

# SECTION IV. NORMAL PROCEDURES

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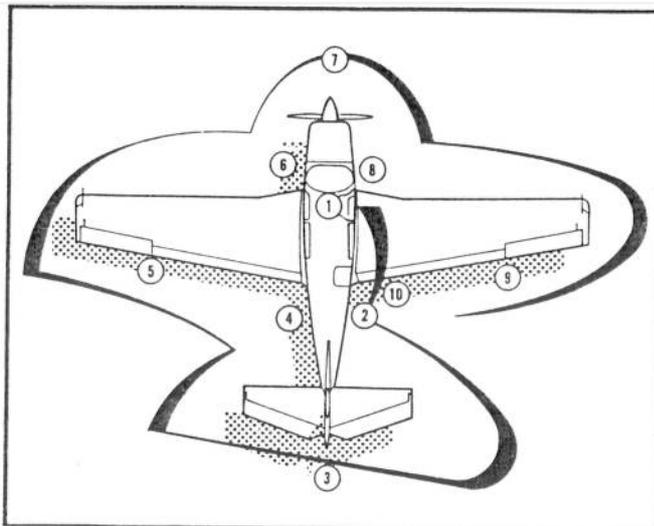


FIGURE 4-1. PREFLIGHT WALK AROUND DIAGRAM

### PREFLIGHT INSPECTION

1. Magneto/Starter Switch--OFF.  
Gear Switch--DOWN.  
Master Switch--ON to check outside lights,  
fuel gages, then OFF.  
Fuel Selector Drain --Selector handle on R; pull  
gascolator ring and hold for five seconds.  
Repeat procedure with selector handle on L.
2. Instrument Static Port--UNOBSTRUCTED.  
Fuselage, Right Side - Check Skin Condition.  
Tail Tiedown--REMOVE.
3. Empennage--CHECK: Elevator & Rudder Attach  
points and control linkage. General skin con-  
ditions. Remove all ice, snow, or frost.
4. Dorsal Fin - Check Fresh Air Vent Clear.  
Fuselage, Left Side - Check Skin Condition.  
Instrument Static Port--UNOBSTRUCTED.  
Tail Cone Access Door--SECURE.  
Static System Drain--CHECK.

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5. **Wing Skins--CHECK.**  
Flap and Attach Points--CHECK.  
Aileron and Attach Points--CHECK.  
Wing Tip and Lights--CHECK.  
Remove all ice, snow, or frost.
6. **Left Wing Leading Edge--CHECK.**  
Pitot Tube--UNOBSTRUCTED, Heat Element Operative.  
Stall Switch Vane--UNOBSTRUCTED.  
Fuel Tank--CHECK QUANTITY, Secure Cap.

**NOTE**

A reduced fuel indicator is located in the filler neck. This indicator is used to indicate useable fuel capacity of 25 U.S. gallons (94.7 liters) (20.8 IMP. Gal.).

**NOTE**

The visual fuel quantity gauge is to be used for partial refueling only; Do not use for preflight check.

- Chock and Tiedown--REMOVE.**  
**Left Main Gear, Shock Discs and Tire--CHECK.**  
**Fuel Tank Sump Drain--SAMPLE.**  
Pitot System Drain--Push Plunger UP.  
**Tank Vent--UNOBSTRUCTED.**  
Gascolator Drain Valve--CLOSED-Check for drips.  
**Windshield--CLEAN.**  
**Left Side Engine Cowl Fasteners--SECURE.**
7. **Propeller--CHECK** for nicks, cracks and oil leaks.  
Forward Engine Components--CHECK starter, alternator belt, etc.  
Ram Air Door--CHECK, off and secure.  
Landing Light--CHECK.  
Nose Gear--CHECK tire; check for towing damage.  
Nose Gear Door & Cowl Flaps--CHECK for loose linkage.  
Shock Discs--CHECK.  
Chocks--REMOVE.
  8. **Right Side Engine Cowl Fasteners--SECURE.**  
Engine Oil Level--CHECK (Full for extended flight, Minimum Quantity 6 Qts.).  
Exhaust Pipe--SECURE.

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Windshield--CLEAN.  
Fuel Tank Sump Drain--SAMPLE.  
Tank Vent--UNOBSTRUCTED.  
Chock and Tiedown--REMOVE.  
Right Main Gear, Shock Discs and Tire--CHECK.  
Right Wing Leading Edge--CHECK.  
Fuel Tank--CHECK QUANTITY.

