is hot or the outside air temperatures are high, the engine may die after running several seconds because the mixture became either too lean due to fuel vapor or too rich due to excessive prime fuel. The following procedure will prevent over-priming and take care of fuel vapor in the system:

(1) Set the throttle 1/3 to 1/2 open.

(2) When the ignition key is on "BOTH" and you are ready to engage the starter, turn the fuel pump on "HI" until the fuel flow comes up to 4-6 gal/hr and then turn the pump off.

NOTE

During a restart after a brief shut-down in extremely hot weather the presence of fuel vapor may require the pump to run on "HI" for up to 1 minute or more before the vapor is cleared sufficiently to obtain 4-6 gal/hr. for starting.

(3) Without hesitation, engage the starter and the engine should start in 3 to 5 revolutions. Adjust the throttle for 1200-1400 RPM.

(4) If there is fuel vapor in the lines, it will pass into the injector nozzles in 2 to 3 seconds and the engine will gradually slow down and stop. When engine speed starts to decrease, turn the fuel pump on "HI" for approximately one second to clear out the vapor. Intermittent use of "HI" boost is needed since prolonged use of "HI" pump after the vapor is cleared will flood out the engine.

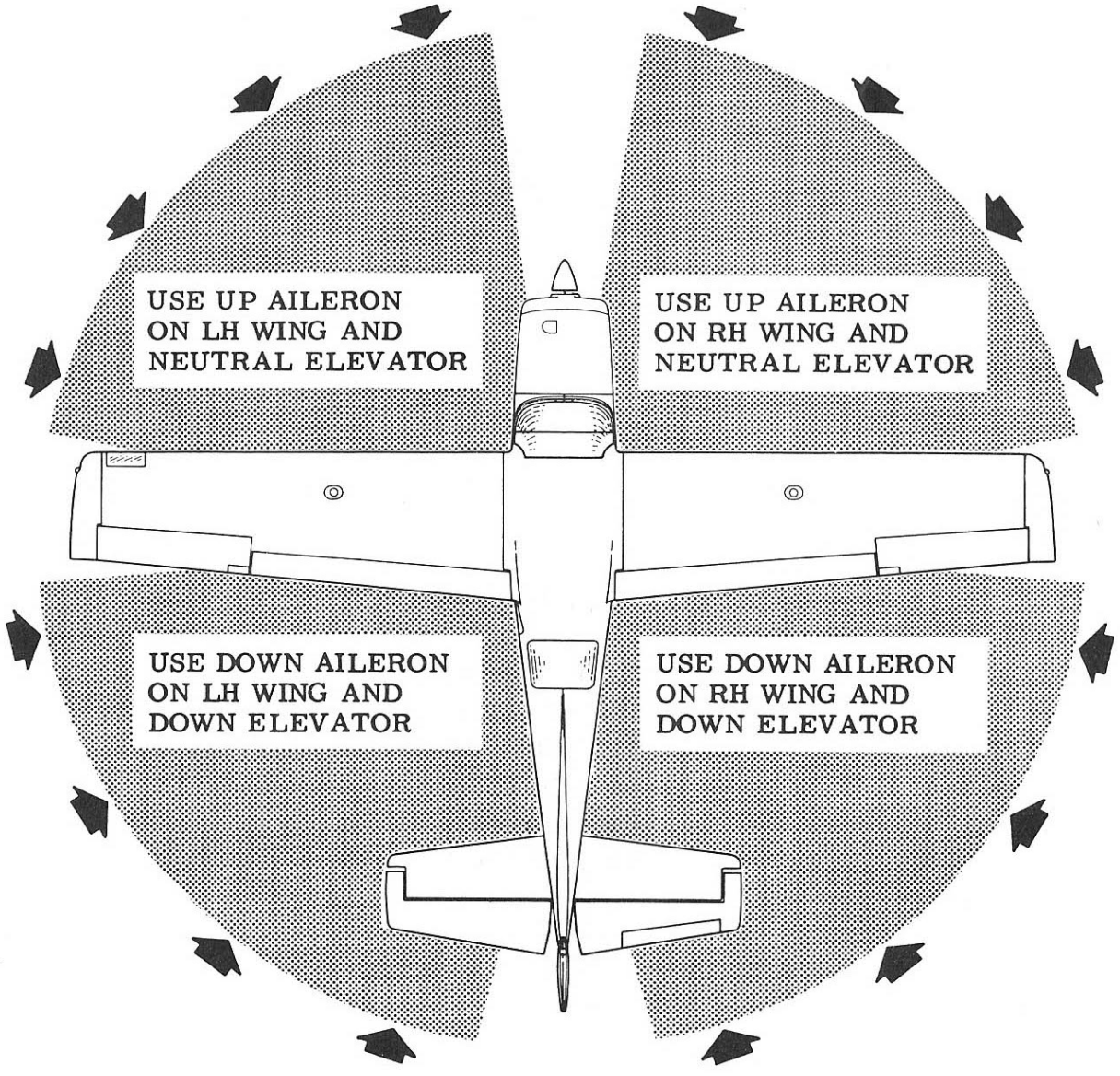
(5) Let the engine run at 1200 to 1400 RPM until the vapor is eliminated and the engine idles normally.

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

TAXIING.

Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller tips. Refer to figure 2-6 for additional taxiing tips.

TAXIING DIAGRAM



CODE

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 2-6.

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.

Prior to flights where verification of proper alternator and voltage regulator operation is essential (such as night or instrument flights), a positive verification can be made by loading the electrical system momentarily (3 to 5 seconds) with the landing light during the engine run-up (1700 rpm). The ammeter will remain within a needle width of zero if the alternator and voltage regulator are operating properly.

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.

Using 20° wing flaps reduces the ground run and total distance over the obstacle by approximately 10 per cent. Soft field take-offs are per-

formed with 20° flaps by lifting the nosewheel off the ground as soon as practical and leaving the ground in a slightly tail-low attitude. However, the airplane should be leveled off immediately to accelerate to a safe climb speed.

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.

Landing gear retraction normally is started after reaching the point over the runway where a wheels-down, forced landing on that runway would become impractical. Since the landing gear swings downward approximately two feet as it starts the retraction cycle, damage can result by retracting it before obtaining at least that much ground clearance. In addition, the landing gear would extend slowly in the event of an engine failure during take-off, and might not be completely down while a wheels-down landing could still be made on the runway.

Before retracting the landing gear, the brakes should be applied momentarily to stop wheel rotation. Centrifugal force caused by the rapidly-spinning wheel expands the diameter of the tire. If there is an accumulation of mud or ice in the wheel wells, the rotating wheel may rub as it is retracted into the wheel well.

CLIMB.

Power settings for climb must be limited to 32.5 in. Hg and 2700 RPM up to 19,000 feet with decreasing manifold pressure above 19,000 feet as noted on the maximum power placard.

A cruising climb at 27.5 inches of manifold pressure, 2500 RPM (approximately 75% power), 20 gal/hr fuel flow, and 120 to 140 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. Higher power settings may be used as desired to reduce time to climb to the higher altitudes for more favorable winds or better weather.

If it is necessary to climb rapidly to clear mountains or reach favor-

able winds at high altitudes, the best rate-of-climb speed should be used with maximum power. This speed is 110 MPH from sea level to 19,000 feet, decreasing linearly to 94 MPH at 30,000 feet.

If an obstruction ahead requires a steep climb angle, the airplane should be flown at the best angle of climb with flaps up and maximum power. This speed is 80 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 VI.

Turbocharging allows you to maintain maximum cruise power up to 24,000 feet. The Optimum Cruise Performance table (figure 2-7) shows the increased cruising speed that can be obtained by going to higher altitudes while maintaining constant 75% power. Lower cruise powers will increase range even farther. For increased passenger comfort, use the lowest RPM and highest manifold pressure (within green arc limits) that will give the desired percent cruise power.

Cowl flaps should be adjusted to maintain the cylinder head temperature at approximately two thirds of the green arc range in normal operation.

OPTIMUM CRUISE PERFORMANCE

ALTITUDE	TRUE AIRSPEED	RANGE (89 GAL. FUEL)
8000	191	1030
16,000	206	1110
24,000	221	1190

Figure 2-7.

