SECTION 4
NORMAL PROCEDURES

TABLE OF CONTENTS **Page**

TABLE OF CONTENTS **Page**

AMPLIFIED NORMAL PROCEDURES

INTRODUCTION

Section 4 provides the checklists and amplified procedures for normal operation of the airplane. This includes pre-flight inspection and preparation of the airplane, normal flight, and after-landing shutdown. Normal operations associated with optional equipment on the airplane are to be found in Section 9 (Supplements) of this handbook.

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AIRSPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following airspeeds are based on a maximum weight of 3500 lb. and may be used at a lesser weight.

CONDITION	KIAS
TAKEOFF	
Normal Climb Out	70-80
Short Field Takeoff – Flaps 20°, Speed at 50 feet	65
ENROUTE CLIMB, FLAPS UP	
Normal – Sea Level	80-90
Best Rate-of-Climb : Sea Level	81
Best Rate-of-Climb : 10,000 feet	77
Best Angle-of-Climb : Sea Level	65
Best Angle-of-Climb : 10,000 feet	71
LANDING APPROACH	
Normal Approach : Flaps Up	76-86
Normal Approach : Flaps 30°	66-76
Short Field Approach : Flaps 30°	66
BALKED LANDING	
Maximum Power : Flaps 30°	80
MAXIMUM RECOMMENDED TURBULENT AIR PENETRATION SPEED	114
MAXIMUM DEMONSTRATED CROSSWIND VELOCITY	
Takeoff or Landing	15

NORMAL PROCEDURES CHECKLISTS

PRE-FLIGHT INSPECTION

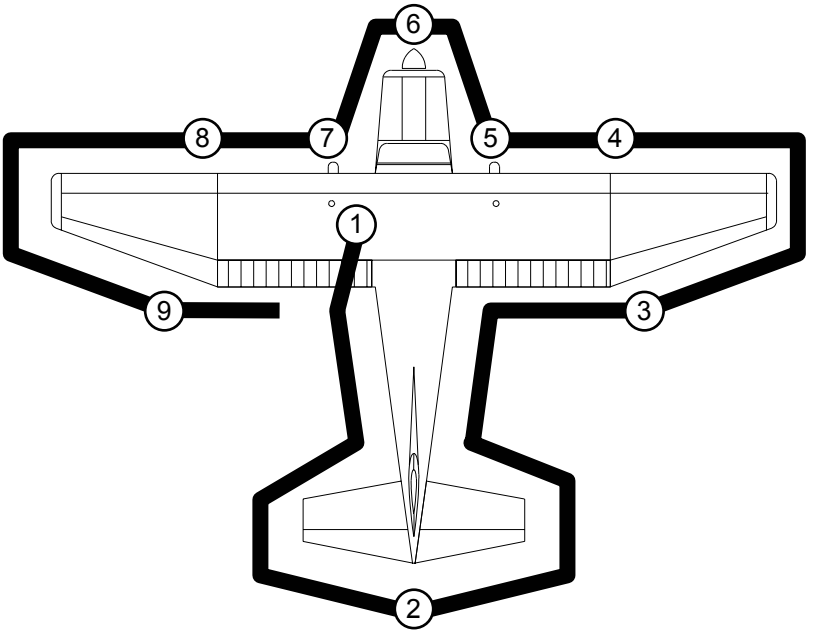


Figure 4-1: Pre-flight Walk-Around Inspection

NOTE

During the pre-flight inspection, perform a walk around of the airplane and make a visually check of the general condition of the airplane and any other items specified in the pre-flight inspection checklist. To ensure that the fuel drain valves allow for accurate fuel inspection, the airplane should be parked in a level ground attitude. In cold weather, make sure to remove even small amounts of frost, ice or snow accumulation from the wing, tailplane and control surfaces. Also make sure that no accumulations reside in the internal spaces of the control surfaces. Furthermore, with the master switch and pitot heat switches ON, check to ensure that the pitot heater is warm to the touch within 30 seconds.

1. CABIN

1. Pilot's Operating Handbook..... VERIFY IN AIRPLANE
2. Airplane Weight and Balance ..... CHECKED
3. Parking Brake..... SET
4. Control Wheel Lock..... REMOVE
5. Ignition Switch ..... OFF

WARNING

WHEN TURNING ON THE MASTER SWITCH OR 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 WITHIN ARC OF PROPELLER >

ANY PERSON STANDING WITHIN PROPELLER ARC MAY BE IN SERIOUS DANGER SINCE A COMPONENT MALFUNCTION INCLUDING A LOOSE OR BROKEN WIRE COULD CAUSE THE PROPELLER TO ROTATE.

6. Master Switch..... ON
7. Avionics Master Switch ..... ON
8. Fuel Quantity Indicators..... CHECK QUANTITY
9. Pitot Heat..... ON

(Check to ensure that pitot heater is warm to touch within 30 sec.)

