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All airspeeds quoted in this section are *indicated airspeeds (IAS)* and assume zero instrument error.

AIR START

CAUTION

The pilot should determine the reason for engine failure before attempting an air start. Do not attempt an air start if N_1 indicates zero.

STARTER ASSIST (PROPELLER FEATHERED OR WINDMILLING)

1. Radar OFF
2. Envir Mode Control OFF
3. Vent Blower AUTO
4. WSHLD Anti-ice OFF
5. Power Lever IDLE
6. Propeller Lever LOW RPM
7. Condition Lever FUEL CUTOFF
8. Firewall Fuel Valve OPEN (EXTINGUISHER PUSH and FW VALVE
CLOSED Annunciators - EXTINGUISHED)
9. Engine Anti-ice OFF
10. Generator (inoperative engine) OFF
11. Airspeed 140 KIAS MINIMUM

NOTE

If conditions permit, retard operative engine ITT to 700°C or less to reduce the possibility of exceeding ITT limit. Reduce electrical load to a minimum consistent with flight conditions.

12. Ignition and Engine Start Switch ON (IGNITION Annunciator - ILLUMINATED)
13. Condition Lever (after N_1 accelerates thru 12%) LOW IDLE
14. ITT and N_1 MONITOR (1000°C maximum)
15. Ignition and Engine Start Switch (N_1 above 50%) OFF
16. Propeller Lever AS REQUIRED
17. Power Lever AS REQUIRED
18. Generator GEN RESET, then ON
19. Eng Auto Ignition AS REQUIRED
20. Prop Sync AS REQUIRED
21. Electrical Equipment AS REQUIRED
22. Bleed Air Valve OPEN
23. Envir Mode Control AUTO

NO STARTER ASSIST (PROPELLER FEATHERED OR WINDMILLING)

1. Power Lever IDLE
2. Propeller Lever
 - a. For Propeller Feathered Airstarts TAXI
 - b. For Propeller Windmilling Airstarts SET 1700 RPM
3. Condition Lever FUEL CUTOFF
4. Firewall Fuel Valve OPEN (EXTINGUISHER PUSH and FW VALVE
CLOSED Annunciators - EXTINGUISHED)
5. Engine Anti-ice OFF
6. Generator (inoperative engine) OFF
7. Airspeed 140 KNOTS MINIMUM
8. Altitude BELOW 20,000 FEET
9. Engine N_1 10% MINIMUM

NOTE

N_1 may be increased by increasing airspeed.

10. Eng Auto Ignition ARM
11. Condition Lever LOW IDLE
12. ITT and N_1 MONITOR (1000° maximum)
13. Power (after ITT has peaked) AS REQUIRED
14. Generator RESET, then ON
15. Eng Auto Ignition AS REQUIRED
16. Prop Sync AS REQUIRED
17. Electrical Equipment AS REQUIRED

LANDING

FLAPS UP LANDING

Refer to Section V, PERFORMANCE for Flaps-up Approach Speed and Landing Distance.

1. Approach Speed CONFIRM
2. Pressurization CHECK
3. Autofeather Switch ARM
4. GPWS Flap Override Switch (if installed) PUSH TO ACTIVATE
(GPWS FLAP OVRD Annunciator - ILLUMINATED)
5. Flaps UP
6. Surface Deice (as required) CYCLE

CAUTION

Do not silence the landing gear warning horn, since the flap actuated portion of the landing gear warning system will not be actuated during a flaps-up landing.

7. Landing Gear DN
8. Lights AS REQUIRED

NOTE

Under low visibility conditions, landing and taxi lights should be left off due to light reflections.

NOTE

If crosswind landing is anticipated, determine Crosswind Component from Section 5, PERFORMANCE. Immediately prior to touchdown, lower up-wind wing and align the fuselage with the runway by use of rudder. During rollout, hold aileron control into the wind and maintain directional control with rudder and brakes. Use proper propeller reverse as desired.

When Landing Assured:

- 9. Yaw DampOFF
- 10. Power Levers IDLE
- 11. Propeller Levers FULL FORWARD

NOTE

If a full-stall landing is made, a slight right wing drop will be experienced during the flare.

After Touchdown:

- 12. Power LeversLift and Select GROUND FINE
- 13. Brakes..... AS REQUIRED (to achieve stopping performance)

ONE-ENGINE-INOPERATIVE APPROACH AND LANDING

- 1. Approach Speed (V_{REF})CONFIRM
- 2. Fuel BalanceCHECK
- 3. PressurizationCHECK
- 4. Bleed Air ValvesENVIR OFF
- 5. Envir Mode ControlOFF
- 6. BlowersHIGH

When it is Certain that the Field Can Be Reached:

- 7. Flaps 17°
- 8. Landing GearDN
- 9. LightsAS REQUIRED
- 10. Surface Deice (as required) CYCLE
- 11. Propeller LeverSET 1700 RPM
- 12. Airspeed $V_{REF} + 5$ KNOTS

When it is Certain there is No Possibility of Go-around:

- 13. Flaps DOWN
- 14. Airspeed V_{REF}
- 15. Execute normal landing.

WARNING

Care must be exercised when using single-engine ground fine on surfaces with reduced traction.

Do not use reverse thrust with one engine inoperative.

NOTE

Single-engine landing distances will be greater than normal landing distance. Refer to Landing Distance - One-Engine-Inoperative - Flaps Down graph in Section 5, PERFORMANCE, for single-engine landing distances.