The fuel injection system employed on this engine is considered to be non-icing. In the event that unusual conditions cause the intake air filter to become clogged or iced over, an alternate intake air door opens automatically for the most efficient use of either normal or alternate air, depending on the amount of filter blockage. Due to the lower intake pressure available through the alternate air door or partially blocked filter, manifold pressure can decrease up to 10 in. Hg from a cruise power setting. This pressure should be recovered by increased throttle setting or higher RPM as necessary to maintain the desired power. Maximum allowable manifold pressure (32.5 in. Hg) is available up to 16,000 feet under hot day conditions using the alternate air source with a fully blocked filter.

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 on figure 6-2 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.

LET-DOWN.

Let-down should be initiated far enough in advance of estimated landing to allow a gradual rate of descent at cruising speed. Descent should be at approximately 500 FPM for passenger comfort, using enough power to keep the engine warm. The optimum engine RPM in a letdown is usually the lowest RPM in the green arc range that will allow cylinder head temperature to remain in the recommended operating range.

The aircraft is equipped with a specially marked altimeter to attract the pilot's attention and prevent misreading the altimeter. A striped

warning segment on the face of the altimeter is exposed at all altitudes below 10,000 feet to indicate low altitude.

BEFORE LANDING.

In view of the relatively low drag of the extended landing gear and the high allowable gear-down speed (160 MPH), the landing gear should be extended before entering the traffic pattern. This practice will allow more time to confirm that the landing gear is down and locked. As a further precaution, leave the landing gear extended in go-around procedures or traffic patterns for touch-and-go landing.

Landing gear extension can be detected by illumination of the gear down indicator light (green), absence of a gear warning horn with the throttle retarded below 12 inches of manifold pressure, and visual inspection of the main gear position. Should the gear indicator light fail to illuminate, the light should be checked for a burned-out bulb by pushing to test. A burned-out bulb can be replaced in flight with the bulb from the compass light or the landing gear up (amber) indicator light.

LANDINGS.

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

For short field landings, make a power approach at 80 MPH with full flaps. After all approach obstacles are cleared, progressively reduce power. Maintain 80 MPH approach speed by lowering the nose of the airplane. Touchdown should be made with the throttle closed, and on the main wheels first. Immediately after touchdown, lower the nose gear 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.

At light operating weights during ground roll with full flaps, hold the control wheel full back to insure maximum weight on the main wheels for braking. Under these conditions, the use of full nose down elevator (control wheel full forward) will raise the main wheels off the ground.

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.

The use of an external pre-heater and an external power source is recommended whenever possible to reduce wear and abuse to the engine and the electrical system. If external preheat is not available, the oil should be diluted before stopping the engine when very cold temperatures are anticipated.

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 VII, paragraph GROUND SERVICE PLUG RECEPTACLE, for operating details.

In very cold weather, no oil temperature indication need be apparent before take-off. After a suitable warm-up period (2 to 5 minutes at 1000 RPM), the engine is ready for take-off if it accelerates smoothly and the oil pressure is normal and steady.

During let-down, observe engine temperatures closely and carry sufficient power to maintain them in the recommended operating range.

Refer to Section VII for discussion of additional cold weather equipment.

WINTERIZATION KIT.

The Turbo-System engine installation has been designed such that a winterization kit is not required. With the cowl flaps fully closed, engine temperature will be normal (in the lower green arc range) in

outside air temperatures as low as 40° to 60° below standard. When colder surface temperatures are encountered, the normal air temperature inversion will result in warmer temperatures at cruise altitudes above 5000 feet.

If low altitude cruise in very cold temperature results in engine temperature below the green arc, increasing cruise altitude or cruise power will increase engine temperature into the green arc. Cylinder head temperatures will increase approximately 50° as cruise altitudes increase from 5000 feet to 24,000 feet.

STATIC PRESSURE ALTERNATE SOURCE VALVE.

A static pressure alternate source valve is 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 7 MPH and 70 feet, respectively.

Section III

EMERGENCY PROCEDURES

SYSTEM EMERGENCY PROCEDURES.

LANDING GEAR—EMERGENCY OPERATION.

When the landing gear will not extend normally, it may be extended manually as follows:

NOTE

Prior to following emergency procedures, it is recommended that the landing gear handle be moved from "UP" to "DOWN" several times. In certain cases, this procedure can dislodge foreign matter which may be causing the malfunction.

(1) Place the gear handle in the full "DOWN" position.
(2) Pull the emergency hand pump out to its full extension.
(3) Operate the hand pump up and down until the down indicator (green) light comes on, and continue pumping until the landing gear handle returns to neutral.

NOTE

Retraction of the landing gear manually will require use of the emergency hand pump, therefore, if the gear will not retract normally, extend the gear, land, and have the malfunction corrected.

LANDING EMERGENCIES (Except Ditching).

FORCED LANDING (Precautionary Landing with Power).

(1) Drag over selected field with flaps 20° and 90 MPH airspeed, noting type of terrain and obstruction.

(2) If surface is smooth and hard (pasture, frozen lake, etc.), plan a wheels-down landing using full flaps and keeping nose wheel off ground as long as practical.

(3) If surface is rough or soft, plan a wheels-up landing as follows:

a. Approach with flaps down at 80 to 90 MPH.
b. Turn off all switches except ignition switch.
c. Unlatch cabin doors prior to flare-out.
d. Reduce power to a minimum during flare-out.
e. Prior to contact, turn ignition switch "OFF."
f. Land in a slightly tail-low attitude.
g. Attempt to hold the tail low throughout slide.

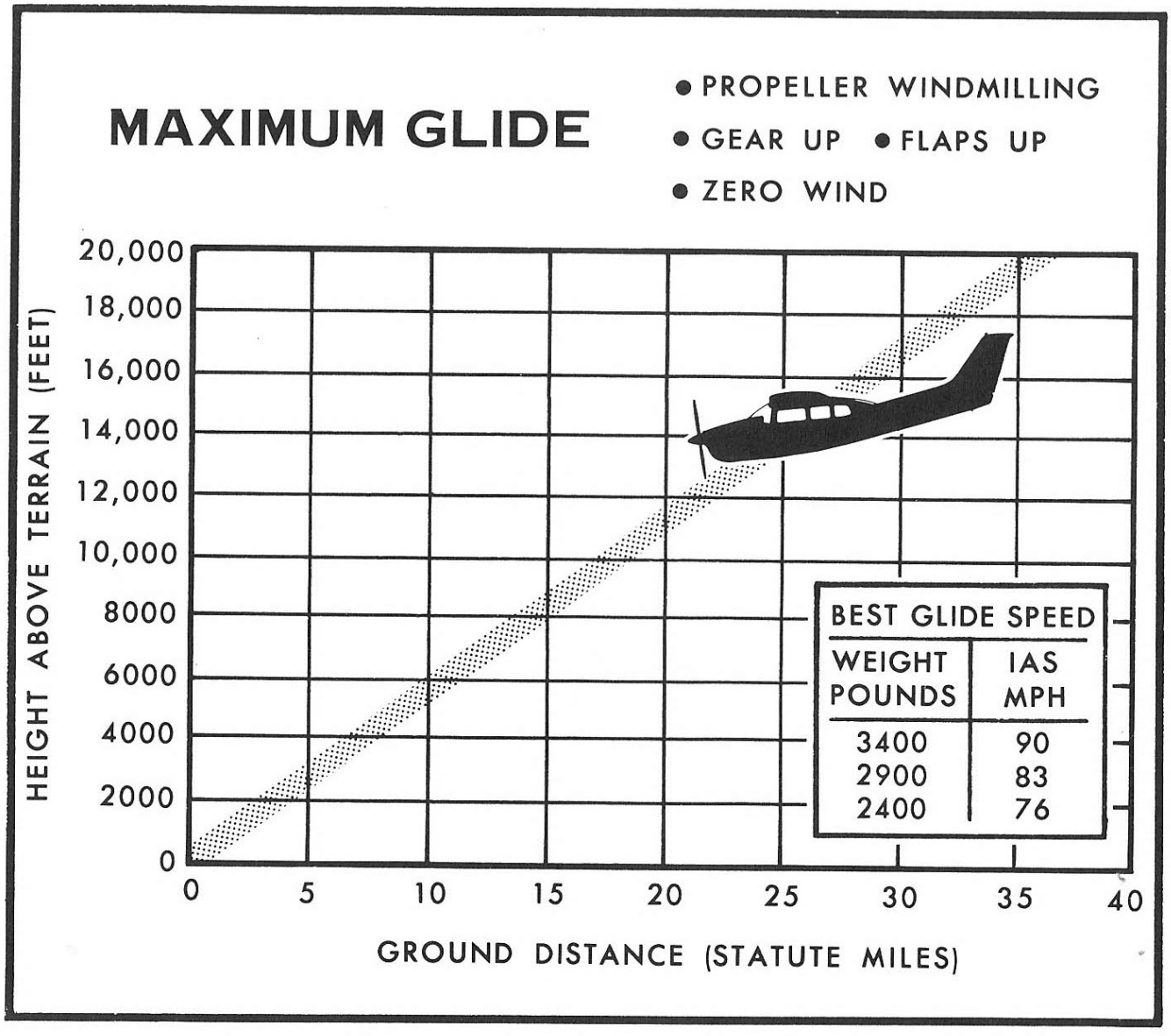


Figure 3-1.

