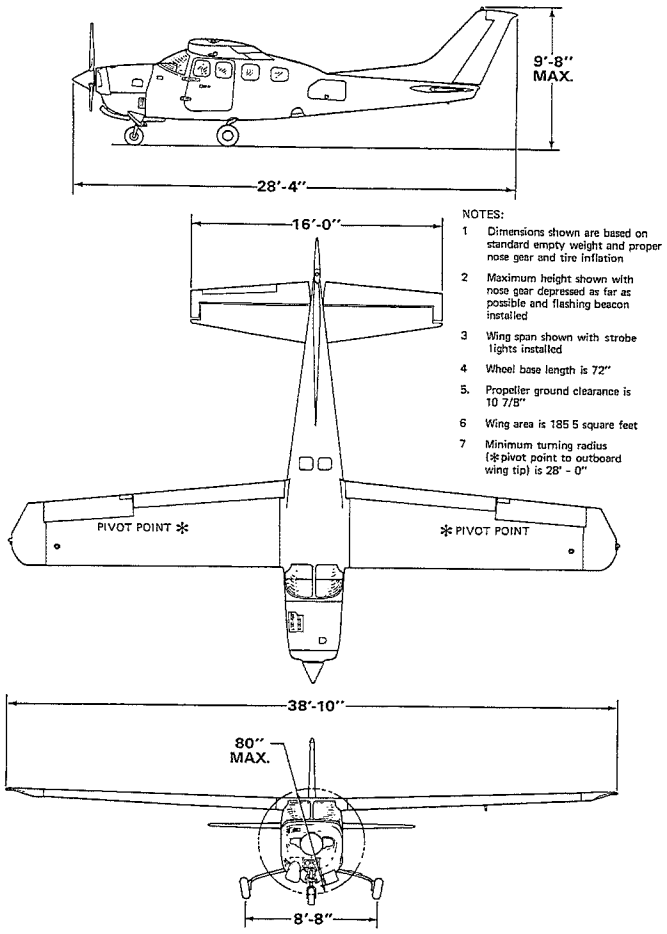


Figure 1-1. Three View

INTRODUCTION

This handbook contains 9 sections, and includes the material required to be furnished to the pilot by CAR Part 3 and FAR Part 23. It also contains supplemental data supplied by Cessna Aircraft Company.

Section 1 provides basic data and information of general interest. It also contains definitions or explanations of symbols, abbreviations, and terminology commonly used.

DESCRIPTIVE DATA

ENGINE

Number of Engines: 1.
Engine Manufacturer: Teledyne Continental.
Engine Model Number: TSIO-520-CE.
Engine Type: Turbocharged and inter-cooled, direct-drive, air-cooled, horizontally-opposed, fuel-injected, six-cylinder engine with 520 cu. in. displacement.
Horsepower Rating and Engine Speed: 325 rated BHP at 37.0 inches Hg and 2700 RPM.

PROPELLER

Propeller Manufacturer: McCauley Accessory Division.
Propeller Model Number: D3A36C410/80VMB-0.
Number of Blades:3.
Propeller Diameter, Maximum: 80 inches.
Minimum: 78.5 inches.
Propeller Type: Constant speed and hydraulically actuated, with a low pitch setting of 14.2° and a high pitch setting of 36.5° (30 inch station).

FUEL

Approved Fuel Grades (and Colors):
100LL Grade Aviation Fuel (Blue).
100 (Formerly 100/130) Grade Aviation Fuel (Green).

NOTE

Isopropyl alcohol or ethylene glycol monomethyl ether may be added to the fuel supply. Additive concentrations shall not exceed 1% for isopropyl alcohol or .15% for ethylene glycol monomethyl ether. Refer to Section 8 for additional information.

Fuel Capacity:
Standard Tanks:
Total Capacity: 90 gallons.
Total Capacity Each Tank: 45 gallons.
Total Usable: 87 gallons.
Long-Range Tanks:
Total Capacity: 120 gallons.
Total Capacity Each Tank: 60 gallons.
Total Usable: 115 gallons.

NOTE

Before refueling or when the airplane is parked on a slope, place the fuel selector handle in the LEFT ON or RIGHT ON position, whichever corresponds to the low wing. This action minimizes cross-feeding from the fuller tank and reduces fuel seepage from the wing tank vents.

OIL

Oil Specification:
The airplane was delivered from the factory with a corrosion-preventive aircraft engine oil. This oil should be drained after the first 25 hours of operation.

