OUTSIDE CABIN

Crossfeed drains.....closed
Right wing, aileron and flap.....check, no ice
Right main gear.....no leaks
Strut.....proper inflation
Tire.....check
Right wing tip.....check
Right leading edge.....check, no ice
Fuel cap.....open, check quantity and color, secure
Right engine nacelle.....check oil
Right propeller.....check
Cowl flaps.....OPEN and secure
Fuel drains.....drain
Nose section.....check
Nose gear.....no leaks
Strut.....proper inflation
Tow bar.....removed and stowed
Landing light.....check
Forward baggage door (key removable in locked position only).....secure and locked
Windshield.....clean
Left wing, engine nacelle and landing gear.....check as on right side
Pitot tube.....clear, checked
Stall warning vanes.....check
Rear door.....latched
Left static vent.....clear
Dorsal fin air scoop.....clear
Empennage.....check, no ice
Stabilator.....free
Right static vent.....clear
Antennas.....check
Navigation and landing lights.....check

BEFORE STARTING ENGINES

Seats.....adjusted
Seat belts and harness.....fasten/adjust check inertia reel
Parking brake.....set
Circuit breakers.....in
Radios.....OFF
Cowl flaps.....OPEN
Alternate air.....OFF
Alternators.....ON

STARTING ENGINES (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

Fuel selector.....ON
Mixture.....RICH
Throttle.....half travel
Propeller.....FORWARD
Master switch.....ON
Ignition switches.....ON
Propeller.....clear
Starter.....engage
Primer button.....ON as required
Throttle.....retard when engine starts
Oil pressure.....check
Repeat for opposite engine
Alternators.....check
Gyro pressure.....check

STARTING ENGINES (AIRPLANE EQUIPPED WITH OPTIONAL ENGINE PRIMER SYSTEM)

Fuel selector.....ON
Mixture.....FULL RICH
Throttle.....FULL FORWARD
Prop control.....FULL FORWARD
Master switch.....ON
Ignition switch (mug).....ON
Auxiliary fuel pump.....OFF
Primer.....ON
See Figure 4-3 for Priming Time
Throttle.....CLOSE
Starter.....engage
At temperatures below +20°F continue priming while cranking until engine starts.

When engine starts & accelerates thru 500 RPM:
Starter.....release
Throttle.....advance slowly to obtain 1000 RPM
Primer.....release
Auxiliary fuel pump.....low only as necessary to obtain smooth engine operation (1-3 minutes will be required when temp. is below 20°F)
Oil pressure.....check
Repeat for opposite engine.

Alternators .....check
Gyro pressure .....check

NOTE

When starting at ambient temperatures +20°F and below, operate first engine started with alternator ON (at max charging rate not to exceed 1500 RPM) for 5 minutes minimum before initiating start on second engine.

STARTING ENGINES WHEN FLOODED

Mixture .....idle cut-off
Throttle .....full FORWARD
Propeller .....FORWARD
Master switch .....ON
Ignition switches .....ON
Auxiliary fuel pump .....OFF
Propeller .....clear
Starter .....engage

When engine fires:
Throttle .....retard
Mixture .....advance slowly

STARTING ENGINES IN COLD WEATHER (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

Props .....turn through by hand (3 times)
Fuel selector .....ON
Mixture .....full RICH
Throttle .....full FORWARD
Prop control .....full FORWARD
Master switch .....ON
Ignition switch (mag) .....ON
Auxiliary fuel pump .....ON LOW boost
Starter .....engage
Primer .....On for 3 sec.
Throttle .....full FORWARD to full AFT
Primer .....ON 3 sec., then OFF 3 sec., then ON 3 sec.