FORCED LANDING (Engine Out).

In the event of a complete engine failure, maximum gliding distance can be obtained by maintaining 90 MPH (at 3400 pounds gross weight) with the landing gear and wing flaps retracted. Refer to Maximum Glide, figure 3-1, for maximum glide data and speed variation with weight.

(1) Pull mixture control knob to idle cut-off.
(2) Turn fuel selector valve handle to "OFF."
(3) Turn off all switches except master switch.
(4) Approach at 90 to 100 MPH.
(5) If field is smooth and hard, extend landing gear within gliding distance of field.
(6) If electrical power is available, extend flaps as necessary within gliding distance of field.
(7) Turn off master switch.
(8) Make a normal landing, keeping nose wheel off ground as long as practical.
(9) If terrain is rough or soft, plan a wheels-up landing as follows:
    a. Approach at 90 to 100 MPH with gear and flaps retracted.
    b. If practical, extend flaps within gliding distance of field.
    c. Turn off master switch.
    d. Unlatch cabin doors prior to flare-out.
    e. Land in a slightly tail-low attitude.
    f. Attempt to hold tail low throughout slide.

LANDING WITHOUT POSITIVE INDICATION OF GEAR LOCKING.

Should a flickering, unsteady, or inoperative gear-down (green) light be obtained, and observers verify that the gear is down and apparently in the locked position, proceed as follows:

(1) Make a normal full-flaps approach.
(2) Holding the landing gear handle in the "DOWN" position and maintaining a minimum of 1000 RPM, complete the landing and taxi clear of the runway.

NOTE

Maintaining 1000 RPM and holding the gear handle "DOWN" secures the landing gear in the extended position by hydraulic pressure.

(3) BEFORE reducing engine RPM or releasing gear handle, have ground personnel depress the tail until nose gear is off ground.

NOTE

The nose gear requires hydraulic pressure to hold it in the "DOWN" position if it is not mechanically locked.

(4) Stop the engine and determine that the nose gear is mechanically locked down BEFORE lowering the nose wheel to the ground.

LANDING WITH DEFECTIVE NOSE GEAR.

If the nose gear does not extend or only partially extends, and observers verify that it is not down, prepare for a wheels-down landing as follows:

(1) Transfer movable load to baggage area, and front seat passenger to rear seat if a rear seat position is unoccupied.
(2) Select a hard-surfaced or smooth sod runway.

NOTE

If terrain is rough or soft, plan a wheels-up landing as presented under "FORCED LANDING (Precautionary Landing with Power)" in lieu of the following steps.

(3) Place landing gear handle "DOWN."
(4) Extend flaps to 30°.
(5) Turn off master switch.
(6) Land in a slightly tail-low attitude.
(7) Pull mixture control knob to idle cut-off.
(8) Turn ignition switch "OFF."
(9) Hold nose off the ground as long as possible.
(10) Turn fuel selector valve handle to "OFF."
(11) Evacuate the airplane as soon as it stops.

Section IV

OPERATING LIMITATIONS

OPERATIONS AUTHORIZED.

Your Cessna exceeds the requirements of airworthiness as set forth by the United States Government, and is certificated under FAA Type Certificate No. 3A21 as Cessna Model No. T210J.

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. 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	3400 lbs	
Flight Load Factor		
*Flaps Up	+3.8	-1.52
*Flaps Down	+3.0	

*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 (CAS).

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

Never Exceed Speed (Glide or dive, smooth air)	225 MPH
Maximum Structural Cruising Speed	190 MPH
Maximum Speed, Gear Extended	160 MPH
Maximum Speed, Flaps Extended	
Flaps 10°	160 MPH
Flaps 10° - 30°	110 MPH
*Maneuvering Speed	135 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)	225 MPH (red line)
Caution Range	190-225 MPH (yellow arc)
Normal Operating Range.	74-190 MPH (green arc)
Flap Operating Range	63-110 MPH (white arc)

ENGINE OPERATION LIMITATIONS.

Power and Speed	285 BHP at 2700 RPM

NOTE

A placard, located adjacent to the manifold pressure gage and fuel flow indicator, defines the maximum allowable

manifold pressure and climb fuel flow settings at altitude. These settings, as called out on the placard, are as follows:

Altitude (Feet)	Manifold Pressure (In. Hg.)	Fuel Flow (Gal/Hr)
S. L. to 19,000	32.5	28
20,000	31.5	26
22,000	29.5	24
24,000	27.5	22
26,000	25.5	20
28,000	23.5	19
30,000	21.5	18
75% POWER CLIMB: 2500 RPM, 27.5 M.P., 20 GPH		

ENGINE INSTRUMENT MARKINGS.

FUEL QUANTITY INDICATORS

Empty (0.5 gallon unusable each fuel bay) . . . . . E (red line)

CYLINDER HEAD TEMPERATURE GAGE

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

OIL TEMPERATURE GAGE

Normal Operating Range. . . . . Green Arc
Do Not Exceed . . . . . 240°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)

TACHOMETER

Normal Operating Range. . . . . 2200-2500 RPM (green arc)
Maximum . . . . . 2700 RPM (red line)

MANIFOLD PRESSURE GAGE

Normal Operating Range. . . . . 15-27.5 in. Hg (green arc)
Maximum Pressure . . . . . 32.5 in. Hg (red line)

FUEL FLOW INDICATOR

Normal Cruise Range	6.0-20.0 gal/hr (green arc)
Normal Climb Range	20.0-28.0 gal/hr (white arc)
Minimum and Maximum .	4.0 and 18.5 psi (29.5 gal/hr) (red lines)

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.

BAGGAGE TIE-DOWN

Two adjustable tie-down straps are provided to secure baggage in the baggage area. The straps are fitted with a hook on each end and have a buckle for strap length adjustment. The straps fasten into four tie-down rings in the baggage area, two at the front edge of the baggage area floor and two at the rear.

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) (Includes 2 qts. unusable oil at approx. 4 lbs.). .	2117	79.9		
* 2. Oil - 9 qts. (To fill oil system to full capacity of 11 qts.)	17	-0.2	17	-0.2
3. Pilot and Front Passenger.	340	12.2		
4. Fuel - (Partial Capacity - 64 gal. at 6 lbs./gal.)	384	16.5		
Fuel - (Total Capacity - 89 gal. at 6 lbs./gal.) .				
5. Rear Passengers - (Std. Seating)†	340	23.8		
6. Rear Passengers - (Opt. Seating)†				
** 7. Child's Seat Passengers (Or Baggage In Same Area) - (Std. Seating)†	140	13.2		
*** 8. Baggage (Aft of Child's Seat) - (Std. Seating) . .	62	7.0		
**** 9. Baggage (Opt. Seating)†				
10. TOTAL WEIGHT AND MOMENT	3400	152.4		

11. Locate this point (3400 at 152.4) on the center of gravity moment envelope, and since this point falls within the envelope, the loading is acceptable.

