EMBRY-RIDDLE
AERONAUTICAL UNIVERSITY

PIPER SEMINOLE
PA-44-180

Standard Operating Procedures

SOP

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REVISION HIGHLIGHTS

The following items were changed, modified, added, or deleted in this revision.

Rev #	Date	Page	Description	Initials
01	09-01-07	All	Complete revision.	WSC
02	09-01-08	All	Complete revision.	WSC
03	01-01-09	All	Complete revision.	WSC

LIST OF EFFECTIVE PAGES

This list of effective pages is used to determine the current status of every page in this Training Program. Any page dated "01/01/09" indicates it has not been changed since 01/01/09.

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DISCLAIMER

Embry-Riddle Aeronautical University (ERAU) is not responsible for any errors or omissions of this document. While the PA-44-180, Piper Seminole Standard Operating Procedures (SOP) and associated checklists are ERAU's guidelines for the safe operation of the Piper Seminole aircraft, they are not the sole source of information regarding the operation of this aircraft. The pilot-in-command must refer to the Piper Seminole Pilot Operating Handbook (POH) for further information.

INTRODUCTION

The procedures outlined within the PA-44-180 Standard Operating Procedures (SOP) have been reviewed and accepted by the Embry-Riddle Flight Training Department for use in the Embry-Riddle Aeronautical University (ERAU) Flight Training Program.

The Standard Operating Procedures explain the intended use of Preflight, Normal, Emergency, and Abnormal procedures used in operating the PA-44-180, Piper Seminole aircraft, and provides a detailed explanation of individual checklist items and recommended techniques used to accomplish them.

The PA-44-180, Piper Seminole SOP has been developed utilizing generally accepted industry procedures and several reference texts and manuals. Industry sources include The New Piper Aircraft Company, The National Aeronautics and Space Administration (NASA), the Federal Aviation Administration (FAA), United Airlines, and Northwest Airlines.

Warnings, Cautions, and Notes found throughout the SOP. The following definitions apply:

WARNING	Operating procedures, techniques, etc., that, if not carefully followed, could result in personal injury or loss of life.
CAUTION	Operating procedures, techniques, etc, that, if not carefully followed, could result in damage to equipment.
NOTE	An operating procedure, technique, etc, that is considered essential to emphasize.

ERAU Checklist Policy

A critical element in the development as a professional pilot is in the training in checklist usage and discipline. Pilot deviations from standard operating procedures are the number one crew related cause of hull loss accidents. Many of these accidents and incidents are the direct result of the improper use of or lack of training in checklist usage. Therefore, checklist usage and discipline must be emphasized in our "crew" environment to help ensure safe and efficient flight operations at Embry-Riddle Aeronautical University and in preparing students for careers as professional pilots.

All checklists are accomplished by either a "Do/Verify" or "Challenge/Response" methodology. The "Read/Do" methodology has been eliminated as an acceptable means of conducting the checklist. The principle advantage of the "Do/Verify" philosophy provides for setup redundancy.

Setup redundancy occurs when the aircraft is configured from memory ("Flow") and the checklist is used only to verify that all items have been accomplished properly. Therefore, if an item is missed in a flow check, a second opportunity exists to catch the missed item during the checklist procedure. While the "Do/Verify" method may require additional "dry" time to learn the "flows", when practiced and perfected, the level of a truly professional pilot will be attained.

Consistent with the "Do/Verify" philosophy, the checklist must be used to back up the flow even though a memorized flow check shall be employed. A memory-guided checklist (no verification of the flow with the checklist) is unacceptable and not consistent with safe flight operations. In addition, only a visual verification that a switch or control is in the correct position when accomplishing the checklist is mandatory (not to be verbalized).

The only exception to the "Do/Verify" philosophy occurs when conducting Abnormal Checklist items. These items are not performed as part of a flow but as "Read/Do". The initiation and completion of all checklists shall be announced by the executing crewmember or the challenging crewmember in the case of a "Challenge/Response" checklist (e.g., "Before Start Checklist"....."Before Start Checklist Complete").

ERAU Checklist Policy (continued)

The initial callout allows the crew to concentrate on the checklist being performed, and the completion call is a necessary action to allow the crew to mentally move to other areas of operation with reassurance that the previous checklist is complete.

Use the specific wording of each Challenge and Response for all normal situations. When an item allows a choice of responses, such as Pitot Heat...Off (On), the choices are listed and the appropriate response shall be given. The first response is the most probable control position, while the response in parentheses is the least probable control position. When a checklist response does not allow for the use of a specific switch position, the following terms should be used as a response:

- SET: Indicates that panel switches/knobs must be moved to or in the appropriate position.
- CHECK: Indicates that controls/other systems must be evaluated/tested.
- INSPECT: Indicates that equipment must be visually checked for damage and security.

Any interruption in accomplishing a checklist (other than for “Final Items” or routine communications) requires the checklist to be repeated to ensure prevention of any checklist item from being missed as a result of the interruption.

The “Sterile Cockpit” concept shall be employed on the ground and in critical phases of flight to help ensure that critical checklists are accomplished correctly. Sterile cockpit refers to the elimination of nonessential conversation, excluding conversation necessary for safe flight operations or flight instruction. Finally, clear communications shall be used when changing system configuration or during exchange of the flight controls.

Intra-Cockpit Verbal Coordination

In addition to reading back communications with ATC, “Hear-Backs” shall be employed between the student and the instructor in the airplane. This is to help ensure a common understanding by one flight crewmember that repeats the instructions verbally and obtains agreement on the content and intent from the other flight crewmember in the airplane. When flight crewmembers verbally confirm their understanding of the instructions, any errors or misunderstandings can be discovered and corrected, thus preventing any hazardous situations from developing. This verbal coordination shall be accomplished:

(1) When ATC issues taxi instructions for departure, the flight crew should refer to the airport diagram, coordinate verbally, and agree on the assigned runway and taxi route, including any instructions to hold short of, or cross any intersecting runways.

(2) When ATC issues landing instructions, the flight crew should coordinate verbally and agree on the runway assigned, as well as any restrictions such as hold short points of an intersecting runway after landing.

(3) After landing and exiting the runway, the flight crew should coordinate verbally and agree on the ATC taxi instructions to the aircraft’s parking area, including any instructions to hold short of, or cross any intersecting runways.

(4) At complex intersections, the flight crew should verbally coordinate to ensure that the intersection is correctly identified and that the aircraft is transitioning through the intersection to the correct taxiway.

(5) When approaching an intersecting runway, the flight crew should verbally coordinate in order to identify the runway. They should also verbally review the ATC instructions as to whether they are to hold short of or cross the runway.

(6) Before crossing the hold short line or entering or crossing a runway for takeoff or landing, the flight crew should visually scan to the left and right, including the full length of the runway and its approach paths, and coordinate verbally that the area scanned is or is not clear.

Intra-Cockpit Verbal Coordination (continued)

(7) Before entering a runway for takeoff, the flight crew shall verbally coordinate to ensure correct identification of the runway and receipt of the proper ATC clearance to use. Confirm runway directional alignment with the aircraft's magnetic compass, horizontal situation indicator, and/or flight management system. Similar verification should be performed during approach to landing.

(8) When a flight crewmember needs to stop monitoring any ATC frequency, the crewmember shall inform the other flight crewmember(s) when stopping and resuming the monitoring of an ATC frequency. Any instructions or information received or transmitted during that flight crewmember's absence from the ATC frequency should be briefed and reviewed upon the crewmember's return.

(9) When the pilot not taxiing the aircraft focuses his or her attention on instruments in the cockpit, such as entering the data into the aircraft's Flight Management System or Global Positioning System (GPS), and subsequently is not able to visually monitor the aircraft's progress, he or she should verbally notify the pilot taxiing the aircraft. Likewise, notification should be made when that flight crewmember has completed his or her task and is again able to assist in visually monitoring the taxi operation.

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STANDARD CALLOUTS

STANDARD CALLOUTS - NORMAL

ACTION	CALLOUT
Initiate Ramp Out Checklist	*"Ramp Out Checklist."*
Completed Ramp Out Checklist	*"Ramp Out Checklist Complete."*
Initiate Before Start Checklist	*"Before Start Checklist."*
Completed Before Start Checklist	*"Before Start Checklist Complete."*
Before engaging starter	*"Clear (Left or Right) Prop."*
Initiate After Start Checklist	*"After Start Checklist."*
Completed After Start Checklist	*"After Start Checklist Complete."*
Initiate Before Taxi Checklist	*"Before Taxi Checklist."*
Completed Before Taxi Checklist	*"Before Taxi Checklist Complete."*
Initiate Changing Flap Position (on the ground) Wait for Instructor's Response	*"Flaps Identified."* *"Flaps Verified."*
Before Crossing Intersection/Hold Line Wait for Instructor's Response	*"Cleared to Cross Intersection/Hold Line."* *"Cleared to Cross."*
Visually check flaps are up Wait for Instructor's Response	*"Flaps Up."* *"Flaps Up, Verified."*
Initiate Before Takeoff "Run-Up" Checklist	*"Before Takeoff Run-Up Checklist."*
Completed Before Takeoff "Run-Up" Checklist	*"Before Takeoff Run-Up Checklist Complete."*
Initiate Before Takeoff Checklist	*"Before Takeoff Checklist."*
Completed Before Takeoff Checklist	*"Before Takeoff Checklist Complete."*
Initiate Before Takeoff "Final Items" Checklist	*"Before Takeoff Final Items Checklist."*
Completed Before Takeoff "Final Items" Checklist	*"Before Takeoff Final Items Checklist Complete."*
At Takeoff Engine Instruments Checked Airspeed Indicator Checked	 *"Engine instruments in the green"* *"Airspeed alive."*

STANDARD CALLOUTS – NORMAL (continued)

ACTION	CALLOUT
Attaining Rotation Speed	*"V-R, Rotate."*
Establishing a Positive Climb	*"Positive Climb."*
Retracting the Landing Gear After Landing Gear has retracted	*"Gear Up."* *"Gear Up, No Lights."*
Extending the Landing Gear	*"Gear Down."*
Verify Landing Gear is Down Instructor's Response	*"Three green, No red, One in the mirror. Verify."* *"Gear Down, Verified."*
Changing Assigned Altitudes	*"Leaving ____ for ____."* *(e.g., "Leaving 7000 for 8000" or "Leaving 8000 for 7000")*
Intiate Climb Checklist	*"Climb Checklist."*
Completed Climb Checklist	*"Climb Checklist Complete."*
Initiate Cruise Checklist	*"Cruise Checklist."*
Completed Cruise Checklist	*"Cruise Checklist Complete."*
Initiate Descent Checklist	*"Descent Checklist."*
Completed Descent Checklist	*"Descent Checklist Complete."*
Initiate Descent "Final Items" Checklist	*"Descent Final Items Checklist."*
Completed Descent "Final Items" Checklist	*"Descent Final Items Checklist Complete."*
GUMP Check: Landing Approach - Stabilized Landing Approach - Not Stabilized	 *"200 feet, Stabilized, Continuing."* *"200 feet, Not Stabilized, Going Around."*
Initiate After Landing Checklist	*"After Landing Checklist."*
Completed After Landing Checklist	*"After Landing Checklist Complete."*
Initiate Shutdown Checklist	*"Shutdown Checklist."*
Complete Shutdown Checklist	*"Shutdown Checklist Complete."*

STANDARD CALLOUTS – NORMAL (continued)

ACTION	CALLOUT
Instrument Approach:	
Precision Approach	*"Localizer Alive."* *"Glide Slope Alive."*
Non-Precision Approach	*"CDI Alive."* *"ADF Within 10 Degrees."*
GPS	*"Approach Mode."*
Outer Maker (OM)/ Final Approach Fix (FAF):	
Precision Approach	*"Outer Marker, (GS Crossing Alt.)"* *(e.g., "Outer Marker, 1,496")*
Non-Precision Approach	*"Final Approach Fix."*
1000 Feet Above DA(H)/MDA	*"1000 Feet Above DA(H)/MDA."*
500 Feet Above DA(H)/MDA	*"500 Feet Above DA(H)/MDA."*
100 Feet Above DA(H)/MDA	*"100 Feet Above DA(H)/MDA."*
At MDA	*"Minimum Descent Altitude."*
At DA(H):	
Runway (Visual Reference) In Sight	*"(Visual Reference) in Sight, Continuing."*
Runway In Sight	*"Runway in Sight, Landing."*
Runway Not In Sight	*"Missed Approach."*
NOTE: "(Visual Reference)" applies to all items listed in 14 CFR Part 91.175.	

STANDARD CALLOUTS - EMERGENCY

ACTION	CALLOUT
Initiate Engine Failure During Takeoff Checklist	*"Engine Failure During Takeoff Checklist."*
Completed Engine Failure During Takeoff Checklist	*"Engine Failure During Takeoff Checklist Complete."*
Initiate Engine Failure During Flight Checklist	*"Engine Failure During Flight Checklist."*
Completed Engine Failure During Flight Checklist	*"Engine Failure During Flight Checklist Complete."*
Initiate One Engine Inoperative Landing Checklist	*"One Engine Inoperative Landing Checklist."*
Completed One Engine Inoperative Landing Checklist	*"One Engine Inoperative Landing Checklist Complete."*
Initiate One Engine Inoperative Go-Around Checklist	*"One Engine Inoperative Go-Around Checklist."*
Completed One Engine Inoperative Go-Around Checklist	*"One Engine Inoperative Go-Around Checklist Complete."*
Initiate Engine-Driven Fuel Pump Failure Checklist	*"Engine-Driven Fuel Pump Failure Checklist."*
Completed Engine-Driven Fuel Pump Failure Checklist	*"Engine-Driven Fuel Pump Failure Checklist Complete."*
Initiate Engine Fire During Start Checklist	*"Engine Fire During Start Checklist."*
Completed Engine Fire During Start Checklist	*"Engine Fire During Start Checklist Complete."*
Initiate Engine Fire In Flight Checklist	*"Engine Fire In Flight Checklist."*
Completed Engine Fire In Flight Checklist	*"Engine Fire In Flight Checklist Complete."*
Initiate Electrical Fire In Flight Checklist	*"Electrical Fire in Flight Checklist."*
Completed Electrical Fire in Flight Checklist	*"Electrical Fire in Flight Checklist Complete."*
Initiate Emergency Exit Checklist	*"Emergency Exit Checklist."*
Completed Emergency Exit Checklist	*"Emergency Exit Checklist Complete."*

STANDARD CALLOUTS – EMERGENCY (continued)

ACTION	CALLOUT
Initiate Spin Recovery Checklist	*"Spin Recovery Checklist."*
Completed Spin Recovery Checklist	*"Spin Recovery Checklist Complete."*

STANDARD CALLOUTS - ABNORMAL

ACTION	CALLOUT
Initiate Unfeathering, Accumulator Functioning Checklist	*"Unfeathering, Accumulator Functioning Checklist."*
Completed Unfeathering, Accumulator Functioning Checklist	*"Unfeathering, Accumulator Functioning Checklist Complete."*
Initiate Unfeathering, Starter Assisted Checklist	*"Unfeathering, Starter Assisted Checklist."*
Completed Unfeathering, Starter Assisted Checklist	*"Unfeathering, Starter Assisted Checklist Complete."*
Initiate Propeller Overspeed Checklist	*"Engine Propeller Overspeed."*
Completed Propeller Overspeed Checklist	*"Propeller Overspeed Checklist Complete."*
Initiate Engine Roughness Checklist	*"Engine Roughness Checklist."*
Completed Engine Roughness Checklist	*"Engine Roughness Checklist Complete."*
Initiate Engine Overheat Checklist	*"Engine Overheat Checklist."*
Completed Engine Overheat Checklist	*"Engine Overheat Checklist Complete."*
Initiate Manual Extension of Landing Gear Checklist	*"Manual Extension of Landing Gear Checklist."*
Completed Manual Extension of Landing Gear Checklist	*"Manual Extension of Landing Gear Checklist Complete."*
Initiate Gyro Suction Failure Checklist	*"Gyro Suction Failure Checklist."*
Completed Gyro Suction Failures Checklist	*"Gyro Suction Failure Checklist Complete."*
Initiate Single Alternator Failure Checklist	*"Single Alternator Failure Checklist."*
Completed Single Alternator Failure Checklist	*"Single Alternator Failure Checklist Complete."*
Initiate Dual Alternator Failures Checklist	*"Dual Alternator Failures Checklist."*
Completed Dual Alternator Failures Checklist	*"Dual Alternator Failures Checklist Complete."*

STANDARD CALLOUTS – ABNORMAL (continued)

ACTION	CALLOUT
Initiate Open Door Checklist	*"Open Door Checklist."*
Completed Open Door Checklist	*"Open Door Checklist Complete."*
Initiate Baggage Door Open in Flight Checklist	*"Baggage Door Open in Flight Checklist."*
Completed Baggage Door Open in Flight Checklist	*"Baggage Door Open in Flight Checklist Complete."*

Priming/Starting Procedures

Cold Start – Oil temperature below 180°F.

1. ELECTRIC FUEL PUMP ..... ON/CHECK PRESSURE
2. PRIMER ..... DEPRESS 1-3 seconds
3. PRIME ..... COMPLETE

Continue with ENGINE START FLOW

Hot Start – Oil Temperature at or greater than 180°F.

1. ELECTRIC FUEL PUMP ..... ON/CHECK PRESSURE
2. THROTTLE ..... OPEN ½”
3. PRIME ..... COMPLETE

Continue with ENGINE START FLOW

If a flooded engine is suspected:

1. MIXTURE CONTROL ..... IDLE CUT-OFF
2. THROTTLE ..... FULL FORWARD
3. ELECTRIC FUEL PUMP ..... OFF
4. STARTER ..... ENGAGE

After engine starts:

5. MIXTURE CONTROL ..... FULL FORWARD (Full Rich)
6. THROTTLE ..... 1000 RPM

Continue with ENGINE START FLOW

NOTE

If the engine fails to start, wait several minutes for the fuel to drain from the cylinders before attempting a subsequent restart. Waiting time will depend on ambient air temperatures, engine temperatures, and battery voltage. If a subsequent start attempt is unsuccessful, contact the Fleet Maintenance Department.

Leaning Procedures

The following leaning procedures, developed for use during ground, climb, cruise, descent, and landing operations, are employed to aid in preventative maintenance and flight safety operations.

With respect to the engine operation, utilization and adherence to these procedures are important, especially during high power settings and rich mixture settings, to prolong the engine life and to ensure flight safety.

GROUND

Lean each engine by:

- Confirming that the Mixture Control is in the Full Forward (Full Rich) position. Then,
- Lean the mixture by slowly moving the Mixture Control back until the engine RPM begins to decrease.
- Once a decrease in engine RPM is observed, enrichen the mixture by slowly moving the Mixture Control forward until peak engine RPM and smooth engine operation is attained.

NOTE

At high elevation airports (at or above 3,000' MSL), prior to takeoff, adjust the mixtures (not to overheat the engines) only enough to obtain smooth operation.

CLIMB

- Leave the Mixture Controls in the Full Forward (Full Rich) position.

CRUISE (Local)

Lean the engines (above 3000' Density Altitude) by:

- Slowly moving each Mixture Control back until a until a slight increase of airspeed is noted or engine operation becomes "rough".
- If engine operation is rough, slowly move the appropriate Mixture Control forward to obtain smooth engine operation.

CRUISE (Cross-country)

Lean the engines (above 3000' Density Altitude) by:

- Leaning each mixture using the Exhaust Gas Temperature (EGT) gauge to achieve engine operation at 125°F to the "rich" side of peak (best power).

Leaning Procedures (continued)

MANEUVERS (Local)

Ground Reference Maneuvers:

- Slowly move both Mixture Controls to the Full Forward (Full Rich) position.
- Ensure that both Electric Fuel Pumps are OFF.

Other Maneuvers:

- Leave both Mixture Controls in the established leaned position.
- Ensure that both Electric Fuel Pumps are OFF.

DESCENT

- Slowly move both Mixture Controls forward, as necessary, to enrichen the mixtures during the descent.
- Below 3000’ Density Altitude, place the MIXTURES in the FULL RICH (Full Forward) position.

LANDING

When operating VFR:

- Verify that both Mixture Controls are in the Full Forward (Full Rich) position.
- Turn both Electric Fuel Pumps ON when descending through 1,000’ AGL.

When operating IFR:

- Verify that both Mixture Controls are in the Full Forward (Full Rich) position.
- Turn both Electric Fuel Pumps ON when descending through 1,000’ AGL.

All VFR airplanes entering the traffic pattern:

- Verify that both Mixture Controls are in the Full Forward (Full Rich) position.
- Turn both Electric Fuel Pumps ON when descending through 1,000’ AGL.

Leaning Procedures (continued)

LANDING (continued)

If the traffic pattern altitude is 1,000’ AGL, abeam the point of intended landing:

- Slowly move both Mixture Controls to the Full Forward (Full Rich) position.
- Turn both Electric Fuel Pumps ON.

Brake/Steering Checking Procedures

When first beginning to taxi, conduct a check of braking effectiveness by:

- Allowing the airplane to begin movement under power; then,
- Reduce the power to idle and depress the top portion of both rudder pedals (brake function) sufficiently to bring the airplane to a complete stop.
- Verify that the braking effort, braking action, and pedal travel are all satisfactory.

Verify that the airplane steering is satisfactory by:

- Depressing the rudder pedal in the direction of turn desired
- Verify that the airplane responds properly to the rudder pedal input.

NOTE

When an Instructor Pilot (IP) is seated in either the left or right front seat, the IP shall conduct a separate check of braking/steering effectiveness from that seating position to ensure that the rudder pedals are functioning properly, effectively, and satisfactory.

Ensure that the throttle is set at idle before initiating a positive exchange of the flight controls.

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Section - 1

PRE-FLIGHT PROCEDURES

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INITIAL AIRCRAFT ACCEPTANCE

CLIPBOARD CHECK

☑ Verify that the aircraft Hobbs meter and Tachometer agree with what is entered on the condition board.

☑ Review past discrepancies and deferred items to ensure that no open discrepancies exist.

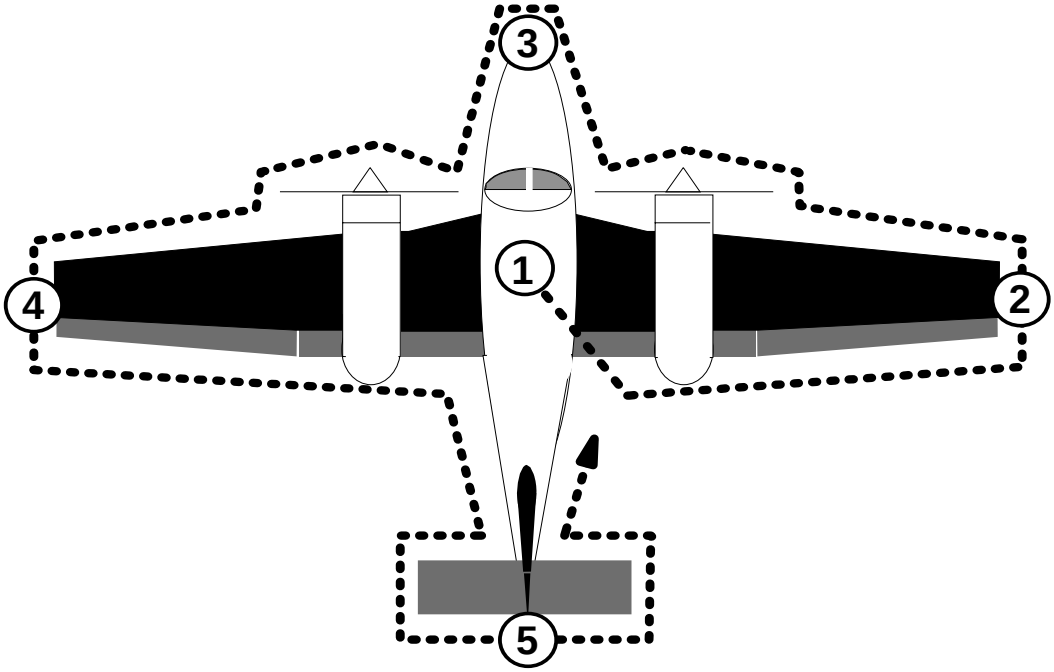
☑ Verify that all aircraft and equipment inspections are current including:

- 100-hour inspection
- Annual Inspection
- 24-month Transponder Test and Inspection
- 24-month Altimeter, Pitot-Static System, and automatic pressure altitude reporting system (Mode C) Test and Inspection
- 12-month ELT Inspection
- ELT Battery
- VOR Accuracy Check (if applicable)
- Survival Kit

☑ Check oil and fuel levels first to avoid any delays on departure.

☑ Clean the interior and exterior sides of the windshield with approved cleaning solution and towels. A clean windshield increases visibility and collision avoidance. Ensure that there are no cracks in the windshield. Do not place any item(s) (i.e. headsets, clipboard, etc.) on top of the glare shield panel, as this can scratch the windshield.

PRE-FLIGHT FLOW



OBJECTIVE:

To facilitate an effective preflight and determine aircraft air worthiness.

1. Cabin Checklist
2. Right Wing Checklist
3. Forward Fuselage Checklist
4. Left Wing Checklist
5. Aft Fuselage and Empennage Checklist

PRE-FLIGHT CHECKLIST

CABIN CHECKLIST

1. GUST LOCKS/PITOT COVER (if installed)..... REMOVE
2. GEAR SELECTOR..... DOWN
3. FIN STROBE (if installed) ..... ON
4. MAGNETO SWITCHES ..... OFF
5. BATTERY MASTER SWITCH..... ON
6. LANDING GEAR LIGHTS .....ILLUMINATED (3 GREEN)
7. FUEL GAUGES.....CHECK
8. ANNUNCIATOR PANEL ..... TEST
9. FLAPS.....EXTEND 40°
10. PITOT HEAT .....CHECK
11. EXTERIOR LIGHTS .....ON/CHECK/OFF
12. BATTERY MASTER SWITCH..... OFF
13. RIGHT WING FUEL QUANTITY .....CHECK
14. RIGHT ENGINE OIL QUANTITY.....CHECK
15. LEFT WING FUEL QUANTITY .....CHECK
16. LEFT ENGINE OIL QUANTITY .....CHECK

CALL FOR SERVICE IF REQUIRED

17. DOCUMENTS .....CHECK
18. POH..... AVAILABLE
19. SEATBELT (as a control lock)..... REMOVE
20. PARKING BRAKE .....SET
21. FLIGHT CONTROLS..... FREE/CORRECT
22. FIRE EXTINGUISHER .....CHECK/SECURED
23. FUEL SELECTORS .....CHECK/ON
24. STABILATOR TRIM/RUDDER TRIM .....CHECK/N (Neutral)
25. COWL FLAPS .....CHECK/OPEN
26. MIXTURE CONTROLS .....IDLE CUT-OFF
27. PROPELLER CONTROLS..... FULL FORWARD
28. THROTTLES..... CLOSE
29. EMERGENCY GEAR EXTENSION KNOB ..... IN/GUARDED
30. MAGNETO SWITCHES ..... OFF
31. ALTERNATE STATIC SOURCE .....ON/NORMAL
32. STATIC SYSTEM..... DRAIN
33. ELECTRICAL SWITCHES ..... OFF
34. ELT SWITCH.....ARMED
35. WINDOWS ..... CLEAN ALL
36. CABIN CHECKLIST .....COMPLETE

PRE-FLIGHT CHECKLIST (continued)

CABIN CHECKLIST (continued)

1. GUST LOCKS/PITOT COVER (if installed) REMOVE

If installed, REMOVE the GUST LOCKS from all flight control surfaces. Stow and secure the gust locks in the baggage compartment.

CAUTION

The ailerons or rudder will be damaged if moved with the gust locks installed.

If installed, REMOVE the PITOT COVER from the Pitot mast.

2. GEAR SELECTOR DOWN

Verify that the GEAR SELECTOR is in the DOWN position to ensure that the landing gear will not attempt to retract when the battery master switch is turned ON.

3. FIN STROBE (if installed) ON

If installed, depress the FIN STROBE switch to the ON position. If a Fin Strobe is not installed, do not use the Nav Lights or Strobe Lights in place of a Fin Strobe.

4. MAGNETO SWITCHES OFF

Verify that the MAGNETO SWITCHES are in the OFF position and that the the plastic safety guards are down covering the switches to avoid inadvertent engine starting during the preflight.

5. BATTERY MASTER SWITCH ON

Depress the BATTERY MASTER SWITCH to the ON position to provide power to the main electrical bus and the tie bus. Listen for the turn coordinator gyro “spooling up” and confirm that the red warning flag on the instrument face is no longer visible (indicating proper operation).

6. LANDING GEAR LIGHTS ILLUMINATED (3 GREEN)

Verify that the three (3) green LANDING GEAR LIGHTS are ILLUMINATED.

PRE-FLIGHT CHECKLIST (continued)

CABIN CHECKLIST (continued)

7. FUEL GAUGES **CHECK**

CHECK that both FUEL GAUGES are indicating properly and that the required amount of fuel for the flight is indicated (refer to the ERAU Flight Operations Manual for fuel requirements).

NOTE
The fuel quantity indicators shall not substitute for visually checking fuel quantity.

8. ANNUNCIATOR PANEL **TEST**

Depress and hold the ANNUNCIATOR PANEL button to TEST that all indicators illuminate, including the red GEAR WARN light. After releasing test button, only the OIL VAC, and ALT lights should remain illuminated.

9. FLAPS **EXTEND 40°**

Verify that the area in the vicinity of the FLAPS is clear and then raise the flap control handle to EXTEND the flaps to the 40° position.

10. PITOT HEAT **CHECK**

NOTE
For IFR only.

Depress the PITOT HEAT switch to the ON position and CHECK that the pitot mast is warm to touch within 30 seconds. Depress the Pitot Heat switch to the OFF position.

WARNING

Ground operation of pitot heat should be limited to a maximum time of 3 minutes to avoid damaging the pitot heating unit. If the pitot heat has been on more than 30 seconds, DO NOT TOUCH THE PITOT MAST. Severe burns may occur.

PRE-FLIGHT CHECKLIST (continued)

CABIN CHECKLIST (continued)

11. EXTERIOR LIGHTS ON/CHECK/OFF

Turn ON and visually CHECK that all EXTERIOR LIGHTS appropriate to the flight are operating properly. Turn the Exterior Lights OFF after checking.

- **Day:** If any lights are inoperative, determine if they are required per 14 CFR Part 91.205, 91.209, and 91.213.
- **Night:** In addition to the exterior lights, CHECK the interior cabin lighting. To adjust the panel lighting, turn both the radio and panel light rheostat controls, located on lower panel below the left control yoke, clockwise to increase light intensity. CHECK the dome lighting with the BRIGHT-OFF-DIM switch located overhead.

NOTE
If flying from daylight into night, lighting required for night flight operations must be operative.

