

**Section 4**  
**NORMAL PROCEDURES**  
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# Hawker Beechcraft Corporation

Model 1900D Airliner

Normal Procedures

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

## AIRSPEEDS FOR SAFE OPERATION (17,120 POUNDS/7765 KILOGRAMS)

Maximum Demonstrated Crosswind Component . . . . .	22 Knots
Two-Engine Best Angle-of-Climb (V <sub>X</sub> ) . . . . .	122 Knots
Two-Engine Best Rate-of-Climb (V <sub>Y</sub> ) . . . . .	138 Knots
	(Decrease 2 Knots per 5000 feet)
Cruise Climb:	
Sea Level to 10,000 feet . . . . .	160 Knots
10,000 to 15,000 feet . . . . .	150 Knots
15,000 to 20,000 feet . . . . .	140 Knots
20,000 to 25,000 feet . . . . .	130 Knots
Maneuvering Speed (V <sub>A</sub> ) . . . . .	178 Knots
Turbulent Air Penetration . . . . .	170 Knots

### CAUTION

For turbulent air penetration, use an airspeed of 170 knots. Avoid over-action on the power levers. Turn off autopilot altitude hold. Keep wings level, maintain attitude and avoid use of trim. Do not chase airspeed and altitude. Penetration should be at an altitude that provides adequate maneuvering margins when severe turbulence is encountered.

Intentional One-Engine Inoperative Speed (V <sub>SSE</sub> ) . . . . .	105 Knots
Air Minimum Control Speed (V <sub>MCA</sub> ):	
Flaps Up . . . . .	92 Knots
Flaps 17° . . . . .	92 Knots

## PROCEDURES BY FLIGHT PHASE

### NOTE

Refer to all applicable Hawker Beechcraft Corporation Supplements and STC Supplements for flight phase procedures for optional equipment installed in the airplane.

## PREFLIGHT INSPECTION

### NOTE

After the first flight of each day, the Preflight Inspection may be omitted except for items marked with a "+" (Fuel Tank Caps and Engine Oil Quantity/Filler Cap need not be checked unless system(s) were serviced.)

### COCKPIT

- 1. Parking Brake . . . . . SET
- + 2. Control Locks . . . . . REMOVE
- 3. Elevator Trim . . . . . SET 1 1/2 UNITS NOSE UP

### CAUTION

The elevator trim system must not be forced past the limits that are indicated on the elevator trim indicator scale by a red line.

## Normal Procedures

Model 1900D Airliner

4. Battery Switch . . . . . ON, CHECK 23V MINIMUM
5. Fuel Quantity . . . . . CHECK
6. Lavatory Smoke Detector (if installed) . . . . . CHECK
  - a. Verify
    - 1) Smoke Detector Green Power Indicator . . . . . ILLUMINATED
    - 2) Smoke Detector Red Alarm Indicator . . . . . EXTINGUISHED
    - 3) LAVATORY SMOKE Annunciator . . . . . EXTINGUISHED
  - b. Smoke Detector Press-to-Test Switch . . . . . PRESS AND RELEASE
    - 1) Smoke Detector Red Alarm Indicator . . . . . ILLUMINATED, THEN EXTINGUISHED
    - 2) LAVATORY SMOKE Annunciator . . . . . ILLUMINATED, THEN EXTINGUISHED
7. Battery Switch . . . . . OFF
8. Oxygen System Preflight Inspection . . . . . COMPLETE (see OTHER NORMAL PROCEDURES)
9. Cabin Door Pressure Gage (with door open) . . . . . 1350-1450 psi at 21° C

## NOSE SECTION

1. OAT Probe . . . . . SECURE
2. Alternate Static Port (left) . . . . . CHECK
3. Pitot-Static Cover (left) . . . . . REMOVE, PROBE CHECK
4. Oxygen Door . . . . . SECURE
5. Oxygen High Pressure Relief Indicator . . . . . CHECK
6. Avionics Door (left) . . . . . SECURE
- + 7. Nose Gear and Door . . . . . CHECK
8. Nose Gear Wheel Well EFIS Cooling Inlet/Outlet, Uplock and Downlock Switches, Shimmy Damper, Manual Steering Pivot Point, Actuator and Actuator Attach Hoses for Leaks) . . . . . CHECK
- + 9. Chock . . . . . REMOVE
10. Taxi Light . . . . . CHECK
11. Windshield Wipers . . . . . CHECK
12. Ram Air Scoop . . . . . CLEAR
13. Avionics Door (right) . . . . . SECURE
14. Oxygen High Pressure Relief Indicator . . . . . CHECK
15. Pitot-Static Cover (right) . . . . . REMOVE, PROBE CHECK
16. Alternate Static Port (right) . . . . . CHECK

## RIGHT FORWARD FUSELAGE

1. Upper and Lower Antennas . . . . . CHECK
2. Vortex Generator . . . . . SECURE
3. Cabin Windows . . . . . CHECK

## RIGHT WING AND NACELLE

1. Auxiliary Fuel Tank Sump . . . . . DRAIN
2. Air Conditioner Condenser Inlet Louvers . . . . . CLEAR AND SECURE
3. Air Conditioner Condenser Exit Louvers . . . . . CLEAR AND SECURE
4. Battery Vent Inlet . . . . . CLEAR
5. Battery Compartment Drain . . . . . CLEAR
6. Air Conditioner Condenser Inlet Duct (wing leading edge) . . . . . CLEAR
7. Inboard Deice Boot . . . . . CHECK

- 8. Battery Exhaust Vent . . . . . CLEAR
- 9. Generator Cooling Inlet Duct . . . . . CLEAR
- +10. Engine Oil . . . . . CHECK QUANTITY, Cap and Door - SECURE
- 11. Nacelle Panels (inboard) . . . . . SECURE
- 12. Nacelle Cooling Exit Louvers (inboard) . . . . . CLEAR
- 13. Nacelle Cowling Locks (inboard) . . . . . LOCKED
- 14. Exhaust Stack (inboard) . . . . . CHECK
- 15. Propeller and Spinner . . . . . CHECK
- 16. Nacelle Cooling Ram Air Inlets . . . . . CLEAR
- 17. Engine Air Intake . . . . . CLEAR
- 18. Nacelle Cowling Locks (outboard) . . . . . LOCKED
- 19. Exhaust Stack (outboard) . . . . . CHECK
- 20. Nacelle Cooling Exit Louvers (outboard) . . . . . CLEAR
- 21. Ice Light . . . . . CHECK
- 22. Nacelle Panels (outboard) . . . . . SECURE
- 23. Oil/Bleed Air Cooler Intake and Exhaust . . . . . CHECK
- 24. Wheel Well (Uplock and Downlock Switches,  
Fire Extinguisher Pressure, Actuator and Actuator Attach Hoses  
for Leaks, Brake Deice Valve, if installed) . . . . . CHECK
- +25. Landing Gear, Doors, and Door Rollers . . . . . CHECK
- +26. Chock . . . . . REMOVE
- 27. Fuel Sumps (Main Wing -2, Collector Tank -1, Filter -1) . . . . . DRAIN
- 28. Fuel Filter Bypass Indicator . . . . . NOT EXTENDED, DOOR LATCHED
  - If bypass indicator pin is extended, reset it and see OTHER NORMAL PROCEDURES.
- 29. Landing Light . . . . . CHECK
- 30. Outboard Boot . . . . . CHECK
- 31. Stall Strip . . . . . SECURE
- 32. Fuel Sight Gages (2) . . . . . CHECK, IF REQUIRED
- 33. Fuel Panels (lower) . . . . . CHECK FOR LEAKS
- +34. Tie-Down . . . . . REMOVE
- 35. Fuel Vents (NACA Scoop, Heated Ram  
Vent, Flush Vent) . . . . . CHECK
- 36. Position/Recognition Lights . . . . . CHECK
- 37. Ringlet, Strobe Light, Static Wicks (2) . . . . . CHECK
- 38. Aileron, Bonding Straps, Static Wicks (3) . . . . . CHECK
- +39. Main Wing Fuel Cap . . . . . SECURE
- 40. Flaps . . . . . CHECK
- 41. Upper Wing Fuel Panel . . . . . CHECK FOR LEAKS
- 42. Oil Breather Exit . . . . . CHECK
- +43. Brake Lines, Brake Wear, Brake Deice (if installed) . . . . . CHECK
- 44. Aft Nacelle Panels . . . . . SECURE
- +45. Auxiliary Fuel Cap . . . . . SECURE

**RIGHT AFT FUSELAGE**

- 1. Emergency Exits (2) . . . . . SECURE
- 2. Cabin Windows . . . . . CHECK

**Normal Procedures**

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- 3. Lower Antennas ..... SECURE
- 4. Lavatory Service Door (if installed) ..... SECURE
- 5. Lower Beacon ..... CHECK
- 6. Flight Data Recorder Pitot-Static Drains (2) ..... DRAIN
- 7. Static Ports ..... CLEAR
- 8. Tail Cone Exhaust Vent. .... CLEAR
- 9. Emergency Locator Antenna ..... CHECK
- 10. Emergency Locator Transmitter ..... ARM
- 11. Access Panel. .... SECURE
- 12. Ventral Fin and Static Wick (1) ..... CHECK

**TAIL SECTION**

- 1. Stabilon and Boots (right and left) ..... CHECK
- 2. VOR Antennas (right and left) ..... CHECK
- 3. Rudder, Rudder Tab, and Static Wicks (4, if installed) ..... CHECK
- 4. Horizontal Stabilizer and Boots (right and left) ..... CHECK
- 5. Elevator, Elevator Tab, and Static Wicks (4) ..... CHECK. VERIFY TABS ARE IN NEUTRAL POSITION.

**NOTE**

The elevator trim tab neutral position is determined by observing that the trailing edge of the elevator trim tab aligns with the trailing edge of the elevator, when the elevator is resting against the downstops with the elevator trim wheel set 1 1/2 units up.

- 6. Taillets and Boots (right and left) ..... CHECK
- 7. Position Lights ..... CHECK
- + 8. Tie-Down ..... REMOVE
- 9. Tail Cone Drain ..... CLEAR

**LEFT AFT FUSELAGE**

- 1. Ventral Fin and Static Wick (1) ..... CHECK
- 2. Access Panel. .... SECURE
- 3. Tail Cone Exhaust Vent. .... CLEAR
- 4. Static Ports ..... CLEAR
- + 5. Cargo Door ..... SECURE
- 6. Escape Hatch ..... SECURE
- 7. Cabin Windows ..... CHECK

**LEFT WING AND NACELLE**

- + 1. Auxiliary Fuel Cap ..... SECURE
- 2. Aft Nacelle Panels ..... SECURE
- 3. Flaps ..... CHECK
- + 4. Brake Lines, Brake Wear, Brake Deice (if installed) ..... CHECK
- 5. External Power Door ..... SECURE
- 6. Oil Breather Exit ..... CLEAR
- 7. Upper Fuel Panel ..... CHECK FOR LEAKS
- 8. Aileron, Tab, Bonding Straps, Static Wicks (3) ..... CHECK
- + 9. Main Wing Fuel Cap ..... SECURE

# Hawker Beechcraft Corporation

## Model 1900D Airliner

## Normal Procedures

- 10. Fuel Vents (NACA Scoop, Heated Ram Vent, Flush Vent) . . . . . CHECK
- 11. Winglet, Strobe Light, and Static Wicks (2) . . . . . CHECK
- 12. Position/Recognition Lights . . . . . CHECK
- 13. Outboard Boots . . . . . CHECK
- +14. Stall Warning Vane . . . . . CHECK FOR FREEDOM OF MOVEMENT
- +15. Tie Down . . . . . REMOVE
- 16. Fuel Sight Gages (2) . . . . . CHECK, IF REQUIRED
- 17. Stall Strip . . . . . SECURE
- 18. Fuel Panels (lower) . . . . . CHECK FOR LEAKS
- 19. Landing Light . . . . . CHECK
- 20. Fuel Sumps (Main Wing -2, Collector Tank -1, Filter -1) . . . . . DRAIN
- 21. Fuel Filter Bypass Indicator Pin . . . . . NOT EXTENDED, DOOR LATCHED
  - If bypass indicator pin is extended, reset it and see OTHER NORMAL PROCEDURES.
- 22. Wheel Well (Uplock and Downlock Switches, Fire Extinguisher Pressure, Actuator and Actuator Attach Hoses for Leaks, Accumulator Pre-charge, Brake Deice Valve, if installed) . . . . . CHECK
- +23. Landing Gear, Doors, and Door Rollers . . . . . CHECK
- +24. Chock . . . . . REMOVE
- 25. Oil/Bleed Air Cooler Intake and Exhaust . . . . . CLEAR
- +26. Engine Oil . . . . . CHECK QUANTITY, CAP AND DOOR SECURE
- 27. Ice Light . . . . . CHECK
- 28. Nacelle Panels (outboard) . . . . . SECURE
- 29. Nacelle Cooling Exit Louvers (outboard) . . . . . CLEAR
- 30. Exhaust Stack (outboard) . . . . . CHECK
- 31. Nacelle Cowling Locks (outboard) . . . . . LOCKED
- 32. Nacelle Cooling Ram Air Inlets . . . . . CLEAR
- 33. Propeller and Spinner . . . . . CHECK
- 34. Engine Air Intake . . . . . CLEAR
- 35. Nacelle Cowling Locks (inboard) . . . . . LOCKED
- 36. Exhaust Stack (inboard) . . . . . CHECK
- 37. Nacelle Cooling Exit Louvers (inboard) . . . . . CLEAR
- 38. Nacelle Panels (inboard) . . . . . SECURE
- 39. Generator Cooling Duct Inlet . . . . . CLEAR
- 40. Hydraulic Fluid . . . . . CHECK; Cap and Door - SECURE
- 41. Inboard Boot . . . . . CHECK
- 42. Air Cycle Machine Intake and Exhaust . . . . . CLEAR, LOUVERS SECURE
- 43. Auxiliary Fuel Tank Sump . . . . . DRAIN

### *LEFT FORWARD FUSELAGE*

- 1. Vortex Generator . . . . . SECURE
- 2. Lower Antennas . . . . . SECURE
- 3. Cabin Windows . . . . . CHECK

**BEFORE ENGINE STARTING**

Items marked with an "\*" may be omitted at pilot's discretion after the first flight of each day.

1. Cabin and Cargo Doors . . . . . LOCKED
  - a. Verify cabin door security by attempting to raise handle to the unlocked position without depressing the release button. Check that rotary cam locks align with each alignment tab (8 positions), and the safety arm is positioned over the diaphragm plunger. The CABIN DOOR annunciator should be extinguished when the battery is on.
  - b. Check that the CARGO DOOR annunciator is extinguished (with battery ON), indicating the cargo door is locked.

**WARNING**

Only a crew member or adequately trained personnel should close and lock the door.

**NOTE**

Prior to the first flight of the day, the cabin door and cargo door annunciator circuitry should be checked in accordance with the CABIN/CARGO DOOR ANNUNCIATOR CIRCUITRY CHECK in this section.

2. Load and Baggage . . . . . SECURE
3. Weight and C.G. . . . . CHECKED
- \* 4. Emergency Exits . . . . . SECURE, Ground Lock Pins - REMOVE

**NOTE**

Instrument Emergency Lights may be used for illumination of the instrument panel prior to engine start.