When engine fires:
Starter .....leave engaged
Primer button .....tap until rhythmic firing
Starter .....release
Throttle .....half travel
Oil pressure .....check

If engine begins to falter:
Primer button .....tap
Throttle .....1000 RPM

Auxiliary fuel pump .....OFF after start complete

STARTING WITH EXTERNAL POWER SOURCE

Master switch .....OFF
All electrical equipment .....OFF
Terminals .....connect
External power plug .....insert in fuselage
Proceed with normal start
Throttles .....lowest possible RPM
External power plug .....disconnect from fuselage
Master switch .....ON-check ammeter
Oil pressure .....check

WARM-UP

Throttles .....1000 to 1200 RPM

TAXIING

Chocks .....removed
Taxi area .....clear
Throttle .....apply slowly
Brakes .....check
Steering .....check
Instruments .....check
Heater and defroster .....check
Fuel selector .....ON, check crossfeed
Autopilot .....OFF

BEFORE TAKEOFF - GROUND CHECK

Parking brake.....ON
Mixture controls.....FORWARD
Prop. controls.....FORWARD
Throttle control.....1000 RPM
Manifold pressure lines.....drain
Prop. controls.....check feathering, 300 RPM max. drop
Throttle controls.....1900 RPM
Prop. controls.....check governor
Prop. controls.....full FORWARD
Alternate air.....ON then OFF
Magnetos.....check, max. drop 150 RPM, max. diff. drop 50 RPM
Alternator output.....check
Gyro pressure gauge.....4.5 to 5.2 in. Hg.
Throttles.....800-1000 RPM
Fuel selectors.....ON
Alternators.....ON
Engine gauges.....in the green
Annunciator panel.....press-to-test
Altimeter.....set
Attitude indicator.....set
D.G.....set
Clock.....wound and set
Mixtures.....set
Propellers.....set in forward position
Quadrant friction.....adjusted
Alternate air.....OFF
Cowl flaps.....set
Seat backs.....erect
Wing flaps.....set
Trim.....set
Seat belts and harness.....fasten/adjust
Empty seats.....seat belts fastened
Controls.....free, full travel
Doors.....latched
Auxiliary fuel pumps.....OFF
Pitot heat.....as required

TAKEOFF

CAUTIONS

Do not exceed 40 in. Hg. manifold pressure.

Fast taxi turns immediately prior to takeoff run can cause temporary malfunction of one engine during takeoff.

Normal sea level takeoff at 39 in. Hg. and 2575 RPM.

Adjust mixture prior to takeoff from high elevations. Do not over heat. Do not exceed 40 in. Hg. manifold pressure.

NORMAL TAKEOFF (Flaps up)

Flaps.....UP
Accelerate to 66 to 71 KIAS.
Control wheel.....ease back to rotate to climb attitude
After breaking ground, accelerate to best rate of climb speed of 89 KIAS.
Gear.....UP

SHORT FIELD TAKEOFF (Flaps up)

Flaps.....UP
Stabilator trim.....takeoff range
Brakes.....set
Full power before brake release.
Accelerate to 66 KIAS.
Control wheel.....rotate firmly to attain 71 KIAS through 50 ft.

Accelerate to best angle of climb speed of 76 KIAS for obstacle clearance or best rate of climb speed of 89 KIAS, no obstacle.
Gear.....UP

SHORT FIELD TAKEOFF (25° Flaps)

Flaps.....25° (second notch)
Stabilator trim.....set
Brakes.....set
Full power before brake release.
Accelerate to 61 KIAS.
Control wheel.....rotate firmly to attain 69 KIAS through 50 ft.
Gear.....UP

TAKEOFF CLIMB

Mixture.....full RICH
Prop speed.....2575 RPM
Manifold pressure.....DO NOT EXCEED 40 in. Hg.
Climb speed
  Best angle.....76 KIAS
  Best rate.....89 KIAS
Cowl flaps.....as required

CRUISE CLIMB

Mixture.....full RICH
Prop speed.....2450 RPM
Manifold pressure.....31.5 in. Hg.
Climb speed.....102 KIAS
Cowl flaps.....as required

CRUISING

Reference performance charts, Teledyne Continental Operator's Manual and power setting table.
Power.....set
Cowl flaps.....as required
Mixture.....adjust
Engine gauges.....monitor

DESCENT

Mixtures.....enrich with descent
Throttles.....cruise setting
Cowl flaps.....CLOSED