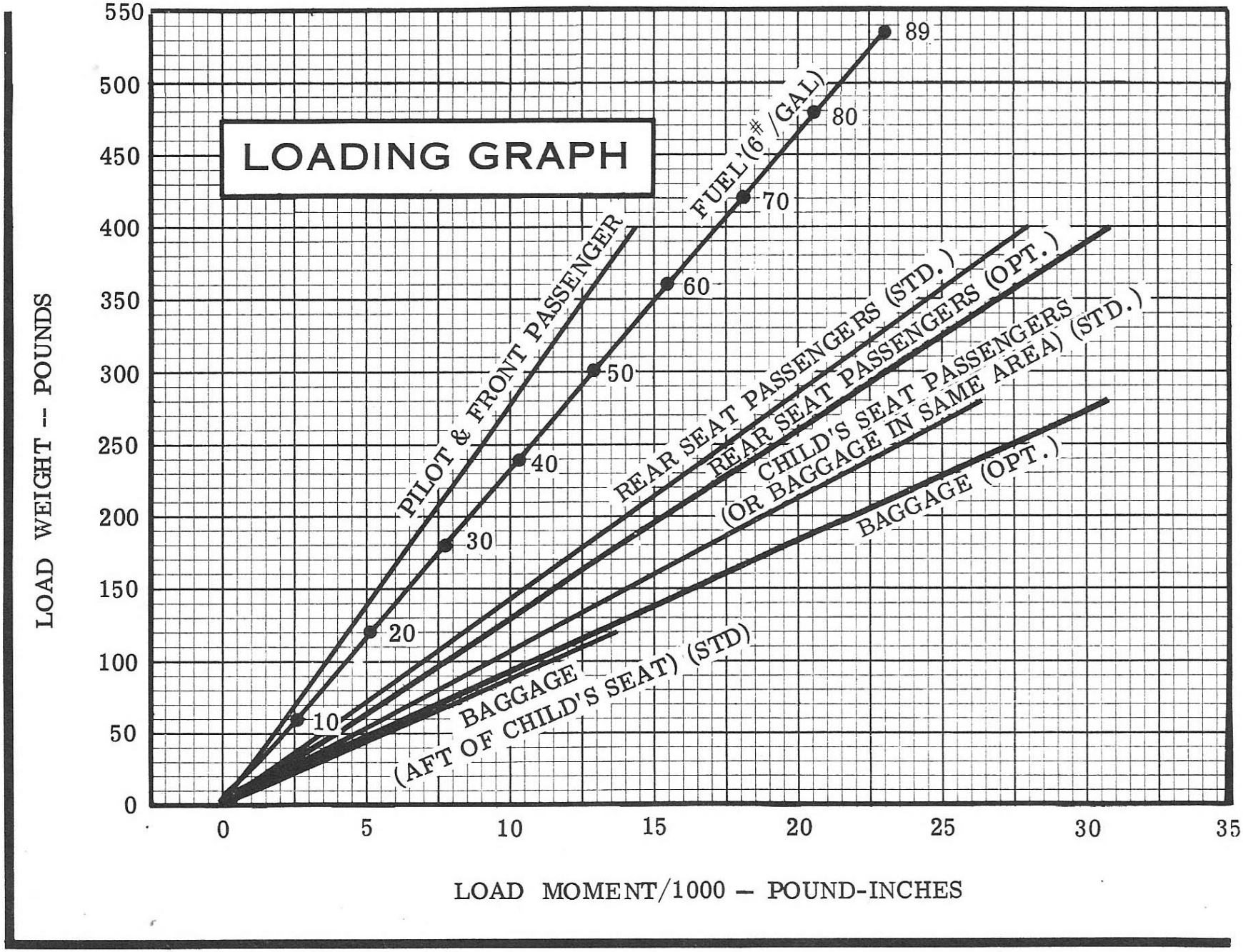
* Normally, full oil may be assumed for all flights.

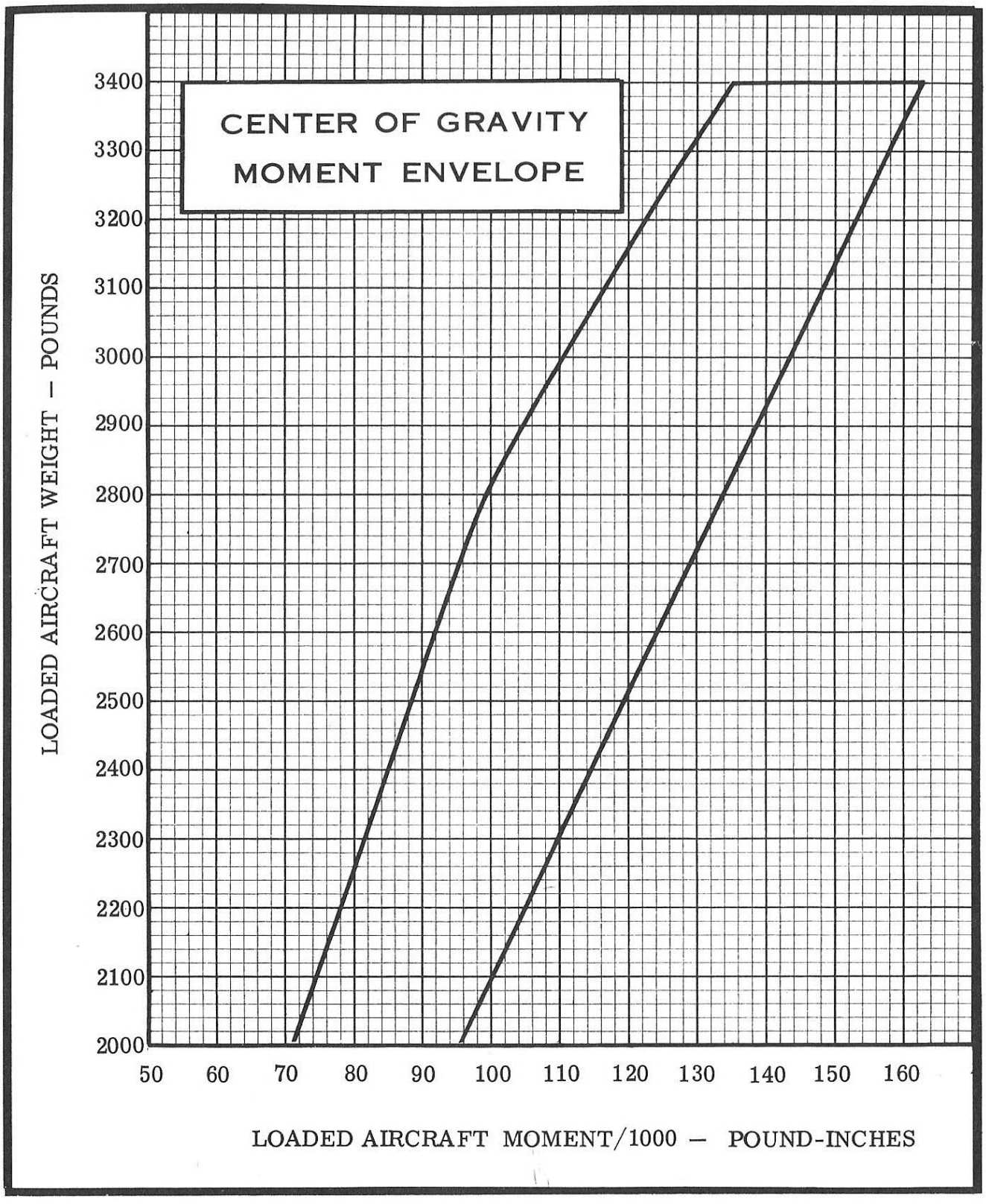
** Maximum allowable load is 140 lbs. for each seat. If total area is used for baggage, maximum allowable load is 280 lbs. Use seat belts to secure baggage.

*** Maximum allowable load is 120 lbs. Combined load in child's seat and baggage area must not exceed 280 lbs. total.

**** Maximum allowable baggage is 280 lbs.

† Standard seating consists of four full-size seats and two child seats. Optional seating is four-place version without child seat provisions.


LOADING GRAPH
LOAD WEIGHT -- POUNDS
LOAD MOMENT/1000 — POUND-INCHES
0
50
100
150
200
250
300
350
400
450
500
550
0
5
10
15
20
25
30
35
PILOT & FRONT PASSENGER
FUEL (6 #/GAL)
REAR SEAT PASSENGERS (STD.)
REAR SEAT PASSENGERS (OPT.)
CHILD'S SEAT PASSENGERS (OR BAGGAGE IN SAME AREA) (STD.)
BAGGAGE (OPT.)
BAGGAGE (AFT OF CHILD'S SEAT) (STD)
10
20
30
40
50
60
70
80
89


CENTER OF GRAVITY
MOMENT ENVELOPE
LOADED AIRCRAFT WEIGHT – POUNDS
3400
3300
3200
3100
3000
2900
2800
2700
2600
2500
2400
2300
2200
2100
2000
50
60
70
80
90
100
110
120
130
140
150
160
LOADED AIRCRAFT MOMENT/1000 – POUND-INCHES

Section V

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 the tow-bar attached to the nosewheel.