ONE-ENGINE-INOPERATIVE GO AROUND

- 1. Power MAXIMUM ALLOWABLE
- 2. Airspeed MAINTAIN V_{REF}
- 3. Flaps 17°
- 4. Landing Gear UP
- 5. Airspeed INCREASE TO V_{YSE}
- 6. Flaps UP

SYSTEMS

PROPELLER SYSTEMS

AUTOFEATHER DISABLED (AFX DISABLE Annunciator)

Illumination of the AFX DISABLE annunciator indicates a loss of the autofeather arm signal when the autofeather switch is in the ARM position and the power levers are advanced beyond a preset level. If the AFX DISABLE annunciator illuminates:

- When Committed to Takeoff If an engine failure occurs, the propeller must be manually feathered

AUTOFEATHER OFF (AUTOFTHER OFF Annunciator)

The AUTOFTHER OFF annunciator will illuminate anytime the landing gear is down and the autofeather switch is not in the ARM position. The autofeather system must be armed for takeoff, climb, approach, and landing.

PROPELLER GROUND IDLE LOW PITCH STOP SOLENOID FAILURE (PROP GND SOL Annunciator) (if installed)

The annunciator is Installed on Serials UE-335 and After, and those Airplanes Modified by Raytheon Aircraft Kit No. 129-9011-1. It is removed on Serials UE-1 and After when Raytheon Aircraft Kit No. 129-9030-1 is installed.

During Ground Operations:

Illumination of the annunciator on the ground indicates one of the following, or some other, abnormal condition.

- 1. PROP GND SOL Circuit Breaker Is Out CHECK IN
- 2. One or both Ground Idle Low Pitch Stop Solenoids is in the unpowered (flight) position. Corresponding Propeller RPM will be abnormally low REPAIR PRIOR TO FLIGHT

In Flight:

Illumination of the annunciator in flight indicates that one or both ground idle low pitch stop solenoids may be in the powered (ground) position.

- 1. PROP GND SOL Circuit Breaker PULL

If PROP GND SOL Annunciator Extinguishes:

- 2. Fly a normal approach. Plan on slightly longer landing distances due to propellers remaining on flight idle stop touchdown.

If PROP GND SOL Annunciator Remains Illuminated:

3. Fly a shallow, power-on approach at 1400 rpm.
4. Do not reduce power until just before, or at touchdown. Plan on slightly longer landing distances.

CAUTION

If the PROP GND SOL annunciator does not extinguish, the pitch of one or both propellers will decrease to the ground idle low pitch stop when the power and airspeed are reduced during the approach and landing, causing an increase in drag and possible yawing of the airplane prior to touchdown. Keeping the propellers on the governor until very close to touchdown, as described in steps 3 and 4, will prevent this from occurring.

ENGINE OIL SYSTEM

LOW OIL PRESSURE INDICATION

Oil pressures below 90 psi are undesirable. They should be tolerated only for the completion of the flight, at a reduced power setting not to exceed 2000 foot-pounds torque. Oil pressure values below 60 psi are unsafe; they require that the engine be shut down or that a landing be made at the nearest suitable airport, using the minimum power required to sustain flight.

CAUTION

On airplanes UE-262 and after, and those airplanes incorporating Kit No. 129-3006-1, the propeller deice may not function in the Auto Mode on an engine with an OIL PRES LO annunciator illuminated. If propeller deice is required, use the Manual Mode.

FIRE DETECT SYSTEM

FIRE DETECTOR LOOP FAILURE (L or R FIRE LOOP Annunciator)

Illumination of the L or R FIRE LOOP annunciator indicates a failure of the fire detector system for the respective engine. Do not take off until the condition is corrected.

NOTE

The L and R FIRE LOOP annunciators may be tested by placing the FIRE DETECT test switches to the LOOP position.

FUEL SYSTEM

FUEL LEVEL LOW (L or R FUEL QTY Annunciator)

Illumination of the L or R FUEL QTY annunciator indicates a fuel quantity of 324 pounds/48 gallons (182 liters) or less remains in the main fuel tank. Illumination of these annunciators may occur at higher fuel quantities during climbs and descents.

COLLECTOR TANK LOW (L or R COL TANK LOW Annunciator)

1. Fuel Quantity 53 lbs or less in Collector Tank
2. Duration 8 minutes at 400 lbs/hour
3. Aux Fuel Tanks Check to ensure fuel has been transferred.
4. Fuel Balance Check. Fuel may be transferred from one wing to the other by using the TRANSFER FLOW switch.

If Low Fuel Condition Cannot Be Remedied:

5. Land at nearest suitable airport.

FIREWALL FUEL VALVE FAILURE (L or R FW VALVE Annunciator)

Illumination of the L or R FW VALVE annunciator indicates that the firewall fuel valve has not reached its proper position within 2 seconds. If the annunciator illuminates during the "Before Engine Starting" procedure, recycle the firewall fuel valve and check for illumination of the annunciator. If the annunciator is still illuminated, do not take off. If the annunciator illuminates during engine shutdown as a part of any emergency procedure, recycle the firewall fuel valve and check for annunciator illumination. If the annunciator remains illuminated, the firewall fuel valve may not be fully closed.

TRANSFER VALVE FAILURE (XFR VALVE FAIL Annunciator)

Illumination of the XFR VALVE FAIL annunciator indicates that the fuel cross-transfer valve did not reach the full-open or full-closed position within 2 seconds of valve activation.