MIL-L-6082 Aviation Grade Straight Mineral Oil: Use to replenish supply during the first 25 hours.

Continental Motors Specification MHS-24 Aviation Grade Ashless Dispersant Oil: Oil conforming to Continental Motors Specification MHS-24, and all revisions or supplements thereto, **must be used** after first 25 hours. Refer to Continental Aircraft Engine Service Bulletin M82-8, and any superseding bulletins, revisions, or supplements thereto, for further recommendations.

Recommended Viscosity for Temperature Range:
All temperatures, use multi-viscosity oil or
Above 4°C (40°F), use SAE 50
Below 4°C (40°F), use SAE 30

NOTE

When operating temperatures overlap, use the lighter grade of oil. Multi-viscosity oil is recommended for improved starting and turbocharger controller operation in cold weather.

Oil Capacity:
Sump: 10 Quarts.
Total: 11 Quarts.

MAXIMUM CERTIFICATED WEIGHTS

Ramp: 4118 lbs.
Takeoff: 4100 lbs.
Landing: 3900 lbs.
Weight in Baggage Compartment:
Baggage Area "A" - Station 124 to 152: 200 lbs.
Baggage - Area "B" - Station 152 to 166: 80 lbs.

NOTE

The maximum allowable combined weight capacity for baggage areas A and B is 200 pounds.

STANDARD AIRPLANE WEIGHTS

Standard Empty Weight: 2471 lbs.
Maximum Useful Load: 1647 lbs.

CABIN AND ENTRY DIMENSIONS

Detailed dimensions of the cabin interior and entry door opening are illustrated in Section 6.

BAGGAGE SPACE AND ENTRY DIMENSIONS

Dimensions of the baggage area and baggage door opening are illustrated in detail in Section 6.

SPECIFIC LOADINGS

Wing Loading: 22.1 lbs./sq. ft.
Power Loading: 12.6 lbs./hp.

SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

KCAS	**Knots Calibrated Airspeed** is indicated airspeed corrected for position and instrument error and expressed in knots. Knots calibrated airspeed is equal to KTAS in standard atmosphere at sea level.
KIAS	**Knots Indicated Airspeed** is the speed shown on the airspeed indicator and expressed in knots.
KTAS	**Knots True Airspeed** is the airspeed expressed in knots relative to undisturbed air which is KCAS corrected for al-

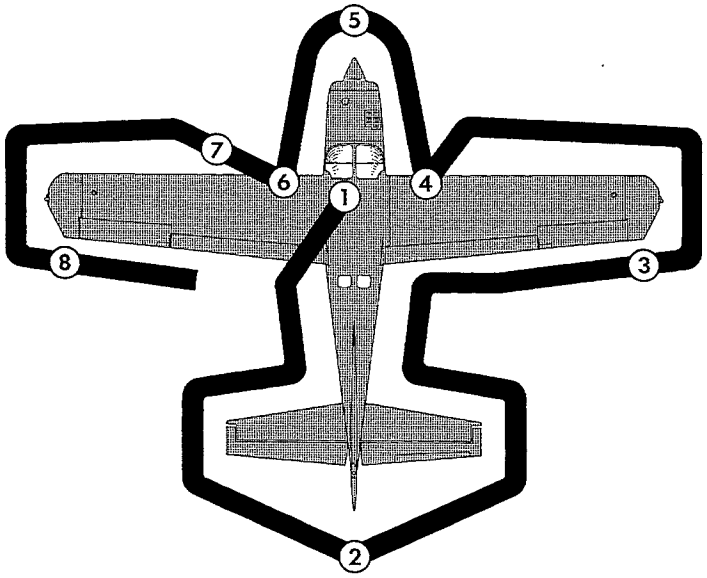
INTRODUCTION

Section 4 provides checklist and amplified procedures for the conduct of normal operation. Normal procedures associated with optional systems can be found in Section 9.

SPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 4100 pounds and may be used for any lesser weight. However, to achieve the performance specified in Section 5 for takeoff distance and climb performance, the speed appropriate to the particular weight must be used.