Be courteous with the use of strobes. Avoid leaving exterior lights on longer than necessary while checking their operation to conserve battery life. Ensure required lights are operating in accordance with 14 CFR Part 91.205, 91.209, and 91.213.

12. BATTERY MASTER SWITCH OFF

Depress the BATTERY MASTER SWITCH to the OFF position to avoid inadvertent starting of the engine during preflight.

13. RIGHT WING FUEL QUANTITY CHECK

Visually CHECK the RIGHT WING FUEL QUANTITY with the calibrated wooden fuel tank dipstick. After checking, ensure that the fuel filler cap is properly secured and that the fuel cap access door is closed and latched securely.

14. RIGHT ENGINE OIL QUANTITY CHECK

Visually CHECK the RIGHT ENGINE OIL QUANTITY level [six (6) to eight (8) quarts] and ensure that the dipstick/filler cap is secured. Do not operate with less than six (6) quarts of oil.

PRE-FLIGHT CHECKLIST (continued)

CABIN CHECKLIST (continued)

NOTE

If the level is below six (6) quarts, obtain Exxon Elite 20W-50 oil from the ramp fuel truck or applicable FBO. Use Aeroshell 100 (SAE 50) or equivalent, only if Exxon Elite 20W-50 is unavailable.

15. LEFT WING FUEL QUANTITY CHECK

Visually CHECK the LEFT WING FUEL QUANTITY with the calibrated wooden fuel tank dipstick. After checking, ensure that the fuel filler cap is properly secured and that the fuel cap access door is closed and latched securely.

16. LEFT ENGINE OIL QUANTITY CHECK

Visually CHECK the LEFT ENGINE OIL QUANTITY [six (6) to eight (8) quarts] and ensure that the dipstick/filler cap is secured. Do not operate with less than six (6) quarts of oil.

NOTE

If the level is below six (6) quarts, obtain Exxon Elite 20W-50 oil from the ramp fuel truck or applicable FBO. Use Aeroshell 100 (SAE 50) or equivalent, only if Exxon Elite 20W-50 is unavailable.

CALL FOR SERVICE IF REQUIRED

If insufficient fuel or oil is noted, contact ERAU Flight Data ("*Eagle Data")* on 122.825 MHz to request aircraft servicing (Fuel Truck).

17. DOCUMENTS CHECK

CHECK that the Airworthiness Certificate and Aircraft Registration are on board the airplane. Verify that the DOCUMENTS have the correct registration number ("N" number) for the airplane. Ensure that the Airworthiness Certificate is clearly visible.

18. POH AVAILABLE

Ensure that the POH (Pilot Operating Handbook) for that airplane is AVAILABLE, including the weight and balance documentation (per 14 CFR Part 91.9).

PRE-FLIGHT CHECKLIST (continued)

CABIN CHECKLIST (continued)

19. SEATBELT (as a control lock) **REMOVE**

REMOVE the pilot side SEATBELT from the control yoke to allow for freedom of movement of the flight controls.

20. PARKING BRAKE **SET**

SET the PARKING BRAKE by applying pressure to the top part of the rudder pedals while pulling the parking brake knob aft.

CAUTION

If the parking brake is not engaged, the airplane may roll on the ramp when tie-downs and chocks are removed.

21. FLIGHT CONTROLS **FREE/CORRECT**

Move the FLIGHT CONTROLS to their maximum travel in all directions ("Box Pattern") to verify they are FREE/CORRECT and not restricted in movement. Visually verify that the control surfaces move in the proper direction.

NOTE

To accomplish a "Box Pattern", move the control yoke full forward, then full left, then full aft, then full right, then full forward, then return to starting position.

22. FIRE EXTINGUISHER **CHECK/SECURED**

CHECK the FIRE EXTINGUISHER for proper charge (indicator pointing in the green) and the date of last inspection (within 1year). Verify that the fire extinguisher is SECURED by verifying the bracket latch is closed.

23. FUEL SELECTORS **CHECK/ON**

CHECK the FUEL SELECTORS for freedom of movement through all positions and return to the ON position.

24. STABILATOR TRIM/RUDDER TRIM **CHECK/N (Neutral)**

CHECK the STABILATOR TRIM and RUDDER TRIM indicators for proper movement and set the Stabilator and Rudder trims to the N (Neutral) position.

PRE-FLIGHT CHECKLIST (continued)

CABIN CHECKLIST (continued)

25. COWL FLAPS **CHECK/OPEN**
CHECK the cowl flap levers for freedom of movement and set the COWL FLAPS to the OPEN position.

26. MIXTURE CONTROLS **IDLE CUT-OFF**
Verify that the MIXTURES CONTROLS are in the IDLE CUT-OFF position to ensure that engine will not inadvertently start during preflight.

27. PROPELLER CONTROLS **FULL FORWARD**
Verify that the PROPELLER CONTROLS are in the FULL FORWARD position.

28. THROTTLES **CLOSE**
Verify that the THROTTLES are in the CLOSE position to help prevent the engine from inadvertently starting during the preflight.

29. EMERGENCY GEAR EXTENSION KNOB **IN/GUARDED**
Verify that the EMERGENCY GEAR EXTENSION KNOB is in the full IN position and that the wire guard for the knob is in the GUARDED position.

30. MAGNETO SWITCHES **OFF**
Verify that the MAGNETO SWITCHES are in the OFF position and that the the plastic safety guards are down covering the switches to avoid inadvertent engine starting during the preflight.

31. ALTERNATE STATIC SOURCE **ON/NORMAL**
Place the ALTERNATE STATIC SOURCE control valve, located below the left side of the instrument panel, to the ON position. A small increase on the altimeter and VSI may be noted. Return the alternate static source control valve to the NORMAL (OFF) position.

32. STATIC SYSTEM **DRAIN**
DRAIN the STATIC SYSTEM pitot and static lines by pushing in on the buttons through separate drain valves located on the lower left side cabin wall adjacent to the pilot.

PRE-FLIGHT CHECKLIST (continued)

CABIN CHECKLIST (continued)

33. ELECTRICAL SWITCHES **OFF**

Verify that all ELECTRICAL SWITCHES, including the Radio Master and Panel Light Switches, are in the OFF position to avoid electrical surges through equipment when the Battery Master Switch is turned ON.

34. ELT SWITCH **ARMED**

Ensure that the ELT SWITCH is in the ARMED position. With the switch in the ON position, an ELT emergency signal will transmit.

35. WINDOWS **CLEAN ALL**

CLEAN ALL WINDOWS, including the windshield (both the interior and exterior sides), with ERAU approved cleaning solution and towels. When wiping the windows, use a linear motion parallel to the direction of airflow. A clean windshield increases visibility and collision avoidance, thereby enhancing safety. Ensure there are no cracks in the windshield. Do not place any items on top of panel as this can scratch the windshield.

36. CABIN CHECKLIST **COMPLETE**

Upon completion of the CABIN CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

NOTE

Start the exterior inspection at the right rear wing and proceed in a counter-clockwise direction. Emphasis and attention should be placed on all surface conditions including flight control surfaces and access panel security. Check surface areas around the aircraft for fluid leakage and foreign object debris (FOD) damage. A flashlight is required for all preflight inspections conducted at night.

PRE-FLIGHT CHECKLIST (continued)

RIGHT WING CHECKLIST

1. FUEL SUMP DRAINS (2) ..... DRAIN
2. FLAP/AILERON ..... INSPECT
3. STATIC WICKS (3) ..... INSPECT
4. WING TIP/LIGHTS ..... INSPECT
5. RECOGNITION LIGHT ..... INSPECT
6. LEADING EDGE ..... INSPECT
7. TIE-DOWN/CHOCKS ..... REMOVE
8. MAIN GEAR ..... INSPECT
9. COWL FLAP ..... INSPECT
10. EXHAUST STACK ..... INSPECT
11. FUEL TANK VENT/SCUPPER DRAIN ..... CHECK
12. FUEL QUANTITY ..... VERIFY (CHECK)
13. OIL QUANTITY ..... VERIFY (CHECK)
14. PROPELLER/SPINNER ..... INSPECT
15. COOLING/INDUCTION INTAKE ..... INSPECT
16. ENGINE COWL ..... INSPECT
17. RIGHT WING CHECKLIST ..... COMPLETE

1. FUEL SUMP DRAINS (2) DRAIN

Using the fuel sample cup, DRAIN a small quantity of fuel from the two (2) flush-type FUEL SUMP DRAINS located on the fuselage by the aircraft step. Check for water, sediment, and verify that the proper grade of fuel (100LL, Blue in color) is present. Water in the sample will be indicated by a clear amount of liquid at the bottom of the sampler cup (due to the greater density of water than fuel). Dispose of contaminated fuel in the fuel receptacles located on the east side of the ERAU ramp. Remove any residual water from inside of sampler cup and continue to take fuel samples until water is no longer present in any fuel sample.

NOTE
DO NOT DUMP FUEL ON THE RAMP.

2. FLAP/AILERON INSPECT

INSPECT the FLAP and AILERON, checking for freedom of movement and/or security of the hinges and actuators.

PRE-FLIGHT CHECKLIST (continued)

RIGHT WING CHECKLIST (continued)

3. STATIC WICKS (3) **INSPECT**

INSPECT the condition and security of the STATIC WICKS (3): one (1) on the flap and two (2) on the aileron.

4. WING TIP/LIGHTS **INSPECT**

INSPECT the WING TIP for dents and cracks. If a crack exists, verify that is has been stop drilled to prevent further cracking. INSPECT the condition of the strobe and position LIGHTS.

5. RECOGNITION LIGHT **INSPECT**

INSPECT that the plastic covering over the RECOGNITION LIGHT is free of cracks (if cracked ensure that the crack has been stop drilled). Check security of wing “fence”.

6. LEADING EDGE **INSPECT**

INSPECT the LEADING EDGE of the wing for dents and cracks.

7. TIE-DOWN/CHOCKS **REMOVE**

Slowly REMOVE the TIE-DOWN to avoid any under wing damage and place the chain adjacent to, but not in, the indentation of the concrete around the chain’s ramp securing points (water accumulation in these areas will rust the chains). Place the CHOCKS over the chain’s ramp securing point to keep them away from the landing gear and propeller.

8. MAIN GEAR **INSPECT**

INSPECT the MAIN GEAR and brake assembly for damage, cracks, hydraulic fluid, and brake pad wear. Check to see that the tire looks properly inflated, is free of “flat” spots from skidding, and no cord is showing. Check the main gear retraction mechanism for any obstruction(s). Check the Up Lock and Down Lock switches. Check the strut for proper strut inflation (2.60” ± .25”). Check the main gear door for security and any damage. Finally, check the external main gear components are secure with castle nuts and safety (cotter) pins.

9. COWL FLAP **INSPECT**

INSPECT the COWL FLAP and acuators for condition and security.

PRE-FLIGHT CHECKLIST (continued)

RIGHT WING CHECKLIST (continued)

10. EXHAUST STACK **INSPECT**

INSPECT the EXHAUST STACK to ensure that it is SECURE and free of cracks. Verify that inside the exhaust stack is clear of any foreign objects.

11. FUEL TANK VENT/SCUPPER DRAIN **CHECK**

CHECK that the FUEL TANK VENT and SCUPPER DRAIN (located on underside of wing) is unobstructed. The fuel tank vent provides a venting source to accommodate changing pressure in the fuel tank to ensure proper fuel flow. It is normal to see fuel or evidence of fuel (blue staining) at the vent due fuel expansion as its temperature increases.

12. FUEL QUANTITY **VERIFY (CHECK)**

VERIFY that the FUEL QUANTITY has been checked at least once since the last refueling. If the aircraft has been refueled since originally sampling the fuel, CHECK the fuel again for proper grade and for any debris.

13. OIL QUANTITY **VERIFY (CHECK)**

VERIFY that the OIL QUANTITY has been checked. If oil has been added since originally checking, CHECK the oil again to ensure the correct level has been attained.

14. PROPELLER/SPINNER **INSPECT**

WARNING

Do not move the propeller.

INSPECT the PROPELLER for nicks, cracks, and that each blade is secure. The SPINNER should be free of cracks and securely fastened with all of its attaching screws. Check for any oil leaks on back side of each blade from the propeller hub.

15. COOLING/INDUCTION INTAKE **INSPECT**

INSPECT the engine COOLING AND INDUCTION INTAKE to ensure that the area is clear of any foreign objects.

PRE-FLIGHT CHECKLIST (continued)

RIGHT WING CHECKLIST (continued)

16. ENGINE COWL **INSPECT**

INSPECT the ENGINE COWL for security and that it is fastened with all of its attaching fasteners. There should be no deformation or damage to the surface of the cowling. Check around and under the cowl for excessive fluid/oil leaks.

17. RIGHT WING CHECKLIST **COMPLETE**

Upon completion of the RIGHT WING CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

PRE-FLIGHT CHECKLIST (continued)

FORWARD FUSELAGE CHECKLIST

1. BATTERY VENTS ..... INSPECT
2. HEATER AIR INLETS ..... INSPECT
3. LANDING LIGHTS ..... INSPECT
4. NOSE GEAR ..... INSPECT
5. TIE-DOWN (if used) ..... REMOVE
6. FORWARD FUSELAGE CHECKLIST ..... COMPLETE

1. BATTERY VENTS **INSPECT**
INSPECT the BATTERY VENTS to ensure that they are clear of any obstructions.

2. HEATER AIR INLETS **INSPECT**
INSPECT the HEATER AIR INLETS to ensure that they are clear of any obstructions.

3. LANDING LIGHTS **INSPECT**
INSPECT the LANDING LIGHTS for general condition and cracks.

4. NOSE GEAR **INSPECT**
INSPECT the NOSE GEAR springs and oleo strut for damage and cracks, and the retraction mechanism for obstructions. Check the Up Lock and Down Lock switches. Check the NOSE GEAR doors for condition and security. Check the nose strut for proper inflation (2.70” ± .25”). Check to see that the tire is properly inflated and no cord is showing. Finally, check the external nose gear components are secure with castle nuts and safety (cotter) pins.

5. TIE-DOWN (if used) **REMOVE**
Slowly REMOVE the TIE-DOWN (if used) to avoid any under nose damage and place the chain adjacent to, but not in, the indentation of the concrete around the chain’s ramp securing points (water accumulation in these areas will rust the chains).

6. FORWARD FUSELAGE CHECKLIST **COMPLETE**
Upon completion of the FORWARD FUSELAGE CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

PRE-FLIGHT CHECKLIST (continued)

LEFT WING CHECKLIST

1. MAIN GEAR.....INSPECT
2. COWL FLAP.....INSPECT
3. EXHAUST STACK.....INSPECT
4. FUEL QUANTITY ..... VERIFY (CHECK)
5. OIL QUANTITY..... VERIFY (CHECK)
6. PROPELLER/SPINNER .....INSPECT
7. COOLING/INDUCTION INTAKE .....INSPECT
8. ENGINE COWL .....INSPECT
9. FUEL TANK VENT/SCUPPER DRAIN.....CHECK
10. TIE-DOWN/CHOCKS .....REMOVE
11. LEADING EDGE.....INSPECT
12. STALL WARNING VANES .....CHECK
13. PITOT MAST .....CHECK
14. RECOGNITION LIGHT.....INSPECT
15. WING TIP/LIGHTS .....INSPECT
16. AILERON/FLAP.....INSPECT
17. STATIC WICKS (3).....INSPECT
18. LEFT WING CHECKLIST .....COMPLETE

1. MAIN GEAR **INSPECT**

INSPECT the MAIN GEAR and brake for damage, cracks, and hydraulic fluid. Check to see that the tire looks properly inflated, is free of “flat” spots from skidding, and no cord is showing. Check the main gear retraction mechanism for any obstruction(s). Check the Up Lock and Down Lock switches and the Squat switch. Check the strut for proper strut inflation (2.60” ± .25”). Check the main gear door for security and any damage. Finally, check the external main gear components are secure with castle nuts and safety (cotter) pins.

2. COWL FLAP **INSPECT**

INSPECT the COWL FLAP and actuators for condition and security.

3. EXHAUST STACK **INSPECT**

INSPECT the EXHAUST STACK to ensure that it is SECURE and free of cracks. Verify that inside the exhaust stack is clear of any foreign objects.

PRE-FLIGHT CHECKLIST (continued)

LEFT WING CHECKLIST (continued)

4. FUEL QUANTITY **VERIFY (CHECK)**

VERIFY that the FUEL QUANTITY has been checked at least once since the last refueling. If the aircraft has been refueled since originally sampling the fuel, CHECK the fuel again for proper grade and for any debris.

5. OIL QUANTITY **VERIFY (CHECK)**

VERIFY that the OIL QUANTITY has been checked. If oil has been added since originally checking, CHECK the oil again to ensure that the correct level has been attained.

6. PROPELLER/SPINNER **INSPECT**

WARNING

Do not move the propeller.

INSPECT the PROPELLER for nicks, cracks, and that each blades is secure. The SPINNER should be free of cracks and securely fastened with all of its attaching screws. Check for any oil leaks on back side of each blade from the propeller hub.

7. COOLING/INDUCTION INTAKE **INSPECT**

INSPECT the engine COOLING AND INDUCTION INTAKE to ensure that the area is clear of any foreign objects.

8. ENGINE COWL **INSPECT**

INSPECT the ENGINE COWL for security and that it is fastened with all of its attaching fasteners. There should be no deformation or damage to the surface of the cowling. Check around and under the cowl for excessive fluid/oil leaks.

PRE-FLIGHT CHECKLIST (continued)

LEFT WING CHECKLIST (continued)

9. FUEL TANK VENT/SCUPPER DRAIN CHECK

CHECK that the FUEL TANK VENT and SCUPPER DRAIN, located on underside of wing, is unobstructed. The fuel tank vent provides a venting source to accommodate changing pressure in the fuel tank to ensure proper fuel flow. It is normal to see fuel or evidence of fuel (blue staining) at the vent due fuel expansion as its temperature increases.

10. TIE-DOWN/CHOCKS REMOVE

Slowly REMOVE the TIE-DOWN to avoid any under wing damage and place the chain adjacent to, but not in, the indentation of the concrete around the chain's ramp securing points (water accumulation in these areas will rust the chains). Place the CHOCKS over the chain's ramp securing point to keep them away from the landing gear and propeller.

11. LEADING EDGE INSPECT

INSPECT the LEADING EDGE of the wing for dents and cracks. If a crack exists, verify that is has been stop drilled to prevent further cracking.

12. STALL WARNING VANES CHECK

CHECK both STALL WARNING VANES for freedom of movement and ensure that both are unobstructed. Listen for microswitch contact.

NOTE

The inboard vane activates for 25° and 40° flap positions. The outboard vane activates for flap settings of 0° and 10°.

13. PITOT MAST CHECK

CHECK the PITOT MAST mounting and verify that the ram air intake and the drain hole are free of obstructions, and, if applicable, that the static port, located on the back of the mast, is free of any obstruction.

14. RECOGNITION LIGHT INSPECT

INSPECT the plastic covering over the RECOGNITION LIGHT is free of cracks (if cracked ensure that the crack has been stop drilled). Check security of wing "fence".

PRE-FLIGHT CHECKLIST (continued)

LEFT WING CHECKLIST (continued)

15. WING TIP/LIGHTS **INSPECT**

INSPECT the LEADING EDGE of the wing for dents and cracks. If a crack exists, verify that is has been stop drilled to prevent further cracking.

16. AILERON/FLAP **INSPECT**

INSPECT the AILERON and FLAP, checking for freedom of movement and security of the hinges, actuators, and static wicks.

17. STATIC WICKS (3) **INSPECT**

INSPECT the condition and security of the STATIC WICKS (3): one (1) on the flap and two (2) on the aileron.

18. LEFT WING CHECKLIST **COMPLETE**

Upon completion of the LEFT WING CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

PRE-FLIGHT CHECKLIST (continued)

AFT FUSELAGE AND EMPENNAGE CHECKLIST

1. HORIZONTAL STABILATOR/TRIM TAB.....INSPECT
2. VERTICAL STABILIZER/RUDDER .....INSPECT
3. STATIC WICKS (3).....INSPECT
4. TIE-DOWN.....REMOVE
5. SURVIVAL EQUIPMENT/CARGO.....SECURED
6. BAGGAGE DOOR .....CLOSED/LOCKED
7. ANTENNAS .....INSPECT
8. 360° WALK-AROUND .....COMPLETE
9. AFT FUSELAGE AND EMPENNAGE CHECKLIST .....COMPLETE

1. HORIZONTAL STABILATOR/TRIM TAB **INSPECT**
INSPECT the HORIZONTAL STABILATOR and TRIM TAB, checking for freedom of movement and security, including hinges and control cables.

2. VERTICAL STABILIZER/RUDDER **INSPECT**
INSPECT the VERTICAL STABILIZER and RUDDER, checking for the condition of the rudder trim tab and ensuring that all hinges and push rods are sound and operational. Do not move rudder.

3. STATIC WICKS (3) **INSPECT**
INSPECT the condition and security of the STATIC WICKS (3): two (2) on the stabilator and one (1) on the rudder.

4. TIE-DOWN **REMOVE**
Slowly REMOVE the TIE-DOWN to avoid any under fuselage damage and place the chain adjacent to, but not in, the indentation of the concrete around the chain's ramp securing points (water accumulation in these areas will rust the chains).

5. SURVIVAL EQUIPMENT/CARGO **SECURED**
Verify that the SURVIVAL EQUIPMENT, including the survival kit, flare gun and life jackets, are on board and that any CARGO (including the Survival Equipment) in the baggage area has been SECURED with the cargo safety net to prevent shifting during flight.

PRE-FLIGHT CHECKLIST (continued)

AFT FUSELAGE AND EMPENNAGE CHECKLIST (continued)

6. BAGGAGE DOOR **CLOSED/LOCKED**

Ensure the BAGGAGE DOOR is CLOSED and LOCKED in order to prevent inadvertent opening during flight.

7. ANTENNAS **INSPECT**

INSPECT all communication, navigation, and ELT ANTENNAS for security and to ensure none are damaged.

8. 360° WALK-AROUND **COMPLETE**

COMPLETE a 360° WALK-AROUND inspection of the airplane in the direction opposite (clockwise) of the direction the airplane was preflighted to ensure that no items (tie downs, fuel caps, chocks, etc.) were missed.

9. AFT FUSELAGE AND EMPENNAGE CHECKLIST **COMPLETE**

Upon completion of the AFT FUSELAGE AND EMPENNAGE CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

RAMP OUT CHECKLIST

1. BATTERY MASTER SWITCH ..... ON
2. RADIO MASTER SWITCH ..... ON
3. CLEARANCE ..... OBTAIN
4. FLIGHT DATA (“Eagle Data”) ..... RAMP OUT
5. RADIO MASTER SWITCH ..... OFF
6. BATTERY MASTER SWITCH ..... OFF
7. RAMP OUT CHECKLIST ..... COMPLETE

1. BATTERY MASTER SWITCH **ON**
Depress the BATTERY MASTER SWITCH to the ON position.

2. RADIO MASTER SWITCH **ON**
Depress the RADIO MASTER SWITCH to the ON position.

3. CLEARANCE **OBTAIN**
Monitor and record ATIS. Then, contact KDAB Clearance Delivery to OBTAIN a VFR or IFR departure CLEARANCE. Verify that the clearance contains all the required items and will not cause you to deviate from any FAA regulation, ERAU policy, or put the aircraft in jeopardy.

4. FLIGHT DATA (“Eagle Data”) **RAMP OUT**
Contact ERAU FLIGHT DATA (“*Eagle Data”*) on 122.825 MHz to RAMP OUT by providing the aircraft’s Hobbs and Tach time. The readings provided should match the clipboard entries. Copy and read back the “due-back” time.

5. RADIO MASTER SWITCH **OFF**
Depress the RADIO MASTER SWITCH to the OFF position.

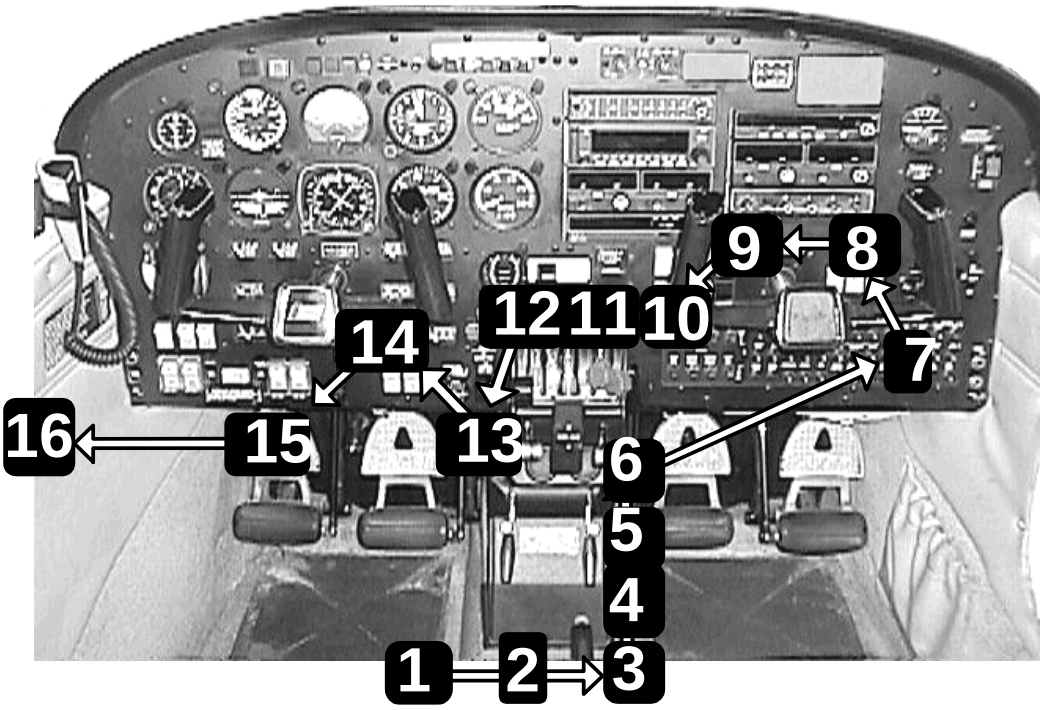
6. BATTERY MASTER SWITCH **OFF**
Depress the BATTERY MASTER SWITCH to the OFF position.

7. RAMP OUT CHECKLIST **COMPLETE**
Upon completion of the RAMP OUT CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

Section - 2

NORMAL PROCEDURES

BEFORE START FLOW



OBJECTIVE:

To configure the aircraft in preparation for engine start.

BEFORE START CHECKLIST

1. PASSENGER/CREW BRIEFING ..... COMPLETE
2. AIRPORT DIAGRAM ..... REVIEW/KEEP AVAILABLE
3. FUEL SELECTORS ..... ON
4. FLAPS ..... RETRACT 0°
5. COWL FLAPS ..... OPEN
6. CARBURETOR HEAT ..... OFF
7. CIRCUIT BREAKERS ..... IN
8. CABIN HEAT/RECIRCULATING FAN ..... OFF
9. FIN STROBE ..... ON
10. MIXTURE CONTROLS ..... FULL FORWARD
11. PROPELLOR CONTROLS ..... FULL FORWARD
12. THROTTLES ..... OPEN ¼”
13. GEAR SELECTOR ..... VERIFY DOWN
14. PANEL LIGHTS ..... OFF (ON)
15. PARKING BRAKE ..... SET
16. SEATBELTS/HARNESSES ..... ON
17. BEFORE START CHECKLIST ..... COMPLETE

1. PASSENGER/CREW BRIEFING **COMPLETE**

COMPLETE the PASSENGER and CREW BRIEFING as appropriate:

PASSENGER BRIEFING

- **S**eatbelts (Operation)
- **A**ir Vents (Location/Operation)
- **F**ire Extinguisher (Location)
- **E**xit Use (Location)
- **S**urvival Kit (Location)
- **T**raffic Watch (Clock Reference/Notification)

CREW BRIEFING

- Airport Diagram
- ATIS/AWOS/FSS
- Runway(s) in use
- Crosswind Component
- Takeoff/Accelerate Stop Distance
- Departure/Taxi Clearance
- V_A
- Who is P-I-C?
- Positive Exchange of Flight Controls
- Sterile Cockpit
- Safe Attitude

BEFORE START CHECKLIST (continued)

2. AIRPORT DIAGRAM **REVIEW/KEEP AVAILABLE**

REVIEW an AIRPORT DIAGRAM of the runways/taxiways and where you are located on the airport. Verify that you are able to comply with all taxi clearances received from ATC. At non-towered airports, determine the best taxi route to the departure runway considering wind conditions and local traffic. KEEP the airport diagram AVAILABLE for reference throughout the taxi.

3. FUEL SELECTORS **ON**

Verify that the FUEL SELECTORS are in the ON position.

4. FLAPS **RETRACT 0°**

Before changing the flap position on the ground, verify that you have the flap control handle and call out, *"Flaps Identified"*. Wait for the IP to respond, *"Flaps Verified"*, then RETRACT the FLAPS the the 0° position, visually verifying that the flaps move towards and stop in the fully retracted position.

NOTE

Although the PA-44-180 Gear Selector and Flap Control Handle are distinguishable, a positive transfer of training will occur from this aircraft to other aircraft where the landing gear and flap controls may be similar.

If the flaps fail to retract by its spring return mechanism, return the Flap Control Hhandle to the next lowest notch to the actual flap position (e.g., flaps at 40°, leave the Flap Control Handle at the 25° position) to avoid having the flaps retract suddenly to the 0° position, which may result in flap damage.

5. COWL FLAPS **OPEN**

Verify that the COWL FLAPS are OPEN by checking to see that the levers are in the full down position.

6. CARBURETOR HEAT **OFF**

Verify that both CARBURETOR HEAT selectors are in the OFF postion.

BEFORE START CHECKLIST (continued)

7. CIRCUIT BREAKERS IN

Visually verify that all CIRCUIT BREAKERS are IN by running your hand across the circuit breaker panel to confirm. Do not reset a "popped" circuit breaker more than one time to avoid the possibility of an electrical fire.

8. CABIN HEAT/RECIRCIRCULATING FAN OFF

Check that the CABIN HEAT and RECIRCULATING FAN switches are in the OFF position to reduce electrical load during engine start.

9. FIN STROBE ON

If installed, verify that the FIN STROBE switch is in the ON position to indicate engine starting in progess. If a Fin Strobe is not installed, use the anti-collision light (Strobe Lights). Turn the anti-collision lights (Strobe Lights) Off after the engine has started.

For night operations (from sunset to sunrise), if a Fin Strobe is not installed, depress the Nav Lights switch to the ON position.

10. MIXTURE CONTROLS FULL FORWARD

Place the MIXTURE CONTROLS to the FULL FORWARD (FULL Rich) position.

NOTE

With the mixture controls in the IDLE CUT-OFF position, the engines could start and attempt to run for a very brief time with fuel provided by priming.

11. PROP CONTROLS FULL FORWARD

Verify that the PROP CONTROLS are in the FULL FORWARD position.