10. Fuel Shut-off Valve..... LEFT or RIGHT
11. Alternate Static Source..... NORMAL (if installed)
12. Flaps ..... EXTENDED
13. Pitot Heat ..... OFF
14. Master Switch..... OFF
15. Left Aft Door..... CHECK Closed

2. EMPENNAGE

1. ELT Antenna..... CHECK Condition and Security
2. Horizontal Stabilizer ..... CHECK Security
3. Tail Tie-Down..... DISCONNECT
4. Rudder..... CHECK Freedom, Condition and Security
5. Control Surfaces..... CHECK Freedom, Condition and Security
6. Tail-wheel and Tail Steering..... CHECK Condition

3. RIGHT WING TRAILING EDGE

1. Right Aft Door ..... CHECK Closed
2. Flap ..... CHECK Security
3. Aileron ..... CHECK Freedom and Security
4. Aileron Balance Weight..... CHECK Condition

4. RIGHT WING LEADING EDGE

1. Landing/Taxi Lights ..... CHECK Condition
2. Wing Tie-Down..... DISCONNECT
3. Fuel Tank Vent opening ..... CHECK for Stoppage
4. Stall Warning Vane..... CHECK Condition and Freedom
   (To check the system, with the MASTER Switch on, moving the vane up will activate the stall warning horn and light.)
5. Navigation Light..... CHECK Condition and Security
6. Leading Edge ..... CHECK Condition
7. Leading Edge VGs ..... CHECK Condition and Security (if applicable)

5. RIGHT WING

1. Fuel Quantity..... CHECK VISUALLY
2. Fuel Filler Cap..... SECURE
   (Ensure filler cap vent is unobstructed)
3. Fuel Quick Drain Valves..... DRAIN

Drain fuel tank at each location using sampler cup and check for water or sediment contamination and for proper fuel grade before each flight and after each refuelling. If water is observed, take further samples until clear and then gently rock the wings to move any additional contaminants to the fuel drains. Take further repeated samples from all fuel drain points to ensure that all contamination has been removed. If contaminants are still present, refer to the above WARNING and do not fly the airplane.

WARNING

IF AFTER REPEATED FUEL SAMPLING EVIDENCE OF CONTAMINATION STILL EXISTS, THE AIRPLANE SHOULD NOT BE FLOWN. FUEL TANKS MUST BE DRAINED AND SYSTEM PURGED BY QUALIFIED MAINTENANCE PERSONNEL. CONTAMINATION MUST BE REMOVED BEFORE FURTHER FLIGHT.

4. Main Wheel Tire ..... CHECK Tread, Sidewall Condition and Inflation
5. Main Wheel Brakes..... CHECK Brake and External Lines Condition and Security
6. Co-Pilot Door ..... CHECK Closed

6. NOSE

1. Header Tank Quick Drain Valve ..... DRAIN
2. Fuel Strainer Quick Drain Valve ..... DRAIN

Drain header tanks and fuel strainer via the drain points located at the bottom of the fuselage. Using a sampler cup, check for water or sediment contamination and for proper fuel grade before each flight and after each refuelling. If water is observed, take further samples until clear and then gently rock the wings to move any additional contaminants to the fuel drains. Take further repeated samples from all fuel drain points to ensure that all contamination has been removed. If contaminants are still present, refer to the WARNING above and do not fly the airplane.

3. Engine Cooling Air Inlets ..... CHECK for Obstructions
4. Propeller and Spinner Cap ..... CHECK for Nicks and Security
5. Air Filter ..... CHECK for Stoppage
6. Oil Cooler Inlet ..... CHECK for Stoppage
7. Engine Oil Dipstick/Filler Cap ..... CHECK Oil Level and Secure Dipstick and Access Cover

WARNING
DO NOT OPERATE ENGINE WITH LESS THAN 3QUARTS OF OIL. FOR EXTENDED FLIGHT, FILL TO 12 QUARTS

8. Cowlings ..... CHECK Fasteners Secure.

7. LEFT WING

1. Fuel Quantity ..... CHECK VISUALLY
2. Fuel Filler Cap ..... SECURE
   (Ensure filler cap vent is unobstructed)
3. Fuel Quick Drain Valves ..... DRAIN

Drain fuel tank at each location using sampler cup and check for water or sediment contamination and for proper fuel grade before each flight and after each refuelling. If water is observed, take further samples until clear and then gently rock the wing to move any additional contaminants to the fuel drains. Take further repeated samples from all fuel drain points to ensure that all contamination has been removed. If contaminants are still present, refer to the WARNING on page 4-9 and do not fly the airplane.

4. Main Wheel Tire .....CHECK Tread, Sidewall Condition and Inflation
5. Main Wheel Brakes.....CHECK Brake and External Lines for Condition and Security

8. LEFT WING LEADING EDGE

1. Fuel Tank Vent opening.....CHECK for Stoppage
2. Wing Tie-Down .....DISCONNECT
3. Pitot Tube Cover .....REMOVE AND CHECK PITOT AND STATIC PORTS CLEAR
4. Leading Edge .....CHECK Condition
5. Leading Edge VGs .....CHECK Condition and Security (if applicable)
6. Navigation Light .....Check Condition and Security.