Illumination When Initiating Fuel Transfer:

1. Transfer valve is fully closed or partially open. White FUEL TRANSFER annunciator will not be illuminated.
2. Monitor Main Fuel Quantity gages. If balance does not change, valve is fully closed. Return transfer switch to off position. Fuel transfer will not be possible.

Illumination When Discontinuing Fuel Transfer:

1. If white FUEL TRANSFER annunciator is on, transfer valve is fully open.
If FUEL TRANSFER annunciator is off, transfer valve is partially open.
2. Ensure transfer switch is off so that boost pump will not run.
3. Monitor fuel balance.
 - a. Two-engine Operation - Little or no transfer will take place.
 - b. One-engine Operation - Fuel will transfer from the engine-running side. Resume fuel transfer from the engine-inop side to keep fuel balanced within 200 pounds.

AUXILIARY FUEL TRANSFER FAILURE (L or R NO AUX XFR Annunciator)

1. Check Fuel Quantity in Respective Aux Tank.

If Tank is Empty, Failure of Automatic Pump Shut-off Feature is Indicated:

2. Aux Pump Switch OFF

If Tank is Not Empty:

3. Aux Pump Switch ON. Check respective
NO AUX XFR annunciator.

If Annunciator is Extinguished (fuel transfer has been restored):

4. Leave AUX PUMP Switch ON. When auxiliary tank fuel is depleted, the respective NO AUX XFR Annunciator will re-illuminate; Aux Pump Switch - OFF

If Annunciator Remains Illuminated, the Fuel in the Auxiliary Tank is Not Available for Flight:

5. Aux Pump Switch OFF
6. Re-plan flight as appropriate (based on non-availability of affected aux fuel).
7. Manage fuel usage so as not to exceed 200 pounds fuel imbalance between left and right fuel systems.

NOTE

The electrical fuel transfer pump provides the only means of using auxiliary tank fuel. Secondary jet pumps are not installed, nor is gravity feed available.

ELECTRICAL SYSTEMS***GENERATOR INOPERATIVE (L or R DC GEN Annunciator)***

1. Generator Switch RESET, THEN ON

If Generator will not Reset:

2. Generator Switch OFF
3. Operating Generator DO NOT EXCEED 100% LOAD

BATTERY CHARGE RATE (BATTERY CHARGE Annunciator)

Ground Operations:

The BATTERY CHARGE annunciator will illuminate after an engine start. Monitor battery ammeter to confirm a decreasing battery charge current. Do not take off with the annunciator illuminated unless a decreasing battery charge current is confirmed. See NICKEL-CADMIUM BATTERY CHECK in Section 4, NORMAL PROCEDURES.

In Flight:

Inflight illumination of the BATTERY CHARGE annunciator indicates a possible battery malfunction.

1. Battery Ammeter MONITOR
2. If Battery Charge Current is Decreasing Continue to monitor
3. BATTERY CHARGE Annunciator (when charge current drops below 6 amps) EXTINGUISHED
4. If Battery Charge Current is Not Decreasing Battery Switch OFF
5. BATTERY CHARGE Annunciator Extinguished CONTINUE TO DESTINATION
6. BATTERY CHARGE Annunciator Illuminated and
Battery Ammeter Continues to Indicate a
Charge Current LAND AT NEAREST SUITABLE AIRPORT

GENERATOR TIE OPEN (L or R GEN TIE OPEN Annunciator)

1. Appropriate Load Meter MONITOR
 - a. If less than 100% BUS SENSE Switch to RESET
 - b. If greater than 100% Turn appropriate generator OFF and monitor
opposite loadmeter; not to exceed 100%
2. If Gen Tie Will Not Reset MONITOR LOADMETERS

BOTH GENERATOR TIES OPEN (L and R GEN TIE OPEN Annunciator)**NOTE**

If L and R GEN TIE OPEN annunciators are illuminated because of a dual generator failure, do not attempt to reset the generator ties. See Section 3, EMERGENCY PROCEDURES.

1. Load Meters MONITOR

If Less Than 100%:

2. Bus Sense Switch RESET (L and R GEN TIE OPEN Annunciators - OFF)

If L and R GEN TIE OPEN Annunciators Still On:

3. Gen Ties Switch MAN CLOSE
(L and R GEN TIE OPEN Annunciators - OFF)
(MAN TIES CLOSE Annunciator - ON)
4. Load Meters MONITOR

If One Load Meter Indicates Greater Than 100%:

5. Turn Generator OFF that has load greater than 100%.
6. Opposite Load Meter MONITOR (not to exceed 100%)

NOTE

If the L and R GEN TIE OPEN annunciators remain on, the Center Bus will be powered only by the battery.
Battery will be depleted by equipment operating on the Center Bus.

BOTH GENERATOR TIES AND BATTERY TIE OPEN (L and R GEN TIE OPEN Annunciators, BATT TIE OPEN Annunciator)

If all three bus ties open simultaneously, a fault on the Center Bus has probably occurred. Do not attempt to reset or manually close the bus ties.

BATTERY TIE OPEN (BATT TIE OPEN Annunciator)

- Bus Sense Switch RESET and RELEASE

If battery tie will not reset, the battery will not charge.

ANNUNCIATOR POWER SOURCE FAILURE (ANN PWR SOURCE Annunciator)

1. ANN POWER and ANN IND Circuit Breakers CHECK

If Both Circuit Breakers Are In And The Ann Pwr Source Annunciator Is Still Illuminated:

2. Correct condition prior to flight. A partial or total power loss has occurred to one or more annunciators controlled by the Annunciator Power Source Circuit. Affected annunciators may not function.