Takeoff:	
Normal Climb Out	80-90 KIAS
Short Field Takeoff, Flaps 20°, Speed at 50 Feet	75 KIAS
Enroute Climb, Flaps and Gear Up:	
Normal	110-130 KIAS
Best Rate of Climb, Sea Level to 21,000 Feet	110 KIAS
Best Rate of Climb, 25,000 Feet	106 KIAS
Best Angle of Climb, All Altitudes	82 KIAS
Landing Approach (3900 Lbs):	
Normal Approach, Flaps Up	90- 95 KIAS
Normal Approach, Flaps 30°	75- 80 KIAS
Short Field Approach, Flaps 30°	72 KIAS
Balked Landing (3900 Lbs):	
Maximum Power, Flaps 20°	73 KIAS
Maximum Recommended Turbulent Air Penetration Speed:	
4100 Lbs	130 KIAS
3400 Lbs	122 KIAS
2700 Lbs	105 KIAS
Maximum Demonstrated Crosswind Velocity:	
Takeoff or Landing	19 KNOTS



NOTE

Visually check airplane for general condition during walk-around inspection. In cold weather, remove even small accumulations of frost, ice or snow from wing, tail and control surfaces. Also, make sure that control surfaces contain no internal accumulations of ice or debris. Prior to flight, check that pitot heater (if installed) is warm to touch within 30 seconds with battery and pitot heat switches on. If a night flight is planned, check operation of all lights, and make sure a flashlight is available. Prior to any flight in icing conditions (if the airplane is so equipped), the preflight checks called out in the Known Icing Equipment Supplement in Section 9 must be completed. Also verify that the aircraft loading will remain within the approved limits for takeoff and landing.

Figure 4-1. Preflight Inspection

CHECKLIST PROCEDURES

PREFLIGHT INSPECTION

(1) CABIN

1. Pilot's Operating Handbook -- AVAILABLE IN THE AIRPLANE.
2. Airplane Weight and Balance -- CHECKED.
3. Control Wheel Lock -- REMOVE.
4. Parking Brake -- SET.
5. Ignition Switch -- OFF.
6. Landing Gear Lever -- GEAR DOWN.
7. Air Conditioner (if installed) -- OFF.
8. Radar (if installed) -- OFF.
9. Master Switch -- ON.

WARNING

When turning on the master switch, using an external power source, or pulling the propeller through by hand, treat the propeller as if the ignition switch were on. Do not stand, nor allow anyone else to stand, within the arc of the propeller, since a loose or broken wire, or a component malfunction, could cause the propeller to rotate.

10. Cabin Altitude Warning Light -- PRESS TO TEST.
11. Avionics Power Switches -- ON ONE AT A TIME. While each switch is ON, check audibly that the avionics cooling fan is operating.
12. Avionics Power Switches -- OFF.
13. Low-Voltage and (if installed) Low-Vacuum Warning Light and Alternator Off Warning Lights -- ON.
14. Suction Gage Warning Buttons (if installed) -- CHECK both extended.
15. Landing Gear Locked Light and Warning Horn -- GREEN and PRESS TO TEST (with throttle closed).
16. Landing Gear Unsafe Light -- OFF and PRESS TO TEST (red).
17. Fuel On-Off Valve -- ON (push full in).
18. Fuel Quantity Indicators -- CHECK QUANTITY.
19. Fuel Selector Valve -- BOTH ON.
20. Oxygen Expended Lights (if installed) -- CHECK.
21. Master Switch -- OFF.
22. Static Pressure Alternate Source Valve -- OFF.
23. Trim Controls -- NEUTRAL (rudder) and TAKEOFF (elevator).
24. Oxygen System (if installed) -- CHECK MASKS, HOSES, AND QUANTITY.
25. Windshield and Windows -- CHECK for CRACKS.

(2) EMPENNAGE

1. Left Static Source Opening -- CHECK for stoppage.
2. Left Main Gear Wheel Well -- CHECK for condition and cleanliness.
3. Baggage Door -- CHECK for security.
4. Rudder Gust Lock -- REMOVE.
5. Tail Tie-Down -- DISCONNECT.
6. Control Surfaces -- CHECK freedom of movement and security.
7. Right Main Gear Wheel Well -- CHECK for condition and cleanliness.
8. Right Static Source Opening -- CHECK for stoppage.

(3) RIGHT WING Trailing Edge

1. Aileron -- CHECK for freedom of movement and security.
2. Aileron Gap Seal -- CHECK security and fit.
3. Fuel Tank Vent at Wing Tip Trailing Edge -- CHECK for stoppage.

