NORMAL PROCEDURES

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INTRODUCTION

Pilot's Operating Manual (POM) Section 7, Operating Instructions, provides checklist and amplified procedures for the conduct of normal operation.

SPEEDS FOR NORMAL OPERATION

All airspeeds quoted in the POM are calibrated unless otherwise noted. Calibrated airspeed is indicated airspeed corrected for instrument and errors. The table on POM page 7-8 gives the correlation between indicated airspeed and calibrated airspeed if zero instrument error is assumed. This calibration is valid only when flown at maximum gross in level flight. Indicated airspeeds (IAS) in this checklist are derived from the table on POM page 7-8 and are approximate.

Takeoff:
- *Normal Climb Out ..... 97 MPH IAS*
- *Short Field Takeoff, Flaps 25°, Speed at 50 Feet .... 91 MPH IAS*

Enroute Climb, Flaps and Gear Up:
- *Normal ..... 110 MPH IAS*
- *Best Rate-of-Climb, Sea Level Gear DOWN ..... 91 MPH IAS*
- *Best Rate-of-Climb, Sea Level Gear UP ..... 97 MPH IAS*
- *Best Angle-of-Climb, Sea Level, Gear DOWN ..... 80 MPH IAS*
- *Best Angle-of-Climb, Sea Level, Gear UP ..... 92 MPH IAS*

Landing Approach:
- *Normal Approach, Flaps Up ..... 110 MPH IAS*
- *Normal Approach, Flaps 40° ..... 90 MPH IAS*
- *Short Field Approach, Flaps 40° ..... 90 MPH IAS*

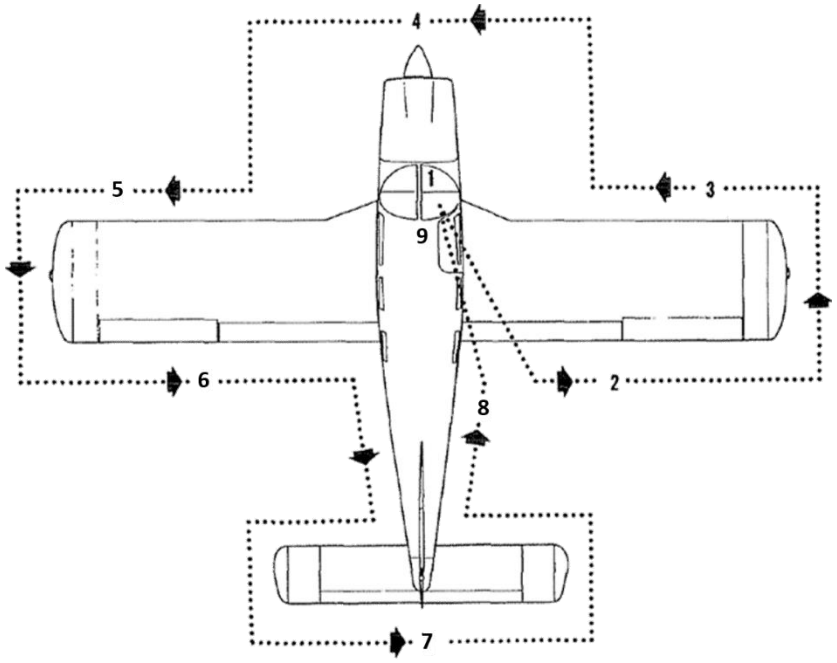
Balked Landing:
- *Maximum Power, Flaps 25°, gear down ..... 91 MPH IAS*

Maximum Recommended Turbulent Air Penetration Speed:
- *2650 lbs ..... 132 MPH IAS*
- *2300 lbs ..... 123 MPH IAS*
- *2000 lbs ..... 114 MPH IAS*

Maximum Demonstrated Crosswind Component . 20 MPH (17 KNOTS)

NOTE

Italic text in this checklist indicates a modification to the checklist in the Owner's Manual.



NOTE

Visually check airplane for general condition during walk- around inspection. Airplane should be parked in a normal ground attitude to ensure that fuel drain valves allow for accurate sampling. In cold weather, remove even small accumulations of frost, ice or snow from wing, tail and control surfaces. Also, make sure that control surfaces contain no internal accumulations of ice or debris. Prior to flight, check that pitot heater is warm to touch within 30 seconds with battery and pitot heat switches on. If a night flight is planned, check operation of all lights, and make sure a flashlight is available.

Preflight Inspection

PREFLIGHT

The airplane should be given a thorough visual inspection prior to each flight. Particular attention should be given to the following items:

(1) *COCKPIT*

1. *Windshield -- CLEAN as required.*
2. *Pitot/Static Tube Cover -- REMOVE. Check for stoppage.*
3. *Nose Plugs -- REMOVE. CHECK for air intake blockage.*
4. *Cowl Scoop Plug -- REMOVE. CHECK for air intake blockage.*
5. *Documents/Hobbs/Tach -- CHECK.*
6. *Pilot's Operating Manual and Flyaway Notebook -- AVAILABLE IN THE AIRPLANE.*
7. Landing Gear *Selector* -- DOWN.
8. Control Wheel Lock -- REMOVE.
9. Ignition Switch -- OFF. Place keys on glare shield.
10. *Avionics Master Switches -- OFF (both OFF).*
11. *Master Switch -- ON.*