5. Control Locks . . . . . CONFIRM REMOVED AND STOWED
6. Seats . . . . . POSITIONED
7. Seatbelts and Shoulder Harnesses . . . . . FASTENED
8. Parking Brake . . . . . CONFIRM SET
- \* 9. Emergency Instrument Lights . . . . . CHECK
- \* 10. Standby Attitude Indicator & Copilot's Electronic Altimeter (if installed) . . . . . CHECK
  - a. ON-OFF-TEST Switch . . . . . HOLD FOR A MAXIMUM OF 5 SECONDS  
(check for momentary illumination of green TEST annunciator)
  - b. ON-OFF-TEST Switch . . . . . ON (amber AUX ON annunciator will illuminate and horn will sound)
  - c. HORN SILENCE Button . . . . . PUSH To Silence Horn
  - d. Uncage Knob . . . . . PULL AND ROTATE Counter-Clockwise To Uncage. OFF Flag Out of View.
  - e. Copilot's Electronic Altimeter (if installed). . . . . ILLUMINATED

**NOTE**

When uncaging gyro, avoid snapping knob against indicator. When caging, use minimum amount of force.

- f. Cage Knob . . . . . PULL AND ROTATE Clockwise To Cage. OFF Flag In View.
- g. ON-OFF-TEST Switch . . . . . OFF  
(AUX ON Annunciator - EXTINGUISHED)



- \* 11. EFIS Aux Power ..... CHECK
  - a. ON-OFF-TEST Switch ..... HOLD TO TEST FOR A MAXIMUM OF 5 SECONDS  
(check for momentary illumination of green TEST annunciator)
  - b. ON-OFF-TEST Switch ..... RELEASE to OFF
- 12. Fuel System and Panel ..... CHECK
  - \* a. Firewall Fuel Valves ..... PULL CLOSED
  - \* b. Standby Pumps ..... ON
  - c. Battery ..... ON
    - L and R FUEL PRESS LO Annunciator ..... ILLUMINATED
  - \* d. L and R ENGINE FIRE DETECT TEST Switches ..... AMP
    - L and R ENG FIRE PUSH TO EXT Annunciators (glareshield) (UE-1 thru UE-92) ..... ILLUMINATED
    - Both EXTINGUISHER PUSH Annunciators (glareshield) (UE-93 & After) ..... ILLUMINATED
    - Red Light (firewall fuel valve handles) ..... ILLUMINATED
  - \* e. Firewall Fuel Valves ..... PUSH OPEN
    - L and R FUEL PRESS LO Annunciators ..... EXTINGUISHED
  - \* f. Standby Pumps ..... OFF
    - L and R FUEL PRESS LO Annunciators ..... ILLUMINATED
  - \* g. Transfer Flow ..... ALTERNATELY LEFT AND RIGHT
    - FUEL TRANSFER Annunciator ..... ILLUMINATED
    - FUEL PRESS LO Annunciator (supplying side) ..... EXTINGUISHED
  - \* h. Transfer Flow ..... OFF
  - i. Fuel Quantity (Main and Aux) ..... CHECK
  - j. Aux Pumps (if fuel in aux tanks) ..... AUTO
  - k. L and R FUEL QTY and L and R COL TANK LOW Annunciators ..... EXTINGUISHED
  - l. Circuit Breaker Panel ..... CHECK
- 13. Pilot's Instrument Panel and Subpanel ..... CHECK
  - a. Clock ..... SET
  - b. Compass Control ..... SLAVED
  - c. Eng Anti-Ice Switches ..... ON, AS REQUIRED

**CAUTION**

To minimize ingestion of ground debris, the engine anti-ice system should be ON for all ground operations.

- d. All Other Switches ..... OFF
- \* e. Oxygen System Preflight Inspection ..... CONFIRM COMPLETE
- f. Oxygen Control ..... CONFIRM ON
- g. Pilot's Static Air Source ..... NORMAL
- h. Pilot Air and Defrost ..... AS REQUIRED
- i. Landing Gear ..... CHECK
  - 1) Landing Gear Control ..... DN
  - 2) Landing Gear Handle Lights ..... TEST
  - 3) Landing Gear Relay Circuit Breaker ..... IN

- 4) Alternate Extension Handle . . . . . STOWED
14. Overhead Panel . . . . . CHECK
- a. MIC Selector Switches . . . . . NORMAL
- b. Master Panel Lights . . . . . AS REQUIRED
- c. Beacon . . . . . GND
- d. Battery Voltage . . . . . CHECK
- 1) BATT . . . . . 23 VOLTS MINIMUM
- 2) TPL BUS . . . . . 22 VOLTS MINIMUM
- 3) CTR BUS . . . . . 23 VOLTS MINIMUM
15. Glareshield Panel . . . . . CHECK
- a. Annunciator Lights . . . . . TEST  
(Warning Panel, Caution/Advisory Panel, Master Warning/Caution, AFX Repeater, Gnd Comm Pwr, VG Fast Erect, Alt Alert, YD Engage, Stby Horiz Pwr, EFIS Aux Power)
16. Avionics Panel . . . . . SET AS REQUIRED
17. Power Console and Pedestal . . . . . CHECK
- a. Power Levers . . . . . IDLE, Friction - SET
- b. Propeller Levers . . . . . TAXI (detent), Friction - SET
- c. Condition Levers . . . . . FUEL CUTOFF, Friction - SET
- d. Aileron Trim . . . . . 0 (neutral)
- e. Rudder Trim . . . . . 0 (neutral)
- f. EFIS Power Switches . . . . . OFF
- g. EFIS Reversionary Panel . . . . . SWITCHES OFF or NORMAL
- h. TRIP and DATE (if installed) . . . . . SET (if desired)
- i. Rudder Boost . . . . . ON
- j. Elevator Trim . . . . . ON
- k. Anti-Skid (if installed) . . . . . ON
- l. Flashlight (if installed) . . . . . CHECK
18. Copilot's Instrument Panel and Subpanel . . . . . CHECK
- a. Clock . . . . . SET
- b. Compass Control . . . . . SLAVED
- c. Bleed Air Valves . . . . . CLOSED
- d. Blowers . . . . . AUTO
- e. Auto Temp . . . . . AS REQUIRED
- f. Envir Mode Control . . . . . OFF

### NOTE

On UE-262 and after, and those airplanes modified by Kit 129-3004-1, the AUDIO SPKR switch must be on to hear aural warning tones.

- g. Overspeed/Stall Warning . . . . . TEST
- h. Engine Fire Extinguisher and Detect . . . . . TEST
- 1) LEFT and RIGHT EXT Switches . . . . . TEST A
- L and R Green "OK" and Yellow "D" Annunciators (glareshield) (UE-1 thru UE-92) . . . . . ILLUMINATED
  - L and R Green "OK" and Yellow "DISCH" Annunciators (glareshield) (UE-93 and After) . . . . . ILLUMINATED

- 2) LEFT and RIGHT EXT Switches . . . . . TEST B
  - L and R Green "OK" Annunciators (glareshield) . . . . . ILLUMINATED
- 3) LEFT and RIGHT DETECT Switches . . . . . LOOP
  - L and R FIRE LOOP Annunciators . . . . . ILLUMINATED
- i. Cabin Air and Copilot Air . . . . . AS DESIRED
- j. Copilot's Static Air Source . . . . . NORMAL
- 19. Copilot's Circuit Breaker Panel . . . . . CHECK

## ENGINE STARTING (BATTERY)

Items marked with an "\*" may be omitted at pilot's discretion after the first flight of each day.



Avoid sustained propeller operation from 400 to 950 rpm and from 1250 to 1395 rpm.

- 1. Right Ignition and Engine Start Switch . . . . . ON  
(R FUEL PRESS LO Annunciator - EXTINGUISHED)
- 2. Right Condition Lever (after N<sub>1</sub> accelerates thru 12%) . . . . . LOW IDLE
- 3. ITT and N<sub>1</sub> . . . . . MONITOR (1000°C maximum)



If no ITT rise is observed within 10 seconds after moving the Condition Lever to LOW IDLE, move the Condition Lever to FUEL CUTOFF and set the IGNITION AND ENGINE START switch to OFF. Follow ENGINE CLEARING OR RESTART PROCEDURES.

- 4. Right Oil Pressure . . . . . CHECK
- 5. Right Ignition and Engine Start Switch (at 50% N<sub>1</sub> or above) . . . . . OFF
- 6. Right Condition Lever . . . . . HIGH IDLE
- 7. Right Generator . . . . . GEN RESET, THEN ON
  - a. L and R GEN TIE OPEN Annunciators . . . . . EXTINGUISHED

*If R GEN TIE OPEN Annunciator Does Not Extinguish:*

- b. Bus Sense Switch . . . . . HOLD TO RESET FOR APPROXIMATELY 5 SECONDS
- c. Repeat as required until R GEN TIE OPEN annunciator remains extinguished.
- d. Battery . . . . . CHARGE until loadmeter reads 50% or less

## NOTE

The BATTERY CHARGE annunciator will illuminate approximately 6 seconds after generator is on the line. If the annunciator does not extinguish within 5 minutes, refer to NICKEL-CADMIUM BATTERY CHECK procedure, this section.

- 8. L and R AC Bus . . . . .CHECK
  - a. Left and Right AC Bus . . . . .ON
  - b. L and R AC BUS Annunciators. . . . . EXTINGUISHED
  - c. L and R Inverter Frequency . . . . . 380 - 420 Hz
  - \* d. Left AC Bus . . . . . OFF, then XFER
    - L AC BUS Annunciator . . . . .ILLUMINATED, then EXTINGUISHED  
(the left AC bus is now powered by the right inverter)
  - \* e. Left AC Bus . . . . .ON
  - \* f. Right AC Bus . . . . . OFF, then XFER
    - R AC BUS Annunciator . . . . .ILLUMINATED, then EXTINGUISHED  
(the right AC bus is now powered by the left inverter)
  - \* g. Right AC Bus . . . . .ON
- 9. Left Ignition and Engine Start Switch. . . . . ON  
(L FUEL PRESS LO Annunciator - EXTINGUISHED)
- 10. Left Condition Lever (after N1 accelerates thru 12%) . . . . . LOW IDLE
- 11. ITT and N1 . . . . . MONITOR (1000°C maximum)
- 12. Left Oil Pressure . . . . .CHECK
- 13. Left Ignition and Engine Start Switch (at 50% N1 or above) . . . . . OFF
- 14. Right Condition Lever . . . . . LOW IDLE
- \* 15. Right Generator . . . . . OFF  
(L and R GEN TIE OPEN Annunciators - ILLUMINATED)
- 16. Left Generator . . . . . GEN RESET, then ON  
(L and R GEN TIE OPEN Annunciators - EXTINGUISHED)
- 17. Voltages . . . . .CHECK
  - a. BATT, R and L GEN, CTR BUS . . . . . 27.5 - 29.0 VOLTS
  - b. TPL BUS. . . . . 26.5 - 28.0 VOLTS
  - c. EXT PWR . . . . . 0 VOLTS
- \* 18. Right Generator . . . . . GEN RESET, then ON
- \* 19. GEN TIES Switch . . . . . OPEN
  - a. L and R GEN TIE OPEN Annunciators. . . . . ILLUMINATED
  - b. TPL BUS Voltage . . . . . 26.5 - 28.0 VOLTS
- \* 20. GEN TIES Switch . . . . . NORM
  - L and R GEN TIE OPEN Annunciators . . . . . EXTINGUISHED
- \* 21. Bus Sense Switch . . . . . TEST
  - a. L and R GEN TIE OPEN and BATT TIE OPEN Annunciators . . . . . ILLUMINATED
  - b. CTR BUS Voltage. . . . . ZERO
- \* 22. Bus Sense Switch . . . . . RESET
  - L and R GEN TIE OPEN and BATT TIE OPEN Annunciators. . . . . EXTINGUISHED
- \* 23. Loadmeters . . . . . PARALLELED WITHIN 10%

## ENGINE STARTING (EXTERNAL POWER)

Items marked with an "\*" may be omitted at pilot's discretion after the first flight of each day.

### CAUTION

Avoid sustained propeller operation from 400 to 950 rpm and from 1250 to 1395 rpm.

### CAUTION

NEVER CONNECT AN EXTERNAL POWER SOURCE TO THE AIRPLANE UNLESS A BATTERY INDICATING AT LEAST 20 VOLTS IS IN THE AIRPLANE. If the battery voltage is less than 20 volts, the battery must be recharged, or replaced with a battery indicating at least 20 volts, before connecting external power. When an external power source is used, ascertain that the Auxiliary Power Unit has a capacity of 1000 amperes minimum intermittent output (300 amperes minimum continuous output). Only use an external power source fitted with an AN-type plug.

- 1. Avionics Switch . . . . . OFF
- 2. Generator Switches . . . . . OFF
- 3. Battery Switch . . . . . ON  
(the battery will tend to absorb transients present in some auxiliary power units.)

### CAUTION

Auxiliary Power Unit Output Voltage - SET 28.0 - 28.4 VOLTS

- 4. External Power Source . . . . . TURN OFF, then CONNECT TO AIRPLANE
  - EXTERNAL POWER Annunciator . . . . . ILLUMINATED
- 5. External Power Source . . . . . TURN ON
- 6. Voltmeter Select . . . . . EXT PWR (confirm 28.0 - 28.4 volts)
- 7. EXT PWR Switch . . . . . ON

## NOTE

If the battery is partially discharged, the BATTERY CHARGE annunciator will illuminate approximately 6 seconds after the external power is on the line. If the annunciator does not extinguish within 5 minutes, refer to the NICKEL-CADMIUM BATTERY CHECK procedure, this section.

- 8. L and R AC Buses . . . . . CHECK
  - a. Left and Right AC Bus . . . . . ON
  - b. L and R AC BUS Annunciators . . . . . EXTINGUISHED
  - c. L and R Inverter Frequency . . . . . 380 - 420 Hz
  - \* d. Left AC Bus . . . . . OFF, then XFER
    - L AC BUS Annunciator . . . . . ILLUMINATED, then EXTINGUISHED  
(the left AC bus is now powered by the right inverter)
  - \* e. Left AC Bus . . . . . ON
  - \* f. Right AC Bus . . . . . OFF, then XFER

- R AC BUS Annunciator . . . . .ILLUMINATED, then EXTINGUISHED  
(the right AC bus is now powered by the left inverter)
- \* g. Right AC Bus . . . . .ON
- 9. Left Propeller Control. . . . .FEATHER
- 10. Right Ignition and Engine Start Switch . . . . .ON  
(R FUEL PRESS LO Annunciator - EXTINGUISHED)
- 11. Right Condition Lever (after N<sub>1</sub> accelerates thru 12%) . . . . .LOW IDLE
- 12. ITT and N<sub>1</sub>. . . . .MONITOR (1000°C maximum)

**CAUTION**

If no ITT rise is observed within 10 seconds after moving the Condition Lever to LOW IDLE, move the Condition Lever to FUEL CUTOFF, and set the Ignition and Engine Start Switch to OFF. Follow ENGINE CLEARING OR RESTART PROCEDURES.