9. LEFT WING TRAILING EDGE

1. Aileron Balance Weight.....CHECK Condition
2. Aileron .....CHECK Freedom and Security
3. Flap.....CHECK Security

PRIOR TO ENGINE START

1. Pre-flight Inspection ..... COMPLETE
2. Passenger Briefing..... COMPLETE
3. Seats..... ADJUST and SECURE
4. Seatbelts ..... FASTENED and ADJUSTED
5. Parking Brakes ..... SET
6. Circuit Breakers..... CHECK IN
7. Electrical Equipment ..... OFF

WARNING

THE AVIONICS MASTER SWITCH MUST BE TURNED OFF DURING ENGINE START TO PREVENT POSSIBLE DAMAGE TO AVIONICS

8. Avionics Master Switch ..... OFF
9. Fuel Selector Valve ..... ON
10. Avionics Circuit Breakers ..... CHECK IN
11. Radios ..... OFF

STARTING ENGINE

STARTING A COLD ENGINE

1. Throttle ..... OPEN ¼ inch.
2. Propeller ..... HIGH RPM
3. Mixture ..... FULL RICH
4. Propeller Area ..... CLEAR
5. Master Switch ..... ON
6. Alternator Switch ..... ON
7. Auxiliary Fuel Pump Switch ..... ON (5 to 15 sec) then OFF.
8. Ignition Switch ..... START (Release After Start)
9. Throttle ..... ADJUST to 800 – 1000 RPM for Warm Up

NOTE

If engine floods, or for hot starts, turn OFF auxiliary fuel pump and place mixture in IDLE CUTOFF position. OPEN throttle to 1/2 to full. When engine fires, advance mixture to FULL RICH and RETARD throttle promptly.

10. Oil Pressure ..... CHECK (Pressure should be indicating within 30 seconds)
11. Navigation Lights ..... ON as Required
12. Strobe Light ..... ON as Required
13. Avionics Master Switch ..... ON
14. Radios ..... ON
15. Flaps ..... CHECK all Positions then UP

PRIOR TO TAKEOFF

1. Parking Brake ..... SET
2. Seats and Seat Belts ..... CHECK Secure
3. Doors ..... CLOSED, UNLOCKED
4. Flight Controls ..... CHECK FREE and CORRECT
5. Flight Instruments ..... CHECK and SET
6. Fuel Quantity & Balance ..... CHECK
7. Mixture ..... RICH
8. Fuel Selector Valve ..... SELECT FULLEST TANK
9. Elevator Trim ..... SET for TAKEOFF
10. Engine Instruments ..... CHECK in Operating Range
    ..... (24 ~ 27 Volts)
11. Propeller ..... HIGH RPM
12. Throttle ..... 1700 RPM
    (a) Magnetos ..... CHECK
        (RPM drop should not exceed 150 RPM on either magneto or 50 RPM differential between magnetos)
    (b) Propeller ..... FULL DECREASE
        (Note RPM drop of 400-500 RPM)
    (c) Propeller ..... HIGH RPM
    (d) Ammeter/Voltmeter ..... CHECK in Operational Range
    (e) Under/Over Voltage Light ..... OUT
13. Throttle ..... IDLE Check RPM
14. Throttle ..... 1000 RPM or LESS
15. Navigation Lights ..... AS DESIRED
16. Master Switch ..... CHECK ON
17. Alternator Switch ..... CHECK ON
18. Throttle Friction Lock ..... ADJUST
19. Strobe Lights ..... ON as DESIRED
20. Radios ..... SET
21. Flaps ..... SET for TAKEOFF (20^{o})
22. Auxiliary Fuel Pump Switch ..... ON
23. Avionics ..... AS REQUIRED
24. Pitot Heat ..... AS REQUIRED
25. Propeller ..... HIGH RPM
26. Mixture ..... RICH
    (Above 3000 ft LEAN to obtain maximum RPM)
27. Parking Brake ..... RELEASE

TAKEOFF

Power Check: Check full-throttle engine operation early in takeoff run. The engine should run smoothly and show manifold pressure of about 29 inches and engine speed of 2700 RPM. Monitor engine instruments for correct indication. Discontinue takeoff at any sign of rough operation or sluggish acceleration. Make a thorough full-throttle static run-up before attempting another takeoff.

For takeoff over a gravel surface: Advance Power Lever slowly. This allows the airplane to start rolling before high RPM is developed, and gravel will be blown behind the propeller rather than pulled into it.

Soft or rough field takeoffs: **P**erformed by lifting the airplane off the ground as soon as practical in a tail-low attitude. If no obstacles are ahead, the airplane should be leveled off immediately to accelerate to a higher climb speed.

Takeoffs with strong crosswinds: These normally performed with the minimum flap setting (0^o or 10^o) necessary for the field length, to minimize the drift angle immediately after takeoff. With the ailerons partially deflected into the wind, accelerate the airplane to a speed slightly higher than normal and then pull it off briskly to prevent the aircraft from settling back to the runway while drifting. When clear of the ground, use rudder to correct for drift.

NORMAL TAKEOFF

1. Flaps ..... 20^o
2. Power ..... FULL THROTTLE at 2700 RPM
3. Mixture ..... RICH
4. Elevator Control ..... LIFT Tail Wheel at 45 KIAS
5. Climb Speed ..... 70-80 KIAS
6. Flaps ..... UP at Safe Speed and Altitude

NOTE

If the flap indicator is non-functional, for example, flap indicator reads zero when flaps are deployed, use flaps up for all takeoffs.