**NOTE**

A reduced fuel indicator is located in the filler neck. This indicator is used to indicate useable fuel capacity of 25 U.S. gallons, (94.7 liters)(20.8 Imp. Gal.).

**NOTE**

The visual fuel quantity gauge is to be used for partial refueling only; Do not use for preflight check.

9. Wing Skins - CHECK.  
Wing Tip and Lights - CHECK.  
Aileron and Attach Points - CHECK.  
Flap and Attach Points - CHECK.  
Remove all ice, snow, or frost.
10. Baggage Door - SECURE & LOCK before flight.

**BEFORE STARTING CHECK**

1. Preflight Inspection - COMPLETE.
2. Emergency Locator Transmitter - ARM.
3. Seats, Seat Belts and Shoulder Harness - ADJUST AND SECURE.
4. Fuel Selector Handle - SET for fuller tank.
5. Parking Brake Control - DEPRESS BRAKE PEDALS AND PULL ON.
6. Magneto/Starter Switch and Master Switches-OFF.
7. Radio Master Switch - OFF.
8. Cowl Flaps - OPEN (Control Full Aft).
9. Ram Air Control - OFF.
10. Landing Gear Switch - DOWN.
11. Mixture Control - IDLE CUTOFF.
12. Propeller - FORWARD HIGH RPM.
13. Throttle - CLOSE (Full Aft).
14. Electric Fuel Boost Pump - OFF.
15. Internal/External Lights - OFF.

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16. Cabin Heat - OFF.
17. Main Circuit Breaker Panel - CHECK.
18. Alternate Static Source - PUSH OFF.
19. Passengers - Emergency and General Information Briefing.
20. Pitot Heat - OFF.
21. Flap Switch - CENTERED.
22. Defrost - PUSH OFF.
23. Cabin Vent - AS DESIRED.
24. Compass Slave - IN (If installed).
25. Radios - SET FREQUENCIES, (Non-Digital Radios).
26. Refer to Section IX for Optional Equipment Checks.
27. Obtain local information prior to engine start.

**STARTING ENGINE**

**NOTE**

When starting engine using an approved external power source (Aux. Power Cable Adapter is available from Mooney Aircraft Corporation) no special starting procedure is necessary. Use normal starting procedures below.

1. Propeller Control - FORWARD-HIGH RPM.
2. Throttle Control - FORWARD 1/4.
3. Master Switch - ON.
4. Mixture Control - FULL FORWARD (RICH).
5. Electric Fuel Boost Pump Switch - ON TO ESTABLISH PRESSURE, THEN OFF.
6. Mixture Control - FULL AFT (IDLE CUTOFF).
7. Propeller Area - CLEAR.
8. Magneto/Starter Switch - TURN AND PUSH TO START, RELEASE TO BOTH WHEN ENGINE STARTS.
9. Mixture - MOVE SLOWLY AND SMOOTHLY TO RICH.
10. Oil Pressure Gage - If minimum oil pressure not indicated within 30 seconds, STOP ENGINE, and determine trouble.

**NOTE**

Cranking should be limited to 30 seconds, and several minutes allowed between cranking periods to permit the starter to cool.

11. Throttle - Set for 1000 to 1200 RPM.
12. Ammeter - Check (Turn on landing light and observe negative movement of needle.)

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### FLOODED ENGINE CLEARING

1. Throttle--FULL OPEN (FULL FORWARD).
2. Mixture Control--IDLE CUTOFF (FULL AFT).
3. Electric Fuel Boost Pump--OFF.
4. Magneto/Starter Switch--turn to "START" and PUSH forward, release to both when engine starts.
5. Throttle--RETARD to 1200 RPM.
6. Mixture Control--OPEN slowly to FULL RICH (FULL FORWARD).
7. Oil Pressure Gage--If minimum oil pressure not indicated within 30 seconds, STOP ENGINE, and determine trouble.

### WARM ENGINE STARTING

1. Fuel boost pump - OFF.
2. Throttle - Slightly open.
3. Mixture - Full aft (idle cut off)
4. Magneto Starter Switch - Turn and push to start, release to both when engine starts.
5. Mixture - Move slowly to Rich.
6. Throttle - Set for 1000 to 1200 RPM.
7. Engine Oil Pressure - If minimum oil pressure not indicated within 30 seconds, stop engine and determine problem.

