Citation V/SII

Cockpit Reference Handbook

CAE SimuFlite

DECEMBER 2003

CAE *SimuFlite*

Welcome to CAE SimuFlite!

Our goal is a basic one: to enhance your safety, proficiency and professionalism within the aviation community. All of us at CAE SimuFlite know that the success of our company depends upon our commitment to *your* needs. We strive for excellence by focusing on our service to you.

We urge you to participate actively in all training activities. Through your involvement, interaction, and practice, the full value of your training will be transferred to the operational environment. As you apply the techniques presented through CAE SimuFlite training, they will become "second nature" to you.

Thank you for choosing CAE SimuFlite. We recognize that you have a choice of training sources. We trust you will find us committed to providing responsive, service-oriented training of the highest quality.

Our best wishes are with you for a most successful and rewarding training experience.

The Staff of CAE SimuFlite

Introduction

CAE SimuFlite created this reference handbook for cockpit use. It is an abbreviated version of the CAE SimuFlite Technical Manual and includes international flight planning information. Please refer to the front of each chapter for a table of contents.

The **Procedures** chapter contains four elements: Preflight Inspection, Expanded Normal Procedures, a sample Standard Operating Procedure (SOP), and Maneuvers.

The **Limitations** chapter contains general, operational, and aircraft systems limitations.

The alphabetically arranged **Systems** chapter includes text for particular systems and relevant color schematics.

The **Flight Planning** chapter includes maximum allowable takeoff and landing weight flow charts and a sample weight and balance form. International flight planning information includes a checklist, a glossary of frequently used international flight operation terms, and sample flight plan forms (ICAO and FAA) with completion instructions.

The **Servicing** chapter contains servicing specifications and checklists for fueling, defueling, and other servicing procedures.

The **Emergency Information** chapter provides basic first aid instructions.

Information in the **Conversion Tables** chapter may facilitate your flight planning and servicing computations.

Operating Procedures

This chapter contains four sections: Preflight Inspection, Expanded Normal Procedures, a sample Standard Operating Procedure (SOP), and Maneuvers. Although these procedures are addressed individually, their smooth integration is critical to ensuring safe, efficient operations.

Preflight Inspection contains an abbreviated checklist for the exterior inspection as well as preflight cockpit and cabin checks.

Expanded Normal Procedures presents checklists for normal phases of flight. Each item, when appropriate, is expanded to include cautions, warnings, and light indications.

Standard Operating Procedures details Pilot Flying/Pilot Not Flying callouts and verbal or physical responses.

Maneuvers contains pictorial representations of specific maneuvers.

Preflight Inspection

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Checklist Usage

Tasks are executed in one of two ways:

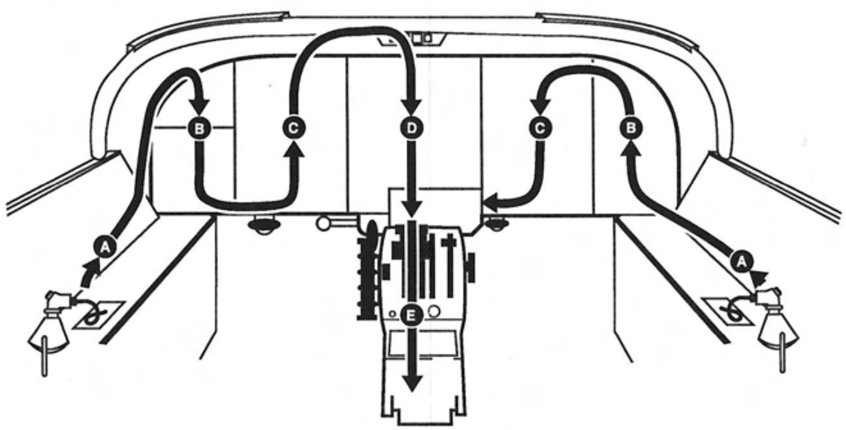
- as a sequence that uses the layout of the cockpit controls and indicators as cues (i.e., "flow pattern")
- as a sequence of tasks organized by event rather than panel location (e.g., After Takeoff; Gear— RETRACT, Flaps — UP).

Placing items in a flow pattern or series provides organization and serves as a memory aid.

A challenge-response review of the checklist follows execution of the tasks; the pilot not flying (PNF) calls the item, and the appropriate pilot responds by verifying its condition (e.g., "Cowl Anti-Ice" [challenge] — "ON" [response]).

Two elements are inherent in the execution of normal procedures:

- use of either the cockpit layout or event cues to prompt the correct switch and/or control positions
- use of normal checklists as "done" lists.



Cockpit Flow Pattern (Power Off)

Left Seat Cockpit Setup

A

Oxygen Mask/Switches and Pressure . . . . CHECKED

Oxygen Line . . . . GREEN BAND

Regulator 100%

Mask . . . . DON

Breathe several times to ensure free flow.

Check mask microphone is operative.

Emergency Pressure Position . . . . CHECKED

Passenger Oxygen Valve . . . . NORM

Microphone Switch . . . . MIC HEADSET

Circuit Breakers . . . . CHECKED

B

Digital Clock . . . . SET

Audio Control Panel . . . . SET

Rotary Test Switch . . . . OFF

BATT Switch . . . . OFF

Generator Switches . . . . GEN

For GPU start . . . . OFF

AC Inverter and Master Avionics . . . . OFF

Boost Pumps . . . . NORM

Ignition Switches . . . . NORM

Anti-Ice/Deice Switches . . . . OFF

Crossfeed . . . . OFF

Vertical Gyro . . . . NORM

LH Gyro Slave . . . . AUTO

Exterior Light Switches . . . . OFF

C

Panel Light Control . . . . AS REQUIRED

Control Lock . . . . OFF

Standby Gyro . . . . TEST/CAGED/OFF

Passenger Advisory Lights . . . . PASS SAFETY/OFF

Beacon and Landing Lights . . . . OFF

Flight Instruments . . . . CHECKED/BUGS SET

D

Thrust Reverser Emergency Stow . . . . NORMAL

Engine Instruments . . . . OFF FLAGS IN VIEW

Avionics . . . . ON/FREQUENCIES SET

Landing Gear Handle . . . . DOWN

Pressurization/Environmental . . . . SET

Ground Idle Switch . . . . NORM

Flood Cooling (**if installed**) . . . . OFF

E

Throttles . . . . OFF

Flaps . . . . SELECTED

Selector matches indicator.

Engine Sync . . . . OFF

Trim . . . . 3 SET

Right Seat Cockpit Setup

A

Oxygen Mask/Switches and Pressure . . . . CHECKED

Oxygen Line . . . . GREEN BAND

Regulator 100%

Mask . . . . DON

Breathe several times to ensure free flow.

Check mask microphone is operative.

Emergency Pressure Position . . . . CHECK

Microphone Switch . . . . MIC HEADSET

Circuit Breakers . . . . CHECKED

B

TAS Computer Switches . . . . OFF

Audio Panel . . . . SET

Digital Clock . . . . SET

C

Flight Instruments . . . . CHECKED/BUGS SET

RH Gyro Slave Switch . . . . AUTO

Overhead and Defog Fan . . . . OFF

Windshield Heat Manual Control Knobs . . . . OFF

Freon Air Conditioner (**if installed**) . . . . OFF

Cockpit Power On Inspection

Battery Switch . . . . BATT(24V DC MI

Rotating Beacon . . . . O

Pitot Heat (30 seconds) . . . . O

Engine Instruments . . . . CHECKE

Check that no off flags are visible at the top of each engi instrument.

Fuel Quantity . . . . CHECKED/BALANCE

Annunciator Panel . . . . PROPER INDICATION

Gear Indicator Lights . . . . 3 GREE

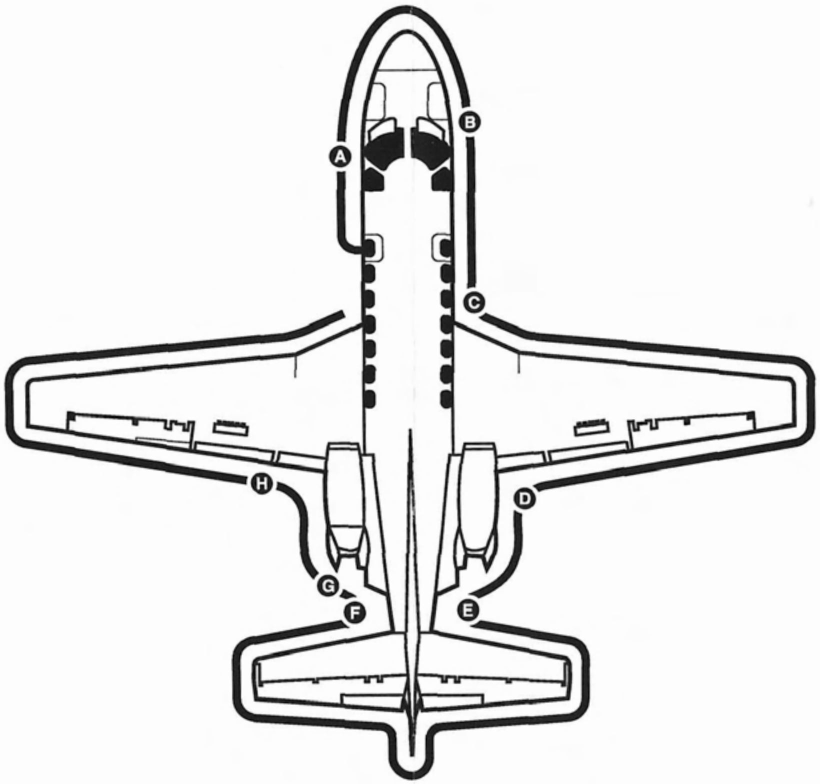
Parking Brake . . . . SE

Pitot Heat . . . . OF

Battery Switch . . . . OF

All Other Switches . . . . OFF (OR NOR

Exterior Inspection Walkaround Path



Exterior Inspection

A Left Nose

Refreshment Center Drain Heater . . . . CLEAR AND WARM

Static Ports . . . . CLEAR/WARM

Baggage Compartment . . . . 350 LBS MAXIMUM

Nose Gear and Wheel . . . . CHECKED

Nose Gear Tire . . . . CONDITION

Inflation . . . . 120 ±5 PSI

Nose Gear Strut and Doors . . . . CHECKED

Strut Extension . . . 3 INCHES (APPROX., FULLY FUELED)

Pitot Tubes (both) . . . . CLEAR AND WARM

CAUTION: Touch pitot tubes lightly; to grasp firmly can cause severe burns.

B Right Nose

Nose Baggage Compartment Door . . . . OPENED

W/S Alcohol Sight Gage . . . . BALL AT TOP

Ensure fluid is visible. See Servicing chapter.

Emergency Gear/Brake Pressure Gage . . . DK GREEN ARC 1,800 TO 2,050 PSI

Power Brake Accumulator . . . . LT GREEN MARK 675 ±25 PSI

Brake Fluid Reservoir Sight Gages:

Accumulator Pressure/Precharge . . . . . . PURPLE TINT/ BALL AT TOP OF UPPER SIGHT GLASS

Accumulator Pressure Normal Pressure . . PURPLE TINT/ BALL AT TOP OF LOWER SIGHT GLASS

Refill before operation if fluid level is not visible in the upper gage (accumulator discharged) or if fluid is at or below the top of the bottom gage (accumulator charged).

Baggage Door . . . . CLOSED/KEY-LOCKED

Overboard Vent Lines . . . . CLEAR

TAS Probe . . . . SECURE

Static Ports . . . . CLEAR/WARM

Angle of Attack Sensor . . . . CLEAR/WARM/ROTATES

C Right Wing

Emergency Exit Door/Handle . . . FLUSH WITH FUSELAGE
Dorsal Fin Air Inlet . . . . CLEAR
Pylon Tailcone Air Inlet . . . . CLEAR
Engine Fan Duct . . . . CLEAR
  Fan/Forward T_1 Sensor . . . . CONDITION
Generator Cooling Air Inlet . . . . CLEAR
Wing Inspection Light (**if installed**) . . . . CHECKED
Anti-Ice Bleed Air Cooling Air Inlet . . . . CLEAR
Heated Leading Edge/Vents . . . . CHECKED/CLEAR
  Scupper Drains . . . . NO FUEL VENTING
Fuel Quick Drains (6) . . . . DRAINED/SAMPLE CHECKED
Fuel Filter Drain . . . . DRAINED/SAMPLE CHECKED

> **CAUTION:** Push straight up on fuel drains; the drain locks open if the sampler is turned.

Main Gear Visual Downlock Indicator . . . . GREEN
Main Gear Door . . . . SECURE
Main Gear Strut . . . . SECURE/NO LEAKS
  Strut Extension (fully fueled) . . . . 2.5 INCHES
Main Gear Tire . . . . CONDITION
  Inflation . . . . 130 ±5 PSI
  Hubcap . . . . SECURE
Brake Wear Indicator . . . . CHECKED
Landing Light . . . . CONDITION

Gear Uplock Release Cable . . . . CHECK TENSION

Deice Boot . . . . CONDITION

Stall Strip (2) . . . . SECURE

Fuel Filler Cap . . . . LATCH CLOSED/DIRECTED AFT

Fuel Tank Vent . . . . CLEAR

Nav/Strobe/Recognition Lights . . . . CONDITION

Static Wicks (5) . . . . SECURE

If an aileron wick is missing, replace before flight.

Aileron/Flap/Speedbrake . . . . SECURE

Ensure flaps match cockpit indicator.

D Right Nacelle

Oil Level . . . . CHECKED WITH ENGINE HOT

> **NOTE:** Oil should be checked within 10 minutes after shutdown for an accurate reading. If in doubt, run engine for a minimum of two minutes and recheck.

Oil Filler Cap . . . . SECURE

Oil Filler Access Door . . . . FASTENED

Generator Cooling Air Exhaust . . . . CLEAR

Engine Fluid Drain Mast . . . . CLEAR

Engine Exhaust/Bypass Ducts . . . . CLEAR

Turbine Blades . . . . CONDITION

Aft T_1 Sensor . . . . CONDITION

Thrust Reversers . . . . CONDITION

E Empennage

Deice Boot Overboard Vent . . . . CLEAR

ACM Overboard Exhaust . . . . CHECKED/CLEAR

Hydraulic Fluid Drain Mast . . . . CLEAR/NO FLUID

Hydraulic Panel Access Door . . . . SECURE

Anti-Ice Bleed Air Exhaust Port . . . . CLEAR

Freon Air Conditioner Overboard Vent . . . . CLEAR

Right Horizontal Stabilizer Deice Boots . . . . . . CONDITION

Right Elevator/Trim Tab . . . . MOVEMENT/CONDITION

Ensure trim tab matches cockpit indicator.

Rotating Beacon . . . . CONDITION

Tailskid . . . . CONDITION

Nav/Strobe Lights . . . . CONDITION

Rudder/Servo Tab . . . . MOVEMENT/CONDITION

Ensure trim tab matches cockpit indicator.

Static Wicks (9) . . . . CONDITION

Replace missing wick(s) before flight.

Left Elevator/Trim Tab . . . . MOVEMENT/CONDITION

Ensure trim tab matches cockpit indicator.

Left Horizontal Stabilizer Deice Boot . . . . CHECKED

Oxygen Blowout Disc . . . . IN PLACE

F Tailcone

Hydraulic Fluid Quantity . . . . ABOVE REFILL

Fire Bottle Pressure Gages . . . . CHECKED

Air Cycle Machine Oil Level . . . . LEVEL ABOVE FILL

Aft Compartment Access . . . . SECURED

Aft Baggage Compartment Light . . . . OFF

Tailcone Access Door . . . . CLOSED/KEY-LOCKED

External Power Service Door . . . . SECURED

Disconnect GPU when aircraft is not attended.

Battery Cooling Intake and Vent Lines . . . . CLEAR

Windshield Heat Exchanger Overboard Exhaust . . . CLEAR

Anti-Ice Bleed Air Exhaust Port . . . . CLEAR

G Left Nacelle

Thrust Reversers . . . . CONDITION

Aft T_1 Sensor . . . . CONDITION

Engine Exhaust/Bypass Ducts . . . . CLEAR

Turbine Blades . . . . CONDITION

Engine Fluid Drain Mast . . . . CLEAR

Generator Cooling Air Exhaust . . . . CLEAR

Oil Level . . . . CHECKED WITH ENGINE HOT

NOTE: Oil should be checked within 10 minutes after shutdown for an accurate reading. If in doubt, run engine for a minimum of two minutes and recheck.

Oil Filler Cap . . . . SECURED

Oil Filler Access Door . . . . FASTENED

H Left Wing

Aileron/Flap/Speedbrake . . . . SECURE

Ensure flaps match cockpit indicator.

Trim Tab . . . . SECURE/PROPER SETTING

Ensure trim tab matches cockpit indicator.

Static Wicks (5) . . . . SECURE

If an aileron wick is missing, replace before flight.

Nav/Strobe/Recognition Lights . . . . CONDITION

Fuel Tank Vent . . . . CLEAR

Fuel Filler Cap . . . . LATCH CLOSED/DIRECTED AFT

Deice Boot . . . . CONDITION

Stall Strip (2) . . . . SECURE

Main Gear Visual Downlock Indicator . . . . GREEN

Main Gear Door . . . . SECURE

Main Gear Strut . . . . SECURE/NO LEAKS

Strut Extension (fully fueled) . . . . 2.5 INCHES

Main Gear Tire . . . . CONDITION

Inflation . . . . 130 ±5 PSI

Hubcap . . . . SECURE

Brake Wear Indicator . . . . CHECKED

Landing Light . . . . CONDITION

Gear Uplock Release Cable . . . . CHECK TENSION

Fuel Quick Drains (6) . . . . DRAINED/SAMPLE CHECKED

H Left Wing (continued)

Fuel Filter Drain . . . . DRAINED/SAMPLE CHECKED

> **CAUTION:** Push straight up on fuel drains; the drain locks open if the sampler is turned.

Engine Fan Duct . . . . CLEAR

Fan/Forward T_1 Sensor . . . . CONDITION

Generator Cooling Air Inlet . . . . CLEAR

Wing Inspection Light . . . . CHECKED

Heated Leading Edge/Vents . . . . CHECKED/CLEAR

Scupper Drains . . . . NO FUEL VENTING

Anti-Ice Bleed Air Cooling Air Inlet . . . . CLEAR

Dorsal Fin Air Inlet . . . . CLEAR

Cabin Door Seals . . . . CONDITION

Cabin Inspection

Emergency Exit Handle . . . . STOWED

Guard . . . . IN PLACE

Locking Pin . . . . REMOVED

Passenger Seats . . . . UPRIGHT/OUTBOARD

Position the seats aft or forward to prevent blocking exits.

Door Entry Lights . . . . OFF

Luminescent Exit Placards . . . . SECURE

Portable Fire Extinguisher . . . . SERVICED/SECURE

Documents . . . . DISPLAYED

- Airworthiness certificate
- Registration Certificate
- Radio Station License

Cockpit Inspection

FAA-Approved AFM/MEL . . . . . . ON BOARD/AVAILABLE

Pilot's Checklist . . . . ON BOARD/AVAILABLE

Avionics/EFIS/FMS Pilot's Guides . . . . ON BOARD/ AVAILABLE

Microphone/Headsets . . . . PLUGGED IN

Oxygen Quantity . . . . CHECKED

Oxygen Masks . . . . PLUGGED IN/SET 100%

Oxygen Control Valve . . . . NORMAL

Flashlight . . . . OPERATIONAL

Portable Fire Extinguisher . . . . . . SERVICED/SECURE

First Aid Kit . . . . ON BOARD/EQUIPPED

Passenger Briefing . . . . COMPLETED

According to Part 91.519 requirements, the pilot-in-command or a crewmember briefs the passengers on smoking, use of safety belts, location and operation of the passenger entry door and emergency exits, location and use of survival equipment, and normal and emergency use of oxygen equipment. For flights over water, the briefing should include ditching procedures and use of flotation equipment.

An exception to the oral briefing rule is if the pilot-in-command determines the passengers are familiar with the briefing content. A printed card with the above information should be available to each passenger to supplement the oral briefing.

Expanded Normal Procedures

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Normal Procedures

Before Starting Engines

Power Off

Cabin Door . . . . CLOSED/KEYS

Check green indicators for proper door pin position. Ensure handle is vertical and in the detent position. Ensure aircraft keys are accounted for.

Passenger Briefing . . . . COMPLETE

FAR 91.519 requires that the pilot-in-command or a crewmember brief the passengers on relevant safety items (e.g., seat belts, door operation, emergency exits, etc.).

An exception to the oral briefing rule is if the pilot-in-command determines passengers are familiar with the briefing content. A printed card with the FAR 91.519 required information should be available to each passenger to supplement the oral briefing.

Seats/Seat Belts/Pedals . . . . SECURE/ADJUSTED

Seats:

- Adjust seat to align white ball in the center of the orange ball on the seat adjustment indicator.
- Adjust seat fore and aft; the handle is below the forward center of the seat.
- Adjust seat vertically; the handle is on the aisle side forward corner.

Seat Belts:

- Ensure seat belt and shoulder harness are secure and snug.

Rudder Pedals . . . . ADJUSTED

Adjust rudder pedals. Depress the tab on the inboard side of the pedal, move the pedal forward or aft into one of the three positions, and then release the tab.

Oxygen Masks/Systems . . . . CHECKED NORMAL/ LEFT/RIGHT

Oxygen Pressure Gage . . . . 1600 TO 1800 PSI

Oxygen Mask Controller . . . . SECURE

Oxygen Control Valve . . . . NORMAL

Regulator 100%

Ensure flow by donning the mask, adjusting the fit, and breathing several times. Stow crew masks in the quick hooks (or mask holder for EROS mask).

CBs and Switches . . . . CHECKED LEFT/RIGHT

Visually ensure all circuit breakers are in and check all switches are in OFF or NORM position in preparation for the engine start.

Generator Switches . . . . GEN (OFF FOR EPU START)

Fuel Boost Pump . . . . NORM

Crossfeed . . . . OFF

Gyro Slave Switches LH & RH . . . . AUTO

Anti-Skid . . . . ON

Ground Idle Switch . . . . NORM

Control Lock . . . . UNLOCK

Rotate the handle clockwise 45° from horizontal and push in to release. Check that the controls and throttles are free. Damage to the throttle may occur if the throttles are forced past the lock position and the control lock is engaged.

Landing Gear Handle . . . . DOWN

Throttles/Engine Sync . . . . CUTOFF/OFF

Flap Selector/Indicator . . . . CHECKED/MATCH

Ensure flap handle and flap position indicator are aligned.

Windshield Bleed Air Manual Valves . . . . OFF

Power On

Standby Gyro . . . . TEST/ON/UNCAGED

Accomplish the standby gyro check with the battery switch OFF to ensure the gyro receives emergency power.

Standby Gyro Switch . . . . TEST

Momentarily place switch in the TEST position. Verify the green light illuminates.

Standby Gyro Caging Knob . . . . UNCAGED

Gyro Horizon . . . . NO FLAG

Battery Switch – EMER . . . . EMERGENCY BUS ITEMS CHECKED

Ensure power to Emergency bus items:

- cockpit flood lights
- COMM 1
- LH & RH fan speed indicator
- NAV 2
- copilot's HSI (**single EFIS**)
- copilot's attitude indicator (**single EFIS**)
- directional gyro 2 (**single EFIS**)
- copilot's RMI (**dual EFIS**)
- NAV 2 repeater (**dual EFIS**)
- directional gyro 1 (**dual EFIS**)
- audio panel (**unit 0032 and subsequent**).