SHORT FIELD TAKEOFF

1.	Flaps	20°
2.	Brakes	APPLY
3.	Propeller	2700 RPM
4.	Mixture	RICH (Above 3000 feet, LEAN to obtain maximum power)
5.	Throttle	FULL
6.	Brakes	RELEASE
7.	Elevator Control	RAISE TAIL AT 45 KIAS
8.	Climb Speed	65 KIAS (Until obstacle cleared) THEN 70-80 KIAS
9.	Flaps	UP at Safe Speed and Altitude

ENROUTE CLIMB

1.	Airspeed	80-90 KIAS

NOTE

If a maximum performance climb is necessary, use speeds shown in the *Rate of Climb* chart in Section 5 - Performance.

2.	Propeller	2600 RPM
3.	Throttle	29.4 inches or FULL THROTTLE whichever is less
4.	Mixture	RICH (Above 3000 feet, LEAN as required)
5.	Auxiliary Fuel Pump	OFF

CRUISE

1.	Power	MP 15 – 25 in. Hg, 2100 – 2500 RPM (See Figure 5-9)
2.	Elevator Trim	ADJUST
3.	Mixture	LEAN (50° rich of peak EGT)

DESCENT

1. Power ..... AS DESIRED
2. Mixture ..... ADJUST for Smooth Operation (Full rich for idle power)
3. Fuel Selector Valve ..... AS REQUIRED
4. Wing Flaps ……..AS DESIRED (UP above 116 KIAS, 10^o to 30^o below 116 KIAS)

BEFORE LANDING

1. Seats ..... ADJUSTED and SECURED
2. Seatbelts ..... FASTENED
3. Fuel Selector Valve ..... SELECT Tank based on Circuit Direction
4. Mixture ..... RICH
5. Landing/Taxi Lights ..... ON
6. Auxiliary Fuel Pump Switch ..... ON
7. External Lights ..... AS REQUIRED

LANDING

NORMAL LANDING

1. Wing Flaps …….. AS DESIRED (UP above 116 KIAS, 10^o to 30^o below 116 KIAS)
2. Airspeed (Flaps Up) ..... 76-86 KIAS @ 3500 lb
3. Airspeed (Flaps 30^o) ..... 66-76 KIAS @ 3500 lb
   (Reduce 1 knot for each 80 pound below 3500 lb)
4. Propeller ..... HIGH RPM
5. Touchdown ..... THREE-POINT ATTITUDE
6. Braking ..... AS REQUIRED

NOTE

Normal landing approaches can be made with power on or off with any flap setting desired. Surface winds and air turbulence are usually the primary factors in determining the most comfortable approach speeds.

SHORT FIELD LANDING

1.	Flaps	FULL DOWN (30°)
2.	Airspeed	66 KIAS
3.	Propeller	HIGH RPM
4.	Throttle	REDUCE to IDLE (After Clearing Obstacles)
5.	Touchdown	THREE-POINT ATTITUDE
6.	Brakes	APPLY as REQUIRED
7.	Flaps	RETRACT

BALKED LANDING

1.	Power	FULL THROTTLE and 2700 RPM
2.	Flaps	20°
3.	Airspeed	80 KIAS
4.	Flaps	SLOWLY RETRACT to FLAPS UP

AFTER LANDING

1.	Flaps	RETRACT
2.	Auxiliary Fuel Pump Switch	OFF
3.	Pitot Heat	OFF

SECURING AIRPLANE

1. Parking Brake ..... SET
2. Radio ..... CHECK 121.5 MHz
   (Check for inadvertent ELT triggering due to landing)
3. Avionics Master Switch ..... OFF
4. Avionics Equipment ..... OFF
5. Mixture ..... IDLE CUTOFF (Pull Full Out)
6. Ignition Switch ..... OFF
7. Master Switch ..... OFF
8. Alternator Switch ..... OFF
9. Fuel Shut-Off Valve ..... OFF
10. Control Lock ..... INSTALL

AMPLIFIED NORMAL PROCEDURES

The following Amplified Normal Procedures provide further insight into the information contained in the Normal Procedures Checklists of this section. These Amplified Procedures also include information which cannot be adapted into a checklist format. This information should be reviewed in detail before flying the airplane and should also be reviewed on a regular basis to maintain pilot proficiency on the procedures.

PRE-FLIGHT INSPECTION

A pre-flight inspection is required before each flight to ensure the proper working condition of the airplane. If the airplane has been in storage for an extended period, or has had recent major maintenance, a more thorough inspection by the pilot is warranted. Furthermore, if the airplane has operated from a marginal airport or has been exposed to severe weather conditions, a more thorough exterior inspection is again appropriate.

Following any extensive maintenance or repairs, all flight controls, including trim controls, should be checked for free and correct movement and security. All access panels on the airplane should be checked to verify that they are securely in place.