APPROACH AND LANDING

Gear warning horn.....check
Airspeed.....98 KIAS on downwind leg
Seat backs.....erect
Seat belts and harness.....fasten/adjust
Fuel selectors.....ON
Cowl flaps.....as required
Auxiliary fuel pumps.....OFF
Mixture controls.....set
Propellers.....2250 RPM
Landing gear.....DOWN, 129 KIAS max.
Flaps.....set as required
Airspeed.....97 KIAS on base leg, 87 KIAS on final
On close final:
Power.....reduced
Prop. controls.....full FORWARD

GO-AROUND

Full takeoff power, both engines (40 in. Hg. max.)
Establish positive climb.
Flaps.....retract
Gear.....UP
Cowl flaps.....adjust

AFTER LANDING

Clear of runway
Flaps.....retract
Cowl flaps.....fully OPEN
Alternate air.....OFF

SHUTDOWN

Heater.....FAN 2 min. then OFF
Radio and electrical equipment.....OFF
Mixture controls.....idle cut-off
Magneto switches.....OFF
Master switch.....OFF
Parking brake.....set ON

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4.7 AMPLIFIED NORMAL PROCEDURES (GENERAL)

The following paragraphs are provided to supply detailed information and explanations of the normal procedures necessary for the operation of the airplane.

4.9 PREPARATION

The airplane should be given a thorough preflight and walk-around check. The preflight should include a determination of the airplane's operational status, a check that necessary papers and charts are on board and in order, and a computation of weight and C.G. limits, takeoff distance and in-flight performance. Baggage should be weighed, stowed and tied down. Passengers should be briefed on the use of seat belts and shoulder harnesses, oxygen, and ventilation controls, advised when smoking is prohibited, and cautioned against handling or interfering with controls, equipment, door handles, etc. A weather briefing for the intended flight path should be obtained, and any other factors relating to a safe flight should be checked before takeoff.

4.11 PREFLIGHT CHECK

CAUTION

The flap position should be noted before boarding the airplane. The flaps must be placed in the "UP" position before they will lock and support weight on the step.

Upon entering the cockpit, check that the landing gear selector is in the DOWN position, turn OFF all avionics equipment (to save power and prevent wear on the units), and turn the master switch ON. Check the landing gear indicator lights to insure that the three green lights have illuminated and the red light has not illuminated. Check the fuel supply. Adequate fuel should be indicated for the flight plus reserve. The cowl flaps should be OPEN to facilitate inspection and ensure cooling after engine start. Return the master switch to OFF to save the battery.

Check that the ignition switches are OFF and move the mixture controls to idle cut-off to prevent an inadvertent start while checking the propellers. Move the trim controls to neutral so that the tabs can be checked for alignment. Extend and retract the flaps to check for proper operation. This check is performed prior to engine start so that you can hear any noise which might indicate binding. The controls should be free and move properly. Drain the pitot and static system lines through the drains located on the side panel next to the pilot's seat. Fasten the seat belts on the empty seats. Before leaving the cockpit, drain the two crossfeed drains on the forward side of the spar box.

The first item to check during the walk-around is to insure that the crossfeed drains are closed. Check the right wing, aileron and flap hinges and surfaces for damage and ice. Make a close check of the right landing gear for leaks, proper piston exposure under a static load (3-1/2 inches) and that the tires are properly inflated and not excessively worn. The right wing tip and leading edge should be free from ice and damage.

Open the fuel cap to check the quantity and color of the fuel and cap vent. The vent should be free of obstructions. Secure the fuel cap properly. Proceeding around to the engine nacelle, check the oil quantity (six to eight quarts). Make sure that the dipstick has properly seated after checking. Check and insure that the oil filler cap is securely tightened and secure the inspection door. Check the right propeller for nicks or leaks. The spinner should be secure and undamaged (check closely for cracks). The cowl flaps should be open and secure.

The right fuel drains should be opened to drain moisture and sediment. Drain the two fuel tank drains under the wing and the gascolator drain near the bottom of the engine nacelle (refer to Section 8 for more detailed draining procedure).