NOTE

When using the tow-bar, do not exceed the nosewheel turning angle of 30° 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 and tail tie-down fittings, and secure each rope or chain to a ramp tie-down.
(4) Tie a sufficiently strong rope to the nose gear torque link, and secure it to a ramp tie-down.
(5) 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.

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 cor-

rosion 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 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.

LANDING GEAR CARE.

Cessna Dealer's mechanics have been trained in the proper adjustment and rigging procedures on the aircraft hydraulic system. To assure trouble-free gear operation, have your Cessna Dealer check the gear regularly and make any necessary adjustments. Only properly trained mechanics should attempt to repair or adjust the landing gear.

INTERIOR CARE.

To remove dust and loose dirt from the upholstery fabric 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 fabric 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.

If your airplane is equipped with leather seating, cleaning of the seats is accomplished using a soft cloth or sponge dipped in mild soap suds. The soap suds, used sparingly, will remove traces of dirt and grease. The soap should be removed with a clean damp cloth.

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 FAA-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 BAY FILLERS:

Service after each flight with 100/130 minimum grade fuel. Fill each bay to the top of the filler for a total capacity of 45 gallons in each bay, or fill to the bottom edge of the fuel filler collar for reduced fuel loading of 32.5 gallons in each bay.

FUEL STRAINER:

Before the first flight of the day and after each refueling, pull out strainer drain knob for about four seconds to clear fuel strainer of possible water and sediment. Make sure drain valve is closed after draining. If water is observed, there is a possibility that the fuel bay sumps contain water. Thus, the fuel bay sump drain plugs and fuel reservoir drain plugs 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 and turbocharger controller operation 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 7 quarts. To minimize loss of oil through breather, fill to 8 quart level for normal flights of less than 3 hours. For extended flight, fill to 10 quarts. (Quantities shown above are oil dipstick level readings only. Actual system capacity is one quart more than shown due to the installation of a standard oil filter on this engine. During oil and filter changes, a total of 11 quarts of oil should be added.)

OXYGEN CYLINDER AND FILLER VALVE:

Check oxygen pressure gage for anticipated requirements before each flight. Use filler valve located on left side of fuselage tailcone (under round cover plate) to refill cylinder with aviator's breathing oxygen (Spec. No. MIL-O-27210). The cylinder, when fully charged, contains approximately 76 cubic feet of oxygen, under a pressure of 1850 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 1850 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	1650	50	1875
10	1700	60	1925
20	1750	70	1975
30	1775	80	2025
40	1825	90	2050

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. 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.

INDUCTION 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

SPARK PLUGS -- Clean, test and regap.

FUEL STRAINER -- Disassemble and clean.

FUEL BAY SUMP DRAIN PLUGS -- Drain.

FUEL RESERVOIR DRAIN PLUGS -- Drain.

FUEL/AIR CONTROL UNIT SCREEN -- Clean.

BRAKE MASTER CYLINDERS -- Check and fill.

LANDING GEAR DOWN LOCK PAWLS -- Lubricate.

HYDRAULIC SYSTEM FILTER -- Disassemble and clean.

VACUUM SYSTEM OIL SEPARATOR (OPT) -- Clean.

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

SERVICING INTERVALS CHECK LIST

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 85 psi.

HYDRAULIC FLUID RESERVOIR -- Check fluid level through sight window and fill through filler fitting with MIL-H-5606 hydraulic fluid.

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 VI

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 0°									
IAS - MPH	70	80	90	100	120	140	160	180	200
CAS - MPH	72	81	90	100	120	140	160	180	200
FLAPS 20° - 30°									
IAS - MPH	60	70	80	90	100	110	—	—	—
CAS - MPH	65	73	81	89	98	107	—	—	—

MAXIMUM FLAP SPEED 110 MPH - CAS

Figure 6-1.

STALL SPEED, POWER OFF

GROSS WEIGHT 3400 LBS. / CONFIGURATION	ANGLE OF BANK 0°	30°	60°
GEAR AND FLAPS UP	74	79	105
GEAR DOWN, FLAPS 20°	66	71	94
GEAR DOWN, FLAPS 30°	63	68	89

SPEEDS ARE MPH, CAS

Figure 6-2.

TAKE-OFF DATA

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

GROSS WEIGHT POUNDS	IAS @ 50 FT.	HEAD WIND KNOTS	AT SEA LEVEL & 59°F		@ 2500 FT. & 50° F.		@ 5000 FT. & 41°F		@7500 FT. & 32°F	
			GROUND RUN	TOTAL TO CLEAR 50 FT. OBS.	GROUND RUN	TOTAL TO CLEAR 50 FT. OBS.	GROUND RUN	TOTAL TO CLEAR 50 FT. OBS.	GROUND RUN	TOTAL TO CLEAR 50 FT. OBS.
3400	72	0	800	1365	895	1480	1005	1620	1130	1775
		10	580	1055	655	1155	745	1275	850	1405
		20	390	785	450	865	520	965	605	1075
2900	67	0	555	1045	620	1130	695	1225	785	1335
		10	390	800	440	870	505	950	575	1045
		20	250	580	290	640	340	705	395	785
2400	60	0	365	805	405	860	455	930	515	1005
		10	245	605	280	655	315	710	365	775
		20	150	430	175	470	200	515	235	570

NOTES:
1. Increase distance 10% for each 20°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 5% of the "total to clear 50 ft. obstacle" figure.

Figure 6-3.

MAXIMUM RATE-OF-CLIMB DATA

Standard Conditions ••• Gear and Flaps Up

ALTITUDE FEET	IAS MPH	GROSS WEIGHT POUNDS	RATE OF CLIMB FT./MIN.	GAL. OF FUEL USED FROM S.L.
SEA LEVEL	110	3400	1115	2.0
		2900	1405	2.0
		2400	1790	2.0
5000	110	3400	1100	4.1
		2900	1390	3.7
		2400	1790	3.3
10,000	110	3400	1060	6.3
		2900	1350	5.4
		2400	1750	4.6
15,000	110	3400	980	8.6
		2900	1270	7.2
		2400	1660	6.0
20,000	109	3400	810	11.2
		2900	1070	9.2
		2400	1430	7.5
25,000	102	3400	510	14.2
		2900	735	11.3
		2400	1040	9.1
30,000	94	3400	120	20.4
		2900	295	14.8
		2400	510	11.3

NOTES:
1. Full throttle, 2700 RPM, mixture at recommended leaning schedule.
2. Fuel used includes warm-up and take-off allowance.
3. For hot weather, decrease rate of climb 45 ft/min for each 10°F above standard day temperature for particular altitude.

Figure 6-4.

CRUISE CLIMB DATA 75% Power

Standard Conditions • Gear & Flaps Up • Gross Weight - 3400 Pounds

ALTITUDE FEET	IAS MPH	FROM SEA LEVEL		
		GAL. OF FUEL USED	TIME MIN.	DIST. MILES
5000	110	4	6	12
	120	4	7	14
	130	5	8	17
10,000	110	6	13	26
	120	7	14	31
	130	7	16	36
15,000	110	9	20	42
	120	9	22	52
	130	10	25	62
20,000	110	12	29	63
	120	13	32	78
	130	14	37	97
24,000	110	15	38	87
	120	17	44	111

NOTES:
1. Based on 2500 RPM, 27.5" MP, and 20 GPH fuel flow.
2. Fuel used includes warm-up and take-off allowance of 2 gallons.

Figure 6-5.

CRUISE PERFORMANCE

NORMAL LEAN MIXTURE

Standard Conditions ↘ Zero Wind ↘ Gross Weight- 3400 Pounds

SEA LEVEL

					*64 GAL(NO RESERVE)		89 GAL (NO RESERVE)	
RPM	MP	% BHP	TAS MPH	GAL/ HOUR	ENDR. HOURS	RANGE MILES	ENDR. HOURS	RANGE MILES
2500	27.5	75	178	16.4	3.9	690	5.4	960
	26	70	173	15.3	4.2	720	5.8	1005
	24	63	166	13.9	4.6	765	6.4	1065
	22	56	159	12.5	5.1	815	7.1	1130
2400	27.5	70	173	15.4	4.2	720	5.8	1000
	26	66	169	14.4	4.4	750	6.2	1040
	24	59	163	13.1	4.9	795	6.8	1105
	22	53	154	11.8	5.4	835	7.6	1160
2300	27.5	66	169	14.4	4.5	750	6.2	1045
	26	61	165	13.5	4.7	780	6.6	1085
	24	56	158	12.3	5.2	815	7.2	1135
	22	49	149	11.1	5.8	860	8.0	1195
2200	27.5	61	164	13.4	4.8	785	6.6	1090
	26	57	160	12.6	5.1	810	7.1	1125
	24	52	153	11.6	5.5	845	7.7	1175
	22	46	144	10.4	6.1	885	8.5	1230
	20	40	134	9.3	6.9	920	9.5	1275
	18	35	120	8.2	7.8	935	10.8	1305

*These columns show, for comparative purposes, typical reduced fuel load conditions.