12. THROTTLES OPEN ¼"

Set both THROTTLES OPEN ¼" from the Close position to allow the fuel/air mixture to reach the cylinders for engine start.

NOTE

If the engine starts with throttle open more than ¼", a surge to a higher RPM prior will be experienced without prior oil being circulated potentially resulting in internal engine damage.

BEFORE START CHECKLIST (continued)

13. GEAR SELECTOR **VERIFY DOWN**

VERIFY that the GEAR SELECTOR is in the DOWN position.

14. PANEL LIGHTS **OFF (ON)**

Except for night operations, ensure that the PANEL LIGHTS rheostat switches are in the OFF position. For night operations, ensure that the panel light rheostat switches are in the ON position and that the light levels are adjusted as appropriate.

15. PARKING BRAKE **SET**

SET the PARKING BRAKE by applying pressure to the top part of the rudder pedals while pulling the parking brake knob aft.

WARNING

The parking brake should not be relied on solely to keep the aircraft stationary. Apply and maintain brake pressure continually throughout the engine starting procedures.

16. SEATBELTS/HARNESSES **ON**

Ensure that passenger SEATBELTS and shoulder HARNESSES are ON and adjusted (per 14 CFR Part 91.107).

17. BEFORE START CHECKLIST **COMPLETE**

Upon completion of the BEFORE START CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

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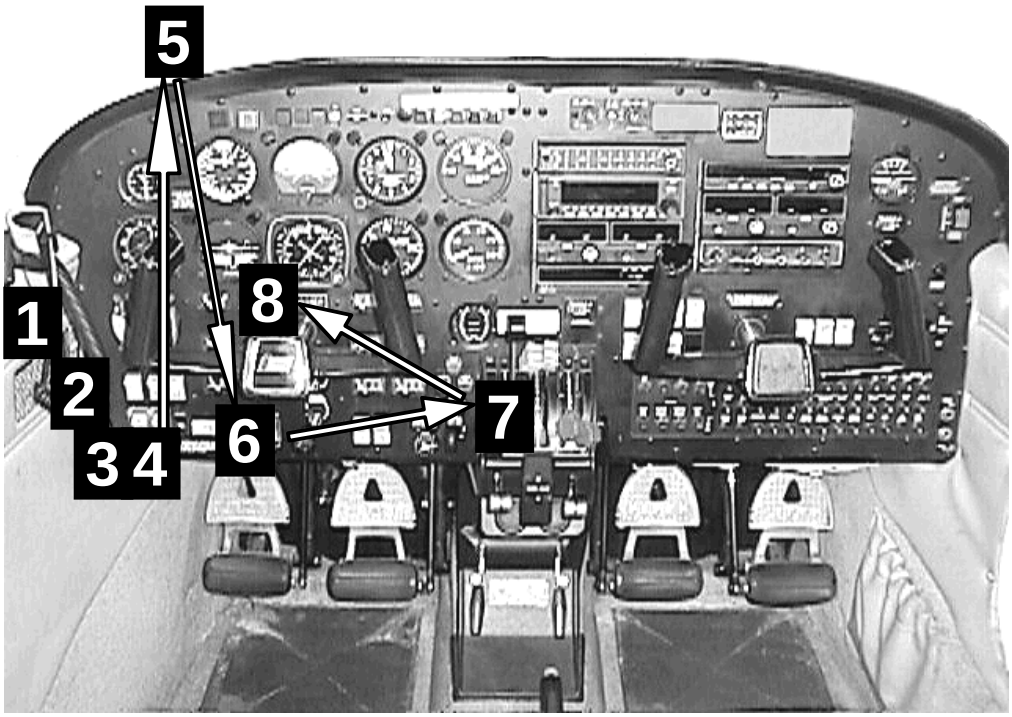
ENGINE START FLOW



OBJECTIVE:

To safely and efficiently start the engine.

ENGINE START CHECKLIST

For engine start, use the hot or cold engine start procedure depending upon ambient air temperature and engine temperature.

1. BATTERY MASTER SWITCH ..... ON
2. ALTERNATOR SWITCHES ..... ON
3. MAGNETO SWITCHES ..... ON
4. PRIME ..... COMPLETE
5. PROP AREA ..... CLEAR
6. STARTER ..... ENGAGE
7. THROTTLE ..... 1000 RPM
8. OIL PRESSURE ..... CHECK
9. AMMETER/ANNUNCIATOR ..... CHECK
10. VACUUM ..... CHECK
11. MIXTURE ..... LEAN
12. ELECTRIC FUEL PUMP ..... OFF

Repeat steps 4 through 12 to start the other engine.

13. FUEL SELECTORS ..... X-FEED (Crossfeed)
14. ENGINE START CHECKLIST ..... COMPLETE

1. BATTERY MASTER SWITCH **ON**
Depress the BATTERY MASTER SWITCH to the ON position to provide power to the main electrical bus and the tie bus.

2. ALTERNATOR SWITCHES **ON**
Depress the ALTERNATOR SWITCHES to the ON position to allow the alternators to energize after the engines are started.

3. MAGNETO SWITCHES **ON**
Depress the left and right engine MAGNETO SWITCHES to the ON position to allow electrical energy to the spark plugs of each cylinder.

4. PRIME **COMPLETE**
COMPLETE the appropriate procedure (see page 15) to PRIME the engine before attempting to start the engine.

ENGINE START CHECKLIST (continued)

5. PROP AREA **CLEAR**

Visually check that the PROP AREA and all quadrants around the aircraft is clear from personnel or obstructions (i.e. chocks, tie-downs, etc.) and call out, *"Clear Prop."* Allow time for any response prior to starting the engine.

NOTE

Headsets must not be worn until after both engines have been started to ensure hearing any response from the callout, or to immediately hear any abnormal sound after engine start (i.e., starter failing to disengage, cylinder misfire, etc.).

If an adjacent aircraft is being fueled, wait until the fueling process is complete before starting the engine.

6. STARTER **ENGAGE**

With the prop area remaining clear, no response from the callout, and the throttle positioned appropriately and held, depress the horizontal STARTER rocker switch (located between the left and right engine magneto switches) towards the respective engine to ENGAGE the starter.

To start the left engine, depress the rocker switch to the left; to start the right engine, depress the rocker switch to the right. Release the starter rocker switch when the engine begins to start. Do not depress the starter rocker while the engine is running.

CAUTION

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 the starter again. Do not engage the starter immediately after releasing it. Doing so may damage the starter mechanism. If engine still fails to start, contact the Fleet Maintenance Department.

ENGINE START CHECKLIST (continued)

7. THROTTLE 1000 RPM

Adjust the THROTTLE to set 1000 RPM immediately to avoid high power settings without oil being circulated in the engine.

8. OIL PRESSURE CHECK

CHECK the OIL PRESSURE gauge to observe an increase in pressure normally within 30 seconds after engine start. Allow 60 seconds for engine starting in cold ambient air temperatures. If no rise in oil pressure is observed, immediately shut down the engine to avoid damage.

9. AMMETER/ANNUNCIATOR CHECK

CHECK the AMMETER for indication of an appropriate load. After the other engine is started, verify that both ammeters indicate a similar load.

CAUTION

If the starter contactor remains closed after engine start (causing the starter to remain engaged), an excessively high load indication will be indicated. In this event, immediately shut down the engine and contact the Fleet Maintenance Department.

After both engines have been started, CHECK to ensure that all ANNUNCIATOR lights are extinguished.

10. VACUUM CHECK

CHECK to verify the absence of the red flow button and CHECK the VACUUM indication (4.8” – 5.2” hg).

11. MIXTURE LEAN

LEAN the MIXTURES by slowly bringing each Mixture Control aft. During this action, the engine RPM will slowly increase as the best power mixture setting is attained. When the engine RPM begins to drop, enrichen the mixture to return the engine speed to its highest RPM.

ENGINE START CHECKLIST (continued)

12. ELECTRIC FUEL PUMP **OFF**

Depress the ELECTRIC FUEL PUMP switch to the OFF position and note a slight pressure decrease. Observing an acceptable fuel pressure with the electric fuel pump OFF will confirm that the engine-driven fuel pump is operating.

Repeat steps 4 through 11 to start the other engine.

13. FUEL SELECTORS **X-FEED (Crossfeed)**

Place each FUEL SELECTOR in the X-FEED (Crossfeed) position and verify that each fuel pressure gauge maintains pressure between 0.5 to 8.0 psi.

14. ENGINE START CHECKLIST **COMPLETE**

Upon completion of the ENGINE START CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

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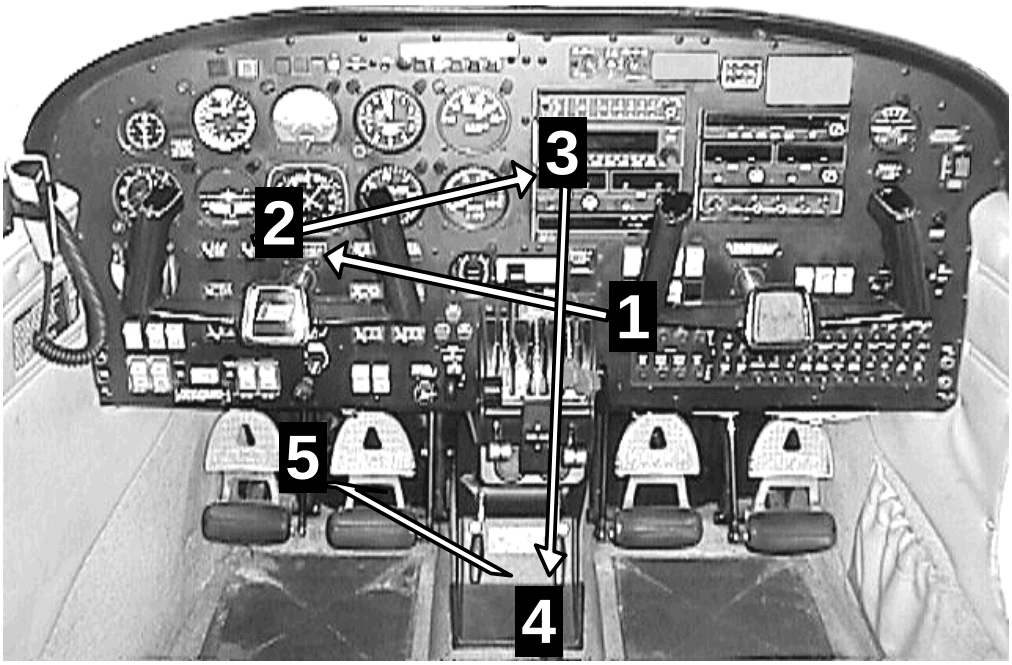
BEFORE TAXI FLOW



OBJECTIVE:

To configure systems and radios prior to taxiing.

BEFORE TAXI CHECKLIST

Accomplish prior to commencing taxi.

1. RADIO MASTER SWITCH	ON
2. FLIGHT INSTRUMENTS	CHECK/SET
3. AVIONICS	SET
4. FUEL SELECTORS	VERIFY X-FEED/ON
5. PARKING BRAKE	RELEASE
6. BEFORE TAXI CHECKLIST	COMPLETE

1. RADIO MASTER SWITCH **ON**

Depress the RADIO MASTER SWITCH to the ON position to allow electrical current to flow from the tie bus to both avionics busses.

2. FLIGHT INSTRUMENTS **CHECK/SET**

Verify that the clock is operating and indicating the current time, and that the adjustable FLIGHT INSTRUMENTS are set to current, available information (as per 14 CFR Part 91.205).

IFR CONSIDERATIONS

For IFR flight, the pitot-static instruments must be checked and within acceptable limits before taxi. Gyroscopic instruments and the magnetic compass should be checked while turning in both directions during taxi after leaving the ramp.

Pitot-Static Instruments

- The Airspeed Indicator should indicate zero.
- The Altimeter should be within ±75 feet of known elevation when set to the local altimeter setting (elevations are shown on airport diagrams).
- The Vertical Speed Indicator (VSI) should indicate zero, or if an error is noted, note the error and use as the zero reference point.

BEFORE TAXI CHECKLIST (continued)

2. FLIGHT INSTRUMENTS (continued) **CHECK/SET**

Gyroscopic Instruments

- The Attitude Indicator should indicate no more than 5° of precession in pitch and bank.
- The Turn Coordinator should indicate a bank in the direction of turn, with the ball (inclinometer) to the outside of the turn. The Off flag should not appear.
- The Heading Indicator Compass Card must indicate a change in heading consistent with the direction the aircraft is turning.

Horizontal Situation Indicator (HSI)

To test the HSI:

- Select “Free” mode
- Flip the CW/CCW switch to CW and verify that the HSI turns clock-wise
- Flip the CW/CCW switch to CCW and verify that the HSI turns counter-clock-wise
- Continue the CCW turn past a known heading
- Return the switch to the “Slave” mode (the HSI heading should automatically correct to the magnetic heading.

Magnetic Compass

- The Magnetic Compass housing should contain full fluid, swing freely, and indicate known headings.
- The Compass Deviation Card must be in place and readable.

3. AVIONICS **SET**

SET the AVIONICS as follows:

- **Marker Beacon:** Test the Anunciators and set to the L (low sensitivity) position.
- **GPS:** Initialize the GPS and make the appropriate entries for the flight. Verify the database is up to date.

BEFORE TAXI CHECKLIST (continued)

3. AVIONICS (continued) SET

- **Comm Radios:** Ensure both comm radios are operating (transmitting and receiving) properly by alternating their uses with ATC. For example, tune in the ground frequency in the opposite comm radio from the one used to ramp out and receive ATIS. This will ensure that both comm radios are operating properly.
- **NAV 1:** Depress the NAV 1 speaker switch (after turning the volume down) and ID the appropriate frequency by using the ID/Volume knob. Next, check the needle swing and flag "flip" on the CDI. Finally, set the departure radial.
- **NAV 2:** Follow the same procedure as NAV 1, but include the next radial in the departure as appropriate.

NOTE

At airports where a VOT is available, the NAV radios may be checked using the VOT. If unable to identify the NAVs on the ground, try again in another position such as the run-up area, or, if necessary, wait until airborne, although, this increases workload in the air and should be planned for accordingly.

- **DME (if equipped):** Verify that the mode select switch is on the desired NAV and identify the signal.
- **ADF (if equipped):** Tune the expected frequency and identify the signal. Check the needle swing with the test or ANT function. Ensure that the moveable card is in the appropriate position. Verify that the switch is in the ADF position.
- **Transponder:** Ensure that the assigned code is set in the transponder (the test to check the operation of the unit for proper functioning is automatic).
- **Autopilot/Flight Director (if equipped):** Test the Autopilot/FD. Ensure that the Autopilot is OFF for takeoff and flight director is set as desired.

BEFORE TAXI CHECKLIST (continued)

3. AVIONICS (continued) **SET**

NOTE

Recheck that each COM/NAV frequencies and HSI/CDI is set for departure. Just before takeoff, review the VFR/IFR departure by mentally flying it, including headings, altitudes and navigation.

4. FUEL SELECTORS **VERIFY X-FEED/ON**

VERIFY that each X-FEED (Crossfeed) position has been checked and place the FUEL SELECTORS in the ON position verifying that each fuel pressure gauge maintains pressure between 0.5 to 8.0 psi.

5. PARKING BRAKE **RELEASE**

Push the Parking Brake knob IN fully to RELEASE the PARKING BRAKE.

6. BEFORE TAXI CHECKLIST **COMPLETE**

Upon completion of the BEFORE TAXI CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

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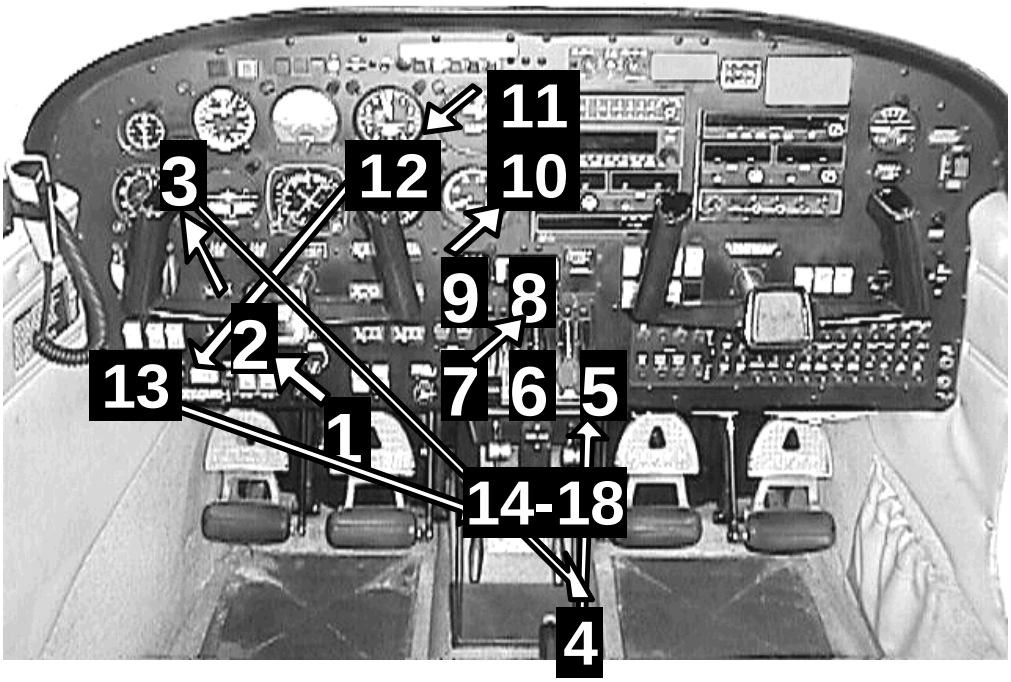
BEFORE TAKEOFF "RUN-UP" FLOW



OBJECTIVE:

To systematically check aircraft and engine systems prior to takeoff.

BEFORE TAKEOFF "RUN-UP" CHECKLIST

1. PARKING BRAKE ..... SET
2. FLIGHT CONTROLS ..... FREE/CORRECT
3. ELECTRIC TRIM (if installed) ..... CHECK
4. FUEL SELECTORS ..... ON
5. MIXTURE CONTROLS ..... FULL FORWARD
6. PROPELLER CONTROLS ..... FULL FORWARD
7. THROTTLES ..... 1500 RPM
8. PROPELLER FEATHERING ..... CHECK
9. THROTTLES ..... 2000 RPM
10. MAGNETOS (175/50) ..... CHECK
11. PROPELLER GOVERNORS ..... CHECK
12. ENGINE INSTRUMENTS/ANNUNCIATORS ..... CHECK
13. ALTERNATORS ..... CHECK
14. CARBURETOR HEAT ..... ON/CHECK
15. THROTTLES ..... CLOSE
16. CARBURETOR HEAT ..... OFF
17. THROTTLES ..... 1000 RPM
18. MIXTURES ..... LEAN
19. BEFORE TAKEOFF "RUN-UP" CHECKLIST ..... COMPLETE

1. PARKING BRAKE **SET**

Apply pressure to the top part of the rudder pedals while pulling the parking brake knob out to SET the PARKING BRAKE.

WARNING

Do not rely on the parking brake solely to keep the aircraft stationary. Apply and maintain brake pressure continually throughout the engine run-up procedures.

2. FLIGHT CONTROLS **FREE/CORRECT**

Accomplish a "box check" by moving the yoke full travel in all directions and check for full movement of the rudder in both directions. This will ensure that all FLIGHT CONTROLS are FREE and CORRECT, and move within their full limits without any restrictions.

BEFORE TAKEOFF "RUN-UP" CHECKLIST (continued)

3. ELECTRIC TRIM (if installed) **CHECK**

If installed, CHECK the ELECTRIC TRIM as follows:

a. Depress the electric trim On/Off switch to the ON position.

b. Depress the split pilot yoke-mounted electric trim switches simultaneously forward, then aft, verifying each time that the stabilator trim wheel and its indicator moves in the appropriate direction.

c. While moving the stabilator trim in either direction, verify that the control yoke cut-off switch disables the electric trim function.

d. While depressing the electric trim interrupt switch, verify that the stabilator trim wheel stops. Verify that the stabiltor trim wheel moves in the appropriate direction when the trim interrupt switch is released.

e. Depress the electric trim On/Off switch to the OFF position and depress the split pilot yoke-mounted electric trim switches simultaneously forward and aft, each time verifying that the stabilator trim wheel and its indicator does not move. This test ensures that electric trim will disengage in the event of an electric trim malfunction.

f. Depress the electric trim On/Off switch to the ON position.

4. FUEL SELECTORS **ON**

Verify that both FUEL SELECTORS are in the ON position.

5. MIXTURE CONTROLS **FULL FORWARD**

Place both MIXTURE CONTROLS to the FULL FORWARD (Full Rich) position.

6. PROPELLER CONTROLS **FULL FORWARD**

Verify that both PROPELLER CONTROLS are in the FULL FORWARD position.

BEFORE TAKEOFF "RUN-UP" CHECKLIST (continued)

7. THROTTLES **1500 RPM**

After checking that the area behind the aircraft is clear, check engine instruments and smoothly move the THROTTLES forward to set 1500 RPM.

8. PROPELLER FEATHERING **CHECK**

Check PROPELLER FEATHERING by moving the propeller controls to the full aft position. Do not allow a drop of more than 500 RPM.

NOTE

Propeller feathering will be conducted until an immediate drop in engine RPM occurs (no more than 3 cycles). If after 3 cycles, there is no drop in engine RPM, no drop in oil pressure, or oil is observed on the engine cowl, return the aircraft to the Fleet Maintenance Department.

9. THROTTLES **2000 RPM**

Smoothly advance the THROTTLES to set 2000 RPM.

10. MAGNETOS (175/50) **CHECK**

CHECK the MAGNETOS, starting with the left engine, by depressing the Left magneto switch to the OFF position and noting the decrease in RPM. Depress the Left magneto switch to the ON position. Repeat this procedure for the Right magneto. Then, check the right engine magnetos in the same manner. The maximum decrease in RPM is 175 RPM. The maximum difference in the decrease in RPM between the magnetos on one engine is 50 RPM.

NOTE

After checking one magneto, do not check the next magneto until engine returns to 2000 RPM. Keep engine operation on one magneto to a minimum. Ensure that all magneto switches are in the ON position after the magneto check.

If a fouled spark plug is suspected: 1) Smoothly advance the throttle to set 2500 RPM, 2) Lean the mixture to peak EGT for 45-60 seconds; 3) Enrichen the mixture to FULL RICH, 4) Smoothly reduce the throttle to set 2000 RPM; then, 5) Proceed with the magneto check.

BEFORE TAKEOFF "RUN-UP" CHECKLIST (continued)

11. PROPELLER GOVERNORS **CHECK**

CHECK the PROPELLER GOVERNORS by moving the propeller controls aft to set 1900 RPM. Smoothly advance the throttles to increase manifold pressure one (1) inch. Propeller speed should remain at 1900 RPM, indicating properly functioning governors. Reduce the manifold pressure one (1) inch and set the propeller controls FULL FORWARD to re-set 2000 RPM.

12. ENGINE INSTRUMENTS/ANNUNCIATOR **CHECK**

CHECK the following ENGINE INSTRUMENTS:

- **Ammeters and Vacuum Gauge:** Check that the ammeters are indicating a load (at least for normal battery charging). Verify that the suction gauge is indicating between 4.8" to 5.2" hg to ensure that adequate vaccum is being provided.

- **Oil Pressure and Oil Temperature Gauges:** Verify that the oil pressure gauge is indicating between 55-90 psi and the oil temperature gauge is indicating between 75°-245° F.

- **Fuel Pressure and Fuel Quantity Gauges:** Verify that the fuel pressure gauges are indicating between 0.5 to 8 psi. Check the fuel quantity guages for proper indications.

Check that all ANNUNCIATOR lights are extinguished.

13. ALTERNATORS **CHECK**

Check the ammeters for normal indications.

CAUTION

DO NOT TURN ALTERNATORS OFF TO CHECK AMMETER LOADS.

BEFORE TAKEOFF "RUN-UP" CHECKLIST (continued)

14. CARBURETOR HEAT **ON/CHECK**
Move the CARBURETOR HEAT controls down to the ON position one at a time and CHECK for a decrease in RPM.

15. THROTTLES **CLOSE**
With both carburetor heats ON, smoothly reduce both THROTTLES to the CLOSE position and check engine operation. The engines should operate smoothly at 500-600 RPM.

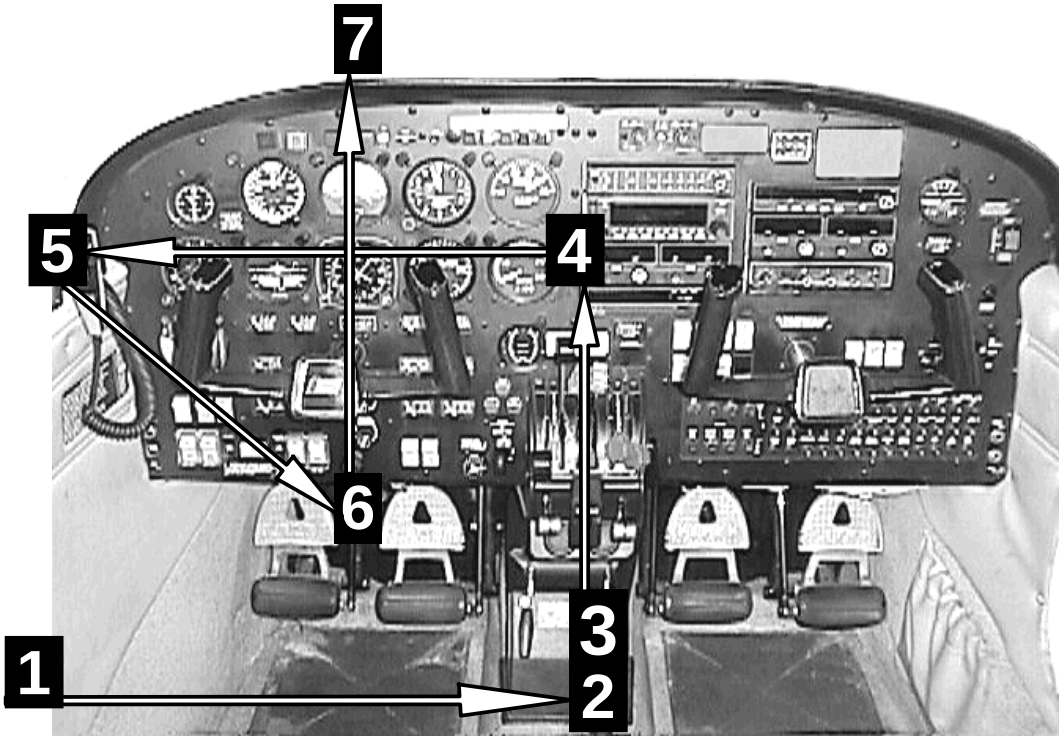
16. CARBURETOR HEAT **OFF**
Move the CARBURETOR HEAT controls up to the OFF position one at a time and CHECK for an increase in RPM.

17. THROTTLES **1000 RPM**
Increase the THROTTLES to set 1000 RPM.

18. MIXTURES **LEAN**
LEAN the MIXTURES by slowly bringing each Mixture Control aft. During this action, the engine RPM will slowly increase as the best power mixture setting is attained. When the engine RPM begins to drop, enrichen the mixture to return the engine speed to its highest RPM.

19. BEFORE TAKEOFF "RUN-UP" CHECKLIST **COMPLETE**
Upon completion of the BEFORE TAKEOFF "RUN-UP" CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

BEFORE TAKEOFF FLOW



OBJECTIVE:

To configure the aircraft for departure.

BEFORE TAKEOFF CHECKLIST

For repeated takeoffs and landings, complete the Final Items and Takeoff Flows, and Checklists for EACH takeoff.

1. PRE-TAKEOFF BRIEFING ..... COMPLETE
2. STABILATOR TRIM/RUDDER TRIM ..... N (Neutral)
3. FLAPS ..... 0°/VERIFY
4. FLIGHT INSTRUMENTS/AVIONICS ..... SET
5. CABIN DOOR/STORM WINDOW ..... CLOSE/LATCH
6. PARKING BRAKE ..... RELEASE
7. TRAFFIC ..... CHECK
8. BEFORE TAKEOFF CHECKLIST ..... COMPLETE

1. PRE-TAKEOFF BRIEFING **COMPLETE**

Provide a verbal PRE-TAKEOFF BRIEFING that covers how emergency situations would be handled during takeoff (see the Sample *Pre-Takeoff Briefing below)*. Complete the briefing by clarifying who will be Pilot in Command.

Sample Pre-Takeoff Briefing

"We are using Runway 7 Left at November 5; 4,500 feet available. We need 1,050 feet for takeoff. There are trees at the end of the runway. No wake turbulence is expected. At takeoff, the wind will be from our right at 7 knots, so ailerons will be positioned to the right. V_R is 75 KIAS; initial climb speed is 88 KIAS. If there is an engine failure or a system malfunction:

- ***Before rotation**, I will close both throttles, maintain directional control with rudder to remain on the runway, and brake as required.*
- ***After rotation with runway available for landing**, I will reduce throttles and land on the remaining runway.*
- ***After rotation with no runway available or gear in transit**, I will execute one engine inoperative procedures and evaluate climb performance for a return to the airport or to make a controlled off-airport landing."*

BEFORE TAKEOFF CHECKLIST (continued)

2. STABILATOR TRIM/RUDDER TRIM **N (Neutral)**
Verify that the STABILATOR TRIM and the RUDDER TRIM are set to the N (Neutral) position.

3. FLAPS **0°/VERIFY**
VERIFY that the FLAPS are set to 0°.

4. FLIGHT INSTRUMENTS/AVIONICS **SET**
Check that the FLIGHT INSTRUMENTS and AVIONICS are SET for takeoff. Check the altimeter and HSI for proper indications and confirm that the appropriate frequencies have been selected.

5. CABIN DOOR/STORM WINDOW **CLOSE/LATCH**
CLOSE (do not slam) the CABIN DOOR and LATCH the door first with the cabin door side latch, followed by the top latch. After latching, push out on door to confirm that it is securely latched.

CLOSE the pilot-side STORM WINDOW and LATCH it with the rotating latch at the top of the window.

6. PARKING BRAKE **RELEASE**
Push the Parking Brake knob IN fully to RELEASE the PARKING BRAKE.

7. TRAFFIC **CHECK**
Turn the airplane towards the approach end of the runway and visually CHECK that the final is clear of TRAFFIC.