- 13. Right Oil Pressure . . . . .CHECK
- 14. Right Ignition and Engine Start Switch (at 50% N<sub>1</sub> or above) . . . . .OFF
- 15. Left Ignition and Engine Start Switch. . . . .ON  
(L FUEL PRESS LO Annunciator - EXTINGUISHED)
- 16. Left Condition Lever (after N<sub>1</sub> accelerates thru 12%) . . . . .LOW IDLE
- 17. ITT and N<sub>1</sub>. . . . .MONITOR (1000°C maximum)
- 18. Left Oil Pressure . . . . .CHECK
- 19. Left Ignition and Engine Start Switch (at 50% N<sub>1</sub> or above) . . . . .OFF
- 20. EXT PWR Switch. . . . .OFF
- 21. Auxiliary Power Unit . . . . .TURN OFF, DISCONNECT, DOOR SECURE
- 22. External Power Annunciator . . . . .EXTINGUISHED
- 23. Left Propeller Control. . . . .TAXI (detent)
- 24. Right Generator. . . . .GEN RESET, then ON
  - L and R GEN TIE OPEN Annunciators . . . . .EXTINGUISHED
- \* 25. Right Generator . . . . .OFF
- 26. Left Generator . . . . .GEN RESET, then ON
- 27. Voltages . . . . .CHECK
  - a. BATT, R and L GEN, CTR BUS . . . . .27.5 - 29.0 VOLTS
  - b. TPL BUS. . . . .26.5 - 28.0 VOLTS
  - c. EXT PWR. . . . .0 VOLTS
- \* 28. Right Generator . . . . .GEN RESET, then ON
- \* 29. GEN TIES Switch . . . . .OPEN
  - a. L and R GEN TIE OPEN Annunciators. . . . .ILLUMINATED
  - b. TPL BUS Voltage . . . . .26.5 - 28.0 VOLTS
- \* 30. GEN TIES Switch . . . . .NORM
  - L and R GEN TIE OPEN Annunciators . . . . .EXTINGUISHED
- \* 31. Bus Sense Switch . . . . .TEST
  - a. L and R GEN TIE OPEN  
and BATT TIE OPEN Annunciators . . . . .ILLUMINATED
  - b. CTR BUS Voltage. . . . .ZERO

- \* 32. Bus Sense Switch ..... RESET
  - L and R GEN TIE OPEN and BATT TIE OPEN Annunciator ..... EXTINGUISHED
- \* 33. Loadmeters ..... PARALLELED WITHIN 10%

## ENGINE CLEARING OR RESTART

The following procedure is used to clear an engine any time it is deemed necessary to remove internally trapped fuel and vapor, or if there is evidence of a fire within the engine. Air passing through the engine serves to purge fuel, vapor or fire from the combustion section, gas generator turbine, power turbines and exhaust system.

- 1. Condition Lever ..... FUEL CUTOFF
- 2. Starter Cool Down ..... 30 SECONDS  
(0 seconds if evidence of fire exists)
- 3. Ignition and Engine Start Switch ..... STARTER ONLY  
(for a maximum of 20 seconds)



Do not exceed starter limits. See Section 2, LIMITATIONS.

- 4. Ignition and Engine Start Switch ..... OFF
- 5. Starter Cool Down ..... 60 SECONDS

A second start attempt or another 20-second engine clearing may be conducted at this time. Then allow a 5-minute cool down prior to using the starter again.

## BEFORE TAXI

Items marked with an “\*” may be omitted at pilot’s discretion after the first flight of each day.



Backing the airplane using reverse thrust (up to the 10-second limitation) can shorten the service life of the following parts:

- 1) Cabin windows due to exhaust heating.
- 2) Engines due to foreign object damage.
- 3) Propellers due to erosion.

- 1. Panel Lights ..... AS REQUIRED
- 2. Exterior Lights ..... AS REQUIRED
- 3. Cabin Lights ..... AS REQUIRED
- 4. Cabin Sign (if installed) ..... FSB
- 5. Avionics ..... ON
- 6. EFIS Aux Power ..... ON  
(AUX ARM Annunciator - ILLUMINATED)
- 7. Copilot’s Electronic Altimeter (if installed) ..... ILLUMINATED
- 8. STBY HORIZ PWR or STBY INST PWR ..... ON  
(AUX ARM Annunciator - ILLUMINATED)
- 9. EFIS Power Switches ..... ON

10. Flight Data Recorder . . . . .CHECK

*Serials With F1000 Flight Data Recorder Installed:*

- a. FLT RCDR OFF Annunciator . . . . . EXTINGUISHED
- b. REPEAT Button (if installed). . . . . PRESS UNTIL CODING LAMP ILLUMINATES (if desired)

*Serials UE-362 and After With FA2100 Flight Data Recorder, If Installed:*

- FDR FAULT and FDAU STATUS Annunciators . . . . . EXTINGUISHED

11. Bleed Air Valves . . . . . OPEN

12. Envir Mode Control . . . . . AUTO

13. Instruments . . . . . CHECK, EFIS BRIGHTNESS SET TO MINIMUM

- Standby Attitude Indicator . . . . . UNCAGE  
(at least 1 minute after power applied. OFF Flag out of sight,  
AUX ARM Annunciator - ILLUMINATED.)

**CAUTION**

Do not taxi with a caged gyro.

\* 14. Brake Deice (if installed) . . . . .CHECK

a. Brake Deice . . . . . ON

- L and R BK DEICE Annunciators . . . . . ILLUMINATED

b. Brake Deice . . . . . OFF

- L and R BK DEICE Annunciators . . . . . EXTINGUISHED

**CAUTION**

Do not leave brake deice on longer than required to check function of annunciators at ambient temperatures above 15°C.

**NOTE**

Brake Deice Control Valves may become inoperative if valves are not cycled periodically. One cycle of the valves is required daily regardless of weather conditions.

15. Stall Warn Heat . . . . . ON

(STALL HEAT Annunciator - EXTINGUISHED)

16. Power Steering (if installed). . . . .AS REQUIRED

17. Brakes . . . . .RELEASED and CHECKED

18. Cabin Briefer . . . . .TAKEOFF

**NOTE**

Single-engine taxi operations have not been demonstrated to provide adequate directional control under all conditions without the optional power steering installed.

Care must be exercised when taxiing on unimproved surfaces. Never taxi with a flat tire or flat shock strut. If possible, conduct runup on a hard surface free of sand and gravel to preclude pitting of the propeller blades and airplane surfaces.



## BEFORE TAKEOFF (RUNUP)

Items marked with an "\*" may be omitted at pilot's discretion after the first flight of each day.

- 1. EFIS ..... CHECK
  - a. Pilot and Copilot EADI/EHSI Dim Control ..... SET BRIGHTNESS LEVEL

### NOTE

Tube brightness should not be set higher than that required for adequate visibility.

- \* b. EFIS TEST, Pilot's Side (PLT TEST) ..... PUSH AND HOLD

The pilot's EADI and EHSI are checked using the PLT TEST button on the reversionary panel located on the pedestal. Three levels of test may be accomplished, depending on how long the button is held down.

*Momentarily pressing the button results in:*

- 1) 10° pitch up and 10° right roll indication on EADI.
- 2) 20° heading increase on EHSI.
- 3) Red TEST flag in upper left corner of EADI.

*Pressing the button for 2 - 3 seconds results in previous indications and:*

- 4) Blinking amber PIT/ROL comparitor annunciator on pilot's and copilot's EADI.
- 5) Blinking amber HDG comparitor annunciator on pilot's and copilot's EHSI.
- 6) Steady amber COMPARE PUSH TO RESET annunciator on pilot's and copilot's instrument panel.

### NOTE

All comparitor annunciators may be cancelled when in or out of the test mode by pressing either the pilot's or copilot's COMPARE PUSH TO RESET switch.

*Pressing and holding the button for 5 seconds or longer results in previous indications and:*

- 7) The sky/ground display disappears from the EADI.
- 8) The following red flags are displayed on the EADI: ATT, XDTA, RA, DSP. The flags will blink for 10 seconds and then become steady.
- 9) The following red flags are displayed on the EHSI: HDG, XDTA, DSP. They will also blink for 10 seconds and then become steady.

### NOTE

The following additional red flags are displayed continually, assuming the receivers are not receiving a valid signal.

EADI: VOR/LOC

EHSI: VOR/LOC, GS, and Bearing Pointer Flags (if selected)

- \* c. EFIS Test, Copilot's Side (COPLT TEST) ..... PUSH AND HOLD
  - The copilot's EFIS tubes are checked using the COPLT TEST switch. Results will be the same as described in Step b., except:
    - a) 10° pitch down and 10° left roll indication on the EADI.
    - b) 20° decrease in heading on the EHSI.
- \* d. Pilot and Copilot Display Select Panels ..... SET AS REQUIRED

- \* 2. Air Data Computer (for airplanes equipped with autopilots) .....CHECK
  - a. ADC TEST Button (on EFIS Reversionary panel) ..... PUSH AND RELEASE
  - b. Pilot's Altimeter ..... Digital Window Flagged With  
Pointer Indicating 250 Feet
  - c. Altimeter Test Button ..... PUSH AND RELEASE - Digital Window  
Flagged and Pointer Indicates 750 Feet
- 3. Standby Attitude Indicator ..... PITCH ATTITUDE SET, GYRO STABILIZED
- 4. Pilot and Copilot Compass System ..... SLAVED MODE  
(DG Not Displayed on EHSI's)
- \* 5. Mark-VI GPWS (if installed) (with flaps UP) ..... TEST

## NOTE

The Mark-VI GPWS relies on the following additional airplane components:

- 1) Radio Altimeter.
- 2) Left Landing Gear Downlock Switch.
- 3) Cockpit Flap Control Switch.
- 4) Copilot's Pitot-Static System.
- 5) Left Generator Bus.
- 6) Glideslope Deviation.

## NOTE

Voice messages from the GPWS will not be heard over the cockpit speakers on UE-262 and after, or on airplanes modified by Kit 129-3004-1, unless the AUDIO SPKR switch is on.

- a. GPWS Test Switch ..... PRESS AND HOLD (GPWS FLAP  
OVRD, GPWS INOP, & G/S CANCLD  
Annunciators - ILLUMINATED)
- b. BELOW G/S Annunciator ..... ILLUMINATED WITHIN 1 SECOND  
FOLLOWED BY "GLIDESLOPE"  
VOICE MESSAGE
- c. GPWS Annunciator ..... ILLUMINATED WITHIN 4-5 SECONDS  
FOLLOWED BY "PULL UP" VOICE  
MESSAGE SOUNDING 2-6 TIMES
- d. GPWS Annunciator ..... EXTINGUISHED
- e. GPWS Test Switch ..... RELEASED
- \* 6. Flight Director .....CHECK
- \* 7. Altitude Alerter .....CHECK
- \* 8. TCAS791 (if installed) .....CHECK

## NOTE

The TCAS791 relies on the following additional airplane components:

- 1) Barometric output from the pilot's (ALTM 1) or copilot's (ALTM 2) altimeter, selected using ENCD ALTM switch on the avionics panel.
- 2) No. 1 Directional Gyro.
- 3) Radio Altimeter.
- 4) Left Squat Switch.
- 5) Left Generator Bus.

## NOTE

Voice messages from the TCAS791 will not be heard over the cockpit speakers on UE-262 and after, or on airplanes modified by Kit 129-3004-1, unless the AUDIO SPKR switch is on.

- a. Dim/Off Knob ..... ROTATE TO ON AND SET BRIGHTNESS
- b. ENCD ALTM Switch (Avionics Panel) ..... SET TO ALTM 1
- c. Pilot's Altimeter ..... SET TO 29.92 In. Hg
- d. Test Button (after the Start-Up screen reverts to the 5NM range, or standby screen) ..... MOMENTARILY PRESS
- e. Test Screen ..... MONITOR (Altitude at bottom of screen must be within ±100 feet of pilot's altimeter reading)
- f. Voice Message ..... "TCAS TEST PASSED" (Display reverts to 5 nm screen or standby screen)
- g. Pilot's Altimeter ..... RESET TO CURRENT BAROMETRIC SETTING
- h. ENCD ALTM Switch (Avionics Panel) ..... AS DESIRED
- \* 9. Autopilot (if installed) ..... CHECK (refer to Supplement)
- \* 10. Yaw Damp ..... CHECK
  - a. Rudder Boost/Yaw Damp Select Switch (if installed) ..... LEFT
  - b. Yaw Damp ..... ON
    - 1) YD Annunciator On Pilot's and Copilot's EADI ..... ILLUMINATED
    - 2) YAW Annunciator On Pilot's or Copilot's Flight Control Panel ..... ILLUMINATED
  - c. Rudder Pedals ..... CHECK FOR ADDED RESISTANCE
  - d. Control Wheel Disconnect Switch ..... PRESS TO FIRST LEVEL  
(yaw damp will disengage)
  - e. Yaw Damp ..... ON
  - f. Rudder Boost/Yaw Control Test Switch ..... YAW CONTROL TEST  
(yaw damp will disengage, RUD BOOST OFF Annunciator - ILLUMINATED)
  - g. Rudder Boost/Yaw Control Test Switch ..... RUDDER BOOST  
(RUD BOOST OFF Annunciator - EXTINGUISHED)
  - h. Rudder Boost/Yaw Damp Select Switch (if installed) ..... RIGHT
  - i. Repeat steps b. thru g.
  - j. Rudder Boost/Yaw Damp Select Switch (if installed) ..... AS REQUIRED
- \* 11. Weather Radar ..... CHECK

## CAUTION

Do not turn radar on in the vicinity of ground personnel. A hazardous area extends up to 4 feet in front of the radar dish.

- 12. Cockpit Voice Recorder ..... CHECK
  - \* a. Headset ..... PLUG INTO CVR JACK
  - b. CVR TEST Button ..... PRESS AND HOLD (5 seconds minimum)
  - \* • Listen for tone in headset
  - \* • Observe meter needle in green band
  - \* c. Speak into area mic on glareshield. Voice should be heard in headset.

## Normal Procedures

Model 1900D Airliner

13. Pressurization . . . . . CHECK and SET
- \* a. Cabin Altitude . . . . . ADJUST SO THAT "CABIN ALT" DIAL INDICATES AN ALTITUDE 1000 FEET BELOW FIELD PRESSURE ALTITUDE
- b. Rate Control Selector . . . . . SET INDEX AT 12-O'CLOCK POSITION
- \* c. Cabin Pressure Switch . . . . . HOLD IN "TEST"
- \* d. Cabin Altitude Indicator . . . . . CHECK FOR DESCENT INDICATION  
(May take up to 45 seconds)
- \* e. Cabin Pressure Switch (when pressurizing is confirmed). . . . . RELEASE TO "PRESS"
- f. Cabin Controller . . . . . ADJUST SO THAT INNER SCALE (ACFT ALT) IS SET AT PLANNED CRUISE ALTITUDE PLUS 1000 FEET  
(If this setting does not result in an outer scale (CABIN ALT) indication of at least 500 feet above take-off field pressure altitude, adjust as required)

**NOTE**

For a cruise altitude of 25,000 feet, set controller at 25,000 feet.