WARNING

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

12. *Fuel Quantity Indicators -- CHECK QUANTITY.*
13. *Landing Gear Position Indicator Lights – THREE GREEN.*
14. *Flashing Beacon and Strobes -- CHECK*
15. *Interior Lights, Navigation Lights, and Landing Light -- CHECK for night operations*
16. *Flaps -- EXTEND.*
17. *Pitot Heat -- ON if freezing temperatures and visible moisture possible. (Carefully check that pitot tube is warm to touch within 30 seconds.)*
18. *Pitot Heat -- OFF.*
19. *Master Switch -- OFF.*
20. *Fuel Selector Valve -- SET. Check movement RIGHT, LEFT, OFF. Then set to RIGHT or LEFT.*
21. *Static Pressure Alternate Source Valve -- OFF.*
22. *Elevator and Rudder Trim -- SET for takeoff.*

(2) *RIGHT WING Trailing Edge*

1. *Flap -- CHECK for security and condition.*
2. Aileron -- CHECK freedom of movement and security.
3. Wing and Control Surfaces -- CLEAR of ice and snow.

(3) *RIGHT WING*

1. *Wing Tie-Down -- DISCONNECT.*
2. Fuel Quantity -- CHECK VISUALLY for desired level.
3. Fuel Filler Cap -- SECURE.
4. *Before first flight of the day and after each refueling, use sampler cup and drain fuel from fuel tank sump drain valve to check for water, sediment, and proper fuel grade. Check strainer drain closed. If water is observed, the fuel system may contain additional water. Take repeated samples from all fuel drain points until all contamination has been removed. If contaminants are still present, refer to WARNING and do not fly the airplane.*

   WARNING

   If, after repeated sampling, evidence of contamination still exists, the airplane should not be flown. Tanks should be drained and system purged by qualified maintenance personnel. All evidence of contamination must be removed before further flight.

5. Fuel System Vent Opening -- CHECK *for stoppage*.
6. *Landing Gear Wheel Well -- CLEAR of obstructions.*
7. Landing Gear Shock Strut -- CHECK for proper inflation (approximately 2 inches showing).
8. Hydraulic Lines and Landing Gear Cylinders -- CHECK for leaks.
9. Tire -- CHECK for cuts, wear, and proper inflation.
10. Brake Blocks and Discs -- CHECK for wear and damage

(4) *NOSE*

1. Engine Oil Level -- CHECK. (Ensure dipstick is properly seated.) *Oil capacity is 8 quarts with a minimum safe quantity of 2 quarts. RAFA Procedure: If below 6 quarts – add 1 quart.*
2. Propeller and Spinner -- CHECK for defects or nicks.
3. *Propeller Hub -- CHECK for oil leaks.*
4. Fuel or oil leaks -- CHECK.
5. Cowling and inspection covers - CHECK FOR SECURITY.
6. Air Inlet -- CHECK for foreign matter.
7. Cowl Scoop -- CLEAR of obstructions.
8. Nose Wheel Tire -- CHECK for *proper* inflation and wear.
9. Nose Gear Shock Strut – CHECK for proper inflation (approximately 2¾ inches showing).
10. *Landing Lights -- CHECK for condition and cleanliness.*
11. *Air Filter -- CHECK for restrictions.*
12. *Before first flight of the day and after each refueling, drain fuel from engine sump drain valve to check for water, sediment, and proper fuel grade. Check strainer drain closed. If water is observed, the fuel system may contain additional water. Take repeated samples from all fuel drain points until all contamination has been removed. If contaminants are still present, refer to WARNING above and do not fly airplane.*

(5) *LEFT WING*

1. *Wing Tie-Down -- DISCONNECT.*
2. Fuel Quantity -- CHECK VISUALLY for desired level.
3. Fuel Filler Cap -- SECURE.
4. *Before first flight of the day and after each refueling, use sampler cup and drain fuel from fuel tank sump drain valve to check for water, sediment, and proper fuel grade. Check strainer drain closed. If water is observed, the fuel system may contain additional water. Take repeated samples from all fuel drain points until all contamination has been removed. If contaminants are still present, refer to WARNING above and do not fly the airplane.*
5. Fuel System Vent Opening -- CHECK for stoppage.
6. *Landing Gear Wheel Well -- CLEAR of obstructions.*
7. Landing Gear Shock Strut -- CHECK for proper inflation (approximately 2 inches showing).
8. Hydraulic Lines and Landing Gear Cylinders -- CHECK for leaks.
9. Tire -- CHECK for cuts, wear, and proper inflation.
10. Brake Blocks and Discs -- CHECK for wear and damage.
11. *Stall Warning Vane -- CHECK for freedom of movement while master switch is momentarily turned ON (horn will sound when vane is momentarily pushed upward).*

(6) *LEFT WING Trailing Edge*

1. Aileron -- CHECK for freedom of movement and security.
2. *Flap -- CHECK for security and condition.*
3. Wing and Control Surfaces – CLEAR of ice and snow.

(7) *EMPENNAGE*

1. *Tail Tie-Down -- DISCONNECT.*
2. *Elevator -- CHECK freedom of movement and security.*
3. *Trim Tab -- CHECK for security.*

CAUTION.

Do not force rudder to move. Moving the rudder may cause damage.

(8) *Baggage Compartment*

1. Tow bar and control locks -- STOW.
2. Baggage -- CHECK for proper storage and security.
3. Baggage Compartment Door -- CLOSE and SECURE.