Aircraft damage which may be caused during ground handling of the airplane, especially in crowded hangar space, may cause minor dents, nicks, or scratches. The wings, fuselage and empennage should be given close attention if any such damage occurs. Other protuberances such as the navigation and anti-collision lights, and avionics antennas are also prone to damage. Improper ground handling during towing and exceeding tow limits can also result in damage to the tail wheel.

Storing the airplane outside over long periods may result in dust and dirt accumulation on the induction air filter, obstructions in the pitot-static system, contaminants in the fuel tanks and fuel system, and even bird/insect nesting. A through inspection of these areas is recommended before each flight.

The fuel system must be checked for water and sediment contamination at all of the following quick drain valves:

1. Fuel tank drain valves
2. Fuel reservoir drain valve
3. Fuel strainer drain valve

If water is observed in any of the above mentioned drain points, take further samples until the contamination is clear and then gently rock the wings to move any additional contaminants to the fuel drains. Take further repeated samples from all fuel drain points to ensure that all contamination has been removed. If contaminants are still present, the fuel tanks and fuel system must be completely drained and cleaned before any further flight.

To protect against in-flight fuel loss as a result of fuel siphoning out of the fuel tank filler necks, ensure that the filler caps are tightly sealed after checking or servicing the fuel system. The fuel system vents should also be checked for and cleared of any blockage including ice or water, especially after exposure to cold, wet weather.

Furthermore, if the airplane has been stored outside in high or gusty wind conditions, or in the wake of taxiing aircraft, special attention should be paid to the control surface stops, hinges and brackets to detect the presence of potential wind damage.

If the airplane is operated in snow, slush or muddy fields, check the main gears and tail wheel for obstructions and cleanliness. In rough fields, especially at higher altitudes, the landing gear may be subjected to unusually high loads and a frequent check of all components including the shocks, struts, tires and brakes should be performed. Additionally, operation from a gravel or cinder field is particularly hazardous to the propeller tips and leading edges of the horizontal tailplane. Stone damage to the propeller tips can seriously reduce the life of the blades, and abrasion on the leading edges of the horizontal stabilizer is also detrimental.

STARTING THE ENGINE

The proper engine start procedure will depend on the climate conditions and the elapsed time after last shutdown. The need to prime the engine will be dependent on these two factors.

In cooler weather, the engine temperature drops off rapidly following an engine shutdown, leaving the injector nozzle lines nearly full of fuel. Engine shutdown in warmer weather will often see a temperature rise following the shutdown which tends to vaporize the lingering fuel in the fuel intake lines and manifold.

In warm weather, the first 20 to 30 minutes after shutdown leaves the fuel manifold adequately primed and the empty injector nozzles will fill before the engine dies. However, after approximately 30 minutes, the vaporized fuel in the manifold will have nearly dissipated and some slight priming could be required to refill the nozzle lines and keep the engine running after the initial start.

Starting a hot engine is facilitated by advancing the mixture promptly to 1/3 open when the engine fires, smoothly advance to full rich as power develops, then reduce throttle to desired idle speed.

If the engine tends to die after starting, turn on the auxiliary fuel pump temporarily and adjust the throttle and/or mixture as necessary to keep the engine running. If the engine has been over-primed or flooded, turn off the auxiliary fuel pump, open the throttle from 1/2 to full open, set mixture to full lean and continue cranking. When the engine fires, retard the throttle to the desired idle speed and smoothly advance the mixture control to full rich.

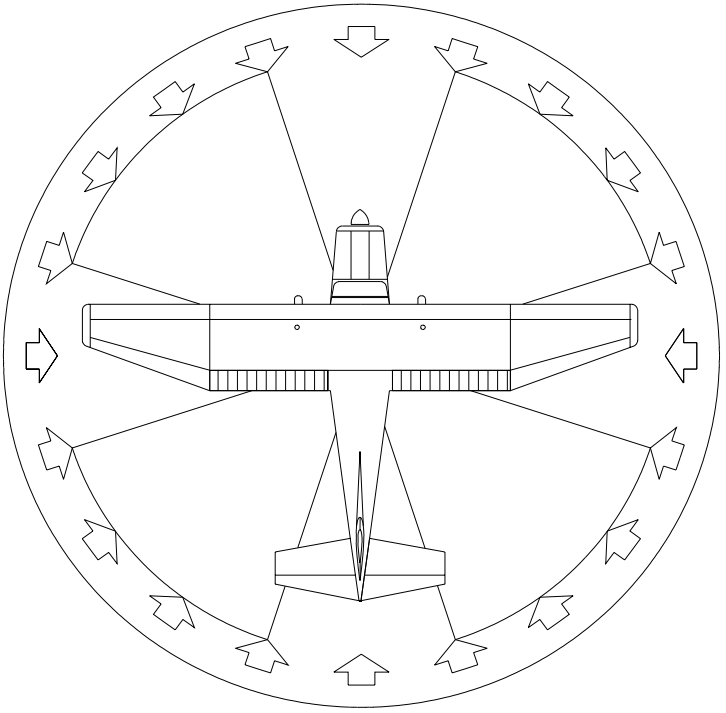
In cold weather with a cold engine, the engine might be under-primed and not fire at all. In this case, additional priming will be necessary. Additional information regarding cold weather staring and operation may be found under the appropriate paragraph at the end of this section.