(4) RIGHT WING

1. Wing Tie-Down -- DISCONNECT.
2. Fuel Quantity -- CHECK VISUALLY for desired level.
3. Fuel Filler Cap -- SECURE and vent unobstructed.
4. Radome (if weather radar is installed) -- CHECK for condition and security.
5. Fuel Tank Sump Quick-Drain Valve(s) -- DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment, and proper fuel grade before first flight of day and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from all fuel drain points until all contamination has been removed.
6. Right Main Wheel -- CHECK tire for proper inflation and condition.

(5) NOSE

1. Vapor Return Line Quick-Drain Valve -- DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment, and proper fuel grade before first flight of day and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from all fuel drain points until all contamination has been removed.

2. Propeller and Spinner -- CHECK for nicks, security and oil leaks.
3. Air Inlets -- CHECK, engine induction air (right side panel), heat exchanger, oil cooler air, and cylinder cooling air (front), for restrictions.
4. Landing and Taxi Lights -- CHECK for condition and cleanliness.
5. Nose Gear Doors -- CHECK for security.
6. Nose Wheel Tire, Strut and Wheel Well -- CHECK tire and strut for proper inflation and wheel well for condition and cleanliness.
7. Nose Tie-Down -- DISCONNECT.
8. Engine Oil Filler Cap -- CHECK secure.
9. Engine Oil Dipstick -- CHECK oil level, then check dipstick SECURE. Do not operate with less than seven quarts. Fill to ten quarts for extended flight.
10. Fuel Strainer Quick-Drain Valve -- DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment, and proper fuel grade before first flight of day and after each refueling. Check strainer drain CLOSED. If water is observed, perform further draining at **all** drain points until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from **all** fuel drain points until all contamination has been removed.
11. Fuel Reservoir Quick-Drain Valve -- DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment, and proper fuel grade before first flight of day and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from **all** fuel drain points until all contamination has been removed.

(6) LEFT WING

1. Left Main Wheel -- CHECK tire for proper inflation and condition.
2. Fuel Tank Sump Quick-Drain Valve(s) -- DRAIN at least a cupful of fuel (using sampler cup) to check for water, sediment, and proper fuel grade before first flight of day and after each refueling. If water is observed, take further samples until clear and then gently rock wings and lower tail to the ground to move any additional contaminants to the sampling points. Take repeated samples from **all** fuel drain points until all contamination has been removed.
3. Fuel Quantity -- CHECK VISUALLY for desired level.
4. Fuel Filler Cap -- SECURE and vent unobstructed.

(7) LEFT WING Leading Edge

1. Pitot Tube Cover -- REMOVE and check opening for stoppage.

2. Stall Warning Vane -- CHECK for freedom of movement. While master switch is turned on, horn should sound when vane is pushed upward.
3. Wing Tie-Down -- DISCONNECT.

(8) LEFT WING Trailing Edge

1. Fuel Tank Vent at Wing Tip Trailing Edge -- CHECK for stoppage.
2. Aileron -- CHECK for freedom of movement and security.
3. Aileron Gap Seal -- CHECK security and ATTACHMENT.

BEFORE STARTING ENGINE

1. Preflight Inspection -- COMPLETE.
2. Passenger Briefing -- COMPLETE.
3. Seats, Seat Belts, Shoulder Harnesses -- ADJUST and LOCK.
4. Control Wheel Lock -- CHECK REMOVED.
5. Brakes -- TEST and SET.
6. Cabin Door -- CLOSE and LOCK (with cabin window open).
7. Openable Window -- AS DESIRED for ventilation.
8. Avionics Power Switches -- OFF.

CAUTION

The avionics power switches must be OFF during engine start to prevent possible damage to avionics.

9. Circuit Breakers -- CHECK IN.
10. Cabin Pressurization:
    a. Dump Valve Control -- IN (OUT on warm days).
    b. Cabin Pressurization Switch -- OFF (until after takeoff) or ON, if desired.
    c. Cabin Altitude Selector -- SET (high on warm days).

NOTE

For improved cabin comfort on warm days, the cabin altitude selector should be set to 8000 to 10,000 feet, the dump valve control should not be pushed in, and the pressurization switch should not be turned on until approaching the set altitude. With the overhead air controls ON, the individual overhead outlets open, and the cabin ventilation fan on HIGH, this procedure will allow maximum entry and circulation of the cooler ram air from the wing airscoops while climbing or cruising through the warm lower altitudes. A similar procedure should be used for hot weather descents.