(9) *COCKPIT*

1. Primary Flight Controls -- CHECK OPERATION.
2. Aircraft Loading -- CHECK properly loaded.
3. Cabin Door -- CLOSE and SECURE.
4. Required Papers -- CHECK in order and in the airplane.
5. *Flaps -- UP.*

STARTING ENGINE

PREPARE FOR STARTING

1. *Surrounding Area -- CHECK for personnel and hazards.*
1. *REMOVE chocks and tow bar.*
2. *Master Switch -- ON.*
3. *Avionics Master Switch – ON. Turn only one Avionics Master Switch ON. Do not turn both Avionics Master Switches ON at same time.*
4. *Radios -- SET (comm and nav).*
5. *Weather -- CHECK (ATIS/ASOS/AWOS).*
6. *Avionics Master Switches -- OFF. Both switches OFF.*
7. *Master Switch -- OFF.*
8. *Passenger Briefing -- COMPLETE.*
9. *Flight Plan -- OPEN.*

BEFORE STARTING ENGINE

1. *Preflight Inspection -- COMPLETE.*
2. *Seats, Seat Belts, Shoulder Harness -- ADJUST and LOCK.*
3. Brakes -- TEST and *SET.*
4. *Circuit Breakers -- CHECK IN.*
5. *Electrical Equipment -- OFF.*
6. *Autopilot -- OFF.*
7. *Avionics Master Switches -- OFF. Both switches OFF.*

CAUTION

The Avionics Master Switches must be OFF during engine start to prevent possible damage to avionics.

8. Fuel Selector Valve -- SET to desired tank.
9. *Landing Gear Selector -- DOWN.*
10. Propeller Control - FULL INCREASE RPM (control forward).

STARTING ENGINE WHEN COLD

1. Throttle -- OPEN ½ INCH.
2. Master Switch -- ON.
3. *Flashing Beacon -- ON.*
4. *Navigation Lights -- ON for night operations.*
5. Electric Fuel Pump Switch -- ON.

NOTE

If engine is HOT, skip step 6. DO NOT prime.

6. Mixture -- SET to FULL RICH (full forward) until an indication on the fuel flow meter is noted. (Engine is primed.)
7. Mixture -- SET to IDLE CUTOFF *(full aft) position*.
8. *Electric Fuel Pump Switch -- OFF.*
9. *Propeller Area -- SHOUT "CLEAR PROP" & check propeller area.*
10. Ignition Switch -- ENGAGE THE STARTER by rotating magneto switch clockwise and pressing IN (*release when engine starts*).
11. Mixture -- ADVANCE *smoothly* to FULL RICH when engine fires and move to the desired setting.
12. If the engine does not fire within five to ten seconds, disengage starter and reprime.
13. Throttle -- 1200 RPM.
14. Oil Pressure -- CHECK.
15. Navigation Lights -- ON as required.
16. *Avionics Master Switch – ON.*
    Turn only one Avionics Master Switch ON.
    Do not turn both Avionics Master Switches ON at same time.
17. *Transponder -- SQUAWK 1200 ALT or ATC assigned code.*

STARTING ENGINE WHEN FLOODED

1. Throttle – FULL OPEN.
2. Master Switch -- ON.
3. *Flashing Beacon -- ON.*
4. *Navigation Lights -- ON for night operations.*
5. Mixture -- SET to IDLE CUTOFF *(full aft) position*.
6. *Electric Fuel Pump Switch -- OFF.*
7. *Propeller Area -- SHOUT "CLEAR PROP" and check propeller area.*
8. Ignition Switch -- Engage the starter by rotating magneto switch clockwise and pressing in (*release when engine starts*).
9. Mixture -- ADVANCE *smoothly* to FULL RICH when engine fires and move to the desired setting.
10. Throttle -- 1200 RPM.
11. Oil Pressure -- CHECK.
12. Navigation Lights -- ON as required.
13. *Avionics Master Switch – ON.*
    Turn only one Avionics Master Switch ON.
    Do not turn both Avionics Master Switches ON at same time.
14. *Transponder -- SQUAWK 1200 ALT or ATC assigned code.*

STARTING WITH EXTERNAL POWER

1. MASTER SWITCH -- OFF.
2. Connect RED lead of PEP kit jumper cable to POSITIVE (+) terminal of external 12-volt battery and BLACK lead to NEGATIVE (-) terminal.
3. Insert plug of jumper cable into socket located on aircraft fuselage.
4. MASTER SWITCH -- ON. Proceed with NORMAL engine starting technique.
5. After engine has been started, turn MASTER SWITCH to OFF and remove jumper cable plug from aircraft.
6. Turn aircraft MASTER SWITCH to ON and check alternator ammeter for indication of output. DO NOT ATTEMPT FLIGHT IF THERE IS NO INDICATION OF ALTERNATOR OUTPUT.

TAXI *– Review checklist before movement, do not read while taxiing.*

1. *Throttle -- Maintain 1000 to 1200 RPM for ground operations.*
2. *Mixture -- LEAN for Taxi.*
3. *Radio -- REQUEST TAXI CLEARANCE or announce intentions.*
4. *Brakes -- CHECK during initial movement.*
5. *Nose Wheel Steering – CHECK.*
6. *Ailerons -- POSITION for crosswind taxi.*
7. *Flight Instruments -- CHECK for proper movement during taxi.*

BEFORE TAKEOFF

1. *Parking Brake -- SET.*
2. *Seats, Seat Belts, Shoulder Harnesses -- CHECK SECURE.*
3. *Cabin Door and Pilot Storm Window -- CLOSED and LOCKED.*
4. *Flight Controls -- FREE and CORRECT.*
5. *Flight Instruments -- SET.*
6. *Fuel Quantity -- CHECK.*
7. *Mixture – FULL RICH.*
8. *Electric Fuel Pump -- ON (check for rise in fuel pressure).*
9. *Fuel Selector Valve – SWITCH TANKS. SET on desired tank.*
10. *Throttle -- 2000 RPM.*
    a. *Magnetos -- CHECK (RPM drop should not exceed 175 RPM on either magneto or 50 RPM differential between magnetos).*
    b. *Propeller -- CYCLE high-to-low-to-high RPM. (< 300 RPM drop.)*
       Cycle three times if engine was cold at starting.
       Cycle one time if engine was hot at starting.
       Return to high RMP (full forward).