Check the nose section for damage and the nose landing gear for leaks and proper strut inflation. Under a normal static load, 2-1/2 inches of strut should be exposed. Check the tire for wear and proper inflation. If the tow bar was used, remove and stow. Before moving on to the forward baggage compartment, check the condition of the landing light. Open the forward baggage compartment and check to make sure that the baggage has been stowed properly. Close, secure and lock the baggage door. The key can be removed from the forward baggage compartment door in the locked position only.

At the front of the airplane, the windshield should be clean, secure and free from cracks or distortion. Moving around to the left wing, check the wing, engine nacelle and landing gear as described for the right side. Don't forget to check the fuel and oil.

If a pitot cover was installed, it should be removed before flight and the holes checked for obstructions. With the heated pitot switch on, check the heated pitot head and heated lift detector for proper heating. Check the stall warning vanes for freedom of movement and damage.

CAUTION

Care should be taken when an operational check of the heated pitot head and the heated lift detectors is being performed. Both units become very hot. Ground operation should be limited to 3 minutes maximum to avoid damaging the heating elements.

Latch the rear door securely and check the left static vent and dorsal fin air scoop for obstructions. The empennage should be free of ice and damage and all hinges should be secure. Check the stabilator for freedom of movement and ensure that the right static vent is unobstructed. Antennas should be secure and undamaged. After turning on the master switch and light switches in the cockpit, check the navigation and landing lights.

4.13 BEFORE STARTING ENGINES

Before starting the engines, adjust the seats and fasten the seat belts and shoulder harnesses. Set the parking brake and check to make sure all the circuit breakers are in and the radios are OFF. Cowl flaps should be OPEN and alternate air OFF. The alternators should now be switched ON.

NOTE

If the fixed shoulder harness (non-inertia reel type) is installed, it must be connected to the seat belt and adjusted to allow proper accessibility to all controls including fuel selector, flaps, trim, etc. while maintaining adequate restraint for the occupant.

If the inertia reel type shoulder harness is installed, a pull test of its locking restraint feature should be performed.

4.15 STARTING ENGINES (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

The first step in starting is to move the fuel selector to the ON position. Advance the mixture control to full RICH, open the throttle half travel and move the propeller control full FORWARD. Turn the master switch and ignition switches ON. After ensuring that the propellers are clear, engage the starter. The primer button should be used (ON) as required. For cold weather starts, refer to paragraph 4.19 - Starting Engines in Cold Weather. When the engine starts, retard the throttle and monitor the oil pressure gauge. If no oil pressure is indicated within 30 seconds, shut down the engine and have it checked. In cold weather it may take somewhat longer for an oil pressure indication. Repeat the above procedure for the opposite engine. After the engines have started, check the alternators for sufficient output and the gyro pressure gauge for a reading between 4.5 and 5.2 in. Hg.

NOTE

To prevent starter damage, limit starter cranking to 30-second periods. If the engine does not start within that time, allow a cooling period of several minutes before engaging starter again. Do not engage the starter immediately after releasing it. This practice may damage the starter mechanism.