Figure 6-6 (Sheet 1 of 7).

CRUISE PERFORMANCE

NORMAL LEAN MIXTURE

Standard Conditions ╲ Zero Wind ╲ Gross Weight- 3400 Pounds

5000 FEET

RPM	MP	% BHP	TAS MPH	GAL/ HOUR	*64 GAL(NO RESERVE)		89 GAL (NO RESERVE)	
					ENDR. HOURS	RANGE MILES	ENDR. HOURS	RANGE MILES
2500	27.5	75	186	16.4	3.9	725	5.4	1010
	26	70	181	15.3	4.2	755	5.8	1055
	24	64	175	13.9	4.6	800	6.4	1115
	22	57	166	12.6	5.1	845	7.1	1175
2400	27.5	70	182	15.4	4.2	755	5.8	1050
	26	66	177	14.4	4.4	785	6.2	1090
	24	60	170	13.2	4.9	825	6.8	1145
	22	53	161	11.9	5.4	865	7.5	1200
2300	27.5	66	177	14.4	4.4	785	6.2	1090
	26	62	172	13.6	4.7	810	6.6	1130
	24	56	165	12.4	5.2	850	7.2	1180
	22	50	156	11.3	5.7	890	7.9	1235
2200	27.5	62	172	13.5	4.7	815	6.6	1130
	26	58	167	12.7	5.0	840	7.0	1165
	24	52	160	11.7	5.5	870	7.6	1210
	22	47	151	10.7	6.0	910	8.4	1265
	20	42	141	9.6	6.7	935	9.3	1305
	18	36	127	8.6	7.5	945	10.4	1315

*These columns show, for comparative purposes, typical reduced fuel load conditions.

Figure 6-6 (Sheet 2 of 7).

CRUISE PERFORMANCE

NORMAL LEAN MIXTURE

Standard Conditions — Zero Wind — Gross Weight- 3400 Pounds

10,000 FEET

RPM	MP	% BHP	TAS MPH	GAL/ HOUR	*64 GAL(NO RESERVE)		89 GAL (NO RESERVE)	
					ENDR. HOURS	RANGE MILES	ENDR. HOURS	RANGE MILES
2500	27.5	75	195	16.4	3.9	765	5.4	1065
	26	70	190	15.3	4.2	795	5.8	1110
	24	64	184	13.9	4.6	840	6.4	1170
	22	57	176	12.7	5.0	885	7.0	1235
2400	27.5	70	191	15.4	4.2	790	5.8	1100
	26	66	186	14.4	4.4	825	6.2	1150
	24	60	179	13.2	4.9	870	6.7	1210
	22	54	172	12.1	5.3	910	7.4	1265
2300	27.5	66	186	14.5	4.4	825	6.2	1145
	26	62	182	13.6	4.7	855	6.6	1190
	24	56	175	12.5	5.1	895	7.1	1245
	22	51	167	11.4	5.6	935	7.8	1300
2200	27.5	62	182	13.6	4.7	855	6.5	1185
	26	58	177	12.9	5.0	880	6.9	1225
	24	53	171	11.9	5.4	920	7.5	1275
	22	48	162	10.9	5.9	955	8.2	1325
	20	43	153	9.9	6.5	985	9.0	1370
	18	38	141	8.9	7.2	1010	10.0	1405

*These columns show, for comparative purposes, typical reduced fuel load conditions.

Figure 6-6 (Sheet 3 of 7).

CRUISE PERFORMANCE

NORMAL LEAN MIXTURE

Standard Conditions ⟍ Zero Wind ⟍ Gross Weight-3400 Pounds

15,000 FEET

RPM	MP	% BHP	TAS MPH	GAL/ HOUR	*64 GAL(NO RESERVE)		89 GAL(NO RESERVE)	
					ENDR. HOURS	RANGE MILES	ENDR. HOURS	RANGE MILES
2500	27.5	75	204	16.4	3.9	795	5.4	1105
	26	70	200	15.2	4.2	840	5.9	1170
	24	63	192	13.9	4.6	880	6.4	1230
	22	58	185	12.8	5.0	920	6.9	1280
2400	27.5	70	200	15.3	4.2	835	5.8	1165
	26	66	195	14.4	4.4	865	6.2	1205
	24	60	188	13.2	4.8	905	6.7	1260
	22	55	180	12.2	5.3	945	7.3	1315
2300	27.5	66	195	14.4	4.4	865	6.2	1200
	26	62	191	13.6	4.7	895	6.5	1245
	24	57	183	12.6	5.1	930	7.1	1295
	22	51	175	11.5	5.6	970	7.7	1345
2200	27.5	63	191	13.7	4.7	890	6.5	1240
	26	59	186	13.0	4.9	915	6.9	1275
	24	54	179	12.0	5.3	950	7.4	1325
	22	49	170	11.1	5.8	985	8.1	1370
	20	44	160	10.1	6.3	1010	8.8	1405
	18	40	148	9.2	7.0	1025	9.7	1425

*These columns show, for comparative purposes, typical reduced fuel load conditions.

Figure 6-6 (Sheet 4 of 7).

CRUISE PERFORMANCE

NORMAL LEAN MIXTURE

Standard Conditions ↘ Zero Wind ↘ Gross Weight- 3400 Pounds

20,000 FEET

					*64 GAL(NO RESERVE)		89 GAL (NO RESERVE)	
RPM	MP	% BHP	TAS MPH	GAL/ HOUR	ENDR. HOURS	RANGE MILES	ENDR. HOURS	RANGE MILES
2500	27.5	75	214	16.4	3.9	835	5.4	1160
	26	69	209	14.9	4.3	895	6.0	1245
	24	64	201	13.9	4.6	925	6.4	1290
	22	58	193	12.9	5.0	960	6.9	1330
2400	27.5	70	209	15.0	4.3	885	6.0	1245
	26	66	204	14.3	4.5	915	6.3	1275
	24	60	196	13.2	4.8	945	6.7	1315
	22	55	188	12.3	5.2	980	7.3	1360
2300	27.5	66	204	14.3	4.5	915	6.2	1275
	26	62	199	13.6	4.7	935	6.6	1300
	24	57	191	12.6	5.1	965	7.1	1345
	22	52	182	11.6	5.5	1000	7.7	1390
2200	27.5	63	200	13.7	4.7	930	6.5	1295
	26	59	194	13.0	4.9	955	6.8	1325
	24	55	187	12.2	5.3	980	7.3	1365
	22	50	177	11.2	5.7	1010	7.9	1405
	20	45	167	10.4	6.2	1025	8.6	1430
	18	41	153	9.5	6.8	1030	9.4	1435

*These columns show, for comparative purposes, typical reduced fuel load conditions.

Figure 6-6 (Sheet 5 of 7).

CRUISE PERFORMANCE

NORMAL LEAN MIXTURE

Standard Conditions ↘ Zero Wind ↘ Gross Weight- 3400 Pounds

25,000 FEET

					*64 GAL(NO RESERVE)		89 GAL (NO RESERVE)	
RPM	MP	% BHP	TAS MPH	GAL/ HOUR	ENDR. HOURS	RANGE MILES	ENDR. HOURS	RANGE MILES
2500	26.5	70	220	15.0	4.3	935	5.9	1300
	24	64	209	13.9	4.6	965	6.4	1340
	22	59	200	12.9	5.0	990	6.9	1380
	20	54	191	12.0	5.4	1020	7.4	1415
2400	26.5	67	214	14.4	4.4	950	6.2	1320
	24	60	204	13.3	4.8	980	6.7	1365
	22	55	194	12.3	5.2	1010	7.2	1405
	20	51	184	11.4	5.6	1030	7.8	1435
2300	26.5	63	209	13.8	4.6	965	6.5	1345
	24	57	198	12.6	5.1	1000	7.1	1390
	22	52	188	11.7	5.5	1025	7.6	1430
	20	48	177	10.9	5.9	1040	8.2	1450
2200	26.5	61	204	13.3	4.8	980	6.7	1365
	24	55	194	12.2	5.2	1010	7.3	1405
	22	50	183	11.3	5.7	1030	7.9	1435
	20	46	172	10.5	6.1	1040	8.5	1450
	18	42	157	9.7	6.6	1035	9.2	1440

*These columns show, for comparative purposes, typical reduced fuel load conditions.