       NOTE

       If propeller fails to cycle, increase throttle to 2200 RPM and repeat step b above.

    c. *Engine Instruments -- CHECK.*
    d. *Ammeter -- CHECK (turn landing light on and observe rise).*
    e. *Vacuum Gage -- CHECK (5" Hg ± 0.1").*
    f. *Alternate Air -- CYCLE (Should be no RPM change).*
    g. *Electric Fuel Pump -- OFF momentarily, check pressure -- ON.*
11. *Throttle -- 1200 RPM.*
12. *Throttle Friction Lock -- ADJUST.*
13. *Radios and Avionics -- SET (Program GPS if needed).*
14. *Autopilot -- OFF.*
15. *Flashing Beacon, Navigation Lights and Strobe Lights -- ON as required.*
16. *Elevator and Rudder Trim -- TAKE-OFF.*
17. *Wing Flaps – EXERCISE and SET for takeoff.*
18. *Radio -- REQUEST TAKEOFF CLEARANCE or announce intentions.*
19. *Parking Brake -- RELEASE.*

TAKEOFF

NORMAL TAKE-OFF

1. *Wing Flaps -- UP.*
2. *Power -- FULL THROTTLE (full forward).*
3. *Propeller – FULL INCREASE (full forward).*
4. *Mixture -- RICH (above 5000 feet, LEAN to obtain maximum RPM).*
5. *Elevator Control -- LIFT NOSE WHEEL (at 60 to 70 MPH IAS).*
6. *Climb Speed -- 91 MPH IAS gear DOWN.*
   97 MPH IAS gear UP.
7. *Brakes -- Apply momentarily when airborne.*
8. *Landing Gear -- RETRACT in climb out.*

SHORT FIELD TAKEOFF

1. Wing Flaps -- 25° (second notch).
2. Brakes -- APPLY.
3. *Power -- FULL THROTTLE (full forward)*
4. *Propeller – FULL INCREASE (full forward).*
5. *Mixture -- FULL RICH (unless engine is rough).*
6. Brakes -- RELEASE.
7. Raise Nose Wheel – 60 to 65 MPH IAS.
8. Climb Speed -- 80 MPH IAS until all obstacles are cleared.
9. *Brakes -- Apply momentarily when airborne.*
10. Landing Gear – RETRACT after obstacles are cleared.
11. Wing Flaps -- RETRACT slowly (after reaching 97 MPH IAS *and clear all obstacles).*

SOFT FIELD TAKEOFF

1. *Wing Flaps -- 25°.*
2. *Elevator -- FULL AFT*
3. *Power -- FULL THROTTLE (slowly).*
4. *Propeller – FULL INCREASE (full forward).*
5. *Mixture -- FULL RICH (unless engine is rough).*
6. *Roll -- Maintain nose-high attitude with minimum weight on nose wheel.*
7. *Elevator Control -- LIFT AIRCRAFT off ground as soon as practical.*
   LEVEL AIRCRAFT just above runway surface.
   ACCELERATE to appropriate airspeed for climb.
8. *Brakes -- Apply momentarily when climbing.*
9. Landing Gear -- RETRACT *in climb-out*.
10. Wing Flaps -- RETRACT slowly after reaching 97 MPH IAS *and 50 feet).*

ENROUTE CLIMB

NORMAL CLIMB

1. Airspeed -- 110 MPH IAS.
2. Power -- 25 INCHES Hg.
3. Propeller -- 2500 RPM.
4. Fuel Selector Valve -- AS DESIRED.
5. Mixture -- FULL RICH (mixture may be leaned above 5000 feet).

MAXIMUM PERFORMANCE CLIMB

1. Airspeed -- 97 MPH IAS.
2. Power -- 25 INCHES Hg.
3. Propeller -- 2500 RPM.
4. Fuel Selector Valve -- AS DESIRED
5. Mixture -- FULL RICH (mixture may be leaned above 5000 feet).

CRUISE

1. Power -- 18-25 INCHES Hg.
2. Propeller -- 2350-2500 RPM (no more than 75% power).

CAUTION

Avoid continuous operation below 15 inches HG between 1900 RPM and 2350 RPM.

CAUTION

To INCREASE power, first increase RPM (propeller control); then increase manifold pressure (throttle control). To DECREASE power, fist decrease manifold pressure (throttle); then decrease RPM (propeller control). *POWER in inches Hg must not exceed PROPELLER RPM in hundreds. Do not operate over-square.*

3. Elevator and Rudder Trim -- ADJUST.
4. Mixture -- LEAN.

DESCENT

(1) Power -- AS DESIRED.
(2) Mixture -- ENRICHEN as required.
(3) *Fuel Selector Valve – AS DESIRED.*

NOTE

The landing gear may be extended below 153 MPH IAS to increase the rate of descent.