- \* 14. Environmental System. . . . . CHECK
- a. Envir Mode Control. . . . . "T" Test
- L and R ENVIR FAIL, L and R ENVIR OFF Annunciators. . . . . ILLUMINATED
- b. Envir Mode Control. . . . . AUTO
- c. Bleed Air Valves . . . . . ENVIR OFF
- L and R ENVIR FAIL Annunciators . . . . . EXTINGUISHED
- d. Bleed Air Valves . . . . . OPEN
- L and R ENVIR OFF Annunciators . . . . . EXTINGUISHED
- e. Blowers. . . . . AS DESIRED
- f. Temp Control . . . . . AS DESIRED
- \* 15. Electric Pitch Trim (if installed) . . . . . CHECK
- a. ELEV TRIM Switch . . . . . ON
- b. Pilot's and Copilot's Trim Switches. . . . . CHECK
- 1) Pilot's trim will override copilot's trim.
- 2) Movement of only half of switch will not activate trim.
- c. Trim Disconnect Switch . . . . . PRESS TO 2ND LEVEL AND RELEASE
- 1) PITCH TRIM OFF Annunciator . . . . . ILLUMINATED
- 2) Electric Pitch Trim . . . . . DEACTIVATED
- d. ELEV TRIM Switch. . . . . OFF, then ON
- PITCH TRIM OFF Annunciator . . . . . EXTINGUISHED

**WARNING**

Operation of the electric trim system should occur only by movement of pairs of switches. Any movement of the elevator trim wheel while depressing only one switch denotes a system malfunction. The elevator trim switch must then be turned OFF and flight conducted only by manual operation of the trim wheel.

16. Elevator Trim. . . . . SET FOR TAKEOFF
- Set trim in FWD range for C.G.s in forward half of envelope.
- Set trim in AFT range for C.G.s in aft half of envelope.

- 17. Engine Control Friction Locks . . . . .SET
- 18. Flaps . . . . .CHECK AND SET
- 19. Flight Controls . . . . .CHECK FOR FREEDOM OF MOVEMENT  
AND PROPER DIRECTION OF TRAVEL
- \* 20. Engine Anti-Ice . . . . .CHECK
- 21. Other Systems For Icing Flight, if required . . . . .CHECK
- \* 22. Autofeather System . . . . .CHECK AND ARM
  - a. Autofeather Switch . . . . .OFF
    - AUTOFTHER OFF Annunciator . . . . .ILLUMINATED
  - b. Autofeather Switch . . . . .TEST
    - AFX DISABLE Annunciator . . . . .ILLUMINATED
  - c. Power Levers . . . . .ADVANCE ABOVE 1000 FT-LBS
    - Approx 1000 Ft-Lbs - L and R AUTOFEATHER  
and L and R AFX Annunciators . . . . .ILLUMINATED
    - AFX DISABLE Annunciator . . . . .EXTINGUISHED
  - d. Power Levers . . . . .RETARD INDIVIDUALLY
    - 1) Approx 750 Ft-Lbs:
      - Opposite AUTOFEATHER and AFX Annunciators . . . . .EXTINGUISHED
      - AFX DISABLE Annunciator . . . . .ILLUMINATED
    - 2) Below 500 Ft-Lbs - On-side AUTOFEATHER  
and AFX Annunciators . . . . .EXTINGUISHED  
(propeller starts to feather)

## NOTE

AUTOFEATHER and AFX annunciators will cycle on and off with each fluctuation of torque as the propeller starts to feather.

- 3) Advance power lever above 1000 Ft-Lbs and repeat 1) and 2) by retarding opposite power lever.
- e. Power Levers . . . . .IDLE
  - L and R AUTOFEATHER and left and right AFX  
Annunciators . . . . .EXTINGUISHED
  - AFX DISABLE Annunciator . . . . .ILLUMINATED
- f. Autofeather Switch . . . . .OFF, then ARM
  - AFX DISABLE Annunciator . . . . .EXTINGUISHED (with switch in OFF or ARM position)
  - AUTOFTHER OFF Annunciator . . . . .EXTINGUISHED (with switch in ARM position)
- 23. Manual Propeller Feathering . . . . .CHECK
- 24. Propeller Controls . . . . .FULL FORWARD
- \* 25. Overspeed Governors and Rudder Boost . . . . .CHECK
  - a. Prop Test Switch . . . . .HOLD TO OVERSPEED
  - b. Power Levers (individually) . . . . .Increase until prop is stabilized at 1535 to  
1595 rpm. Continue to increase until rudder  
pedal resistance is felt on side of advancing  
power (approximately 1200 Ft-Lbs differential  
torque). Observe ITT and torque limits.
  - c. Control Wheel Disconnect Switch . . . . .1ST LEVEL
    - 1) Rudder Boost . . . . .INTERRUPTED
  - d. Power Levers . . . . .IDLE
  - e. Repeat Steps b, c, d on the opposite engine.
  - f. Prop Test Switch . . . . .RELEASE

\* 26. Ground Idle Low Pitch Stops . . . . .CHECK

**NOTE**

The PROP GND SOL annunciator is installed on serials UE-335 and after, and those airplanes modified by Kit 129-9011-1. It is removed on serials UE-1 and after when Kit 129-9030-1 is installed.

- a. Power Levers . . . . . IDLE
- b. Condition Levers . . . . . HIGH IDLE, NOTE PROP RPM
- c. Prop Test Switch . . . . . HOLD TO LOW PITCH
  - 1) L & R RPM . . . . . STABILIZED APPROX 200 RPM BELOW VALUE IN STEP b.
  - 2) PROP GND SOL Annunciator (if installed) . . . . . ILLUMINATED IN APPROX 8 SECONDS

(On serials UE-272 and after, and those airplanes modified by Kit 129-5200, accomplish Step 3.)

- 3) Each Power Lever . . . . . INDIVIDUALLY LIFT & RELEASE
  - a) L & R RPM . . . . . NOTE BOTH INCREASE TO ORIGINAL VALUE IN STEP b. AS EACH POWER LEVER IS LIFTED
  - b) PROP GND SOL Annunciator (if installed) . . . . . EXTINGUISHED
- d. Prop Test Switch . . . . . RELEASE
  - 1) L & R RPM . . . . . VERIFY RETURNS TO VALUE IN STEP b.
  - 2) PROP GND SOL . . . . . REMAINS EXTINGUISHED
- e. Condition Levers . . . . . LOW IDLE
- \* 27. Primary Governors . . . . . EXERCISE AT 1500 RPM
- \* 28. Vacuum/Pneumatic Pressure . . . . . CHECK AT IDLE
  - a. Left Bleed Air Valve . . . . . INST & ENVIR OFF  
(Suction in wide green arc, press at 17.5 - 19.0 psi)
  - b. Right Bleed Air Valve . . . . . INST & ENVIR OFF
    - 1) Suction and Pressure . . . . . ZERO
    - 2) L and R BL AIR FAIL Annunciator . . . . . ILLUMINATED
  - c. Left Bleed Air Valve . . . . . OPEN  
(Suction in wide green arc, press at 17.5 - 19.0 psi)
    - L and R BL AIR FAIL Annunciators . . . . . EXTINGUISHED
  - d. Right Bleed Air Valve . . . . . OPEN
- 29. Fuel Quantity, Flight and Engine Instruments . . . . .CHECK

**BEFORE TAKEOFF (FINAL ITEMS)**

- 1. Propeller Levers . . . . . CONFIRM FULL FORWARD
- 2. Flaps . . . . . CONFIRM SET
- 3. Trim . . . . . CONFIRM SET
- 4. Brake Deice (if installed) . . . . . OFF
- 5. Stall Warn Heat . . . . . CONFIRM ON  
(STALL HEAT Annunciator - EXTINGUISHED)
- 6. Left and Right Pitot Heat . . . . . ON  
(L and R PITOT HEAT Annunciators - EXTINGUISHED)
- 7. Autofeather . . . . . CONFIRM ARMED
- 8. Transponder . . . . . ON

- 9. Ice Protection . . . . . AS REQUIRED
  - a. Eng Auto Ignition, if required . . . . . ARM
  - b. Eng Anti-Ice . . . . . CONFIRM ON (if required), or OFF
  - c. WSHLD Anti-Ice, if required . . . . . NORMAL/HI
  - d. Prop Deice, if required . . . . . AUTO

**CAUTION**

Use of propeller deice boots at ambient temperatures above 10°C may damage the propeller.

- e. L and R Fuel Vent Heat, if required . . . . . ON
- f. Alt Static Heat, if required . . . . . ON
- 10. Bleed Air Valves . . . . . AS REQUIRED
- 11. Blowers . . . . . HI or AUTO
- 12. Envir Mode Control . . . . . AS REQUIRED
- 13. Generator Load . . . . . CHECK
- 14. Annunciators . . . . . EXTINGUISHED or CONSIDERED
  - Takeoff with the BATTERY CHARGE annunciator illuminated is permitted if a decreasing battery charge current is confirmed. See NICKEL-CADMIUM BATTERY CHECK in OTHER NORMAL PROCEDURES of this section.
- 15. Interior/Exterior Lights . . . . . AS REQUIRED
- 16. V<sub>1</sub>, V<sub>R</sub>, V<sub>2</sub>, Static Take-Off Power . . . . . CONFIRM

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

- 17. TCAS791 (if installed) . . . . . SET
  - a. Display Mode . . . . . SET

*If in Standby Mode:*

RNG Button . . . . . PRESS TO SELECT ABV DISPLAY MODE  
(or other desired mode)

*If not in Standby Mode:*

TEST Button . . . . . PRESS AS REQUIRED TO SELECT ABV DISPLAY MODE  
(or other desired mode)

- b. RNG Button . . . . . PRESS TO SELECT 5 or 10 nm RANGE

**CAUTION**

Do not take off without sufficient fuel in the main tanks to successfully recover the airplane at a suitable airport in case Auxiliary Fuel Transfer Failure renders the fuel in those tanks unusable.

**TAKEOFF**

- 1. Power Steering (if installed) . . . . . OFF
- 2. Brakes . . . . . HOLD
- 3. Power Levers/Prop Levers . . . . . SET STATIC TAKE-OFF POWER

**NOTE**

RPM may exceed 1700 with the propeller levers full forward. Manually reset RPM to 1700 prior to takeoff.

- 4. Autofeather Annunciators . . . . . ILLUMINATED
- 5. Brakes . . . . . RELEASE

**NOTE**

Increasing airspeed will cause torque and ITT to increase.

- 6. V<sub>R</sub> . . . . . ROTATE TO APPROXIMATELY 8°
- 7. Landing Gear Control (when positive climb established) . . . . . UP

**ROLLING TAKEOFF**

- 1. Power Steering (if installed) . . . . . OFF
- 2. Brakes . . . . . RELEASE
- 3. Power Levers/Prop Levers . . . . . SET STATIC TAKE-OFF POWER WITHIN 10 SECONDS OF BRAKE RELEASE (observe ITT limits)
- 4. Autofeather Annunciators . . . . . ILLUMINATED
- 5. V<sub>R</sub> . . . . . ROTATE TO APPROXIMATELY 8°
- 6. Landing Gear Control (when positive climb established) . . . . . UP

**CLIMB**

- 1. Flaps (if extended) . . . . . UP
- 2. Envir Mode Control . . . . . AUTO
- 3. Bleed Air Valves . . . . . OPEN
- 4. Blowers . . . . . AS REQUIRED
- 5. Yaw Damp . . . . . ON
- 6. Climb Power . . . . . SET
- 7. Propellers . . . . . 1550 RPM
- 8. Prop Sync . . . . . ON
- 9. Windshield Anti-Ice . . . . . NORMAL

**CAUTION**

The practice of turning the windshield anti-ice on early in the flight is recommended if it is anticipated that it will be required later in the flight after the windshield has been cold-soaked. Activating the windshield anti-ice after the windshield has been cold-soaked may cause the windshield to crack.

- 10. Engine Instruments . . . . . MONITOR
- 11. Cabin Pressurization . . . . . CHECK
- 12. Lights . . . . . AS REQUIRED
- 13. Cabin Sign (if installed) . . . . . OFF, IF CONDITIONS PERMIT



## CRUISE

### WARNING

Do not lift Power Levers in flight.

1. Cruise Power .....SET
2. Autofeather .....OFF
3. Engine Instruments .....MONITOR
4. Auxiliary Fuel Quantity .....MONITOR  
(ensure fuel is being transferred from the auxiliary tanks)
5. TCAS791 (if installed) .....SET
6. Cabin Sign (if installed) .....OFF, IF CONDITIONS PERMIT

## CABIN PRESSURIZATION CONTROLLER

1. If cruise altitude is changed by 1000 feet or more, select the new cruise altitude plus 1000 feet on the ACFT ALT dial of the cabin pressurization controller.
2. For a cruise altitude of 25,000 feet, set controller at 25,000 feet.

## TCAS791 (IF INSTALLED)

### WARNING

The TCAS791 does not provide protection from aircraft that do not have an operating transponder. The TCAS791 is only an aid in detecting other traffic and provides a means for the pilot to visually acquire and avoid aircraft that may pose a collision threat. Evasive maneuvers should not be made based solely on the TCAS display.

### CAUTION

Optimum TCAS791 performance is realized when intruder aircraft are reporting their altitude.

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

1. Test Button ..... PRESS TO SELECT NRM DISPLAY MODE  
(or other desired mode)

*All Airplanes:*

2. Traffic advisories (TAs) can be expected to occur during normal flight operation. Generally, TAs will occur more frequently in terminal areas during arrival, and less frequently during departure and enroute operations. In the vast majority of these cases, the aircraft displayed will be safely separated and there will be no need for pilots to initiate any avoidance maneuvers.
3. The TCAS791 provides the following Traffic Advisories:

VOICE MESSAGE	VISUAL	CREW RESPONSE
"TRAFFIC, TRAFFIC"	A filled yellow circle on the traffic display	Conduct visual search for the intruder. If successful, maintain visual acquisition to ensure safe operation.

4. The voice message, "TRAFFIC, TRAFFIC", is inhibited below 400 feet above the ground.
5. The following are the recommended crew responses to a traffic advisory.

**WARNING**

Maneuvers based solely on the TCAS display may result in loss of separation with the intruder.

- a. Attempt to visually acquire the intruder aircraft and maintain/attain safe separation in accordance with regulatory requirements and good operating practice.
- b. If the intruder aircraft is not visually acquired, air traffic control should be contacted to obtain any information that may assist the crew concerning the intruder aircraft.
- c. Evasive maneuvers (rapid changes in pitch, roll, normal acceleration, thrust, or speed) should only be conducted after visual acquisition of the intruder, and then only when necessary to achieve or assure safe separation.
- d. Minor adjustments to the vertical flight path, consistent with air traffic control requirements, are not considered evasive maneuvers.

