

**PREFLIGHT INSPECTION****CABIN**

1. Documents/Hobbs/Tach/Squawks—CHECK
2. For IFR **VOR 30 Day Accuracy** – CHECK
3. Pilot's Operating Handbook and **Flyaway Book**--IN AIRPLANE
4. Control Wheel Lock--REMOVE
5. Ignition Switch--OFF place keys on glare shield
6. **Avionics Master Switch--OFF**
7. Circuit Breakers--IN
8. **Master Switch--ON**
9. Flashing Beacon--ON / CHECK
10. Fuel Quantity Indicators--CHECK FUEL QUANTITY
11. Fuel Selector Valve--**CHECK, Movement. left, right, off, SET TO BOTH**
12. Flaps--EXTEND
13. Exterior and Interior Lights (for night flight)--CHECK
14. **Master Switch--OFF**
15. Static Pressure Alternate Air Source Valve (if installed)--OFF
16. Baggage Door-- CHECK, Lock with Key.

**EMPENNAGE**

1. Rudder Gust Lock—REMOVE (if installed)
2. Tail Tie-Down--DISCONNECT
3. Control Surfaces--CHECK freedom of movement and security
4. Trim Tab—CHECK for security
5. Antennas—CHECK for security and general condition

**RIGHT WING Trailing Edge**

1. Flap--CHECK for security and damage
2. Aileron--CHECK freedom of movement and security

**RIGHT WING**

1. Wing Tip and Lights--CHECK
2. Wing Tie-Down--DISCONNECT
3. Main Wheel/Tire--CHECK brakes, tire condition/inflation, chocks
4. Fuel Sample--CHECK for water, sediment, proper fuel grade & color
5. Fuel Quantity--CHECK VISUALLY for desired level
6. Fuel Filler Cap—SECURE (**this should be a vented cap**)
7. Cabin Vent—CHECK

**NOTE**

Visually check airplane for general condition during walk-around inspection. In cold weather, remove even small accumulations of frost, ice or snow from wing, tail and control surfaces. Also, make sure that control surfaces contain no internal accumulation of ice or debris. Prior to flight, check that pitot heater (if installed) is warm to touch within 30 seconds of battery and pitot heat switches on. If a night flight is planned, check operation of all lights, and make sure a flashlight is available. Check the surrounding area for debris which may be drawn into or blown about by the propeller. If necessary, position the airplane to avoid creating a hazard to buildings, vehicles or persons by the propeller blast

**WARNING**

When turning on the master switch, using an external power source, or pulling the propeller through by hand, treat the propeller as if the ignition switch were on. Do not stand, or allow anyone else to stand within the arc of the propeller, since a loose or broken wire, or a component malfunction, could cause the propeller to rotate.

**NOSE**

1. Engine Oil Level--CHECK, **do not operate with less than six quarts.** Fill to eight quarts for extended flight
2. Fuel Strainer--DRAIN before first flight of the day and after each refueling. Pull out strainer knob for about four seconds to clear strainer of water / sediment. CHECK STRAINER DRAIN CLOSED
3. Propeller and Spinner--CHECK for nicks and security
4. Engine Cooling Air Inlets—CLEAR of obstructions, check for cylinder cooling baffle integrity, oil leaks, alternator belt security and tension.
5. Cowling--CHECK FOR SECURITY
6. Carburetor Air Filter--CHECK for restrictions, dust, or foreign matter
7. Nose Wheel Strut and Tire--CHECK condition, inflation, and security
8. Nose Tie-Down--DISCONNECT, remove chocks
9. Static Port (left side of fuselage)--CHECK for stoppage

**LEFT WING**

1. Fuel Quantity--CHECK VISUALLY for desired level
2. Fuel Filler Cap—SECURE (**this should be a vented cap**)
3. Fuel Sample--CHECK for water, sediment, proper fuel grade & color
4. Cabin Vent—CHECK
5. Main Wheel/Tire--CHECK brakes, tire condition/inflation, chocks

**LEFT WING Leading Edge**

1. Pitot Tube Cover--REMOVE, check opening for stoppage
2. Fuel Tank Vent Opening--CHECK for stoppage
3. Stall Warning Opening--CHECK for stoppage. To check operation, place a handkerchief over the vent opening and apply suction; a sound from the warning horn will confirm system operation
4. Wing Tie-Down—DISCONNECT
5. Landing/Taxi Lights--CHECK condition and cleanliness
6. Wing Tip and Lights--CHECK

**LEFT WING Trailing Edge**

1. Aileron--CHECK freedom of movement and security
2. Flap--CHECK for security and damage

# SECTION 4 NORMAL PROCEDURES

## SPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 2300 pounds and may be used for any lesser weight. However, to achieve the performance specified in Section 5 for takeoff distance, the speed appropriate to the particular weight must be used.