8. BEFORE TAKEOFF CHECKLIST **COMPLETE**
Upon completion of the BEFORE TAKEOFF CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

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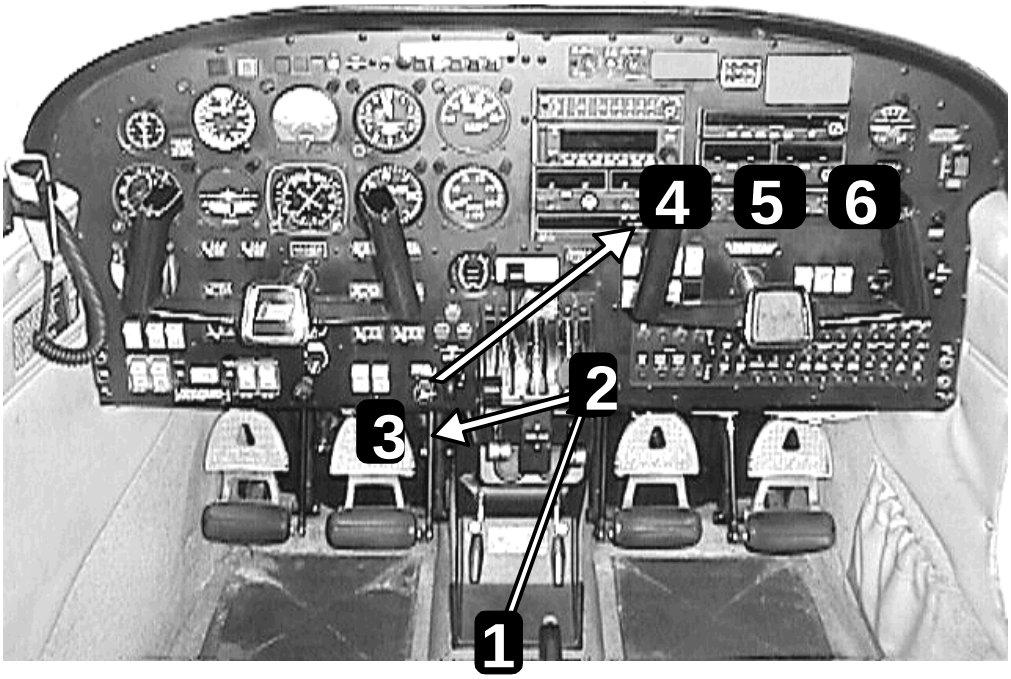
BEFORE TAKEOFF "FINAL ITEMS" FLOW



OBJECTIVE:

To configure the aircraft for takeoff.

BEFORE TAKEOFF "FINAL ITEMS" CHECKLIST

1. FUEL SELECTORS ..... ON
2. MIXTURE CONTROLS ..... FULL FORWARD (Full Rich)
3. ELECTRIC FUEL PUMPS ..... ON
4. LIGHTS ..... ON
5. PITOT HEAT ..... OFF (ON)
6. TRANSPONDER ..... ALT

Verification not required

1. FUEL SELECTORS **ON**

Verify that both FUEL SELECTORS are in the ON position.

2. MIXTURE CONTROLS **FULL FORWARD (Full Rich)**

Place the MIXTURE CONTROLS in the FULL FORWARD (Full Rich) position for takeoff (for high elevation airport operations, see NOTE, page 16).

3. ELECTRIC FUEL PUMPS **ON**

Depress the switches for both ELECTRIC FUEL PUMPS to the ON position and check that the fuel pressures increase slightly.

4. LIGHTS **ON**

Turn the LIGHTS ON as appropriate:

- **Day:** Turn the landing lights, recognition lights, and strobe lights ON for collision avoidance.
- **Night:** Turn the landing lights and recognition lights ON for takeoff visibility and collision avoidance. Nav lights should be ON per 14 CFR Part 91.209. Turn the Strobe Lights ON only after taxiing onto the runway or, to avoid distraction and disorientation, when safely airborne.

NOTE

Avoid shining lights directly at another aircraft. Turn off strobe lights during low visibility to avoid becoming distracted and disoriented.

5. PITOT HEAT **OFF (ON)**

Verify that the PITOT HEAT is OFF, or ON if the outside air temperature is 50°F (10°C) or below with visible moisture (i.e. clouds, fog, mist, rain, etc.).

BEFORE TAKEOFF "FINAL ITEMS" CHECKLIST (continued)

6. TRANSPONDER **ALT**

Depress the ALT button on the TRANSPONDER.

Verification not required

NOTE

To ensure that the pilot's total attention to the runway and final approach environment remains uncompromised by any Before Takeoff task, when ready for takeoff and holding short:

<u>At tower controlled airports</u>:

1. **Contact the tower to advise, "Ready for Takeoff."**
2. **When a takeoff or "position and hold" clearance has been received, while still holding short (and not moving), conduct the Before Takeoff "Final Items" flow.**
3. **Upon completion of the Before Takeoff "Final Items" flow, ensure that the runway and final approach environments are clear before proceeding onto the runway for takeoff, or position and hold, as appropriate.**
4. **Refuse any "Immediate Takeoff" clearance if you are unable to accomplish the above.**

<u>At uncontrolled airports</u>:

1. **Make the takeoff announcement.**
2. **While still holding short (and not moving), conduct the Before Takeoff "Final Items" flow.**
3. **Upon completion of the Before Takeoff "Final Items" flow, ensure that the runway and final approach environments are clear before proceeding onto the runway for takeoff.**
4. **For collision avoidance reasons, avoid a "position and hold" situation on the runway when waiting for landing traffic to clear the runway.**

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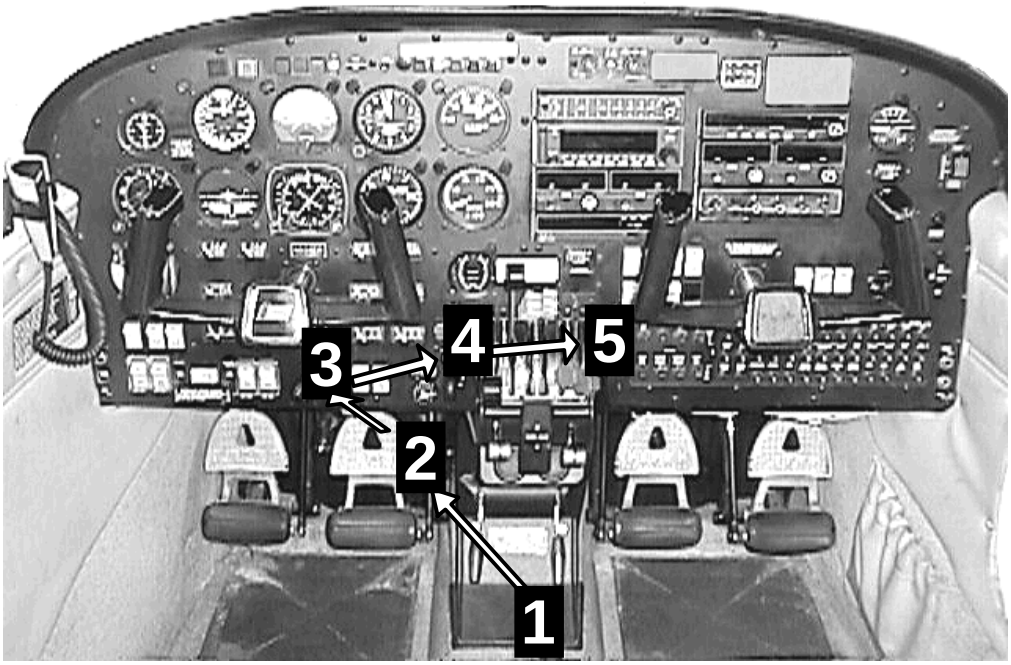
CLIMB FLOW



OBJECTIVE:

To configure the aircraft for optimum climb performance.

CLIMB CHECKLIST

Accomplish at 1000'AGL
(Not required if remaining in the traffic pattern.)

1. FLAPS	UP
2. GEAR SELECTOR	UP/NO LIGHTS
3. ELECTRIC FUEL PUMPS	ON
4. CLIMB POWER	SET
5. MIXTURE CONTROLS	FULL FORWARD
6. CLIMB CHECKLIST	COMPLETE

1. FLAPS **UP**
Verify that the FLAPS are in the UP position for optimum climb performance.

2. GEAR SELECTOR **UP/NO LIGHTS**
Verify that the GEAR SELECTOR is in the UP position and that NO LIGHTS (3 green landing gear indicator/1 red Gear Warn) are illuminated. When verified, call out, *"Gear Up, No Lights."*

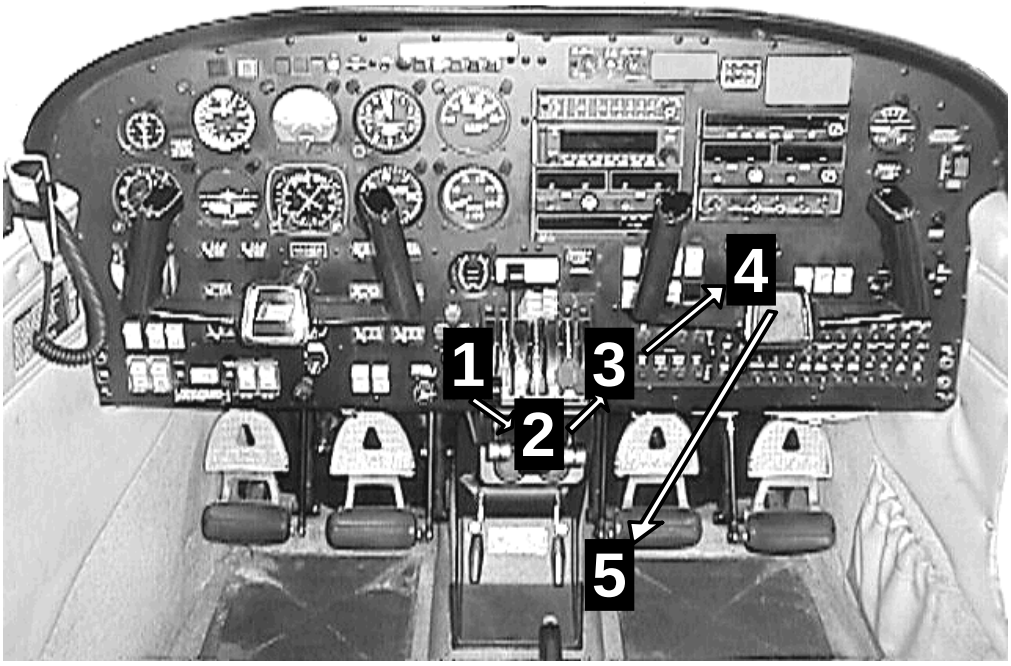
3. ELECTRIC FUEL PUMPS **ON**
Verify that the ELECTRIC FUEL PUMPS are ON.

4. CLIMB POWER **SET**
At 500' AFE, adjust for CLIMB POWER by reducing the throttles to SET 24.5" MP, then reduce the propeller controls to SET 2500 RPM. The manifold pressure will increase slightly when the propeller RPM is reduced. Adjust MP for every 1000 feet of climb.

5. MIXTURE CONTROLS **FULL FORWARD**
Verify that the MIXTURE CONTROLS are in the FULL FORWARD (Full Rich) position throughout the climb, only adjusting the mixtures as required to obtain smooth engine operation.

6. CLIMB CHECKLIST **COMPLETE**
Upon completion of the CLIMB CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

CRUISE FLOW



OBJECTIVE:

To configure the aircraft for optimum cruise performance.

CRUISE CHECKLIST

Not required if remaining in the traffic pattern.

1. CRUISE POWER .....SET
2. ELECTRIC FUEL PUMPS..... OFF
3. MIXTURES..... LEAN
4. LANDING LIGHTS .....ON (OFF)
5. COWL FLAPS .....CLOSE (OPEN)
6. CRUISE CHECKLIST.....COMPLETE

1. CRUISE POWER **SET**

Maintain climb power throughout the level off and until the desired cruise airspeed is reached. Then, reduce the throttles and SET the props for the desired CRUISE POWER setting (for training, 23" MP/2300RPM).

2. ELECTRIC FUEL PUMPS **OFF**

No lower than 1000' AGL, depress the switches for the ELECTRIC FUEL PUMPS to the OFF position (one at a time). Check the fuel pressures. A slight decrease in fuel pressure may be observed.

3. MIXTURES **LEAN**

LEAN the MIXTURES until the EGT peaks on the EGT indicator, then:

- **Economy Cruise Mixture:** Leave the Mixture Controls set where peak EGT was obtained.
- **Best Power Cruise Mixture:** Enrichen the mixtures until the EGT indicator stabilizes at 125° less than (below) peak EGT. A Best Power Mixture setting will result in an increase in fuel flow and a reduction in range.

NOTE

Cylinder Head Temperature (CHT) should be maintained below 435° C during Best Power cruise and below 400° C during Economy Cruise.

CRUISE CHECKLIST (continued)

4. LANDING LIGHTS **ON (OFF)**

Verify that the LANDING LIGHTS and recognition lights are ON for collision avoidance precautions. The strobe lights should remain ON. Turn the lights OFF only when operating in clouds, low visibility conditions, at night, or in any other condition where having the lights ON would compromise safety of flight.

5. COWL FLAPS **CLOSE (OPEN)**

CLOSE (OPEN) the COWL FLAPS as appropriate to maintain proper CHT.

6. CRUISE CHECKLIST **COMPLETE**

Upon completion of the CRUISE CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

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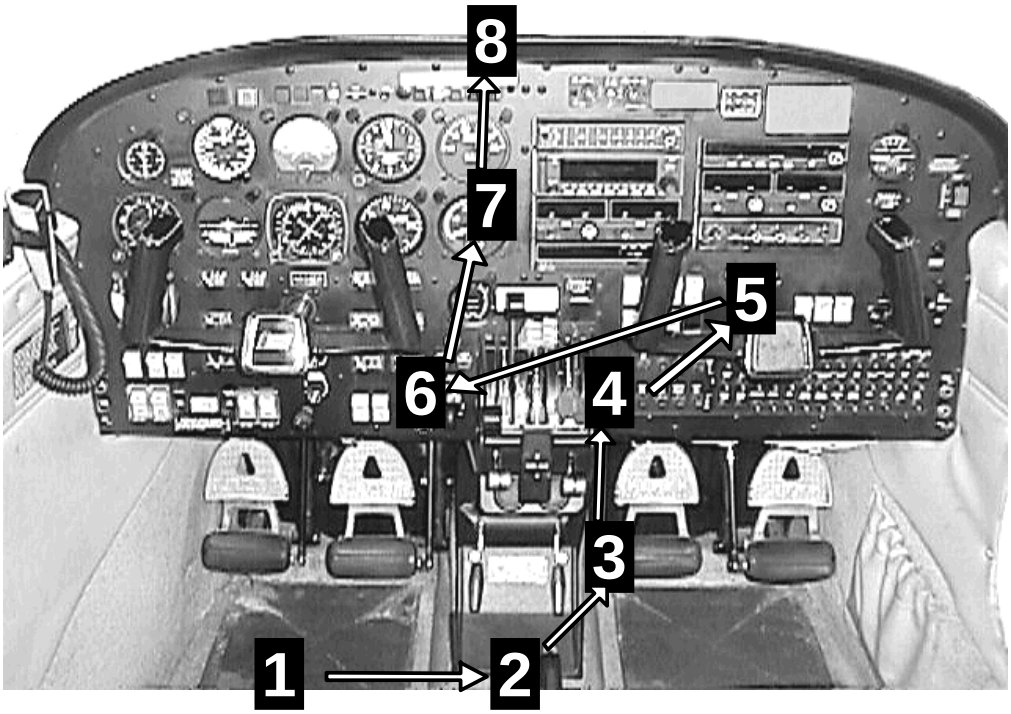
DESCENT FLOW



OBJECTIVE:

To configure the aircraft for an approach or arrival.

DESCENT CHECKLIST

Not required if remaining in the traffic pattern. Accomplish before beginning a descent from cruise altitude, or within 10 nm of the airport if a descent is not required. Copy ATIS and Brief the approach or arrival prior to beginning the Checklist. The "A-B-C" check is a systematic method for preparing for arrival.

1. APPROACH BRIEFING ..... COMPLETE
2. FUEL SELECTORS ..... ON
3. COWL FLAPS ..... CLOSE (OPEN)
4. MIXTURES ..... ENRICHEN/FULL RICH
5. LIGHTS ..... ON
6. AVIONICS/FLIGHT INSTRUMENTS ..... CHECK/SET
7. SEATBELTS/HARNESSES ..... ON
8. DESCENT CHECKLIST ..... COMPLETE

1. APPROACH BRIEFING **COMPLETE**

COMPLETE the APPROACH BRIEFING to include:

- Altimeter Setting
- Traffic Watch
- NOTAMs
- Windshear and Braking Conditions
- Terrain Obstacles
- Details unique to the Airport/Approach
- Runway to be used
- Traffic Pattern Entry
- HSI Corrected to the Magnetic Compass
- Crosswind
- Runway Exit Plan

In addition, if an instrument approach procedure is expected, include in the APPROACH BRIEFING:

DESCENT CHECKLIST (continued)

1. APPROACH BRIEFING (continued) **COMPLETE**

- Name of Airport
- Type of Approach
- Approach Chart Number and Date
- Navaid Frequency
- Inbound Course
- FAF/Glideslope Crossing Altitude
- DA(H)/MDA
- Missed Approach
- Time or Distance for Approach
- Visibility Requirements
- Approach Lights

2. FUEL SELECTORS **ON**

Verify that both FUEL SELECTORS are in the ON position.

3. COWL FLAPS **CLOSE (OPEN)**

CLOSE (OPEN) the COWL FLAPS as required to maintain proper CHT.

4. MIXTURES **ENRICHEN/FULL RICH**

ENRICHEN the MIXTURES throughout the descent. If descending below 3000' density altitude, place the Mixture Controls in the FULL RICH (Full Forward) position.

5. LIGHTS **ON**

Ensure that the LIGHTS are ON as appropriate:

- **Day:** Ensure that the the landing lights, recognition lights, and strobe lights are ON for collision avoidance.

- **Night:** Turn the landing light, recognition light, and strobe lights are ON for takeoff visibility and collision avoidance. Nav lights should be ON per 14 CFR Part 91.209.

DESCENT CHECKLIST (continued)

6. AVIONICS/FLIGHT INSTRUMENTS CHECK/SET

CHECK the FLIGHT INSTRUMENTS by verifying that the current barometric pressure is SET in the Kollsman window and that the HSI is SET to the magnetic compass (known heading). CHECK the AVIONICS by verifying that the communication and navigation frequencies are SET:

If IFR:

- Verify that the marker beacon switch is ON, if needed
- Set navigation/communication frequencies for the planned approach
- Set anticipated frequencies on standby
- If equipped, set the ADF receiver to the desired frequency
- Set the desired course in the HSI and CDI
- Identify the navaids to be used for approach
- Set the GPS for the approach procedure or destination airport
- If equipped, set the Autopilot/Flight Director for the approach, if desired.

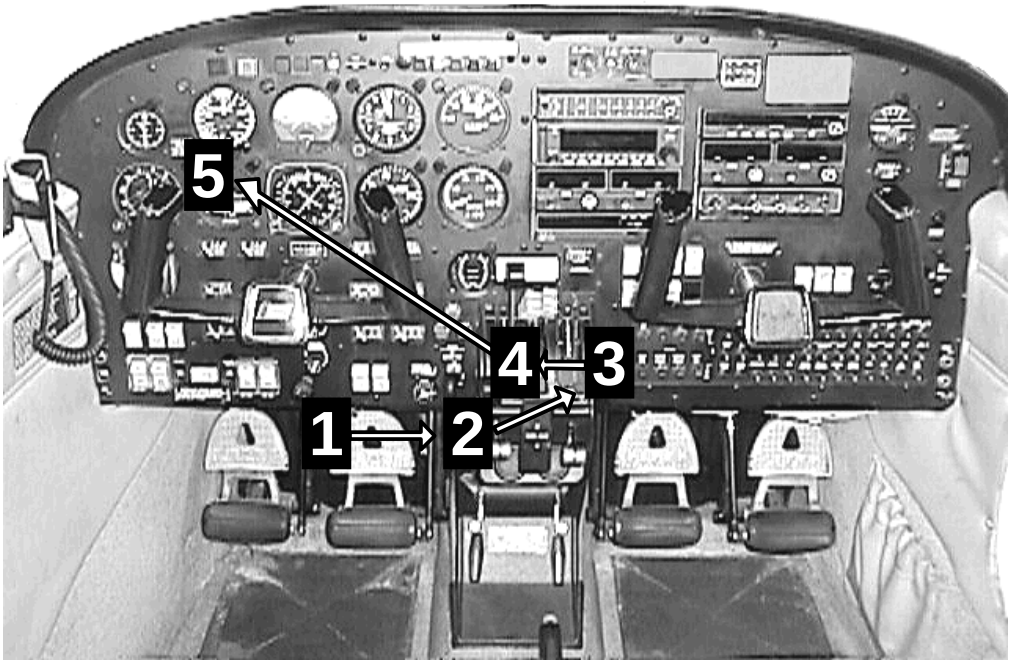
7. SEATBELTS/HARNESSES ON

Ensure that all occupants' SEATBELTS and shoulder HARNESSES, if applicable, are ON and adjusted (per 14 CFR Part 91.107).

8. DESCENT CHECKLIST COMPLETE

Upon completion of the DESCENT CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

DESCENT "FINAL ITEMS" FLOW



OBJECTIVE:

To properly configure the aircraft for landing.

DESCENT "FINAL ITEMS" CHECKLIST

Accomplish prior to 300' AFE.

1. ELECTRIC FUEL PUMPS..... ON
2. GEAR SELECTOR.....DOWN/ 3 GREEN
3. MIXTURE CONTROLS ..... FULL FORWARD
4. PROPELLER CONTROLS..... FULL FORWARD
5. AUTOPILOT (if installed).....DISCONNECT
6. DESCENT "FINAL ITEMS" CHECKLIST.....COMPLETE

1. ELECTRIC FUEL PUMPS **ON**
Verify that both ELECTRIC FUEL PUMPS are ON.

2. GEAR SELECTOR **DOWN/ 3 GREEN**
Verify that the GEAR SELECTOR is in the DOWN position. Visually check to confirm that the 3 GREEN indicator lights are illuminated and that the nose gear appears extended in the external engine nacelle mirror.

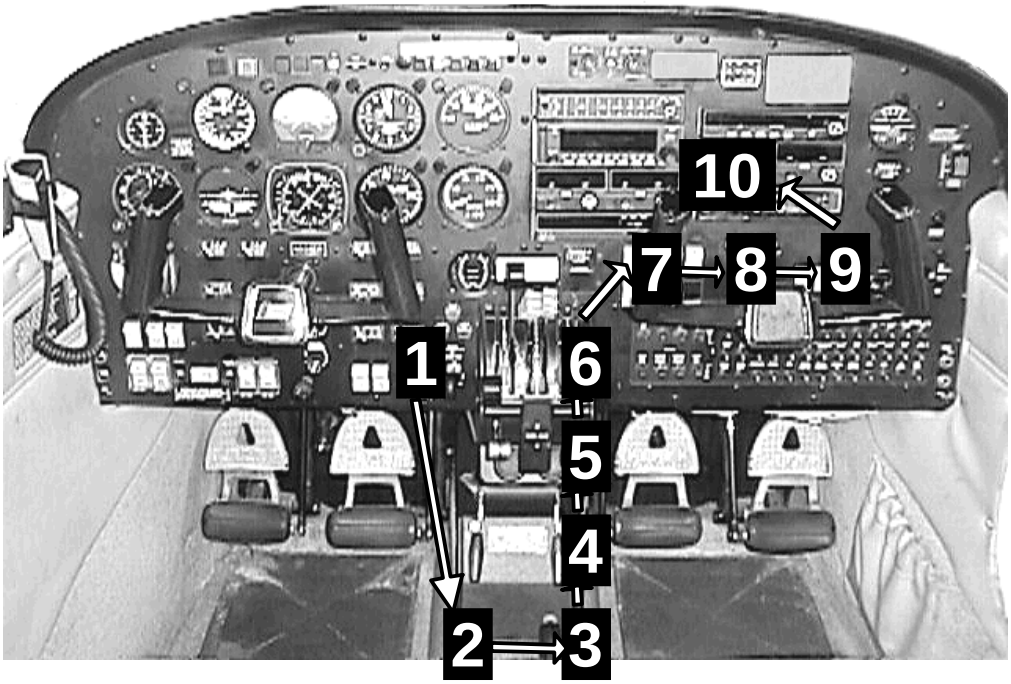
3. MIXTURE CONTROLS **FULL FORWARD**
Place the MIXTURE CONTROLS in the FULL FORWARD (Full Rich) position.

4. PROPELLER CONTROLS **FULL FORWARD**
Verify that the PROPELLER CONTROLS are in the FULL FORWARD position.

5. AUTOPILOT (if installed) **DISCONNECT**
Depress the Control Wheel DISCONNECT switch and verify that the AUTOPILOT is Off for landing.

6. DESCENT "FINAL ITEMS" CHECKLIST **COMPLETE**
Upon completion of the DESCENT "FINAL ITEMS" CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

AFTER LANDING FLOW



OBJECTIVE:

To “clean up” the aircraft after landing in preparation for taxi.

AFTER LANDING CHECKLIST

Accomplish only when clear of the runway and stopped completely.

1. ELECTRIC FUEL PUMPS ..... OFF
2. STABILATOR TRIM/RUDDER TRIM ..... N (Neutral)
3. FLAPS ..... RETRACT 0°
4. COWL FLAPS ..... OPEN
5. CARBURETOR HEAT CONTROLS ..... OFF
6. MIXTURES ..... LEAN
7. LIGHTS (except Fin Strobe) ..... OFF
8. PITOT HEAT ..... OFF
9. CABIN HEAT ..... AS REQUIRED
10. TRANSPONDER ..... STBY
11. AFTER LANDING CHECKLIST ..... COMPLETE

1. ELECTRIC FUEL PUMPS **OFF**

Depress the switches for the ELECTRIC FUEL PUMPS to the OFF position (one at a time). Check fuel pressures. A slight decrease in fuel pressure may be observed.

2. STABILATOR TRIM/RUDDER TRIM **N (Neutral)**

Set the STABILATOR TRIM and the RUDDER TRIM to the N (Neutral) position for takeoff.

3. FLAPS **RETRACT 0°**

Before changing the flap position on the ground, verify that you have the flap control handle and call out, *"Flaps Identified"*. Wait for the IP to respond, *"Flaps Verified"*, then RETRACT the FLAPS the the 0° position, visually verifying that the flaps are moving towards the retracted position.

4. COWL FLAPS **OPEN**

OPEN the COWL FLAPS as appropriate to maintain proper CHT.

5. CARBURETOR HEAT CONTROLS **OFF**

Verify that the CARBURETOR HEAT CONTROLS are in the OFF position.

AFTER LANDING CHECKLIST (continued)

6. MIXTURES **LEAN**

LEAN the MIXTURES by slowly bringing each Mixture Control aft. During this action, the engine RPM will slowly increase as the best power mixture setting is attained. When the engine RPM begins to drop, enrichen the mixture to return the engine speed to its highest RPM.

7. LIGHTS (except Fin Strobe) **OFF**

Adjust the LIGHTS (except the Fin Strobe) as appropriate:

- **Day:** Turn the landing lights, recognition lights, and strobe lights OFF.
- **Night:** Turn the recognition lights and strobe lights OFF. Use the landing lights as necessary for taxi. Nav lights should be ON per 14 CFR Part 91.209.

8. PITOT HEAT **OFF**

Verify that the PITOT HEAT switch is in the OFF position.

9. CABIN HEAT **AS REQUIRED**

Depress the CABIN HEAT switch AS REQUIRED for taxi. If the Janitrol heater was used during flight, but is no longer necessary for ground operations, depress the CABIN HEAT switch to the FAN position for at least two (2) minutes before depressing the CABIN HEAT switch to the OFF position. If the Janitrol heater is to be used during ground operations, prior to engine shutdown and with the air intake lever in the open position, depress the CABIN HEAT switch to the FAN position for two (2) minutes before depressing the CABIN HEAT switch to the OFF postion.

10. TRANSPONDER **STBY**

Depress the STBY (Standby) button on the TRANSPONDER.

11. AFTER LANDING CHECKLIST **COMPLETE**

Upon completion of the AFTER LANDING CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

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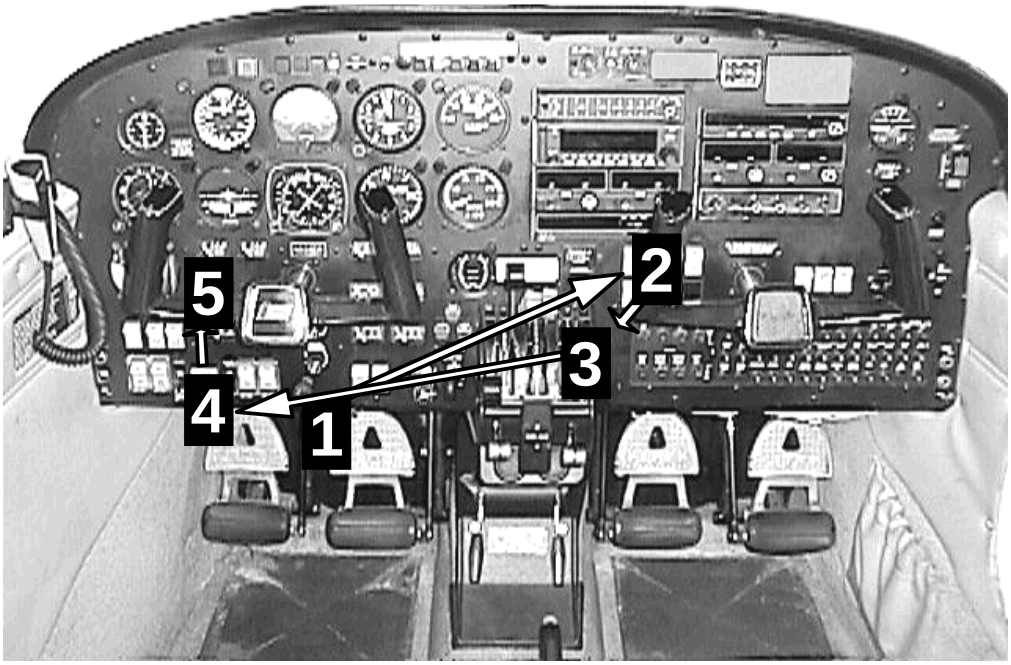
SHUTDOWN FLOW



OBJECTIVE:

To safely shut down the engines.

SHUTDOWN CHECKLIST

1. PARKING BRAKE .....SET
2. MIXTURE CONTROLS .....IDLE CUT-OFF
3. MAGNETO SWITCHES ..... OFF
4. ALTERNATOR SWITCHES ..... OFF
5. SHUTDOWN CHECKLIST .....COMPLETE

1. PARKING BRAKE **SET**

SET the PARKING BRAKE by applying pressure to the top part of the rudder pedals while pulling the parking brake knob aft.

2. MIXTURE CONTROLS **IDLE CUT-OFF**

Advance both engines to 1000 RPM, and then move both MIXTURE CONTROLS to the IDLE CUT-OFF position.