**DESCENT**

- 1. TCAS791 (if installed) . . . . . SET
- UE-266 and after and those airplanes modified by BFGoodrich Service Memo 104:*
  - a. TEST Button . . . . . PRESS TO SELECT BLW DISPLAY MODEL  
(or other desired mode)
- All Airplanes:*
  - b. RNG Button . . . . . PRESS TO SELECT DESIRED RANGE
- 2. Pressurization . . . . . SET
  - a. Cabin Altitude . . . . . SET per PRESSURIZATION CONTROLLER SETTING FOR  
LANDING graph, or so that "CABIN ALT" DIAL INDICATES  
LANDING FIELD PRESSURE ALTITUDE PLUS 500 FEET
  - b. Rate Control Selector . . . . . AS REQUIRED
- 3. Altimeter . . . . . SET
- 4. WSHLD Anti-Ice . . . . . AS REQUIRED  
(NORMAL or HI; well before descent into  
warm, moist air, to aid in defogging)
- 5. Prop Deice (at ambient temperatures above 10°C) . . . . . OFF

**CAUTION**

Use of propeller deice boots at ambient temperatures above 10°C may damage the propeller.

- 6. Fuel Balance . . . . . CHECK
- 7. Power . . . . . AS REQUIRED to give desired rate of descent
- 8. Cabin Briefer . . . . . LANDING
- 9. Cabin Sign (if installed) . . . . . FSB

**NOTE**

Approximately 75% N<sub>1</sub> is required to maintain the pressurization schedule during descent.

## BEFORE LANDING

- 1. Cabin Sign (if installed) . . . . .FSB
- 2. Approach Speeds . . . . .CONFIRM
- 3. Cockpit Door (curtain) . . . . . OPEN
- 4. Autofeather . . . . . ARM
- 5. Pressurization . . . . . CHECK
- 6. Flaps . . . . . 17°
- 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.

- 9. Surface Deice . . . . .CYCLE, IF REQUIRED

### 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 propeller reverse as desired.

## NORMAL LANDING

- 1. Flaps . . . . . 35°
- 2. Airspeed . . . . . VREF
- 3. Yaw Damp . . . . .OFF
- 4. Power Levers . . . . . IDLE
- 5. Propeller Levers . . . . . FULL FORWARD

*After Touchdown:*

- 6. Power Levers . . . . .LIFT AND SELECT GROUND FINE
- 7. Brakes . . . . .AS REQUIRED

## MAXIMUM REVERSE THRUST LANDING

- 1. Flaps . . . . . 35°
- 2. Airspeed . . . . . VREF
- 3. Yaw Damp . . . . .OFF
- 4. Condition Levers . . . . . HIGH IDLE
- 5. Power Levers . . . . . IDLE
- 6. Propeller Levers . . . . . FULL FORWARD

*After Touchdown:*

### CAUTION

To ensure constant reversing characteristics, the propeller control must be in FULL INCREASE RPM position.

- 7. Power Levers ..... LIFT AND SELECT GROUND FINE,  
then LIFT AND SELECT REVERSE

**CAUTION**

If possible, propellers should be moved out of reverse at approximately 40 knots to minimize the chance of engine FOD and propeller erosion. Care must be exercised when reversing on runways with loose sand, dust, or snow on the surface. Flying gravel will damage propeller blades and possibly be ingested by the engine. Blowing dust or snow may impair the pilot's visibility.

- 8. Brakes ..... AS REQUIRED
- 9. Condition Levers ..... LOW IDLE

**BALKED LANDING**

- 1. Power ..... MAXIMUM ALLOWABLE
- 2. Airspeed ..... MAINTAIN  $V_{REF}$   
(when clear of obstacles,  
establish normal climb)
- 3. Flaps (at  $V_{REF} + 5$  knots) ..... 17°
- 4. Landing Gear ..... UP
- 5. Flaps (at 140 knots) ..... UP

**AFTER LANDING**

- 1. Power Steering (if installed) ..... AS REQUIRED
- 2. Propeller Levers ..... TAXI
- 3. Lights ..... AS REQUIRED
- 4. Eng Anti-Ice ..... ON, AS REQUIRED

**CAUTION**

To minimize ingestion of ground debris, the engine anti-ice system should be ON for all ground operations.

- 5. Stall Warn Heat ..... OFF
- 6. Left and Right Pitot Heat ..... OFF
- 7. Ice Protection ..... OFF
  - a. Eng Auto Ignition ..... OFF
  - b. WSHLD Anti-Ice ..... OFF
  - c. Prop Deice ..... OFF
  - d. Left and Right Fuel Vent Heat ..... OFF
  - e. Alt Static Heat ..... OFF
- 8. TCAS791 (if installed) ..... OFF
- 9. Transponder ..... STANDBY
- 10. Trim ..... SET
- 11. Flaps ..... UP
- 12. Radar ..... OFF

# Hawker Beechcraft Corporation

Model 1900D Airliner

## NORMAL PROCEDURES

### AFTER LANDING

1. Power Steering (if installed) ..... AS REQUIRED
2. Propeller Levers ..... TAXI
3. Power Levers ..... AS REQUIRED FOR TAXI

### NOTE

Taxi operations at minimum power may be considered part of the 2-minute stabilization time prior to engine shutdown.

4. Lights ..... AS REQUIRED
5. Eng Anti-Ice ..... ON, AS REQUIRED

### CAUTION

To minimize ingestion of ground debris, the engine anti-ice system should be ON for all ground operations.

6. Stall Warn Heat ..... OFF
7. Left and Right Pitot Heat ..... OFF
8. Ice Protection ..... OFF
  - a. Eng Auto Ignition ..... OFF
  - b. WSHLD Anti-Ice ..... OFF
  - c. Prop Deice ..... OFF
  - d. Left and Right Fuel Vent Heat ..... OFF
  - e. Alt Static Heat ..... OFF
9. TCAS791 (if installed) ..... OFF
10. Transponder ..... STANDBY
11. Trim ..... SET
12. Flaps ..... UP
13. Radar ..... OFF

### CAUTION

Some radars produce a hazardous area up to 4 feet (122 centimeters) in front of the radar dish.

### CAUTION

Backing the airplane using reverse thrust (up to the 10-second limitation) can shorten the service life of the following parts:

1. Cabin windows due to exhaust heating.
2. Engines due to foreign object damage.
3. Propellers due to erosion.

# Hawker Beechcraft Corporation

Model 1900D Airliner

## SHUTDOWN AND SECURING

1. Parking Brake . . . . . SET
2. Power Steering (if installed). . . . . OFF
3. EFIS Power Switches . . . . . OFF
4. Standby Attitude Indicator . . . . . CAGED, POWER OFF
5. EFIS Aux Power Switch. . . . . OFF
6. Avionics Switch . . . . . OFF
7. Left and Right AC Bus. . . . . OFF
8. Oxygen Control (after last flight of the day). . . . . PUSH OFF
9. Autofeather Switch . . . . . OFF
10. Lights. . . . . OFF
11. Instrument Emergency Lights (for night shutdown). . . . . ON
12. Blowers . . . . . AUTO
13. Envir Mode Control . . . . . OFF
14. Fuel System Aux Pump Switches . . . . . OFF
15. Battery . . . . . CHARGED (if BATTERY CHARGE annunciator is illuminated, refer to NICKEL-CADMIUM BATTERY CONDITION CHECK procedure in this section.)
16. ITT . . . . . STABILIZED AT MINIMUM OBTAINABLE TEMPERATURE FOR 2 MINUTES

### NOTE

After landing, taxi operations at minimum power may be considered part of the 2-minute stabilization time.

17. Condition Levers . . . . . FUEL CUTOFF
18. Propellers . . . . . FEATHERED

### CAUTION

Monitor ITT during shutdown. If sustained combustion is observed, proceed immediately to the ENGINE CLEARING OR RESTART procedure. During shutdown, ensure that the compressors decelerate freely. Do not close the firewall fuel valves for normal engine shutdown.

19. Overhead Panel Switches . . . . . OFF
20. Battery and Generator Switches (below 15% N<sub>1</sub>) . . . . . OFF
21. Battery and Generator Switches (below 15% N<sub>1</sub>) . . . . . OFF

### NOTE

N<sub>1</sub> decreasing below 15% indicates the starter relay is not engaged.

22. Control Locks . . . . . INSTALL
23. Instrument Emergency Lights . . . . . OFF

# Hawker Beechcraft Corporation

## Model 1900D Airliner

24. Cabin Door ..... OPEN

### CAUTION

If the cabin door pressure gage indicates less than 1000 psi, the restraining force required to lower the door will be increased. If pressure is zero, assistance may be required to lower the door normally and prevent it from free-falling.

25. Lavatory Trash Container (if optional Lavatory and  
Lavatory Fire Extinguisher are installed)  
(after last flight of the day) ..... CHECK FOR EVIDENCE OF FIRE

(If evidence of fire is found, replace lavatory fire extinguisher prior to next flight. Refer to the *Model 1900D Airliner Maintenance Manual* for replacement procedures.)

26. Tie-Downs and Chocks ..... INSTALL

27. Parking Brake ..... OFF

28. External Covers ..... INSTALL

# Hawker Beechcraft Corporation

Model 1900D Airliner

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**CAUTION**

Some radars produce a hazardous area up to 4 feet (122 centimeters) in front of the radar dish.

**CAUTION**

Backing the airplane using reverse thrust (up to the 10 second limitation) can shorten the service life of the following parts:

1. Cabin windows due to exhaust heating.
2. Engines due to foreign object damage.
3. Propellers due to erosion.

## SHUTDOWN AND SECURING

1. Parking Brake . . . . .SET
2. Power Steering (if installed) . . . . .OFF
3. EFIS Power Switches . . . . .OFF
4. Standby Attitude Indicator . . . . .CAGED, POWER OFF
5. EFIS Aux Power Switch . . . . .OFF
6. Avionics Switch . . . . .OFF
7. Left and Right AC Bus . . . . .OFF
8. Oxygen Control (After last flight of the day) . . . . .PUSH OFF
9. Autofeather Switch . . . . .OFF
10. Lights . . . . .OFF
11. Instrument Emergency Lights (for night shutdown). . . . .ON
12. Blowers . . . . .AUTO
13. Envir Mode Control . . . . .OFF
14. Fuel System Aux Pump Switches . . . . .OFF
15. Battery . . . . .CHARGED (if BATTERY CHARGE annunciator is illuminated, refer to NICKEL-CADMIUM BATTERY CONDITION CHECK procedure in this section.)
16. ITT . . . . .STABILIZED AT MINIMUM OBTAINABLE TEMPERATURE FOR ONE MINUTE
17. Condition Levers . . . . .FUEL CUTOFF
18. Propellers . . . . .FEATHERED

**CAUTION**

Monitor ITT during shutdown. If sustained combustion is observed, proceed immediately to the ENGINE CLEARING OR RESTART procedure. During shutdown, ensure that the compressors decelerate freely. Do not close the firewall fuel valves for normal engine shutdown.

19. Overhead Panel Switches . . . . .OFF
20. Battery and Generator Switches (below 15% N<sub>1</sub>) . . . . .OFF

**NOTE**

N<sub>1</sub> decreasing below 15% indicates the starter relay is not engaged.

- 21. Control Locks .....INSTALL
- 22. Instrument Emergency Lights ..... OFF
- 23. Cabin Door ..... OPEN

**CAUTION**

If the cabin door pressure gage indicates less than 1000 psi, the restraining force required to lower the door will be increased. If pressure is zero, assistance may be required to lower the door normally and prevent it from free-falling.

- 24. Lavatory Trash Container (if optional Lavatory and Lavatory Fire Extinguisher are installed) (after last flight of the day) ..... CHECK FOR EVIDENCE OF FIRE  
(If evidence of fire is found, replace lavatory fire extinguisher prior to next flight. Refer to the *Model 1900D Airliner Maintenance Manual* for replacement procedures.)
- 25. Tie-Downs and Chocks .....INSTALL
- 26. Parking Brake ..... OFF
- 27. External Covers .....INSTALL

**OTHER NORMAL PROCEDURES**

**OXYGEN SYSTEM**

*PREFLIGHT INSPECTION*

- 1. Oxygen Control Knob ..... PULL ON
- 2. Crew ..... DON MASK AND SMOKE GOGGLES (IF INSTALLED), CHECK FIT AND OPERATION, SET SELECTOR AT 100%, STOW.

**WARNING**

Beards and mustaches should be carefully trimmed so that they will not interfere with the proper sealing of an oxygen mask. The fit of the oxygen mask around the beard or mustache should be checked on the ground for proper sealing. Studies conducted by the military and FAA conclude that oxygen masks do not seal over beards and mustaches.

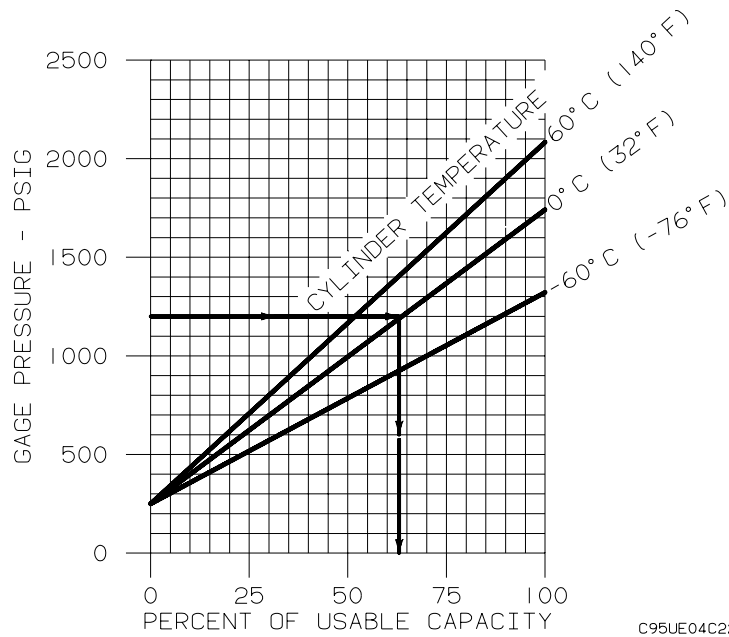
- 3. Amount of Oxygen On Board ..... DETERMINE
  - a. An oxygen cylinder with a pressure of 1850 psig at 15°C is fully charged (100% capacity). If a different pressure/temperature combination exists, determine the percent of usable capacity on board as follows.
  - b. Read the oxygen pressure from each gage and determine the average pressure.

e.g. 
$$\frac{1100 + 1300}{2} = 1200 \text{ psig}$$

- c. Read the OAT (assume OAT to be equal to CYLINDER TEMPERATURE).
- d. Determine the percent of usable capacity from the following graph.

e.g. 1200 psig at 0°C = 63%

OXYGEN AVAILABLE WITH PARTIALLY FULL CYLINDER



C95UE04C2253 C

4. Oxygen Duration ..... DETERMINE

- There are two ways to determine oxygen duration. In the first method, demonstrated in Example 1, the crew masks and the passenger masks are operated for the same period of time. In the second method, demonstrated in Example 2, it is desired to determine the oxygen duration when the crew masks and passenger masks are operated for different amounts of time.