Battery Switch – BATT . . . . 24V MIN (28V EPU)

Minimum battery voltage for start is 24V DC.

Landing Gear Lights . . . . THREE GREEN/NO RED

Verify three green lights illuminated and red unlocked light extinguished.

Parking Brake/Chocks . . . . SET/REMOVED

Power brakes must be operational in order to set parking brake. Depress the brake pedals and pull the parking brake handle to trap pressure.

Cockpit Voice Recorder (if installed) . . . . . . CHECKED

Depress TEST button until green light illuminates.

Rotary Test Switch . . . . CHECKED

Rotate the TEST switch to each of the following positions and verify the proper response:

- OFF – red light above rotary test switch extinguishes and test system is inoperative.
- FIRE WARN – both ENGINE FIRE PUSH annunciators illuminate.
- LDG GEAR – three green safe and red GEAR UNLOCKED annunciators illuminate; the gear horn sounds. Check that the horn silences by pressing the horn silence button on the landing gear panel. The horn can be silenced only if the flap position is 15° or less.
- BATT TEMP – BATT O'TEMP annunciator flashes and battery temperature gage shows 160° to demonstrate circuit integrity. MASTER WARNING annunciator also illuminates. Cancel MASTER WARNING by pressing annunciator.
- STICK SHAKER (cone type AOA sensor) – the angle of attack indicator drives to zero and the flag appears. The flag disappears and the indicator moves to 1.0. As the indicator moves, the EADI fast/slow indicator and the AOA indexer (**if installed**) should correspond to indicator position. At approximately 0.82 the stick shaker activates for a few seconds. This cycle repeats as long as the rotary test switch remains in this position.
- STICK SHAKER (vane type AOA sensor) – the stick shaker operates. The AOA indicator goes past the red area and the EADI fast/slow indicator moves past slow. The AOA indexer (**if installed**) flashes.

- T/REV – the left and right ARM, LOCK, and DEPLOY annunciators illuminate and the MASTER WARNING annunciator illuminates. Cancel MASTER WARNING by pressing annunciator.
- W/S TEMP – the W/S AIR O'HEAT annunciator illuminates when the windshield bleed air switch is selected to HIGH or LOW
- OVER-SPEED – the audible overspeed warning sounds
- ANTI-SKID – the anti-skid system initiates a self-test. ANTI-SKID INOP annunciator illuminates and remains illuminated for three or four seconds after the test switch is placed in OFF. The annunciator extinguishes if the system checks operational. If the system fails the check, the annunciator remains illuminated.
- ANNU – all annunciators and the MASTER WARNING annunciators illuminate. The turbine speed indicator self tests with its red lights illuminating and the displays flashing all eights (888). When the avionics power switches are on, the altitude alert and autopilot/flight director mode selector panel lights illuminate. EFIS and FMS lights also illuminate. The MASTER WARNING annunciators cannot be reset while the rotary selector switch is in this position.

DOOR WARNING LIGHT . . . . OUT

ENGINE INSTRUMENTS . . . . NO FLAGS

FUEL QUANTITY . . . . CHECKED

Check that proper fuel quantity is indicated on the fuel gages and tanks are balanced. Maximum imbalance is 200 lbs.

Starting Engines

Rotating Beacon . . . . BEACON

Flood/Center Panel Lights . . . . FULL BRIGHT

Freon Air/Avionics Power Switches . . . OFF/BOTH OFF

First Engine . . . . START

START Button . . . . PRESS

Momentarily pressing the START button begins engine rotation by closing the start relay. When the relay closes, the START button illuminates white and the ignition system then arms for actuation. The engine instrument floodlight and the associated FUEL BOOST ON annunciator illuminate. The FUEL LOW PRESS annunciator extinguishes as boost pump pressure increases.

Throttle . . . . IDLE AT 8 TO 10% N_2

Lift the cutoff latch and advance the throttle to IDLE. Fuel flow initiates and the ignition system activates. The associated ignition light illuminates.

ITT . . . . CHECK

Abort start if there is no ITT indication within 10 seconds or ITT exceeds 550°C. Maximum start ITT is 700°C.

N_1 Speed . . . . CHECK

Check for an N_1 indication between 20 and 25% N_2. Abort start if there is no N_1 indication by 25% N_2.

Engine Instruments . . . . CHECK NORMAL

Monitor the engine instruments during acceleration. Abort start for abnormal indication.

Annunciators . . . . CHECK

The engine start cycle terminates at approximately 38% N_2. The START button light, ignition light, instrument floodlights, and FUEL BOOST ON annunciator extinguish as hydraulic flow increases during start. If the GEN switch is in the GEN position, the GEN OFF annunciator extinguishes when generator output voltage exceeds battery voltage.

If automatic start sequencing does not terminate, the FUEL BOOST ON annunciator and ignition and associated lights remain illuminated. At 38% N_2, the speed sensor discontinues motoring the starter/generator. Depress the STARTER DISENGAGE button to terminate the automatic start sequence.

Cross Generator Start/GND IDLE HIGH . . . 52 TO 53% N_2

After engine reaches approximately 46% N_2 ground idle RPM, place the ground idle switch in the HIGH position. Verify N_2 increases to 52% (flight idle). A 52% N_2 reading indicates the ground idle system is working and that proper RPM, which ensures correct torque on the operating generator drive, is available for a cross generator start.

For a cross generator start, wait until turbine RPM reaches 52% N_2 and the generator is on line. Start the second. Both starter buttons illuminate during a cross generator start. A cross generator start reduces battery heat by eliminating a charging cycle.

For an external power start, both generator switches may be off until start is complete. Do not turn on any electrical equipment until both GEN OFF annunciators are extinguished. The Citation V has an overcurrent and overvoltage protection system for GPU usage.

CAUTION: Turbine speed greater than 53% N_2 on the operating engine produces a generator output that may damage the generator drive during the second engine start.

Second Engine . . . . START

Proceedings for second engine start are the same as for the first engine start.

Engine Instruments/Annunciators . . . . CHECKED

Verify all engine instruments are within normal range. Check that engine annunciators are extinguished.

External Power (if applicable) . . . . . . DISCONNECTED

Verify the ground power unit is off by confirming a 24V DC battery reading on the voltmeter.

Generator Switches . . . . GEN

L/R generator annunciators are extinguished and the ammeters show shared load.

Volt/Ammeters . . . . CHECKED

Voltmeter indicates 28.5V DC and ammeters indicate a shared load within 10%.

Left Generator . . . . OFF

Right generator powers the main DC buses. Voltmeter shows 28.5V DC under increased load.

Voltmeter Selector . . . . LEFT GEN

Voltmeter shows 28.5V DC without load.

Left Generator . . . . ON

Generator again shares the load.

Right Generator . . . . OFF

Left generator powers the main DC buses. Voltmeter shows 28.5V DC under increased load.

Voltmeter Selector . . . . RIGHT GEN

Shows 28.5V DC without a load.

Left Generator . . . . ON

Check for a shared load on ammeters within 10%.

Battery Switch . . . . EMER

Voltmeter drops toward 24V DC, indicating BATT relay open.

Battery Switch . . . . BATT

Battery Temperature . . . . CHECKED

Avionics Power . . . . AC/ON

Before Taxi

Anti-Ice/Deice (if applicable) . . . . CHECKED

CAUTION: Limit ground operation of pitot/static heat to two minutes to prevent damage to the angle-of-attack system.

Windshield Bleed Air:

W/S BLEED AIR Switch . . . . LOW

W/S BLEED Air Valves . . . . MAX

Check for bleed air noise.

If temperature is above -18°C, turn the W/S bleed air switch to LOW. If temperature is -18°C or below, turn W/S BLEED air switch to HIGH. Check that windshield bleed air valves are in MAX.

Engine Anti-Ice:

Ground Idle Switch . . . . HIGH

Left Turbine (N_2) . . . . SET 70% OR ABOVE

Left Engine Anti-Ice Switch . . . . ON

Note decrease in N_1 and N_2 and an increase in ITT. Left ignition light illuminates.

ENG ANT-ICE LH Fail Annunciator . . . EXTINGUISHED

Annunciator should extinguish within two minutes or less.

Right Engine Anti-Ice Switch . . . . XFD

Opens anti-ice crossfeed valve and disables cowling and stator anti-ice sensor on right engine.

ENG ANTI-ICE RH Fail Annunciator . . . EXTINGUISHED

Indicates anti-ice crossfeed valve is operating properly.

Right Turbine (N_2) . . . . SET 70% OR ABOVE

Right Engine Anti-Ice Switch . . . . ON

ENG ANTI-ICE RH Fail Annunciator . . . EXTINGUISHED

Left Engine Anti-Ice Switch . . . . XFD

ENG ANTI-ICE LH Fail Annunciator . . . EXTINGUISHED

Throttles . . . . IDLE

Ground Idle Switch . . . . AS REQUIRED

Ground idle switch should be HIGH for anti-ice operation on the ground.

Engine Anti-Ice Switches . . . . AS REQUIRED

Icing conditions are defined as visible moisture with an ambient air temperature between +10 and -30°C. Engine anti-ice is required when operating in icing conditions. For ground operation in icing conditions, the ENG ANTI-ICE fail annunciators must be extinguished for a minimum of one minute out of four (with the engine anti-ice switches ON).

Surface Deice:

CAUTION: Do not operate deice boots when ambient temperature is below -40°C.

Turbine (N_2) . . . . SET 60% OR ABOVE

Below 60% N_2, the SURFACE DEICE annunciator may not illuminate.

SURFACE DEICE Switch . . . . AUTO

Momentarily place the SURFACE DEICE switch in AUTO and observe that wing and empennage boots inflate properly as follows:

The lower wing and left horizontal stabilizer boots inflate for six seconds with the SURFACE DEICE annunciator illuminating. The system then rests for six seconds with the SURFACE DEICE annunciator extinguished. The upper wing and the right horizontal stabilizer boots then inflate for six seconds with the SURFACE DEICE annunciator illuminating. The cycle does not repeat.

Throttles . . . . IDLE

Coffee/Freon Air . . . . AS REQUIRED

Overhead Fan . . . . AS REQUIRED

ATIS/CLEARANCE/FMS . . . . CHECKED/SET

Radios/Avionics . . . . CHECKED/SET

Altimeters/Altitude Alerter . . . . CHECKED/SET

Radar . . . . STANDBY

Pressurization Source Selector . . . . CHECKED

Source Selector . . . . LH/CHECK AIRFLOW

Source Selector . . . . RH/CHECK AIRFLOW

Source Selector . . . . NORM OR GND

Pressurization/Rate Control . . . . SET

Set pressurization controller to cruise altitude plus 1,000 ft and set rate knob in white arc.

Flaps . . . . CHECKED/SET FOR TAKEOFF

Extend flaps to LAND and check indicator movement. Check that the HYD PRESS ON annunciator illuminates when the flap handle is moved. Verify flap trim interconnect operation between 15 and 25°. Retract flaps to T.O. & APPR (15°) or to T.O. (7°) as appropriate.

Speedbrakes . . . . CHECKED

Speedbrakes . . . . EXTEND

Check that the HYD PRESS ON annunciator illuminates until speedbrakes are extended. The annunciator extinguishes when the SPD BRAKE EXTENDED annunciator illuminates. Observe upper speedbrake panels extension.

Speedbrakes . . . . RETRACT

Check that the HYD PRESS ON annunciator illuminates and then extinguishes and the SPD BRAKE EXTENDED annunciator extinguishes. Visually check that the upper speedbrake panel stows properly.

Flight Controls . . . . FREE AND CLEAR

Inverters/EFIS Test . . . . CHECKED

AC TEST Switch . . . . INV 1/HOLD

Selecting the INV 1 position turns off the No. 1 inverter and illuminates the INVERTER FAIL NO. 1 annunciator. The AC FAIL and MASTER WARNING annunciators should illuminate. Press the MASTER WARNING annunciator and note that the MASTER WARNING and AC FAIL annunciators extinguish. Confirm EFIS is still operational (AC powered by No. 2 inverter).

AC TEST Switch . . . . INV 2/HOLD

Selecting the INV 2 position turns off the No. 2 inverter and illuminates the INVERTER FAIL NO. 2 annunciator. The AC FAIL and MASTER WARNING annunciators should illuminate. Press the MASTER WARNING annunciator and note that the MASTER WARNING and AC FAIL annunciators extinguish. Confirm EFIS (dual EFIS configuration) is still operational (AC powered by No. 1 inverter).

AC TEST Switch . . . . RELEASE

EFIS Test Button . . . . PRESS

Verify the following:

- radio altimeter test value on pilot display is 50 ft
- all digit readouts replaced with dashes (except radio altimeter)
- all flags in view

- command cue, if selected, biased from view
- on **optional dual EFIS** the comparator monitor annunciators illuminate ATT, HDG, and ILS if ILS sources are selected on both sides
- test pass light in upper left corner of EADI illuminates.

Autopilot/Flight Director . . . . CHECKED/SET

Autopilot . . . . ENGAGE

TEST EACH FLT Button . . . . PRESS/HOLD FOR 5 SECONDS

The AP TORQUE and AP ROLL MONITOR annunciators illuminate and then the autopilot disengages. The AUTOPILOT OFF annunciator illuminates and the autopilot warning horn sounds for one second.

Autopilot . . . . ENGAGE

Position the elevator and ailerons in neutral for the following check.

Pitch Wheel . . . . ROTATE UP/DOWN

Column must move in direction of pitch wheel movement.

Turn Knob . . . . ROTATE LEFT/RIGHT

Control wheel must move in direction of turn knob.

Flight Director HDG Mode . . . . ENGAGE

Move the heading cursor to the left or right of lubber line. Note that the control wheel follows.

Flight Director ALT Mode . . . . ENGAGE

Adjust pilot's altimeter by changing the altimeter setting in the Kollsman window. With a lower altitude selected on the pilot's altimeter, the control column moves aft. After selecting a higher altitude the control column moves forward.

Flight Director ALT Mode . . . . DISENGAGE

Altimeter . . . . RESET

Control Wheel . . . . PULL AFT

Ensure elevator trim wheel, after a short delay, starts trimming nose down.

Control Wheel . . . . PUSH FORWARD

Ensure elevator trim wheel, after a short delay, starts trimming nose up.

Autopilot . . . . DISENGAGE

Check all of the normal autopilot disconnects:

- pilot's and copilot's AP/TRIM DISC switches
- pilot's and copilot's electric trim
- go-around button.

Re-engage autopilot between each disconnect test.

Flight Director . . . . HDG/ALT SEL

Electric Elevator Trim . . . . CHECKED

Copilot's Electric Trim Switch . . . . CHECK

Left Half of Switch . . . . ENGAGE

Engage nose-up then nose-down. Verify that electric trim does not move.

Right Half of Switch . . . . ENGAGE

Engage nose-up then nose-down. Verify that electric trim does not move.

Trim . . . . OPERATE NOSE UP

Manual trim wheel rotates nose-up.

AP/TRIM DISC Switch . . . . PUSH

Check that trim stops.

Trim . . . . OPERATE NOSE DOWN

Manual trim wheel rotates nose-down.

AP/TRIM DISC Switch . . . . PUSH

Check that trim stops.

Pilot's Electric Trim Switch . . . . REPEAT ABOVE TEST

Pilot's Electric Trim Switch . . . . OVERRIDES COPILOT'S SWITCH

Trim . . . . SET

Rudder and Aileron Trim . . . . SET AT NEUTRAL

Elevator Trim . . . . ENSURE IN TAKEOFF RANGE

Taxi/Before Takeoff

Exterior Lights . . . . AS REQUIRED

Passenger Advisory . . . . PASS SAFETY

This position advises the passengers to fasten safety belts and stop smoking for takeoff. It also illuminates cabin exits and baggage area lights.

Ground Idle . . . . AS REQUIRED

Brakes . . . . CHECKED

> **CAUTION:** If during taxiing a hard brake pedal/no braking condition occurs, operate the emergency brake system. Maintenance is required before flight.

Flight Instruments . . . . CHECKED

Warning Flags . . . . NONE VISIBLE

EHSIs/HSIs/RMIs/Compass . . . . AGREE

Altimeters (both) . . . . CHECK/AGREE

Flight Instruments . . . . CHECK

Check for correct indications during turns.

Thrust Reversers . . . . CHECKED

T/R Levers . . . . IDLE

Check that the ARM and UNLOCK annunciators illuminate and the DEPLOY annunciator illuminates within 1.5 seconds of the UNLOCK annunciator illuminating.

Emergency Stow Switches . . . . EMER

The UNLOCK and DEPLOY annunciators extinguish. The ARM and HYD PRESS ON annunciators remain illuminated.

T/R Levers . . . . DOWN

The ARM and HYD PRESS ON annunciators remain illuminated.

Emergency Stow Switches . . . . NORMAL

The ARM and HYD PRESS ON annunciators extinguish.

CAUTION: Do not attempt to fly the aircraft if the thrust reverser preflight test is unsuccessful.

Pressurization Source Selector . . . . NORMAL

If the source selector is left in GND, excessive air extraction occurs on the right engine and the engine does not develop full takeoff thrust.

Cabin Temperature Control . . . . AUTOMATIC

The ACM over-temperature protection circuit operates only in the AUTOMATIC mode.

Anti-Skid (when stopped) . . . . ON

Takeoff Data/Crew Brief . . . . SET/COMPLETE

Review and bug appropriate takeoff speeds.

Refer to Standard Operating Procedures for detailed explanation of items on the takeoff briefing.

Takeoff

Ignition . . . . ON

Turning the ignition system on for takeoff may prevent a flameout if an engine problem arises during takeoff.

Pitot Heat . . . . PITOT & STATIC

> **CAUTION:** Limit ground operation of pitot/static heat to two minutes to preclude damage to the angle-of-attack system.

Anti-Ice . . . . AS REQUIRED

Exterior/Landing Lights . . . . ON

For flights 30 minutes before sunset to 30 minutes after sunrise, turn on navigation lights. Do not operate anti-collision lights in fog, clouds, or haze. The light beam reflection can cause disorientation or vertigo.

Radar . . . . ON

Radar switch is in ON but radar remains in standby with aircraft weight-on-wheels (squat switch protection). Simultaneously, pressing both range buttons on the radar control panel overrides squat switch protection.

Transponder . . . . ALT

Check that all annunciators are extinguished except possibly GROUND IDLE and ENG ANTI-ICE (if that system was selected with low engine power).

Verify flight director is in GO AROUND mode with HDG and ALT SEL functions selected.

F.A.T.S. . . . . SET

Final checks before application of takeoff power.

Flaps . . . . SET

Annunciators . . . . CHECKED

Trims . . . . THREE SET

Speeds . . . . TAKEOFF BUGS SET

After Takeoff/Climb

Landing Gear/Lights . . . . UP/OFF

When a positive rate-of-climb is indicated, pull the gear handle out and move it to the UP position to begin the retraction cycle. Handle movement illuminates the GEAR UNLOCKED and HYD PRESS ON annunciators. Check that both annunciators extinguish to indicate the landing gear is up and locked.

Flaps . . . . UP

At a comfortable altitude with the wings level and a minimum airspeed of V_2 +10, depress the flap handle to clear the detent then move full forward. Check that the position indicator to the left of the handle moves to the FLAPS UP position. The HYD PRESS ON annunciator should remain illuminated any time the flaps are in transit and extinguish when they reach the selected position.

Yaw Damper . . . . ENGAGED

Check that the YAW DAMPER ENGAGE light illuminates. The yaw damper improves aircraft control and passenger comfort.

Ignition . . . . NORM

When clear of any bird hazard and the cockpit workload permits, place IGNITION switches in NORM.

Climb Power . . . . SET

Use indicated temperature and the climb thrust chart to determine N_1.

Engine Sync . . . . AS DESIRED

With N_1 speeds matched within 1.5% or N_2 speeds matched within 1%, place the engine synchronizer selector in FAN or TURB. Check that the engine instruments remain within normal operating limits. Selecting FAN synchronizes the left and right fan (N_1) speeds resulting in a quieter passenger cabin while selecting TURBINE matches left and right engine turbine (N_2) speeds resulting in a quieter cockpit.

> **NOTE:** N_1 RPM increases with altitude. Throttle adjustments may be necessary to maintain specified thrust setting.

Pressurization/Cabin Temperature . . . . CHECKED/SET

The controller was programmed before taxi. Adjust the rate knob to achieve a comfortable cabin rate-of-climb (usually between 300 and 500 FPM). Observe differential pressure/cabin altitude and cabin vertical speed indicators. A thorough understanding of the differential pressure/cabin altitude indicator assists the crew in smooth operation of the pressurization system.

Anti-Ice/Deice . . . . AS REQUIRED

Select anti-ice systems on as required for climb. Use of engine anti-ice reduces allowable fan speed and dictates close monitoring of ITT and RPM limitations.

Passenger Advisory . . . . AS REQUIRED

Place the passenger advisory switch in SEAT BELT to keep the FASTEN SEAT BELT sign illuminated and extinguish the NO SMOKING and emergency exit lights. If no turbulence is expected, place the switch in OFF to extinguish the FASTEN SEAT BELT sign and emergency exit lights.

Flood Cooling (by 10,000 ft) . . . . OFF

If installed, flood cooling must be off before passing through 10,000 ft.

Transition Level

Altimeters . . . . SET

Set altimeters to 29.92 inches Hg and cross-check.

Recognition Lights . . . . OFF

Freon Air (by 18,000 ft) . . . . OFF/FAN

Turn freon air conditioning off to prevent compressor motor arcing.

Cabin Temperature (by FL 310) . . . . AUTO

Selecting AUTO above 31,000 ft reduces the possibility of an ACM overheat and normally maintains a comfortable cabin temperature. With low airspeed and high power settings, an ACM overheat is possible with an excessively cold setting in MANUAL.

Cruise

Cruise Power . . . . SET

Maintain climb thrust until acceleration until attaining the desired cruise speed. If engine RPM does not automatically synchronize at the desired cruise setting, turn engine synchronization OFF. This allows the synchronizer actuator to center. Roughly synchronize the engines with throttles and place the engine synchronizer switch in FAN or TURB.

Engine Instruments . . . . CHECKED

Fuel Quantity/Crossfeed . . . . CHECKED

Ensure proper consumption rate. Balance fuel as required to remain within the 200 lbs wing fuel tank imbalance.

Pressurization/Oxygen . . . . . CHECKED/AS REQUIRED

Reset cabin altitude and/or rate as required. Maintain the TEMPERATURE CONTROL knob in the 12 to 2 o'clock position for a comfortable cabin temperature.

Check oxygen system pressure and masks:

- below FL 350 masks must be ready in their "quick-donning" position
- above FL 350 with only one pilot in the cockpit, that pilot must be wearing an oxygen mask
- above FL 410, at least one pilot must wear an oxygen mask.

Anti-Ice/Deice . . . . AS REQUIRED

Check the anti-ice systems for proper operation before entering areas where icing may be encountered. The engine bleed air anti-ice must be activated when operating in visible moisture at temperatures between +10 and -30°C indicated OAT and any time icing occurs. Normally operate pitot and static anti-ice during all phases of flight.

CAUTION: Do not operate the deice boots when indicated OAT is below -40°C.

Descent (15 Minutes Prior)

Defog Fan . . . . HI

Turn on the DEFOG fan and close the foot warmers approximately 15 minutes before descent to reduce condensation on the windshield and cockpit side windows.

Foot Warmer . . . . CLOSED LEFT/RIGHT

Closing foot warmers increases the flow of air available for windshield defogging and isolates dry conditioned air between the cockpit side windows to inhibit condensation formation.