CIRCUIT BREAKER TRIPPED

1. Nonessential Circuit. DO NOT RESET IN FLIGHT
2. Essential Circuit (necessary for continued safe flight):
 - a. Circuit Breaker (after allowing to cool for a minimum of 10 seconds). PUSH TO RESET
 - b. If Circuit Breaker Trips Again DO NOT RESET

AVIONICS SWITCH FAILURE

If the AVIONICS Switch Fails to Operate in the ON Position:

- Avionics Master Circuit Breaker PULL

NOTE

Turning on the AVIONICS switch removes power that holds the avionics relay open. If the switch fails to the OFF position, pulling the Avionics Master circuit breaker will remove power to the relay and should restore power to the avionics buses.

FLIGHT CONTROLS

YAW DAMP/RUDDER BOOST COMPUTER FAILURE (YD/RB FAIL Annunciator)

(For airplanes not equipped with an autopilot)

Illumination of the YD/RB FAIL annunciator indicates a failure of the left or right (if installed) yaw damp/rudder boost computer. The rudder boost and yaw damp systems will be inoperative.

NOTE

The annunciator will also illuminate while the quick-disconnect switch is held to the second level. This is normal.

Illumination in Flight (If Dual Computers are Installed):

1. RUD BOOST/YAW DAMP Select Switch. SELECT OTHER COMPUTER (left or right)
2. YD/RB FAIL Annunciator EXTINGUISHED
3. Yaw Damp RE-ENGAGE, IF DESIRED

RUDDER BOOST SYSTEM INOPERATIVE (RUD BOOST OFF Annunciator)

Illumination of the RUD BOOST OFF annunciator indicates that the Rudder Boost switch is in the OFF position.

ELECTRIC PITCH TRIM INOPERATIVE (PITCH TRIM OFF Annunciator) (If Installed)

Illumination of the PITCH TRIM OFF annunciator indicates that the electric pitch trim system has been disconnected by the pilot's or copilot's quick-disconnect switch. The electric trim may be re-engaged by cycling the ELEV TRIM switch to OFF and back to ELEV TRIM.

LANDING GEAR SYSTEM

HYDRAULIC FLUID LOW (HYD FLUID LOW Annunciator)

If the HYD FLUID LOW annunciator illuminates during flight, attempt to extend landing gear normally upon reaching destination. If landing gear fails to extend, follow LANDING GEAR MANUAL EXTENSION procedures.

LANDING GEAR MANUAL EXTENSION

If the Landing Gear Fails to Extend After Placing the Landing Gear Control Down, Perform the Following:

1. Landing Gear Relay Circuit Breaker (pilot's right subpanel) PULL
2. Landing Gear Control CONFIRM DN
3. Alternate Extension Handle UNSTOW AND PUMP
 - a. Pump handle up and down until the three green gear-down annunciators are illuminated.
 - b. While pumping, do not lower handle to the level of the securing clip as this will result in loss of pressure.

If All Three Green Gear-Down Annunciators are Illuminated:

4. Alternate Extension Handle STOW
5. Landing Gear Controls DO NOT ACTIVATE
 - a. The Landing Gear Control and the Landing Gear Relay Circuit Breaker MUST NOT BE ACTIVATED.
 - b. The landing gear should be considered UNSAFE until the airplane is on jacks and the system has been cycled and checked.

If One or More Green Gear-Down Annunciators Do Not Illuminate for Any Reason and a Decision is Made to Land in This Condition:

6. Alternate Extension HandleCONTINUE PUMPING
 - a. Continue to pump the handle until maximum resistance is felt.
 - b. When pumping is complete, leave handle at the top of the stroke. DO NOT LOWER AND STOW.

Prior to Landing:

7. Alternate Extension HandlePUMP AGAIN
 - a. Pump the handle again until maximum resistance is felt.
 - b. When pumping is complete, leave handle at the top of the stroke. DO NOT LOWER AND STOW.

After Landing:

8. Alternate Extension Handle PUMP AGAIN WHEN CONDITIONS PERMIT
 - a. Pump the handle again, when conditions permit, to maintain hydraulic pressure until the gear can be mechanically secured.
 - b. DO NOT STOW HANDLE
 - c. DO NOT ACTIVATE THE LANDING GEAR CONTROL OR THE LANDING GEAR RELAY CIRCUIT BREAKER
 - d. The landing gear should be considered UNLOCKED until the airplane is on jacks and the system has been cycled and checked.

LANDING GEAR CONTROL HANDLE WILL NOT MOVE TO UP POSITION

1. If the LANDING GEAR CONTROL HANDLE will not move to the UP position after takeoff, press down on the red DOWNLOCK RELEASE button to the left of the CONTROL handle and attempt to raise the landing gear. If the landing gear retracts, continue operation.
2. If the landing gear fails to retract, place the LANDING GEAR CONTROL HANDLE down and check that the green GEAR DOWN indicator lights illuminate. After landing, determine the cause of the malfunction and correct.

ICE PROTECTION SYSTEMS

ELECTROTHERMAL PROPELLER DEICE (AUTO SYSTEM) (FOR AIRPLANES PRIOR TO UE-327 WITHOUT KIT NO. 129-9024-1 OR -3 INSTALLED)

ABNORMAL READINGS ON DEICE AMMETER: (NORMAL OPERATION: 32 TO 38 AMPS)

1. Zero Amps:
 - a. Automatic Propeller Deice CONFIRM AUTO
 - b. If zero amps reading on both sides, system is inoperative; place the switch to OFF.