A control knob on the lower center portion of the instrument panel is used to set the propeller and control engine RPM as desired for various flight conditions. The knob is labeled PROP PITCH PUSH INCR RPM. When the control knob is pushed in, blade pitch will decrease, giving a higher RPM. When the control knob is pulled out, the blade pitch increases, thereby decreasing RPM. The propeller control knob is equipped with a vernier feature which allows slow or fine RPM adjustments by rotating the knob clockwise to increase RPM, and counterclockwise to decrease it. To make rapid or large adjustments, depress the button on the end of the control knob and reposition the control as desired.

FUEL SYSTEM

Two fuel systems, standard and long range, are available for this airplane (see figure 7-6). The standard system consists of two vented integral fuel tanks (one in each wing), and the optional long-range system utilizes two additional vented fuel tanks (one in each wing), interconnected with the standard fuel tank in the respective wing. In the following paragraphs and diagrams, these tanks will be designated and referred to as a single tank in either the left or right wing. Refer to figure 7-7 for total and usable fuel quantities for both systems. The components of both systems, from tanks to engine, are identical. Each system contains the fuel tanks, a fuel selector valve, a reservoir, an auxiliary fuel pump, an on-off valve, fuel strainer, engine-driven fuel pump, fuel flow (pressure) limiter, fuel/air control unit, fuel manifold, and fuel-injection nozzles.

NOTE

Unusable fuel is at a minimum due to the design of the fuel system. However, when the fuel tanks are 1/4 full or less, prolonged uncoordinated flight, such as slips or skids, can uncover the fuel tank outlets, possibly causing fuel starvation and engine stoppage. Therefore, with low fuel reserves, do not allow the airplane to remain in uncoordinated flight for periods in excess of 30 seconds with fuel selector in LEFT ON or RIGHT ON or one minute with the selector in BOTH ON position.

Fuel flows by gravity from the tanks to a two-segment, three-position selector valve labeled LEFT ON, RIGHT ON, and BOTH ON.

NOTE

When the fuel selector valve handle is in the BOTH ON position in cruising flight, unequal fuel flow from each tank

may occur if the wings are not maintained exactly level. Resulting wing heaviness can be alleviated gradually by turning the selector valve handle to the detent for the tank in the "heavy" wing. Maximum allowable fuel unbalance is 150 lbs.

With the selector valve handle in one of the designated detent positions, fuel from either the left tank(s), right tank(s) or both tanks flows through the selector valve, the reservoir, through a bypass in the auxiliary fuel pump (when it is not in operation), and through a fuel on-off valve to a strainer mounted on the firewall. The engine-driven fuel pump delivers fuel from the strainer to the fuel/air control unit where it is metered. A fuel flow (pressure) limiter limits pressure at the inlet to the control unit such that the metered fuel flow does not exceed a maximum of 225 PPH. The metered fuel is then routed to a manifold which distributes it to each cylinder. Vapor and excess fuel from the engine-driven fuel pump, fuel flow (pressure) limiter, and the fuel/air control unit are returned by way of a separate segment of the selector valve to the wing fuel tank or tanks, as selected by the fuel selector handle position.

A two-position on-off valve is incorporated into the fuel system to be used for maintenance purposes or in the event of emergency conditions requiring fuel flow to be shut off. A push-pull control, labeled FUEL VALVE PUSH ON and located on the lower left side of the pedestal, controls valve position. Under normal conditions the control is pushed fully in to the ON position. To shut off fuel flow, the control is pulled fully out.

Fuel system venting is essential to system operation. Complete blockage of the venting system will result in decreasing fuel flow and eventual engine stoppage. Venting is accomplished by vent lines, one from each fuel tank, which are equipped with vent valves, and a tank interconnect vent line. The fuel filler caps are equipped with vacuum operated vents which open, allowing air into the tanks, should the fuel tank vent system become blocked.