After starting the engine, the oil pressure gauge should show pressure within 30 seconds in the summer time and one minute in very cold weather. If this is not the case, shut down the engine immediately and investigate the problem. A lack of oil or oil pressure can seriously damage the engine.

TAXIING

When taxiing the aircraft, speed should be kept to a minimum, controlled primarily with throttle. Be especially careful not to "ride" the brakes as this may cause them to overheat. Tail wheel steering provides adequate control of direction, even in significant wind conditions. A momentary use of brakes in the direction of turn is required to "unlock" the tail wheel and allow it to caster. During taxi, both elevator and aileron control should be used to help maintain directional control and balance (refer to figure below).

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



NOTE

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

PRIOR TO TAKEOFF

WARM UP

Engine oil temperature limitations must be adhered to. It is recommended that the oil temperature be allowed to increase to 45°C at low power settings before advancing power to 1700 RPM for run-up, and full power should not be applied until oil temperature is at 55°C or warmer. As with all air-cooled general aviation piston engines, care must be taken not to overheat the engine during long periods of idling, especially in warm weather conditions. Air-cooled engines are cowled to provide efficient in-flight engine cooling and are therefore by nature inefficient while on the ground. Extensive idling can also foul the spark plugs leading to further engine troubles. Accordingly, it is recommended that the engine be operated lean during operations on the ground.

MAGNETO CHECK

The magneto check is intended to verify proper ignition system operation prior to flight. The magneto check should be made at 1700 RPM using the following procedure. First move the ignition switch to the right (R) position and note the RPM. Then move the ignition switch to the both (BOTH) position to clear the other set of plugs. Then move the ignition switch to the left (L) position and again note the RPM. Finally, return the switch to the both (BOTH) position. The RPM drop on either magneto should not exceed 150 RPM, and the difference in RPM reading between the left and right magnetos should not be more than 50 RPM. Should these limits be exceeded, or if there is any other doubt as to the working function of the ignition system, an RPM check at higher engine speeds will usually confirm whether a problem exists. Attention should also be paid to the ignition system if there is an absence of an RPM drop when switching over the magnetos. This may be an indication of a faulty ground connection on one side of the ignition system or that the magneto timing is set in advance of the proper setting.

ALTERNATOR CHECK

Verification of proper alternator and alternator control unit operation can be achieved by momentarily loading the electrical system (3 to 5 seconds) and ensuring that the ammeter remains within a needle width of its initial reading. This check can be performed by switching on the landing light during the engine run-up at 1700 RPM. An alternator check is especially important prior to night or instrument flights.

FUEL FLOW METER

The Electronics International Inc. FP-5L Fuel Flow Meter is an electronic measuring device used for fuel management. It has six programmable display modes; (a) fuel flow, (b) fuel remaining, (c) fuel used, (d) time to empty, (e) fuel to destination, and (f) fuel reserve. The display can be readily shown in any of U.S gallons, Imperial gallons, pounds or litres. In addition, two low fuel alarms and a time to empty alarm are also incorporated.

The user should refer to the operator's manual to determine the features and uses of the instrument. It should be noted that the indicated fuel remaining in the tanks is not a measurement of the fuel in the tanks. Rather, it is an amount calculated from the starting level the pilot programs into the FP-5 minus the fuel used while the engine was running.

WARNING

THE FP-5 SHOULD NEVER BE USED AS THE PRIMARY INDICATOR OF FUEL QUANTITY IN THE TANKS. IT IS IMPORTANT THE PILOT VISUALLY CHECK/MEASURE THE FUEL QUANTITY FOR EACH TANK BEFORE TAKEOFF AND CROSSCHECK THESE READINGS AGAINST THE FUEL LEVEL GAUGES.

TAKEOFF

POWER CHECK

It is important to check full throttle operation early in the takeoff roll. Any sign of rough engine operation or sluggish response is good cause for discontinuing the takeoff. Should this occur, a full throttle static run-up is justified and should be conducted before any further flights can be attempted. In the run-up, the engine should run smoothly and turn at approximately 2700 RPM.

When takeoffs are attempted over surfaces consisting of loose gravel or cinders, care should be taken not to damage the propellers by pulling the loose material into it. It is important to advance the throttle slowly thereby rolling the airplane first before high RPM is developed.

Prior to takeoffs from fields above 3000 feet elevation, the mixture should be leaned to provide maximum RPM in a full throttle static run-up.

After full throttle is applied, the throttle friction lock can be tightened so as to prevent the throttle from creeping back from the maximum power position. The throttle lock is tightened by adjusting it clockwise and should also be done in other flight conditions to maintain a fixed throttle setting.

FLAP SETTINGS

Normal Takeoffs

Normal takeoffs are accomplished using 20^{o} of flaps. This setting reduces ground roll and total distance over an obstacle. Flap settings above 20^{o} are not approved for normal takeoffs. The flap position should be maintained until all obstacles are cleared and a safe retraction speed of 70 KIAS is reached.