### BEFORE TAXIING

1. Radio Master Switch - On.
2. External Lights - As desired.
3. Directional Gyro - Set.
4. Instruments - Normal Operation.
5. Radios - Check - Set Frequencies.
6. Altimeter - Set.
7. Fuel Selector - Switch tanks, verify engine runs on other tank.

**TAXIING**

**NOTE**

It may be necessary to increase RPM slightly to prevent flashing of the LOW voltage light.

1. Parking brake - Release.
2. Brakes - Check.
3. Directional Gyro - Proper indication during turns.
4. Turn Coordinator - Proper indication during turns.
5. Artificial Horizon - Erect during turns.
6. Taxi to position with minimum power as quickly as possible.

**BEFORE TAKEOFF**

**NOTE**

Excessive time spent conducting a thorough pre-takeoff check list will effect fuel economy.

1. Parking Brake - SET.
2. Fuel Selector - FULLER TANK.
3. Controls - CHECK FREE AND CORRECT MOVEMENT.
4. Instruments and Radios - CHECK AND SET AS DESIRED. (Refer to Section IX).
5. Ram Air - PUSH CLOSED.
6. Internal/External Lights - AS DESIRED.
7. Strobe Lights and Rotating Beacon - ON (If Installed)
8. Annunciator Lights - CHECK PRESS-TO-TEST.
9. Cowl Flaps - PULL OPEN.
10. Trim - TAKEOFF SETTING. If forward CG set trim to upper portion of band and to lower portion when at aft CG.
11. Mixture - FULL FORWARD.
12. Throttle - 1900-2000 RPM.
13. Magnetos - CHECK. Make magneto check at 1900-2000 RPM, as follows:

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- a. Magneto/Starter Switch - BOTH to R. Note RPM.
- b. Magneto/Starter Switch - BOTH. Allow time for plugs to clear.
- c. Magneto/Starter Switch - BOTH to L. Note RPM.
- d. Magneto/Starter Switch - BOTH.

The RPM drop should not exceed 175 RPM on either magneto or indicate greater than a 50 RPM differential between magnetos.

**NOTE**

An absence of RPM drop may be an indication of faulty magneto grounding or improper timing. If there is doubt concerning ignition system operation, RPM checks at a leaner mixture setting or higher engine speed will usually confirm whether a deficiency exists.

14. Propeller Control - CYCLE/RETURN TO HIGH RPM (full forward).
15. Throttle - RETARD TO IDLE RPM.
16. Cabin Door - SECURE.
17. Seat Belts and Shoulder Harness - SECURE.
18. Wing Flaps - TAKEOFF (15<sup>0</sup>)
19. Pilots Window - CLOSED.
20. Emergency Gear Extension Red Handle - DOWN AND LATCHED.
21. Parking Brake - Release.

## TAKEOFF

### NOTE

Move the controls slowly and smoothly. In particular, avoid rapid opening and closing of the throttle as the engine is equipped with a counterweighted crankshaft and there is a possibility of detuning the counterweights with subsequent engine damage.

Proper full throttle engine operation should be checked early in the takeoff roll. Any significant indication of rough or sluggish engine response is reason to discontinue the takeoff.

When takeoff must be made over a gravel surface, it is important that the throttle be applied slowly. This will allow the aircraft to start rolling before a high RPM is developed, and gravel or loose material will be blown back from the prop area instead of being pulled into it.

### TAKEOFF (Normal)

1. Electric Fuel Boost Pump - ON at start of takeoff roll.
2. Power - FULL THROTTLE and 2700 RPM.
3. Aircraft Attitude - LIFT NOSE WHEEL AT 63 KIAS.
4. Climb Speed - 71 KIAS.
5. Landing Gear - RETRACT IN CLIMB BEFORE ATTAINING AN AIRSPEED OF 106 KIAS.
6. Wing Flaps - RETRACT IN CLIMB.
7. Electric Fuel Boost Pump - OFF, CHECK PRESSURE.

### NOTE

See Section V, page 5-14, for takeoff distances and aircraft weight vs speed table.