	<u>MPH (Indicated)</u>
Takeoff, Flaps Up:	
Normal Climb Out .....	85
Short Field Takeoff, Flaps 0°, Speed at 50 Feet .....	68
Enroute Climb, Flaps Up:	
Normal, Sea Level .....	80-90
Best Rate of Climb, Sea Level .....	82
Best Rate of Climb, 10,000 Feet .....	79
Best Angle of Climb, Sea Level .....	68
Best Angle of Climb, 10,000 Feet .....	74
Landing Approach:	
Normal Approach, Flaps Up .....	70-80
Normal Approach, Flaps 40° .....	65-75
Short Field approach, Flaps 40° .....	69
Balked Landing:	
Maximum Power, Flaps 20° .....	65
Maximum Recommended Turbulent Air Penetration Speed:	
2300 Lbs .....	122
2000 Lbs .....	113
1600 Lbs .....	80
Maximum Demonstrated Crosswind Velocity:	
Takeoff or Landing .....	15

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## **BEFORE STARTING ENGINE**

1. Surrounding Area--CHECK FOR PERSONNEL AND HAZARDS; REMOVE CHOCKS AND TOW BAR. IF REQUIRED MOVE AIRCRAFT TO AVOID PROPWASH ON PARKING AREA/HANGAR
2. Preflight Inspection--COMPLETE
3. Seats--ADJUST AND LOCK
4. Seat Belts and Shoulder Harnesses--ADJUST and LOCK
5. Passengers--BRIEFED
6. Fuel Selector Valve—CHECK BOTH
7. Electrical Switches – CHECK OFF
8. Circuit Breakers--RECHECK IN
9. **Avionics Master Switch – CHECK OFF**

**CAUTION**

**AVIONICS MASTER SWITCH MUST BE OFF DURING ENGINE START TO PREVENT POSSIBLE DAMAGE TO AVIONICS**

10. Flashing Beacon Switch--RECHECK ON
11. Brakes--TEST and SET

**STARTING ENGINE**

1. Mixture--RICH
2. Carburetor Heat--COLD
3. **Master Switch--ON**
4. Prime--AS REQUIRED (2-6 strokes, none if engine is warm)
5. Throttle--OPEN 1/8 INCH
6. Propeller Area--CLEAR
7. Ignition Switch--START (release when engine starts),set 1000 RPM
8. Oil Pressure--CHECK
9. Flashing Beacon and Navigation Lights--ON as required
10. **Avionics Master Switch - ON**
11. Radios -- SET & CHECK OPERATION.
12. Electrical Equipment--ON as required
13. Transponder -- SQUAWK STBY
14. Flaps--RETRACT

**TAXI CHECK**

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1. Radio— **Contact FSS and Activate Flight Plan** prior to taxi
2. TAXI- REQUEST Taxi Clearance or announce intentions
2. Brakes--CHECK during initial movement
3. Maintain 1000 RPM minimum and lean mixture during taxi to reduce plug fouling
3. Nose Wheel Steering--CHECK
4. Ailerons--POSITION for crosswind taxi
5. Magnetic Compass, Directional Gyro, Turn Coordinator—CHECK