CAUTION

On airplanes UE-262 and after, and those airplanes incorporating Kit No. 129-3006-1, the propeller deice may not function in the Auto Mode on an engine with an OIL PRES LO annunciator illuminated. If propeller deice is required, use the Manual Mode.

- c. Manual Propeller Deice ON AND HOLD
 - d. If zero amps reading on one or both sides, system is inoperativeEXIT ICING CONDITIONS
2. Below 32 amps:
 - a. Continue operation.
 - b. If propeller imbalance occurs, increase rpm briefly to aid in ice removal.

3. Over 38 amps:
 - a. Icing Conditions EXIT AS SOON AS POSSIBLE
 - b. Propeller Deice OFF AS SOON AS POSSIBLE

ELECTROTHERMAL PROPELLER DEICE (MANUAL SYSTEM) (FOR AIRPLANES PRIOR TO UE-327 WITHOUT KIT NO. 129-9024-1 OR -3 INSTALLED)

1. To use manual system, hold manual propeller deice switch in MANUAL position for approximately 90 seconds, or until ice is dislodged from blades.
2. Monitor Prop Deice Ammeter. Ammeter should indicate 32 to 38 amps on both right and left scales for as long as switch is held in MANUAL position.

ELECTROTHERMAL PROPELLER DEICE (AUTO SYSTEM) (FOR AIRPLANES UE-327 AND AFTER AND AIRPLANES PRIOR TO UE-327 WITH KIT NO. 129-9024-1 OR -3 INSTALLED)

ABNORMAL READINGS ON DEICE AMMETER: (NORMAL OPERATION: 26 TO 32 AMPS)

1. Zero Amps:
 - a. Automatic Propeller Deice CONFIRM AUTO
 - b. If zero amps reading on both sides, system is inoperative; place the switch to OFF.

CAUTION

On airplanes UE-262 and after, and those airplanes incorporating Kit No. 129-3006-1, the propeller deice may not function in the Auto Mode on an engine with an OIL PRES LO annunciator illuminated. If propeller deice is required, use the Manual Mode.

- c. Manual Propeller Deice ON AND HOLD
 - d. If zero amps reading on one or both sides, system is inoperative. EXIT ICING CONDITIONS
2. Below 26 amps:
 - a. Continue operation.
 - b. If propeller imbalance occurs, increase rpm briefly to aid in ice removal.
3. Over 32 amps:
 - a. Icing Conditions EXIT AS SOON AS POSSIBLE
 - b. Propeller Deice OFF AS SOON AS POSSIBLE

ELECTROTHERMAL PROPELLER DEICE (MANUAL SYSTEM) (FOR AIRPLANES UE-327 AND AFTER AND AIRPLANES PRIOR TO UE-327 WITH KIT NO. 129-9024-1 OR -3 INSTALLED)

1. To use manual system, hold manual propeller deice switch in MANUAL position for approximately 90 seconds, or until ice is dislodged from blades.
2. Monitor Prop Deice Ammeter. Ammeter should indicate 26 to 32 amps on both right and left scales for as long as switch is held in MANUAL position.

ENGINE ANTI-ICE FAILURE (L or R ENG ICE FAIL Annunciator)

1. Engine Anti-Ice Actuator STANDBY

If ENG ICE FAIL Annunciator Does Not Extinguish:

2. Exit icing conditions.
3. Assume engine anti-ice is ON for performance calculations.

STALL WARNING VANE HEAT FAILURE (STALL HEAT Annunciator)

Illumination of the STALL HEAT annunciator indicates there is insufficient current to the stall warning vane to provide the necessary heat required for anti-icing. The annunciator will also illuminate anytime the STALL WARN heat switch is in the OFF position.

PITOT-STATIC MAST HEAT FAILURE (L or R PITOT HEAT Annunciator)

Illumination of the L or R PITOT HEAT annunciator indicates insufficient current to the pitot mast to provide the necessary heat required for anti-icing. The annunciator will also illuminate anytime the PITOT switch is in the OFF position.

SURFACE DEICE FAILURE

Surface deice system failure is indicated by:

- (1) Failure of one or more of the following annunciators to illuminate or to extinguish during a deice cycle and/or,
- (2) An abnormal pressure or vacuum source indication.

OUTBD WING DEICE: The left and/or right wing boot outboard of the nacelles has malfunctioned.

INBD WING DEICE: The left and/or right wing boot inboard of the nacelles has malfunctioned.

TAIL DEICE: One or more of the following boots has malfunctioned: Left or Right Stabilon, Left or Right Taillet, Left or Right Horizontal Stabilizer.

Check Vacuum and Pneumatic Pressure While Surface Deice System Is Not Activated:

1. Vacuum Source

Gyro Suction Gage (UE-1 thru UE-31) CHECK VACUUM FOR 3.0 TO 5.9 in.Hg

Vacuum Gage (UE-32 and After) CHECK VACUUM FOR 4.3 TO 5.9 in.Hg

NOTE

A failed vacuum source may not be detected by the surface deice annunciator.

- #### 2. Pneumatic Pressure Gage CHECK FOR 17.5 PSI MINIMUM

NOTE

Increasing N_1 may produce a higher pneumatic pressure.

If the SINGLE Mode Continues to Produce Abnormal Results:

- #### 3. Surface Deice Switch MANUAL and hold until OUTBD WING, INBD WING, and TAIL DEICE annunciators illuminate (within 6 seconds), then release

NOTE

A momentary illumination of the BLEED AIR FAIL annunciator and tripping of the MASTER WARNING annunciator may occur during manual boot activations.