Fuel quantity is measured by a float-type fuel quantity transmitter in each tank and is indicated by two electrically-operated fuel quantity indicators on the lower portion of the pedestal adjacent to the fuel selector valve handle. The indicators are marked in pounds (top scale) and gallons (bottom scale) with a red line indicating an empty tank. When an indicator shows an empty tank, approximately 1.5 gallon remains in the standard tank and an additional 1.0 gallon remains in the long-range tank (if installed) as unusable fuel. The indicators cannot be relied upon for accurate readings during skids, slips or unusual attitudes. Maximum indicator travel is reached with 40 to 41 gallons in the standard tank or 56 to 57 gallons in the long-range configuration. Therefore, indications at the right end of the scale (40 gallons to F with standard tanks only, or 50 gallons to

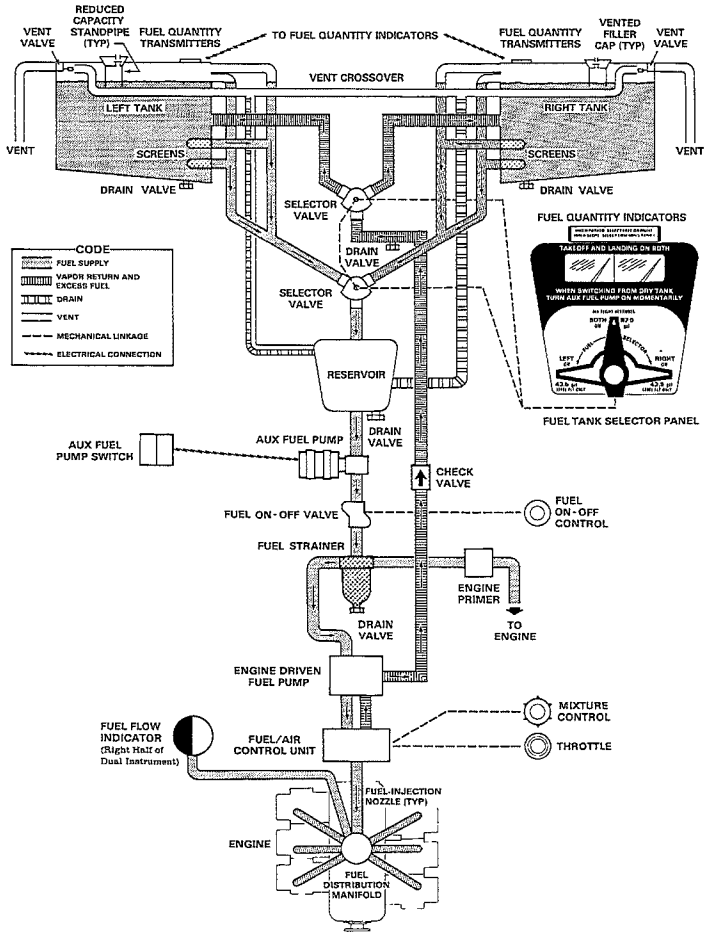


Figure 7-6. Standard Fuel System (Sheet 1 of 2)

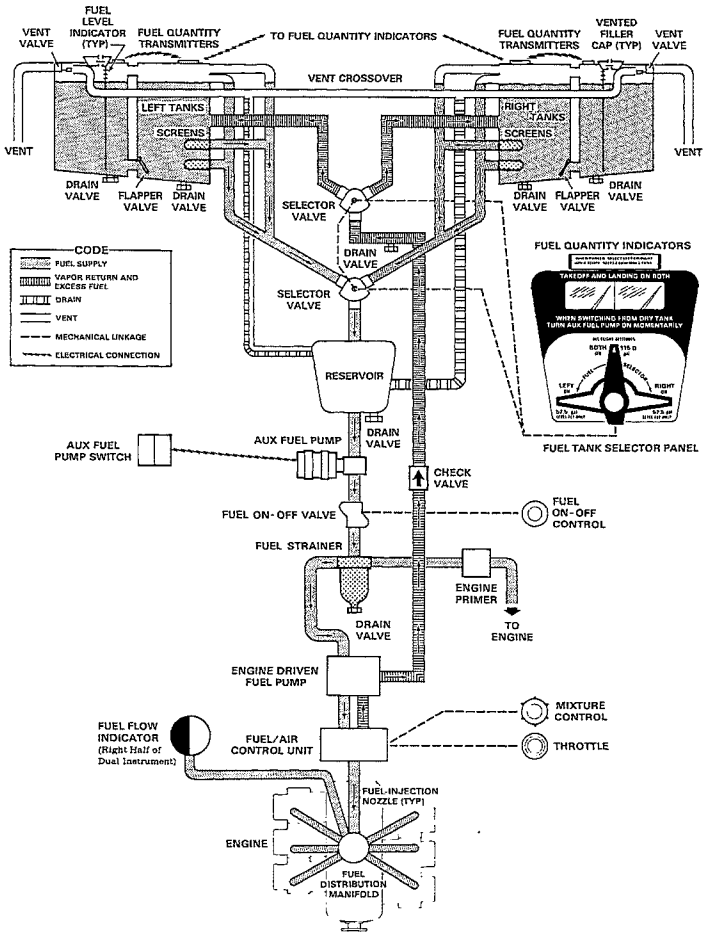


Figure 7-6. Long-Range Fuel System (Sheet 2 of 2)