**BEFORE TAKEOFF**

1. Parking Brake--SET
2. Seats, Seat Belts, Shoulder Harnesses--CHECK SECURE
3. Cabin Doors and Windows--CLOSED and LOCKED
4. Flight Controls--FREE, and CORRECT
5. Flight Instruments--SET (Attitude Ind, Directional Gyro, Altimeter)
6. Primer--IN and LOCKED
7. Fuel Quantity--CHECK
8. Fuel Selector Valve--RECHECK ON BOTH
9. Mixture--RICH (below 3000 feet)
10. Elevator and Rudder Trim --SET FOR TAKEOFF
11. High/Low Voltage Light and Alternator Function--CHECK
12. Throttle--1700 RPM
  - a. Magnetos--CHECK (RPM drop should not exceed 125 RPM on either magneto or 50 RPM differential between magnetos)
  - b. Carburetor Heat--CHECK for RPM drop
  - c. Engine Instruments and Ammeter--CHECK
  - d. Suction Gauge—CHECK
- 13 Throttle--1000 RPM Mimimum- Relean mixture for extended taxi
- 14 Navigation Lights and Strobes--ON as required
15. Flaps--AS REQUIRED
16. Throttle Friction Lock--ADJUST
17. Radios (comm and nav)--SET, Call Tower for Takeoff Clearance or announce takeoff intentions.
18. Transponder --SET CODE & SQUAWK ALTITUDE
19. Record Time Off

**LINE-UP CHECK**

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1. **Taxi into position –Perform Visual Check of runway final approaches for conflicting Traffic.**
2. Compass and Directional Gyro Heading—CHECK
3. Landing / Taxi Lights--AS REQUIRED
4. Brakes—RELEASE

### TAKEOFF

#### NORMAL TAKEOFF

1. Wing Flaps—UP
2. Carburetor Heat—COLD
3. Throttle--FULL OPEN - **Confirm Max RPM and Oil pressure early in takeoff roll**
4. Elevator Control--LIFT NOSE WHEEL (at 60 MPH)
5. Climb Speed—85 MPH

#### SHORT FIELD TAKEOFF

1. Wing Flaps—UP
2. Carburetor Heat--COLD
3. Brakes—APPLY
4. Throttle--FULL OPEN - **Confirm Max RPM and Oil pressure early in takeoff roll**
5. Mixture--RICH (above 3000 feet LEAN to obtain maximum RPM)
6. Brakes--RELEASE
7. Elevator Control--SLIGHTLY TAIL LOW
8. Climb Speed--68 MPH (until all obstacles are cleared)
9. Accelerate to normal climb or 82 MPH(Vy) if required
10. Wing Flaps—RETRACT slowly after obstacle

#### SOFT FIELD TAKEOFF (No Obstacles)

1. Wing Flaps--UP°
2. Carburetor Heat--COLD
3. Use ROLLING TAKEOFF Technique
4. Throttle--FULL OPEN - **Confirm Max RPM and Oil pressure early in takeoff roll**
5. Elevator Control--LIFT AIRCRAFT off ground as soon as practical
6. LEVEL AIRCRAFT just above runway surface
7. ACCELERATE to Appropriate Airspeed for Climb

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8. Wing Flaps--RETRACT slowly after reaching 80-90 MPH

### NORMAL CLIMB

1. Airspeed—80-90 MPH

#### NOTE

If a maximum performance climb is necessary, use 82 MPH at Sea Level to 79 MPH at 10,000 feet

2. Throttle--FULL OPEN
3. Mixture-- RICH (above 3000 feet, LEAN to obtain maximum RPM)

### CRUISE

1. Power--2200-2700 RPM (no more than 75% is recommended)

#### NOTE

Maximum cruise RPM varies with altitude, For details, refer to Section V

2. Elevator and Rudder Trim (if installed)--ADJUST
3. Mixture--LEAN for maximum RPM
4. Directional Gyro--CHECK / SET

### DESCENT

1. Power--AS DESIRED
2. Mixture--ADJUST for smooth operation (full rich for idle power)
3. Fuel Selector Valve—BOTH
4. Carburetor Heat—FULL AS REQUIRED (to prevent carburetor icing)

### BEFORE LANDING

1. Seats, Seat Belts, Shoulder Harnesses--SECURE
2. Fuel Selector Valve--BOTH
3. Mixture--RICH
4. Carburetor Heat--ON (apply full heat before reducing power)

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**LANDING****NORMAL LANDING**

1. Airspeed—70-80 MPH (flaps up)
2. Wing Flaps—AS DESIRED (0-40 degrees below 100 mph)
3. Airspeed—65-75 MPH (flaps down)
4. Touchdown--MAIN WHEELS FIRST
5. Landing Roll--LOWER NOSE WHEEL GENTLY
6. Braking--MINIMUM REQUIRED