If Annunciators do not Illuminate, or Fail to Extinguish, and if Boot Inflation Cannot Be Confirmed Visually:

4. Icing ConditionsEXIT AS SOON AS PRACTICAL
5. Performance SectionCONSULT FOR RECOMMENDED APPROACH SPEEDS AND PERFORMANCE WITH ICE ON THE AIRPLANE

WARNING

Intentional stalls are prohibited with a surface deice system failure and ice on the airplane.

VACUUM SYSTEM

VACUUM SOURCE FAILURE

1. Failure of the vacuum source will be indicated by:
 - a. Abnormally low or zero indication on the gyro suction gage/vacuum gage.
 - b. An uncontrolled cabin rate-of-descent until maximum cabin differential pressure is reached.
2. Both Bleed Air Valves ENVIR OFF
(as required to decrease cabin differential pressure to zero prior to landing)

NOTE

The DUMP position of the pressurization control switch will be inoperative.

STATIC AIR SYSTEM

PILOT'S/COPILOT'S ALTERNATE STATIC AIR SOURCE

THE PILOT'S OR COPILOT'S ALTERNATE STATIC AIR SOURCE (AFFECTED SIDE) SHOULD BE USED ANYTIME THE NORMAL STATIC AIR SOURCE IS OBSTRUCTED.

When the airplane has been exposed to moisture and/or icing conditions (especially on the ground), the possibility of obstructed pitot/static air ports should be considered. Partial obstructions will result in the rate-of-climb indication being sluggish during a climb or descent. A suspected obstruction is verified by switching to the alternate system and noting a sudden sustained change in the rate of climb. This may be accompanied by abnormal indicated airspeed and altitude changes beyond normal calibration differences.

Whenever an Obstruction Exists in the Normal Static Air System or When the Alternate Static Air System Use is Desired:

1. Pilot's or Copilot's Static Air Source (affected side) ALTERNATE AND DRAIN
2. For Airspeed Calibration and Altimeter Correction, refer to Section V, PERFORMANCE.

NOTE

Be certain the static air valves are in the NORMAL position when the alternate system is not needed.

AVIONICS/FLIGHT INSTRUMENTS

DISPLAY PROCESSOR UNIT (DPU) FAILURE (Red DPU FAIL Flag Illuminated on the EADI and EHSI or the EADI and/or EHSI Blanked or Disabled)

NOTE

The Display Select Panel (DSP) on the side of the failed DPU will be inoperative if the red XDTA flag is illuminated.

NOTE

Displays may be disabled due to a DPU failure without an accompanying DPU FAIL flag. This procedure is also applicable to such occurrences.

1. DR XFR Switch SELECT OPERABLE DPU

- If PLT Is Selected ATT1 Will Be Displayed On Both EADI's
MAG1 Will Be Displayed On Both EHSI's
DRIVE XFR Will Be Displayed On Copilot's Instrument Panel
- If COPLT Is Selected ATT2 Will Be Displayed On Both EADI's
MAG2 Will Be Displayed On Both EHSI's
DRIVE XFR Will Be Displayed On The Pilot's Instrument Panel

NOTE

The autopilot will automatically disengage when the DR XFR switch is actuated if the autopilot is operating on the side opposite to the DPU selected.

NOTE

Both EADI's and both EHSI's will show identical information. This includes the color of the NAV source. Therefore, the color of the NAV source on the side of the failed DPU will be the opposite of its normal color.

NOTE

Placing the DR XFR in the PLT or COPLT position renders the opposite DSP inoperative and blanks out the opposite Autopilot Flight Control Panel (FCP).

2. Display Select Panel (DSP) Use The DSP On The Side Of The Operable DPU

NOTE

If Autopilot or Flight Director operation is to be resumed, the airplane must be flown from the side of the operable DPU, using the Autopilot Computer (i.e., AP/L or AP/R) or Flight Director on that side.

NOTE

If a subsequent failure of the operating Display Select Panel occurs, it may be possible to regain use of the DSP on the side of the inoperable DPU if the XDTA flag is not displayed. Use the DSP reversionary switch to select the desired DSP (PLT or COPLT).

DISPLAY SELECT PANEL (DSP) FAILURE (Red DSP Annunciator on EADI and EHSI)

1. Autopilot DISENGAGE
2. DSP Switch SELECT OPERABLE DSP (PLT or COPLT)
 - If PLT is selected, DSP1 will be annunciated on the Copilot's EADI and EHSI.
 - If COPLT is selected, DSP2 will be annunciated on the pilot's EADI and EHSI.

NOTE

The displays on the side of the inoperable DSP will revert to the configuration selected on the operable DSP. The color of the NAV sources will remain correct on each side.

3. Operable DSP Use To Control Both the Pilot's and Copilot's Displays
4. Autopilot RE-ENGAGE, If Desired

MISLEADING ATTITUDE OR HEADING INFORMATION (Amber PIT/ROLL, HDG, and COMPARE PUSH TO RESET Annunciators)

Illumination of the flashing PIT and/or ROLL annunciator on both EADI's accompanied by a COMPARE PUSH TO RESET annunciator on the pilot's and copilot's instrument panels indicates a difference of more than 4° (3° if glideslope is captured) between the pilot's and copilot's pitch and/or roll.