3. MAGNETOS **OFF**

After the propellers (engines) have come to a complete stop, depress all switches for the MAGNETOS to the OFF position to ground the magnetos, disabling the ignition system.

CAUTION

If the magnetos are turned OFF before the propellers (engines) stop, any fuel remaining in the cylinders will not ignite creating a hazard of igniting unexpectedly when the prop is rotated with the magnetos ungrounded, or it may effect engine priming on the next flight.

4. ALTERNATORS **OFF**

Depress the switches for the ALTERNATORS to the OFF position.

5. SHUTDOWN CHECKLIST **COMPLETE**

Upon completion of the SHUTDOWN CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

RAMP IN CHECKLIST

1. FLIGHT DATA (“Eagle Data”)..... RAMP IN
2. RADIO MASTER SWITCH ..... OFF
3. BATTERY MASTER SWITCH ..... OFF
4. RAMP IN CHECKLIST.....COMPLETE

1. FLIGHT DATA (“Eagle Data”) RAMP IN

Contact ERAU FLIGHT DATA (*“Eagle Data”*) on 122.825 MHz to RAMP IN by providing the aircraft’s status (“Up” or “Down”), parking spot location (e.g., “Charlie 10”), and the airplane’s Hobbs and Tach times.

NOTE

If the aircraft is “DOWN”, record the discrepancy on the Discrepancy Record form. If more than one discrepancy exists, list each discrepancy separately in the boxes provided. Record the Hobbs and Tach times on the Aircraft Flight Record form. Both forms are attached to the airplane’s clipboard.

2. RADIO MASTER SWITCH OFF

Depress the RADIO MASTER SWITCH to the OFF position.

3. BATTERY MASTER SWITCH OFF

Depress the BATTERY MASTER SWITCH to the OFF position.

4. RAMP IN CHECKLIST COMPLETE

Upon completion of the RAMP IN CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

SECURE CHECKLIST

1. LIGHTS (except Fin Strobe) ..... OFF
2. TRASH ..... REMOVE
3. SEAT BELT (as a control lock) ..... INSTALL
4. TIE-DOWNS ..... SECURE/LOCK
5. MAIN WHEELS ..... CHOCK
6. PARKING BRAKE ..... RELEASE
7. STORM WINDOW/CABIN DOOR ..... CLOSE/LOCK
8. POST-FLIGHT INSPECTION ..... COMPLETE
9. SECURE CHECKLIST ..... COMPLETE

1. LIGHTS **OFF**

Ensure that all interior and exterior aircraft LIGHTS (except Fin Strobe) are OFF.

2. TRASH **REMOVE**

REMOVE any and all TRASH from the cabin (even if it is not yours).

3. SEAT BELT (as a control lock) **INSTALL**

INSTALL the pilot-side SEAT BELT on the control yoke to restrict freedom of movement of the flight controls.

4. TIE-DOWNS **SECURE/LOCK**

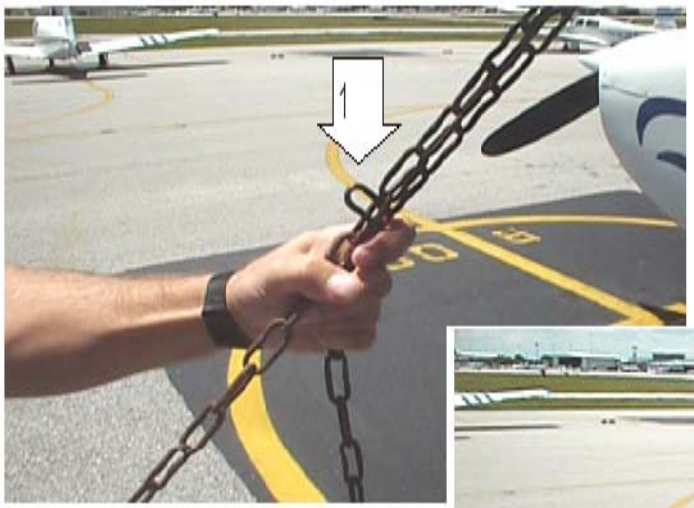
Install the TIE-DOWNS for the wings and tail. Use the tail tie-down to complete tightening the chains on the wings (see next page). Install the Master Lock through the tail tie-down chain links.

NOTE

If at an outlying airport and strong winds are not expected, you may temporarily substitute tie-downs with chocks on the nose gear.

SECURE CHECKLIST (continued)

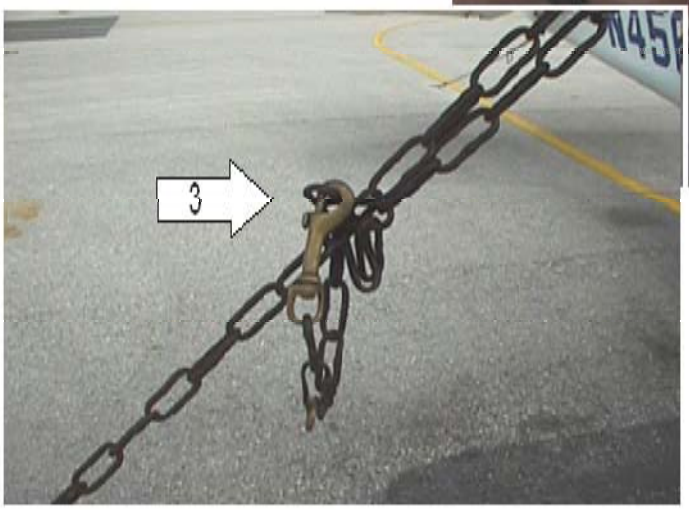
4. TIE-DOWNS (continued) SECURE/LOCK



1. Pull tight and insert the first link as shown.

2. Insert a second link through the first link.

3. Attach the snap bolt (clip) to the second link.



NOTE: The above procedure places the stress on the chain links, and not the clip. The clip is only there to hold the links in place

SECURE CHECKLIST (continued)

5. MAIN WHEELS **CHOCK**
Securely CHOCK the MAIN WHEELS.

6. PARKING BRAKE **RELEASE**
Push the parking brake knob IN fully to RELEASE the PARKING BRAKE.

7. STORM WINDOW/CABIN DOOR **CLOSE/LOCK**
CLOSE and latch the the STORM WINDOW. CLOSE the cabin DOOR and latch the side latch first, followed by the upper latch. LOCK the cabin door with the key provided.

8. POST-FLIGHT INSPECTION **COMPLETE**
COMPLETE a POST-FLIGHT INSPECTION of the aircraft by conducting a 360° walk-around, checking for any damage that may have occurred during the flight, that all lights are OFF, and that the airplane is properly secured. Confirm that the tail tie-down is secured properly with a Master Lock.

NOTE

Verify that any and all discrepancies (if any) are recorded on the Discrepancy Record form. If more than one discrepancy exists, list each discrepancy separately in the boxes provided. Verify that Hobbs and Tach times have been recorded on the Aircraft Flight Record form. Both forms are attached to the airplane's clipboard. Return all Gust Locks (if equipped) to Flight Dispatch.

9. SECURE CHECKLIST **COMPLETE**
Upon completion of the SECURE CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

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Section - 3

EMERGENCY PROCEDURES

INTRODUCTION

Successful handling of emergency situations is largely dependent on the judgment and skill of the flight crew. All emergency conditions should be handled with planning and organization. Although it is not possible to write specific procedures to cover every facet of every emergency or irregularity a pilot may confront, it is possible to establish certain operating guidelines. The overriding matter of importance is very basic: **someone must fly the airplane.** In addition to executing the required procedure(s), the pilot must still devote primary attention to the control and navigation of the airplane with regard to terrain, weather, air traffic control, and airplane configuration.

There are some situations which always require a landing at the nearest suitable airport. These situations include, but are not limited to, cabin smoke or fire that persists, loss of equipment cooling, and electrical faults that result in only leaving a single critical system remaining. In any event, it is the responsibility of the pilot in command to assess the situation and execute sound judgment to determine the safest course of action to be taken. It is stressed that for persistent smoke, or a fire that cannot be positively confirmed to be completely extinguished, the earliest possible descent, landing, and passenger evacuation should be accomplished.

Cycling or resetting “tripped” circuit breakers shall not be done indiscriminately. Cycling or resetting circuit breakers on the ground is acceptable, except for those prohibited in any procedure. Before cycling or resetting a circuit breaker in flight, the pilot in command shall consider available resources such as the Pilot’s Operating Handbook (POH), the ERAU Fleet Maintenance Department, and pilot experience to ensure that no restriction(s) exist.

A tripped circuit breaker may be reset one time after a 90-second cooling period. Consider the relative importance of the inoperative component to the remainder of the flight, as well as other indications (i.e., other tripped circuit breakers, etc.) prior to resetting the associated circuit breaker.

Discrepancy Reporting/Flight Log Entries

Reporting of a system and other airplane discrepancies to the ERAU Fleet Maintenance Department is of the utmost importance. Prompt notification not only allows Fleet Maintenance to respond quickly, but to pre-plan for down line maintenance. In addition, reporting certain mechanical discrepancies such as: engine failures, fire warnings, and fire extinguisher discharges are required by regulation.

Emergency Procedures

Initially, flying the airplane and confirming an emergency are most important steps in dealing with any emergency. Emergency procedures may include immediate action items that are of such critical nature that they must be accomplished from memory. Memory steps are enclosed in a Dashed Box. Memory steps are to be called out and accomplished prior to reading the checklist. When accomplishing the checklist, the pilot reads the checklist aloud, taking note of all instructions. Conditions permitting, the Pilot Flying (PF) maintains an awareness of checklist progress and announces when the emergency procedure is complete.

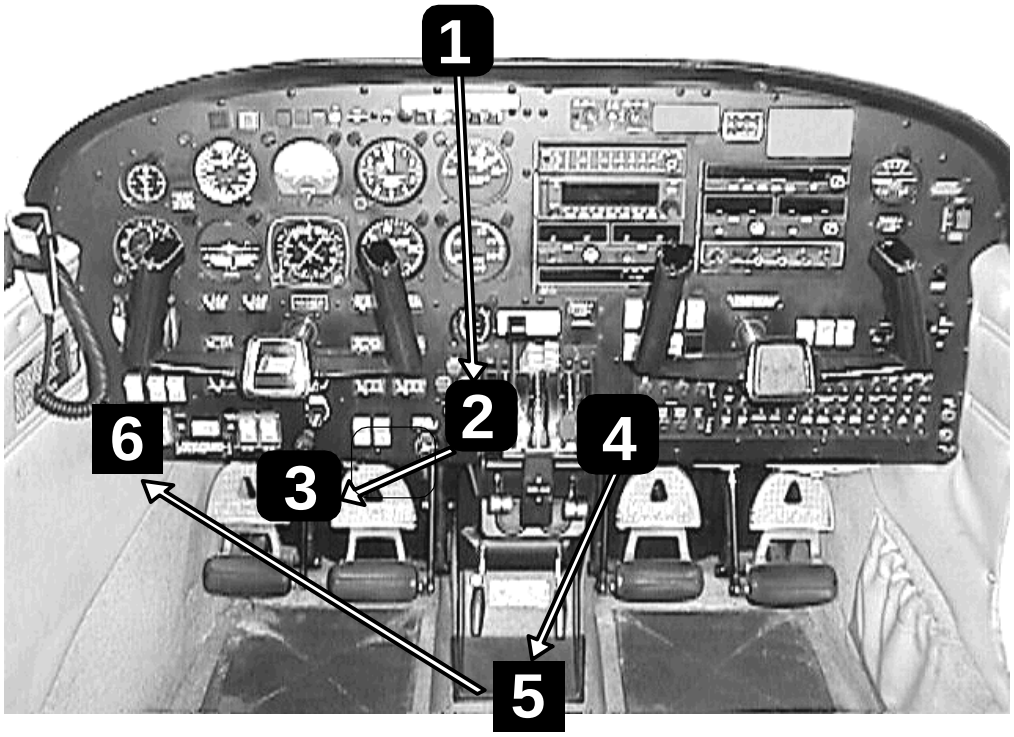
Communications

Proper communication during normal, emergency, and abnormal situation is essential to safe and effective mission management. Such situations include, but are not limited to, airplane system irregularities and emergencies, medical emergencies, and diversions. In such circumstances, the pilot should communicate as appropriate with:

- **ATC:** Declaring emergency and communicating intentions.
- **ERAU Dispatch:** Coordinating emergency support and/or diversions.
- **ERAU Fleet Maintenance Department:** Support for resolving and handling airplane system abnormalities.
- **FSS:** Obtaining weather updates and coordinating emergency support and/or diversions.

Advising control and resource groups of these situations as well as pilot intentions is paramount in utilizing all available resources to arrive at an informed plan of action.

ENGINE FAILURE DURING TAKEOFF FLOW (BELOW 75 KIAS OR GEAR DOWN)



OBJECTIVE:

To safely stop the airplane if an engine fails during the takeoff roll when the speed is below 75 KIAS, or, if airborne at a speed below 75 KIAS when the landing gear is down (extended).

ENGINE FAILURE DURING TAKEOFF CHECKLIST (BELOW 75 KIAS OR GEAR DOWN)

If sufficient runway remains for a complete stop:

1. DIRECTIONAL CONTROL.....MAINTAIN
2. THROTTLES ..... CLOSE IMMEDIATELY
3. BRAKE (LAND AND BRAKE) .....AS REQUIRED

If insufficient runway remains for a complete stop:

4. MIXTURE CONTROLS .....IDLE CUT-OFF
5. FUEL SELECTORS ..... OFF
6. BATTERY MASTER SWITCH..... OFF

7. MAGNETO SWITCHES ..... OFF
8. ENGINE FAILURE DURING TAKEOFF CHECKLIST (BELOW 75 KIAS OR GEAR DOWN).....COMPLETE

If sufficient runway remains for a complete stop:

1. DIRECTIONAL CONTROL **MAINTAIN**

MAINTAIN DIRECTIONAL CONTROL of the aircraft, avoiding obstacles.

2. THROTTLES **CLOSE IMMEDIATELY**

Upon the first indication of an engine failure during the takeoff roll, CLOSE both THROTTLES IMMEDIATELY while maintaining directional control.

If airborne, land the airplane. CLOSE both THROTTLES as necessary to maintain sufficient airspeed for directional control, adjusting the pitch attitude to avoid a high sink rate.

When appropriate, advise ATC, or announce on the CTAF, that the takeoff has been aborted.

NOTE

Items 1 and 2 must be accomplished simultaneously. An aborted takeoff is a very critical maneuver requiring timely decision-making and reaction. In additon, for every takeoff, calculating an accelerate/stop distance is important for takeoff planning and aeronautical decision-making.

ENGINE FAILURE DURING TAKEOFF CHECKLIST (BELOW 75 KIAS OR GEAR DOWN) (continued)

3. BRAKE (LAND AND BRAKE) AS REQUIRED

When on the runway, BRAKE AS REQUIRED to stop straight ahead on the remaining runway, taking care not to lock the wheels. If airborne, LAND the airplane and BRAKE AS REQUIRED to stop straight ahead on the remaining runway. If able, exit the airplane onto a taxiway.

NOTE:

Avoid "locking" the wheels, which will cause skidding, resulting in an increase in the stopping distance, and may cause one or both main gear tires to blow.

If insufficient runway remains for a complete stop:

4. MIXTURE CONTROLS IDLE CUT-OFF

Move both MIXTURE CONTROLS to the IDLE CUT-OFF position.

5. FUEL SELECTORS OFF

Place both FUEL SELECTORS in the OFF position to stop the flow of fuel to the engines and reduce the possibilty of fire and injury to the crew members.

6. BATTERY MASTER SWITCH OFF

Depress the BATTERY MASTER SWITCH to the OFF position.

7. MAGNETO SWITCHES OFF

Depress all MAGNETO SWITCHES to the OFF position to ground the magnetos, disabling the ignition system.

8. ENGINE FAILURE DURING TAKEOFF CHECKLIST (BELOW 75 KIAS OR GEAR DOWN)

COMPLETE

Upon completion of the ENGINE FAILURE DURING TAKEOFF CHECKLIST (BELOW 75 KIAS or GEAR DOWN), verify that all items have been accomplished and that the checklist is COMPLETE.

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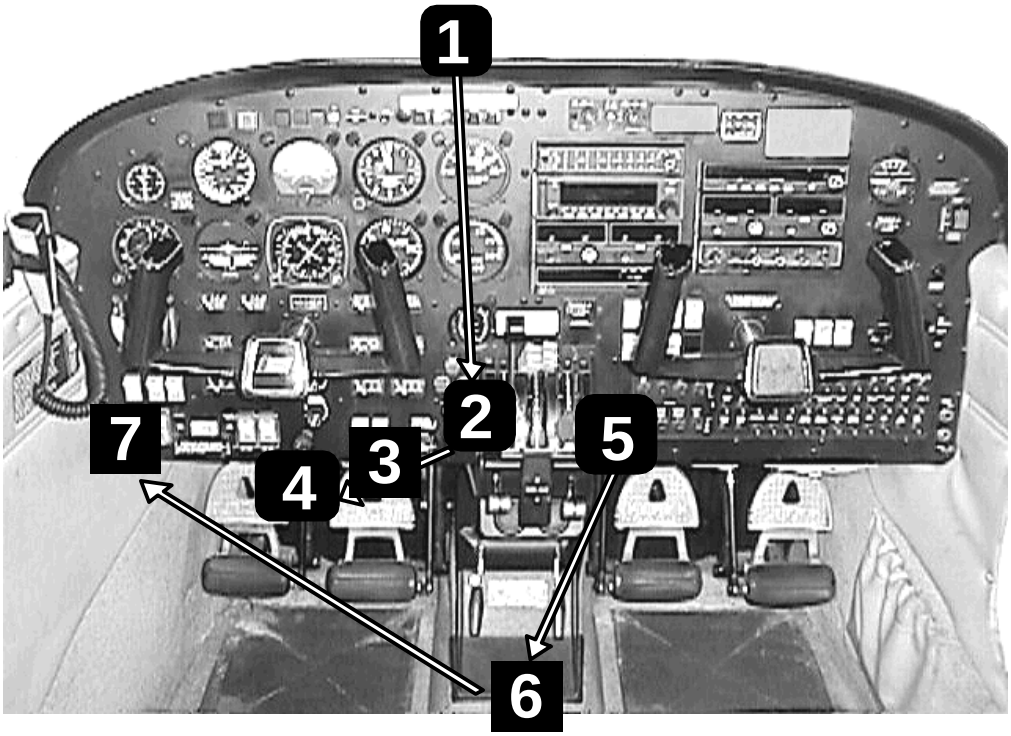
ENGINE FAILURE DURING TAKEOFF FLOW (ABOVE 75 KIAS, RUNWAY REMAINING)



OBJECTIVE:

To safely stop the airplane when an engine fails during the takeoff roll when the speed is above 75 KIAS, or when airborne immediately after liftoff at a speed above 75 KIAS.

ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, RUNWAY REMAINING)

Landing gear is DOWN, not in transit, and discontinuing the takeoff.

If sufficient runway remains for a complete stop:

1. DIRECTIONAL CONTROL.....MAINTAIN
2. THROTTLES ..... CLOSE
3. LAND..... STRAIGHT AHEAD
4. BRAKES.....AS REQUIRED

If insufficient runway remains for a complete stop:

5. MIXTURE CONTROLS .....IDLE CUT-OFF
6. FUEL SELECTORS ..... OFF
7. BATTERY MASTER SWITCH..... OFF

8. MAGNETO SWITCHES ..... OFF
9 ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, RUNWAY REMAINING) .....COMPLETE

If sufficient runway remains for a complete stop:

1. DIRECTIONAL CONTROL **MAINTAIN**

MAINTAIN DIRECTIONAL CONTROL of the aircraft, maneuvering as necessary to avoid any obstacles.

2. THROTTLES **CLOSE**

Upon the first indication of an engine failure during the takeoff roll, CLOSE both THROTTLES IMMEDIATELY while maintaining directional control.

If airborne, land the airplane. CLOSE both THROTTLES as necessary to maintain sufficient airspeed for directional control, adjusting the pitch attitude to avoid a high sink rate.

Advise ATC, or announce on the CTAF, that the takeoff has been aborted.

ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, RUNWAY REMAINING) (continued)

NOTE

Items 1 and 2 must be accomplished simultaneously. An aborted takeoff is a very critical maneuver requiring timely decision-making and reaction. In additon, for every takeoff, calculating an accelerate/stop distance is important for takeoff planning and aeronautical decision-making.

3. LAND **STRAIGHT AHEAD**

LAND STRAIGHT AHEAD, making small turns only to avoid obstructions.

4. BRAKES **AS REQUIRED**

Depress the BRAKES, AS REQUIRED, in order to stop on the remaining runway.

NOTE:

Avoid "locking" the brakes, which will cause skidding and result in an increase in the stopping distance.

If insufficient runway remains for a complete stop:

5. MIXTURE CONTROLS **IDLE CUT-OFF**

Move both MIXTURE CONTROLS to the IDLE CUT-OFF position.

6. FUEL SELECTORS **OFF**

Place both FUEL SELECTORS in the OFF position to stop the flow of fuel to the engines and reduce the possibilty of fire and injury to the crew members.

7. BATTERY MASTER SWITCH **OFF**

Depress the BATTERY MASTER SWITCH to the OFF position.

8. MAGNETO SWITCHES **OFF**

Depress all MAGNETO SWITCHES to the OFF position to ground the magnetos, disabling the ignition system.

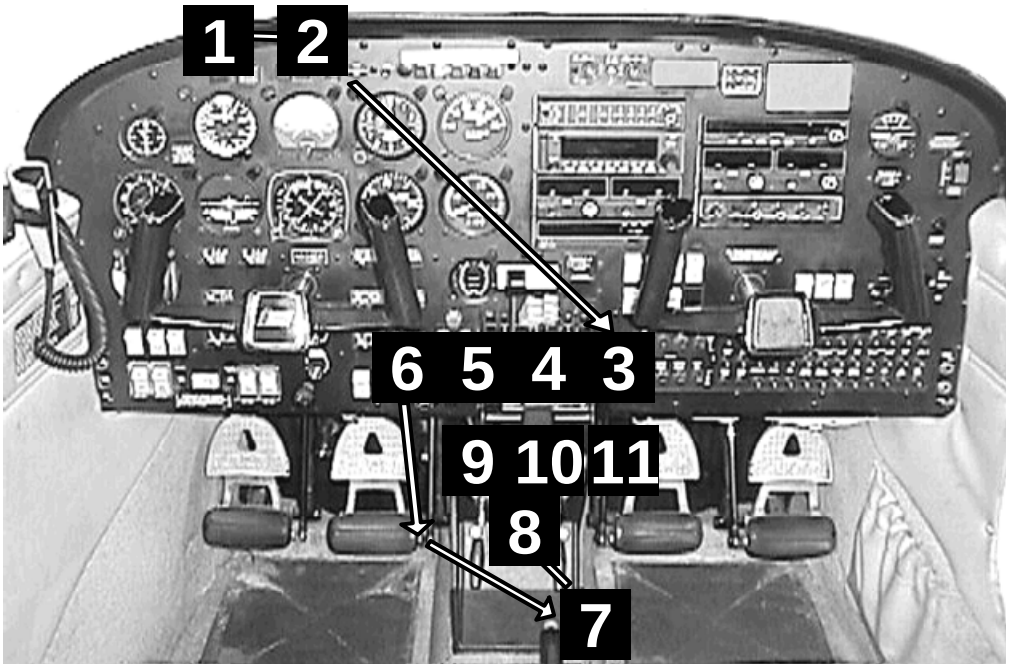
ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, RUNWAY REMAINING) (continued)

9. ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, RUNWAY REMAINING)

COMPLETE

Upon completion of the ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, RUNWAY REMAINING), verify that all items have been accomplished and that the checklist is COMPLETE.

ENGINE FAILURE DURING TAKEOFF FLOW (ABOVE 75 KIAS, NO RUNWAY REMAINING)



OBJECTIVE:

To safely continue the takeoff after an engine fails after liftoff above 75 KIAS with no runway remaining.

ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, NO RUNWAY REMAINING)

Landing gear is UP, or in transit, and continuing the takeoff.

WARNING

In many combinations of aircraft weight, configuration, ambient conditions and speed, negative climb performance may result. Refer to the PA-44-180, Seminole POH/IM, One Engine Operating - Gear Up (page 5-24, figure 5-19).

1. AIRSPEED ..... 88 KIAS (82 KIAS)
2. BANK..... 2° TO 3° INTO OPERATIVE ENGINE
3. MIXTURE CONTROLS ..... FULL FORWARD
4. PROPELLER CONTROLS..... FULL FORWARD
5. THROTTLES ..... FULL FORWARD
6. GEAR SELECTOR..... UP
7. FLAPS..... UP
8. INOPERATIVE ENGINE ..... IDENTIFY
9. THROTTLE (Inoperative Engine) .....VERIFY/CLOSE
10. PROPELLER (Inoperative Engine) .....FEATHER (950 RPM Min.)
11. MIXTURE CONTROL (Inoperative Engine) .....IDLE CUT-OFF

12. STABILATOR TRIM/RUDDER TRIM .....AS REQUIRED
13. AIRPORT .....RETURN

Engine Securing Procedure (Time/Altitude Permitting):

14. FUEL SELECTOR (Inoperative Engine)..... OFF
15. COWL FLAP (Inoperative Engine) ..... CLOSE
16. COWL FLAP (Operating Engine) .....AS REQUIRED
17. ELECTRIC FUEL PUMP (Inoperative Engine)..... OFF
18. MAGNETO SWITCHES (Inoperative Engine)..... OFF
19. ALTERNATOR SWITCH (Inoperative Engine)..... OFF
20. ELECTRICAL LOAD ..... REDUCE (if required)
21. X-FEED (Crossfeed) .....AS REQUIRED
22. ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, NO RUNWAY REMAINING).....COMPLETE

ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, NO RUNWAY REMAINING) (continued)

1. AIRSPEED **88 KIAS (82 KIAS)**

Adjust pitch as necessary to establish a pitch attitude (just above the level flight pitch attitude) to achieve and maintain an AIRSPEED of 88 KIAS (V_{YSE}), or 82 KIAS (V_{XSE}) until clearing obstacles.

NOTE

In some cases, V_{XSE} (82 KIAS) may be needed to clear obstacles. Once all obstacles have been cleared, accelerate to 88 KIAS.

2. BANK **2° TO 3° INTO OPERATIVE ENGINE**

BANK 2° to 3° INTO the OPERATIVE ENGINE, with the inclinometer ball displaced ½ toward the side of the operative engine, to establish a zero side-slip condition and provide the best climb performance.

3. MIXTURE CONTROLS **FULL FORWARD**

Move the MIXTURE CONTROLS to the FULL FORWARD (Full Rich) position.

4. PROPELLER CONTROLS **FULL FORWARD**

Move the PROPELLER CONTROLS to the FULL FORWARD (High RPM) position.

5. THROTTLES **FULL FORWARD**

Move both THROTTLES to the FULL FORWARD position.

NOTE

Approximately 90% of climb performance is lost during single-engine operations. Maximum power is required to achieved the best single-engine climb performance.

6. GEAR SELECTOR **UP**

Verify that the GEAR SELECTOR is in the UP position.

7. FLAPS **UP**

Verify that the FLAPS are in the UP position.

ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, NO RUNWAY REMAINING) (continued)

8. INOPERATIVE ENGINE IDENTIFY
IDENTIFY the INOPERATIVE ENGINE by using the “Dead Foot - Dead Engine” method.

9. THROTTLE (Inoperative Engine) VERIFY/CLOSE
Move the THROTTLE of the suspected Inoperative Engine to the CLOSE position to VERIFY that the correct engine has been identified (no change in yaw/no changes in rudder pressure).

NOTE
If the inoperative engine is found to be developing partial power, the decision whether to feather, or not, will need to be made.

10. PROPELLER (Inoperative Engine) FEATHER (950 RPM Min.)
Before the propeller RPM decreases below 950 RPM, move the PROPELLER control for the Inoperative Engine to the FEATHER position.

NOTE
Feathering the propeller must occur before the propeller speed decreases below 950 RPM. A locking pin will prevent the propeller from feathering below 950 RPM.

11. MIXTURE CONTROL (Inoperative Engine) IDLE CUT-OFF
Verify that the MIXTURE CONTROL for the Inoperative Engine is in the IDLE CUT-OFF position.

12. STABILATOR TRIM/RUDDER TRIM AS REQUIRED
Adjust the STABILATOR TRIM and the RUDDER TRIM, AS REQUIRED, to assist in maintaining control of the aircraft.

13. AIRPORT RETURN
RETURN to the departure AIRPORT as soon as practical.

NOTE
A turn to crosswind should not be attempted until reaching at least 500’ above field elevation.

ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, NO RUNWAY REMAINING) (continued)

Engine Securing Procedure (Time/Altitude Permitting):

NOTE
Provided that the airplane is controllable and time permits, secure the inoperative engine. The P-I-C will make that decision based on all available information.

14. FUEL SELECTOR (Inoperative Engine) OFF
Place the FUEL SELECTOR for the Inoperative Engine in the OFF position.

15. COWL FLAP (Inoperative Engine) CLOSE
CLOSE the COWL FLAP for the Inoperative Engine.

16. COWL FLAP (Operating Engine) AS REQUIRED
OPEN the COWL FLAP for the Operative Engine AS REQUIRED to maintain proper CHT.

17. ELECTRIC FUEL PUMP (Inoperative Engine) OFF
Depress the ELECTRIC FUEL PUMP switch for the Inoperative Engine to the OFF position.

18. MAGNETO SWITCHES (Inoperative Engine) OFF
Depress the MAGNETO SWITCHES for the Inoperative Engine to the OFF position.

19. ALTERNATOR SWITCH (Inoperative Engine) OFF
Depress the ALTERNATOR SWITCH for the Inoperative Engine to the OFF position.

20. ELECTRICAL LOAD REDUCE (if required)
REDUCE the ELECTRICAL LOAD, if required, to ensure reliability of the operating alternator.

ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, NO RUNWAY REMAINING) (continued)

21. X-FEED (Crossfeed) **AS REQUIRED**

Verify that the fuel selector for the inoperative engine is in the OFF position. Move the fuel selector for the operative engine to the X-FEED (Crossfeed) position, AS REQUIRED, to extend the range, or keep fuel weight balanced during one engine inoperative operations.

NOTE

Do not operate with both fuel selectors in the X-Feed (Crossfeed) position. Do not land with a selector on X-Feed (Crossfeed).