Figure 6-6 (Sheet 6 of 7).

CRUISE PERFORMANCE

NORMAL LEAN MIXTURE

Standard Conditions ⟍ Zero Wind ⟍ Gross Weight- 3400 Pounds

30,000 FEET

RPM	MP	% BHP	TAS MPH	GAL/ HOUR	*64 GAL(NO RESERVE)		89 GAL (NO RESERVE)	
					ENDR. HOURS	RANGE MILES	ENDR. HOURS	RANGE MILES
2500	21.5	57	206	12.2	5.3	1080	7.3	1500
	20	54	197	11.7	5.5	1080	7.6	1500
	18	49	184	10.9	5.9	1070	8.1	1490
2400	21.5	54	198	11.7	5.5	1080	7.6	1500
	20	51	189	11.2	5.7	1080	7.9	1500
	18	47	175	10.5	6.1	1065	8.5	1480
2300	21.5	51	190	11.3	5.7	1080	7.9	1500
	20	48	180	10.8	6.0	1070	8.3	1485
	18	44	161	10.0	6.4	1030	8.9	1430
2200	21.5	50	185	11.0	5.8	1075	8.1	1495
	20	47	175	10.5	6.1	1065	8.5	1480
	18	43	155	9.8	6.5	1005	9.1	1400

*These columns show, for comparative purposes, typical reduced fuel load conditions.

Figure 6-6 (Sheet 7 of 7).

LANDING DISTANCE TABLE

LANDING DISTANCE WITH 30° 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.
3400	80	625	1355	665	1440	705	1525	745	1620

NOTES:
1. Distances shown are based on zero wind, power off, and heavy braking.
2. Reduce landing distances 10% for each 5 knots 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 6-7.

Section VII

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.

COLD WEATHER EQUIPMENT

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 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 semiconductors 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.

ENGINE PRIMER SYSTEM.

A manually-operated, plunger-type engine primer may be installed in the control pedestal.

For quick smooth engine starts in zero degree temperatures, use six strokes of the primer before cranking, with an additional one or two strokes as the engine starts. In colder temperatures, use additional priming before cranking, and place the auxiliary fuel pump switch in the "HI" position while cranking. After priming, make sure the primer is full in and locked.

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 7-1 for dilution time for the anticipated temperature.) While diluting the 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.

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 (10 quarts on dipstick), subsequent starts and engine warm-up should be prolonged to evaporate enough of the fuel to lower the oil sump level to 11 quarts prior to take-off. Otherwise, the sump may overflow when the airplane is in a nose high attitude.

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

OIL DILUTION TABLE

	TEMPERATURE		
	0°F	-10°F	-20°F
DILUTION TIME	2 min.	5 min.	8 min.
FUEL ADDED	1 qt.	2.5 qt.	4 qt.

Maximum Sump Capacity - 14 quarts
Maximum for Take-off - 11 quarts

Figure 7-1.

DE-ICING SYSTEM

Pneumatic de-icing boots are available as optional equipment for installation on the leading edges of the wings and horizontal stabilizer.

BEFORE ENTERING AIRPLANE.

Make an exterior inspection to check de-icing boots for tears, abrasions, and cleanliness. Boots must be cleaned and damage repaired prior to flight.

DURING ENGINE RUN-UP.

(1) Move de-icing switch to "ON" position and check inflation and deflation cycle. The pressure indicator light should be on during inflation part of cycle (approximately 6 seconds). The system should be checked through several cycles.

NOTE

The de-icing switch is a three position switch spring-loaded to the normal off (center) position. When pushed to the "ON" (up) position and released, it will activate one de-icing cycle. Each time a cycle is desired, the switch must be pushed to the "ON" position and released. When pushed to the "OFF" (down) position and released, the switch will stop the system at any point in its cycle.

(2) Check boots visually for complete deflation to the vacuum hold-down condition.

IN FLIGHT.

When ice has accumulated to approximately 1/2 inch thick on the leading edges, push de-icing switch to "ON" position and release.

NOTE

Maximum safe operating altitude for the de-icing system

is 14,500 feet. Flight into known icing conditions above this altitude is not recommended. For satisfactory operation of this system at or near 14,500 feet, the engine RPM must be a minimum of 2500.

AFTER LANDING.

Check de-icing boots for damage and cleanliness. Remove any accumulations of engine oil or grease.

OPERATING DETAILS

Cycling the de-icing boots produces no adverse aerodynamic effects in any attitude within the allowable flight limitations.

De-icing boots are intended for removal of ice after it has accumulated rather than prevent its formation. If ice accumulation is slow, best results can be obtained by not using the de-ice system until approximately 1/2 inch of ice has accumulated. Clear the accumulation with one or two cycles of operation. Do not repeat de-icing procedure until ice has again accumulated.

Continual cycling of the de-ice system is not recommended as this may cause ice to form outside the contour of the inflated boots, preventing its removal.

NOTE

Wing and horizontal stabilizer de-icing boots alone do not provide adequate protection for the entire airplane, and unless heated pitot, heated stall warning, and propeller anti-icing equipment is installed, known icing conditions should be avoided.

DE-ICER BOOT CARE

De-icing boots have a special electrically-conductive coating to bleed off static electricity which causes radio interference and could perforate

the boots. Fueling and other servicing should be done carefully to avoid damage to the conductive coating or tearing of the boot.

Keep boots clean and free from oil and grease which can swell the rubber. Wash boots with mild soap and water, using benzol or unleaded gasoline to remove stubborn grease. Do not scrub boots and be sure to wipe off all solvent before it dries.

Small tears and abrasions can be repaired temporarily and the conductive coating can be renewed, without removing the boots. Your Cessna Dealer has the proper materials and know-how to do this correctly.

ICE DETECTOR LIGHT

An ice detector light may be installed to facilitate the detection of wing ice at night or during reduced visibility.

The ice detector light system consists of a light installed on the left side of the cowl deck forward of the windshield which is positioned to illuminate the leading edge of the wing, and a momentary push-button type switch located to the left of the circuit breakers. The switch button must be held in as long as the light is required.

PROPELLER ANTI-ICE SYSTEM

A propeller anti-ice system is available to facilitate all-weather operation. The system is operated by a toggle switch located above the right hand switch and control panel. When the switch is placed in the "ON" position, current flows to an anti-ice timer which supplies electric power in cycles every 30 seconds to elements in the anti-icing boots located on the propeller blades. Operation of the anti-ice system can be checked by a propeller anti-ice ammeter located on the extreme right side of the instrument panel. The anti-ice system is protected by a circuit breaker located in the circuit breaker panel.

NORMAL OPERATION.

(1) Master Switch -- "ON."
(2) Propeller Anti-Ice Circuit Breaker -- Check in.
(3) Propeller Anti-Ice Switch -- "ON."
(4) Propeller Anti-Ice Ammeter -- Check in green arc range (2-bladed propeller -- 20 to 24 amps, 3-bladed -- 30 to 34 amps).

NOTE

To check the heating elements and anti-ice timer for one complete cycle, the system must be left on for approximately 1-1/2 minutes. Ammeter readings must remain in the green arc except during momentary cycle change.

NOTE

While using the anti-ice system, limit the use of other electrical equipment so that the aircraft system ammeter maintains a slight charge indication, assuring that the electrical system is not overloaded.

IMPORTANT

If the ammeter indicates unusually high or low amperage during the 30 second cycle of operation, a malfunction has occurred and it is imperative that the system be turned off. Uneven anti-icing may result, causing propeller unbalance and engine roughness.

(5) When anti-icing is no longer needed, move propeller anti-ice switch to the "OFF" position.