ENROUTE CLIMB

NORMAL CLIMB

A normal enroute climb is performed with flaps retracted, full throttle and propeller set to 2600 RPM, at the best rate-of-climb airspeed. The mixture should be set to full rich below 3000 feet and may be leaned above 3000 feet altitude to obtain best power or for smoother engine operation.

BEST RATE-OF-CLIMB

For a maximum rate-of-climb, use the best rate-of-climb airspeeds shown in the performance tables of Section 5 - *Rate of Climb Chart*.

BEST ANGLE-OF-CLIMB

If obstacles dictate the use of a steep climb angle, the best angle-of-climb airspeed of 65~68 KIAS should be used with flaps retracted, throttle set to full and 2600 RPM. Climbs at speeds lower than the best rate-of-climb airspeed should be of short duration to improve engine cooling.

CRUISE

Normal cruise is maintained with an engine power setting of 60% to 75%. Section 5 - *Cruise Performance*, provides data for the engine speed (RPM), the manifold pressure (MP) and corresponding fuel consumption for various altitudes. During initial break-in of the engine, cruise should be done at 75% power as much as possible until a total of 50 hours have accumulated or the oil consumption has stabilized. It is a common misconception that high power during the break-in period of the engine is harmful. In fact, proper seating of the rings is dependent on operation at higher power settings. This is applicable to new engines, engines having received new cylinders, or engines with a top overhaul of one or more cylinders.

When planning long trips, the selection of cruise altitude depends on the basis of the most favourable wind conditions, and the use of low power settings are significant factors to reduce fuel consumption. In addition to power settings, proper leaning techniques can also improve range and are factored into the cruise performance tables. To achieve the Recommended Lean Mixture fuel consumption figures shown in Section-5, the mixture should be leaned until the EGT peaks and then enriched to decrease EGT by 50^{o}F. At lower power settings, it may be necessary to enrich the mixture slightly to obtain smoother engine operation.

LEANING WITH AN EGT GAUGE

When leaning the engine in cruising flight at 75% power or less, the Exhaust Gas Temperature (EGT) indicator may be used as a guide. To lean the mixture using this indicator, lean the engine to establish the peak EGT as a reference point. Then enrich the mixture as based on the following chart below:

Mixture Description	Exhaust Gas Temperature (EGT)
Recommended Lean Mixture (Pilot's Operating Handbook)	50° F Rich of Peak EGT
BEST POWER	150 ° F Rich of Peak EGT
Best Economy (75% Power or Less)	Peak EGT

NOTE

Any change in altitude or throttle position requires a re-check of EGT indication. Operating at peak EGT may cause engine roughness and the Recommended Lean Mixture should be used instead.

As shown in the figure above, Peak EGT will provide the best economy possible. This setting results in an increased range of approximately 4% and a decrease in speed of approximately 3 knots over the Recommended Lean Mixture.

STALLS

The stall characteristics of this airplane are conventional and an audible warning and light is provided by the stall warning system between 5 and 10 knots above the stall in all configurations.

Normally, the stall is marked by a gentle nose drop and the wings can easily be held level or in the bank with coordinated use of the ailerons and rudder. Upon stall warning in flight, recovery is accomplished by immediately by reducing back pressure to maintain safe airspeed, adding power if necessary and rolling wings level with coordinated use of the controls.

SPINS

Intentional spins are not approved for this aircraft. However, should the pilot enter an inadvertent spin, the following procedure should be used to recover from the event:

1. Retract the flaps.
2. Retard the throttle to the IDLE position.
3. Place the ailerons in NEUTRAL position.
4. Apply and HOLD FULL RUDDER OPPOSITE to the direction of Rotation.
5. Just after the rudder reaches the stop, move the CONTROL WHEEL BRISKLY FORWARD far enough to break the stall. Full down elevator may be required at aft center of gravity loadings to assure optimum recovery.
6. HOLD these control inputs UNTIL ROTATION STOPS. Premature relaxation of the control inputs may extend the recovery.
7. As rotation stops, NEUTRALIZE RUDDER and make a smooth RECOVERY from the resulting dive.

NOTE

If disorientation precludes a visual determination of the direction of rotation, the turn co-ordinator may be referred to for this information.

Variations in the weight and balance of the airplane can cause differences in spin behaviour. However, the recovery technique shown above should be used in any case and will result in the quickest recovery from a spin.

LANDING

NORMAL LANDING

A normal landing approach can be made with or without power and using any flap setting desired. The combination of these will be dependent on the approach setup, the surface winds and field length. A comfortable approach speed is usually governed by the air turbulence and surface winds present at the time. Touchdown should be made with power off to reduce the landing speed and braking requirement in the rollout. A slight hold-off to allow the aircraft to achieve a three-point attitude just prior to touchdown results in very little tendency to bounce. This is particularly beneficial in rough or soft field landings.

SHORT FIELD LANDING

A short field landing should be made with 30^{o} of flaps and at speed of 66 KIAS (higher approach speeds should be used in windy or turbulent conditions). Power should be used to control the glide path over obstacles. Once the obstacles are cleared, the power should be progressively reduced while maintaining airspeed by lowering the nose of the airplane. Touchdown should be made in a three-point attitude, followed by braking as required. To maximize braking effectiveness, retract the flaps and hold the control wheel full back. Do not skid the tires as this may not only damage the tires but also reduce directional control of the airplane.