Flow Distribution . . . . CKPT

Bias the FLOW DISTR selector toward CKPT for maximum defog capability.

Pressurization/Temperature . . . . CHECKED/SET

After beginning descent, set destination field pressure altitude +200 ft on the controller CABIN dial. Monitor differential pressure/cabin altitude and cabin vertical speed indicators. A high cabin altitude and low differential pressure indicates insufficient rate-of-descent. Depressurization occurs when cabin and aircraft altitude are identical. High cabin descent rates may be uncomfortable and may result in programmed cabin altitude being reached well before landing. Spreading the cabin descent requirement over the majority of the letdown provides optimum comfort for the passengers and crew.

Windshield Bleed Air Switch/Manual Valves . . LOW/MAX

Windshield bleed air can be used to externally warm the windshield in extreme conditions. Normally, the W/S BLEED switch LOW position provides adequate temperature.

Anti-Ice/Deice . . . . AS REQUIRED

A minimum of 70% N_2 is required to keep the engine anti-ice system operating properly. When operating in visible moisture with indicated OAT between -30 and +10°C, ensure pitot/static and engine anti-ice is on and operating. Use windshield bleed air as required.

Transition Level

Altimeters . . . . CHECKED/SET

When cleared below or passing through the transition altitude, set the reported or landing field barometric pressure on both altimeters. Cross-check settings.

Exterior/Recognition Lights . . . . ON

Freon Air . . . . AS REQUIRED

Turning on the Freon air conditioning system can aid windshield defogging.

Approach/In Range

Seats/Seat Belts/
Shoulder Harnesses . . . . SECURED LEFT/RIGHT

Check that the seats are locked in the desired position. Ensure seat belts and shoulder harnesses are secure and snug.

Passenger Seats . . . . UPRIGHT/OUTBOARD

Cabin and Emergency Exits . . . . CLEAR

Ensure there is unobstructed access to the normal and emergency exits.

Avionics/Flight Instruments . . . . CHECKED/SET

Tune navigation equipment and identify. Set courses and program the flight director as required.

Crossfeed . . . . OFF

Check that the CROSSFEED knob is in OFF and the INTRANSIT and FUEL BOOST ON annunciators are extinguished.

Passenger Advisory . . . . PASS SAFETY

Anti-Skid . . . . ON

Ground Idle . . . . AS REQUIRED

Use HIGH if ground icing is anticipated or for touch and go landings. If the GROUND IDLE annunciator illuminates in flight, select HIGH and ensure that N_2 does not decrease below 52%. Engine acceleration from below 52% N_2 may be excessive for some flight conditions.

Engine Sync . . . . OFF

Altimeters/Radar Altimeter . . . . CHECKED/SET

Landing Data/Bugs . . . . CHECKED/SET

Complete the approach side of TOLD card. Set airspeed bugs to V_{REF}.

Crew Brief . . . . COMPLETE

Check standard operating procedure for a list of items that should be included in the approach briefing.

Ignition . . . . ON

Flaps . . . . T.O. & APPR

Flaps may be extended to T.O. & APPR below 200 KIAS. Check indicator to verify position.

Pressurization . . . . SET FOR LANDING

Check pressurization and verify that it is set for landing. Check that cabin differential pressure is near zero. If still excessive, adjust rate so the cabin ascends. Differential pressure should be zero for landing. Any existing pressure is dumped on touchdown. If landing above 12,000 ft pressure altitude, turn the OXYGEN CONTROL VALVE to CREW ONLY and the PRESS SOURCE selector to OFF to prevent passenger oxygen mask deployment.

Landing

Landing Gear/Lights . . . . DOWN AND LOCKED/ON

Pull the landing gear handle out then move to DOWN. While the gear is extending, the HYD PRESS ON and GEAR UNLOCKED annunciators illuminate. When the landing gear reaches the down and locked position, the three green gear lights illuminate and the HYD PRESS ON and GEAR UNLOCKED lights extinguish.

Annunciator Panel/Flight Director . . . . . CHECKED/SET

Ensure the annunciator panel is clear and flight director is appropriately set.

Flaps . . . . LAND

Select flaps to LAND position for all normal landings. Flaps may be extended to LAND below 173 KIAS. Depress the flap handle then move it to the LAND position. Ensure flap indicator moves to correspond with handle position. The HYD PRESS ON annunciator should illuminate whenever the flaps are moving.

Autopilot/Yaw Damper . . . . OFF

Depress the AP/TRIM DISC switch on either control wheel. With the yaw damper off, the pilot has complete rudder authority and nosewheel steering for landing.

Landing With Thrust Reversers

Throttles . . . . IDLE

Suggested crosswind technique involves flying a crab down final approach and aligning the longitudinal axis of the aircraft to runway centerline with the rudder just before touchdown. The wide expanse of cockpit visibility makes small crab angles difficult to detect; therefore, devote particular attention to this area to achieve smooth crosswind landings.

Eight seconds after touchdown, the engines spool down from flight idle (approximately 52% N_2) to ground idle (46% N_2) if the flight idle switch is in the NORM position. The GROUND IDLE annunciator illuminates.

Brakes (after touchdown) . . . . CONTINUOUS MAXIMUM APPLIED

To obtain maximum braking performance from the anti-skid system, apply continuous maximum effort (no modulation) to brake pedals.

> **CAUTION:** If, during taxiing, a hard brake pedal/no braking condition occurs, operate the emergency brake system. Maintenance is required before flight.

Speedbrakes (after touchdown) . . . . EXTENDED

Touchdown, preceded by a slight flare, should occur on the main wheels. Check thrust at idle and extend speedbrakes while lowering the nose wheel.

Thrust Reversers
(after nose wheel on ground) . . . . DEPLOYED

Apply wheel brakes and deploy the thrust reversers. The aircraft pitches slightly upward during deployment; therefore, use slight nosedown elevator pressure during thrust reverser deployment, especially at high speeds such as a refused takeoff or no-flap landing.

The nose wheel must be on the ground before actuation of the thrust reversers to reduce the possibility of pitch-up and lift-off and to improve directional control. Do not exceed approximately 15 lbs of force on the thrust reverser levers during deployment to prevent jamming of the throttle lockout cams.

Reverser Indicator . . . . CHECK ILLUMINATION

The ARM, UNLOCK, and DEPLOY annunciators illuminate.

Reverser Power . . . . AS REQUIRED

Do not exceed 79% N_1 when OAT is below -18°C or 86% N_1 at or above -18°C. Once the thrust reversers are deployed, move the levers aft to maximum reverse thrust. Stops on the levers provide 86% N_1 on a -18°C day at sea level so the pilot can keep his attention on the landing rollout. The factory setting results in lower than 86% N_1 at warmer temperatures and may be reset for higher N_1 if temperatures are predominantly warmer. Do not exceed 86% N_1.

At 60 KIAS:

Thrust Reverser Levers . . . . IDLE REVERSE

With the thrust reverser levers in the IDLE REVERSE detent, leave the reversers deployed for aerodynamic drag. Commence thrust reversing and braking according to runway length. With excess runway, normally begin braking after thrust reverser deceleration is below 60 knots.

Use caution on runways with small loose gravel that may be ingested in the engine at idle reverse at low taxi speed.

CAUTION: Do not use the thrust reversers for touch and go landings; a full stop landing must be made once the reversers are selected.

CAUTION: Do not advance throttles until the reverser UNLOCK annunciators extinguish. There is danger of the throttle being rapidly returned to idle position, which could cause injury.

After Landing

Accomplish this checklist after the aircraft is clear of the runway.

Thrust Reversers . . . . **STOWED**

Flaps/Trim . . . . **UP/SET**

Check that the HYD PRESS ON annunciator extinguishes after the flaps are up. Taxiing with flaps extended on a snow- or slush-covered taxiway could result in obstruction of the flaps.

Speedbrakes . . . . **RETRACTED**

> **CAUTION:** Operation of the PITOT & STATIC heat on the ground for over 2 minutes may result in damage to the angle-of-attack system.

Check that the SPD BRAKE EXTENDED and HYD PRESS ON annunciators extinguish.

Ignition . . . . **NORM**

Pitot Heat/Anti-Ice . . . . **OFF**

W/S BLEED AIR may be used as required in falling precipitation. Turn engine anti-ice ON and operate the engines at or above 70% N_2 for a maximum of one minute out of every four minutes if taxiing in visible moisture with temperatures between +10 and -30°C. Ensure the PITOT & STATIC switch is off.

Exterior Lights . . . . **AS REQUIRED**

Recognition light life is shortened considerably if used during ground operations.

Ground Idle . . . . **AS REQUIRED**

Radar . . . . **OFF/STANDBY**

Transponder . . . . **OFF/STANDBY**

Shutdown

Parking Brake . . . . **SET**

Do not set the parking brake if brakes are very hot. This can increase heat transfer from the brakes to the wheel, causing the fusible plug to melt and deflate the tire.

AC Power/Master Avionics . . . . **OFF**

Exterior Lights . . . . **OFF**

Standby Gyro . . . . **CAGED AND OFF**

Pull out the standby attitude indicator caging knob and rotate it clockwise to cage then turn switch off.

Overhead/Defog Fans . . . . **OFF**

Throttles . . . . **OFF**

Allow ITT to stabilize for at least one minute at minimum value. Lifting the latch and placing the throttle full aft terminates fuel flow to the engine combustion section. A canister collects manifold fuel on shutdown. During the next flight, this fuel returns to the fuel cell. Repeated starts for ground operations cause the canister to overflow through the lower nacelle after the third shutdown.

Rotating Beacon . . . . **OFF**

Passenger Advisory . . . . OFF

Control Lock . . . . AS REQUIRED

Parking Brake/Chocks . . . . AS REQUIRED

Battery . . . . OFF

Move the BATT switch to OFF. Exercise care not to place it in EMER. Emergency bus items will drain the battery over an extended period.

For deplaning at night, leave the battery switch in BATT for cabin lighting until passengers and cabin baggage are deplaned. Turn the EXTERIOR WING INSP LIGHTS switch to ON to provide additional illumination in front of the cabin door. An illuminated courtesy light switch on the forward door post is wired to the Hot Battery bus to turn on the emergency exit lights and one aft cabin baggage compartment light.

Parking

Normally park the aircraft facing a direction that facilitates servicing, regardless of the prevailing wind. If not already accomplished, ensure the following are completed.

Aircraft . . . . PARKED

Park on hard, level surface.

Parking Brake/Control Lock . . . . AS REQUIRED

Setting the parking brake is optional. The aircraft may be relocated without anyone entering the aircraft if the parking brake is not set.

Main Gear . . . . CHOCKED

Static Ground Cable . . . . CONNECTED

Engine/Protective Covers . . INSTALLED AS REQUIRED

Foul Weather Window/Door . . CLOSED AS NECESSARY

Mooring

If extended parking plans or impending weather necessitates mooring the aircraft, attach ¾-inch ropes (or an equivalent substitute) to the nose gear and main gear struts. This procedure requires tie-down eyelets set into the apron; there is no procedure for mooring at unprepared facilities.

Aircraft . . . . PARKED

Park on hard, level surface; head into the wind.

Parking Brake/Control Lock . . . . AS REQUIRED

Setting the parking brake is optional. The aircraft may be relocated without anyone entering the aircraft if the parking brake is not set.

Main Gear . . . . CHOCKED

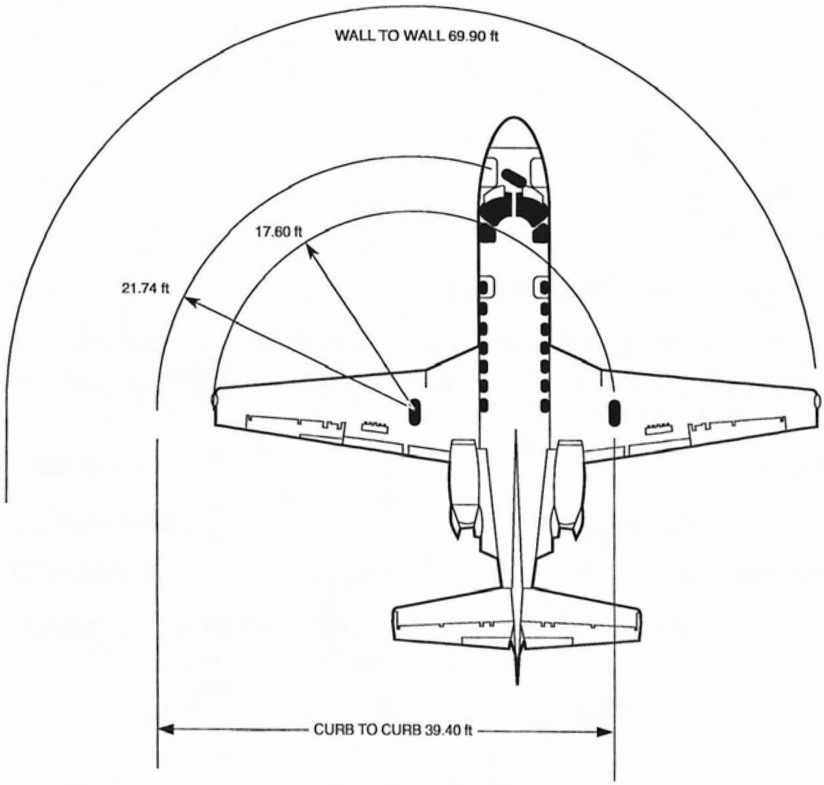
Static Ground Cable . . . . CONNECTED

Protective Covers . . . . INSTALLED AS REQUIRED

Ropes . . . . ATTACHED TO NOSE/MAIN GEAR/ SECURED TO PARKING APRON

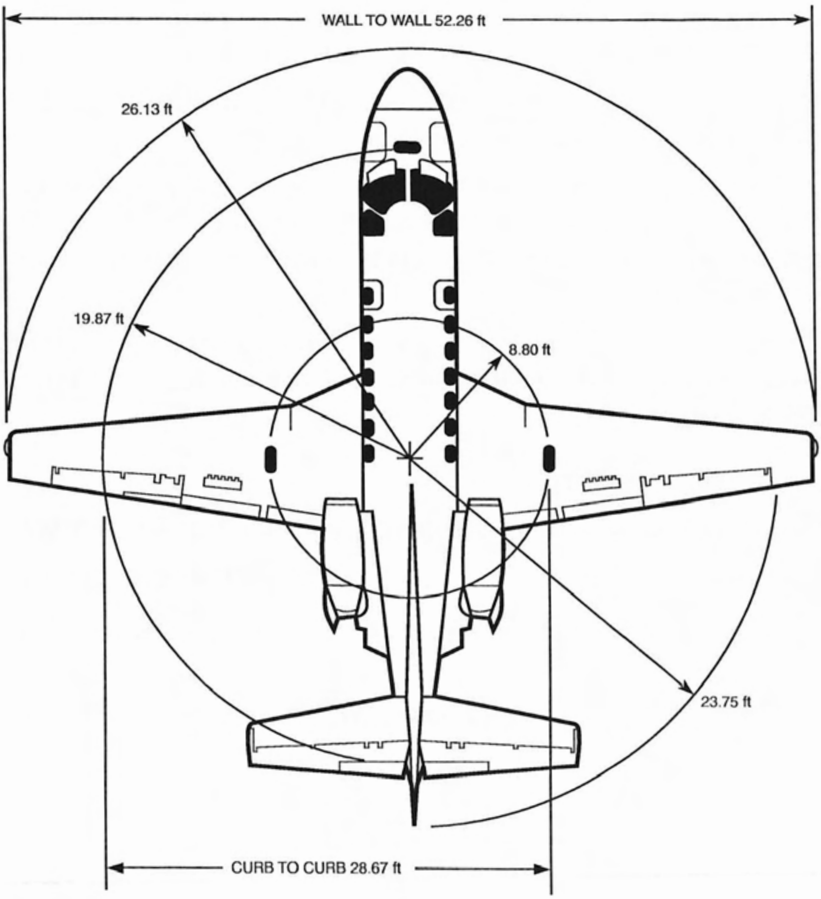
Foul Weather Window/Door . . CLOSED AS NECESSARY

Taxi Turning Distance



2B-1

Towbar Turning Distance



2B-2

Towing/Taxiing

Taxiing the aircraft may be accomplished on hard surfaces as well as on gravel or sod surfaces. Rudder pedal movement operates the nosewheel steering system.

On hard surfaces, the aircraft can be towed using a yoke-type tow bar attached to the nose gear.

While towing or taxiing an aircraft with a flat tire is not recommended, a situation may require it. In such a case, tow or taxi the aircraft forward enough to clear the immediate area; avoid sharp turns if towing.

Observe the aircraft taxi turning with brakes and towbar turning distances depicted on **Figure 2B-1**, (page 2B-40) and **Figure 2B-2**, (page 2B-41).

Nose Gear Towing

Perform all turns during nose gear towing through the tow bar.

Tow Bar . . . . PLACED AT NOSE WHEEL

Insert tow bar into nosewheel axle and secure tow bar locking handle.

Tow Bar . . . . CONNECTED TO TOWING VEHICLE

Pilotís Seat . . . . OCCUPIED

Control Lock . . . . OFF

Parking Brake . . . . OFF

If the parking brake is not set, towing can be accomplished without entering the aircraft.

Chocks/Static Ground Cable/
Mooring Ropes . . . . REMOVED

Wing/Tail Walkers . . . . STATIONED (OPTIONAL)

In congested areas, wing/tail walkers ensure adequate clearance between the aircraft and adjacent equipment or structures.

Aircraft . . . . TOW

Use smooth starts and stops.

When towing operation complete:

Nosewheel . . . . CENTERED

Parking Brake . . . . AS REQUIRED

Control Lock . . . . AS REQUIRED

Main Gear Wheels . . . . CHOCKED

Static Ground Cable . . . . CONNECTED

Tow Bar . . . . REMOVED

Main Gear Towing

Pilot's Seat . . . . OCCUPIED

Main Gear Towing Adapters . . . . INSTALLED

Cables . . . . ATTACHED TO TOWING ADAPTERS/ TOWING VEHICLE

Use care to prevent crushing of wiring or linkage rods in the area. Make sure the cables are long enough to clear the aircraft and that the towing vehicle is on a hard surface.

Chocks/Static Ground Cable/ Mooring Ropes . . . . REMOVED

Parking Brake . . . . OFF

Control Lock . . . . OFF

Aircraft . . . . **STEERED WITH BRAKES AND RUDDER PEDALS**

Using a smooth and even pressure, apply aircraft brakes as required.

When towing operation is complete:

Nose Wheel . . . . **CENTERED**

Parking Brake . . . . **AS REQUIRED**

Control Lock . . . . **AS REQUIRED**

Main Gear Wheels . . . . **CHOCKED**

Static Ground Cable . . . . **CONNECTED**

Tow Cables/Towing Adapters . . . . **REMOVED**

Hot Weather Operations

Ground Cooling

Use GPU if available for maximum ground cabin cooling:

Temperature Control . . . . FULL COLD

Press Source Selector . . . . GND

Overhead Fan . . . . HI

Defog Fan . . . . HI

Freon Air Conditioner (if installed) . . . . ON

Cold Weather Operations

NOTE: Flight crews should refamiliarize themselves seasonally with Cessna Maintenance Manual Chapter 12 and FAA Advisory Circular AC120-58, dated September 9, 1992 or later, for expanded deice and anti-ice procedures.

Ground Deice/Anti-Ice Operations

During cold weather operations, flight crews are responsible for ensuring the aircraft is free of ice contaminants.

Ground icing may occur at temperatures of +10°C or colder with high humidity. To comply with FAA regulations (clean wing concept) requiring critical component airframe deicing and anti-icing, Type I deice fluids and Type II anti-ice fluids can be used sequentially.

CAUTION: Type I and Type II fluids are not compatible and may not be mixed. Additionally, most manufacturers prohibit mixing of brands within type.

The pilot-in-command (PIC) or second-in-command (SIC) should supervise line personnel to ensure proper application of either fluid.

Deicing Supplemental Information

This section provides supplementary information on aircraft deicing, anti-icing/deicing fluids, deicing procedures, and aircraft operating procedures. Consult the AFM, Maintenance Manual Chapter 12 – Servicing, and FAA Advisory Circulars for deicing procedures, holdover times, fluid specifications, recommendations, and hazards.

Federal Aviation Regulations (FARs) prohibit takeoff with snow, ice, or frost adhering to the wings and control surfaces of the aircraft. It is the responsibility of the pilot-in-command to ensure the aircraft is free of snow, ice, or frost before takeoff.

Failure to adequately deice the aircraft can result in seriously degraded aircraft performance, loss of lift, and erratic engine and flight instrument indications.

Following extended high-altitude flight, frost can form at ambient temperatures above freezing on the wing's underside in the fuel tank areas. Refueling the aircraft with warmer fuel usually melts the frost.

Deicing

When necessary, use the following methods to deice the aircraft:

- placing the aircraft in a warm hangar until the ice melts
- mechanically brushing the snow or ice off with brooms, brushes, or other means
- applying a heated water/glycol solution (one-step procedure)
- applying heated water followed by an undiluted glycol-based fluid (two-step procedure).

Deicing Fluids

Two types of anti-icing/deicing fluids are in commercial use: SAE/ISO Types I and II. Type I fluids are used generally in North America. Type II fluids, also referred to as AEA Type II, are used generally in Europe.

Type I fluids are unthickened glycol-based fluids that are usually diluted with water and applied hot; they provide limited holdover time.

Type II fluids are thickened glycol-based fluids that are usually applied cold on a deiced aircraft; they provide longer holdover times than Type I fluids.

Holdover Times

Holdover timetables are only estimates and vary depending on many factors, which include:

- temperature
- precipitation type
- wind
- aircraft skin temperature.

Holdover times are based on mixture ratio. Times start when the last application has begun. Guidelines for holdover times anticipated by SAE Type I or Type II and ISO Type I or Type II fluid mixtures are a function of weather conditions and outside air temperature (OAT).

The freezing point of either type of fluid mixture must be at least 10°C (18°F) below OAT.

> **NOTE**: Holdover time is the estimated time that an anti-icing/deicing fluid protects a treated surface from ice or frost formation.

Many factors influence snow, ice, and frost accumulation and the effectiveness of deicing fluids. These factors include:

- ambient temperature and aircraft surface temperature
- relative humidity, precipitation type, and rate
- wind velocity and direction
- operation on snow, slush, or wet surfaces
- operation near other aircraft, equipment, and buildings
- presence of deicing fluid and its type, dilution strength, and application method.

> **CAUTION:** Type II FPD generally should not be applied forward of the wing leading edges. If used for deicing, do not apply forward of cockpit windows. Ensure that radome and cockpit windows are clean.

Deicing Procedures

One-step deicing involves spraying the aircraft with a heated, diluted deicing/anti-icing fluid to remove ice, snow, or frost. The fluid coating then provides limited protection from further accumulation.

Two-step deicing involves spraying the aircraft with hot water or a hot water/deicing fluid mixture to remove any ice, snow, or frost accumulation followed immediately by treatment with anti-icing fluid (usually Type II FPD fluid).

Deice the aircraft from top to bottom. Avoid flushing snow, ice, or frost onto treated areas. Start the deicing process by treating the horizontal stabilizer followed by the vertical stabilizer. Continue by treating the fuselage top and sides. Finally, apply deicing fluid to the wings.

CAUTION: If engines are running when spraying of deicing fluids is in progress, turn bleed air and air conditioning packs off.