4.16 STARTING ENGINES (AIRPLANE EQUIPPED WITH OPTIONAL ENGINE PRIMER SYSTEM)

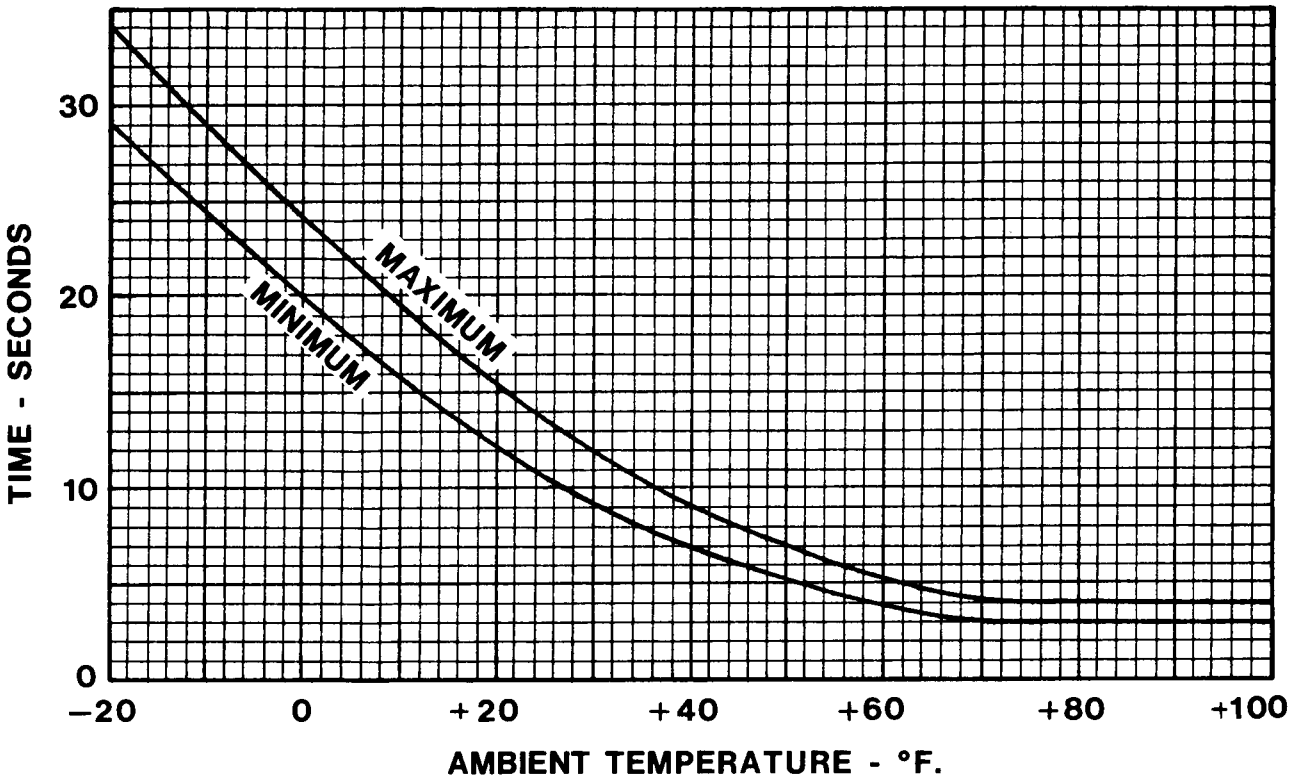
NOTE

Engine starts can be accomplished down to ambient temperatures of +20°F with engines equipped with standard (massive electrode) spark plugs. Below that temperature fine wire spark plugs are highly recommended to ensure engine starts, and are a necessity at +10°F and below. In addition, the use of external electrical power source is also recommended when ambient temperatures are below +20°F.

Upon entering the cockpit, begin starting procedure by moving the fuel selector to ON. Advance the mixture to full RICH and the throttle and prop controls to full FORWARD. Turn the master switch and the ignition switch (mag.) ON. The auxiliary fuel pump should be OFF. Push primer switch and hold for the required priming time (see Figure 4-3). Close throttle and immediately engage starter. With ambient temperatures above +20°F, starts may be made by discontinuing priming before engaging starter. With ambient temperatures below +20°F. starts should be made by continuing to prime during cranking period. Do not release starter until engine accelerates through 500 RPM, then SLOWLY advance throttle to obtain 1000 RPM. Release primer and immediately place auxiliary fuel pump switch to LO. Auxiliary fuel pump operation will be required for one to three minutes initial engine warm-up. When starting at ambient temperatures of +20°F and below, operate the first engine started with alternator ON (at maximum charging rate not to exceed 1500 RPM) for 5 minutes minimum before initiating start on second engine.

NOTE

When cold weather engine starts are made without the use of engine preheating (refer to TCM Operator's Manual), longer than normal elapsed time may be required before an oil pressure indication is observed.



OPTIONAL ENGINE PRIMER SYSTEM - PRIMING TIME VS. AMBIENT TEMPERATURE

Figure 4-3

4.17 STARTING ENGINES WHEN FLOODED

If an engine is flooded, move the mixture control to idle cut-off and advance the throttle and propeller controls full forward. Turn ON the master switch and ignition switches. The auxiliary fuel pump should be OFF. After ensuring that the propeller is clear, engage the starter. When the engine fires, retard the throttle and advance the mixture slowly.