22. ENGINE FAILURE DURING TAKEOFF CHECKLIST (ABOVE 75 KIAS, NO RUNWAY REMAINING)

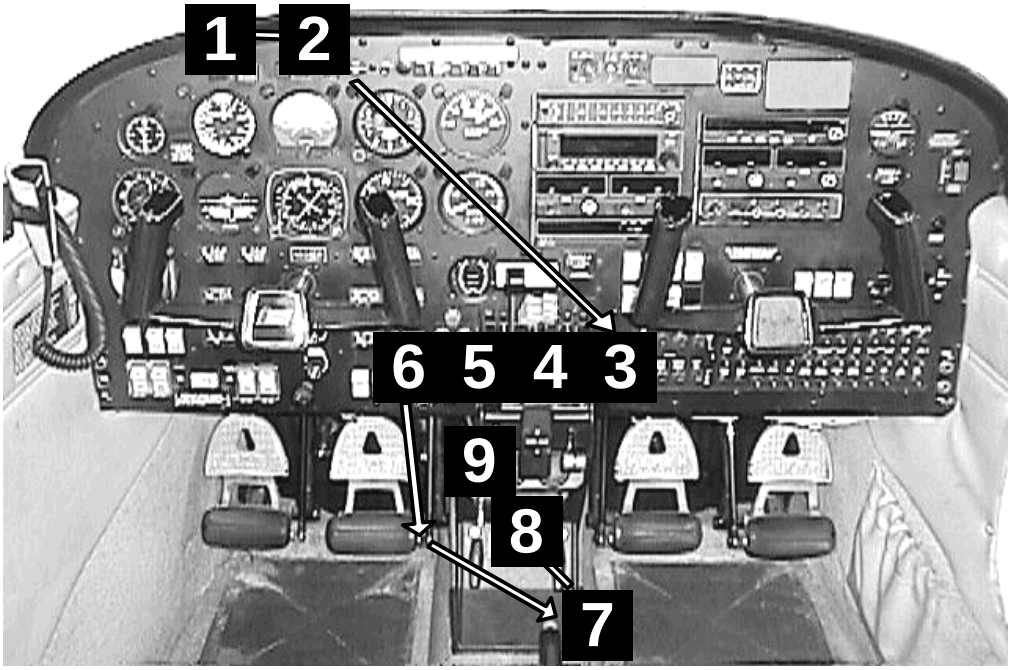
COMPLETE

Upon completion of the ENGINE FAILURE DURING TAKEOFF CHECKLIST (NO RUNWAY REMAINING), verify that all items have been accomplished and that the checklist is COMPLETE.

NOTE

Complete the One Engine Inoperative Landing Checklist (page 125).

ENGINE FAILURE DURING FLIGHT FLOW



OBJECTIVE:

To promptly identify, troubleshoot, and restart or shut down, as appropriate, an engine that has failed in flight while maintaining aircraft control.

ENGINE FAILURE DURING FLIGHT CHECKLIST

1. ALTITUDE/AIRSPEED ..... MAINTAIN/ V_{YSE}
2. BANK ..... 2° TO 3° INTO OPERATIVE ENGINE
3. MIXTURE CONTROLS ..... FULL FORWARD
4. PROPELLER CONTROLS ..... FULL FORWARD
5. THROTTLES ..... FULL FORWARD
6. GEAR SELECTOR ..... UP
7. FLAPS ..... UP
8. INOPERATIVE ENGINE ..... IDENTIFY
9. THROTTLE (Suspected Engine) ..... VERIFY/CLOSE

If time/altitude permits, attempt a restart:

10. STABILATOR TRIM/RUDDER TRIM ..... AS REQUIRED
11. AIRPORT ..... DETERMINE
12. FUEL SELECTOR (Inoperative Engine) ..... ON (X-FEED)
13. CARBURETOR HEAT (Inoperative Engine) ..... ON
14. MIXTURE CONTROL (Inoperative Engine) ..... FULL FORWARD
15. ELECTRIC FUEL PUMP (Inoperative Engine) ..... ON
16. MAGNETO SWITCHES (Inoperative Engine) ..... ON
17. FUEL QUANTITY ..... CHECK
18. THROTTLE (Inoperative Engine) ..... OPEN ¼"

If the restart attempt fails, or if time/altitude does not permit a restart, secure the engine.

Engine Securing Procedure (Time/Altitude Permitting):

19. THROTTLE (Inoperative Engine) ..... CLOSE
20. PROPELLER (Inoperative Engine) ..... FEATHER (950 RPM Min.)
21. STABILATOR TRIM/RUDDER TRIM ..... AS REQUIRED
22. FUEL SELECTOR (Inoperative Engine) ..... OFF
23. COWL FLAP (Inoperative Engine) ..... CLOSE
24. COWL FLAP (Operating Engine) ..... AS REQUIRED
25. CARBURETOR HEAT (Inoperative Engine) ..... OFF
26. MIXTURE CONTROL (Inoperative Engine) ..... IDLE CUT-OFF
27. ELECTRIC FUEL PUMP (Inoperative Engine) ..... OFF
28. MAGNETO SWITCHES (Inoperative Engine) ..... OFF
29. ALTERNATOR SWITCH (Inoperative Engine) ..... OFF
30. ELECTRICAL LOAD ..... REDUCE (if required)

ENGINE FAILURE DURING FLIGHT CHECKLIST (continued)

Engine Securing Procedure (Time/Altitude Permitting) (continued):

31. X-FEED (Crossfeed).....AS REQUIRED
32. AIRPORT.....LAND
33. ENGINE FAILURE DURING FLIGHT CHECKLIST.....COMPLETE

1. ALTITUDE/AIRSPEED **MAINTAIN/ V_{YSE}**
Maintain ALTITUDE and anAIRSPEED (V_{YSE} or as appropriate) for the best one engine inoperative performance.

2. BANK **2° TO 3° INTO OPERATIVE ENGINE**
BANK 2° to 3° INTO the OPERATIVE ENGINE, with the inclinometer ball displaced ½ toward the side of the operative engine, to establish a zero side-slip condition.

3. MIXTURE CONTROLS **FULL FORWARD**
Move both MIXTURE CONTROLS to the FULL FORWARD (Full Rich) position.

4. PROPELLER CONTROLS **FULL FORWARD**
Move both PROPELLER CONTROLS to the FULL FORWARD (High RPM) position.

5. THROTTLES **FULL FORWARD**
Move both THROTTLES to the FULL FORWARD position.

NOTE
Approximately 90% of climb performance is lost during one engine inoperative operations. Maximum power on the operating engine is required to achieved the best single-engine climb performance.

6. GEAR SELECTOR **UP**
Verify that the GEAR SELECTOR is in the UP position.

7. FLAPS **UP**
Verify that the FLAPS are in the UP position.

ENGINE FAILURE DURING FLIGHT CHECKLIST (continued)

8. INOPERATIVE ENGINE IDENTIFY
IDENTIFY the INOPERATIVE ENGINE by using the “Dead Foot - Dead Engine” method.

9. THROTTLE (Suspected Engine) VERIFY/CLOSE
VERIFY that suspected inoperative engine has been correctly identified by moving the Suspected Engine THROTTLE to the CLOSE position. If correct , no change in yaw/rudder pressure should be experienced.

If time/altitude permits, attempt a restart:

10. STABILATOR TRIM/RUDDER TRIM AS REQUIRED
Adjust the STABILATOR TRIM and RUDDER TRIM, AS REQUIRED, to assist in maintaining control of the aircraft.

11. AIRPORT DETERMINE
DETERMINE the nearest suitable AIRPORT and turn in the direction of the airport in the event a landing may become necessary.

12. FUEL SELECTOR (Inoperative Engine) ON (X-FEED)
Verify that the FUEL SELECTOR is in the ON (X-FEED) position.

13. CARBURETOR HEAT (Inoperative Engine) ON
Place the CARBURETOR HEAT control for the Inoperative Engine in the ON position.

14. MIXTURE CONTROL (Inoperative Engine) FULL FORWARD
Verify that the MIXTURE CONTROL for the Inoperative Engine is in the FULL FORWARD (Full Rich) position.

15. ELECTRIC FUEL PUMP (Inoperative Engine) ON
Depress the ELECTRIC FUEL PUMP switch for the Inoperative Engine to the ON position. Check the fuel pressure. An increase in fuel pressure may be observed.

ENGINE FAILURE DURING FLIGHT CHECKLIST (continued)

16. MAGNETO SWITCHES (Inoperative Engine) ON
Verify that the MAGNETO SWITCHES for the Inoperative Engine are in the ON position.

17. FUEL QUANTITY CHECK
CHECK the FUEL QUANTITY to ensure that the Inoperative Engine has a sufficient fuel supply.

18. THROTTLE (Inoperative Engine) OPEN ¼"
Set the THROTTLE for the Inoperative Engine OPEN ¼" from the Close position.

NOTE
If the inoperative engine is found to be developing partial power, the decision whether to feather or not will need to be made.

If a re-start fails, or if altitude does not permit a re-start, secure the engine.

Engine Securing Procedure (Time/Altitude Permitting):

19. THROTTLE (Inoperative Engine) CLOSE
Move the the THROTTLE of the suspected Inoperative Engine to the CLOSE position.

20. PROPELLER (Inoperative Engine) FEATHER (950 RPM Min.)
Before the propeller RPM decreases below 950 RPM, move the PROPELLER control for the Inoperative Engine to the FEATHER position.

NOTE
Feathering the propeller must occur before the propeller speed decreases below 950 RPM. A locking pin will prevent the propeller from feathering below 950 RPM.

21. STABILATOR TRIM/RUDDER TRIM AS REQUIRED
Adjust the STABILATOR TRIM and RUDDER TRIM, AS REQUIRED, to assist in maintaining control of the aircraft.

ENGINE FAILURE DURING FLIGHT CHECKLIST (continued)

22. FUEL SELECTOR (Inoperative Engine) OFF
Place the FUEL SELECTOR for the Inoperative Engine in the OFF position.

23. COWL FLAP (Inoperative Engine) CLOSE
CLOSE the COWL FLAP for the Inoperative Engine.

24. COWL FLAP (Operating Engine) AS REQUIRED
OPEN the COWL FLAP for the Operative Engine, AS REQUIRED, to maintain proper CHT.

25. CARBURETOR HEAT (Inoperative Engine) OFF
Place the CARBURETOR HEAT control for the Inoperative Engine in the OFF position.

26. MIXTURE CONTROL (Inoperative Engine) IDLE CUT-OFF
Verify that the MIXTURE CONTROL for the Inoperative Engine is in the IDLE CUT-OFF position.

27. ELECTRIC FUEL PUMP (Inoperative Engine) OFF
Depress the ELECTRIC FUEL PUMP switch for the Inoperative Engine to the OFF position.

28. MAGNETO SWITCHES (Inoperative Engine) OFF
Depress the MAGNETO SWITCHES for the Inoperative Engine to the OFF position.

29. ALTERNATOR SWITCH (Inoperative Engine) OFF
Depress the ALTERNATOR SWITCH for the Inoperative Engine to the OFF position.

30. ELECTRICAL LOAD REDUCE (if required)
REDUCE the ELECTRICAL LOAD, if required, to maintain below 60 amperes (50 amperes for IFR) to ensure reliability of the operating alternator.

ENGINE FAILURE DURING FLIGHT CHECKLIST (continued)

31. X-FEED (Crossfeed) AS REQUIRED

Verify that the fuel selector for the inoperative engine is in the OFF position. Move the fuel selector for the operative engine to the X-FEED (Crossfeed) position, AS REQUIRED, to extend range or keep fuel weight balanced during one engine inoperative operations.

NOTE

Do not operate with both fuel selectors in the X-FEED (Crossfeed) position. Do not land with a selector on X-FEED (Crossfeed).

32. AIRPORT LAND

LAND at the nearest suitable AIRPORT as soon as practical.

33. ENGINE FAILURE DURING FLIGHT CHECKLIST COMPLETE

Upon completion of the ENGINE FAILURE DURING FLIGHT CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

NOTE

Complete the One Engine Inoperative Landing Checklist (page 125).

ONE ENGINE INOPERATIVE LANDING CHECKLIST

1. INOPERATIVE ENGINE ..... SECURED
2. APPROACH BRIEFING ..... COMPLETE
3. SEATBELTS/HARNESSES ..... ON
4. MIXTURE CONTROL (Operative Engine)..... FULL RICH
5. PROPELLER CONTROL (Operative Engine) ..... FULL FORWARD
6. ELECTRIC FUEL PUMP (Operative Engine)..... ON
7. COWL FLAP (Operative Engine)..... AS REQUIRED
8. ALTITUDE/AIRSPEED..... NORMAL APPROACH

When landing is assured:

9. GEAR SELECTOR..... DOWN
10. FLAPS..... 25° (2nd Notch)
11. FINAL APPROACH SPEED..... 90 KIAS
12. THROTTLE (Operative Engine) .....SLOWLY REDUCE
13. RUDDER TRIM .....ADJUST
14. ONE ENGINE INOPERATIVE LANDING CHECKLIST..... COMPLETE

1. INOPERATIVE ENGINE **SECURED**
Verify that the INOPERATIVE ENGINE is SECURED.

2. APPROACH BRIEFING **COMPLETE**
COMPLETE the APPROACH BRIEFING as appropriate.

3. SEATBELTS/HARNESSES **ON**
Ensure that all occupant(s') SEAT BELTS and shoulder HARNESSES, if applicable, are ON and adjusted (per 14 CFR Part 91.107).

4. MIXTURE CONTROL (Operative Engine) **FULL RICH**
Place the MIXTURE CONTROL for the Operative Engine in the FULL RICH position.

5. PROPELLER CONTROL (Operative Engine) **FULL FORWARD**
Place or verify that the PROPELLER CONTROL for the Operative Engine is in the FULL FORWARD position.

6. ELECTRIC FUEL PUMP (Operative Engine) **ON**
Verify that the ELECTRIC FUEL PUMP for the Operative Engine is ON.

ONE ENGINE INOPERATIVE LANDING CHECKLIST (continued)

7. COWL FLAP (Operative Engine) AS REQUIRED
Adjust the COWL FLAP for the Operative Engine AS REQUIRED to maintain proper CHT.

8. ALTITUDE/AIRSPEED NORMAL APPROACH
Maintain an AIRSPEED of 90 KIAS and adjust ALTITUDE as necessary to prepare for a NORMAL APPROACH.

WARNING

Under some conditions of loading and density altitude, a go-around may be impossible. A one engine inoperative go-around should be avoided if at all possible. In any event, the sudden application of power during a one engine inoperative operation will make control of the airplane more difficult.

When landing is assured:

9. GEAR SELECTOR DOWN
Place the GEAR SELECTOR in the DOWN position. Visually check for the 3 GREEN indicator lights. Visually check the external engine nacelle mirror to confirm that the nose gear is extended.

10. FLAPS 25° (2nd Notch)
Below V_{FE} (111 KIAS) and when landing is assured, extend the FLAPS to the 25° (2nd Notch) position.

NOTE

While a one engine inoperative go-around is not recommended, extending flaps no greater than 25° will place the airplane in the best configuration should a go-around become necessary.

11. FINAL APPROACH SPEED 90 KIAS
Maintain a FINAL APPROACH SPEED of 90 KIAS during the approach to the roundout.

ONE ENGINE INOPERATIVE LANDING CHECKLIST (continued)

12. THROTTLE (Operative Engine) SLOWLY REDUCE

Adjust the THROTTLE for the Operative Engine to SLOWLY REDUCE the power during the landing.

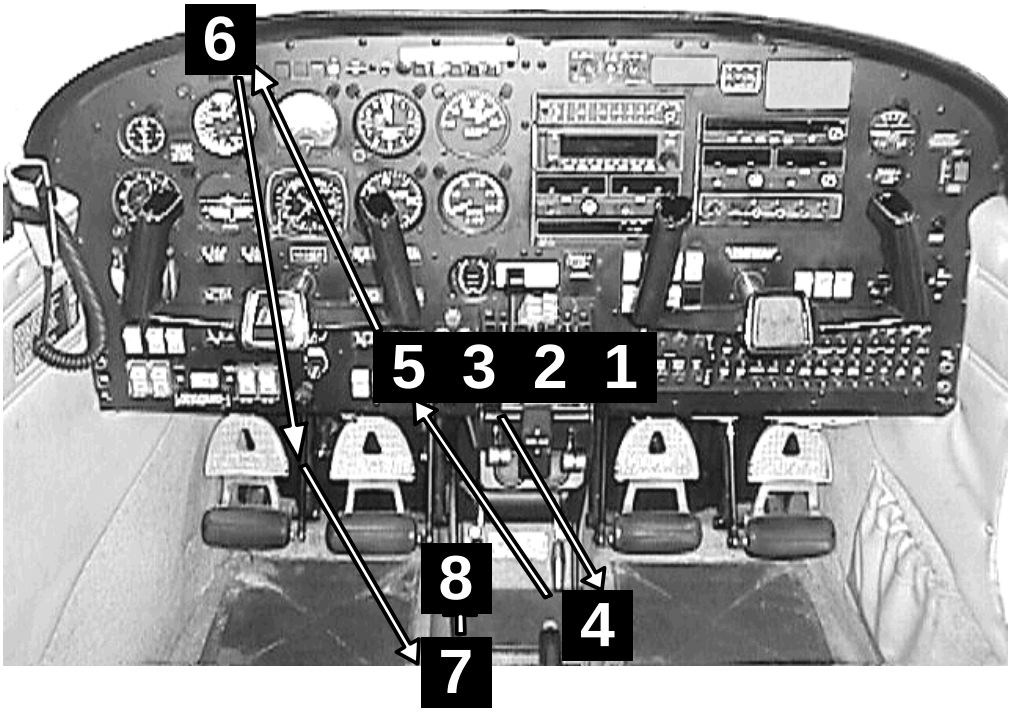
13. RUDDER TRIM ADJUST

ADJUST the RUDDER TRIM, as necessary, to assist in maintaining directional control throughout the approach and landing.

14. ONE ENGINE INOPERATIVE LANDING CHECKLIST COMPLETE

Upon completion of the ONE ENGINE INOPERATIVE LANDING CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

ONE ENGINE INOPERATIVE GO-AROUND FLOW



OBJECTIVE:

To safely perform a go-around maneuver with one engine inoperative. A one engine inoperative go-around should be avoided if at all possible.

ONE ENGINE INOPERATIVE GO-AROUND CHECKLIST

CAUTION

A one engine inoperative go-around should be avoided if at all possible. This procedure is not an approved maneuver to be practiced at ERAU.

When initiating a go-around:

1. MIXTURE CONTROL ..... FULL FORWARD
2. PROPELLER CONTROL ..... FULL FORWARD
3. THROTTLE ..... SMOOTHLY ADVANCE
4. FLAPS ..... RETRACT 0°
5. GEAR SELECTOR ..... UP/NO LIGHTS
6. AIRSPEED ..... 88 KIAS (82 KIAS)
7. STABILATOR TRIM/RUDDER TRIM ..... AS REQUIRED
8. COWL FLAP (Operative Engine) ..... AS REQUIRED

9. ONE ENGINE INOPERATIVE GO-AROUND CHECKLIST ... COMPLETE

When initiating a go-around:

1. MIXTURE CONTROL — FULL FORWARD
Verify that the MIXTURE CONTROL for the operating engine is in the FULL FORWARD position.

2. PROPELLER CONTROL — FULL FORWARD
Verify that the PROPELLER CONTROL for the operating engine is in the FULL FORWARD position.

3. THROTTLE — SMOOTHLY ADVANCE
SMOOTHLY ADVANCE the THROTTLE for the operating engine to the full forward position while applying sufficient rudder pressure to maintain aircraft directional control.

4. FLAPS — RETRACT 0°
RETRACT the flaps slowly to reduce drag and improve climb performance.

ONE ENGINE INOPERATIVE GO-AROUND CHECKLIST (continued)

5. GEAR SELECTOR **UP/NO LIGHTS**

After a positive climb is achieved, place the GEAR SELECTOR in the UP position to retract the landing gear. When appropriate, call out, *"Gear Up, NO LIGHTS"* to indicate that the landing gear has completed its retraction.

NOTE

Waiting until a positive climb is achieved prior to retracting the landing gear is important because, with the possibility that the airplane could contact the ground during the go-around, the landing gear will help to absorb the impact.

6. AIRSPEED **88 KIAS (82 KIAS)**

Maintain an AIRSPEED of 88 KIAS, or 82 KIAS (V_{XSE}), until clearing obstacles.

NOTE

In some cases, V_{XSE} (82 KIAS) may be needed to clear obstacles. Once all obstacles have been cleared, accelerate to 88 KIAS.

7. STABILATOR TRIM/RUDDER TRIM **AS REQUIRED**

Adjust the STABILATOR TRIM and RUDDER TRIM, AS REQUIRED, to assist in maintaining control of the aircraft.

8. COWL FLAP (Operative Engine) **AS REQUIRED**

Adjust the COWL FLAP for the Operative Engine, AS REQUIRED, to maintain proper CHT.

WARNING

Closing the cowl flap will reduce drag, improving aircraft performance. However, reaching for the cowl flap control handle may become a distraction resulting in the loss of aircraft control.

9. ONE ENGINE INOPERATIVE GO-AROUND CHECKLIST

COMPLETE

Upon completion of the ONE ENGINE INOPERATIVE GO-AROUND CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

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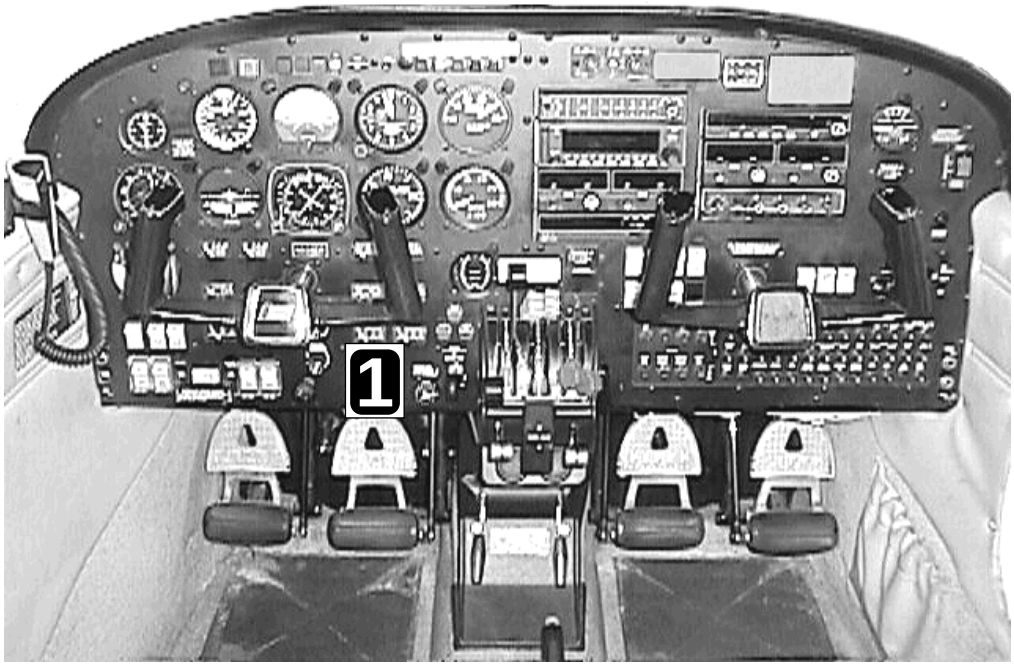
ENGINE-DRIVEN FUEL PUMP FAILURE FLOW



OBJECTIVE:

To promptly re-establish fuel pressure when the engine-driven fuel pump has failed.

ENGINE-DRIVEN FUEL PUMP FAILURE CHECKLIST

The engine will only operate with its electric fuel pump ON:

1. ELECTRIC FUEL PUMP (Affected Engine) ..... ON

2. ENGINE-DRIVEN FUEL PUMP FAILURE CHECKLIST ..... COMPLETE

1. ELECTRIC FUEL PUMP (Affected Engine) ON

Depress the ELECTRIC FUEL PUMP switch for the Affected Engine to the ON position. Check the fuel pressure. An increase in fuel pressure may be observed.

2. ENGINE-DRIVEN FUEL PUMP FAILURE CHECKLIST

COMPLETE

Upon completion of the ENGINE FAILURE DURING FLIGHT CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

NOTE

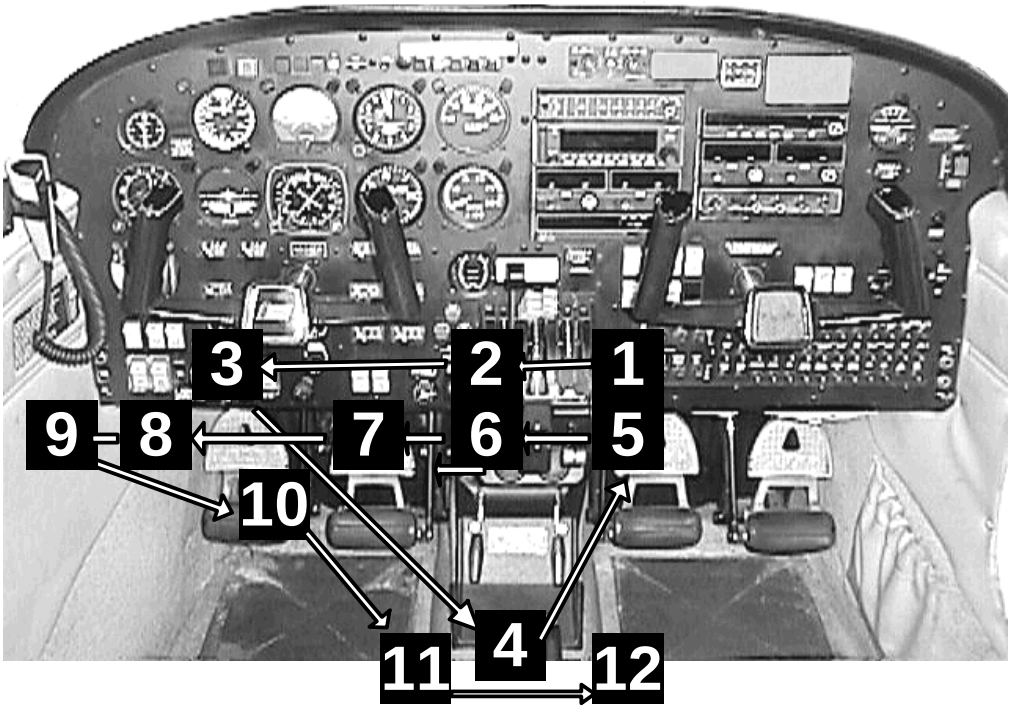
Land at the nearest suitable airport where repairs can be made. Remember that you now have no backup fuel pump for that engine.

Operating an engine with only its electric fuel pump (engine-driven fuel pump failed) may require making corresponding mixture changes when power is changed:

1) **When reducing power, lean the mixture to prevent the engine from quitting from having too rich of a mixture condition,**
2) **Enrichen the mixture when increasing power to prevent engine stoppage from having too lean of a mixture condition.**

Always lean sufficiently to obtain a smooth running engine.

ENGINE FIRE DURING START FLOW



OBJECTIVE:

To promptly extinguish an engine fire occuring during engine start.

ENGINE FIRE DURING START CHECKLIST

If the engine has not started:

1. MIXTURE CONTROL.....IDLE CUT-OFF
2. THROTTLE ..... FULL FORWARD
3. STARTER.....CONTINUE TO ENGAGE

NOTE

If the engine starts, continue operating to ingest the fire into the engine. If the fire continues, shut down both engines and evacuate.

4. FUEL SELECTORS ..... OFF
5. MIXTURE CONTROLS .....IDLE CUT-OFF
6. THROTTLES ..... FULL FORWARD
7. ELECTRIC FUEL PUMPS..... OFF
8. MAGNETO SWITCHES ..... OFF
9. BATTERY MASTER SWITCH..... OFF
10. PARKING BRAKE ..... RELEASE
11. FIRE EXTINGUISHER ..... OBTAIN
12. AIRPLANE..... EVACUATE

13. ENGINE FIRE DURING START CHECKLIST .....COMPLETE

1. MIXTURE CONTROL **IDLE CUT-OFF**

Place the MIXTURE CONTROL in the IDLE CUT-OFF position.

2. THROTTLE **FULL FORWARD**

Move the THROTTLE to the FULL FORWARD position.

3. STARTER **CONTINUE TO ENGAGE**

CONTINUE TO ENGAGE the STARTER in an attempt to ingest the flames into the engine through the carburetor.

NOTE

If the engine starts, continue its operation to ingest the fire into the engine and extinguish the flames. Once the fire has been extinguished, shut down the airplane's engines and have Fleet Maintenance inspect the affected engine. If the fire continues, shut down both engines and evacuate the aircraft.

ENGINE FIRE DURING START CHECKLIST (continued)

4. FUEL SELECTORS **OFF**
Place the FUEL SELECTORS in the OFF position.

5. MIXTURE CONTROLS **IDLE CUT-OFF**
Move both MIXTURE CONTROLS to the IDLE CUT-OFF position.

6. THROTTLES **FULL FORWARD**
Move both THROTTLES to the FULL FORWARD position.

7. ELECTRIC FUEL PUMPS **OFF**
Depress the switches for the ELECTRIC FUEL PUMPS to the OFF position.

8. MAGNETO SWITCHES **OFF**
Depress the MAGNETO SWITCHES to the OFF position.

9. BATTERY MASTER SWITCH **OFF**
Depress the BATTERY MASTER SWITCH to the OFF position.

10. PARKING BRAKE **RELEASE**
Push the parking brake knob In Fully to RELEASE the PARKING BRAKE.

11. FIRE EXTINGUISHER **OBTAIN**
OBTAIN the FIRE EXTINGUISHER from between the aft portion of the front seats by unlatching the retaining straps. Prepare it for use.

12. AIRPLANE **EVACUATE**
EVACUATE the AIRPLANE and seek help in extinguishing the fire. Do not attempt to fight the fire alone. It is safer for the flight crew and passengers to get professional fire fighting personnel to fight the fire.