Deicing fluid should not be applied to:

- pitot/static tubes, static ports, temperature probes, AOA vanes, or TAT probe
- gaps between control surfaces and airfoil
- cockpit windows
- passenger windows
- air and engine inlets and exhausts
- vents and drains
- wing and control surface trailing edges
- brakes.

CAUTION: Do not use deicing fluid to deice engines. Mechanically remove snow and ice from the engine inlet. Check the first stage fan blades for freedom of movement. If engine does not rotate freely, deice engine with hot air.

Spraying Technique – Type I

Spray Type I fluid on the aircraft (with engines off) in a manner that minimizes heat loss to the air. If possible, spray fluid in a solid cone pattern of large coarse droplets at a temperature of 160 to 180°F (**Figure 2B-3**, following page). Spray the fluid as close as possible to the aircraft surfaces, but no closer than 10 ft if using a high pressure nozzle.

Spraying Technique – Type II

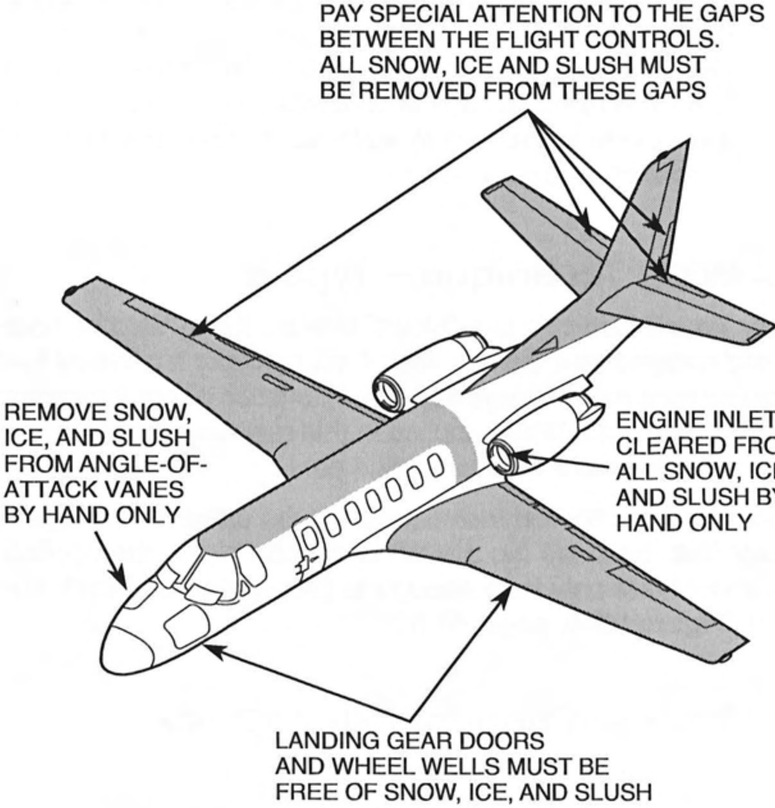
Apply Type II fluid cold to a "clean" aircraft. It may also be heated and sprayed as a deicing fluid; if so, consider it a Type I fluid because heat may change the characteristics of the thickening agents in the fluid. When applied in this manner, Type II fluid is not as effective as if it were applied cold.

Type II fluid application techniques are the same as for Type I, except that, because the aircraft is already clean, the application should last only long enough to properly coat aircraft surfaces (**Figure 2B-4**, page 2B-53).

Pre-Takeoff Contamination Check

In ground icing conditions, the PIC/SIC conducts a pre-takeoff contamination check within five minutes of takeoff, preferably just prior to taxiing onto the active runway. Critical areas of the aircraft (e.g., empennage, wing, windshield, control surfaces) must be checked to ensure they are free of ice, slush, and snow or that the deice/anti-ice fluids are still protecting the aircraft.

Type I Fluid Spray Pattern

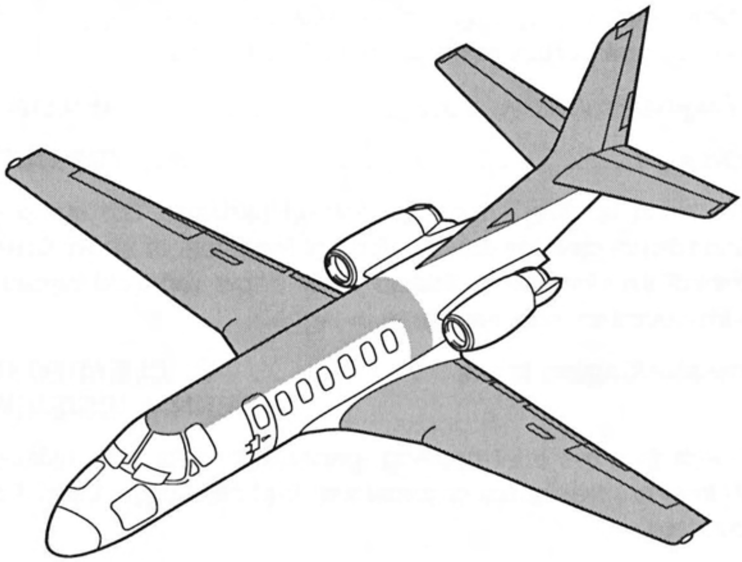


NOTE: SHADED AREAS INDICATE ESSENTIAL AREAS TO BE DEICED.

NOTE: MINIMUM DIRECT SPRAY AREAS INCLUDE ENGINE INLETS, ENGINE EXHAUST, RAM AIR INLETS, BRAKES, PITOT HEADS, STATIC PORTS,WINDSHIELD, CABIN WINDOWS, AND AOA VANES.

2B-3

Type II Fluid Spray Pattern



NOTE: SHADED AREAS INDICATE ESSENTIAL AREAS TO BE ANTI-ICED.

NOTE: MINIMUM DIRECT SPRAY AREAS INCLUDE ENGINE INLETS, ENGINE EXHAUST, RAM AIR INLETS, BRAKES, PITOT HEADS, STATIC PORTS, WINDSHIELD, CABIN WINDOWS, AND AOA VANES.

2B-4

Preflight

During preflight preparation, inspect areas where surface snow or frost can change or affect normal system operations. Supplemental preflight checks include the following.

All Engine/Protective Covers . . . . REMOVED

Surface . . . . CHECKED

The wing leading edges, all control surfaces, tab surfaces, and control cavities must be free of frost, ice, or snow. Check control cavities for drainage after snow removal because water puddles may re-freeze in flight.

Generator/Engine Inlets . . . . CLEARED OF INTERNAL ICE/SNOW

Check that the inlet cowling, generator inlets, and tailcone air inlet are free of ice or snow and that the engine fan is free to rotate.

Fuel Tank Vents . . . . CHECKED

Check the fuel tank vents; remove all traces of ice or snow.

Fuel Drains . . . . ALL WATER DRAINED

Pitot Heads And Static Ports . . . . . . CLEARED OF ICE

Water rundown resulting from snow removal may re-freeze immediately forward of the static ports. This causes an ice buildup that results in disturbed airflow over the static ports. The disturbed airflow can cause erroneous static readings even though the static ports themselves are clear.

Landing Gear Doors . . . . CHECKED

Make sure the landing gear doors are unobstructed and free of impacted ice or snow.

Air Conditioning Inlets and Exits . . . . CLEARED

Verify that the air inlets and exits are clear of ice or snow.

Aircraft Deicing . . . . COMPLETED

For different deicing fluids, protection (holdover) time varies considerably. Furthermore, this time depends on meteorological conditions.

Preliminary Cockpit Preparations . . . . COMPLETED

Battery . . . . INSTALLED/PREHEATED/24V DC

Engine . . . . PREHEATED

Engine preheating is best accomplished by installing the engine covers and directing hot air through the oil filler access door.

External Power Start

If aircraft is cold-soaked below -10°C, use a GPU and/or preheat procedure for starting.

Engine Start

During cold weather starts, initial oil pressure may be slow in rising; the OIL PRESS WARN annunciator may remain illuminated longer than normal.

After Engine Start

Instruments . . . . OBSERVED FOR NORMAL OPERATION

The engine instruments display approximately normal indications within a short time after reaching idle.

Engine Oil Pressure . . . . CHECKED

During cold weather starts, the oil pressure may temporarily exceed maximum pressure limits until the oil temperature rises. At low ambient temperatures, tolerate a temporary high pressure above maximum limits, but delay takeoff until the pressure drops into normal limits.

Anti-Ice . . . . AS REQUIRED

During operation from snow-covered runways, turn on engine anti-ice during taxi and takeoff. Precede takeoff by a static engine run-up to as high a power level as practical to ensure observation of stable engine operation prior to brake release.

If severe icing conditions are present, turn on engine anti-ice immediately after engine start. During prolonged ground operation, perform periodic engine run-up to reduce the possibility of ice buildup. For sustained ground operation, operate the engines at a power setting high enough to extinguish the engine anti-ice annunciators for one out of every four minutes.

Flight Controls . . . . CHECKED

Check for freedom of movement when the aircraft has been exposed for an extended period of time to snow, freezing rain, or other conditions that can restrict flight control movement. Increased control forces can be expected at low temperatures because of the increased resistance in cables and the congealed oil in snubbers and bearings. It may be desirable to accomplish an additional control check prior to taxi.

Wing Flaps . . . . CHECKED

Pressurization/Temperature Control Switches . . . . SET

Set for maximum cabin heat.

Temperature Control . . . . MANUAL HOT

Overhead Fan . . . . HI

Press Source Selector . . . . GND

Reduce temperature control as desired prior to takeoff.

Windshield Bleed Air . . . . LOW OR HI

Use windshield bleed air and defog fan to clear the windshield.

Taxi/Before Takeoff

Flaps . . . . T.O. OR T.O. & APPR

Before Takeoff Checklist . . . . COMPLETED

To ensure the aircraft is configured for takeoff, recheck the flap position and trim indicators.

Takeoff

If engine anti-ice is used for takeoff:

Thrust . . . . ANTI-ICE SETTINGS

Takeoff Field Length . . . . ADJUSTED

Adjust in accordance with AFM.

If aircraft slides on ice or snow during engine power check:

Brakes . . . . RELEASED

Takeoff Roll . . . . BEGUN

Continue engine check during early part of takeoff roll. During takeoffs on icy runways, expect a lag in nosewheel steering and anticipate corrections. A light forward pressure on the control column increases nosewheel steering effectiveness.

In Flight

Pitot Heat . . . . ON

Windshield Bleed Air . . . . LOW OR HI

This keeps the windshield clear (HI at -18°C [0°F] OAT or below). Speedbrakes plus increased power settings provide additional bleed air.

Windshield Alcohol . . . . AS REQUIRED

Use alcohol if windshield bleed air fails. The alcohol lasts approximately 10 minutes and is distributed to the pilot's windshield only. Be conservative; it may be required for approach.

Engine Anti-Ice . . . . ON

Use when operating in visible moisture with outside air temperatures between -30°C and +10°C; use anti-ice thrust settings.

Surface Deice . . . . AUTO

Use when wing ice buildup is estimated between ¼ and ½ inch, as seen with the wing inspection light (if necessary); use the stall strip as the gage.

Taxi-in and Park

Engine Anti-Ice . . . . AS REQUIRED

If severe icing conditions are present, turn on engine anti-icing. During prolonged ground operation, perform periodic engine run-ups to reduce the possibility of ice buildup. For sustained ground operation, operate the engines at a power setting high enough to extinguish the engine anti-ice annunciators for one out of every four minutes.

Windshield Bleed Air . . . . LOW OR HI

Use windshield bleed air and the defog fan to clear the windshield.

Securing Overnight or for Extended Period (Aircraft Unattended)

Wheel Chocks . . . . CHECKED IN PLACE

Parking Brake . . . . OFF

This eliminates the possibility of the brakes freezing.

Engine/Protective Covers . . . . INSTALLED

Water Storage Containers . . . . DRAINED

Toilets . . . . DRAINED

Battery . . . . REMOVED

If the ni-cad battery will be exposed to temperatures below -18°C (0°F), remove the battery and store in an area warmer than -18°C (0°F) but below 40°C (104°F). Subsequent re-installation of the warm battery enhances starting capability.

Doors . . . . CLOSED AND LOCKED

Standard Operating Procedures

Table of Contents

General Information

SimuFlite strongly supports the premise that the disciplined use of well-developed Standard Operating Procedures (SOP) is central to safe, professional aircraft operations, especially in multi-crew, complex, or high performance aircraft.

If your flight department has an SOP, we encourage you to use it during your training. If your flight department does not already have one, we welcome your use of the SimuFlite SOP.

Corporate pilots carefully developed this SOP. A product of their experience, it is the way SimuFlite conducts its flight operations.

The procedures described herein are specific to the Citation V and apply to specified phases of flight. The flight crew member designated for each step accomplishes it as indicated.

Definitions

LH/RH – Pilot Station. Designation of seat position for accomplishing a given task because of proximity to the respective control/indicator. Regardless of PF or PNF role, the pilot in that seat performs tasks and responds to checklist challenges accordingly.

PF – Pilot Flying. The pilot responsible for controlling the flight of the aircraft.

PIC – Pilot-in-Command. The pilot responsible for the operation and safety of an aircraft during flight time.

PNF – Pilot Not Flying. The pilot who is not controlling the flight of the aircraft.

Flow Patterns

Flow patterns are an integral part of the SOP. Accomplish the cockpit setup for each phase of flight with a flow pattern, then refer to the checklist to verify the setup. Use normal checklists as "done lists" instead of "do lists."

Flow patterns are disciplined procedures; they require pilots who understand the aircraft systems/controls and who methodically accomplish the flow pattern.

A standardized flow pattern for the cockpit setup before starting engines appears in the Preflight section.

Checklists

Use a challenge-response method to execute any checklist. After the PF initiates the checklist, the PNF challenges by reading the checklist item aloud. The PF is responsible for verifying that the items designated as PF or his seat position (i.e., LH or RH) are accomplished and for responding orally to the challenge. Items designated on the checklist as PNF or by his seat position are the PNF's responsibility. The PNF confirms the accomplishment of the item, then responds orally to his own challenge. In all cases, the response by either pilot is confirmed by the other and any disagreement is resolved prior to continuing the checklist.

After completion of any checklist, the PNF states "_____ checklist is complete." This allows the PF to maintain situational awareness during checklist phases and prompts the PF to continue to the next checklist, if required.

Effective checklists are pertinent and concise. Use them the way they are written: verbatim, smartly, and professionally.

Omission of Checklists

While the PF is responsible for initiating checklists, the PNF should ask the PF whether a checklist should be started if, in his opinion, a checklist is overlooked. As an expression of good crew resource management, such prompting is appropriate for any flight situation: training, operations, or checkrides.

Challenge/No Response

If the PNF observes and challenges a flight deviation or critical situation, the PF should respond immediately. If the PF does not respond by oral communication or action, the PNF must issue a second challenge that is loud and clear. If the PF does not respond after the second challenge, the PNF must ensure the safety of the aircraft. The PNF must announce that he is assuming control and then take the necessary actions to return the aircraft to a safe operating envelope.

Abnormal/Emergency Procedures

When any crewmember recognizes an abnormal or emergency condition, the PIC designates who controls the aircraft, who performs the tasks, and any items to be monitored. Following these designations, the PIC calls for the appropriate checklist. The crewmember designated on the checklist accomplishes the checklist items with the appropriate challenge/response.

> **NOTE**: "Control" means responsible for flight control of the aircraft, whether manual or automatic.

The pilot designated to fly the aircraft (i.e., PF) does not perform tasks that compromise this primary responsibility, regardless of whether he uses the autopilot or flies manually.

Both pilots must be able to respond to an emergency situation that requires immediate corrective action without reference to a checklist. The elements of an emergency procedure that must be performed without reference to the appropriate checklist are called memory or recall items. Accomplish all other abnormal and emergency procedures while referring to the printed checklist.

Accomplishing abnormal and emergency checklists differs from accomplishing normal procedure checklists in that the pilot reading the checklist states both the challenge and the response when challenging each item.

When a checklist procedure calls for the movement or manipulation of controls or switches critical to safety of flight (e.g., throttles, engine fire switches, fire bottle discharge switches), the pilot performing the action obtains verification from the other pilot that he is moving the correct control or switch prior to initiating the action.

Any checklist action pertaining to a specific control, switch, or equipment that is duplicated in the cockpit is read to include its relative position and the action required (e.g., "Left Throttle – OFF; Left Boost Pump – NORMAL").

Time Critical Situations

When the aircraft, passengers, and/or crew are in jeopardy, remember three things.

- FLY THE AIRCRAFT – Maintain aircraft control.
- RECOGNIZE CHALLENGE – Analyze the situation.
- RESPOND – Take appropriate action.

Rejected Takeoffs

The rejected takeoff (abort) procedure is a preplanned maneuver; both crewmembers must be aware of and briefed on the types of malfunctions that mandate an abort. Assuming the crew trains to a firmly established SOP, either crewmember may call for an abort.

The PF normally commands and executes the takeoff abort for directional control problems or catastrophic malfunctions. Additionally, any indication of the following malfunctions prior to V_1 is cause for an abort:

- engine failure
- engine fire
- thrust reverser deployment
- loss of directional control.

In addition to the above, the PF usually executes an abort prior to 70 KIAS for any abnormality observed.

When the PNF calls an abort, the PF announces "Abort." or "Continue." and executes the appropriate procedure.

Critical Malfunctions in Flight

In flight, the observing crewmember positively announces a malfunction. As time permits, the other crewmember makes every effort to confirm/identify the malfunction before initiating any emergency action.

If the PNF is the first to observe any indication of a critical failure, he announces it and simultaneously identifies the malfunction to the PF by pointing to the indicator/annunciator.

After verifying the malfunction, the PF announces his decision and commands accomplishment of any checklist memory items. The PF monitors the PNF during the accomplishment of those tasks assigned to him.

Non-Critical Malfunctions in Flight

Procedures for recognizing and verifying a non-critical malfunction or impending malfunction are the same as those used for time critical situations: use positive oral and graphic communication to identify and direct the proper response. Time, however, is not as critical and allows a more deliberate response to the malfunction. Always use the appropriate checklist to accomplish the corrective action.

Radio Tuning and Communication

The PNF accomplishes navigation and communication radio tuning, identification, and ground communication. For navigation radios, the PNF tunes and identifies all navigation aids. Before tuning the PF's radios, he announces the NAVAID to be set. In tuning the primary NAVAID, the PNF coordinates with the PF to ensure proper selection sequencing with the autopilot mode. After tuning and identifying the PF's NAVAID, the PNF announces "(Facility) tuned and identified."

Monitor NDB audio output anytime the NDB is in use as the NAVAID. Use the marker beacon audio as backup to visual annunciation for marker passage confirmation.

In tuning the VHF radios for ATC communication, the PNF places the newly assigned frequency in the head not in use (i.e., preselected) at the time of receipt. After contact on the new frequency, the PNF retains the previously assigned frequency for a reasonable time period.

Pre-Departure Briefings

The PIC should conduct a pre-departure briefing prior to each flight to address potential problems, weather delays, safety considerations, and operational issues. Pre-departure briefings should include all crewmembers to enhance team-building and set the tone for the flight. The briefing may be formal or informal, but should include some standard items. The acronym AWARE works well to ensure no points are missed. This is also an opportunity to brief any takeoff or departure deviations from the SOP due to weather or runway conditions.

NOTE: The acronym AWARE stands for the following.

- Aircraft status
- Weather
- Airport information
- Route of flight
- Extra

Altitude Assignment

The PNF sets the assigned altitude in the altitude alerter and points to the alerter while orally repeating the altitude. The PNF continues to point to the altitude alerter until the PF confirms the altitude assignment and alerter setting.

Advising of Aircraft Configuration Change

If the PF is about to make an aircraft control or configuration change, he alerts the PNF to the forthcoming change (e.g., gear, speedbrake, and flap selections). If time permits, he also announces any abrupt flight path changes so there is always mutual understanding of the intended flight path.

Time permitting, a PA announcement to the passengers precedes maneuvers involving unusual deck or roll angles.

Transitioning from Instrument to Visual Conditions

If visual meteorological conditions (VMC) are encountered during an instrument approach, the PNF normally continues to make callouts for the instrument approach being conducted. However, the PF may request a changeover to visual traffic pattern callouts.

Phase of Flight SOP

Holding Short

PF	PNF
CALL "Before Takeoff checklist."	
	ACTION Complete Before Takeoff checklist.
	CALL "Before Takeoff checklist complete."

Takeoff Briefing

ACTION Brief the following:

- initial heading/ course
- initial altitude
- airspeed limit (if applicable)
- clearance limit
- emergency return plan
- SOP deviations.

Consider the following:

- impaired runway conditions
- weather
- obstacle clearance
- SIDS.

Cleared for Takeoff

PF	PNF
CALL "Takeoff checklist."	
	ACTION Complete Takeoff checklist.
	CALL "Takeoff checklist complete."

Takeoff Roll

PF	PNF
Setting Takeoff Power	
CALL "Set ______ ."	**CALL** " ______ set."
Initial Airspeed Indication	
	CALL "Airspeed alive."
	At 70 KIAS, **CALL** "70 kts crosscheck."
At V_1	
	CALL "V_1."
ACTION Move hand from throttles to yoke.	
At V_R	
	CALL "Rotate."
ACTION Rotate to approximately 12° to 15° pitch attitude for takeoff.	

Climb

PF	PNF
At Positive Rate of Climb	
	CALL "Positive rate."
Only after PNF's call, **CALL** "Gear up."	
	CALL "Gear selected up." When gear indicates up, "Gear indicates up."
After Gear Retraction	
	ACTION Immediately accomplish attitude correlation check. ▪ PF's and PNF's ADI displays agree. ▪ Pitch and bank angles are acceptable.
	CALL "Attitudes check." Or, if a fault exists, give a concise statement of the discrepancy.
At V_2 + 10 KIAS and 400 Ft Above Airport Surface (Minimum)	
	CALL "V_2 + 10 KIAS."
CALL "Flaps up."	
	CALL "Flaps selected UP." When indicator indicates UP, "Flaps indicate UP."

Climb (continued)

PF	PNF
At V_{ENR} (Minimum)	
CALL "Climb power."	
	CALL "Climb power set."
At 1,500 Ft (Minimum) Above Airport Surface and Workload Permitting	
CALL "Climb checklist."	
	ACTION Complete Climb checklist.
	CALL "Climb checklist complete.
At Transition Altitude	
CALL "29.92 set." Transition Altitude checklist."	**CALL** "29.92 set."
	ACTION Complete Transition Altitude checklist.
	CALL "Transition Altitude checklist complete."
At 1,000 Ft Below Assigned Altitude	
	CALL "____ (altitude) for ____ (altitude)." (e.g., "9,000 for 10,000.")
CALL "____ (altitude) for ____ (altitude)." (e.g., "9,000 for 10,000.")	

Cruise

PF	PNF
CALL "Cruise checklist."	
	ACTION Complete Cruise checklist.
	CALL "Cruise checklist complete."

Altitude Deviation in Excess of 100 Ft

PF	PNF
	CALL "Altitude."
CALL "Correcting."	

Course Deviation in Excess of One Half Dot

PF	PNF
	CALL "Course."
CALL "Correcting."	

Descent

PF	PNF
CALL "Descent checklist."	
	ACTION Complete Descent checklist.
	CALL "Descent checklist complete."

At 1,000 Ft Above Assigned Altitude

PF	PNF
	CALL "____ (altitude) for ____ (altitude)." (e.g., "10,000 for 9,000.")
CALL "____ (altitude) for ____ (altitude)." (e.g., "10,000 for 9,000.")	