CROSSWIND LANDING

Landings in strong crosswind mandate the use of the minimum flap settings needed for the landing field length. The *crab* or *combination method* of drift correction may be used in a crosswind landing, however the *wing low method* gives the best control. After touchdown, hold a straight course using the steerable tail wheel and occasional braking if necessary. Maintain aileron deflection in direction of the wind component throughout the landing roll.

The maximum allowable crosswind is dependent on pilot capability and airplane limitations. However, landing in a direct crosswind of 15 knots has been demonstrated in this airplane.

BALKED LANDING

If an approach or landing is not successful and a go-around is required, immediately apply full power. If obstacles must be cleared during the climb, reduce the flap settings to 20^{o} and climb at 80 KIAS initially. Once the obstacles are cleared, retract the flaps and re-trim the aircraft in stages until flaps are fully retracted.

COLD WEATHER OPERATION

When operating during the winter season or in cold temperatures, special attention should be given to the airplane before any flight.

Proper pre-flight draining of the fuel system sumps is particularly important to ensure that no water is present in the system which may contaminate the system or freeze up and cause blockage in the lines. The use of additives such as isopropyl alcohol or diethylene glycol monomethyl ether (DIEGME) may also be desirable. Refer to Section 8 - *Handling, Service and Maintenance* for the proper use of such additives.

During the walk around inspection, any accumulations of snow, frost, or ice must be removed from all surfaces, especially the wing, tailplane and all control surfaces. The control surfaces must also be free of any internal accumulations which may inhibit proper movement of the controls. Even small accumulations of snow, frost or ice can affect airplane performance and handling.

Should the takeoff surface be covered in snow or slush, a greater takeoff allowance must be given to account for the degradation in takeoff roll performance. Depending on the depth and consistency of the snow cover, a safe takeoff may not be possible and one should not be attempted.

If the engine has been cold soaked, general recommendation is that the propeller be pulled through by hand several times to break loose or limber the oil. This procedure will reduce power draw on the battery if a battery start is made.

The ground-adjustable cowl flap at the bottom trailing edge of the cowling should be checked for position prior to takeoff. For cold weather operation the cowl flap may be closed to the minimum position.

STARTING - GENERAL

On cold mornings, it is advisable to pull the propeller through several times to free up the oil before cranking with the engine starter.

WARNING

WHEN PULLING THE PROPELLER THROUGH BY HAND, TREAT THE PROPELLER AS IF THE IGNITION SWITCH WERE ON.

< DO NOT STAND WITHIN ARC OF PROPELLER >

ANY PERSON STANDING WITHIN PROPELLER ARC MAY BE IN SERIOUS DANGER SINCE A COMPONENT MALFUNCTION INCLUDING A LOOSE OR BROKEN WIRE COULD CAUSE THE PROPELLER TO ROTATE.

When air temperatures are below 20°F (-6°C), the use of an external pre-heater is recommended in order to obtain a good start. By using the external pre-heater, oil which has accumulated in the oil cooler can be thawed from its congealed state thereby reducing wear on the engine.

Cold weather starting procedures are the same as the normal starting procedures (refer to *Normal Procedures Checklist - Starting Engine*). Be careful not to allow inadvertent forward motion of the airplane during starting when parked on a slippery surface, snow, or ice.

NOTE

If the engine does not start during the first few attempts, or if the engine firing diminishes in strength, there is a possibility that the spark plugs have frosted over. In this case, pre-heat of the engine is necessary before another start can be attempted.

HOT WEATHER OPERATION

During hot weather operations, the engine starting procedure is dependent on the severity of the weather and how soon after engine shutdown the next engine start is attempted. Refer to the starting information (*Starting Engine*) in this section for further details.

In hot weather, avoid prolonged idling and engine operation on the ground because of the poor engine cooling efficiency.

The ground-adjustable cowl flap at the bottom trailing edge of the cowling should be checked for position prior to takeoff. For hot weather operation the cowl flap should be opened to the maximum position.

NOISE CHARACTERISTICS AND NOISE REDUCTION

The certificated noise level for the Found FBA-2C2 Bush Hawk at a maximum weight of 3500 lb. is 84.3 dB(A) using maximum continuous power at 2600 RPM. No determination has been made by Transport Canada that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into or out of any airport.

In order to minimize the effects of airplane noise on the environment, the following noise abatement procedures are suggested:

1. Pilots operating airplanes under VFR conditions over outdoor assemblies of persons, recreational and park areas, and other noise sensitive areas should make every effort to fly not less than 2000 feet above the surface, weather permitting, even though flight at a lower level may be consistent with the provisions of government regulations.

2. During departure from or approach to an airport, climb after takeoff and descent for landing should be made so as to avoid prolonged flight at low altitude near noise sensitive areas.

NOTE

The above recommended procedures do not apply where they would conflict with Air Traffic Control clearances or instructions, or where, in the pilot's judgement, an altitude of less than 2000 feet is necessary to adequately exercise the duty to see and avoid other airplanes.