Example 1. (Crew Masks and Passenger Masks Operating for Same Period of Time)

- Assume the pilot and copilot are using mask 128-380067 (Puritan Bennett - Sweep On 2000), a NORMAL mask setting, 10 passenger masks in use, and a cabin altitude of 20,000 feet.
- Using Table 2, read the oxygen duration with full cylinders as 129 minutes (12 masks in use at a cabin altitude of 20,000 feet).
- Compute the oxygen duration with partially full cylinders (63% full based on example in Step 3, above).

$$129 \text{ minutes} \times .63 = 81 \text{ minutes of oxygen duration for the crew and passengers}$$

Example 2. (Crew Masks and Passenger Masks Operating for Different Amounts of Time)

- Assume the pilot and copilot are using mask 129-380020 (Scott-359) a NORMAL mask setting, 19 passenger masks in use, and a cabin altitude of 20,000 feet.
- Assume a crew oxygen requirement of 2 hours.
- Compute total usable liters of oxygen

$$\frac{1372}{2.4 \text{ LPM} \times 19 \text{ passengers}} = 30 \text{ minutes of oxygen duration of the passengers}$$

OXYGEN DURATION WITH FULL CYLINDERS MASK SELECTOR SWITCH - NORMAL									
DILUTER DEMAND CREW MASKS - STRAP-TYPE HARNESS 129-380020 (SCOTT - 359) 129-380093 (SCOTT - 893)									
MASKS IN USE		CABIN PRESSURE ALTITUDE - FEET							
		10,000	12,500	15,000	20,000	25,000	DURATION - MINUTES		
PILOT	1	(7.4)	531	(6.6)	595	(6.0)	655	(4.6)	854
COPILOT	2		266		298		328		427
PASSENGERS	3	(1.4)	243	(1.6)	266	(1.8)	285	(2.4)	339
	4		223		240		252		281
	5		207		218		226		240
	6		193		201		205		209
	7		180		185		187		185
	8		169		172		172		167
	9		160		161		160		151
	10		151		151		149		138
	11		143		142		139		128
	12		136		135		131		118
	13		130		128		124		110
	14		124		121		117		103
	15		119		116		111		97
	16		114		110		106		92
	17		110		106		101		87
	18		106		101		96		83
	19		102		97		92		79
	20		98		94		89		75
	21		95		90		85		72

SET THIS MASK TO 100% ABOVE 20,000 FEET

LPM - LITERS PER MINUTE

NTPD = NORMAL TEMPERATURE, PRESSURE, DRY

(-) = OXYGEN FLOW RATE IN LPM - NTPD FOR EACH INDIVIDUAL CREW OR PASSENGER MASK AT THE NOTED CABIN PRESSURE ALTITUDE.

WHEN USING CREW MASK WITH "EMERGENCY" SELECTED, USE 12 LPM AS AN AVERAGE OXYGEN FLOW RATE. ACTUAL FLOW RATE WILL VARY DEPENDING ON USER DEMAND AND MASK FIT.

<b>OXYGEN DURATION WITH FULL CYLINDERS                      MASK SELECTOR SWITCH - NORMAL</b>											
<b>DILUTER DEMAND CREW MASKS - INFLATABLE HARNESS                      128-380067 (PURITAN BENNETT - SWEEP ON 2000)                      101-384220 (SCOTT-EROS)</b>											
<b>MASKS                      IN                      USE</b>		<b>CABIN PRESSURE ALTITUDE - FEET</b>									
		<b>10,000</b>		<b>12,500</b>		<b>15,000</b>		<b>20,000</b>		<b>25,000</b>	
		<b>DURATION - MINUTES</b>									
PILOT	1	(2.5)	1572	(2.5)	1572	(2.5)	1572	(3.2)	1228	(5.0)	786
COPILOT	2		786		786		786		614		393
PASSENGERS	3	(1.4)	614	(1.6)	595	(1.8)	578	(2.4)	447	(2.9)	305
	4		504		479		457		351		249
	5		427		401		378		289		210
	6		371		345		322		246		182
	7		328		302		281		214		160
	8		293		269		249		189		143
	9		266		243		223		169		130
	10		243		221		203		154		118
	11		223		203		185		140		109
	12		207		187		171		129		101
	13		193		174		158		120		94
	14		180		162		148		112		88
	15		169		152		138		105		82
	16		160		143		130		98		78
	17		151		136		123		93		73
	18		143		128		116		88		70
	19		136		122		110		83		66
	20		130		116		105		79		63
	21		124		111		100		76		60

LPM - LITERS PER MINUTE

NTPD = NORMAL TEMPERATURE, PRESSURE, DRY

(- -) = OXYGEN FLOW RATE IN LPM - NTPD FOR EACH INDIVIDUAL CREW OR PASSENGER MASK AT THE NOTED CABIN PRESSURE ALTITUDE.

WHEN USING CREW MASK WITH "EMERGENCY" SELECTED, USE 12 LPM AS AN AVERAGE OXYGEN FLOW RATE. ACTUAL FLOW RATE WILL VARY DEPENDING ON USER DEMAND AND MASK FIT.

<b>OXYGEN DURATION WITH FULL CYLINDERS MASK SELECTOR SWITCH - 100%</b>											
<b>DILUTER DEMAND CREW MASKS 129-380020 (SCOTT-359) - STRAP-TYPE HARNESS 129-380093 (SCOTT-893) - STRAP-TYPE HARNESS 128-380067 (PURITAN BENNETT-SWEEP ON 2000) - INFLATABLE HARNESS</b>											
<b>MASKS IN USE</b>		<b>CABIN PRESSURE ALTITUDE - FEET</b>									
		<b>10,000</b>		<b>12,500</b>		<b>15,000</b>		<b>20,000</b>		<b>25,000</b>	
		<b>DURATION - MINUTES</b>									
PILOT	1	(12.0)	328	(10.7)	367	(9.6)	409	(7.6)	517	(6.0)	655
COPILOT	2		164		184		205		259		328
PASSENGERS	3	(1.4)	155	(1.6)	171	(1.8)	187	(2.4)	223	(2.9)	264
	4		147		160		172		197		221
	5		139		150		160		175		190
	6		133		141		149		158		167
	7		127		134		139		144		148
	8		121		127		131		133		134
	9		116		121		124		123		122
	10		112		115		117		114		112
	11		107		110		111		107		103
	12		103		105		106		100		96
	13		100		101		101		94		90
	14		96		97		96		89		84
	15		93		93		92		85		79
	16		90		90		89		81		75
	17		87		87		85		77		71
	18		85		84		82		73		67
	19		82		81		79		70		64
	20		80		78		76		67		61
	21		78		76		74		65		59

LPM - LITERS PER MINUTE

NTPD = NORMAL TEMPERATURE, PRESSURE, DRY

(-) = OXYGEN FLOW RATE IN LPM - NTPD FOR EACH INDIVIDUAL CREW OR PASSENGER MASK AT THE NOTED CABIN PRESSURE ALTITUDE.

WHEN USING CREW MASK WITH "EMERGENCY" SELECTED, USE 12 LPM AS AN AVERAGE OXYGEN FLOW RATE. ACTUAL FLOW RATE WILL VARY DEPENDING ON USER DEMAND AND MASK FIT.

OXYGEN DURATION WITH FULL CYLINDERS MASK SELECTOR SWITCH - 100%											
DILUTER DEMAND CREW MASKS 101-384220 (SCOTT-EROS) - INFLATABLE HARNESS											
MASKS IN USE		CABIN PRESSURE ALTITUDE - FEET									
		10,000		12,500		15,000		20,000		25,000	
		DURATION - MINUTES									
PILOT	1	(4.5)	873	(4.5)	873	(4.5)	873	(5.2)	756	(7.0)	561
COPILOT	2		437		437		437		378		281
PASSENGERS	3	(1.4)	378	(1.6)	371	(1.8)	364	(2.4)	307	(2.9)	233
	4		333		322		312		259		198
	5		298		285		273		223		173
	6		269		255		243		197		154
	7		246		231		218		175		138
	8		226		211		198		158		125
	9		209		195		182		144		115
	10		195		180		168		133		106
	11		182		168		156		123		98
	12		171		157		146		114		91
	13		161		148		136		107		86
	14		152		139		128		100		81
	15		144		132		121		94		76
	16		137		125		115		89		72
	17		131		119		109		85		68
	18		125		114		104		81		65
	19		120		109		99		77		62
	20		115		104		95		73		59
	21		110		100		91		70		57

LPM - LITERS PER MINUTE

NTPD = NORMAL TEMPERATURE, PRESSURE, DRY

(- -) = OXYGEN FLOW RATE IN LPM - NTPD FOR EACH INDIVIDUAL CREW OR PASSENGER MASK AT THE NOTED CABIN PRESSURE ALTITUDE.

WHEN USING CREW MASK WITH "EMERGENCY" SELECTED, USE 12 LPM AS AN AVERAGE OXYGEN FLOW RATE. ACTUAL FLOW RATE WILL VARY DEPENDING ON USER DEMAND AND MASK FIT.

**COLLINS FDS-65 SINGLE OR DUAL FLIGHT DIRECTOR SYSTEM (FIRST FLIGHT OF THE DAY)**

*BEFORE TAKEOFF (RUNUP)*

- 1. Flight Director . . . . . CHECK PILOT'S AND COPILOT'S (IF INSTALLED)
  - a. Flight Control Panel (FCP) Test Button . . . . . PRESS and RELEASE
  - b. FCP Mode Annunciators . . . . . ILLUMINATE Briefly,  
Then EXTINGUISH, Except for GA

**NOTE**

The GA annunciator indicates the computer is in the Ground Test mode. If other annunciators are illuminated, a fault is indicated. Report these to maintenance personnel. If additional diagnostic data on a malfunction is required while in the Ground Test mode:

- 1) HDG Button . . . . . PRESS and HOLD  
Record displayed annunciators, then release.
- 2) ALT Button . . . . . PRESS and HOLD  
Record displayed annunciators, then release.

**NOTE**

If the rudder boost switch is on, the ALT ARM annunciators will illuminate while the ALT button is depressed. If the turn knob is out of detent, the TRIM annunciator will illuminate.

- 3) IAS Button . . . . . PRESS and HOLD  
Record displayed annunciators, then release.
- c. EADI . . . . . TEST Annunciator ILLUMINATED
- d. FCP Test Button . . . . . PRESS and HOLD to Enter Airborne Test Mode.  
FCP Mode Annunciators Begin to Blink.

**NOTE**

Any annunciators that remain illuminated indicate a fault. Report these to maintenance personnel. If additional diagnostic data on a malfunction is required, alternately hold the HDG, ALT, and IAS buttons (while still holding the test button) and record any annunciators that illuminate.

- e. FCP Test Button . . . . . RELEASE

*IN FLIGHT*

*The Flight Director may be tested in flight using the following procedure:*

- 1. Test Button on FCP . . . . . PRESS and HOLD
- 2. FCP annunciators will flash, then display mode annunciators indicating a fault, if present. If no fault exists, the flashing sequence will repeat. Record any annunciators of faults.
- 3. Test Button on FCP . . . . . RELEASE

*SYSTEM DESCRIPTION*

This system description applies to airplanes equipped with single or dual Collins FDS-65 Flight Directors and with no autopilot installed. When a single flight director is installed, the copilot will not have a Flight Control Panel (FCP), a go-around switch, a command bar, or a CWS/pitch SYNC button. (For those airplanes not in compliance with Service Bulletin 34-3221, Rev. 2, the copilot's EADI will display a command bar that is repeated from the pilot's flight director computer. This command bar is for reference only and cannot be controlled from the copilot's side. See SINGLE FLIGHT DIRECTOR OPERATIONS in Section 2, LIMITATIONS, for limitations applicable to these airplanes.) For a description of airplanes equipped with dual Collins FCS-65 Flight Control Systems, refer to the appropriate Flight Manual Supplement.



The following Flight Director modes are available. (Airplanes equipped with FCS-65 Flight Control Systems will have the same modes plus an Altitude Select, Climb, and Descent mode.)

1. Heading Mode (HDG)
  - a. Set heading bug to desired heading on HSI.
  - b. Press HDG button. The flight director command bars will command a turn to capture and hold the selected heading. Bank angles are limited to  $\pm 25^\circ$  during HDG mode.
2. Altitude Hold (ALT)
  - a. Maneuver airplane to desired altitude.
  - b. Press ALT button.
  - c. If a new barometric setting is input, the flight director will automatically adjust to the new altitude.

*To Change Altitude Using the Control Wheel Steering (CWS) Button:*

- d. CWS/Pitch SYNC Button . . . . . PRESS and HOLD
  - e. Maneuver to desired altitude.
  - f. CWS/Pitch SYNC Button . . . . . RELEASE
  - g. Flight director command will maintain new altitude.
3. Vertical Speed Hold (VS)
    - a. Maneuver to desired vertical speed.
    - b. VS Button . . . . . PRESS

*To Change Vertical Speed Using the CWS Button:*

- c. CWS/Pitch SYNC Button . . . . . PRESS and HOLD
- d. Maneuver to desired new vertical speed.
- e. CWS/Pitch SYNC Button . . . . . RELEASE
- f. Flight director command bars will synchronize to and maintain the new vertical speed.

4. Airspeed Hold (IAS)
  - a. Maneuver to desired airspeed.
  - b. IAS Button . . . . . PRESS

*To Change Airspeed Using the CWS Button:*

- c. CWS/Pitch SYNC Button . . . . . PRESS and HOLD
- d. Maneuver to desired airspeed.
- e. CWS/Pitch SYNC Button . . . . . RELEASE
- f. Flight director command will maintain new airspeed.

5. Navigation Mode (NAV)
  - a. NAV Receiver . . . . . TUNE TO DESIRED STATION FREQUENCY
  - b. Course Selector . . . . . SET DESIRED COURSE ON EHSI
  - c. Heading Bug . . . . . SET DESIRED INTERCEPT HEADING ON EHSI
  - d. NAV Button . . . . . PRESS  
(FCP annunciates NAV ARM, and HDG is automatically selected if airplane is outside computed capture point.)
  - e. Upon Capture . . . . . HDG Cancels, FCP Annunciates NAV, and Flight Director Commands Turn to Track Selected Course

**NOTE**

Approaching station passage, the flight director will enter Dead-Reckoning (DR) mode. During the DR mode, course changes of less than 30° may be made using the course knob. Course changes of more than 30° must be accomplished using the HDG mode to set up a new NAV capture.

For optimum NAV mode operation, select intercept angle so the system maintains straight and level flight in the NAV ARM mode for a minimum of 30 seconds. Maximum recommended capture angles are 90° or less in NAV mode and 60° or less in APPR mode.

## 6. Approach Mode (APPR)

When making an approach, primary flight instruments must be monitored by the pilot. Presence of a VOR/LOC/GS flag must be considered as a warning of system or signal failure.

## a. VOR Approaches

**NOTE**

Use of the VOR Approach mode is limited to an area within 10 nm of the VOR station.

- 1) Navigation Receiver. . . . . TUNE TO DESIRED STATION FREQUENCY
- 2) Course Selector. . . . . SET DESIRED COURSE ON EHSI
- 3) Heading Cursor . . . . . SET DESIRED INTERCEPT HEADING ON EHSI
- 4) APPR Button . . . . . PRESS  
(Mode selector annunciates APPR ARM. HDG mode is automatically selected if the airplane is outside computed capture point.)
- 5) At Computed Capture Point. . . . . HDG Mode is Cancelled and Flight Control Panel  
Annunciates APPR. Flight Director Commands a  
Turn to Capture and Track Selected Course.