At Transition Level

PF	PNF
CALL "Altimeter set ____ Transition Level checklist."	**CALL** "Altimeter set ____ ."
	ACTION Complete Transition Level checklist.
	CALL "Transition Level checklist complete."

At 10,000 Ft

PF	PNF
	CALL "10,000 ft."
CALL "Check. Speed 250 kts."	

Maintain sterile cockpit below 10,000 ft above airport surface.

Descent (continued)

PF	PNF

At Appropriate Workload Time

REVIEW **REVIEW**

Review the following:
- approach to be executed
- field elevation
- appropriate minimum sector altitude(s)
- inbound leg to FAF, procedure turn direction and altitude
- final approach course heading and intercept altitude
- timing required
- DA/MDA
- MAP (non-precision)
- VDP
- special procedures (DME step-down, arc, etc.)
- type of approach lights in use (and radio keying procedures, if required)
- missed approach procedures
- runway information and conditions.

ACTION Brief the following:
- configuration
- approach speed
- minimum safe altitude
- approach course
- FAF altitude
- DA/MDA altitude
- field elevation
- VDP
- missed approach
  - heading
  - altitude
  - intentions
- abnormal implications.

Accomplish as many checklist items as possible. The Approach checklist must be completed prior to the initial approach fix.

Precision Approach

PF	PNF

Prior to Initial Approach Fix

PF		PNF	
CALL	"Approach checklist."		
		ACTION	Complete Approach checklist.
		CALL	"Approach checklist complete."

After Level-Off on Intermediate Approach Segment

PF		PNF	
CALL	"Flaps APPROACH."		
		CALL	"Flaps selected APPROACH." When flaps indicate APPROACH "Flaps indicate APPROACH."

At Initial Convergence of Course Deviation Bar

PF		PNF	
CALL	"Localizer/course alive."	**CALL**	"Localizer/course alive."

At Initial Downward Movement of Glideslope Raw Data Indicator

PF		PNF	
CALL	"Glideslope alive."	**CALL**	"Glideslope alive."

When Annunciators Indicate Localizer Capture

PF		PNF	
CALL	"Localizer captured."	**CALL**	"Localizer captured."

Precision Approach (continued)

PF	PNF
At One Dot From Glideslope Intercept	
	CALL "One dot to go."
CALL "Gear down. Before Landing checklist."	
	CALL "Gear selected down." When gear indicates down, "Gear indicates down."
	ACTION Complete Before Landing checklist except for full flaps and autopilot/ yaw damper.
When Annunciator Indicates Glideslope Capture	
CALL "Glideslope captured."	**CALL** "Glideslope captured."
CALL "Flaps LAND."	
	CALL "Flaps selected LAND." When flaps indicate LAND, "Flaps indicate LAND."

If the VOR on the PNF's side is used for crosschecks on the intermediate segment, the PNF's localizer and glideslope status calls are accomplished at the time the PNF changes to the ILS frequency. This should be no later than at completion of the FAF crosscheck, if required. The PNF should tune and identify his NAV radios to the specific approach and monitor.

Precision Approach (continued)

PF	PNF
At FAF	
CALL "Outer marker." or "Final fix."	
	ACTION ▪ Start timing. ▪ Visually crosscheck that both altimeters agree with crossing altitude. ▪ Set missed approach altitude in altitude alerter. ▪ Check PF and PNF instruments. ▪ Call FAF inbound.
	CALL "Outer marker." or "Final fix." "Altitude checks."
At 1,000 Ft Above DA (H)	
	CALL "1,000 ft to minimums."
CALL "Check."	

Precision Approach (continued)

PF	PNF

At 500 Ft Above DA(H)

PF	PNF
	CALL "500 ft to minimums."
CALL "Check."	

> **NOTE:** An approach window has the following parameters:
> - within one dot deflection, both LOC and GS
> - IVSI less than 1,000 fpm
> - IAS within V_{AP} ±10 kts (no less than V_{REF} or 0.6 AOA, whichever is less)
> - no flight instrument flags with the landing runway or visual references not in sight
> - landing configuration, except for full flaps (non-precision or single engine approaches).
>
> When within 500 ft above touchdown, the aircraft must be within the approach window. If the aircraft is not within this window, a missed approach must be executed.

At 200 Ft Above DA(H)

PF	PNF
	CALL "200 ft to minimums."
CALL "Check."	

At 100 Ft Above DA(H)

PF	PNF
	CALL "100 ft to minimums."
CALL "Check."	

Precision Approach (continued)

PF	PNF
At Point Where PNF Sights Runway or Visual References	
	CALL "Runway (or visual reference) ____ o'clock."
CALL "Going visual. Land," or "Missed approach."	
	ACTION As PF goes visual, PNF transitions to instruments.
At DA(H)	
	CALL "Minimums. Runway (or visual reference) ____ o'clock."
ACTION Announce intentions. **CALL** "Going visual. Land." or "Missed approach."	
	ACTION As PF goes visual, PNF transitions to instruments.

Precision Missed Approach

PF		PNF	
At DA(H)			
		CALL	"Minimums. Missed approach."
CALL	"Missed approach."		
ACTION	Apply power firmly and positively. Activate go-around mode and initially rotate the nose to the flight director go-around attitude.	**ACTION**	Assist PF in setting power for go-around.
CALL	"Flaps APPROACH."		
		CALL	"Flaps selected APPROACH." When flaps indicate APPROACH, "Flaps indicate APPROACH."
At Positive Rate of Climb			
		CALL	"Positive rate."
CALL	"Gear up."		
		CALL	"Gear selected up. When gear indicates up, "Gear indicates up."
		ACTION	Announce heading and altitude for missed approach.

Precision Approach Deviations

PF	PNF
± One Half Dot ñ Glideslope	
	CALL “One half dot (high, low) and (increasing, holding, decreasing).”
CALL “Correcting.”	
± One Half Dot ñ Localizer	
	CALL “One half dot (right, left) and (increasing, holding, decreasing).”
CALL “Correcting.”	
V_{AP} ± ____	
	CALL “Speed (plus or minus) _____ (knots) and (increasing, holding, decreasing).”
CALL “Correcting.”	
At or Below V_{REF}	
	CALL “V_{REF}.” or “V_{REF} minus _____ (knots below V_{REF}).”
CALL “Correcting.”	
Rate of Descent Exceeds 1,000 FPM	
	CALL “Sink _____ (amount) hundred and (increasing, holding, decreasing).”
CALL “Correcting.”	

Non-Precision Approach

PF		PNF	
Prior to Initial Approach Fix			
CALL	"Approach checklist."		
		ACTION	Complete Approach checklist.
		CALL	"Approach checklist complete."
After Level-Off on Intermediate Approach Segment			
CALL	"Flaps APPROACH."		
		CALL	"Flaps selected APPROACH." When flaps indicate APPROACH, "Flaps indicate APPROACH."
At Initial Convergence of Course Deviation Bar			
CALL	"Localizer/course alive."	**CALL**	"Localizer/course alive."
When Annunciators Indicate Course Capture			
CALL	"Localizer/course captured."	**CALL**	"Localizer/course captured."

Non-Precision Approach (continued)

PF	PNF
Prior to FAF	
	CALL "_____ (number) miles/minutes from FAF."
CALL "Gear down. Before Landing checklist."	
	CALL "Gear selected down."
	When gear indicates down, "Gear indicates down."
	ACTION Complete Before Landing checklist except for full flaps and autopilot/yaw damper.

Non-Precision Approach (continued)

PF	PNF
At FAF	
CALL "Outer marker." or "Final fix."	**CALL** "Outer marker." or "Final fix." "Altimeters check."
	ACTION ▪ Start timing. ▪ Visually crosscheck that both altimeters agree. ▪ Set MDA (or nearest 100 ft above) in altitude alerter. ▪ Check PF and PNF instruments. ▪ Call FAF inbound.
At 1,000 Ft Above MDA	
	CALL "1,000 ft to minimums."
CALL "Check."	

Non-Precision Approach (continued)

PF	PNF

At 500 Ft Above MDA

CALL "500 ft to minimums."

CALL "Check."

NOTE: An approach window has the following parameters:
- within one dot CDI deflection or 5° bearing
- IVSI less than 1,000 fpm
- IAS within V_{AP} ±10 kts (no less than V_{REF} or 0.6 AOA, whichever is less)
- no flight instrument flags with the landing runway or visual references not in sight
- landing configuration, except for full flaps.

When within 500 ft above touchdown, the aircraft must be within the approach window. If the aircraft is not within this window, a missed approach must be executed.

At 200 Ft Above MDA

CALL "200 ft to minimums."

CALL "Check."

At 100 Ft Above MDA

CALL "100 ft to minimums."

CALL "Check."

At MDA

CALL "Minimums. _____ (time) to go." or "Minimums. _____ (distance) to go."

CALL "Check."

Non-Precision Approach (continued)

PF	PNF
At Point Where PNF Sights Runway or Visual References	
	CALL "Runway (or visual reference) ____ o'clock."
CALL "Going visual. Land. or "Missed approach."	
When leaving MDA, **CALL** "Flaps LAND."	
	CALL "Flaps selected LAND." When flaps indicate LAND, "Flaps indicate LAND."

Non-Precision Missed Approach

PF		PNF	
At MAP			
		CALL	"Missed approach point. Missed approach."
CALL	"Missed approach."		
ACTION	Apply power firmly and positively. Activate go-around mode and initially rotate the nose to the flight director go-around attitude.	**ACTION**	Assist PF in setting power for go-around.
CALL	"Flaps APPROACH."		
		CALL	"Flaps selected APPROACH." When flaps indicate APPROACH, "Flaps indicate APPROACH."
At Positive Rate of Climb			
		CALL	"Positive rate."
CALL	"Gear up."		
		CALL	"Gear selected up." When gear indicates up, "Gear indicates up."
		ACTION	Announce heading and altitude for missed approach.

Non-Precision Missed Approach (continued)

PF	PNF
At V_{REF} +10 and 400 Ft Above Airport Surface (Minimum)	
CALL "Flaps UP."	
	CALL "Flaps selected UP." When flaps indicate UP, "Flaps indicate UP."
At 1,500 Ft (Minimum) Above Airport Surface and Workload Permitting	
CALL "Climb checklist."	
	ACTION Complete Climb checklist.
	CALL "Climb checklist complete."

Non-Precision Approach Deviations

PF	PNF
± One Dot ñ Localizer/VOR	
	CALL "One dot (right, left) and (increasing, holding, decreasing)."
CALL "Correcting."	
± 5 At or Beyond Midpoint for NDB Approach	
	CALL "_____ (degrees off course) (right, left) and (increasing, holding, decreasing).
CALL "Correcting."	
V_{AP} ± _____	
	CALL "Speed (plus or minus) _____ (knots) and (increasing, holding, decreasing)."
CALL "Correcting."	
At or Below V_{REF}	
	CALL "V_{REF}." or "V_{REF} minus _____ (knots below V_{REF})."
CALL "Correcting."	
Rate of Descent Exceeds 1,000 FPM	
	CALL "Sink _____ (amount) hundred and (increasing, holding, decreasing)."
CALL "Correcting."	

Visual Traffic Patterns

PF	PNF
Before Pattern Entry/Downwind (1,500 Ft Above Airport Surface)	
CALL "Approach checklist."	
	ACTION Complete Approach checklist.
	CALL "Approach checklist complete."
Downwind	
CALL "Flaps APPROACH."	
	CALL "Flaps selected APPROACH." When flaps indicate APPROACH "Flaps indicate APPROACH."
CALL "Gear down. Before Landing checklist."	
	CALL "Gear selected down." When gear indicates down, "Gear indicates down."
	ACTION Complete Before Landing checklist except for full flaps and yaw damper.

Visual Traffic Patterns (continued)

PF	PNF
At 1,000 Ft Above Airport Surface	
	CALL "1,000 AGL."
CALL "Check."	
At 500 Ft Above Airport Surface	
	CALL "500 AGL."
CALL "Check."	
At 200 Ft Above Airport Surface	
	CALL "200 AGL."
CALL "Check."	

Landing

PF	PNF
At Point on Approach When PF Sights Runway or Visual Reference (Landing Assured)	
CALL "Going visual. Land. Flaps LAND."	
	CALL "Flaps selected LAND." When flaps indicate LAND, "Flaps indicate LAND."
ACTION Push autopilot and trim disconnect switch.	**ACTION** Continue with: ▪ speed check ▪ vertical speed check ▪ callouts ▪ gear down verification ▪ flap verification.
CALL "Autopilot/yaw damper off."	
	CALL "Final gear and flaps recheck." "Before Landing checklist complete."
At 100 Ft Above Touchdown	
	CALL "100 ft."
At 50 Ft Above Touchdown	
	CALL "50 ft."
At Touchdown	
CALL "Extend speedbrakes."	
	ACTION Extend speedbrakes.
	CALL "Speedbrakes extended."

Landing (continued)

PF	PNF
As Thrust Reversers Deployment	
	CALL "Six lights."
At Thrust Reverser Idle Speed (60 KIAS)	
	CALL "60 kts."

Maneuvers

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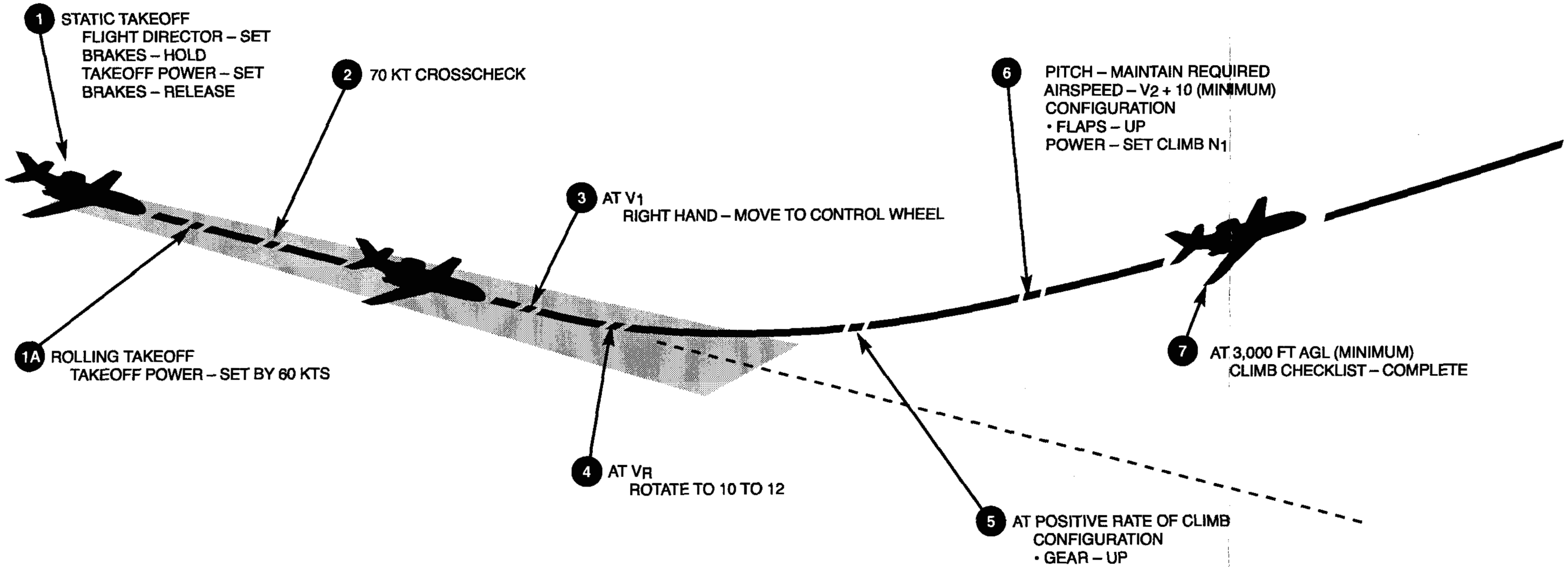
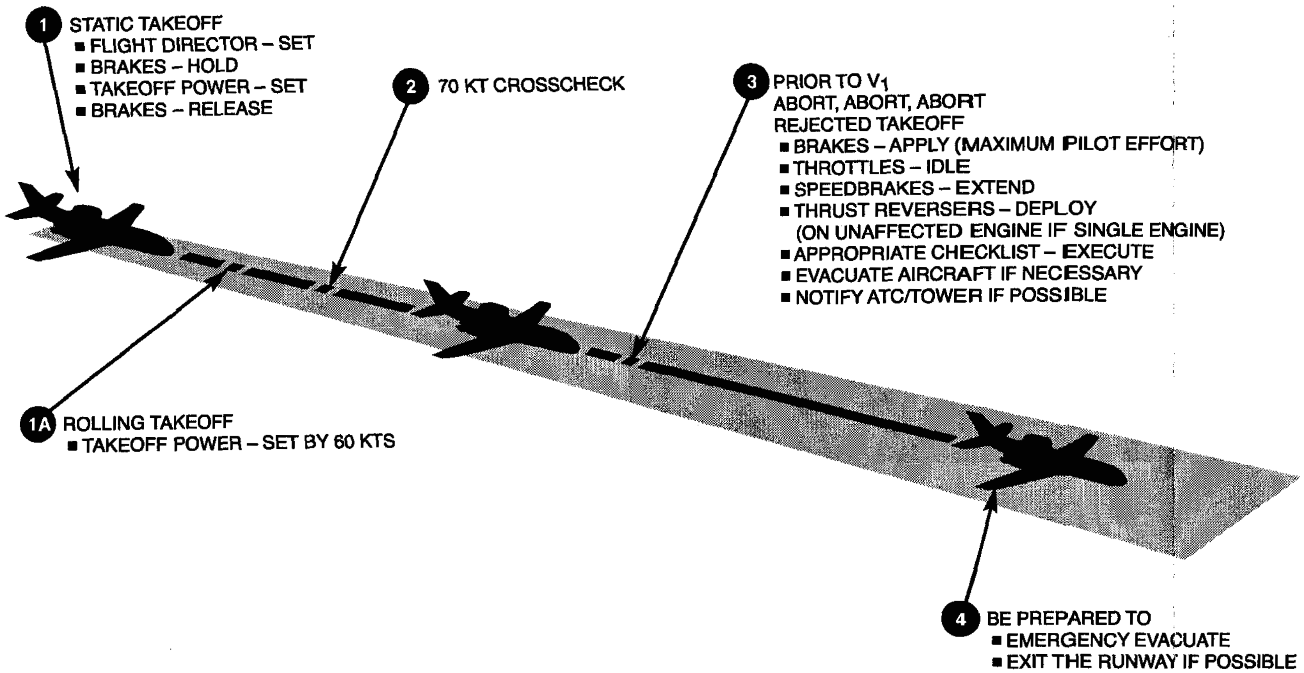
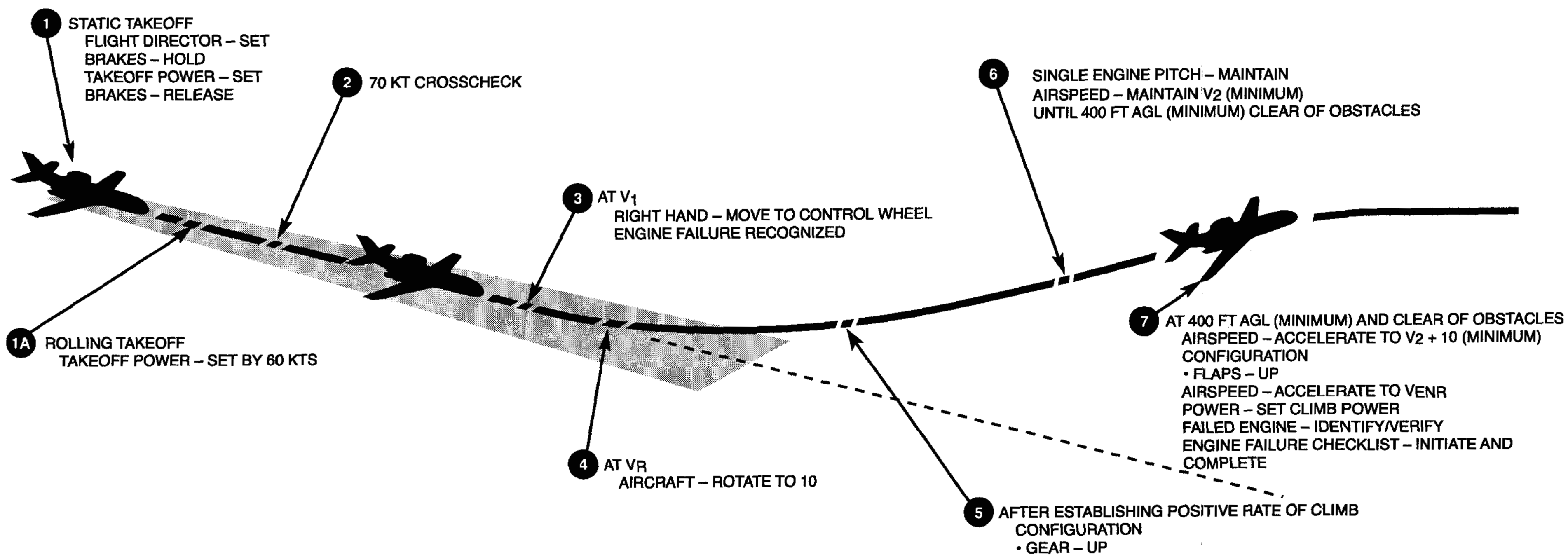
Normal Takeoff – Static or Rolling