4.19 STARTING ENGINES IN COLD WEATHER (AIRPLANE EQUIPPED WITH STANDARD ENGINE PRIMER SYSTEM)

NOTE

As cold weather engine operations are decidedly more demanding, it may become necessary to utilize the starting procedure listed below in low ambient temperatures. (See Continental Engine Operator's Manual for Cold Weather Operating Recommendations.)

NOTE

It may be necessary to apply an external power source to facilitate engine cranking if the aircraft's battery is deficient of charge.

Prior to attempting the start, turn the propellers through by hand three times after insuring that the magneto switches are off and mixture controls are in the full aft position. Upon entering the cockpit, begin the starting procedure by moving the fuel selector to ON. Advance the mixture to full RICH and the throttle and prop controls to full FORWARD. Turn ON the master switch and the ignition switches (mags). The auxiliary fuel pump should be ON in the LOW boost position. Push the primer button and engage the starter simultaneously. Begin moving the throttle control back and forth from full forward to full aft. Release the primer button after about 3 seconds of cranking. Leave the primer button off for 3 seconds of cranking and then reapply primer for about 3 seconds, repeat until the engine begins to fire.

When the engine begins firing, leave the starter engaged and tap the primer periodically until a rhythmic firing pattern is observed and then release the starter switch and position the throttle at half travel. Tap the primer button if the engine begins to falter during this period and adjust the throttle to a 1000 RPM idle speed.

The auxiliary fuel pump may be turned OFF as soon as it is determined that the engine will continue to run without it.

4.21 STARTING ENGINES WITH EXTERNAL POWER

An optional feature called the Piper External Power (PEP) allows the operator to use an external battery to crank the engines without having to gain access to the airplane's battery.

Turn the master switch OFF and turn all electrical equipment OFF. Connect the RED lead of the PEP kit jumper cable to the POSITIVE (+) terminal of an external 12-volt battery and the BLACK lead to the NEGATIVE (-) terminal. Insert the plug of the jumper cable into the socket located on the fuselage. Note that when the plug is inserted, the electrical system is ON. Proceed with the normal starting technique.

After the engines have started, reduce power to the lowest possible RPM, to reduce sparking, and disconnect the jumper cable from the aircraft. Turn the master switch ON and check the alternator ammeter for an indication of output. DO NOT ATTEMPT FLIGHT IF THERE IS NO INDICATION OF ALTERNATOR OUTPUT.

NOTE

For all normal operations using the PEP jumper cables, the master switch should be OFF, but it is possible to use the ships battery in parallel by turning the master switch ON. This will give longer cranking capabilities, but will not increase the amperage. CAUTION: Care should be exercised because if the ships battery has been depleted, the external power supply can be reduced to the level of the ships battery. This can be tested by turning the master switch ON momentarily while the starter is engaged. If cranking speed increases, the ships battery is at a higher level than the external power supply. If the battery has been depleted by excessive cranking, it must be recharged before the second engine is started. All the alternator current will go to the low battery until it receives sufficient charge, and it may not start the other engine immediately.

4.23 TAXIING

Remove chocks from the wheels and check to make sure the taxi area is clear. Always apply the throttles slowly.

Before taxiing, the brakes should be checked by moving forward a few feet, throttling back and applying pressure on the toe pedals. As much as possible, turns during taxiing should be made using rudder pedal motion and differential power (more power on the engine on the outside of the turn, less on the inside engine) rather than brakes.

During the taxi, check the instruments (turn indicator, directional gyro, coordination ball, compass) and the heater and defroster. Check the operation of the fuel management controls by moving each fuel selector to CROSSFEED for a short time, while the other selector is in the ON position. Return the selectors to the ON position. DO NOT attempt a takeoff with the fuel selector on CROSSFEED. The autopilot (if installed) should be off during taxi.

4.25 BEFORE TAKEOFF - GROUND CHECK

A thorough check should be made before takeoff, using a check list. Before advancing the throttle to check the magnetos and the propeller action, be sure that the engine oil temperature is 75°F or above.