**SHORT FIELD LANDING**

1. Airspeed 70-80 MPH (flaps up)
2. Wing Flaps--FULL DOWN (40°)
3. Airspeed—69 MPH (until flare)
4. Power--REDUCE to idle after clearing obstacle
5. Touchdown--MAIN WHEELS FIRST
6. Brakes--APPLY HEAVILY
7. Wing Flaps—RETRACT

**SOFT FIELD LANDING**

1. Normal Approach and Landing Configuration
2. Power—AS REQUIRED on final approach and through touchdown (Approx 1400-1500 RPM)
3. Touchdown—SOFTLY on main wheels. Maintain nose high attitude with minimum weight on nose wheel through roll-out
4. Brakes—NONE unless absolutely necessary

**BALKED LANDING**

1. Throttle--FULL OPEN
2. Carburetor Heat--COLD
3. Wing Flaps--20° (Immediately)
4. Climb Speed—65 MPH
5. Wing Flaps--RETRACT (after reaching a safe altitude and 65 MPH)

**AFTER LANDING**

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1. Wing Flaps--UP
2. Carburetor Heat--COLD
3. Transponder--STBY
4. Strobe Lights—OFF
5. Landing/Taxi Lights—OFF (as required at night)
6. Radio Call--TAXI INSTRUCTIONS / INTENTIONS
7. Close Flight Plan after Tower frequency release

**NOTE**

**THE FOLLOWING PROCEDURE IS PROVIDED FOR AIRCRAFT SHUTDOWN AT THE FUEL TANKS FOR REFUELING AS REQUIRED BY SOP.**

1. Parking Brake—SET as required
2. Flight Plan--CLOSED
3. **Avionics Master Switch -- OFF**
4. Electrical Equipment --OFF
5. Mixture--IDLE CUT-OFF
6. Ignition Switch--OFF REMOVE KEYS AND PLACE ON GLARE SHIELD
7. Master Switch--OFF
8. Fuel Selector --**SET to RIGHT OR LEFT**
9. Chock Airplane -CHECK
10. Connect Fueling Grounding Wire --CHECK
11. Unlock Pump --TURN ON
12. Position Ladder and Fuel Hose-CHECK
13. After Refueling --NOTE fuel quantity for log
14. Replace hose at pump, lock pump, get keys, move hose to safe area-
15. Disconnect and roll up Grounding wire- CHECK
16. Remove Chocks- CHECK
17. Attach tow bar, and move aircraft to parking position-CHECK

**SECURING AIRPLANE**

1. Parking Brake—SET as required

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2. Tiedown Wings, then tighten tail tiedown -CHECK
3. Chock Main wheel- CHECK
4. Hobbs, Tach, fuel and Squawks--RECORD
5. Control Lock--INSTALL
6. Clean Cabin, Store Belts, Replace Sun Screens and Covers --CHECK
8. Collect Keys and Airplane Book, pilot gear -CHECK
9. Log Aircraft back in—CHECK. Note Squawks, fuel, oil, flight time.
10. Return keys to Key box - CHECK

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**SECTION 3**

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# EMERGENCY PROCEDURES

## AIRSPEEDS FOR EMERGENCY OPERATION

Engine Failure After Takeoff: :	MPH (Indicated)
Wing Flaps Up .....	80
Wing Flaps Down.....	70
Maneuvering Speed:	
2300 Lbs.....	122
Maximum Glide.....	80
Precautionary Landing With Engine Power .....	65-75
Landing Landing Without Engine Power:	
Wing Flaps Up .....	70-80
Wing Flaps Down.....	65-75

## OPERATIONAL CHECKLISTS

### ENGINE FAILURES

#### ENGINE FAILURE DURING TAKEOFF RUN

1. Throttle--IDLE
2. Brakes--APPLY HEAVILY
3. Wing Flaps--RETRACT
4. Mixture--IDLE CUTOFF
5. Ignition Switch--OFF
6. Master Switch--OFF

#### ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. Airspeed-- 80 MPH (flaps up)  
70 MPH (flaps down)
2. Mixture--IDLE CUTOFF
3. Fuel Selector Valve--OFF
4. Ignition Switch--OFF
5. Wing Flaps--AS REQUIRED
6. Master Switch--OFF

#### ENGINE FAILURE DURING FLIGHT

1. Airspeed-- 80 MPH
2. Carburetor Heat--ON
3. Fuel Selector Valve--BOTH
4. Mixture--RICH
5. Master Switch--ON
6. Ignition Switch--BOTH (or START if prop is stopped)
7. Primer--IN and LOCKED
8. Radio--TRANSMIT "MAYDAY" CALL 121.5 MHz
9. Transponder--7700

### FORCED LANDINGS

**EMERGENCY LANDING WITHOUT ENGINE POWER**

1. Airspeed-- 80 MPH (flaps UP)  
70 MPH (flaps DOWN)
2. Mixture--IDLE CUTOFF
3. Fuel Selector Valve--OFF
4. Ignition Switch--OFF
5. Wing Flaps--AS REQUIRED (30° recommended)
6. Master Switch--OFF
7. Seat Belts--FASTENED
8. Doors--UNLATCH PRIOR TO TOUCHDOWN
9. Touchdown--SLIGHTLY TAIL LOW
10. Brakes--APPLY HEAVILY

**PRECAUTIONARY LANDING WITH ENGINE POWER**

1. Airspeed--65-75 MPH
2. Wing Flaps--20°
3. Selected Field--FLY OVER, noting terrain and obstructions, then retract flaps upon reaching a safe altitude and airspeed
4. Radios and Electrical Switches--OFF
5. Wing Flaps--40° (on final approach)
6. Airspeed--65 MPH
7. Master Switch--OFF
8. Doors--UNLATCH PRIOR TO TOUCHDOWN
9. Touchdown--SLIGHTLY TAIL LOW
10. Ignition Switch--OFF
11. Brakes--APPLY HEAVILY

**DITCHING**

1. Radio--TRANSMIT MAYDAY on 121.5 MHz , giving location and intentions and SQUAWK 7700
2. Heavy Objects --SECURE OR JETTISON
3. Approach--High Winds, Heavy Seas--INTO THE WIND  
Light Winds, Heavy Swells--PARALLEL TO SWELLS
4. Wing Flaps--40° recommended
5. Power--ESTABLISH 300 FPM DESCENT

NOTE

If no power is available, approach at 80 MPH (flaps up)

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or 70 HM with 10° flaps

6. Cabin Doors--UNLATCH
7. Touchdown--LEVEL ATTITUDE AT ESTABLISHED RATE OF DESCENT
8. Face--CUSHION at touchdown with folded coat
9. Airplane--EVACUATE through cabin doors. If necessary, open window and flood cabin to equalize pressure so doors can be opened.
10. Life Vests and Raft--INFLATE

**FIRES****DURING START ON GROUND**

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

If Engine Starts:

2. Power--1700 RPM for a few minutes
3. Engine--SHUT DOWN and inspect for damage

If Engine Fails to Start:

4. Throttle--FULL OPEN
5. Mixture--IDLE CUT-OFF
6. Cranking--CONTINUE
7. Fire Extinguisher--OBTAIN  
(have ground attendants obtain if not installed)
8. Engine--SECURE
  - a. Master Switch--OFF
  - b. Ignition Switch--OFF
  - c. Fuel Selector Valve--OFF
9. Fire--EXTINGUISH using fire extinguisher, wool blanket or dirt
10. Fire Damage--INSPECT, repair damage or replace damaged components or wiring before conducting another flight

**ENGINE FIRE IN FLIGHT**

1. Mixture--IDLE CUT-OFF

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2. Fuel Selector Valve--OFF
3. Master Switch--OFF
4. Cabin Heat and Air--OFF (except overhead vents)
5. Airspeed--100 MPH (If fire is not extinguished, increase glide speed to find an airspeed which will provide an incombustible mixture)
6. Forced Landing--EXECUTE (as described in Emergency Landing without Engine Power)

### **ELECTRICAL FIRE IN FLIGHT**

1. Master Switch--OFF
2. Avionics Power Switch--OFF
3. All Other Switches (except ignition switch)--OFF
4. Vents / Cabin Air / Heat--CLOSED
5. Fire Extinguisher--ACTIVATE (if available)