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TAKEOFF (Maximum Performance)

1. Electric Fuel Boost Pump - ON at start of takeoff roll.
2. Power - FULL THROTTLE AND 2700 RPM.
3. Aircraft attitude - LIFT NOSE WHEEL AT 62 KIAS.
4. Climb Speed - 66 KIAS until clear of obstacle, then accelerate to 91 to 100 KIAS.
5. Landing Gear - RETRACT IN CLIMB AFTER CLEARING OBSTACLE.
6. Wing Flaps - RETRACT AFTER CLEARING OBSTACLE.
7. Electric Fuel Boost Pump - OFF, CHECK PRESSURE.

**NOTE**

See Section V, page 5-15, for takeoff distances and aircraft weight vs speed table.

**CLIMB**

**NOTE**

Use noise abatement procedures as published by airport and/or this manual.

CLIMB (Normal)

1. Throttle - 26" HG MANIFOLD PRESSURE.
2. Propeller - 2600 RPM.
3. Mixture - FULL RICH (Lean for smooth operation at high elevations).
4. Cowl Flaps - PULL OPEN.
5. Airspeed 91 - 100 KTS.
6. Ram Air - ON AFTER ENTERING CLEAR AIR.
7. Maintain these power settings and attitude to at least 3000 ft. AGL. or cruise altitude.

CLIMB (Best Angle)

1. Power - FULL THROTTLE AND 2700 RPM.
2. Mixture - FULL RICH (Lean for smooth operation at high elevations).
3. Cowl Flaps - PULL OPEN.
4. Airspeed - 69 KIAS AT SEA LEVEL INCREASING APPROX. 1 KIAS FOR EACH 500 FT.
5. Ram Air - ON AFTER ENTERING CLEAN AIR.

CLIMB (Best Rate)

1. Power - FULL THROTTLE & 2700 RPM.
2. Mixture - FULL RICH (Lean for smooth operation at high elevations).
3. Cowl Flaps - FULL OPEN.
4. Airspeed - 88 KIAS AT SEA LEVEL. DECREASING TO 82 KIAS AT 10,000 FT.
5. Ram Air - ON AFTER ENTERING CLEAR AIR.

Manifold pressure will drop with increasing altitude at any throttle setting. Power can be restored by gradually opening the throttle.

To increase performance at full throttle pull the Ram Air Control aft (Ram Air ON position) allowing induction air to bypass the air filter and increase manifold pressure.



Turn ram air off if encountering icing conditions. Do not fly aircraft into known icing conditions. Using unfiltered induction air when flying in snow or other IFR conditions can be hazardous. Snow can accumulate in the fuel injector impact tubes, or moisture can freeze in the inlet passages under icing conditions to cause loss of power. If snow or icing conditions were encountered DO NOT TURN RAM AIR ON AGAIN when entering clear air until assured that all ice has melted from the aircraft. Do not use ram air in visibly dusty air.

After establishing climb power and trimming the aircraft for climb, check to insure that all controls, switches, and instruments are set and functioning properly.

## CRUISE

Upon reaching cruise altitude, accelerate to cruise airspeed, trim the aircraft for level flight, reduce manifold pressure and RPM to desired cruise power, and close the cowl flaps. The cowl flaps may be partially opened (control pulled aft approximately three inches) if necessary, to maintain the oil and cylinder head temperatures within the normal operating range.

When cruising at 75 percent power or less, lean the mixture after cruise power is established in accordance with one of the following methods:

- A. Leaning using exhaust gas temperature gage (EGT) (if installed)
1. Lean the mixture until temperature peaks on the EGT indicator.  
ECONOMY CRUISE - Enrich mixture (push mixture control forward) until the EGT indicator drops 25°F or more below peak.  
BEST POWER MIXTURE - Enrich mixture until EGT indicator drops 100°F below peak.

### NOTE

Compared to Economy Cruise  
Best power mixture will result in  
an increase in fuel flow and a re-  
duction in range.

2. Changes in altitude and power settings require the peak EGT to be rechecked and the mixture re-set.
- B. Leaning without exhaust gas temperature gage (EGT)
1. Slowly move mixture control lever aft from "Full Rich" position toward lean position.
  2. Continue leaning until slight loss of power is noted (loss of power may or may not be accompanied by roughness).
  3. Enrich until engine runs smoothly and power is regained.