FUEL QUANTITY DATA (U S GALLONS)				
FUEL TANKS	FUEL LEVEL (QUANTITY EACH TANK)	TOTAL FUEL	TOTAL UNUSABLE	TOTAL USABLE ALL FLIGHT CONDITIONS
STANDARD	FULL (45)	90	3	87
	REDUCED (33 5)	67	3	64
LONG RANGE	FULL (60)	120	5	115
	* LEVEL A (52.5)	105	5	100
	* LEVEL B (42 5)	85	5	80
	* LEVEL C (32 5)	65	5	60
* Long Range Fuel Tank filler neck indicators are most accurate when airplane wings are level				

Figure 7-7. Fuel Quantity Data

F with long-range tanks) should be verified by visual inspection of the tanks if a short field takeoff or a long-range flight is planned. If both indicator pointers should rapidly move to a zero reading, check the cylinder head temperature and oil temperature gages for operation. If these gages are not indicating, an electrical malfunction has occurred.

The airplane may be serviced to a reduced capacity to permit heavier cabin loadings. This is accomplished by filling each standard tank to the bottom edge of the fuel filler neck, thus giving a reduced fuel load of 201 pounds in each tank (192 pounds usable in all flight conditions) or filling each optional long-range tank to the desired graduated indicator marking (level A, B or C) as seen through the filler neck.

CAUTION

The long range tank filler neck indicators are accurate only when the wings are level. A one-degree lateral deviation from level will cause indication errors of up to 14 gallons per tank. While the low wing tank will contain less fuel than indicated and the high wing tank will contain more fuel than indicated, the errors may not balance out.

Before refueling or when the airplane is parked on a slope, place the fuel selector handle in the LEFT ON or RIGHT ON position, whichever corresponds to the low wing. This action minimizes crossfeeding from the fuller tank and reduces any fuel seepage tendency from the wing tank vents.

The auxiliary fuel pump switch is located on the left side of the instrument panel and is a yellow and red split-rocker type switch. The yellow right half of the switch is labeled START, and its upper ON position is used for normal starting, minor vapor purging and continued engine operation in the event of an engine-driven fuel pump failure. With the right

half of the switch in the ON position, the pump operates at one of two flow rates that are dependent upon the setting of the throttle. With the throttle open to a cruise setting, the pump operates at a high enough capacity to supply sufficient fuel flow to maintain flight with an inoperative engine-driven fuel pump. When the throttle is moved toward the closed position (as during letdown, landing, and taxiing), the fuel pump flow rate is automatically reduced, preventing an excessively rich mixture during these periods of reduced engine speed.

NOTE

If the engine-driven fuel pump is functioning and the auxiliary fuel pump switch is placed in the ON position, an excessively rich fuel/air ratio is produced unless the mixture is leaned. Therefore, this switch should be turned off during takeoff (unless takeoff fuel flow is slightly deficient) and during approach and landing.

NOTE

If the auxiliary fuel pump switch is accidentally placed in the ON position with the master switch on and the engine stopped, the intake manifolds will be flooded.

The red left half of the switch is labeled EMERG, and its upper HI position is used in the event of an engine-driven fuel pump failure during takeoff or high power operation. The HI position may also be used for extreme vapor purging. Maximum fuel flow is produced when the left half of the switch is held in the spring-loaded HI position. In this position, an interlock within the switch automatically trips the right half of the switch to the ON position. When the spring-loaded left half of the switch is released, the right half will remain in the ON position until manually returned to the off position.

Under hot day-high altitude conditions, or conditions during a climb that are conducive to fuel vapor formation, it may be necessary to utilize the auxiliary fuel pump to attain or stabilize the fuel flow required for the type of climb being performed. In this case, turn the auxiliary fuel pump on and adjust the mixture to the desired fuel flow. If fluctuating fuel flow (greater than 5 PPH is observed during climb or cruise at high altitudes on hot days, place the auxiliary fuel pump switch in the ON position to clear the fuel system of vapor. The auxiliary fuel pump may be operated continuously in cruise, if necessary, but should be turned off prior to descent.