**CAUTION**

When conducting a VOR approach, APPR mode should be selected only within normal approach distances and not until after VOR capture occurs. During a VOR approach, the pilot is cautioned to remember that the flight director system automatically goes to DR (dead reckoning) mode when a VOR station is crossed, and DR is not a recommended approach mode. If the VOR approach being flown is one that crosses the VOR on the way to the airport, then HDG mode should be selected at station passage rather than continuing with APPR mode (ensure that the heading cursor on the EHSI is under the lubber line before selecting HDG mode). The reason for this is, if the distance between the VOR and the airport is short, the system may not have time to come out of DR mode after passing the station.

## b. Localizer Approach (APPR)

- 1) Navigation Receiver. . . . . TUNE TO DESIRED LOCALIZER FREQUENCY
- 2) Course Selector. . . . . SET INBOUND LOCALIZER COURSE ON EHSI
- 3) Heading Bug . . . . . SET DESIRED INTERCEPT HEADING ON EHSI
- 4) Mode Selector APPR Button . . . . . PRESS  
(Mode selector annunciates APPR ARM, and HDG mode is automatically selected if the airplane is outside the computed capture point.)
- 5) At Computed Capture Point. . . . . HDG Mode is Cancelled and Mode Selector Annunciates  
APPR. Flight Director Commands a Turn to  
Capture and Track Localizer Beam.

- 6) Flight Control Panel . . . . . SELECT VERTICAL FLIGHT DIRECTOR MODE, AS REQUIRED
- c. Back Course Approach (BC)
  - 1) Navigation Receiver . . . . . TUNE TO DESIRED LOCALIZER FREQUENCY
  - 2) Course Selector . . . . . SET INBOUND LOCALIZER COURSE ON EHSI
  - 3) Heading Bug . . . . . SET DESIRED INTERCEPT HEADING ON EHSI
  - 4) B/C Button . . . . . PRESS  
(Mode selector annunciates APPR ARM B/C, and HDG mode is automatically selected if the airplane is outside the computed capture point.)
  - 5) At Computed Capture Point . . . . . HDG Mode is Cancelled and Mode Selector Annunciates APPR B/C. Flight Director Commands a Turn to Capture and Track Localizer Back Course.
  - 6) Flight Control Panel . . . . . SELECT VERTICAL FLIGHT DIRECTOR MODE, AS REQUIRED
- d. ILS Approach (APPR)
  - 1) Navigation Receiver . . . . . TUNE TO DESIRED ILS FREQUENCY
  - 2) Course Selector . . . . . SET INBOUND LOCALIZER COURSE ON EHSI
  - 3) Heading Bug . . . . . SET DESIRED INTERCEPT HEADING ON EHSI
  - 4) APPR Button . . . . . PRESS  
(Mode selector annunciates APPR ARM, and HDG mode is automatically selected if the airplane is outside the computed localizer capture point.)
  - 5) Mode Selector . . . . . SELECT VERTICAL FLIGHT DIRECTOR MODE, AS REQUIRED, TO INTERCEPT GLIDESLOPE
  - 6) At Localizer Capture Point . . . . . HDG Mode is Cancelled, and Mode Selector Annunciates APPR and GS ARM. Flight Director Commands a Turn to Capture and Track Localizer Beam.
  - 7) At Glideslope Capture Point . . . . . Flight Director Modes are Cancelled (except ALT SEL ARM). Mode Selector Annunciates GS and APPR. Flight Director Commands a Pitch Change to Capture and Track Glideslope.

### NOTE

Glideslope capture will not occur until localizer has been captured.

### GO-AROUND MODE (GA)

Go-Around mode is activated by pushing the Go-Around switch, located on the left power lever or on the copilot's control wheel when dual Flight Directors are installed. GA mode may be selected whenever a lateral mode is selected on the controlling FCP.

When GA mode is activated by either crew member on dual Flight Director installations, both flight directors command a wings-level, 10° nose-up attitude. GA is cancelled by the CWS/Pitch SYNC button, or other mode selections.

### ALTITUDE ALERTER

### NOTE

The altitude alert system functions only on the pilot's altimeter.

- 1. Pilot's Baro Set Knob . . . . . ADJUST FOR NEAREST 100-FOOT ALTIMETER READING

2. Altitude Alert Panel . . . . . SET TO MATCH ALTIMETER READING
3. Pilot's Baro Set Knob . . . . . ADJUST TO INCREASE AND DECREASE ALTITUDE
  - At 300 feet from initial altitude, ensure that:
    - 1) Warning horn sounds for approximately 2 seconds.
    - 2) The ALT ALERT annunciator on the pilot's and copilot's panels and on the altitude alert panel blinks on and off.
4. Pilot's Baro Set Knob . . . . .Adjust to Field Elevation Setting
5. The ALT ALERT annunciators will extinguish at 300 feet from alert panel setting.

**NOTE**

If an autopilot is installed, the alerter will warn of deviations exceeding 200 feet.

**FUEL SYSTEM**

*FUEL TRANSFER*

1. Standby Pumps . . . . . OFF
2. Transfer Flow Switch . . . . . LEFT or RIGHT (as required);  
Check FUEL TRANSFER Annunciator - ILLUMINATED

**NOTE**

With one standby pump inoperative, transfer of fuel will not be available from the side of the inoperative standby pump.

3. Transfer Flow Switch . . . . . OFF (centered) To Discontinue Fuel Transfer

*EXTENDED FUEL FILTER BYPASS INDICATOR PIN*

If the fuel filter bypass indicator pin is found to be extended during the preflight inspection, the following procedure may be used to permit continued flight in lieu of a maintenance inspection of the filter.

1. Bypass Indicator Pin . . . . . ENSURE THAT IT HAS BEEN RESET
2. Engine On Affected Side . . . . .RUN AT IDLE POWER FOR A MINIMUM OF 5 MINUTES
3. Inspect The Fuel Filter After The Engine Run.
  - a. Bypass Indicator Pin Not Extended . . . . .CONTINUED FLIGHT IS PERMITTED
  - b. Bypass Indicator Pin Extended . . . . .CONTINUED FLIGHT IS NOT PERMITTED UNTIL THE FILTER DISC ELEMENTS HAVE BEEN REMOVED, INSPECTED FOR DEBRIS, CLEANED, REINSTALLED AND STEPS 1 THRU 3a SUCCESSFULLY COMPLETED.

*BLENDING ANTI-ICING ADDITIVE TO FUEL*

■ The following procedures must be observed when blending anti-icing additive with the fuel:

1. The additive must conform to specification MIL-I-27686 or MIL-I-85470.
2. The concentration of the additive must be a minimum of 0.10% and a maximum of 0.15% by volume. Thus, a 20 oz. (591.5 ml) can of additive is sufficient for 105 to 155 gallons (398 to 586 liters) of fuel.
3. When blending the additive as the airplane is being refueled, use the following precautions:
  - a. Refuel at a rate of 30 to 45 gallons (114 to 170 liters) per minute. A rate of less than 30 GPM (114 LPM) may be used when topping off the tanks.
  - b. Start additive flow after fuel flow starts, and stop before fuel flow stops.
  - c. Ensure additive is directed into the flowing stream.
  - d. Do not allow concentrated additive to contact coated interior of fuel cells or airplane surfaces.

## *ADDING BIOCIDES TO FUEL*

Refer to the *Model 1900D Airliner Maintenance Manual*, and to the latest revision of Pratt & Whitney Service Bulletin No. 14004 for concentrations to use, and for procedures, recommendations, and limitations pertaining to the use of Biocidal/fungicidal additives in turbine fuels.

## *USE OF JET B, JP-4, AND AVIATION GASOLINE*

Fuel quantity indicators will not indicate correctly when using Jet B, JP-4, or aviation gasoline due to the differences in their density and dielectric constants. The indicated fuel quantity should be corrected using the factors shown below. These factors have been generalized in some cases for simplicity, thus results should be considered as approximations.

- When using Jet B or JP-4, multiply the indicated fuel quantity by .96 to obtain the corrected fuel quantity.
- When using aviation gasoline, multiply the indicated fuel value by .94 to obtain the corrected fuel quantity.

## **NICKEL-CADMIUM BATTERY CHECK**

Illumination of the BATTERY CHARGE annunciator indicates an above-normal charge current. Following an engine start, the battery recharge current is very high and causes the illumination of the BATTERY CHARGE annunciator. It should normally extinguish within five minutes. If it does not, or if it should reappear, the battery charge current should be monitored until it decreases to a level to extinguish the BATTERY CHARGE annunciator. Use the battery ammeter to determine the battery charge current. The BATTERY CHARGE annunciator illuminates for charge currents greater than 7.5 amps and extinguishes at 6 amps. Failure to obtain a charge value of below 6 amps within 5 minutes after engine start indicates a partially charged battery. Continue to charge the battery, checking the battery charge current every 90 seconds until the charge current decreases below a value of 6 amps. No decrease of charging current between checks indicates an unsatisfactory condition. The battery should be removed and checked by a qualified nickel-cadmium battery shop. Do not take off with the annunciator illuminated unless a decreasing charge current is confirmed.

## **COLD WEATHER PROCEDURES (SNOW, SLUSH AND ICE)**

### *PREFLIGHT INSPECTION*

Verify that the tires are not frozen to the ramp, and that the brakes are free of ice contamination. Deicing or anti-icing solutions may be used on the tires and brakes if they are frozen. Solutions that contain a lubricant such as oil must not be used as they will decrease the effectiveness of the brakes.

In addition to the normal exterior preflight inspection, special attention should be given all vents, openings, control surfaces, hinge points, the stall warning vane, and the wing, tail, and fuselage surfaces for accumulations of ice or snow. Removal of these accumulations is necessary prior to takeoff. Airfoil contours may be altered by the ice and snow to the extent that their lift qualities will be seriously impaired. Ice and snow on the fuselage can increase drag and weight. Frost that may form on the wing fuel tank bottom skins need not be removed prior to flight. Frost that may accumulate on other portions of the wing, the tail surfaces, or on any control surface, must be removed prior to flight.

Inspect the propeller blades and hubs for ice and snow. Unless engine inlet and exhaust covers have been installed during snow or icing conditions, the propellers should be turned by hand in the direction of normal rotation to make sure they are free to rotate prior to starting engines.

The removal of frozen deposits by chipping or scraping is not recommended. A soft brush, squeegee, or mop may be used to clear snow that is not adhering to the surfaces. If use of deicing/anti-icing fluids are required to produce a clean airplane, special attention must be given to ensure that the pitot masts, static ports, fuel vents, stall warning vane, cockpit windows and the area forward of the cockpit windows are free of deicing/anti-icing solution. Both wings and both stabilizers must receive the same complete treatment. The type and concentration of deicing/anti-icing solution being applied and the rate of precipitation will affect the length of time the treatment will be effective. Refer to Chapter 12 of the *Model 1900D Airliner Maintenance Manual* for additional information on deicing and anti-icing of airplanes on the ground. See Section 2, LIMITATIONS, for a list of approved fluids.

Complete the normal preflight procedures, including a check of the flight controls for complete freedom of movement.

After engine start, exercise the propellers through low- and high-pitch and into reverse range to flush any congealed oil through the system.

If the optional brake deicing system is installed, turn it on prior to taxi if brakes require deicing.

### *TAXIING*

Taxiing through deep snow or slush should be avoided when possible. Snow and slush can be forced into the brake assemblies, which may cause the brakes to freeze during a prolonged hold on the ground or during the subsequent flight. Keep flaps retracted during taxiing to avoid throwing snow or slush into flap mechanisms and to minimize damage to flap surfaces.

Glaze ice can be difficult to see. Therefore, taxi slowly and allow more clearance from objects when maneuvering the airplane.

### *BEFORE TAKEOFF*

After completion of the normal Before Takeoff checklist, verify that the airplane is still free of frozen contaminants.

Ensure the runway is free from hazards such as snow drifts, glazed ice, and ruts.

### **WARNING**

Ice, frost, or snow on top of deicing/anti-icing solutions must be considered as adhering to the airplane. Takeoff should not be attempted.

If visible moisture will be encountered during the takeoff, engine anti-ice must be turned on to reduce the possibility of ice being ingested into the engine air inlet.

### *TAKEOFF*

Allow additional take-off distance when snow or slush is on the runway. Extra cycling of the landing gear when above 500 feet AGL may help clear any contamination from the gear system.

When using FAA Approved SAE Type II or Type IV deicing/anti-icing fluids in the concentrated form, the control column force required to rotate for takeoff may temporarily increase by approximately 20 pounds. The cruise, descent, approach and landing phases of flight are not affected by the use of these fluids.

### *LANDING*

If it is possible that the brakes may be restricted by ice accumulations from previous ground or in-flight icing conditions, turn the brake deicing system (if installed) on during the descent.

Braking and steering are less effective on slick runways. Also, hydroplaning may occur under wet runway conditions at higher speeds. Use the rudder to maintain directional control until the tires make solid contact with the runway surface.

Selecting ground fine or reverse thrust can effectively reduce stopping distances on slick runways; however, reverse thrust may cause snow or moisture to be thrown forward, temporarily reducing forward visibility.

### *SHUTDOWN AND SECURING*

Avoid setting the parking brake, if possible. This will help reduce the possibility of freezing the brakes. Proper chocking can be used to prevent the airplane from rolling.

## ICING FLIGHT

This airplane is approved for flight in icing conditions as defined in FAR 25, Appendix C. These conditions do not include, nor were tests conducted in, all icing conditions that may be encountered (e.g., freezing rain, freezing drizzle, mixed conditions, or conditions defined as severe). Some icing conditions not defined in FAR 25 have the potential of producing hazardous ice accumulations, which: 1) exceed the capabilities of the airplane's ice protection equipment; and/or 2) create unacceptable airplane performance. Flight into icing conditions that lie outside the FAR-defined conditions is not prohibited; however, pilots must be prepared to divert the flight promptly if hazardous ice accumulations occur.

Refer to Section 2 for limitations relating to icing flight, Section 3A for abnormal procedures associated with icing equipment malfunctions and procedures required by FAA AD 96-09-13, and Section 5 for performance degradations associated with icing flight.

### BEFORE TAKEOFF (RUNUP)

1. Engine Auto-Ignition . . . . . CHECK
  - a. Power Levers . . . . . IDLE
  - b. Eng Auto Ignition Switches . . . . . ARM  
(L and R IGNITION ON Annunciators - ILLUMINATED)
  - c. Power Levers . . . . . ADVANCE ABOVE 1000 FT-LB  
(L and R IGNITION ON Annunciators - EXTINGUISHED)
  - d. Power Levers . . . . . IDLE  
(L and R IGNITION ON Annunciators - ILLUMINATED)
  - e. Eng Auto Ignition Switches . . . . . OFF  
(L and R IGNITION ON Annunciators - EXTINGUISHED)
2. Engine Anti-Ice . . . . . CHECK (system initially ON)
  - a. Eng Anti-Ice Actuator Switches . . . . . STANDBY
  - b. Eng Anti-Ice Switches . . . . . OFF  
(L and R ENG ANTI-ICE Annunciators - EXTINGUISHED)
  - c. Eng Anti-Ice Actuator Switches . . . . . MAIN
  - d. Eng Anti-Ice Switches . . . . . ON  
(L and R ENG ANTI-ICE Annunciators - ILLUMINATED)
3. Electrothermal Propeller Deice . . . . . CHECK

**CAUTION**

Do not operate propeller deice when the propellers are static.