When increasing power always return mixture to full rich, then increase RPM before increasing manifold pressure.

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when decreasing power decrease manifold pressure before reducing RPM. Always stay within the established operating limits, and always operate the controls slowly and smoothly.

**DESCENT**

1. Mixture - RICH/OR LEAN FOR SMOOTH OPERATION.
2. Power - AS REQUIRED to keep CHT in Green Arc (300°F minimum).

**CAUTION**

Avoid continuous operation between 1500 and 1950 RPM with power settings below 15" Hg. manifold pressure.

**NOTE**

Exercise caution with power settings below 15" Hg manifold pressure at air-speeds between 70 - 113 KIAS to preclude continuous operation in the 1500 - 1950 RPM restricted range.

**CAUTION**

Avoid long high speed descents at low manifold pressure as the engine can cool excessively.

3. Cowl Flaps - CLOSED (control full forward).
4. Ram Air - OFF before entering dusty air layers.

**NOTE**

Plan descents to arrive at pattern altitude on downwind leg for maximum fuel efficiency and minimum aircraft noise.

**BEFORE LANDING**

1. Seats, Seat Belts and Shoulder Harnesses - ADJUST AND SECURE.
2. Internal/External Lights - AS DESIRED.
3. Landing Gear - EXTEND BELOW 133 KIAS.
4. Mixture Control - FULL RICH.
5. Fuel Selector - RIGHT OR LEFT (Fullest tank).
6. Propeller Control - HIGH RPM.
7. Wing Flaps - FULL DOWN (33°) BELOW 115 KIAS.

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8. Trim - ADJUST, as necessary.
9. Electric Fuel Boost Pump - ON.
10. Ram Air - OFF: WARNING LIGHT OFF.
11. Check Gear Down - GEAR DOWN LIGHT ON - MARKS ALIGNED IN VISUAL INDICATOR IN FLOOR.
12. Parking Brake - OFF.

**GO AROUND (BALKED LANDING )**

1. Power - FULL THROTTLE AND 2700 RPM.
2. AIRSPEED - 65 KIAS.
3. Flaps - AFTER CLIMB ESTABLISHED RE-TRACT TO 0 DEGREES WHILE ACCELERATING TO 73 KIAS.
4. Gear - RETRACT AFTER CLIMB IS ESTABLISHED.
5. Cowl Flaps - FULL OPEN.

**LANDING**

1. Airspeed on Final-71 KIAS WITH FULL FLAPS.
2. Touchdown - MAIN WHEELS FIRST.
3. Landing Roll - LOWER NOSE WHEEL GENTLY.
4. Brakes - MINIMUM REQUIRED.
5. Wing Flaps - RETRACT AFTER CLEARING RUNWAY.
6. Cowl Flaps - OPEN (After Touchdown)
7. Electric Fuel Boost Pump - OFF AFTER LANDING.
8. Trim - TAKEOFF POSITION.

**TAXI**

1. Throttle--1000 to 1200 RPM.
2. Lighting--As required.

## SHUTDOWN

1. Throttle--IDLE at 1000 to 1200 RPM until cylinder head temperature starts to drop.
2. Cowl Flaps--OPEN.
3. Radio Master Switch--OFF.
4. Electrical Equipment Switches--OFF.
5. Mixture Control--IDLE CUTOFF.
6. Throttle--RETARD as engine stops firing.
7. Magneto/Starter Switch--OFF when propeller stops.
8. Parking Brake--Set (for short-term parking).
9. Trim--TAKEOFF POSITION - CHECK.
10. Flaps--RETRACTED.
11. Master Switch--OFF.
12. Control Wheel--LOCK with seat belt.
13. Oxygen System (If equipped) - OFF.

## SECURING THE AIRCRAFT

1. Parking Brake - SET.
2. Radio Master and Electrical Equipment - OFF.
3. Magneto/Starter Switch - OFF/Key Removed.
4. Master Switch - OFF.
5. Mixture Control - IDLE CUTOFF.
6. Parking Brake - RELEASE AND INSTALL WHEEL CHOCKS.
7. For Extended Parking or in Gusty Wind Conditions - SECURE PILOTS CONTROL WHEEL WITH SEAT BELT, TIE DOWN AIRCRAFT AT WING AND TAIL POINTS.

