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Many portions were omitted for brevity.

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 3100 pounds and may be used for any lesser weight. However, to achieve the performance specified in Section 5 for takeoff distance, the speed appropriate to the particular weight must be used.

Takeoff:

Normal Climb Out	70-80 KIAS
Short Field Takeoff, Flaps 20°, Speed at 50 Feet	59 KIAS

Enroute Climb, Flaps and Gear Up:

Normal	90-100 KIAS
Best Rate of Climb, Sea Level	88 KIAS
V_y Best Rate of Climb, 20,000 Feet	85 KIAS
Best Angle of Climb, Sea Level	72 KIAS
V_x Best Angle of Climb, 10,000 Feet	74 KIAS

Landing Approach:

Normal Approach, Flaps Up	70-80 KIAS
Normal Approach, Flaps 40°	65-75 KIAS
Short Field Approach, Flaps 40°	64 KIAS

Balked Landing:

Maximum Power, Flaps 20°	70 KIAS
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Maximum Recommended Turbulent Air Penetration Speed:

3100 Lbs	112 KIAS
2600 Lbs	102 KIAS
2100 Lbs	91 KIAS

Maximum Demonstrated Crosswind Velocity:

Takeoff or Landing	18 KNOTS
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AMPLIFIED PROCEDURES

STARTING ENGINE

Proper fuel management and throttle adjustments are the determining factors in securing an easy start from your turbocharged, carbureted engine. The procedure outlined in this section 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; however, the throttle should be fully closed. When ready to start, place the ignition switch in the start position. In warm weather, if the engine does not start after 5 seconds of cranking, crack the throttle 1/8 inch open and crank again. When the engine starts, slowly adjust the throttle to the desired idle speed.

NOTE

The carburetor used on this airplane does not have an accelerator pump; therefore, pumping of the throttle **must be avoided during starting** because doing so will only cause excessive leaning.

In cold weather, 2 strokes of the primer may be necessary prior to starting. During extremely cold temperatures, up to 4 strokes of the primer may be necessary.

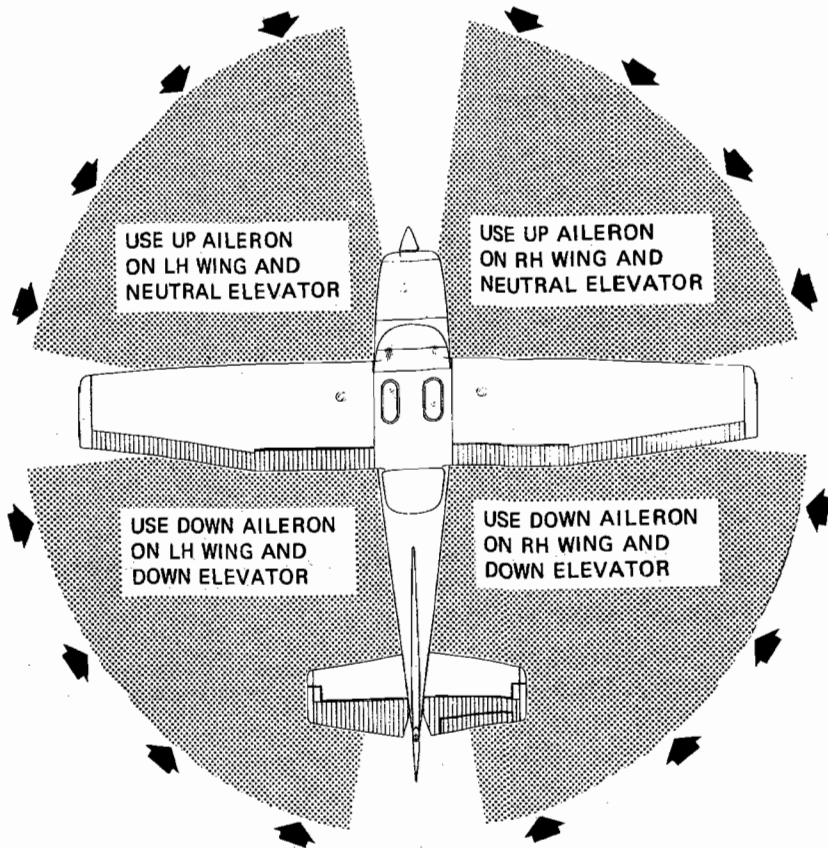
NOTE

Additional details concerning cold weather starting and operation may be found under COLD WEATHER OPERATION paragraphs in this section.