*For Airplanes Prior to UE-327 Without Kit 129-9024-1 or -3 Installed:*

- a. Deice Ammeter . . . . . MONITOR to ensure automatic timer operation  
(Automatic Prop Deice Switch - momentarily AUTO - left or right scale 32 to 38 amperes, then OFF, and within 5 seconds, momentarily AUTO - opposite scale 32 to 38 amperes)
- b. Automatic Prop Deice Switch . . . . . OFF
- c. Manual Prop Deice Switch . . . . . HOLD in MANUAL position  
(Monitor deice ammeter for 32 to 38 amperes indication on both scales)
- d. Manual Prop Deice Switch . . . . . OFF

For Airplanes UE-327 and After and Airplanes Prior to UE-327 With Kit 129-9024-1 or -3 Installed:

- e. Deice Ammeter . . . . . MONITOR to ensure automatic timer operation  
(Automatic Prop Deice Switch - momentarily AUTO - left or right  
scale 26 to 32 amperes, then OFF, and within 5 seconds,  
momentarily AUTO - opposite scale 26 to 32 amperes)
- f. Automatic Prop Deice Switch . . . . . OFF
- g. Manual Prop Deice Switch . . . . . HOLD in MANUAL position  
(monitor deice ammeter for 26 to 32  
amperes indication on both scales)
- h. Manual Prop Deice Switch . . . . . OFF
- 4. Surface Deice System . . . . . CHECK
  - a. Surface Deice Switch . . . . . SINGLE and RELEASE
    - 1) Pneumatic pressure gage decreases momentarily.
    - 2) OUTBD WING DEICE annunciator illuminates within 6 seconds, then extinguishes.
    - 3) INBD WING DEICE and TAIL DEICE annunciators illuminate within an additional 6 seconds, then extinguish.
    - 4) Check boots visually, where possible, for inflation and hold down.
  - b. Surface Deice Switch . . . . . MANUAL and HOLD
    - 1) Pneumatic pressure gage decreases momentarily.
    - 2) OUTBD WING DEICE, INBD WING DEICE, and TAIL DEICE annunciators illuminate.
    - 3) Check boots visually, where possible, for inflation.
  - c. Surface Deice Switch . . . . . RELEASE
    - 1) OUTBD WING DEICE, INBD WING DEICE, and TAIL DEICE annunciators extinguish.
    - 2) Check boots visually, where possible, for hold down.
- 5. Windshield Anti-Ice . . . . . CHECK
  - a. WSHLD ANTI-ICE Switches . . . . . HI  
(observe increase on Left and Right Loadmeters)
  - b. WSHLD ANTI-ICE Switches . . . . . OFF, then NORMAL  
(observe increase on Left and Right Loadmeters)
  - c. WSHLD ANTI-ICE Switches . . . . . OFF



## IN FLIGHT

### PERFORMANCE DEGRADATIONS

#### CAUTION

The following degradations in performance were determined with simulated ice shapes installed on the airplane to represent the ice that could accumulate on the protected surfaces just prior to a boot activation (1 - 1.5 inches or 2.5 - 3.8 centimeters) and on unprotected surfaces during 45 minutes of icing flight. Speed reductions include the effects of engine anti-ice. Climb performance, maximum landing weight, and landing distances include the effect of increasing the normal approach by 15 KIAS.

Flaps-Up Stall Speed . . . . .	Increase by 10 KIAS
Flaps-Down Stall Speed . . . . .	Increase by 10 KIAS
Two-Engine Cruise Speed . . . . .	See POM Section 4
One-Engine-Inoperative Cruise . . . . .	See POM Section 4
Maximum Landing Weight . . . . .	See Section 5
Approach Climb Gradient . . . . .	Decrease by 6%
Climb - Balked Landing . . . . .	Decrease of 750 FPM
Normal Landing Distance - Flaps 35° . . . . .	Increase by 24%
Landing Distance - Flaps Up (0°) . . . . .	Increase by 22%
Landing Distance - One-Engine-Inoperative. . . . .	Increase by 23%

### NORMAL ICING OPERATIONS

#### WARNING

Due to distortion of the wing airfoil, stall warning devices are not accurate and should not be relied upon. With ice accumulations on the airplane, a significant aerodynamic buffet will occur in advance of the stall with flaps up. With flaps down, buffet may not occur until very close to the stall. In order to minimize ice accumulation on unprotected surfaces of the wing, maintain a minimum of 160 knots during operations in sustained icing conditions. In the event of windshield icing, reduce airspeed to 223 knots or below. Prior to landing approach, cycle the deicing boots to shed any accumulated ice.

#### 1. Engine Ice Protection

Before visible moisture is encountered at +5°C and below, or:

At night when freedom from visible moisture is not ensured at +5°C and below (Operation of strobe lights will sometimes show ice crystals not normally visible).

- a. ENG ANTI-ICE Switches . . . . . ON  
(L and R ENG ANTI-ICE Annunciators - ILLUMINATED)
- b. Power . . . . . See POM Section 4, FLIGHT PLANNING DATA, For Cruise Performance With Ice Vanes Down

**WARNING**

If in doubt, actuate the Engine Anti-Ice System. Engine icing can occur though no surface icing is present. If freedom from visible moisture cannot be assured, engine ice protection should be activated. Visible moisture is moisture in any form; clouds, ice crystals, snow, rain, sleet, hail, or any combination of these.

**NOTE**

Illumination of either the L or R ENG ICE FAIL caution annunciator immediately upon turning the respective ENGINE ANTI-ICE switch ON indicates loss of electrical power to the actuator motor. Illumination of either annunciator at any other time indicates failure of the actuator motor.

2. Engine Auto Ignition

- ENG AUTO IGNITION Switches . . . . . ARM

**NOTE**

Engine Auto Ignition must be ARMED for icing encounters and operation during turbulence. To prevent prolonged operation of the igniters during a descent when the Auto Ignition is ARMED, do not reduce power below 750 ft-lbs torque.

3. Electrothermal Propeller Deice

**CAUTION**

Use of propeller deice boots at ambient temperatures above 10°C may damage the propeller.

- a. Automatic Prop Deice Switch . . . . . AUTO  
(The system may be operated continuously in flight, and will function automatically until the switch is turned off.)
- b. Relieve propeller imbalance due to ice by increasing rpm briefly and returning to the desired setting. Repeat as necessary.

**CAUTION**

*For Airplanes Prior to UE-327 Without Kit 129-9024-1 or -3 Installed:*

If the deice ammeter does not indicate 32 to 38 amperes or the automatic timer fails to switch, refer to Section 3A, ABNORMAL PROCEDURES.

**CAUTION**

*For Airplanes UE-327 and After and Airplanes Prior to UE-327 With Kit 129-9024-1 or -3 Installed:*

If the deice ammeter does not indicate 26 to 32 amperes or the automatic timer fails to switch, refer to Section 3A, ABNORMAL PROCEDURES.

4. Surface Deice

### WARNING

All components of the surface deice system must be monitored during icing flight to ensure the system is functioning normally. These components include:

Pneumatic Pressure Gage - The gage should indicate 17.5 - 20.0 psi before boots are activated. The pressure will momentarily decrease when the boots are activated.

Vacuum Gyro Gage - The gage should indicate in the area of the green arc corresponding to the airplane altitude. The vacuum will momentarily decrease when the boots are activated.

OUTBD WING, INBD WING, and TAIL DEICE Annunciators - The OUTBD WING annunciator will illuminate within 6 seconds and the INBD WING and TAIL DEICE annunciators will illuminate within 12 seconds of switch activation when using the SINGLE mode. All annunciators will illuminate within 6 seconds of switch activation when using the MANUAL mode.

Pneumatic Boots - Visually monitor the boots, where possible, to ensure ice is being removed.

If one or more surface deice annunciators fail to illuminate or extinguish during a boot cycle, or if an abnormal pneumatic pressure or vacuum source is detected, see SURFACE DEICE FAILURE in Section 3A, ABNORMAL PROCEDURES.

### CAUTION

Operation of the surface deice system in ambient temperatures below -40°C can cause permanent damage to the deice boots.

*When Ice Accumulation is 1 to 1.5 inches (2.5 to 3.8 centimeters):*

- a. Surface Deice Switch ..... SINGLE and RELEASE  
(OUTBD WING, INBD WING and TAIL DEICE  
annunciators illuminated, then extinguished)
- b. Repeat as required.

*If SINGLE Position of the Surface Deice Switch Fails:*

- c. 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.

- d. Repeat as required.
- 5. WSHLD Anti-Ice ..... NORMAL/HIGH
- 6. L and R Fuel Vent Heat ..... ON
- 7. Alt Static Heat ..... ON
- 8. Wing Ice Lights ..... AS REQUIRED

**BEFORE LANDING**

- 1. Surface Deice Switch ..... SINGLE
- 2. Approach Speeds (Flaps Up or Flaps Down) ..... INCREASE 15 KIAS
- 3. Landing Distances ..... See SECTION 5

**NOTE**

Prior to the landing approach, cycle the wing deice boots to shed as much residual ice as possible, regardless of the amount of ice remaining on the boots. Stall speeds can be expected to increase by 10 knots or more if ice is not shed from the deice boots.

**PRACTICE LANDING GEAR MANUAL EXTENSION**

- 1. Airspeed ..... ESTABLISH BETWEEN 130 AND 180 KNOTS
- 2. Landing Gear Relay Circuit Breaker (pilot's subpanel) ..... PULL
- 3. Landing Gear Control Handle ..... DN
- 4. Alternate Extension Handle ..... PUMP UP AND DOWN UNTIL THE THREE GREEN GEAR-DOWN ANNUNCIATORS ILLUMINATE AND FURTHER RESISTANCE IS FELT.
- 5. Alternate Extension Handle ..... STOW

**NOTE**

Ensure the pump handle is in the full down position prior to placing the pump handle in the securing clip.

**LANDING GEAR RETRACTION AFTER PRACTICE MANUAL EXTENSION**

*After a Practice Manual Extension of the Landing Gear, the Gear may be Retracted Electrically as Follows:*

- 1. Alternate Extension Handle ..... STOW
- 2. Landing Gear Relay Circuit Breaker (pilot's subpanel) ..... PUSH IN
- 3. Landing Gear Control ..... UP

**SIMULATING ONE-ENGINE-INOPERATIVE (ZERO THRUST)**

When establishing zero thrust operation, use the power setting listed below. By using this power setting to establish zero thrust, one avoids the inherent delays of restarting a shut-down engine and preserves almost instant power to counter any attendant hazard.

- 1. Propeller ..... 1700 OR 1550 RPM
- 2. Power Lever ..... SET 200 ft-lbs torque

**WARNING**

INTENTIONAL IN-FLIGHT ENGINE CUTS SHOULD BE CONDUCTED BY RETARDING THE POWER LEVER TO ZERO THRUST AT OR ABOVE THE VSSE SPEED OF 105 KNOTS. For training, this setting will approximate Zero Thrust at low altitudes using recommended One-Engine-Inoperative Climb speeds. The propeller autofeather system is disabled with a power lever retarded.

## PRACTICE DEMONSTRATION OF $V_{MCA}$

$V_{MCA}$  demonstration may be required for multi-engine pilot certification. The following procedure shall be used at a safe altitude of at least 5000 feet above the ground in clear air only.

### WARNING

INTENTIONAL IN-FLIGHT ENGINE CUTS SHOULD BE CONDUCTED BY RETARDING THE POWER LEVER TO ZERO THRUST AT OR ABOVE THE  $V_{SSE}$  SPEED OF 105 KNOTS. For training, this setting will approximate Zero Thrust at low altitudes using recommended One-Engine-Inoperative Climb speeds. The propeller autofeather system is disabled with a power lever retarded.

1. Landing Gear Control .....UP
2. Flaps .....UP
3. Airspeed ..... ABOVE 105 KNOTS ( $V_{SSE}$ )
4. Propeller Levers ..... HIGH RPM
5. Power Lever (simulated inoperative engine)..... SET TO ZERO THRUST (200 ft/lbs)
6. Power Lever (other engine) ..... MAXIMUM ALLOWABLE
7. Airspeed ..... REDUCE APPROXIMATELY 1 KNOT PER SECOND UNTIL  
EITHER  $V_{MCA}$  OR STALL WARNING IS OBTAINED

### CAUTION

Use rudder to maintain directional control (heading) and ailerons to maintain 5° bank towards the operative engine (lateral attitude). At the first sign of either  $V_{MCA}$  or stall warning (which may be evidenced by: inability to maintain heading or lateral attitude, aerodynamic stall buffet, or stall warning horn sound), immediately initiate recovery; reduce power to idle on the operative engine and immediately lower the nose to regain  $V_{SSE}$ .

## NOISE CHARACTERISTICS

Approach to and departure from an airport should be made so as to avoid prolonged flight at low altitude near noise-sensitive areas. Avoidance of noise-sensitive areas, if practical, is preferable to overflight at relatively low altitudes.

For VFR operations over outdoor assemblies of persons, recreational and park areas, and other noise-sensitive areas, pilots should make every effort to fly not less than 2000 feet above the surface, weather permitting, even though flight at lower level may be consistent with the provisions of government regulations.

### NOTE

The preceding recommended procedures do not apply where they would conflict with Air Traffic Control clearances or instructions, or where, in the pilot's judgement, an altitude less than 2000 feet is necessary to adequately exercise his duty to see and avoid other airplanes.

The take-off noise level established in compliance with 14 CFR Part 36 is: 81.97dB(A)

No determination has been made by the Federal Aviation Administration that the noise level of this airplane is or should be acceptable or unacceptable for operation at, into, or out of any airport.

**CABIN/CARGO DOOR ANNUNCIATOR CIRCUITRY CHECK**

The following test shall be performed prior to the first flight of the day:

1. Perform annunciator circuitry check:
  - a. Battery - ON
  - b. With cabin and cargo door open and mechanisms in locked position, ensure CABIN DOOR and CARGO DOOR annunciators are illuminated.
  - c. Check that, with doors closed but not locked, the CABIN DOOR and CARGO DOOR annunciators remain illuminated.
  - d. Close and lock both doors. Check that the CABIN DOOR and CARGO DOOR annunciators extinguish.
  - e. Battery - OFF
2. Ensure that the cabin door is closed and locked using the following procedure:
  - a. Check the position of the safety arm and diaphragm plunger.
  - b. Check that the orange index marks on each of the eight rotary cam locks align within the indicator windows.
3. Ensure that the cargo door is closed and locked as follows:
  - a. Check that the orange colored indicator aligns with orange stripe through the window located in the forward lower corner.
  - b. Check release button out (orange ring visible).

**STANDBY COMPASS CHARACTERISTICS**

The deviation error of the standby compass will exceed 10° when any one of the following conditions exist:

1. Windshield Anti-Ice . . . . . NORMAL or HI
2. Landing Lights and Taxi Light . . . . . ON
3. Tail Flood and Recognition Lights . . . . . ON