During engine run-up, head the airplane into the wind if possible (see crosswind limits for propellers) and set the parking brake. Advance the mixture and propeller controls forward and the throttle controls to 1000 RPM. Drain the manifold pressure lines by depressing the drain valves located behind and below the dual manifold pressure gauge for 5 seconds. Do not depress the valves when the manifold pressure exceeds 25 inches Hg. Check the feather position of the propellers by bringing the controls fully aft and then full forward. Do not allow more than a 300 RPM drop during the feathering check. Move the throttles to 1900 RPM and exercise the propeller controls to check the function of the governor. Retard control until a 200 to 300 drop in RPM is indicated. This should be done three times on the first flight of the day The governor can be checked by retarding the propeller control until a drop of 100 RPM to 200 RPM appears, then advancing the throttle to get a slight increase in manifold pressure. The propeller speed should stay the same when the throttle is advanced, thus indicating proper function of the governor.

Return the propeller controls to full forward and move the alternate air controls to ON then OFF. Check the magnetos. The normal drop on each magneto is 100 RPM and the maximum drop should not exceed 150 RPM. The maximum differential drop should not exceed 50 RPM. The alternator output should be approximately equal for both alternators. A 4.5 to 5.2 in. Hg. indication on the gyro pressure gauge signifies proper operation of the gyro pressure system.

CAUTION

Insure that the alternators are not indicating full charge prior to takeoff.

Set the throttles between 800 and 1000 RPM, check that the fuel selectors and alternator switches are ON and that all the engine gauges are within their normal operating ranges (green arc). Press-to-test the annunciator light to make sure they all illuminate. Set the altimeter, attitude indicator and directional gyro. Wind and set the clock. Set the mixtures and advance the propeller controls in the forward position. The friction lock on the right side of the control quadrant should be adjusted. Check to make sure the alternate air is OFF. Adjust the cowl flaps and set the wing flaps and trim (stabilator and rudder) tabs as required. The seat backs should be erect and seat belts and harnesses fastened. Fasten the seat belts on the empty seats.

NOTE

If the fixed shoulder harness (non-inertia reel type) is installed, it must be connected to the seat belt and adjusted to allow proper accessibility to all controls including fuel selector, flaps, trim, etc. while maintaining adequate restraint for the occupant.

If the inertia reel type shoulder harness is installed, a pull test of its locking restraint feature should be performed.

All controls should be free with full travel, and all doors should be securely latched. Ensure that the auxiliary fuel pumps are OFF. Pitot heat should be used as required.

4.27 TAKEOFF

The normally recommended procedure for sea level takeoff is to advance throttle until a manifold pressure of 39 in. Hg. is indicated at 2575 RPM. During pretakeoff check at a high elevation, lean the mixture to obtain maximum power. Apply 40 in. Hg. manifold pressure; then lean the mixture until the fuel flow pointer stabilizes at a fuel consumption mark consistent with the altitude as shown on the green takeoff range on the gauge. Leave the mixture in this position for takeoff. Do not overheat the engine when operating with mixture leaned. If overheating occurs, enrich the mixture enough that temperature returns to normal.

NOTE

The “overboost” indicator lights on the annunciator panel will illuminate at approximately 39.8 in. Hg. manifold pressure. Do not exceed 40 in. Hg. manifold pressure.

Illumination of the yellow overboost light on the annunciator panel does not indicate a malfunction. The overboost lights illuminate when manifold pressure approaches the maximum limit. The overboost lights should be monitored during takeoff to insure that an overboost condition does not persist.

Takeoff should not be attempted with ice or frost on the wings. Takeoff distances and 50-foot obstacle clearance distances are shown on charts in the Performance Section of this Handbook. The performance shown on charts will be reduced by uphill gradient, tailwind component, or soft, wet, rough or grassy surface, or poor pilot technique.