TAXIING

When taxiing, it is important that speed and use of brakes be held to a minimum and that all controls be utilized (see Taxiing Diagram, figure 4-2) to maintain directional control and balance.

The carburetor heat control knob should be pushed full in during all ground operations unless heat is absolutely necessary for smooth engine operation. When the knob is pulled out to the heat position, air entering the engine is not filtered.



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 4-2. Taxiing Diagram

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

BEFORE TAKEOFF

WARM-UP

Since the engine is closely cowled for efficient in-flight cooling, precautions should be taken to avoid overheating on the ground. Full power checks on the ground are not recommended unless the pilot has good reason to suspect that the engine is not turning up properly.

MAGNETO CHECK

The magneto check should be made at 1700 RPM as follows. Move ignition switch first to R position and note RPM. Next move switch back to BOTH to clear the other set of plugs. Then move switch to the L position, note RPM and return the switch to the BOTH position. RPM drop should not exceed 175 RPM on either magneto or show greater than 50 RPM differential between magnetos. If there is a doubt concerning operation of the ignition system, RPM checks at higher engine speeds 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.

ALTERNATOR CHECK

Prior to flights where verification of proper alternator and alternator control unit 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 lights during the engine runup (1700 RPM). The ammeter will remain within a needle width of the initial reading if the alternator and alternator control unit are operating properly.

TAKEOFF

POWER CHECK

It is important to check takeoff power early in the takeoff run. Full throttle will not be necessary to maintain the maximum rated manifold pressure. Any sign of rough engine operation or sluggish engine acceleration is good cause for discontinuing the takeoff.

Full power runups over loose gravel are especially harmful to propeller tips. When takeoffs 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. When unavoidable small dents appear in the propeller blades they should be corrected immediately as described in Section 8 under Propeller Care.

After a manifold pressure of 31 inches Hg is obtained, adjust the throttle friction lock clockwise to prevent the throttle from creeping from a maximum power position. Similar friction lock adjustment should be made as required in other flight conditions to maintain a fixed throttle setting.

WING FLAP SETTINGS

Normal takeoffs are accomplished with wing flaps 0° to 20°. Using 20° wing flaps reduces the ground run and total distance over an obstacle by approximately 20 per cent. Flap deflections greater than 20° are not approved for takeoff.

If 20° wing flaps are used for takeoff, they should be left down until all obstacles are cleared and a safe flap retraction speed of 70 KIAS is reached. To clear an obstacle with wing flaps 20°, an obstacle clearance speed of 59 KIAS should be used.

Soft field takeoffs are performed with 20° flaps by lifting the airplane off the ground as soon as practical in a slightly tail-low attitude. If no obstacles are ahead, the airplane should be leveled off immediately to accelerate to a safer climb speed.

With wing flaps retracted and no obstructions ahead, a climb-out speed of 80 KIAS would be most efficient.

CROSSWIND TAKEOFF

Takeoffs into strong crosswinds normally are performed with the minimum flap setting necessary for the field length, to minimize the drift angle immediately after takeoff. With the ailerons partially deflected into the wind, the airplane is accelerated to a speed slightly higher than normal, and 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

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.

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.

ENROUTE CLIMB

Normal climbs are performed at 90-100 KIAS with flaps up, 25 inches of manifold pressure, 2400 RPM, and full rich mixture for the best combination of engine cooling, rate of climb and forward visibility. If it is necessary to climb rapidly to clear mountains or reach favorable winds at high altitudes, the best rate-of-climb speed should be used with maximum power of 31 inches Hg, 2400 RPM and full rich mixture. This speed is 88 KIAS at sea level, decreasing to 85 KIAS at 20,000 feet.

If an obstruction ahead requires a steep climb angle, a best angle-of-climb speed should be used with landing gear and flaps up and maximum power. This speed is 72 KIAS at sea level, increasing to 74 KIAS at 10,000 feet.

CRUISE

Normal cruising is performed between 55% and 75% power. The corresponding power settings and fuel consumption for various altitudes can be determined by using your Cessna Power Computer or the data in Section 5.