BEFORE LANDING

(1) Seat backs -- ERECT.
(2) Seats, *Seat* Belts, Shoulder Harnesses -- ADJUST and LOCK.
(3) Autopilot -- OFF.
(4) ***G –*** Fuel Selector Valve – AS DESIRED.
(5) ***U –*** Landing Gear – DOWN (below 153 MPH IAS).
(6) Landing Gear – CHECK (green indicator lights illuminated).
(7) ***M –*** Mixture -- RICH.
(8) ***P –*** Propeller -- HIGH RPM (full forward).

LANDING

NORMAL LANDING

(1) Airspeed -- 110 MPH IAS (flaps UP).
(2) Wing Flaps -- AS DESIRED (below 125 MPH IAS)
(3) Airspeed -- 90 MPH IAS (flaps DOWN).
(4) Trim -- ADJUST.
(5) Touchdown -- MAIN WHEELS FIRST.
(6) Landing Roll -- LOWER NOSE WHEEL GENTLY.
(7) Braking -- MINIMUM REQUIRED.

SHORT FIELD LANDING

(1) Airspeed -- 110 MPH IAS (flaps UP) – *Normal*.
(2) Wing Flaps -- 40° (below 125 MPH IAS).
(3) Airspeed -- MAINTAIN 90 MPH IAS.
(4) Trim -- ADJUST.
(5) Power -- REDUCE to idle as obstacle is cleared.
(6) Touchdown -- MAIN WHEELS FIRST.
(7) Brakes -- APPLY HEAVILY – *DO NOT LOCK THE BRAKES*.
(8) Wing Flaps – RETRACT for maximum braking effectiveness.
(9) *Elevator -- FULL NOSE UP.*

SOFT FIELD LANDING

(1) *Airspeed* -- 110 MPH IAS *(flaps UP). – Normal.*
(2) *Wing Flaps -- FULL DOWN (40°).*
(3) *Airspeed -- 90 MPH IAS (Flaps DOWN).*
(4) *Power -- 1200-1300 RPM at touchdown.*
(5) *Touchdown -- SOFTLY ON MAIN WHEELS FIRST.*
(6) *Power – IDLE.*
(7) *Rollout -- Maintain nose-high attitude with minimum weight on nose wheel.*
(8) *Brakes -- NONE unless absolutely necessary.*

BALKED LANDING

(1) Power -- FULL THROTTLE (full forward)
(2) Propeller – FULL INCREASE (full forward).
(3) Mixture -- FULL RICH (unless engine is rough).
(4) Wing Flaps -- RETRACT TO 25°.
(5) Climb Speed -- 80 MPH IAS.
(6) Landing Gear – RETRACT after obstacles are cleared.
(7) Wing Flaps -- RETRACT slowly (after reaching 97 MPH IAS and clear all obstacles).

AFTER LANDING

(1) Wing Flaps -- UP.
(2) *Strobe Lights -- OFF.*

SECURING AIRPLANE

(1) Parking Brake -- SET *as required*.
(2) *Transponder -- 1200.*
(3) *Electrical Equipment -- OFF except Flashing Beacon and Navigation Lights at night.*
(4) *Auto Pilot -- OFF.*
(5) *Avionics Master Switch -- OFF.*
(6) *Throttle – IDLE 1200 - 1500 RPM.*
(7) Mixture -- IDLE CUT-OFF (pulled full out).
(8) Ignition Switch -- OFF. *Place keys on glare shield*.
(9) Master Switch -- OFF.
(10) *Electrical Switches -- ALL OFF.*
(11) Fuel Selector Valve – RIGHT or LEFT.
(12) *Flight Plan -- CLOSE.*
(13) Control Lock -- INSTALL.

SERVICING AIRPLANE

(1) *Nose Gear -- CHOCK.*
(2) *Grounding Wire -- CONNECT.*
(3) *Ladder – POSITION.*
(4) *Pump -- TURN ON and ZERO COUNTER.*
(5) *Refuel -- TO TABS.*
(6) *Counter -- NOTE fuel quantity for log.*
(7) *Pump -- REPLACE HOSE and TURN-OFF PUMP.*
(8) *Grounding Wire – DISCONNECT.*
(9) *Chocks -- REMOVE.*
(10) *Tow Bar -- ATTACH.*
(11) *Airplane -- MOVE to parking spot.*

PARKING AIRPLANE

(1) *Wings and Tail -- TIE DOWN.*
(2) *Nose Gear -- CHOCK.*
(3) *Control Lock – Verify INSTALLED.*
(4) *Pitot Tube Cover, Nose Plugs, and Sun Screen -- INSTALL.*
(5) *Hobbs, Tach, Fuel, and Oil -- RECORD.*
(6) *Cabin -- CLEAN.*
(7) *Flight Plan -- Verify CLOSED.*
(8) *Doors -- LOCK.*

EMERGENCY PROCEDURES

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INTRODUCTION

Pilot's Operating Manual (POM) Section 4, Emergency Procedures, provides checklist and amplified procedures for coping with emergencies that may occur. Emergencies caused by airplane or engine malfunctions are extremely rare if proper preflight inspections and maintenance are practiced. Enroute weather emergencies can be minimized or eliminated by careful flight planning and good judgment when unexpected weather is encountered. However, should an emergency arise, the basic guidelines described below should be considered and applied as necessary to correct the problem.