Avoid fast turns onto the runway, followed by immediate takeoff, especially with a low fuel supply. Fast taxi turns immediately prior to takeoff run can cause temporary malfunction of one engine on takeoff. As power is applied at the start of the takeoff roll, look at the engine instruments to see that the engines are operating properly and putting out normal power, and at the airspeed indicator to see that it is functioning. Apply throttle smoothly until 40 in. Hg. manifold pressure is obtained. DO NOT APPLY ADDITIONAL THROTTLES.

NOTE

At altitudes below 12,000 feet, normal takeoffs are made with less than full throttle - use throttle only as required to obtain 40 in. Hg. manifold pressure. DO NOT EXCEED 40 IN. HG. MANIFOLD PRESSURE.

The flap setting for normal takeoff is 0°. In certain short field takeoff efforts when the shortest possible ground roll and the greatest clearance distance over a 50 ft. obstacle is desired, a flap setting of 25° is recommended.

When obstacle clearance is no problem, a normal flaps up (0°) takeoff may be used. Accelerate to 66-71 KIAS and ease back on the wheel enough to let the airplane lift off. After lift-off, accelerate to the best rate of climb speed, 89 KIAS, or higher if desired, retracting the landing gear when a gear-down landing is no longer possible on the runway.

When a short field effort is required but the situation presents a wide margin on obstacle clearance, the safest short field technique to use is with the flaps up (0°). In the event of an engine failure, the airplane is in the best flight configuration to sustain altitude immediately after the gear is raised. Set the stabilator trim indicator in the takeoff range. Set the brakes and bring the engines to full power before release. Accelerate to 66 KIAS and rotate the airplane firmly so that the airspeed is approximately 71 KIAS when passing through the 50-foot height. The airplane should then be allowed to accelerate to the best angle of climb speed (76 KIAS at sea level) if obstacle clearance is necessary, or best rate of climb speed (89 KIAS) if obstacles are not a problem. The landing gear should be retracted when a gear-down landing is no longer possible on the runway. The distances for this takeoff procedure are given on a chart in the Performance Section of this Handbook.

When the shortest possible ground roll and the greatest clearance distance over a 50-foot obstacle is desired, use a 25-degree flap setting (second notch). Set the stabilator trim indicator slightly nose up from the takeoff range. Set the brakes and bring the engines to full power before release. Accelerate to 61 KIAS and rotate firmly so that when passing through the 50-foot height the airspeed is approximately 69 KIAS. Retract the gear when a gear down landing is no longer possible on the runway.

It should be noted that the airplane is momentarily below Vmc when using the above procedure. IN THE EVENT THAT AN ENGINE FAILURE SHOULD OCCUR WHILE THE AIRPLANE IS BELOW Vmc, IT IS MANDATORY THAT THE THROTTLE ON THE OPERATING ENGINE BE RETARDED AND THE NOSE LOWERED IMMEDIATELY TO MAINTAIN CONTROL OF THE AIRPLANE. It should also be noted that when a 25-degree flap setting is used on the takeoff roll, an effort to hold the airplane on the runway too long may result in a “wheelbarrowing” tendency. This should be avoided.

The distances required using this takeoff procedure are given on a chart in the Performance Section of this Handbook.

4.29 CLIMB

On climb-out after takeoff, it is recommended that the best angle of climb speed (76 KIAS) be maintained only if obstacle clearance is a consideration. The best rate of climb speed (89 KIAS) should be maintained with full power on the engines until adequate terrain clearance is obtained. At this point, engine power should be reduced to 31.5 inches manifold pressure and 2450 RPM (approximately 75% power) for cruise climb. A cruise climb speed of 102 KIAS or higher is also recommended. This combination of reduced power and increased climb speed provides better engine cooling, less engine wear, reduced fuel consumption, lower cabin noise level, and better forward visibility.

When reducing engine power the throttles should be retarded first, followed by the propeller controls. The mixture controls should remain at full rich during the climb. Cowl flaps should be adjusted to maintain cylinder head and oil temperatures within the normal ranges specified for the engine. During climbs under hot weather conditions, it may be necessary to use LO auxiliary fuel pump for vapor suppression.

Consistent operational use of cruise climb power settings is strongly recommended since this practice will make a substantial contribution to fuel economy and increased engine life, and will reduce the incidence of premature engine overhauls.