1. Standby Attitude Indicator Monitor To Determine Which Attitude Is Correct

2. ATT Reversionary Switch Select Operable Attitude Reference System
ALL ON NO 1 for pilot's system
(ATT1 will be displayed on both EADI's)
ALL ON NO 2 for copilot's system
(ATT2 will be displayed on both EADI's)

NOTE

The Attitude Comparitor system will be disabled when the ATT reversionary switch is moved from the NORM position.

3. COMPARE PUSH TO RESET Switches Push Either Switch To Cancel Annunciators

Illumination of the flashing HDG annunciator on both EHSI's accompanied by the COMPARE PUSH TO RESET annunciator indicates a difference of 6° + (1/2 bank angle) between the pilot's and copilot's heading.

4. Standby Compass Monitor To Determine Which Heading is Correct
5. Incorrect Compass System
Mode Switch Push To DG Mode, Then Return To SLAVE Mode.

If Compass System Remains Incorrect:

6. HDG Reversionary Switch Select Operable Heading Reference System
ALL ON NO 1 for pilot's system
(MAG1 will be displayed on both EHSI's)
ALL ON NO 2 for copilot's system
(MAG2 will be displayed on both EHSI's)

NOTE

The Heading Comparitor system will be disabled when the HDG reversionary switch is moved from the NORM position.

7. COMPARE PUSH TO RESET Switches Push Either Switch To Cancel Annunciators

FAILURE OF AN ATTITUDE OR HEADING REFERENCE SYSTEM (Red ATT or HDG Flag)

NOTE

A failure of a vertical gyro that produces a red ATT flag on the EADI or a failure of a slaved compass that produces a red HDG flag on the EHSI will disable the respective comparitor system.

If a Red ATT Flag is Displayed on Either EADI:

1. ATT Reversionary Switch Select Operable Attitude Reference System
ALL ON NO 1 for pilot's system
(ATT1 will be displayed on both EADI's)
ALL ON NO 2 for copilot's system
(ATT2 will be displayed on both EADI's)

If a Red HDG Flag is Displayed on Either EHSI:

2. HDG Reversionary Switch Select Operable Heading System
ALL ON NO 1 for pilot's system
(MAG1 will be displayed on both EHSI's)
ALL ON NO 2 for copilot's system
(MAG2 will be displayed on both EHSI's)

FAILURE OF ANY ONE EFIS TUBE

If Failure Occurs on the Pilot's Side:

1. PLT CMPST Switch CMPST (a Composite Display will be presented on the operating tube)

If Failure Occurs on the Copilot's Side:

2. COPLT CMPST Switch. CMPST (a Composite Display will be presented on the operating tube)

NOTE

If the failed tube remains illuminated and is distracting, it may be blanked by turning the appropriate brightness control fully counter-clockwise.

FAILURE OF CROSS-SIDE DATA BUS (Red XDTA Flag Displayed on Either EADI and/or Either EHSI)

Illumination of the XDTA flag indicates that any off-side navigation, heading, or attitude information will not be available on the side displaying the XDTA flag. This flag is usually, but not always, displayed in conjunction with a DPU FAIL flag.

1. An XDTA flag on pilot's EADI results in:
 - a. Inability to transfer the copilot's attitude reference to the pilot's side using the ATT revisionary switch.
 - b. Loss of NO 2 navigation information.
 - c. The DSP reversionary switch will be non-functional.
2. An XDTA flag on the pilot's EHSI results in:
 - a. Inability to transfer the copilot's heading reference to the pilot's side using the HDG reversionary switch.
 - b. Loss of NO 2 navigation information.
 - c. The DSP reversionary switch will be non-functional.
3. Similar situations will occur with XDTA flag on the copilot's EADI and EHSI.

STANDBY ATTITUDE INDICATOR

1. Use the Standby Attitude Indicator to resolve differences between the pilot's and copilot's attitude indicator or when one or both EADI's are lost.
2. During normal operation, the indicator may exhibit small movements in pitch up to $\pm 5^\circ$. This is not detrimental.
3. DO NOT RE-CAGE the indicator unless a known error exists. If caging is required, caging should be accomplished when the aircraft is in a wings-level, normal cruise attitude, as indicated by other instruments or the horizon. If the gyro is caged when the aircraft is not in this attitude, the resulting attitude presentation immediately after caging will be in error by the difference between true vertical and the actual aircraft attitude. Errors of less than 7° will automatically erect out at a nominal rate of 2.5° per minute.

CAUTION

Do not cage-lock an operating attitude indicator when the airplane is in motion (taxiing or in flight).

4. When normal power to the standby attitude indicator is lost, a warning horn will sound and the AUX ON amber annunciator will illuminate. The warning horn can be silenced using the HORN SILENCE button. The emergency power supply will provide a minimum of 30 minutes of operation. After depletion of the emergency power supply, the indicator will provide a minimum of 9 more minutes of altitude information. During this time the OFF flag will be in view and the indicator may oscillate up to 6° either side of vertical.

TCAS791 (IF INSTALLED)

1. If the following abnormal indications are observed during the self test, the TCAS791 should be turned off and not used until repaired.
 - a. The altitude displayed at the bottom of the test screen is not within 100 feet of the altitude indicated on the pilot's altimeter when set to 29.92 in. Hg.
 - b. The "TCAS Test Failed" voice message is heard.
 - c. The TCAS FAILED message is observed on the screen.
 - d. The "TCAS Test Passed" voice message is heard without a display of the test screen.
2. If a maintenance code appears at the bottom of the TCAS screen, the TCAS can be used but the system should be serviced as soon as possible. (Maintenance codes are displayed only when the airplane is on the ground.)
3. If Air Traffic Control requests that the altitude reporting function of the airplane transponder be disabled, the TCAS must be turned off.
4. If the TCAS FAILED message is displayed in flight and does not clear within 5 minutes, the system is inoperative. Turn the TCAS off.