AIRSPEEDS FOR EMERGENCY OPERATION

Engine Failure After Takeoff:	
Wing Flaps Up	*102 MPH IAS*
Wing Flaps Down	*90 MPH IAS*
Maneuvering Speed:	
2650 lbs	*132 MPH IAS*
2300 lbs	*123 MPH IAS*
2000 lbs	*114 MPH IAS*
Maximum Glide (flaps up, gear up)	*102 MPH IAS*
Precautionary Landing With Engine Power	*90 MPH IAS*
Landing Without Engine Power:	
Wing Flaps Up	*102 MPH IAS*
Wing Flaps Up	*90 MPH IAS*

OPERATIONAL CHECKLISTS

ENGINE FAILURES

ENGINE POWER LOSS DURING TAKEOFF

1. If sufficient runway remains for a normal landing, leave the gear down and land.
2. If area ahead is rough, or if it is necessary to clear obstructions, put gear selector switch in “UP” position.
3. If you have gained sufficient altitude to attempt a restart, proceed as follows:
   a. Airspeed -- MAINTAIN SAFE AIRSPEED.
   b. Fuel Selector -- SWITCH TO ANOTHER TANK CONTAINING FUEL.
   c. Electric Fuel Pump -- CHECK ON.
   d. Mixture -- CHECK RICH.
   e. Alternate AIR -- ON.
   f. Emergency Gear Lever -- AS REQUIRED.

NOTE

If engine failure was caused by fuel exhaustion, power will not be regained after tanks are switched until empty fuel lines are filled, which may require up to ten seconds.

If power is not regained, proceed with the POWER OFF LANDING procedure.

ENGINE POWER LOSS IN-FLIGHT

1. Airspeed - MAINTAIN 110 MPH IAS, gear and flaps UP
2. Fuel Selector Switch -- CHANGE to the other tank containing fuel.
3. Electric Fuel Pump -- ON.
4. Mixture -- RICH.
5. Alternate Air -- ON
6. Engine Gauges -- CHECK for indication of the cause of power loss.
7. *Fuel Pressure -- CHECK*. If no fuel pressure is indicated, check tank selector position to be sure it is on a tank containing fuel.

When power is restored:

8. Alternate Air -- OFF.
9. Electric Fuel Pump -- OFF.

If power is not restored, prepare for an emergency landing.
If time permits:

1. Ignition Switch -- "L," then "R" then back to "BOTH."
2. Throttle and Mixture -- Different settings. (This may restore power if problem is too rich or to lean a mixture, or partial fuel system restriction).
3. Fuel Selector Switch -- TRY THE OTHER FUEL TANK. (Water in the fuel could take some time to be used up, and allowing the engine to windmill may restore power. If power loss is due to water, fuel pressure indications will be normal).

NOTE

If engine failure was caused by fuel exhaustion, power will not be restored after tanks are switched until empty fuel lines are filled, which may require up to ten seconds.

If power is not restored, proceed with POWER OFF LANDING procedures.

FORCED LANDINGS

POWER OFF LANDING

1. *Passenger Seat Backs -- MOST UPRIGHT POSITION.*
2. *Seats, Seat Belts, Shoulder Harnesses -- SECURE.*
3. Airspeed -- 102 MPH IAS (flaps UP).
   90 MPH IAS (flaps DOWN).
4. Mixture -- IDLE CUT OFF.
5. Fuel Selector Valve -- OFF.
6. Ignition Switch -- OFF.
7. Landing Gear -- DOWN (UP if terrain is rough or soft).
8. Propeller Control -- FULL DECREASE (full aft).
9. Wing Flaps -- AS REQUIRED (40° recommended).
10. Door -- UNLATCH PRIOR TO TOUCHDOWN.
11. Master Switch -- OFF when landing is assured.
12. Touchdown -- SLIGHTLY TAIL LOW.
13. Brakes -- APPLY HEAVILY.

GEAR DOWN LANDING

1. *Passenger Seat Backs -- MOST UPRIGHT POSITION.*
2. *Seats, Seat Belts, Shoulder Harnesses -- SECURE.*
3. *Airspeed -- 102 MPH IAS (flaps UP).*
   90 MPH IAS (flaps DOWN).
4. *Landing Gear -- DOWN (UP if terrain is rough or soft).*
5. *Propeller Control -- FULL DECREASE (full aft).*
6. Throttle -- CLOSED (full aft).
7. *Electrical Switches -- OFF.*
8. Avionics Master Switch -- OFF.
9. Master Switch -- OFF.
10. Ignition Switch -- OFF.
11. Wing Flaps -- AS DESIRED.
12. Fuel Selector Valve -- OFF.
13. Mixture -- IDLE CUT OFF.
14. *Door -- UNLATCH PRIOR TO TOUCHDOWN.*
15. Touchdown -- LOWEST POSSIBLE SPEED.

NOTE

With the master switch off, landing gear cannot be retracted.

PROPELLER OVERSPEED

1. Throttle -- RETARD.
2. Oil Pressure -- CHECK.
3. Propeller Control -- FULL DECREASE RPM, THEN SET IF ANY CONTROL AVAILABLE.
4. Airspeed -- REDUCE.
5. Throttle -- AS REQUIRED TO REMAIN BELOW 2700 RPM.

LANDING GEAR MALFUNCTION PROCEDURES

LANDING GEAR FAILS TO RETRACT

1. *Master Switch -- ON.*
2. *Landing Gear Pump Circuit Breaker -- IN.*
3. *Landing Gear Selector -- CHECK (lever full up).*
4. *Landing Gear Position Lights -- CHECK.*
5. *Landing Gear Selector -- RECYCLE.*

LANDING GEAR FAILS TO EXTEND

1. *Landing Gear Selector -- DOWN.*
2. Master Switch -- CHECK ON.
3. Landing Gear Pump Circuit Breaker -- IN.
4. Panel Lights -- OFF (in daytime).
5. Gear Indicator Bulbs -- CHECK.