NOTE

Cruising should be done at 25 inches Hg and 2400 RPM as much as practical until a total of 50 hours has accumulated or oil consumption has stabilized. This is to ensure proper seating of the rings and is applicable to new engines, and engines in service following cylinder replacement or top overhaul of one or more cylinders.

ALTITUDE	75% POWER		65% POWER		55% POWER	
	KTAS	NMPG	KTAS	NMPG	KTAS	NMPG
5000	151	10.6	142	11.5	132	12.5
10,000	158	11.1	148	12.0	137	12.9
15,000	165	11.6	155	12.5	142	13.4
20,000	173	12.1	162	13.1	147	13.9
Standard Conditions						Zero Wind

Figure 4-3. Cruise Performance Table

The Cruise Performance Table, figure 4-3, illustrates the true airspeed and nautical miles per gallon during cruise for various altitudes and percent powers. This table should be used as a guide, along with the available winds aloft information, to determine the most favorable altitudes and power setting for a given trip. The selection of cruise altitude on the basis of the most favorable wind conditions and the use of low power settings are significant factors that should be considered on every trip to reduce fuel consumption.

For reduced noise levels, it is desirable to select the lowest RPM in the green arc range for a given percent power that will provide smooth engine operation. The cowl flaps should be opened, if necessary, to maintain the cylinder head temperature at approximately two-thirds of the normal operating range (green arc).

Cruise performance data in this handbook and on the power computer is based on a recommended lean mixture setting which is established by reference to exhaust gas temperature (EGT) as shown on the Cessna Economy Mixture Indicator. EGT is used for mixture leaning in cruising flight at maximum recommended cruise power or less. To adjust the mixture, lean to establish the peak EGT as a reference point and then enrichen the mixture by a desired increment based on data in figure 4-4. The mixture should be full rich at any power setting above maximum recommended cruise power.

As noted in the table, operation at peak EGT provides best fuel economy. This results in approximately 7% greater range than shown in this handbook accompanied by approximately 4 knots decrease in speed.

When leaning the mixture under some conditions, engine roughness may occur before peak EGT is reached. In this case, continue to lean until

BEFORE LANDING

In view of the relatively low drag of the extended landing gear and the high allowable gear operating speed (140 KIAS), 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 landings.

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 approximately 12 inches of manifold pressure and/or the wing flaps extended beyond 25°, 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 landing gear up (amber) indicator light.

LANDING

NORMAL LANDING

Landings should be made on the main wheels first to reduce the landing speed and the subsequent need for braking in the landing roll. The nose wheel is lowered gently to the runway after the speed has diminished to avoid unnecessary nose gear load. This procedure is especially important in rough field landings.

SHORT FIELD LANDING

For a short field landing, make a power-off approach at 64 KIAS with 40° flaps and land on the main wheels first. Immediately after touchdown, lower the nose gear to the ground and apply heavy braking as required. For maximum brake effectiveness after all three wheels are on the ground, retract the flaps, hold full nose up elevator and apply maximum possible brake pressure without sliding the tires.

CROSSWIND LANDING

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

MIXTURE DESCRIPTION	EXHAUST GAS TEMPERATURE
RECOMMENDED LEAN (Pilot's Operating Handbook and Power Computer)	50°F Rich of Peak EGT
BEST ECONOMY	Peak EGT

Figure 4-4. EGT Table

peak EGT is established, then enrichen to any desired mixture setting that allows smooth engine operation.

The mixture may be leaned during descent to provide smooth engine operation and improved fuel economy. Any change in altitude, power or carburetor heat will require a change in the mixture setting and a recheck of the EGT.

Carburetor ice, as evidenced by an unexplained drop in manifold pressure, can be removed by application of full carburetor heat. Upon regaining the original manifold pressure indication (with heat off), use the minimum amount of heat (by trial and error) to prevent ice from forming. When operating above approximately 5000 feet at maximum recommended cruise power, the heat available from turbocharging increases with altitude and carburetor icing becomes less likely.

Carburetor heat may be used as an alternate air source in the event the induction air filter becomes blocked. However, since application of full carburetor heat at high altitudes may result in the loss of as much as 10 inches of manifold pressure, carburetor heat should be used only as necessary. With carburetor heat on, throttle and mixture should be readjusted as necessary.