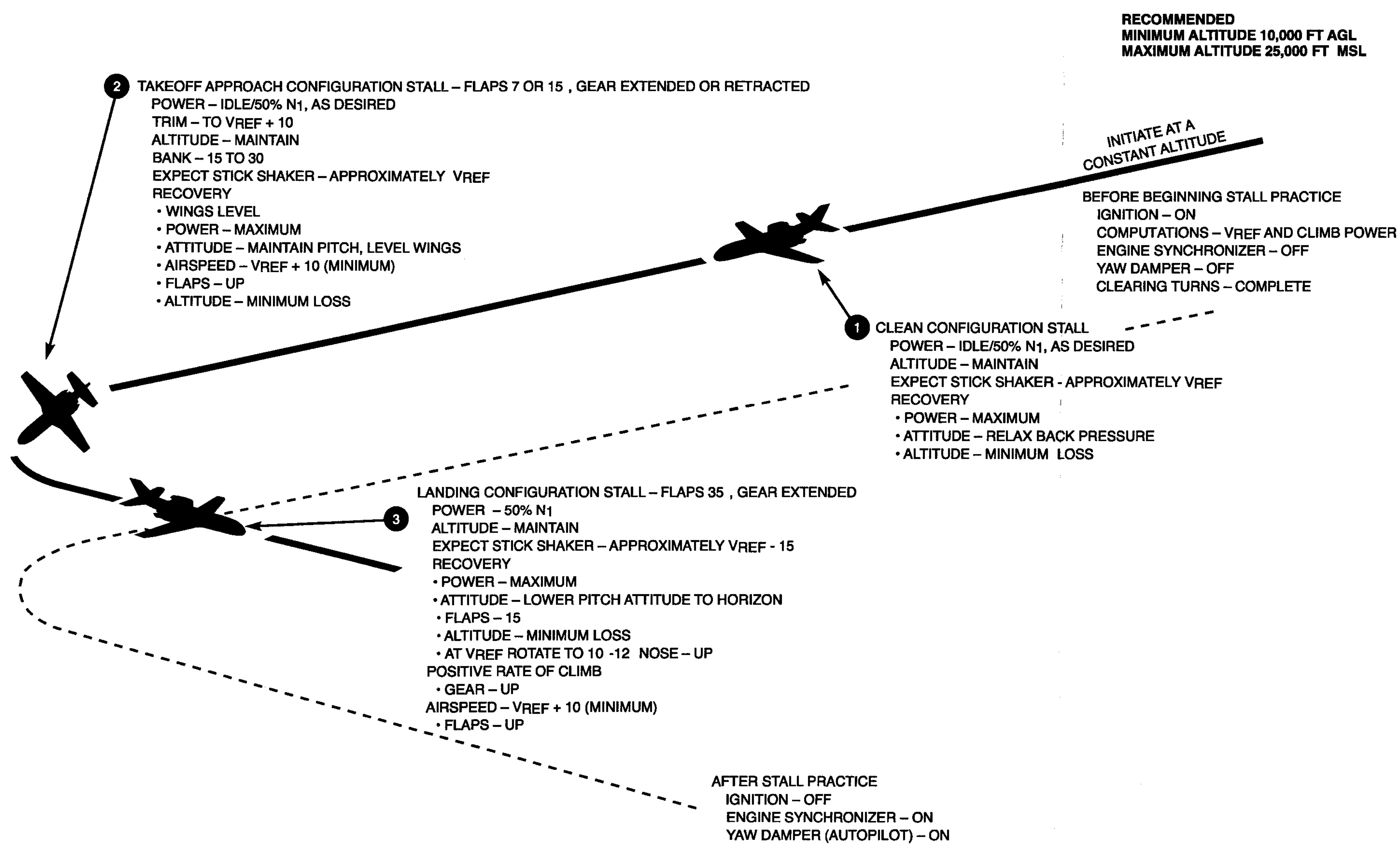
Rejected Takeoff



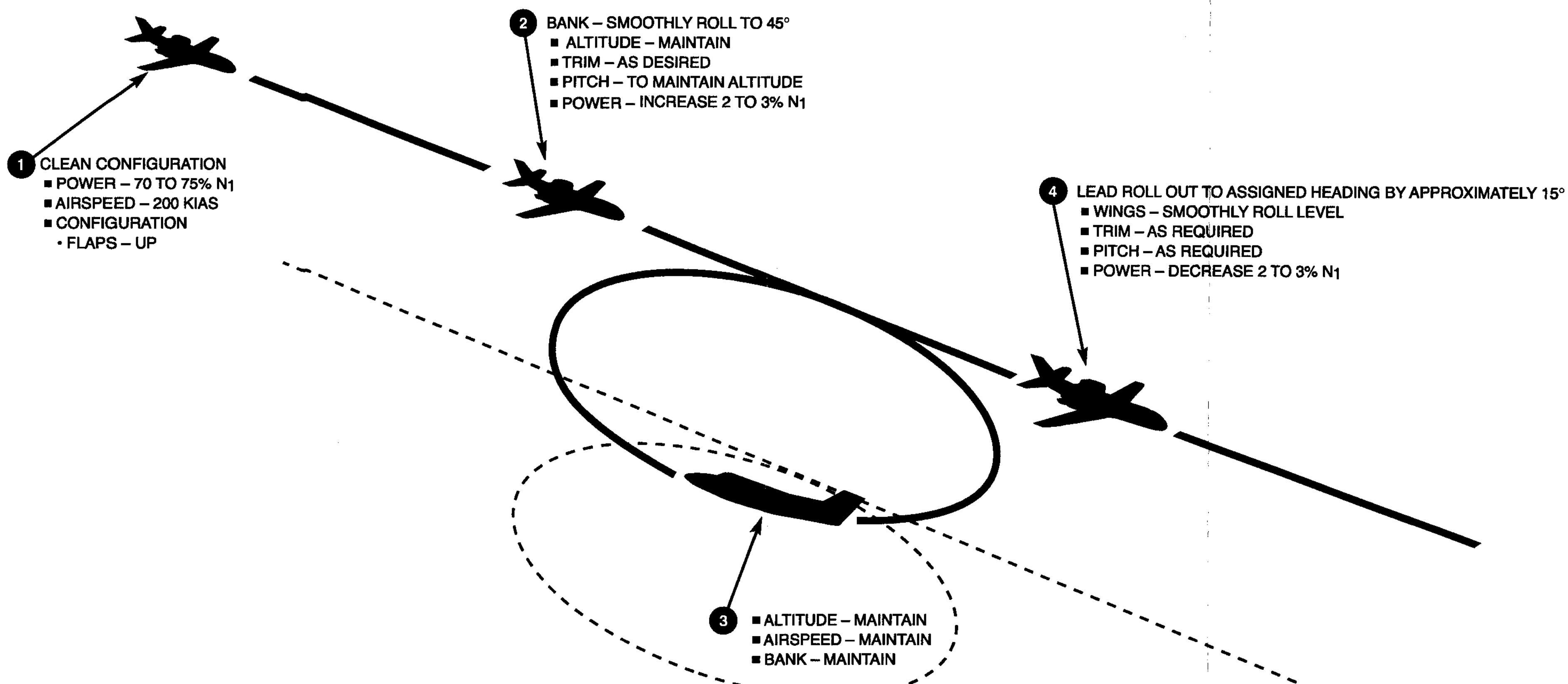
Engine Failure After V_1



Stalls at Altitude



Steep Turns



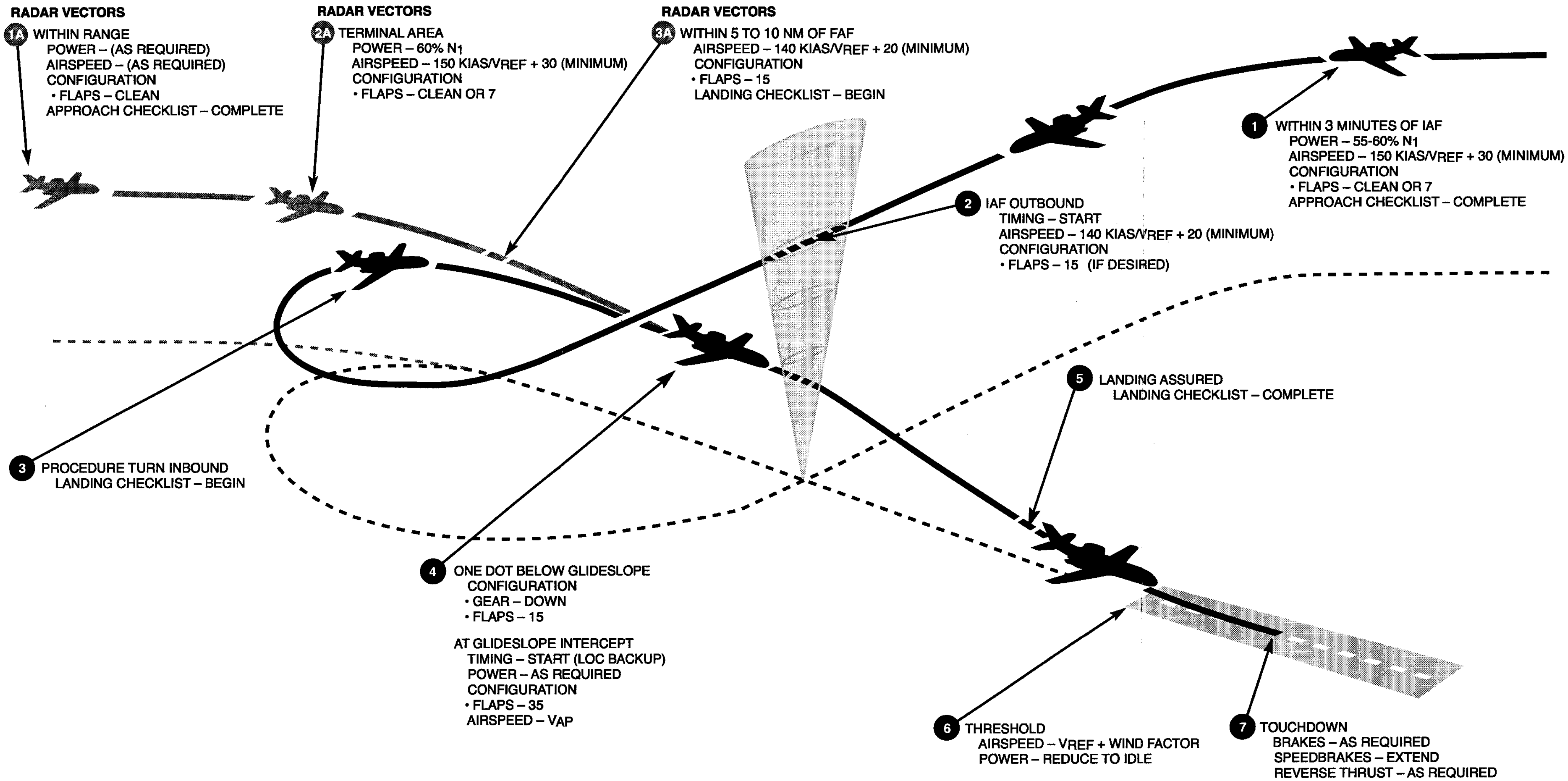
THIS MANEUVER MAY BE USED FOR A 180° OR 360° TURN, AND MAY BE FOLLOWED BY A REVERSAL IN THE OPPOSITE DIRECTION.

THE PNF MAY ASSIST AS DIRECTED BY THE PF.

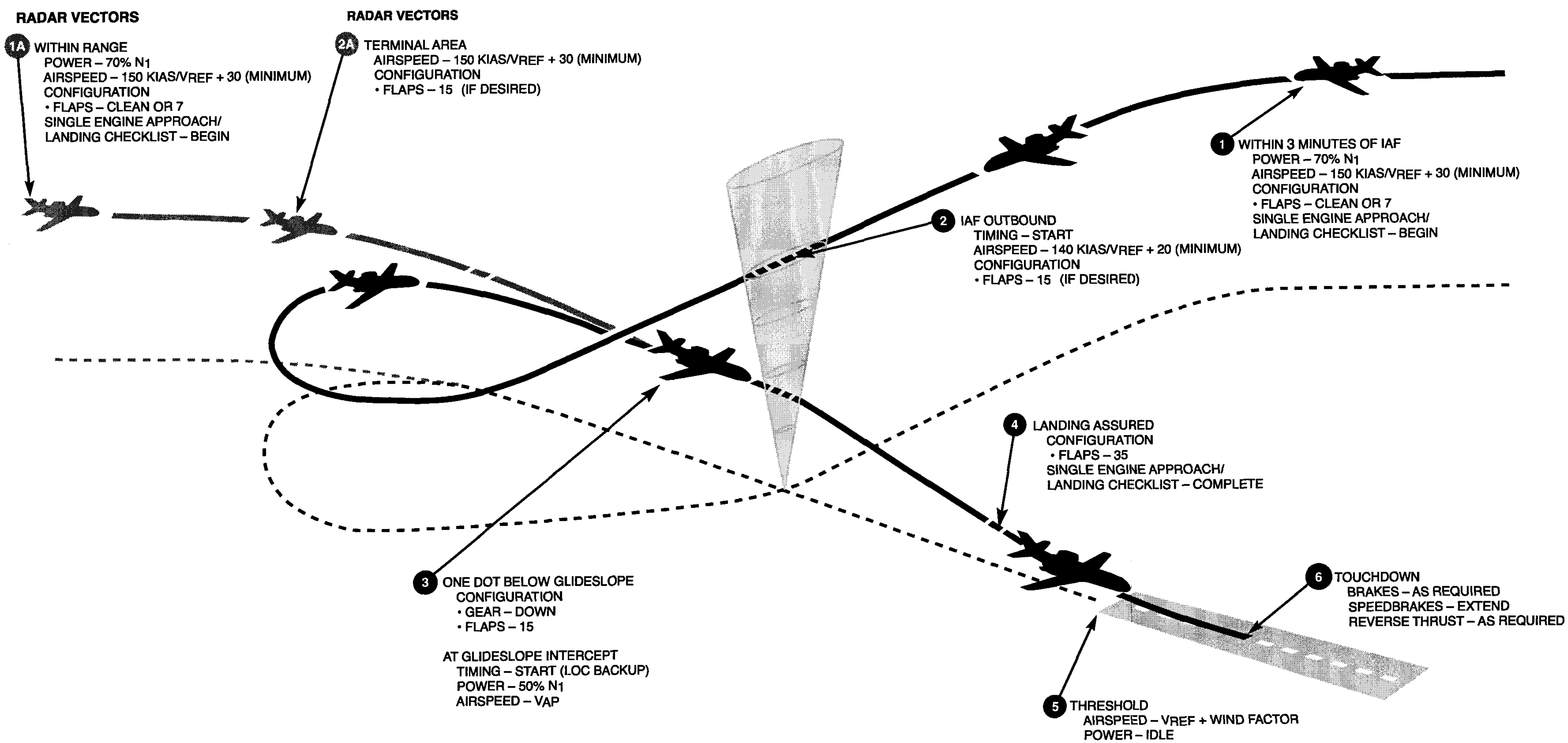
TOLERANCES:

- SPEED ± 10 KIAS
- ALTITUDE ± 100 FT
- BANK ± 5°
- HEADING ± 10°

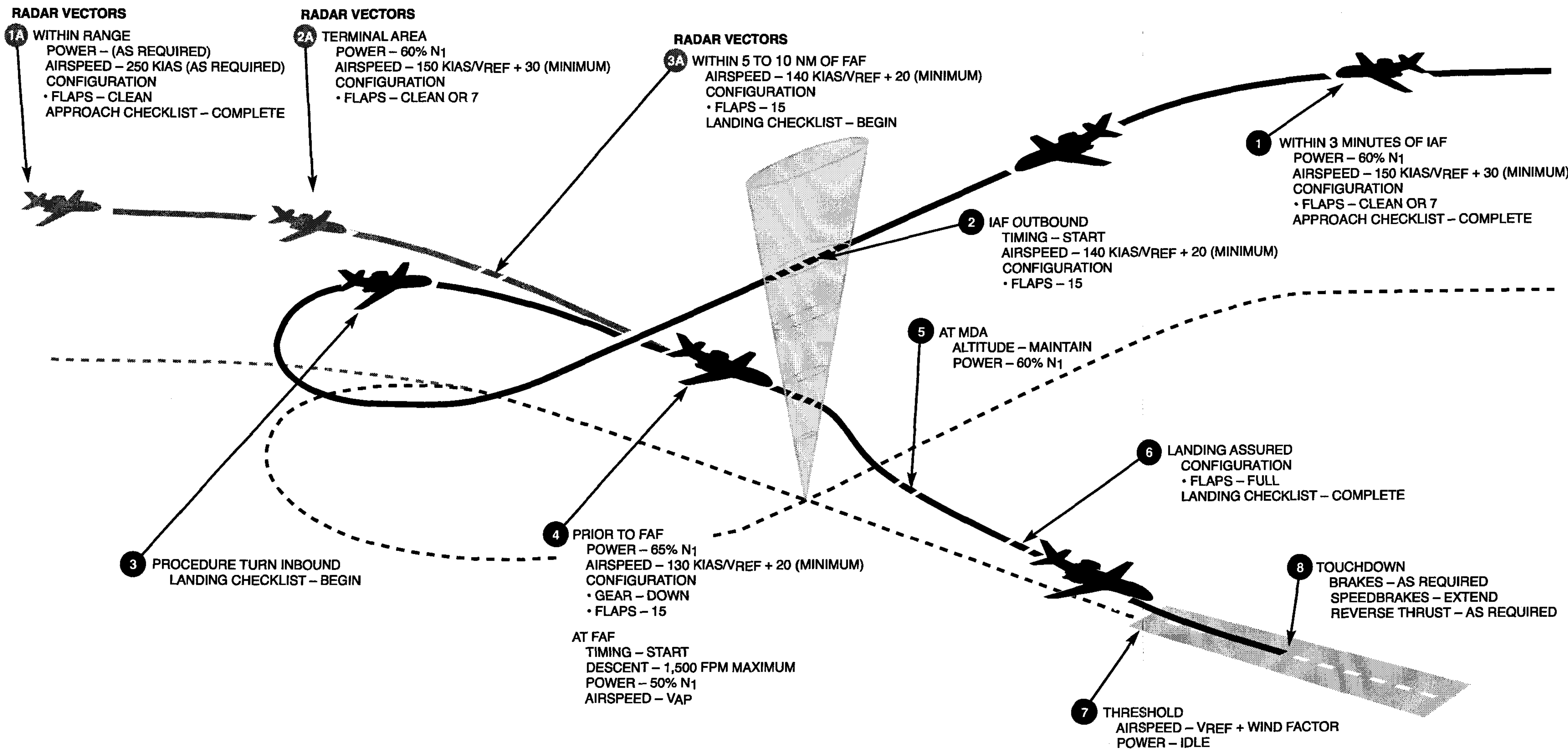
Precision Approach and Landing



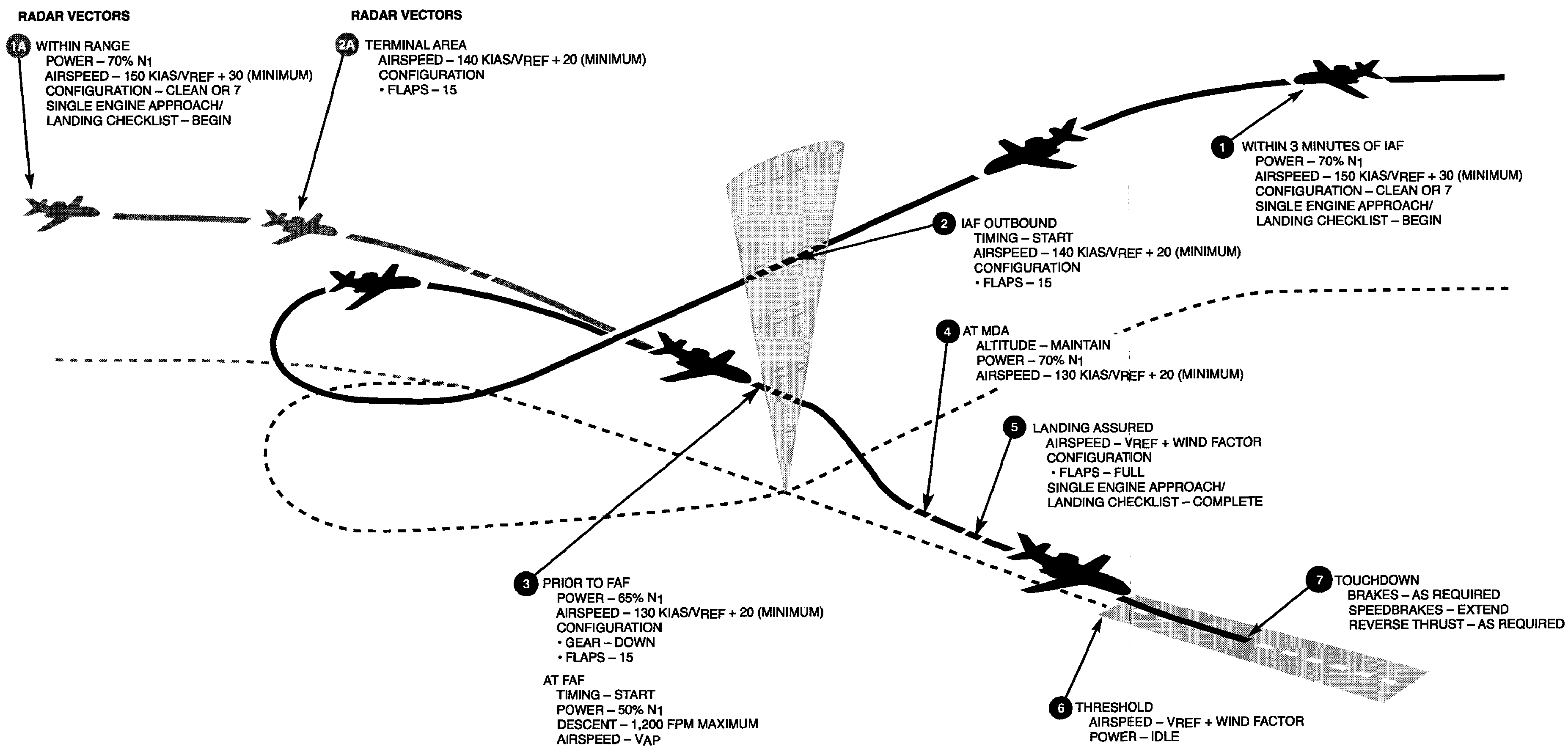
Single Engine Precision Approach and Landing