#### **WARNING**

**After discharging an extinguisher in a closed cabin, ventilate the cabin**

If fire appears out and electrical power is necessary for continued flight:

6. Master Switch--ON
7. Circuit Breakers--CHECK for faulty circuit, do not reset
8. Radio Switches--OFF
9. Avionics Power Switch--ON
10. Radios / Electrical Switches--ON one at a time, with delay after each until short circuit is located
11. Vents / Cabin Air / Heat--OPEN when it is ascertained that fire is completely extinguished

### **CABIN FIRE**

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

#### **WARNING**

**After discharging an extinguisher in a closed cabin, ventilate the cabin**

4. Land the airplane as soon as possible to inspect for damage

### **WING FIRE**

1. Navigation Light Switch--OFF
2. Pitot Heat Switch (if installed) --OFF
3. Strobe Light Switch (if installed) -- OFF

#### **NOTE**

Perform a side slip to keep flames away from fuel tank and cabin, and land as soon as possible using flaps only as required on final approach.

### **ICING**

#### **INADVERTENT ICING ENCOUNTER**

1. Turn pitot heat switch ON (if installed)
2. Turn back or change altitude to obtain an outside temperature that is less conducive to icing
3. Pull cabin heat control full out and open defroster outlets to obtain maximum windshield defroster airflow. Adjust cabin air control to get maximum defroster heat and airflow
4. Open the throttle to increase engine speed and minimize ice build-up on propeller blades
5. Watch for signs of carburetor air filter ice and apply carburetor heat as required. An unexplained loss in engine speed could be caused by carburetor ice or air intake filter ice. Lean the mixture for maximum RPM if carburetor heat is used continuously
6. Plan a landing at the nearest airport. With an extremely rapid ice build-up, select a suitable "off airport" landing site
7. With an ice accumulation of 1/4 inch or more on the wing leading edges, be prepared for a significantly higher stall speed.
8. Leave wing flaps retracted. With a severe build-up on the horizontal tail, the change in wing wake airflow direction caused by wing flap extension could result in loss of elevator effectiveness.
9. Open left window and, if practical, scrape ice from a portion of the windshield for visibility in the landing approach
10. Perform a landing approach using a forward slip, of necessary for improved visibility
11. Approach at 65-75 KIAS depending upon the amount of the accumulation
12. Perform a landing in a level attitude

### **STATIC SOURCE BLOCKAGE**

**(Erroneous Instrument Reading Suspected)**

BREAK GLASS in Vertical Speed Indicator to provide an alternate static source. CAUTION: ALTIMETER AND AIRSPEED READINGS WILL NOT BE AS ACCURATE AS WITH THE NORMAL STATIC SOURCE

### **LANDING WITH A FLAT MAIN TIRE**

1. Approach--NORMAL
2. Touchdown--GOOD TIRE FIRST, hold airplane off flat tire as long as possible

### **AMMETER SHOWS EXCESSIVE RATE OF CHARGE**

**(Full Scale deflection)**

1. Alternator--OFF
2. Alternator Circuit Breaker--PULL
3. Nonessential Electrical Equipment--OFF
4. Flight--TERMINATE as soon as practical

### **LOW VOLTAGE LIGHT ILLUMINATES DURING FLIGHT**

**(Ammeter Indicates Discharge)**

#### NOTE

Illumination of the low-voltage light may occur during low RPM conditions with an electrical load on the system such as during a low RPM taxi. Under these conditions, the light will go out at higher RPM. the master switch need not be recycled since an over-voltage condition has not occurred to de-activate the alternator system.

1. Avionics Master Switch--OFF
2. Alternator Circuit Breaker--CHECK IN
3. Master Switch--OFF (both sides)
4. Master Switch--ON
5. Low Voltage Light--CHECK OFF
6. Avionics Master Switch--ON

#### If Low Voltage Light Illuminates Again:

7. Alternator—OFF (Left side of master switch)
8. Non-essential Radio and Electrical Equipment--OFF
9. Flight--TERMINATE as soon as practical

## **ELECTRICAL POWER SUPPLY SYSTEM** **MALFUNCTIONS**