UE-266 and after and those airplanes modified by BFGoodrich Service Memo 104:

5. A TCAS FAILED message displayed on the screen accompanied by a BAROMETRIC INPUT message at the bottom of the screen indicates that the TCAS791 is not detecting barometric altitude from the selected source (ALTM 1 or ALTM 2). The TCAS791 can not operate without a barometric altitude input. Do not turn the TCAS791 off. The screen will automatically return to normal operation when the barometric altitude input is restored. Selecting the opposite altimeter barometric input source using the ENCD ALTM switch on the avionics panel may restore the signal.

MARK-VI GPWS (IF INSTALLED)

Troubleshoot System As Follows:

1. GPWS Inoperative on the Ground (GPWS INOP Annunciator)
 - a. GPWS Test Switch PRESS AND HOLD
 - b. Voice Messages MONITOR
("Radio Altitude Fault", "Glideslope Fault", "Baro Rate Fault", or No Message)
 - c. GPWS Test Switch RELEASE
2. GPWS Inoperative in Flight (GPWS INOP Annunciator)
 - a. Radio Altm Circuit Breaker (Right CB Panel) PULL
 - b. GPWS Test Switch PRESS AND HOLD
 - c. Voice Messages MONITOR
("Radio Altitude Fault", "Glideslope Fault", "Baro Rate Fault", or No Message)
 - d. GPWS Test Switch RELEASE
 - e. Radio Altm Circuit Breaker (Right CB Panel) RESET

NOTE

"Radio Altitude Fault" will be heard due to the Radio Altm Circuit Breaker being pulled.

CRACKED OR SHATTERED WINDSHIELD

The following procedure should be used when one or more cracks occur in the inner or outer ply of the windshield. The procedure is also applicable if the windshield shatters. This usually occurs in the inner ply and is characterized by a multitude of cracks which will likely obstruct the crew members vision and may produce small particles or flakes of glass that can break free of the windshield.

1. Altitude MAINTAIN 18,000 FT OR LESS, IF POSSIBLE
2. Pressurization Controller RESET
 - a. Cruise and Descent MAINTAIN A CABIN DIFFERENTIAL PRESSURE OF 2.0 TO 3.0 PSI
(A cabin differential pressure of 3.0 psi will produce approximately a 9,500-foot cabin altitude at an airplane altitude of 18,000 feet.)
 - b. Before Landing DEPRESSURIZE CABIN PRIOR TO TOUCHDOWN
3. Other In-flight Considerations
 - a. Visibility through a shattered windshield may be sufficiently reduced to dictate flying the airplane from the opposite side of the cockpit.
 - b. Precautions should be taken to prevent particles or flakes of glass from a shattered inner ply of the windshield from interfering with the crew's vision.
 - c. A cracked outer windshield ply may damage operating windshield wipers.
 - d. Windshield heat may be inoperative in the area of the crack(s).
 - e. The structural integrity of the windshield will be maintained.
4. Postflight Considerations - See Section II, LIMITATIONS.

CRACK IN ANY SIDE WINDOW (COCKPIT OR CABIN)

1. AltitudeDESCEND TO AN ALTITUDE NOT REQUIRING OXYGEN, IF POSSIBLE
2. Crew and Passengers DON OXYGEN MASKS, IF REQUIRED
3. Pressurization Controller RESET AS REQUIRED TO DEPRESSURIZE CABIN
4. Cabin Pressure SwitchDUMP
5. Postflight Considerations SEE SECTION II, LIMITATIONS

SEVERE ICING CONDITIONS (Required by FAA AD 96-09-13)

THE FOLLOWING WEATHER CONDITIONS MAY BE CONDUCTIVE TO SEVERE IN-FLIGHT ICING:

- Visible rain at temperatures below 0 degrees Celsius ambient air temperature.
- Droplets that splash or splatter on impact at temperatures below 0 degrees Celsius ambient air temperature.

PROCEDURES FOR EXITING THE SEVERE ICING ENVIRONMENT:

These procedures are applicable to all flight phases from takeoff to landing. Monitor the ambient air temperature. While severe icing may form at temperatures as cold as -18 degrees Celsius, increased vigilance is warranted at temperatures around freezing with visible moisture present. If the visual cues specified in the Limitations Section for identifying severe icing conditions are observed, accomplish the following:

1. Immediately request priority handling from Air Traffic Control to facilitate a route or an altitude change to exit the severe icing conditions in order to avoid extended exposure to flight conditions more severe than those for which the airplane has been certificated.
2. Avoid abrupt and excessive maneuvering that may exacerbate control difficulties.
3. Do not engage the autopilot.
4. If the autopilot is engaged, hold the control wheel firmly and disengage the autopilot.

5. If an unusual roll response or uncommanded roll control movement is observed, reduce the angle-of-attack.
6. Do not extend flaps during extended operation in icing conditions. Operation with flaps extended can result in a reduced wing angle-of-attack with the possibility of ice forming on the upper surface further aft on the wing than normal, possibly aft of the protected area.
7. If the flaps are extended, do not retract them until the airframe is clear of ice.
8. Report these weather conditions to Air Traffic Control.

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