If landing gear does not check down and locked:

6. Airspeed -- BELOW *97* MPH IAS.
7. Landing Gear Selector -- GEAR DOWN position.
8. Emergency Gear Lever – MOVE and HOLD in “EMERGENCY DOWN” position.
9. *Landing Gear – CHECK DOWN (three green indicator lights illuminated).*

If landing gear still failed lock down:

10. Rudder – YAW the airplane side-to-side abruptly.

If nose gear will not lock down using the above procedure:

11. Slow the airplane to the lowest safe speed attainable using the lowest power setting required for safe operation and accomplish the following:
12. Landing Gear Selector – DOWN position.

If landing gear does not check down, recycle gear through UP position, and repeat step 11.

GEAR UP LANDING

1. *Landing Gear Selector -- UP.*
2. *Runway -- SELECT longest hard surface or smooth sod runway available.*
3. *Wing* Flaps -- AS DESIRED.
4. Airspeed -- 90 MPH IAS.
5. *Door -- UNLATCH PRIOR TO TOUCHDOWN.*
6. Throttle -- CLOSED
7. *Avionics Master Switch -- OFF.*
8. Master Switch -- OFF when landing is assured.
9. *Touchdown* -- MINIUM POSSIBLE SPEED.
10. *Mixture -- IDLE CUT-OFF.*
11. Ignition Switch -- OFF.
12. Fuel Selector Valve -- OFF.
13. *Airplane -- EVACUATE.*

NOTE

With the master switch OFF, the landing gear cannot be retracted.

LANDING WITHOUT POSITIVE INDICATION OF GEAR LOCKING

1. *Before Landing Check -- COMPLETE.*
2. *Approach – NORMAL (full flaps).*
3. *Landing Gear Pump Circuit Breaker -- IN.*
4. *Landing -- TAIL LOW as smooth as possible.*
5. *Braking -- MINIMUM necessary.*
6. *Taxi -- SLOWLY.*
7. *Engine -- SHUTDOWN before inspecting gear.*

LANDING WITH A DEFECTIVE NOSE GEAR (Or Flat Nose Tire)

1. Movable Load -- TRANSFER to baggage area.
2. Passenger -- MOVE to rear seat.
3. Before Landing Checklist -- COMPLETE.
4. Runway -- HARD SURFACE or SMOOTH SOD.
5. Flaps -- 40°.
6. Cabin Door -- UNLATCH PRIOR TO TOUCHDOWN.
7. Avionics Master Switch -- OFF.
8. Master Switch -- OFF when landing is assured.
9. Land -- SLIGHTLY TAIL LOW.
10. Mixture -- IDLE CUT-OFF.
11. Ignition Switch -- OFF.
12. Fuel Selector Valve -- OFF.
13. Elevator Control -- HOLD NOSE OFF GROUND as long as possible.
14. Airplane – EVACUATE as soon as it stops.

LANDING WITH A FLAT MAIN TIRE

1. Approach – NORMAL (full flaps).
2. Touchdown -- GOOD MAIN TIRE FIRST, hold airplane off flat tire as long as possible with aileron control.
3. Directional Control -- MAINTAIN using brake on good wheel as required.

SPINS

1. Throttle – IDLE.
2. Rudder - FULL OPPOSITE DIRECTION OF ROTATION.
3. Control Wheel - FLL FORWARD.
4. Rudder - NEUTRAL (WHEN ROTATION STOPS).
5. Control Wheel - AS REQUIRED TO SMOOTHLY REGAIN LEVEL FLIGHT ATTITUDE.

OPEN DOOR

1. *Airspeed - 97* mph IAS.
2. Cabin Vents - Close.
3. Storm Window - Open.
4. If upper latch is open - LATCH.
5. If lower latch is open - OPEN TOP LATCH, PUSH DOOR FURTHER OPEN, AND THEN CLOSE RAPIDLY. Latch top latch.

NOTE

A slip in the direction of the open door will assist in latching procedure

FIRE

ENGINE FIRE *DURING START* ON GROUND

1. *Cranking -- CONTINUE, to get a start which would suck the flames and accumulated fuel into the engine.*

If engine starts:

2. *Power -- 2000 RPM for a few minutes.*
3. *Engine -- SHUTDOWN and inspect for damage.*

If engine fails to start:

4. Mixture -- IDLE CUT OFF.
5. Throttle -- FULL OPEN.
6. *Cranking -- CONTINUE.*

If the fire continues longer than a few seconds:

7. Fire -- EXTINGUISH by best available external means.
8. *Fire Extinguisher -- OBTAIN (have ground attendants obtain if not installed).*
9. *Engine -- SECURE.*
   a. *Master Switch -- OFF.*
   b. *Ignition Switch -- OFF*
   c. Fuel Selector Valve -- OFF.
   d. Mixture -- IDLE CUT OFF.
10. *Fire Damage -- INSPECT. Repair damage or replace damaged components or wiring before conducting another flight.*

ENGINE FIRE *IN-FLIGHT*

1. Fuel Selector Valve -- OFF.
2. Throttle -- CLOSE.
3. Mixture -- IDLE CUT OFF.
4. Heater -- Off (In all cases of fire).
5. Defroster -- OFF (In all cases of fire).
6. *Airspeed -- 125 MPH IAS (If fire is not extinguished, increase glide speed to find an airspeed - within airspeed limitations - which will provide an incombustible mixture).*
7. *Forced Landing -- EXECUTE (as described in Emergency Landing Without Engine Power).*

ELECTRICAL FIRE IN-FLIGHT

1. Master Switch -- OFF.
2. *Avionics Master Switch -- OFF.*
3. *All Other Switches (except ignition switch) -- OFF.*
4. Vents -- OPEN.
5. Cabin Heat – OFF.
6. *Fire Extinguisher-- ACTIVATE.*

WARNING

After discharging fire extinguisher within a closed cabin, ventilate the cabin.