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

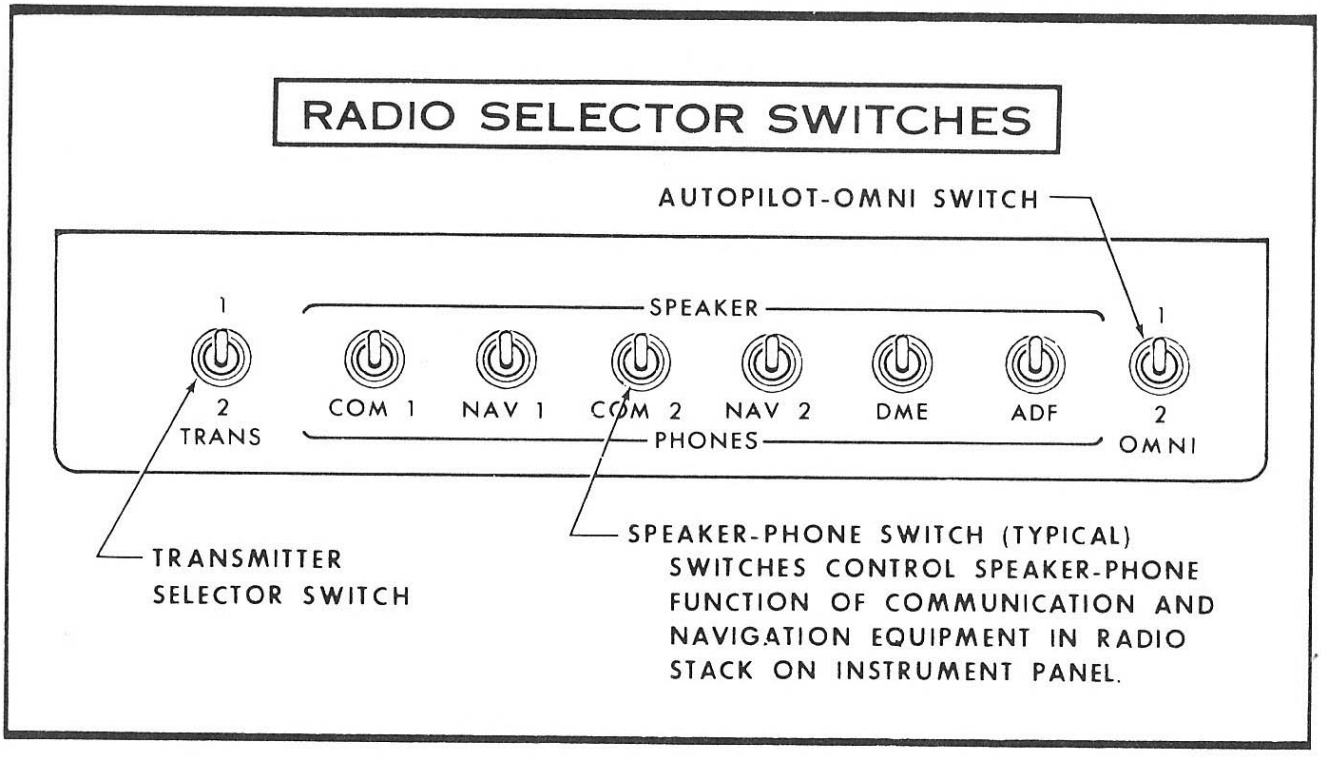


Figure 7-2.

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.

FUEL BAY QUICK-DRAIN VALVE KIT

Two fuel bay quick-drain valves and a fuel sampler cup are available as a kit to facilitate daily draining and inspection of fuel in the fuel bays for the presence of water and sediment. The valves replace existing fuel bay 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.

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 chart below should be used to establish mixture settings in take-off, climb and cruise conditions.

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.

FLIGHT CONDITION	POWER SETTING	EGT	REMARKS
TAKE-OFF AND CLIMB	Full throttle 2700 RPM and 32.5" MP	———	Use 28 GPH for full power take-off and climb
NORMAL CLIMB	27.5" MP and 2500 RPM	Peak minus 125° to 150° (ENRICHEN)	Use NORMAL CLIMB mixture
MAXIMUM CRUISE SPEED	75% or less	Peak minus 100°F (ENRICHEN)	BEST POWER mixture, 1 or 2 MPH TAS increase and 8% range loss from NORMAL LEAN
NORMAL CRUISE	75% or less	Peak minus 25°F to 50°F (ENRICHEN)	NORMAL LEAN mixture-Owner's Manual and Power Computer performance

NOTE

Enrichen mixture during climb if excessive cylinder head temperatures occur.

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

In the event that a distinct peak is not obtained, use the corresponding maximum EGT as the reference point for enriching the mixture to the desired cruise setting.

Changes in 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.

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.

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.

3-BLADED PROPELLER

A Cessna-Crafted three-bladed propeller is optionally offered. There is no significant performance change with the three-bladed propeller.

ELECTRIC ELEVATOR TRIM SYSTEM

An electric elevator trim system is available to facilitate trimming the airplane. The system is controlled by a switch on the left side of the pilot's control wheel. Pushing the switch forward, labeled "DN", moves the elevator trim tab in the "nose-down" direction; conversely, pushing the switch aft, labeled "UP", moves the tab in the "nose-up" direction. When the switch is released, it automatically returns to the center (off) position and elevator tab motion stops.

A servo unit (which includes a motor and a chain-driven, solenoid-operated clutch) in the fuselage actuates the trim tab to the selected position. When the clutch is not energized (trim switch off), the electric portion of the trim system freewheels so that manual operation is not affected. The electric trim system can be overriden at any time by the manual system, if necessary. Should the electric trim malfunction and run continuously, electric power to the servo unit can be turned off by pulling out the breaker on the control pedestal.

STOWABLE RUDDER PEDALS

Stowable right-hand rudder pedals are available as part of the optional right-hand flight controls installation. The pedals fold forward and stow against the firewall, thereby permitting the right front passenger to extend his feet forward for greater comfort, and also to rest his feet on the rudder pedals during flight without, in any way, interfering with the flight operation of the pilot's rudder pedals.

A push-pull control on the instrument panel actuates the pedal unlocking mechanism. The pedals are stowed simply by squeezing the double buttons of the control knob and pulling the knob out to release the pedals; the pedals can then be pushed forward against the firewall where they are retained by spring clips within a bracket. The pedals are restored to their operating positions by pushing the control knob full in, and inserting the toe of the shoe underneath each pedal and pulling each pedal aft until it snaps into position. The pedals are again ready for flight use by the right front passenger.

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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 -- 100/130 MINIMUM GRADE.
TOTAL CAPACITY EACH BAY -- 45 GAL. (44.5 GAL. USABLE)
REDUCED CAPACITY EACH BAY (INDICATED BY FILLING BAY TO BOTTOM EDGE OF FUEL FILLER COLLAR) -- 32.5 GAL. (32 GAL. USABLE).

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 AND TURBOCHARGER CONTROLLER OPERATION IN COLD WEATHER. DETERGENT OR DISPERSANT OIL, CONFORMING TO CONTINENTAL MOTORS SPECIFICATION MHS-24A, MUST BE USED.)

CAPACITY OF ENGINE SUMP -- 10 QUARTS
(DO NOT OPERATE ON LESS THAN 7 QUARTS. TO MINIMIZE LOSS OF OIL THROUGH BREATHER, FILL TO 8 QUART LEVEL FOR NORMAL FLIGHTS OF LESS THAN 3 HOURS. FOR EXTENDED FLIGHT, FILL TO 10 QUARTS.) (THE ABOVE QUANTITIES REFER TO OIL DIPSTICK LEVEL READINGS ONLY. ONE ADDITIONAL QUART SHOULD BE ADDED DURING OIL CHANGES TO COMPENSATE FOR THE INSTALLATION OF THE STANDARD OIL FILTER.)

HYDRAULIC FLUID:

MIL-H-5606 HYDRAULIC FLUID

OXYGEN:

AVIATOR'S BREATHING OXYGEN -- SPEC. NO. MIL-O-27210
MAXIMUM PRESSURE -- 1850 PSI AT 70°F.
(CYLINDER TEMPERATURE STABILIZED AFTER FILLING)
(REFER TO PAGE 5-7 FOR FILLING PRESSURES.)

TIRE PRESSURE:

MAIN WHEELS -- 42 PSI ON 6:00 X 6 TIRES
NOSE WHEEL -- 49 PSI ON 5:00 X 5 TIRE

NOSE GEAR SHOCK STRUT:

KEEP FILLED WITH FLUID AND INFLATED TO 85 PSI.

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

CESSNA AIRCRAFT COMPANY

WICHITA, KANSAS