STALLS

The stall characteristics are conventional and aural warning is provided by a stall warning horn which sounds between 5 and 10 knots above the stall in all configurations. Altitude loss during stall recovery may be as much as 300 feet.

Power-off stall speeds at maximum weight for both forward and aft C.G. positions are presented in Section 5.

BALKED LANDING

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. To prevent overboosting the engine, power should then be reduced to approximately 25 inches of manifold pressure and the carburetor heat control placed in the cold position.

COLD WEATHER OPERATION

STARTING

Prior to starting on cold mornings, it is advisable to pull the propeller through several times by hand to "break loose" or "limber" the oil, thus conserving battery energy.

NOTE

When pulling the propeller through by hand, treat it as if the ignition switch is turned on. A loose or broken ground wire on either magneto could cause the engine to fire.

In extremely cold (-18°C and lower) weather, the use of an external pre-heater and an external power source are recommended whenever possible to obtain positive starting and to reduce wear and abuse to the engine and the electrical system. Pre-heat will thaw the oil trapped in the oil cooler, which probably will be congealed prior to starting in extremely cold temperatures. When using an external power source, the position of the master switch is important. Refer to Section 9, Supplements, for Ground Service Plug Receptacle operating details.

Cold weather starting procedures are as follows:

With Preheat:

1. With ignition switch turned off, mixture full rich and throttle closed, prime the engine one to two strokes.

NOTE

Use heavy strokes of the primer for best atomization of fuel. After priming, push primer all the way in and turn to the locked position to avoid the possibility of the engine drawing fuel through the primer.

2. Propeller -- CLEAR.
3. Avionics Power Switch -- OFF.
4. Master Switch -- ON.
5. Throttle -- CLOSED until engine starts.
6. Ignition Switch -- START (release to BOTH when engine starts).

Without Preheat:

1. Prime the engine two to four strokes with mixture full rich and throttle closed.
2. Propeller -- CLEAR.
3. Avionics Power Switch -- OFF.
4. Master Switch -- ON.
5. Throttle -- CLOSED until engine starts.
6. Ignition Switch -- START.
7. Release ignition switch to BOTH when engine starts.
8. Oil Pressure -- CHECK.
9. Primer -- LOCK.

NOTE

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

NOTE

Pumping of the throttle will make starting more difficult due to a rapidly varying mixture. The carburetor is not equipped with an accelerator pump.

OPERATION

During cold weather operations, no indication will be apparent on the oil temperature gage prior to takeoff if outside air temperatures are very cold. After a suitable warm-up period (2 to 5 minutes at 1000 RPM), smoothly accelerate the engine several times to higher engine RPM. If the engine accelerates smoothly and the oil pressure remains normal and steady, the airplane is ready for takeoff.

Rough engine operation in cold weather can be caused by a combination of an inherently leaner mixture due to the dense air and poor vaporization and distribution of the fuel-air mixture to the cylinders. The effects of these conditions are especially noticeable during operation on one magneto in ground checks where only one spark plug fires in each cylinder.

For optimum operation of the engine in cold weather, the appropriate use of carburetor heat may be necessary. The following procedures are indicated as a guideline:

1. Use the minimum carburetor heat required for smooth operation in takeoff, climb, and cruise.

NOTE

Care should be exercised when using partial carburetor heat to avoid icing. Partial heat may raise the carburetor air temperature to 0° to 21°C range where icing is critical under certain atmospheric conditions.

2. The carburetor air temperature gage can be used as a reference in maintaining carburetor air temperature at or slightly above the top of the yellow arc by application of carburetor heat.

HOT WEATHER OPERATION

The general warm temperature starting information in this section is appropriate. Avoid prolonged engine operation on the ground.

NOISE ABATEMENT

Increased emphasis on improving the quality of our environment requires renewed effort on the part of all pilots to minimize the effect of airplane noise on the public.

We, as pilots, can demonstrate our concern for environmental improvement, by application of the following suggested procedures, and thereby tend to build public support for aviation:

1. Pilots operating aircraft under VFR 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 judgment, an altitude of less than 2000 feet is necessary for him to adequately exercise his duty to see and avoid other aircraft.

The certificated noise level for the Model TR182 at 3100 pounds maximum weight is 72.5 dB(A) with a two-bladed propeller and 69.4 dB(A) with a three-bladed propeller. No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.