13. ENGINE FIRE DURING START CHECKLIST **COMPLETE**
Upon completion of the ENGINE FIRE DURING START CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

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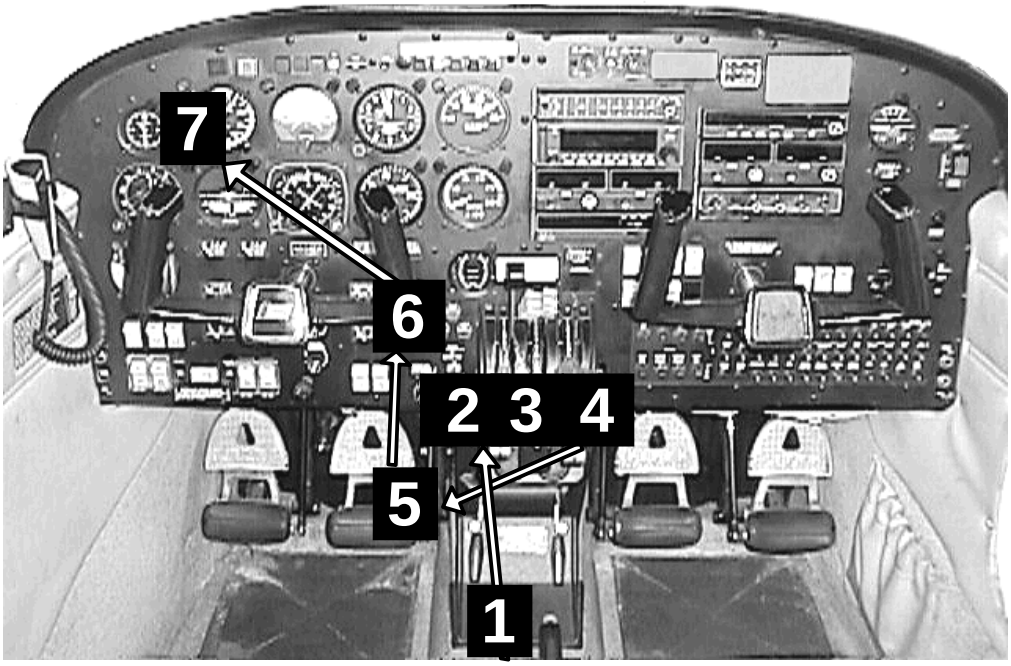
ENGINE FIRE IN FLIGHT FLOW



OBJECTIVE:

To promptly extinguish an engine fire ocurring in flight.

ENGINE FIRE IN FLIGHT CHECKLIST

1. FUEL SELECTOR (Affected Engine) ..... OFF
2. THROTTLE (Affected Engine)..... CLOSE
3. PROPELLER CONTROL (Affected Engine).....FEATHER
4. MIXTURE CONTROL (Affected Engine) .....IDLE CUT-OFF
5. COWL FLAP (Affected Engine)..... OPEN
6. AFFECTED ENGINE.....SECURE

If the fire persists:

7. AIRSPEED ..... INCREASE/EXTINGUISH
(attempt to extinguish the fire)

Engine Securing Procedure (Time/Altitude Permitting):

8. THROTTLE (Inoperative Engine) ..... CLOSE
9. PROPELLER CONTROL (Inoperative Engine).....
.....FEATHER (950 RPM Min.)
10. STABILATOR TRIM/RUDDER TRIM .....AS REQUIRED
11. FUEL SELECTOR (Inoperative Engine)..... OFF
12. COWL FLAP (Inoperative Engine) ..... CLOSE
13. COWL FLAP (Operative Engine) .....AS REQUIRED
14. CARBURETOR HEAT (Inoperative Engine) ..... OFF
15. MIXTURE CONTROL (Inoperative Engine) .....IDLE CUT-OFF
16. ELECTRIC FUEL PUMP (Inoperative Engine)..... OFF
17. MAGNETO SWITCHES (Inoperative Engine)..... OFF
18. ALTERNATOR SWITCH (Inoperative Engine)..... OFF
19. ELECTRICAL LOAD ..... REDUCE (if required)
20. X-FEED (Crossfeed) .....AS REQUIRED
21. AIRPORT ..... LAND
22. ENGINE FIRE IN FLIGHT CHECKLIST .....COMPLETE

1. FUEL SELECTOR (Affected Engine) OFF
Place the FUEL SELECTOR for the Affected Engine in the OFF position.

2. THROTTLE (Affected Engine) CLOSE
Move the THROTTLE for the Affected Engine to the FULL FORWARD position.

ENGINE FIRE IN FLIGHT CHECKLIST (continued)

3. PROPELLER CONTROL (Affected Engine) FEATHER
Move the PROPELLER CONTROL for the Affected Engine to the FEATHER position.

4. MIXTURE CONTROL (Affected Engine) IDLE CUT-OFF
Move the MIXTURE CONTROL for the Affected Engine to the IDLE CUT-OFF position.

5. COWL FLAP (Affected Engine) OPEN
OPEN the COWL FLAP on the Affected Engine.

6. AFFECTED ENGINE SECURE
SECURE the AFFECTED ENGINE utilizing the Engine Securing Procedure.

If the fire persists:

7. AIRSPEED INCREASE/EXTINGUISH
INCREASE the AIRSPEED in an attempt to EXTINGUISH the fire.

Engine Securing Procedure:

8. THROTTLE (Inoperative Engine) CLOSE
Move the THROTTLE for the Inoperative Engine to the CLOSE position.

9. PROPELLER CONTROL (Inop. Engine) FEATHER (950 RPM Min.)
Before the propeller RPM decreases below 950 RPM, move the PROPELLER control for the Inoperative Engine to the FEATHER position.

NOTE
Feathering the propeller must occur before the propeller speed decreases below 950 RPM. A locking pin will prevent the propeller from feathering below 950 RPM.

10. STABILATOR TRIM/RUDDER TRIM AS REQUIRED
Adjust the STABILATOR TRIM and RUDDER TRIM, AS REQUIRED, to assist in maintaining control of the aircraft.

ENGINE FIRE IN FLIGHT CHECKLIST (continued)

11. FUEL SELECTOR (Inoperative Engine) OFF
Place the FUEL SELECTOR for the Inoperative Engine in the OFF position.

12. COWL FLAP (Inoperative Engine) CLOSE
CLOSE the COWL FLAP for the Inoperative Engine.

13. COWL FLAP (Operative Engine) AS REQUIRED
OPEN the COWL FLAP on the Operative Engine, AS REQUIRED, to maintain proper CHT.

14. CARBURETOR HEAT (Inoperative Engine) OFF
Place the CARBURETOR HEAT control for the Inoperative Engine in the OFF position.

15. MIXTURE (Inoperative Engine) IDLE CUT-OFF
Verify that the MIXTURE for the Inoperative Engine is in the IDLE CUT-OFF position.

16. ELECTRIC FUEL PUMP (Inoperative Engine) OFF
Depress the ELECTRIC FUEL PUMP switch for the Inoperative Engine to the OFF position.

17. MAGNETO SWITCHES (Inoperative Engine) OFF
Depress the MAGNETO SWITCHES for the Inoperative Engine to the OFF position.

18. ALTERNATOR SWITCH (Inoperative Engine) OFF
Depress the ALTERNATOR SWITCH for the Inoperative Engine to the OFF position.

19. ELECTRICAL LOAD REDUCE (if required)
REDUCE the ELECTRICAL LOAD, if required, to ensure reliability of the operating alternator.

ENGINE FIRE IN FLIGHT CHECKLIST (continued)

20. X-FEED (Crossfeed) AS REQUIRED

Verify that the fuel selector for the inoperative engine is in the OFF position. Move the fuel selector for the operative engine to the X-FEED (Crossfeed) position, AS REQUIRED, to extend the range or keep fuel weight balanced during one engine inoperative operations.

NOTE

Do not operate with both fuel selectors in the X-Feed (Crossfeed) position. Do not land with a selector on X-Feed (Crossfeed).

21. AIRPORT LAND

LAND at the nearest suitable AIRPORT as soon as practical.

22. ENGINE FIRE IN FLIGHT CHECKLIST COMPLETE

Upon completion of the ENGINE FIRE IN FLIGHT CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

NOTE

Complete the One Engine Inoperative Landing Checklist (page 125).

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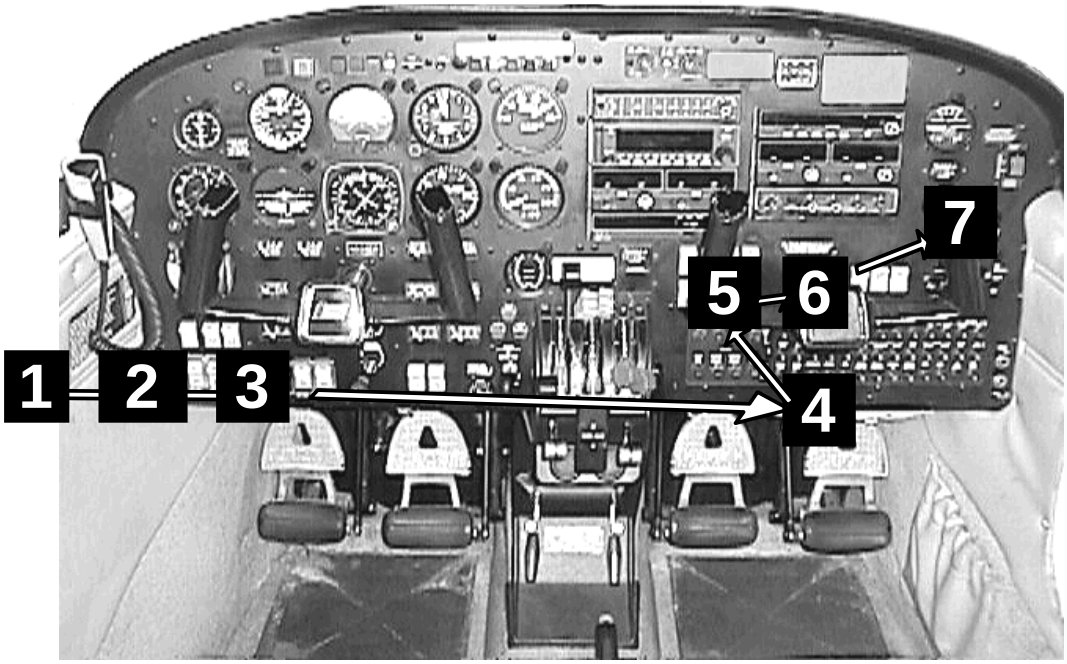
ELECTRICAL FIRE IN FLIGHT FLOW



OBJECTIVE:

To safely extinguish an electrical fire occuring in flight.

ELECTRICAL FIRE IN FLIGHT CHECKLIST

1. FLASHLIGHT (if at night) ..... OBTAIN
2. BATTERY MASTER SWITCH..... OFF
3. ALTERNATOR SWITCHES ..... OFF
4. CIRCUIT BREAKERS ..... CHECK
5. RADIO MASTER SWITCH..... OFF
6. ALL ELECTRICAL SWITCHES..... OFF
7. CABIN VENTS/CABIN HEAT..... CLOSE/OFF

NOTE

If the fire persists, obtain the portable fire extinguisher (located behind the center console aft of the front seats) and extinguish, if practical.

8. BUS TIE CIRCUIT BREAKERS:
   a. MAIN BUS (2 – 60 AMP)..... PULL OUT
   b. NON ESS (1 - 40 AMP)..... PULL OUT
   c. AVI BUS (2 - 40 AMP)..... PULL OUT
   d. L ALT (1 – 70 AMP) ..... PULL OUT
   e. R ALT (1 – 70 AMP)..... PULL OUT

9. OTHER CIRCUIT BREAKERS..... PULL OUT

NOTE

At this point, the pilot must decide if the flight can be safely continued without electrical power. If so, land at the nearest airport and have the electrical system repaired.

If electrical power is required for safe continuation of the flight, proceed as follows:

WARNING

The following procedure may re-energize the faulty system. Reset the circuit breakers one at a time, pausing a short period of time before re-setting the next breaker. If the faulty system is re-energized, pull the corresponding circuit breaker immediately.

ELECTRICAL FIRE IN FLIGHT CHECKLIST (continued)

NOTE

Refer to the PA-44-180, Seminole POH/IM, Power Distribution (page 7-22) and Electrical Power Distribution System (Page 7-23, figure 7-23) for electrical power distribution information.

10. ONE (1) MAIN BUS TIE CIRCUIT BREAKER.....IN
11. BATTERY MASTER SWITCH.....ON
12. L ALT OR R ALT CIRCUIT BREAKER.....IN

NOTE

Select the Alternator Field circuit breaker and Alternator switch corresponding to the Alt circuit breaker reset.

13. ALTERNATOR FIELD CIRCUIT BREAKER.....IN
14. ALTERNATOR SWITCH.....ON
15. CIRCUIT BREAKERS (MAIN BUS):
    - a. ELEC TACH.....IN
    - b. GEAR IND.....IN
    - c. AVI BUS #1.....IN
    - d. AVI BUS #2.....IN

    RADIO MASTER SWITCH.....ON
    - a. COMPASS.....IN
    - b. AUDIO SELECT.....IN
    - c. COMM #1.....IN
    - d. NAV #1.....IN

16. CABIN VENTS.....FIRE EXTINGUISHED/OPEN
17. AIRPORT.....LAND

WARNING

The Manual Extension of Landing Gear procedure must be used to lower the landing gear. In additon, the stall and gear warnings are not available with the Battery Master Switch OFF.

18. ELECTRICAL FIRE IN FLIGHT CHECKLIST.....COMPLETE

ELECTRICAL FIRE IN FLIGHT CHECKLIST (continued)

1. FLASHLIGHT (if at night) **OBTAIN**
In the event of an electrical fire at night, OBTAIN a FLASHLIGHT and have it readily available should the cockpit lighting system become disabled.

2. BATTERY MASTER SWITCH **OFF**
Depress the BATTERY MASTER SWITCH to the OFF position.

3. ALTERNATOR SWITCHES **OFF**
Depress the ALTERNATOR SWITCHES to the OFF position.

4. CIRCUIT BREAKERS **CHECK**
CHECK for OPEN (out) CIRCUIT BREAKERS.

5. RADIO MASTER SWITCH **OFF**
Depress the RADIO MASTER SWITCH to the OFF position.

6. ALL ELECTRICAL SWITCHES **OFF**
Place ALL ELECTRICAL SWITCHES in the OFF position.

7. CABIN VENTS/CABIN HEAT **CLOSE/OFF**
CLOSE ALL CABIN VENTS to reduce introducing an air source that could continue to support the fire. Depress the CABIN HEAT switch to the OFF position.

NOTE
If practical, obtain the portable fire extinguisher (located behind the center console, aft of the front seats) and extinguish the fire.

8. BUS TIE CIRCUIT BREAKERS **PULL OUT**
Locate the circuit breaker panel, and PULL OUT the BUS TIE CIRCUIT BREAKERS: a. MAIN BUS (2), b. NON-ESS (Non-Essential), c. AVI (Avionics) Bus (2), d. L ALT (Left Alternator), e. R ALT (Right Alternator).

9. OTHER CIRCUIT BREAKERS **PULL OUT**
PULL OUT all OTHER installed CIRCUIT BREAKERS.

ELECTRICAL FIRE IN FLIGHT CHECKLIST (continued)

NOTE

At this point, the pilot must decide whether the flight can be continued safely without electrical power. If so, land at the nearest airport and have the electrical system repaired.

If electrical power is required for a safe continuation of the flight, proceed as follows:

WARNING

The following procedure may re-energize the faulty system. Reset the circuit breakers one at a time, pausing a short period of time before re-setting the next breaker. If the faulty system is re-energized, pull the corresponding circuit breaker immediately.

NOTE

Refer to the PA-44-180, Seminole POH/IM, Power Distribution (page 7-22) and Electrical Power Distribution System (Page 7-23, figure 7-23) for electrical power distribution information.

10. MAIN (1) BUS TIE CIRCUIT BREAKER IN

Depress one (1) MAIN BUS TIE CIRCUIT BREAKER to the IN position.

11. BATTERY MASTER SWITCH ON

Depress the BATTERY MASTER SWITCH to the ON position.

12. L ALT OR R ALT CIRCUIT BREAKER IN

Depress either the L ALT or R ALT CIRCUIT BREAKER to the IN position.

NOTE

Select the Alternator Field circuit breaker and the Alternator switch corresponding to the Alt circuit breaker re-set.

13. ALTERNATOR FIELD CIRCUIT BREAKER IN

Depress the ALTERNATOR FIELD CIRCUIT BREAKER (corresponding to the Alt Circuit Breaker selected) to the IN position.

ELECTRICAL FIRE IN FLIGHT CHECKLIST (continued)

14. ALTERNATOR SWITCH ON

Depress the ALTERNATOR SWITCH (corresponding to the Alt Circuit Breaker selected) to the ON position.

15. CIRCUIT BREAKERS (Main Bus) AS REQUIRED

Only AS REQUIRED for flight, depress the CIRCUIT BREAKERS on the Main Bus:

a. ELEC TACH (Electric Tachometer) - IN
b. GEAR IND (Indicator) - IN
c. AVI (Avionics) BUS #1 -IN
d. AVI (Avionics) BUS #2 -IN

RADIO MASTER -ON

a. Comp (Compass) – IN
b. Audio Select - IN
c. Comm #1 - IN
d. Nav #1 - IN

NOTE

All remaining circuit breakers should be left in the OUT (Off) position for the remainder of the flight.

16. CABIN VENTS FIRE EXTINGUISHED/OPEN

If the the FIRE has been EXTINGUISHED, OPEN the CABIN VENTS as necessary.

17. AIRPORT LAND

LAND at the nearest suitable AIRPORT as soon as practical.

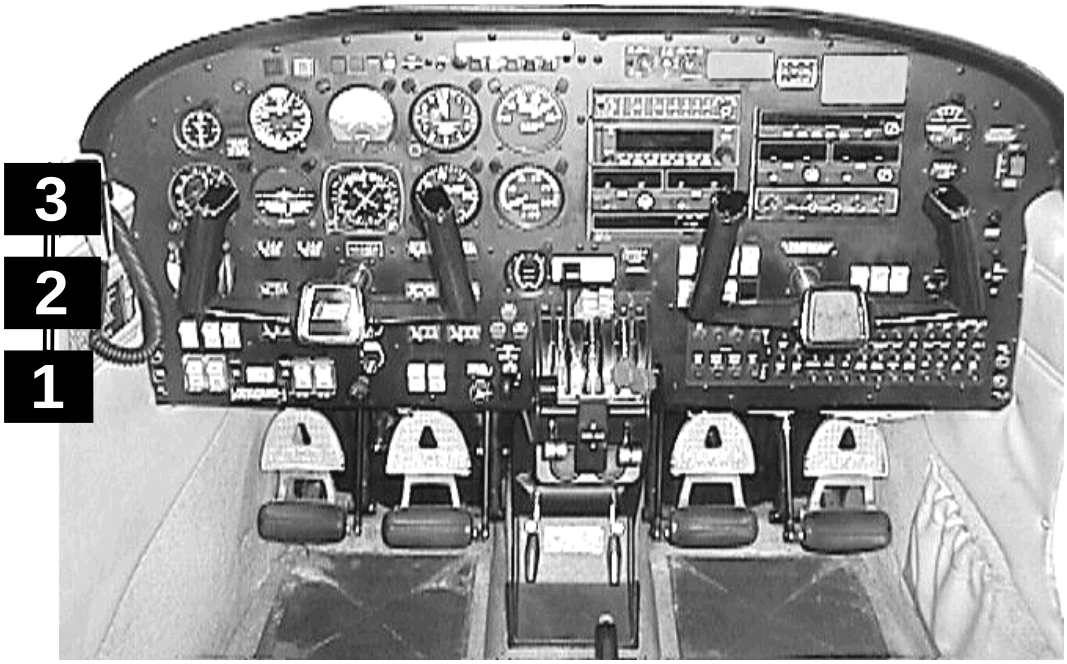
WARNING

The Manual Extension of Landing Gear procedure must be used to lower the landing gear. In additon, the stall and gear warnings are not available with the Battery Master Switch OFF.

18. ELECTRICAL FIRE IN FLIGHT CHECKLIST COMPLETE

Upon completion of the ELECTRICAL FIRE IN FLIGHT CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

EMERGENCY EXIT FLOW



OBJECTIVE:

To safely exit the aircraft on the ground in the event of an an emergency.

EMERGENCY EXIT CHECKLIST

1. THERMOPLASTIC COVER ..... REMOVE
2. EMERGENCY EXIT RELEASE HANDLE ..... PULL FORWARD
3. WINDOW ..... PUSH OUT/EVACUATE

4. EMERGENCY EXIT CHECKLIST ..... COMPLETE

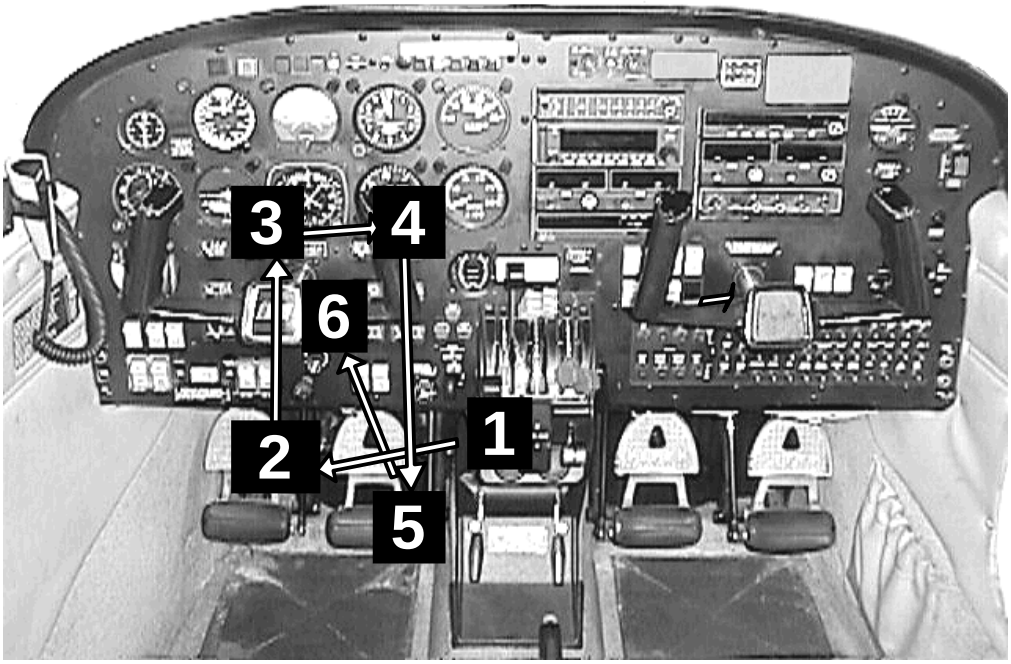
1. THERMOPLASTIC COVER **REMOVE**
REMOVE the THERMOPLASTIC COVER to gain access to the pilot's left side window emergency exit handle.

2. EMERGENCY EXIT RELEASE HANDLE **PULL FORWARD**
PULL the EMERGENCY EXIT RELEASE HANDLE sufficiently FORWARD to break the safety wire and release the pilot's left side window.

3. WINDOW **PUSH OUT/EVACUATE**
PUSH OUT on the pilot's left side WINDOW to have it free fall from the fuselage. EVACUATE the aircraft and assist others in exiting the aircraft through the pilot's side emergency exit or the cabin door.

4. EMERGENCY EXIT CHECKLIST **COMPLETE**
Upon completion of the EMERGENCY EXIT CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

SPIN RECOVERY FLOW



OBJECTIVE:

To attempt recovery after entering into a spin. FAA regulations do not require spin demonstrations of multi-engine airplanes; spin tests have not been conducted.

SPIN RECOVERY CHECKLIST

WARNING

Intentional spins are prohibited in this airplane. FAA regulations do not require spin demonstration of multi-engine airplanes; spin tests have not been conducted. The recovery technique presented is based on the best available information.

1. THROTTLES ..... CLOSE
2. RUDDER ..... FULL OPPOSITE TO DIRECTION OF SPIN
3. CONTROL WHEEL ..... FULL FORWARD
4. AILERONS ..... NEUTRAL

When rotation stops:

5. RUDDER ..... NEUTRALIZE

To recover from the dive:

6. CONTROL WHEEL ..... SMOOTH BACK PRESSURE

7. SPIN RECOVERY CHECKLIST ..... COMPLETE

1. THROTTLES **CLOSE**

Promptly move the THROTTLES to the CLOSE position to prevent aggravating the spin characteristics (flatter spin attitude, increased rortation rate) and excessive airspeed during the spin recovery.

2. RUDDER **FULL OPPOSITE DIRECTION OF SPIN**

Apply FULL RUDDER in the OPPOSITE DIRECTION OF the SPIN to stop the rotation of the spin.

3. CONTROL WHEEL **FULL FORWARD**

Move the CONTROL WHEEL (Yoke) briskly FULL FORWARD to reduce the critical angle of attack and break the stall.

SPIN RECOVERY CHECKLIST (continued)

4. AILERONS **NEUTRAL**

Ensure that the AILERONS are in the NEUTRAL position. Ailerons positioned other than in the Neutral postion may aggravate the spin, making recovery impossible.

When rotation stops:

5. RUDDER **NEUTRALIZE**

When the spin rotation stops, NEUTRALIZE the RUDDER (return the rudder to the neutral position (no left or right rudder input).

NOTE

Applying too much rudder pressure in the opposite direction will cause the airplane to enter into a spin in the opposite direction.

When rotation stops, to recover from the dive:

6. CONTROL WHEEL **SMOOTH BACK PRESSURE**

In a SMOOTH manner, apply sufficient BACK PRESSURE to the CONTROL WHEEL to recover from the resulting dive. Monitor airspeed so as not to exceed aircraft limitations during the recovery.

7. SPIN RECOVERY CHECKLIST **COMPLETE**

Upon completion of the SPIN RECOVERY CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

Section - 4

ABNORMAL PROCEDURES

INTRODUCTION

Successful handling of abnormal situations is largely dependent on the judgment and skill of the crew. All abnormal conditions should be handled with planning and organization. Although it is not possible to write specific procedures to cover every facet of every abnormal situation or irregularity a pilot may confront, it is possible to establish certain operating guidelines. The overriding matter of importance is very basic: **someone must fly the airplane.** In addition to executing the required procedure(s), the pilot must still devote primary attention to the control and navigation of the airplane with regard to terrain, weather, air traffic control, and airplane configuration.

Abnormal Procedures

An abnormal procedure is a procedure not classified by the aircraft manufacturer as a normal or emergency procedure. The abnormal procedures that follow are the only abnormal procedures provided by the aircraft manufacturer and may not cover every abnormal situation that may be encountered during flight. The Abnormal procedures do not include immediate action or memory items because the checklist items are not time-critical in nature.

If an abnormal situation arises, the number one priority is to maintain control of the airplane, and then confirm the situation and follow the appropriate procedures.

When operating in the “pseudo-crew” environment, the pilot not flying (PNF) shall perform the checklist and announce its completion. The Pilot flying (PF) shall maintain an awareness of the checklist progress.

AIR STARTING/UNFEATHERING CHECKLIST (UNFEATHERING ACCUMULATOR FUNCTIONING)

With a functioning unfeathering accumulator system installed, the propeller will begin windmilling automatically when the propeller control is moved out of the feather position to the full forward position.

1. FUEL SELECTOR (Inoperative Engine) ..... ON
2. MIXTURE CONTROL (Inoperative Engine) ..... FULL FORWARD
3. THROTTLE (Inoperative Engine) .....OPEN ¼ INCH
4. ELECTRIC FUEL PUMP (Inoperative Engine)..... ON
5. MAGNETO SWITCHES (Inoperative Engine)..... ON

NOTE
To assist the engine in restarting, establish and maintain 100-110 KIAS and perform a forward slip, banking in the direction the propeller of the engine to be started will be turning.

6. PROPELLER CONTROL (Inoperative Engine)..... FULL FORWARD

NOTE
When propeller unfeathering occurs, it may be necessary to retard the propeller control so as not to allow the propeller to overspeed.

If the propeller is not windmilling freely within 8-12 seconds after the propeller control has been moved to the full forward position, a starter assisted start (for 1-2 seconds) will be required.

After engine start:

7. THROTTLE/PROPELLER.....20” MP/2000 RPM/200° F
8. ALTERNATOR ..... ON
9. ELECTRIC FUEL PUMP ..... OFF
10. COWL FLAP.....AS REQUIRED
11. AIR STARTING/UNFEATHERING CHECKLIST.....COMPLETE

1. FUEL SELECTOR (Inoperative Engine) ON
Place the FUEL SELECTOR for the Inoperative Engine in the ON position.

AIR STARTING/UNFEATHERING CHECKLIST (UNFEATHERING ACCUMULATOR FUNCTIONING) (continued)

2. MIXTURE CONTROL (Inoperative Engine) FULL FORWARD
Move the MIXTURE CONTROL for the Inoperative Engine to the FULL FORWARD (Full Rich) position.

3. THROTTLE (Inoperative Engine) OPEN ¼"
Set the THROTTLES for the Inoperative Engine OPEN ¼" from the CLOSE position.

4. ELECTRIC FUEL PUMP (Inoperative Engine) ON
Depress the ELECTRIC FUEL PUMP switch for the Inoperative Engine to the ON position. Check the fuel pressure. An increase in fuel pressure may be observed.

5. MAGNETO SWITCHES (Inoperative Engine) ON
Depress the MAGNETO SWITCHES for the Inoperative Engine to the ON position.

NOTE

To assist the engine in restarting, establish and maintain 100-110 KIAS and perform a forward slip, banking toward the engine being restarted.

6. PROPELLER CONTROL (Inoperative Engine) FULL FORWARD
Move the PROPELLER CONTROL for the Inoperative Engine to the FULL FORWARD (High RPM) position.

NOTE

When propeller unfeathering occurs, it may be necessary to retard the propeller control so as not to allow the propeller to overspeed.

If the propeller is not windmilling freely within 8-12 seconds after the propeller control has been moved to the full forward position, a starter assisted start (for 1-2 seconds) will be required.

AIR STARTING/UNFEATHERING CHECKLIST (UNFEATHERING ACCUMULATOR FUNCTIONING) (continued)

After engine start:

7. THROTTLE/PROPELLER 20” MP/2000 RPM/200° F
As necessary, adjust the THROTTLE and PROPELLER controls of the restarted engine to set 20” MP/2000 RPM. Maintain this power setting until the CHT reaches 200° F. At this temperature, normal engine operation may be resumed.

8. ALTERNATOR ON
Depress the ALTERNATOR switch for the restarted engine to the ON position.

9. ELECTRIC FUEL PUMP OFF
Depress the ELECTRIC FUEL PUMP switch for the restarted engine to the OFF position. Check the fuel pressure. A slight decrease in fuel pressure may be observed.

10. COWL FLAP AS REQUIRED
OPEN the COWL FLAP for the restarted engine, AS REQUIRED, to maintain proper CHT.

11. AIR STARTING/UNFEATHERING CHECKLIST COMPLETE
Upon completion of the AIR STARTING/UNFEATHERING CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

AIR STARTING/UNFEATHERING CHECKLIST (STARTER ASSISTED)

1. FUEL SELECTOR (Inoperative Engine).....ON
2. MIXTURE CONTROL (Inoperative Engine).....FULL FORWARD
3. PROPELLER CONTROL (Inoperative Engine) .... FORWARD/CRUISE RPM
4. THROTTLE (Inoperative Engine) .....OPEN ¼”
5. ELECTRIC FUEL PUMP (Inoperative Engine) .....ON
6. MAGNETO SWITCHES (Inoperative Engine) .....ON
7. STARTER (Inoperative Engine).....ENGAGE/PROP WINDMILLS

If engine does not start, prime as required. After the engine starts:

8. THROTTLE/PROPELLER ..... 19” MP/2000 RPM/200° F
9. ALTERNATOR.....ON
10. ELECTRIC FUEL PUMP.....OFF
11. COWL FLAP .....AS REQUIRED
12. AIR STARTING/UNFEATHERING CHECKLIST .....COMPLETE

1. FUEL SELECTOR (Inoperative Engine) ON
Place the FUEL SELECTOR for the Inoperative Engine in the ON position.

2. MIXTURE CONTROL (Inoperative Engine) FULL FORWARD
Move the MIXTURE CONTROL for the Inoperative Engine to the FULL FORWARD (Full Rich) position.