7. *Vents/Heat -- OPEN when it is ascertained that fire is completely extinguished.*

If fire appears out and electrical power is necessary for continuance of flight to nearest suitable airport or landing area:

8. *Master Switch -- ON.*
9. *Circuit Breakers -- CHECK for faulty circuit, do not reset.*
10. *Radio Switches -- OFF.*
11. *Avionics Master Switch -- ON.*
12. *Essential Radio/Electrical Switches -- ON one at a time, with delay after each until short circuit is localized.*

CABIN FIRE

1. *Master Switch -- OFF.*
2. *Vents/Heat -- CLOSED (to avoid drafts).*
3. *Fire Extinguisher-- ACTIVATE.*

WARNING

After discharging fire extinguisher within a closed cabin, ventilate the cabin.

4. *Vents/Heat -- OPEN when it is ascertained that fire is completely extinguished.*
5. *Land the airplane as soon as possible to inspect for damage.*

WING FIRE

1. *Navigation Light Switch -- OFF.*
2. *Strobe Light Switch -- OFF.*
3. *Pitot Heat Switch -- OFF.*

NOTE

Perform a sideslip to keep the flames away from the fuel tank and cabin. Land as soon as possible using flaps only as required for final approach and touchdown.

LOSS OF OIL PRESSURE

1. Partial Loss of Oil Pressure -- LAND AS SOON AS POSSIBLE.
   a. Shutdown as soon as practical to prevent engine damage.
   b. Investigate the cause.
2. Complete Loss of Oil Pressure -- PROCEED *TO* THE NEAREST *SUITABLE* AIRPORT *AND LAND*.
   a. Engine may stop suddenly.
   b. Be prepared for a forced landing.
   c. Maintain altitude until a dead-stick landing can be accomplished.
   d. Don't change power settings unnecessarily.

NOTE

Depending on the circumstances, it may be advisable to make an off-airport landing while power is still available, particularly if other indications of actual oil pressure loss, such as sudden increase in temperatures, or oil smoke, are apparent, and an airport is not close.

If engine stoppage occurs, proceed to POWER OFF LANDING.

LOSS OF FUEL PRESSURE

1. Electric Boost Pump -- ON.
2. Mixture Control -- FORWARD
3. Fuel Selector -- CHECK ON FULL TANK

NOTE

If problem is not an empty fuel tank, land as soon as practicable and have the fuel system checked.

HIGH OIL TEMPERATURE

1. High Oil Temperature -- LAND AS SOON AS PRACTICABLE.
   a. Investigate the cause.

NOTE

A steady, rapid rise in oil temperature is a sign of trouble. Land at the nearest airport and let a mechanic investigate the problem. Watch the oil pressure gauge for an accompanying loss of pressure.

ALTERNATOR FAILURE

1. *Ammeter Gage – CHECK.*

NOTE

Loss of alternator output is detected through a zero reading on the ammeter. Before executing the following procedure, ensure that the reading is zero and not merely low by actuating an electrically powered device, such as the landing light. If no increase in the ammeter reading is noted, alternator failure can be assumed.

2. *Avionics Master Switch -- OFF.*
3. Electrical Load -- Reduce.
4. Alternator Circuit Breaker -- CHECK *IN*.
5. “ALT” Switch -- OFF for 1 second.
6. “ALT” Switch -- ON.
7. Ammeter Gage – CHECK.
8. Avionics Master Switch -- ON. (If ammeter is normal)

If the ammeter continues to indicate no output or alternator will not stay reset*:*

9. “ALT” Switch -- OFF.
10. Nonessential Radio and Electrical Equipment -- OFF.
11. Flight -- LAND as soon as practical.

NOTE

If the battery is fully discharged, the gear will have to be lowered using the "EMERGENCY LANDING GEAR EXTENSION" procedure. The *landing gear* position lights will not *illuminate with a dead battery*.

PA-28R-200 – N4884T EMERGENCY PROCEDURES

ICING

INADVERTENT ICING ENCOUNTER

1. *Turn pitot heat switch ON.*
2. *Turn back or change altitude to obtain an outside air temperature that is less conducive to icing.*
3. *Push cabin heat control full on.*
4. *Increase engine speed to minimize ice build-up propeller blades.*
5. *Watch for signs of air filter ice. An unexplained loss in manifold pressure could be caused by air intake filter ice. Use Alternate Air if needed.*
6. *Plan a landing at the nearest airport. With an extremely rapid ice buildup, select a suitable "off airport" landing site.*
7. *With an ice accumulation of ¼ inch or more on the wing leading edges, be prepared for significantly higher stall speed and a longer landing roll.*
8. *Leave wing flaps retracted. With a severe ice build-up on the horizontal tail, the change in wing wake airflow direction caused by wing flap extension could result in a loss of elevator effectiveness.*
9. *Perform a landing approach using a forward slip, if necessary, for improved visibility.*
10. *Fly approach at higher-than-normal airspeed depending upon the amount of the accumulation.*
11. *Perform a landing in level attitude.*

STATIC SOURCE BLOCKAGE (Erroneous Instrument Reading Suspected)

1. *Alternate Static Source Valve -- TURN ON.*