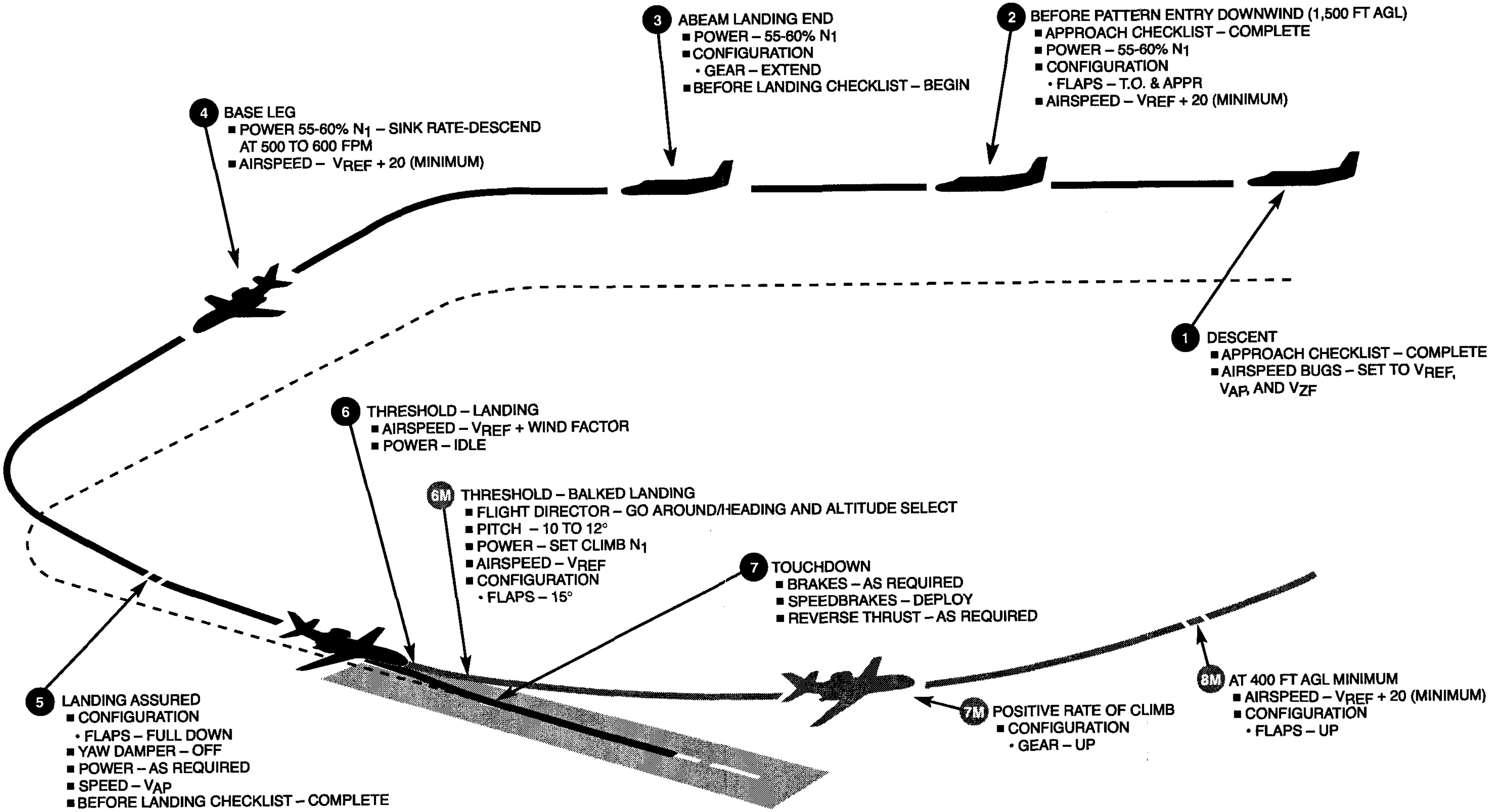
Non-Precision Approach and Landing



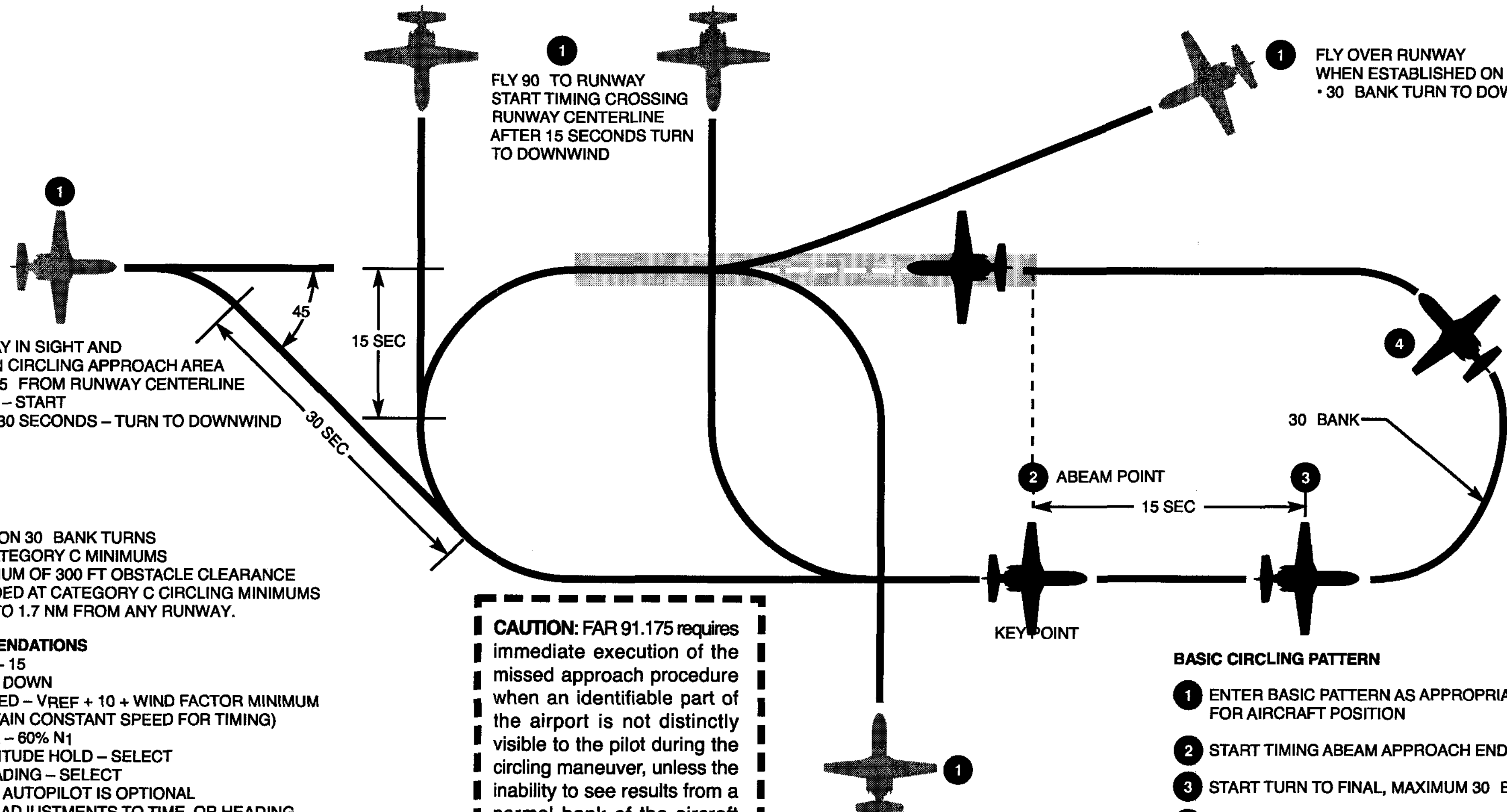
Single Engine Non-Precision Approach and Landing



Visual Approach/Balked Landing



Circling Approach



NOTES
BASED ON 30 BANK TURNS
USE CATEGORY C MINIMUMS
A MINIMUM OF 300 FT OBSTACLE CLEARANCE PROVIDED AT CATEGORY C CIRCLING MINIMUMS (MDA) TO 1.7 NM FROM ANY RUNWAY.

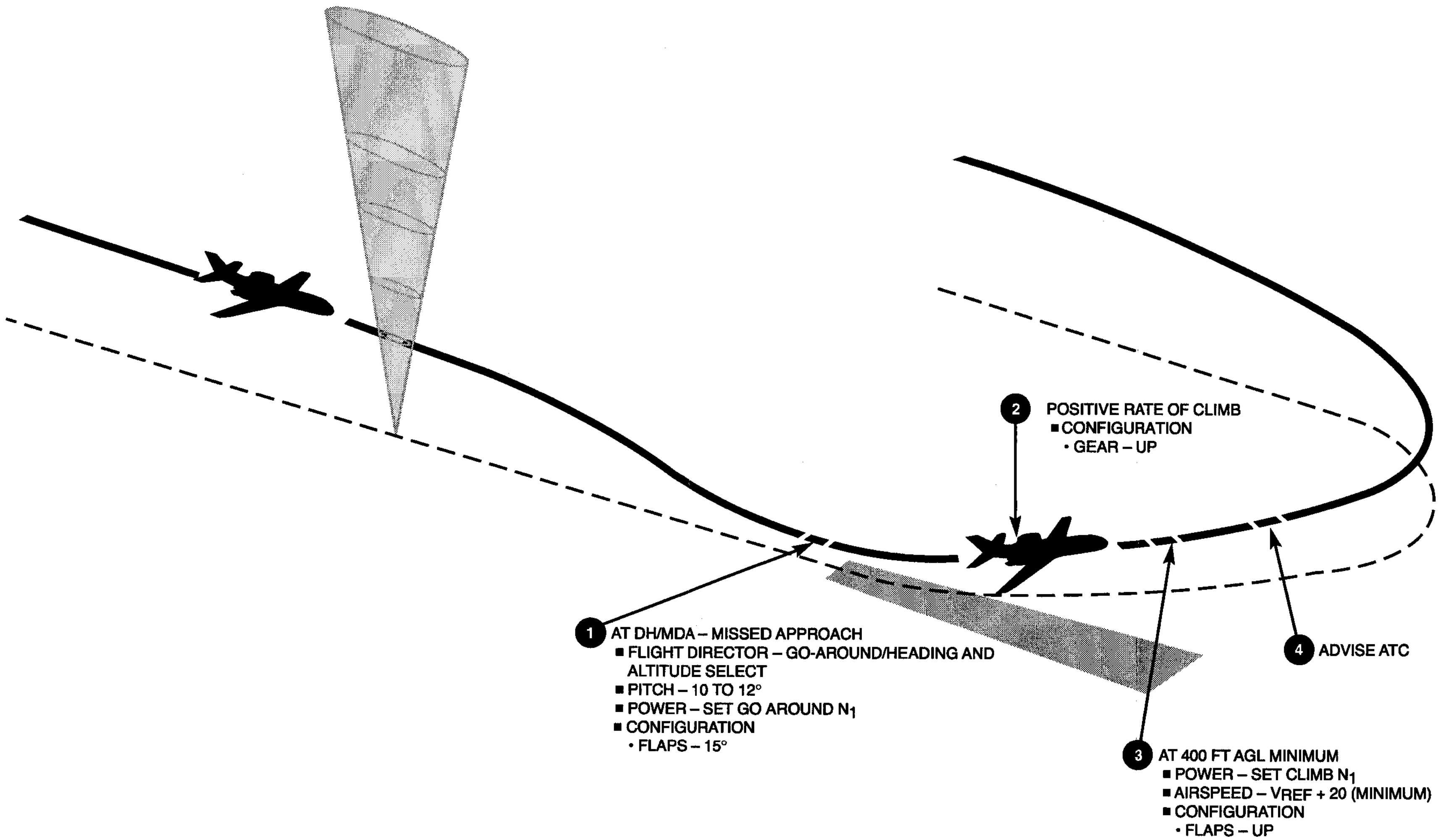
RECOMMENDATIONS
FLAPS – 15
GEAR – DOWN
AIRSPEED – V_{REF} + 10 + WIND FACTOR MINIMUM (MAINTAIN CONSTANT SPEED FOR TIMING)
POWER – 60% N_1
F/D ALTITUDE HOLD – SELECT
F/D HEADING – SELECT
USE OF AUTOPILOT IS OPTIONAL
SLIGHT ADJUSTMENTS TO TIME OR HEADING MAY BE USED TO ADJUST FOR WIND

CAUTION: FAR 91.175 requires immediate execution of the missed approach procedure when an identifiable part of the airport is not distinctly visible to the pilot during the circling maneuver, unless the inability to see results from a normal bank of the aircraft during the approach.

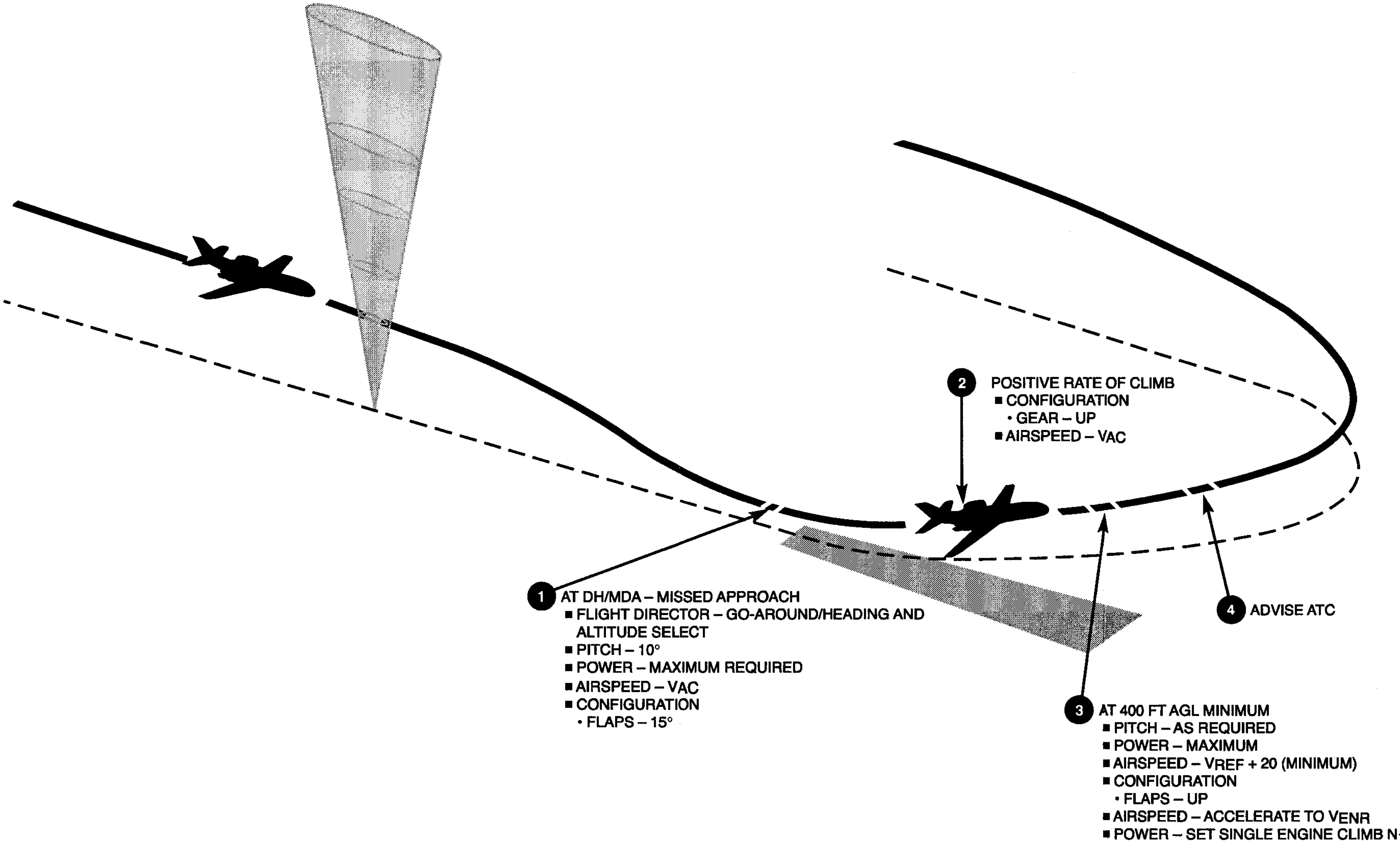
BASIC CIRCLING PATTERN

1. ENTER BASIC PATTERN AS APPROPRIATE FOR AIRCRAFT POSITION
2. START TIMING ABEAM APPROACH END OF RUNWAY
3. START TURN TO FINAL, MAXIMUM 30 BANK
4. WITH RUNWAY IN SIGHT AND IN POSITION TO MAKE A NORMAL DESCENT TO LANDING
   BEFORE LANDING CHECKLIST – COMPLETE
   DESCENT FROM MDA – BEGIN
   AIRSPEED – V_{AP}
   IF NOT IN A POSITION TO MAKE A NORMAL LANDING
   • GO-AROUND – EXECUTE
   AT THRESHOLD
   • AIRSPEED – V_{REF} + WIND FACTOR

Go-Around/Missed Approach



Single Engine Go-Around/Missed Approach



Limitations

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General Limitations

Audio Checklist (with or without Cabin Briefer)

- The audio checklist must contain FAA-approved operating procedures. It is the operator's responsibility to ensure checklist contents are consistent with current AFM revisions.

Authorized Operations

- Day and night
- VFR and IFR flight
- Flight into icing conditions

Baggage

Nose Baggage Compartment . . . . 350 LBS

Aft Cabin Storage Compartment . . . . 600 LBS

Aft Cabin Storage Floor Load Limit . . . . . 120 LBS/SQ FT

Tailcone Baggage Compartment . . . . 500 LBS TOTAL

Forward Section . . . . 300 LBS

Aft Section . . . . 200 LBS

Blade Antenna (E-Field) Installation

Used with Global GNS-X VLF/OMEGA

- Flight in P-static conditions (e.g., snow, rain, dust) causes VLF/OMEGA signal degradation. An associated decrease in position certainty may occur during these encounters.

Center Panel Mounted Single Clock

- Single pilot operation is prohibited when a center panel mounted single clock is installed.

Certification Status

- FAR, Part 25

Emergency Exit Door Pin

- Remove the emergency exit door pin prior to flight.

Maneuvers

- Acrobatic maneuvers, including spins, are prohibited.
- Intentional stalls above 25,000 ft are prohibited.

Minimum Flight Crew

- Pilot and copilot

Noise Levels

The Effective Perceived Noise Levels (EPNL) established in compliance with FAR 36, Amendment 12 (Stage 3) are shown in **Table 3-A**.The ICAO Annex 16 Chapter 3 noise values are the same as those for FAR Part 36, Amendment 12, and were obtained with the procedures used to establish compliance with FAR Part 36, Amendment 12. See **Table 3-A**.

The takeoff weight for these figures was 15,900 lbs; the landing weight was 15,200 lbs. Takeoff and sideline noise levels were established with a climb speed of 125 KIAS and with 7° flaps. The thrust was reduced at 3,565 ft AGL from the takeoff N_1% RPM to 82.7 N_1% RPM. Approach noise levels were obtained at 116 KIAS and FULL flaps.

No determination has been made by the FAA that the noise levels in the AFM are or should be acceptable or unacceptable for operation at, into, or out of any airport.

ICAO data applies only after approval of the Civil Aviation Authority of the country of the aircraft's registration (including approval of equivalent procedures used to establish FAR 36, Amendment 12 compliance).

Noise Reference	FAR 36 (EPNdB)	ICAO Annex 16, Chapter 3 (EPNdB)
Takeoff	83.7	68.7
Sideline	94.7	—
Approach	88.9	80.5

Table 3-A; Effective Perceived Noise Levels

Passenger Seat Position

- For all takeoffs and landings, the following apply.
  - Seats must be fully upright and outboard.
  - The seat just aft of emergency exit must be in most aft position to allow unobstructed access to the emergency exit.

Operational Limitations

Weight Limits

Maximum Ramp Weight . . . . 16,100 LBS

Maximum Takeoff Weight . . . . 15,900 LBS

- Takeoff weight is limited by the most restrictive of:
  - maximum certified takeoff weight
  - maximum takeoff weight permitted by climb requirements
  - takeoff field length.

Maximum Landing Weight . . . . 15,200 LBS

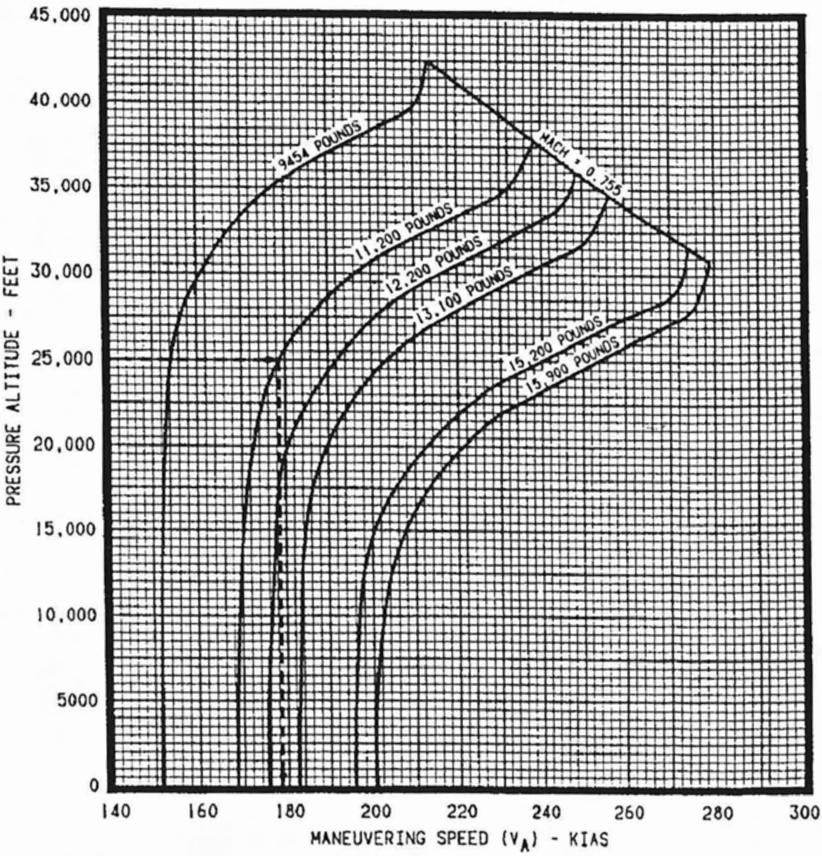
- Landing weight is limited by the most restrictive of:
  - maximum certified landing weight
  - maximum landing weight permitted by climb requirements or brake energy limit
  - landing distance.

Maximum Zero Fuel Weight:

Standard . . . . 11,200 LBS

Optional . . . . 12,200 LBS

Maximum Maneuvering Speeds



3-1

Speed Limits

V_A, Maximum Maneuvering . . . . SEE CHART (**Figure 3-1**)

- Full application of rudder and aileron controls, as well as maneuvers that involve angles-of-attack near stall, should be confined to speeds below maximum maneuvering speed.

V_{FE}, Maximum Flap Extended:

Full Flaps, LAND Position (35°) . . . . 173 KIAS

Partial Flaps, T.O., and T.O. & APPR. Position . . . . 200 KIAS

V_{LE}, Maximum Landing Gear Extended . . . . . . 292 KIAS

V_{LO}, Maximum Landing Gear Operating:

Extending . . . . 250 KIAS

Retracting . . . . 200 KIAS

V_{MCA}, Minimum Control, Air . . . . 85 KIAS

V_{MCG}, Minimum Control, Ground . . . . 86 KIAS

V_{MO}/M_{MO}, Maximum Operating (Zero Fuel Weight 11,200 Lbs):

V_{MO} Below 8,000 Ft . . . . 261 KIAS

V_{MO} Between 8,000 and 28,907 Ft . . . . 292 KIAS

M_{MO} Above 28,907 Ft . . . . 0.755 M

- Do not deliberately exceed the maximum operating limit speeds in any regime of flight (climb, cruise, or descent) unless a higher speed is authorized for flight test or pilot training.
- The center-of-gravity envelope is shown in **Figure 3-2**.

V_{MO}/M_{MO}, Maximum Operating (Zero Fuel Weight 12,200 Lbs):

V_{MO} Below 8,000 Ft . . . . 261 KIAS

V_{MO} Between 8,000 and 31,400 Ft . . . . 276 KIAS

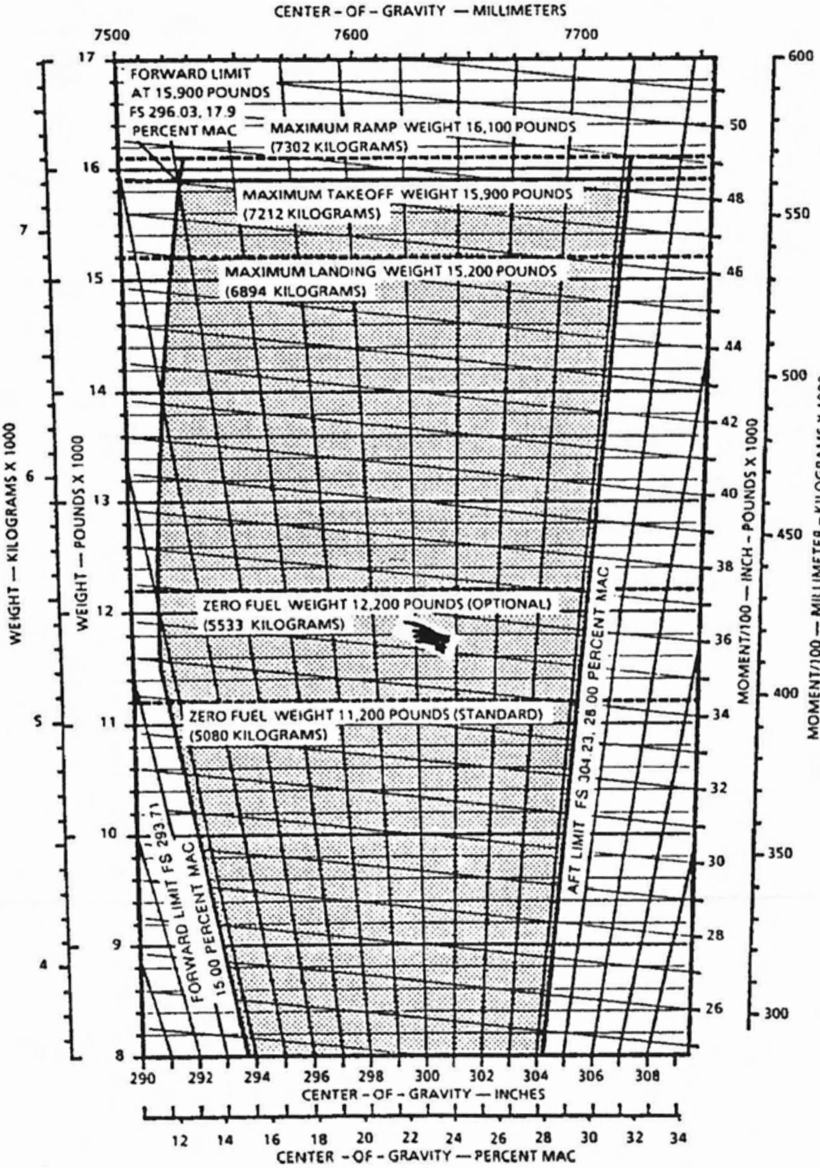
M_{MO} Above 31,400 Ft . . . . 0.755 M

- Do not deliberately exceed the maximum operating limit speeds in any regime of flight (climb, cruise, or descent) unless a higher speed is authorized for flight test or pilot training.