3. PROPELLER CONTROL (Inop. Engine) FORWARD/CRUISE RPM
Move the PROPELLER CONTROL for the Inoperative Engine FORWARD to a CRUISE RPM position (2/3 of Full Forward).

4. THROTTLE (Inoperative Engine) OPEN ¼”
Set the THROTTLE for the Inoperative Engine OPEN ¼" from the CLOSE position.

5. ELECTRIC FUEL PUMP (Inoperative Engine) ON
Depress the ELECTRIC FUEL PUMP switch for the Inoperative Engine to the ON position. Check the fuel pressure. An increase in fuel pressure may be observed.

AIR STARTING/UNFEATHERING CHECKLIST (STARTER ASSISTED) (continued)

6. MAGNETO SWITCHES (Inoperative Engine) ON
Depress the MAGNETO SWITCHES for the Inoperative Engine to the ON position.

7. STARTER (Inoperative Engine) ENGAGE/PROP WINDMILLS
Depress the STARTER switch for the Inoperative Engine to ENGAGE the starter until the PROP WINDMILLS.

If the engine does not start, prime as required. After the engine starts:

8. THROTTLE/PROPELLER 20" MP/2000 RPM/200° F
As necessary, adjust the THROTTLE and PROPELLER controls of the restarted engine to set 20" MP/2000 RPM. Maintain this power setting until the CHT reaches 200° F. At this temperature, normal engine operation may be resumed.

9. ALTERNATOR ON
Depress the ALTERNATOR switch for the restarted engine to the ON position.

10. ELECTRIC FUEL PUMP OFF
Depress the ELECTRIC FUEL PUMP switch for the restarted engine to the OFF position. Check the fuel pressure. A slight decrease in fuel pressure may be observed.

11. COWL FLAP AS REQUIRED
OPEN the COWL FLAP for the restarted engine, AS REQUIRED, to maintain proper CHT.

12. AIR STARTING/UNFEATHERING CHECKLIST COMPLETE
Upon completion of the AIR STARTING/UNFEATHERING CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

PROPELLER OVERSPEED CHECKLIST

1. THROTTLE (Affected Engine) ..... REDUCE
2. OIL PRESSURE (Affected Engine) .....CHECK
3. PROPELLER (Affected Engine) .....FULL DECREASE/SET (if control available)
4. AIRSPEED..... REDUCE
5. THROTTLE (Affected Engine) .....AS REQUIRED/BELOW 2700 RPM
6. AIRPORT.....LAND
7. PROPELLER OVERSPEED CHECKLIST.....COMPLETE

1. THROTTLE (Affected Engine) REDUCE
REDUCE the THROTTLE for the Affected Engine to maintain propeller speed below 2700 RPM.

2. OIL PRESSURE (Affected Engine) CHECK
CHECK the OIL PRESSURE for the Affected Engine to determine if the engine is developing sufficient pressure.

3. PROPELLER (Affected Engine) FULL DECREASE/SET (if control available)
Move the PROPELLER control for the Affected Engine to FULL DECREASE to obtain control of the propeller speed. SET if any control is available.

4. AIRSPEED REDUCE
REDUCE the indicated AIRSPEED as much as practical to assist in maintaining propeller speed below 2700 RPM, or as set.

5. THROTTLE (Affected Engine) AS REQUIRED/BELOW 2700 RPM
Set the THROTTLE for the Affected Engine AS REQUIRED to assist in maintaining propeller speed BELOW 2700 RPM, or as set.

6. AIRPORT LAND
LAND at the nearest suitable AIRPORT as soon as practical.

7. PROPELLER OVERSPEED CHECKLIST COMPLETE
Upon completion of the PROPELLER OVERSPEED CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

ENGINE ROUGHNESS CHECKLIST

Engine roughness may be caused by induction system icing or ignition problems.

If induction icing is suspected:

1. CARBURETOR HEAT (Affected Engine) ..... ON

NOTE

When using carburetor heat, always use in the ON position. When the ice is removed, return the control to the OFF position. Partial carburetor heat may worsen the situation by melting a portion of the ice which then refreezes in the intake system.

2. MIXTURE (Affected Engine) .....ADJUST

If roughness continues after one minute:

3. CARBURETOR HEAT (Affected Engine) ..... OFF
4. MIXTURE (Affected Engine) .....ADJUST
5. ELECTRIC FUEL PUMP (Affected Engine) ..... ON
6. ENGINE GAUGES (Affected Engine)..... CHECK
7. MAGNETO SWITCHES (Affected Engine)..... CHECK

If satisfactory engine operation on either magneto can be obtained:

8. THROTTLE (Affected Engine).....REDUCE
9. MIXTURE CONTROL (Affected Engine)..... FULL FORWARD
10. AIRPORT ..... LAND

If engine roughness persists:

11. AIRPORT ..... LAND
12. ENGINE ROUGHNESS CHECKLIST .....COMPLETE

If induction icing is suspected:

1. CARBURETOR HEAT (Affected Engine) ON

Place the CARBURETOR HEAT control for the Affected Engine in the ON position.

ENGINE ROUGHNESS CHECKLIST (continued)

1. CARBURETOR HEAT (Affected Engine) (continued) ON

NOTE

When using carburetor heat, always use in the ON position. When the ice is removed, return the control to the OFF position. Partial carburetor heat may worsen the situation by melting a portion of the ice which then refreezes in the intake system.

2. MIXTURE (Affected Engine) ADJUST

ADJUST the MIXTURE for the Affected Engine to attempt to obtain smooth engine operation.

If roughness continues after one minute:

3. CARBURETOR HEAT (Affected Engine) OFF

Place the CARBURETOR HEAT control for the Affected Engine in the OFF position.

4. MIXTURE (Affected Engine) ADJUST

ADJUST the MIXTURE for the Affected Engine to attempt to obtain smooth engine operation.

5. ELECTRIC FUEL PUMP (Affected Engine) ON

Depress the ELECTRIC FUEL PUMP switch for the Affected Engine to the ON position. Check th.e fuel pressure. An increase in fuel pressure may be observed.

6. ENGINE GAUGES (Affected Engine) CHECK

CHECK the ENGINE GAUGES for any abnormal indications.

7. MAGNETO SWITCHES (Affected Engine) CHECK

Depress the MAGNETO SWITCHES one at a time to attempt to obtain satisfactory engine operation.

ENGINE ROUGHNESS CHECKLIST (continued)

If satisfactory engine operation can be achieved on either magneto:

9. MIXTURE CONTROL (Affected Engine) FULL FORWARD
Move the MIXTURE CONTROL for the Affected engine to the FULL FORWARD (Full Rich) position.

10. AIRPORT LAND
LAND at the nearest suitable AIRPORT as soon as practical.

If engine roughness persists:

11. AIRPORT LAND
LAND at the nearest suitable AIRPORT as soon as practical.

12. ENGINE ROUGHNESS CHECKLIST COMPLETE
Upon completion of the ENGINE ROUGHNESS CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

ENGINE OVERHEAT CHECKLIST

NOTE

An abnormally high oil temperature may be caused by a low oil level, an obstruction in the oil cooler, damaged or improper baffle seals, a defective gauge or thermocouple, etc.

CAUTION

Watch the oil pressure gauge for an accompanying loss in pressure. In addition, cylinder head temperature may parallel excessive oil temperature.

1. COWL FLAP (Affected Engine) ..... OPEN
2. MIXTURE (Affected Engine) ..... ENRICHEN
3. THROTTLE (Affected Engine) ..... REDUCE
4. AIRSPEED ..... INCREASE (if altitude permits)

If engine overheating persists:

5. AIRPORT ..... LAND
6. ENGINE OVERHEAT CHECKLIST ..... COMPLETE

1. COWL FLAP (Affected Engine) OPEN

Move the COWL FLAP control for the Affected Engine to the OPEN position.

2. MIXTURE (Affected Engine) ENRICHEN

ENRICHEN the MIXTURE for the Affected Engine to assist in engine cooling.

3. THROTTLE (Affected Engine) REDUCE

REDUCE the THROTTLE for Affected Engine to assist in engine cooling.

4. AIRSPEED INCREASE (if altitude permits)

If altitude permits, INCREASE indicated airspeed (shallow dive).

ENGINE OVERHEAT CHECKLIST (continued)

If engine overheating persists:

5. AIRPORT **LAND**

LAND at the nearest suitable AIRPORT as soon as practical.

6. ENGINE OVERHEAT CHECKLIST **COMPLETE**

Upon completion of the ENGINE OVERHEAT CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

LOSS OF OIL PRESSURE IN FLIGHT CHECKLIST

A partial loss of oil pressure usually indicates a malfunction in the oil pressure regulating system. A complete loss of oil pressure may signify oil exhaustion or be the result of a faulty gauge.

1. OIL PRESSURE GAUGE (Affected Engine).....CHECK/VERIFY
2. AFFECTED ENGINE ..... SECURE

NOTE

If engine oil is depleted, the engine will seize and, if the propeller is not feathered before reaching 950 RPM, the propeller will not feather.

Engine Securing Procedure:

3. THROTTLE (Affected Engine) ..... CLOSE
4. PROPELLER (Affected Engine) ..... FEATHER (950 RPM Min.)
5. STABILATOR TRIM/RUDDER TRIM.....AS REQUIRED
6. FUEL SELECTOR (Inoperative Engine)..... OFF
7. COWL FLAP (Inoperative Engine)..... CLOSE
8. COWL FLAP (Operative Engine).....AS REQUIRED
9. CARBURETOR HEAT (Inoperative Engine)..... OFF
10. MIXTURE CONTROL (Inoperative Engine).....IDLE CUT-OFF
11. ELECTRIC FUEL PUMP (Inoperative Engine) ..... OFF
12. MAGNETO SWITCHES (Inoperative Engine) ..... OFF
13. ALTERNATOR SWITCH (Inoperative Engine) ..... OFF
14. ELECTRICAL LOAD .....REDUCE (if required)
15. X-FEED (Crossfeed).....AS REQUIRED
16. AIRPORT .....LAND
17. LOSS OF OIL PRESSURE IN FLIGHT CHECKLIST .....COMPLETE

1. OIL PRESSURE GAUGE (Affected Engine) CHECK/VERIFY

CHECK the OIL PRESSURE GAUGE for the Affected Engine to VERIFY whether the loss in oil pressure is partial or complete.

2. AFFECTED ENGINE SECURE

Complete the Engine Securing Procedure to SECURE the AFFECTED ENGINE.

LOSS OF OIL PRESSURE IN FLIGHT CHECKLIST (continued)

3. THROTTLE (Affected Engine) CLOSE
Move the THROTTLE of the suspected Inoperative Engine to the CLOSE position.

4. PROPELLER (Inoperative Engine) FEATHER (950 RPM Min.)
Before the propeller RPM decreases below 950 RPM, move the PROPELLER control for the Inoperative Engine to the FEATHER position.

NOTE
Feathering the propeller must occur before the propeller speed decreases below 950 RPM. A locking pin will prevent the propeller from feathering below 950 RPM.

5. STABILATOR TRIM/RUDDER TRIM AS REQUIRED
Adjust the STABILATOR TRIM and RUDDER TRIM, AS REQUIRED, to assist in maintaining control of the aircraft.

6. FUEL SELECTOR (Inoperative Engine) OFF
Place the FUEL SELECTOR for the Inoperative Engine in the OFF position.

7. COWL FLAP (Inoperative Engine) CLOSE
CLOSE the COWL FLAP for the Inoperative Engine.

8. COWL FLAP (Operative Engine) AS REQUIRED
OPEN the COWL FLAP for the Operative Engine, AS REQUIRED, to maintain proper CHT.

9. CARBURETOR HEAT (Inoperative Engine) OFF
Place the CARBURETOR HEAT control for the Inoperative Engine in the OFF position.

10. MIXTURE CONTROL (Inoperative Engine) IDLE CUT-OFF
Verify that the MIXTURE CONTROL for the Inoperative Engine is in the IDLE CUT-OFF position.

LOSS OF OIL PRESSURE IN FLIGHT CHECKLIST (continued)

11. ELECTRIC FUEL PUMP (Inoperative Engine) OFF
Depress the ELECTRIC FUEL PUMP switch for the Inoperative Engine to the OFF position.

12. MAGNETO SWITCHES (Inoperative Engine) OFF
Depress the MAGNETO SWITCHES for the Inoperative Engine to the OFF position.

13. ALTERNATOR SWITCH (Inoperative Engine) OFF
Depress the ALTERNATOR SWITCH for the Inoperative Engine to the OFF position.

14. ELECTRICAL LOAD REDUCE (if required)
REDUCE the ELECTRICAL LOAD, if required, to ensure reliability of the operating alternator.

15. X-FEED (Crossfeed) AS REQUIRED
Verify that the fuel selector for the inoperative engine is in the OFF position. Move the fuel selector for the operative engine to the X-FEED (Crossfeed) position, AS REQUIRED, to extend range or keep fuel weight balanced during one engine inoperative operations.

NOTE
Do not operate with both fuel selectors in the X-Feed (Crossfeed) position. Do not land with a selector on X-Feed (Crossfeed).

16. AIRPORT LAND
LAND at the nearest suitable AIRPORT as soon as practical.

17. LOSS OF OIL PRESSURE IN FLIGHT CHECKLIST COMPLETE
Upon completion of the LOSS OF OIL PRESSURE IN FLIGHT CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

LANDING GEAR UNSAFE WARNINGS

Red **WARN GEAR UNSAFE** light illuminates:

- Gear Selector is in the UP or DOWN position and the landing gear is in transition between the fully-retracted (UP) position, or the down-and-locked (DOWN) position.

- Gear Selector in the UP position, and loss of hydraulic pressure prevents keeping the landing gear in the fully-retracted (UP) position (check nacelle mirrors for the nose gear position).

Red **WARN GEAR UNSAFE** light illuminates and the Gear Warning Horn sounds:

- The landing gear is not down-and-locked, and the MP is below 14” on one or both engines.

- The Gear Selector is in the UP position, and the Flap Control Handle is moved beyond the 1st notch (10°) position.

NOTE
If an unsafe indication continues, contact ERAU Flight Ops (123.30 MHz) before taking any other action.

MANUAL EXTENSION OF LANDING GEAR CHECKLIST

NOTE
When operating in the KDAB area, do not initiate this procedure until ERAU Flight Operations and Fleet Maintenance have been notified. Before initiating this procedure, proceed to a safe holding area, or request radar vectors from ATC.

Before extending the landing gear manually:

1. NAV LIGHT (DAY/NIGHT SWITCH) (Daytime) ..... OFF (DAY)
2. CIRCUIT BREAKERS.....CHECK
3. BATTERY MASTER SWITCH .....VERIFY ON
4. ALTERNATORS .....CHECK
5. GEAR INDICATOR LIGHTS.....CHECK

If the landing gear does not check down and locked:

6. AIRSPEED..... 100 KIAS MAX.
7. GEAR SELECTOR .....DOWN
8. EMERGENCY GEAR EXTENSION KNOB.....
..... PULL OUT FULLY/LEAVE OUT
9. GEAR INDICATOR LIGHTS.....CHECK/3 GREEN
10. MANUAL EXTENSION OF LANDING GEAR CHECKLIST..COMPLETE

Check the following before extending the landing gear manually:

1. NAV LIGHTS (DAY/NIGHT switch) (Daytime) OFF (DAY)
During Daytime operations, verify that the NAV LIGHT switch is in the OFF position, or, if installed, the DAY/NIGHT Switch is in the DAY position.

2. CIRCUIT BREAKERS CHECK
CHECK that all CIRCUIT BREAKERS are In by running your hand across the circuit breaker panel to confirm. Do not reset a “popped” circuit breaker more than one time to avoid the possibility of an electrical fire.

3. BATTERY MASTER SWITCH VERIFY ON
VERIFY that the BATTERY MASTER SWITCH is in the ON position.

MANUAL EXTENSION OF LANDING GEAR CHECKLIST (continued)

4. ALTERNATORS **CHECK**
CHECK the ALTERNATORS for proper operation.

5. GEAR INDICATOR LIGHTS **CHECK**
CHECK the GEAR INDICATOR LIGHTS to ensure that each is secured properly. Interchange the indicator light bulb assemblies to determine if a light has burned out.

If the landing gear does not check down and locked:

6. AIRSPEED **100 KIAS MAX.**
Adjust the indicated AIRSPEED for operation not to exceed 100 KIAS MAX.

7. GEAR SELECTOR **DOWN**
Place the GEAR SELECTOR in the DOWN position.

8. EMERGENCY GEAR EXTENSION KNOB
PULL OUT FULLY/LEAVE OUT
Slide the wire guard away from the EMERGENCY GEAR EXTENSION KNOB, PULL the knob OUT FULLY, and LEAVE the knob OUT.

9. GEAR INDICATOR LIGHTS **CHECK/3 GREEN**
CHECK the GEAR INDICATOR LIGHTS to verify that the 3 GREEN lights are illuminated.

10. MANUAL EXTENSION OF LANDING GEAR CHECKLIST
COMPLETE
Upon completion of the MANUAL EXTENSION OF LANDING GEAR CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

GEAR UP LANDING (INTENTIONAL) CHECKLIST

Ensure that all available resources have been exhausted in an effort to correct the landing gear extension problem. Refer to the ERAU Flight Operations Manual for additional guidance.

If unsuccessful in extending the landing gear manually:

1. AIRSPEED..... 80 KIAS
2. FLAPS ..... UP 0°
3. GEAR SELECTOR ..... UP
4. SEATBELTS/HARNESSES ..... ON

Just before touchdown:

5. THROTTLES ..... CLOSE
6. MIXTURE CONTROLS..... IDLE CUT-OFF
7. FUEL SELECTORS..... OFF
8. MAGNETO SWITCHES..... OFF
9. BATTERY MASTER SWITCH ..... OFF
10. AIRSPEED..... MINIMUM AT TOUCHDOWN
11. GEAR UP LANDING CHECKLIST ..... COMPLETE

If unsuccessful in extending the landing gear manually:

1. AIRSPEED **80 KIAS**
Establish a stabilized approach to the runway at 80 KIAS.

2. FLAPS **UP 0°**
Verify that the FLAPS are in the UP 0° position to minimize wing and flap damage.

3. GEAR SELECTOR **UP**
Verify that the GEAR SELECTOR is in the UP position.

4. SEATBELTS/HARNESSES **ON**
Ensure that all occupant(s') SEATBELTS and shoulder HARNESSES, if applicable, are ON and adjusted (per 14 CFR Part 91.107).

GEAR UP LANDING (INTENTIONAL) CHECKLIST (continued)

Just before touchdown:

5. THROTTLES **CLOSE**
Move the THROTTLES to the CLOSE position.

6. MIXTURE CONTROLS **IDLE CUT-OFF**
Move the MIXTURE CONTROLS to the IDLE CUT-OFF position.

7. FUEL SELECTORS **OFF**
Move both FUEL SELECTORS to the OFF position.

8. MAGNETO SWITCHES **OFF**
Depress the MAGNETO SWITCHES for both engines to the OFF position.

9. BATTERY MASTER SWITCH **OFF**
Depress the BATTERY MASTER SWITCH to the OFF position.

10. AIRSPEED **MINIMUM AT TOUCHDOWN**
Execute the roundout and flare so as to achieve a MINIMUM AIRSPEED AT TOUCHDOWN.

11. GEAR UP LANDING CHECKLIST **COMPLETE**
Upon completion of the GEAR UP LANDING CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

GYRO SUCTION FAILURE CHECKLIST

1. VAC ANNUNCIATOR ILLUMINATED .....CHECK

If Suction Gauge indicates below 4.5” Hg:

2. PROPELLER .....INCREASE TO 2700 RPM
3. ALTITUDE .....DESCEND/MAINTAIN 4.5” Hg

NOTE
Monitor attitude indicator performance by cross-checking it with the electric turn coordinator and other basic flight instruments.

4. GYRO SUCTION FAILURE CHECKLIST.....COMPLETE

1. VAC ANNUNCIATOR ILLUMINATED CHECK
If the VAC ANNUNCIATOR light is ILLUMINATED, CHECK the Gyro Suction gauge to determine the possible cause (i.e., vacuum pump failure).

If Suction Gauge indicates below 4.5” Hg:

2. PROPELLER INCREASE TO 2700 RPM
INCREASE the PROPELLER speed TO 2700 RPM.

3. ALTITUDE DESCEND/MAINTAIN 4.5” Hg
If possible, DESCEND to a lower ALTITUDE in order to MAINTAIN 4.5” Hg. suction.

NOTE
Monitor attitude and heading performance and accuracy by cross-checking it with the electric turn coordinator and other basic flight instruments.

4. GYRO SUCTION FAILURE CHECKLIST COMPLETE
Upon completion of the GYRO SUCTION FAILURE CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

SINGLE ALTERNATOR FAILURE CHECKLIST

One ammeter indicates 0 Amps or ALT annunciator light illuminates.

1. AMMETERS ..... CHECK/VERIFY
2. ELECTRICAL LOAD ..... REDUCE

NOTE

If LO BUS annunciator light illuminates (total tie bus voltage is below 12.5 Vdc), reduce the total electrical load below 60 (50) amps.

3. ALTERNATOR SWITCH (Affected)..... OFF
4. ALTERNATOR CIRCUIT BREAKER (Affected) ..... CHECK (RESET)
5. ALTERNATOR SWITCH (after 1 second) ..... ON

If power not restored:

6. ALTERNATOR SWITCH (Affected)..... OFF
7. AMMETER ..... MONITOR/MAINTAIN BELOW 60 (50) AMPS

NOTE

Although one alternator will provide sufficient current for the minimum required avionics and cockpit lighting, under no circumstances may the total electrical load exceed 60 amps. Cabin recirculation fans, Nav lights, strobe lights, and landing lights should be used only when absolutely necessary.

8. SINGLE ALTERNATOR FAILURE CHECKLIST ..... COMPLETE

1. AMMETERS **CHECK/VERIFY**

CHECK the AMMETERS to VERIFY which alternator has failed.

2. ELECTRICAL LOAD **REDUCE**

REDUCE the ELECTRICAL LOAD for the operative alternator below 60 amperes (50 amperes for IFR).

NOTE

If LO BUS annunciator light illuminates (total tie bus voltage is below 12.5 Vdc), reduce the total electrical below 60 (50) amps.

SINGLE ALTERNATOR FAILURE CHECKLIST (continued)

3. ALTERNATOR SWITCH (Affected) OFF
Depress the ALTERNATOR SWITCH for the Affected alternator to the OFF position.

4. ALTERNATOR CIRCUIT BREAKER (Affected) CHECK (RESET)
CHECK that the CIRCUIT BREAKER for the Affected alternator is IN. If not, RESET the circuit breaker to the IN position.

5. ALTERNATOR SWITCH (Affected) (after 1 second) ON
After one (1) second, depress the ALTERNATOR SWITCH for the Affected alternator to the ON position.

If power is not restored:

6. ALTERNATOR SWITCH (Affected) OFF
Depress the ALTERNATOR SWITCH for the Affected alternator to the OFF position.

7. AMMETER MONITOR/MAINTAIN BELOW 60 (50) AMPS
MONITOR the operation of the operating alternator and MAINTAIN an electrical load BELOW 60 AMPS or 50 amperes for IFR.

NOTE
Although one alternator will provide sufficient current for the minimum required avionics and cockpit lighting, under no circumstances may the total electrical load exceed 60 (50) amps. Cabin recirculation fans, Nav lights, strobe lights, and landing lights should be used only when absolutely necessary.

8. SINGLE ALTERNATOR FAILURE CHECKLIST COMPLETE
Upon completion of the SINGLE ALTERNATOR FAILURE CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

DUAL ALTERNATOR FAILURES CHECKLIST

1. AMMETERS ..... CHECK/VERIFY
2. ELECTRICAL LOAD .....REDUCE/MINIMUM FOR SAFE FLIGHT

NOTE
If the LO BUS annunciator light illuminates (total tie bus voltage below 12.5 Vdc), reduce the total electrical load below 60 (50) amps.

3. ALTERNATOR SWITCHES ..... OFF
4. ALTERNATOR CIRCUIT BREAKERS ..... CHECK/RESET
5. ALTERNATOR SWITCHES (after 1 second, one at a time) ..... ON

If only one alternator resets:

6. ALTERNATOR (Reset) .....LEAVE ON
7. ALTERNATOR (Inoperative) ..... OFF
8. AMMETER ..... MONITOR/MAINTAIN BELOW 60 (50) AMPS

If neither alternator resets:

9. ALTERNATORS ..... OFF
10. AIRPORT ..... LAND
11. DUAL ALTERNATOR FAILURES CHECKLIST .....
..... COMPLETE

WARNING

Anticipate a complete electrical power failure. Battery power availability will depend on electrical load and battery condition prior to alternator failures. With a depleted battery, extend the landing gear using the Manual Extension of Landing Gear procedure (page 157). The 3-Green Landing Gear position lights will be inoperative. Compass error may exceed 10° with both alternators inoperative.

DUAL ALTERNATOR FAILURES CHECKLIST (continued)

1. AMMETERS CHECK/VERIFY
CHECK each AMMETER to VERIFY which alternator has failed.

2. ELECTRICAL LOAD REDUCE/MINIMUM FOR SAFE FLIGHT
REDUCE the ELECTRICAL LOAD as much as practical, leaving on only the MINIMUM required items necessary FOR continued SAFE FLIGHT.

NOTE
If the LO BUS annunciator light illuminates (total tie bus voltage is below 12.5 Vdc), reduce the total electrical below 60 amps.

3. ALTERNATOR SWITCHES OFF
Depress both ALTERNATOR SWITCHES to the OFF position.

4. ALTERNATOR CIRCUIT BREAKERS CHECK/RESET
CHECK that both ALTERNATOR CIRCUIT BREAKERS are IN. If not, RESET the circuit breaker(s) to the IN position.

5. ALTERNATOR SWITCHES (after 1 second, one at a time) ON
After one (1) second, depress the ALTERNATOR SWITCHES to the ON position, one at a time.

If only one alternator resets:

6. ALTERNATOR (Reset) LEAVE ON
LEAVE the ALTERNATOR switch for the alternator that Reset in the ON position.

7. ALTERNATOR (Inoperative) OFF
Depress the ALTERNATOR switch for the Inoperative alternator to the OFF position.

8. AMMETER MONITOR/MAINTAIN BELOW 60 (50) AMPS
MONITOR the operation of the operating alternator and MAINTAIN an electrical load BELOW 60 AMPS or 50 amperes for IFR.

DUAL ALTERNATOR FAILURES CHECKLIST (continued)

If neither alternator resets:

9. ALTERNATOR SWITCHES **OFF**
Depress both ALTERNATOR SWITCHES to the OFF position.

10. AIRPORT **LAND**
LAND at the nearest suitable AIRPORT as soon as practical.

11. DUAL ALTERNATOR FAILURES CHECKLIST **COMPLETE**
Upon completion of the DUAL ALTERNATOR FAILURES CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

WARNING

Anticipate a complete electrical power failure. Battery power availability will depend on electrical load and battery condition prior to the alternator failures. With a depleted battery, extend the landing gear using the Manual Extension of Landing Gear procedure (page 172). The 3-Green Landing Gear position lights will be inoperative. Compass error may exceed 10° with both alternators inoperative.

CABIN DOOR OPEN IN FLIGHT CHECKLIST

If the cabin door is not latched at the top or side, the door will trail, slightly open. Normal flight characteristic will not be affected. No attempt should be made to close the entry door until the aircraft is in a safe area and at a safe altitude.

To close the cabin door in flight:

1. AIRSPEED..... 82 KIAS
2. CABIN VENTS..... CLOSE
3. STORM WINDOW..... OPEN

Close the cabin door as appropriate:

4. ONLY TOP OPEN .....PULL STRAP/LATCH
5. ONLY SIDE OPEN .....PULL ARMREST/LATCH
6. CABIN DOOR OPEN..... LATCH SIDE-LATCH, THEN TOP-LATCH
7. CABIN DOOR OPEN IN FLIGHT CHECKLIST .....COMPLETE

To close the cabin door in flight:

1. AIRSPEED **82 KIAS**
Maintain an AIRSPEED of 82 KIAS to allow the cabin door to be swung open slightly to before closing.

2. CABIN VENTS **CLOSE**
CLOSE all CABIN VENTS.

3. STORM WINDOW **OPEN**
OPEN the pilot's side STORM WINDOW to allow air to escape when closing the cabin door.

Close the cabin door as appropriate:

4. ONLY TOP OPEN **PULL STRAP/LATCH**
If ONLY the TOP of the cabin door is OPEN, PULL the top door STRAP and turn the top lever forward to LATCH.

5. ONLY SIDE OPEN **PULL ARMREST/LATCH**
If ONLY the SIDE of the door is OPEN, PULL on the ARMREST and push down on the lever to LATCH.

OPEN CABIN DOOR CHECKLIST (continued)

6. CABIN DOOR OPEN LATCH SIDE-LATCH, THEN TOP-LATCH
If the CABIN DOOR is OPEN and not latched at the top or side, PULL on the ARMREST and push down on the lever to LATCH first. Then, PULL the top door STRAP and turn the top lever forward to LATCH.

7. CABIN DOOR OPEN IN FLIGHT CHECKLIST COMPLETE
Upon completion of the CABIN DOOR OPEN IN FLIGHT CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

BAGGAGE DOOR OPEN IN FLIGHT

The baggage door may come unlatched in flight, during or after takeoff, if it is not properly closed and latched. Improperly closed and latched, the door may open to its full or intermediate position, depending on the speed of the aircraft. In addition, considerable wind noise will occur and loose objects in the vicinity of the open door may exit the airplane. From inside the airplane, there is no way to shut and latch the door.

1. AIRPORT.....LAND
2. BAGGAGE DOOR.....LATCH/LOCK
3. BAGGAGE DOOR OPEN IN FLIGHT CHECKLIST .....COMPLETE

1. AIRPORT **LAND**

LAND at the nearest suitable AIRPORT as soon as practical.

2. BAGGAGE DOOR **LATCH/LOCK**

LATCH the BAGGAGE DOOR securely and LOCK the door with the appropriate key. Verify that the baggage door is locked by depressing the small rectangular latch release button to ensure that the latch and door will not open.

3. BAGGAGE DOOR OPEN IN FLIGHT CHECKLIST

COMPLETE

Upon completion of the BAGGAGE DOOR OPEN IN FLIGHT CHECKLIST, verify that all items have been accomplished and that the checklist is COMPLETE.