NOTE

Each time the auxiliary fuel pump switch is turned on or off, the mixture should be readjusted.

If it is desired to completely exhaust a fuel tank quantity in flight, the

auxiliary fuel pump will be needed to assist in restarting the engine when fuel exhaustion occurs. Therefore, it is recommended that proper operation of the auxiliary fuel pump be verified prior to running a fuel tank dry by turning the auxiliary fuel pump ON momentarily and checking for a slight rise in fuel flow indication.

To ensure a prompt engine restart in flight after running a fuel tank dry, immediately switch to the tank containing fuel or to BOTH ON at the first indication of fuel pressure fluctuation and/or power loss. Then place the right half of the auxiliary fuel pump switch in the ON position momentarily (3 to 5 seconds) with the throttle at least 1/2 open. Excessive use of the ON position at high altitude and full rich mixture can cause flooding of the engine as indicated by a short (1 to 2 seconds) 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. At high altitudes, leaning the mixture will hasten restarting.

If the propeller should stop (possible at very low airspeeds) before the tank containing fuel is selected, place the auxiliary fuel pump switch in the ON 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.

The fuel system is equipped with drain valves to provide a means for the examination of fuel in the system for contamination and grade. The system should be examined before the first flight of every day and after each refueling by using the sampler cup provided to drain fuel from the wing tank sump quick-drains, the fuel strainer quick-drain on the lower left side of the engine cowling, and the fuel reservoir and vapor return line quick-drains located approximately in line with the front edge of the cabin door beneath the cabin. If any evidence of fuel contamination is found, it must be eliminated in accordance with the Preflight Inspection checklist and the discussion in Section 8 of this handbook. The fuel tanks should be filled after each flight to minimize condensation.

HYDRAULIC SYSTEM

Hydraulic power (see figure 7-8) is supplied by an electrically-driven hydraulic power pack located behind the control pedestal. The power pack's only function is to supply hydraulic power for operation of the retractable landing gear. This is accomplished by applying hydraulic pressure to actuator cylinders which extend or retract the gear and operate the gear down locks. The electrical portion of the power pack is protected by a 35-amp "pull-off" type circuit breaker on the circuit breaker panel.

The hydraulic power pack is turned on by a pressure switch on the power pack when the landing gear lever is placed in either the GEAR UP or GEAR DOWN position. When the lever is placed in the GEAR UP or GEAR DOWN position, it mechanically rotates a selector valve which applies hydraulic pressure in the direction selected. As soon as the landing gear reaches the selected position, a series of electrical switches will illuminate the green GEAR LOCKED light or turn off the red GEAR UNSAFE light to show gear position and completion of the cycle.

The hydraulic system normally operates at 1000 to 1500 PSI, and is protected by relief valves which prevent high pressure damage to the pump and other components in the system.

NOTE

In the event the hydraulic pump continues to run (longer than one minute) after completion of a cycle as evidenced by audible sound from the gear pump motor and the red GEAR UNSAFE light staying on, it is recommended that the circuit breaker, labeled GEAR PUMP, be pulled out to prevent possible damage due to overheating.

The hydraulic system includes an emergency hand pump to permit manual extension of the landing gear in the event of hydraulic power pack or electrical system failure. The hand pump is located on the cabin floor between the front seats.

During normal operations, the landing gear should require from 6 to 8 seconds to fully extend or retract. For malfunctions of the hydraulic and landing gear systems, refer to Section 3 of this handbook.

BRAKE SYSTEM

The airplane has a single-disc, hydraulically-actuated, metallic-type brake on each main landing gear wheel. Each brake is connected, by a hydraulic line, to a master cylinder attached to each of the pilot's rudder pedals. The brakes are operated by applying pressure to the top of either the left (pilot's) or right (copilot's) set of rudder pedals, which are interconnected. When the airplane is parked, both main wheel brakes may be set by utilizing the parking brake which is operated by a handle under the left side of the instrument panel. To apply the parking brake, set the brakes with the rudder pedals, pull the handle aft and rotate it 90° down.

For maximum brake life, keep the brake system properly maintained. The brakes on this airplane are the metallic type and were given a special brake burn-in before delivery. Also, unlike organic brakes, the day-to-day braking technique is different. When conditions permit, **hard** brake application is beneficial in that the resulting higher brake temperatures tend to maintain proper brake glazing and will prolong the expected brake life.