V_{SB}, Maximum Speedbrake Operation . . . . NO LIMIT

Autopilot Operation . . . . 292 KIAS/0.755 M

Center of Gravity Moment Envelope



3-2

Takeoff and Landing Operational Limits

Maximum Altitude . . . . 14,000 FT

Maximum Ambient Temperature (**Figure 3-3**) . . ISA + 39°C

Minimum Ambient Temperature . . . . -54°C

Maximum Demonstrated Crosswind . . . . 20 KTS

Maximum Tailwind Component . . . . 10 KTS

Maximum Tire Groundspeed . . . . 165 KTS

Maximum Water/Slush on Runway . . . . 0.5 INCH

Nose Tire Pressure . . . . 120 ± 5 PSI

- Goodrich nose tire P/N 031-613-8 is the only nose tire approved.
- The autopilot and yaw damper must be off for takeoff and landing.
- Vertical navigation system must be off below 500 ft AGL.

Gravel Runway Modification

For aircraft equipped for gravel runway operations, the following limitations apply.

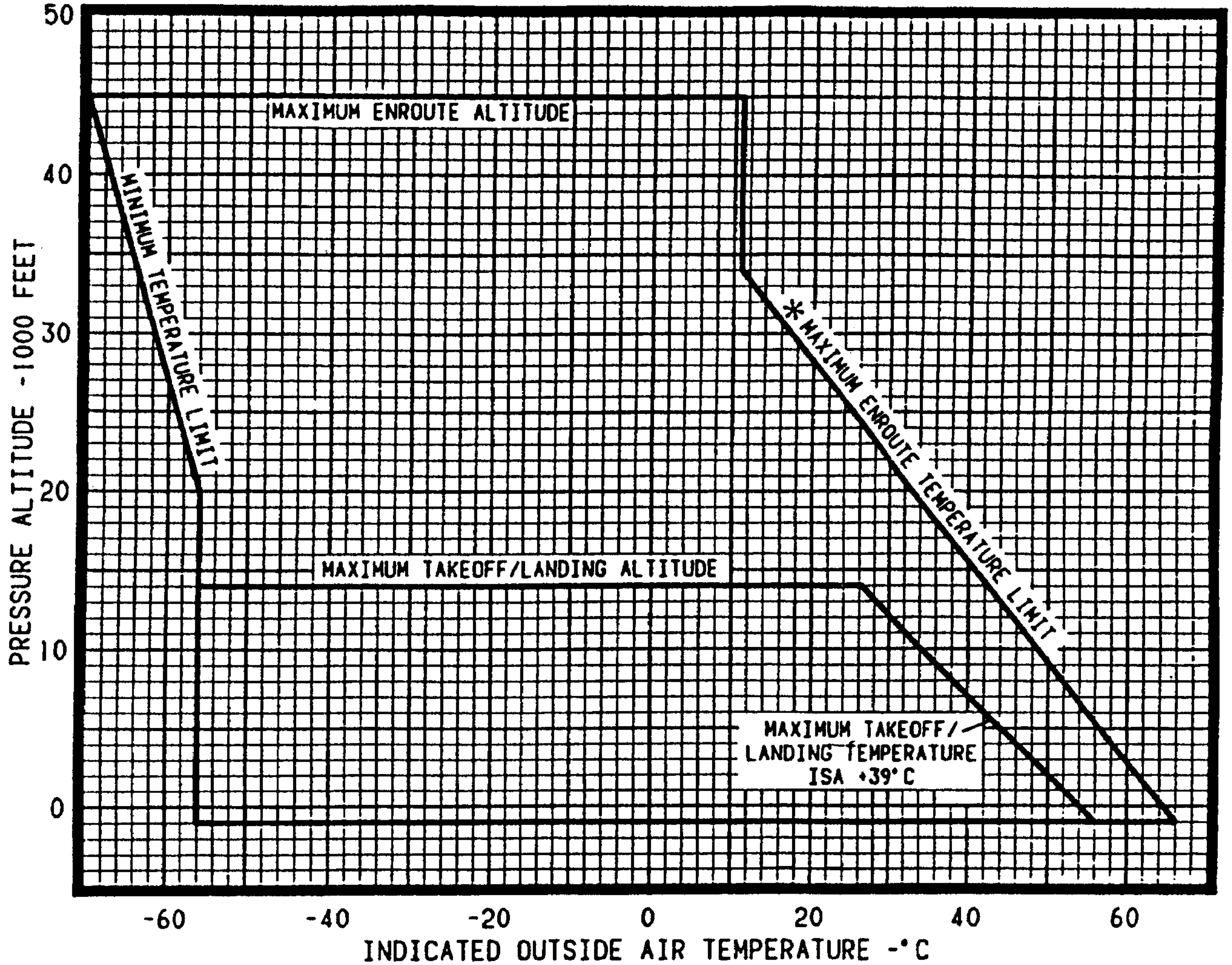
V_{LE}, Maximum Landing Gear Extended . . . . . . 200 KIAS

V_{LO}, Maximum Landing Gear Operating
(Extending or Retracting) . . . . 200 KIAS

- The anti-skid system must be operational and on for takeoff and landing on gravel runways.
- The nosewheel spin-up system shall be operational and on for landing on a gravel runway.
- Single pilot operation, per Exemption 4050A, is prohibited when operating from gravel runways.
- The nosewheel steering must be disengaged for takeoff and/or landing operation on gravel runways.

Information shown in italics is not included in the AFM Limitations chapter.

Takeoff/Landing/Enroute Temperature Limitations



* Maximum enroute operating temperature limit is ISA + 39°C ambient temperature adjusted for ram rise (refer to Figures 4-2 and 4-3, AFM, Performance Section) or the indicated outside air temperature from the above chart (AFM, Section 2), whichever is less.

3-3

Thrust reverser operation is prohibited on gravel runways.

> **CAUTION:** Damage to the aircraft structure and engines may occur when operations are conducted on gravel. Exercise extreme care in maintaining proper approach speeds. High speeds during touchdown may cause gravel damage from the nose wheel.

Enroute Operational Limits

Maximum Operating Altitude . . . . 45,000 FT

Maximum Ambient Temperature . . . . SEE CHART (**Figure 3-3**, previous page)

Minimum Ambient Temperature . . . . SEE CHART (**Figure 3-3**, previous page)

Generator Load 300A

Load Factors

In Flight

Flaps Up Position (0°) . . . -1.52 TO +3.8 G AT 15,900 LBS

Flaps T.O., T.O. & APPR to LAND
Position (7 to 35°) . . . . 0.0 TO +2.0 G AT 15,900 LBS

These accelerations limit the angle-of-bank in turns and severity of pullup maneuvers.

Landing

Flaps T.O. & APPR to LAND
Position (15 to 35°) . . . . +3.5 G AT 15,200 LBS

Systems Limitations

Avionics and Communications

Angle-of-Attack/Stick Shaker

- Use the angle-of-attack (AOA) indicating system as a reference, but do not use it to replace the airspeed indicator as a primary instrument.
- Use the AOA system as a reference for approach speed (1.3 V_{S1}) at all aircraft weights and center-of-gravity locations at zero, takeoff, takeoff/approach, and landing flap positions.
- If the stick shaker does not operate during the warning system test, or the AOA system is otherwise inoperative, it must be repaired before flight, except when operating the aircraft according to an approved Minimum Equipment List (MEL).

Autopilot

- One pilot must remain in his seat with seat belt fastened during all autopilot operations.
- Functionally test the autopilot torque monitor and roll monitor per procedures in the AFM, Section III prior to inflight use of the autopilot.
- Autopilot operation is prohibited above 14,500 ft if the torque monitor does not test (AP TORQUE annunciator illuminated) per normal procedures in the AFM, Section III.
- Autopilot operation is prohibited if the roll monitor annunciator illuminates in flight.
- Turn off the autopilot and yaw damper for takeoff and landing.
- Turn off the vertical navigation system below 500 ft AGL.

Global Airborne Flight Information System (AFIS)

- The Global System, Incorporated, Operator's Manual GNS-X (Report Number 1280, dated April 1, 1988, or later revision) and AFIS Operator's Manual Supplement for Global-Wulfsburg Systems GNS-X (Report Number 1278, dated March, 1989, revision 2 or later revision) must be immediately available to the flight crew for aircraft equipped with the Global AFIS.
- Navigation predicated on the GNS-X is prohibited until the navigation program is verified to be version PROG 02.
- The pilot in command must exercise reasonable and prudent judgment in the use of the advisory services of AFIS.

Global GNS-X Flight Management System

- The GNS Operator's Manual, Report No. 1280 with the applicable or later revisions, must be available to the flight crew whenever navigation is predicated on the use of the GNS-X.

  Refer to the applicable AFM supplement for pertinent program and report number information. Program version must be verified on the system's initialization page.
- Whenever operation is predicated on the use of the optional AFIS, the respective operator's manual, report number xxxx with the applicable or later revisions, must be available to the flight crew.

  Refer to the applicable AFM supplement for pertinent program and report number information.
- The GNS-X is not approved as the sole means of navigation. Other navigation equipment appropriate to the ground facilities along the intended route must be installed and operable, as required by the FARs applicable to the specific type of operation (i.e., VOR, DME, etc).

Information shown in italics is not included in the AFM Limitations chapter.

- The GNS-X position information must be checked for accuracy (reasonableness) prior to use as a means of navigation. The GNS-X position should be updated when a cross-check with other approved navigation equipment reveals an error greater than 3 NM, along-track or cross-track.
- Navigation within the national aerospace system shall not be predicated upon the GNS-X during periods of dead reckoning (DR).
- Following a period of dead reckoning, position should be verified by visually sighting ground reference points and/or using other navigation equipment such as NDB, VOR, DME, or radar fix.
- The GNS-X is not to be used as the primary reference in terminal areas, during approaches to or departures from airports unless the VPU sensor is operating and contributing to the position solution.
- When latitude/longitude transferred from the internal database (IDB) is displayed on the CDU, the pilot will ensure that it is a reasonable position for the requested identifier.
- The internal data base (IDB) must be updated to the latest revision every 28 days; updating to be accomplished with the Global Wulfsberg Systems update disk or equivalent. Update disks will be received by mail (to subscribers) or obtained from authorized Global Wulfsberg installation centers or update centers.
- The fuel management mode is for advisory purposes only and it does not replace the airplane primary fuel flow and fuel quantity systems.
- When operating outside the magnetic variation model (north of 70° north latitude or south of 60° south latitude), the pilot must manually insert magnetic variation.

- The GNS-X with LORAN-C and/or VLF/OMEGA sensors may be used in the North Atlantic - Minimum Navigation Performance Specification (NAT-MNPS) Airspace provided the proper documentation and approval is obtained and dual navigation systems are installed in accordance with Advisory Circular 91-49.
- It is the responsibility of the pilot in command to exercise reasonable and prudent judgement in the use of the advisory services of the optional AFIS.

Global GNS-X with LORAN-C

- Navigation may not be predicated on LORAN-C when operating outside the approved LOA boundaries as shown in the GNS-X Operator's Manual, or when the LORAN-C sensor is in DR.

Global GNS-X with VLF/OMEGA

- Navigation may not be predicated on VLF/OMEGA when the VLF/OMEGA sensor is in DR.
- The GNS-X with only the VLF/OMEGA sensor operating is not approved for operation into valleys (e.g., between peaks in mountainous terrain).

Global GNS-X with GPS

- The Global Positioning System (GPS) sensor is approved as a contributing sensor for navigation if one of the following is true.
  - the GPS sensor is not the only sensor selected for use; it receives four or more satellites; the GDOP is six or less, and the sensor is not using altitude
  - the system is receiving three or more satellites and the GDOP, using altitude, is 10 or less.
- Use manually entered altitude only after failure of the automatic inputs; update it every five minutes.

High Frequency (HF) Automatic Direction Finder (ADF) System

- The ADF bearing information may be erratic when keying the HF transmitter. If this occurs, disregard the ADF bearing during periods of transmission.

Honeywell FMZ-600/800/900 Flight Management System (FMS) with VLF/ OMEGA Sensor and Optional AFIS

- The Honeywell FMS Pilot's Manual (Report Number 5400-0154 with the following applicable or later revisions) must be immediately available to the flight crew for aircraft equipped with the Honeywell FMZ-600/800/900 FMS. The AFM supplement is intended for use with the following FMS program versions:
  - FMS Program Version – NZ-8803, NZ-8804, NZ-9002
  - FMS Pilot's Manual – F/4-25-88, G/1-27-89, H/1-8-90.
- The FMZ, with either one VOR/DME or two DMEs available for navigation, is approved for VFR/IFR RNAV operation within the contiguous U.S. and Alaska according to the enroute, terminal, and approach criteria of AC 90-45A and AC 20-130.
- If the Honeywell OZ-800 VLF/OMEGA sensor is receiving usable signals from at least two OMEGA navigation stations, the Honeywell OZ-800 VLF/OMEGA sensor is capable of and meets the requirements of the following:
  - VFR/IFR RNAV operation within the contiguous U.S. and Alaska according to the enroute criteria of AC 20-101C
  - flight in the NAT-MNPS airspace according to AC 120-33 or AC 91-49 with dual independent system installations
  - operation as sole means of lateral navigation according to AC 120-37 in the areas between latitudes 70°N and 55°S with the exceptions of that area above 45°N bounded by longitudes 30°E and 120°E extended across the Asian continent.

- The FMZ is not approved as the sole means of navigation. Therefore, when the FMZ with the Honeywell OZ-800 VLF/OMEGA sensor is to be used as the primary means of navigation, or when coupled to the autopilot, flight director, or HSI, the navigation equipment required by the FAR applicable to the specific type of operation must be installed and operating.
- Check the OZ-800 VLF-OMEGA position information for accuracy (reasonableness) prior to use as a means of navigation and under the following conditions:
  - prior to compulsory reporting points during IFR operation when not under radar surveillance or control
  - at or prior to arrival at each enroute waypoint during VLF/OMEGA operation along approved RNAV routes
  - prior to requesting off-airway routing, and at hourly intervals thereafter during VLF operation off of approved RNAV routes.
- Navigation shall not be predicated on the use of the OZ-800 VLF/OMEGA sensor during periods of sensor DR (annunciated as DR on VLF/OMEGA status).
- Following a period of DR (annunciated as NO POSITION SENSORS), visually sight ground reference points and/or use other navigation equipment (e.g., RNAV, NDB, VOR/DME, radar fix) to verify position fix.
- The OZ-800 VLF/OMEGA sensor is not to be used as the primary reference during any operation in a terminal area or during departures from or approaches to airports or into valleys (e.g., between peaks in mountainous terrain).

- The FMZ is approved for IFR RNAV approach operation if the following conditions are true:
  - the pilot confirms the tuned navaid used for VOR/DME updating and/or display
  - both the EHSI and FMZ CDU annunciate the approach mode (EHSI annunciates APP in blue and FMZ CDU annunciates APRCH in white)
  - the FMZ is programmed with data from the current published instrument approach procedures only
  - the FMZ CDU degrade annunciator is not illuminated
  - the last waypoint in the active flight plan is the destination airport.
- The use of manually inserted runway coordinates (place/bearing/distance, place/bearing/place/bearing, or latitude and longitude) is approved for VFR operations only.
- The FMS data base information must be kept current by monthly updates obtained from Honeywell – Commercial Flight Systems Division.
- When transferring latitude/longitude and vertical waypoint altitude from the data base, ensure that it is a reasonable position and correct vertical waypoint altitude for the requested identifier.
- When using previously stored flight plans and waypoints, verify them for reasonable position prior to use.
- During terminal area operation with the degrade annunciator illuminated on the FMZ CDU, verify the VOR/DME position.
- Fuel display parameters are advisory only; they do not replace the primary fuel quantity and flow indicators.

- The pilot's and copilot's altimeters are the primary altitude reference during all vertical navigation (VNAV) operations.
- Navigation data from the FMZ during periods of DR as indicated by the illumination of the CDU DR light above the CRT are not reliable; therefore, their use is prohibited for navigation.
- FMS vertical navigation data is advisory only and is limited to FMS CDU and EFIS. It cannot be coupled to the autopilot or EFIS.
- The pilot in command must exercise reasonable and prudent judgment in the use of the advisory services of AFIS.

Honeywell LSZ-850 Lightning Sensor System

- The Honeywell LSZ-850 Lightning Sensor System Pilot's Operating Manual (Publication Number 28-1146-54-00, dated June, 1988, or later revision) must be immediately available to the flight crew for aircraft equipped with the Honeywell LSZ-850 Lightning Sensor System.
- Do not base thunderstorm avoidance solely upon the use of the LSZ-850 Lightning Sensor System.

Honeywell Primus II SRZ-850 Integrated Radio System

- The Honeywell Pilot's Operating Handbook, SRZ-850 (Publication Number 28-1146-50-01, dated June, 1988, or later revision) must be immediately available to the flight crew for aircraft equipped with the Honeywell Primus II SRZ-850 Integrated Radio System.
- The aircraft must be equipped with an independent operational auxiliary COM 1/NAV 2 control display unit.

Honeywell Single EDZ-605 Electronic Flight Instrument System (EFIS) with Multifunction Display (MFD)

- The Honeywell SPZ-500C Integrated Flight Control System Pilot's Manual for the Citation II/V (Publication Number 28-1146-63-00, dated November, 1989, or later revision) must be immediately available to the flight crew for aircraft equipped with the single EDZ-605 EFIS.
- Both flight director and autopilot-coupled Category II approaches are approved using the Honeywell EDZ-605 EFIS displays.
- Category II approaches are not approved in the composite mode (REV SELECTED).

> **NOTE:** Crew qualification is required to conduct Category II approaches. The Honeywell EDZ-605 EFIS is compatible with the Sperry SPZ-500 Flight Guidance System.

- Operating in the composite mode (REV SELECTED) is approved only with the flight director selected.
- Limit EFIS ground operation with the pilot's DISP FAN annunciator illuminated to 10 minutes or until either EADI HOT or EHSI annunciator illuminates (whichever occurs first).
- Do not dispatch with any EADI HOT or EHSI HOT annunciator illuminated.
- Do not dispatch in instrument meteorological conditions with the pilot's DISP FAN annunciator illuminated. Dispatch in visual meteorological conditions is allowed with the DISP FAN annunciator illuminated if the DISP FAN Illuminated on Ground abnormal procedures are followed.

- Do not dispatch following a flight where either an EADI HOT or EHSI HOT annunciator is illuminated until the condition is identified and corrected.
- The pilot's EADI and EHSI must be installed and operational in the normal (non-reversionary) mode for takeoff.
- Verify the EDZ-605 system is operational with a satisfactory preflight test per AFM normal procedures.
- Use the "T" speed display in the EADI for reference, but do not use it to replace the airspeed indicator as a primary instrument.
- The radar checklist must contain FAA-approved operating procedures. The operator must ensure the checklist contents are consistent with current AFM revisions.

On **units 001 to 074 with the Honeywell Single EDZ-605 EFIS**, limit ground operation with engines inoperative to ambient temperatures below ISA + 34°C as shown below.

Below 45°C . . . . NO LIMIT
Between 45°C and 51°C . . . . ONE HOUR LIMIT
Above 51°C . . . . NO OPERATIONS PERMITTED

Honeywell SPZ-500 Flight Guidance System – Category II

- Equipment operation must be according to the Category II Manual. Category II operation is approved only from the left seat with the SPZ-500 system mounted for use from the pilot's instrument panel.
- The autopilot must be off at 80 ft AGL for approaches with the flaps in the landing position.
- Do not activate the marker beacon audio muting at the middle marker on a Category II approach. If it is activated, the inner marker audio remains muted because of the short time between markers.
- Prior to initiating a coupled Category II approach, verify autopilot is functioning.

- Make Category II approaches in the following configurations only: flaps in LAND, gear down, and both engines operating.

Honeywell Single EDZ-605 Electronic Flight Instrument System (EFIS)

- The Honeywell SPZ-500C Integrated Flight Control System Pilot's Manual for the Cessna Citation II/V (Publication EDZ-605/805, number 28-1146-63-00, dated November, 1989, or later revision) must be immediately available to the flight crew for aircraft equipped with the Honeywell Single EDZ-605/805 Electronic Flight Instrument System.
- Both flight director- and autopilot-coupled Category II approaches are approved for using the Honeywell EDZ-605 EFIS displays.
- Category II approaches are not approved in the composite mode (REV selected).

> **NOTE:** Crew qualification is required to conduct Category II approaches. The Honeywell EDZ-605 EFIS is compatible with the Sperry SPZ-500 Flight Guidance System.

- Operating in the composite mode (REV selected) is approved only with the flight director selected.
- Limit EFIS ground operation with the pilot's DISP FAN annunciator illuminated to 10 minutes or until either EADI HOT or EHSI HOT annunciator illuminates (whichever occurs first).
- Do not dispatch if either the EADI HOT, EHSI HOT, or SG HOT annunciators illuminate.
- Do not dispatch in instrument meteorological conditions with the pilot's DISP FAN annunciator illuminated. Dispatch in visual meteorological conditions is allowed with the DISP FAN annunciator illuminated if the DISP FAN Illuminated on Ground abnormal procedures are followed.

- Do not dispatch following a flight where either an EADI HOT or EHSI HOT annunciator illuminates until identifying and correcting the condition.
- The pilot's EADI and EHSI must be installed and operational in the normal (non-reversionary) mode for takeoff.
- Verify the EDZ-605 system as operational per a satisfactory preflight test.
- On **units 001 to 074**, limit operations on the ground with or without engines operating as shown below.

  Below 45°C . . . . NO LIMIT

  Between 45 and 51°C . . . . ONE HOUR LIMIT

  Above 51°C . . . . NO OPERATIONS PERMITTED

Honeywell Dual EDZ-605 Electronic Flight Instrument System (EFIS) with Multifunction Display (MFD)

- The Honeywell SPZ-500C Integrated Flight Control System Pilot's Manual for the Cessna Citation II/V (Publication Number 28-1146-63-00, dated November, 1989, or later revision) must be immediately available to the flight crew for aircraft with the Honeywell Dual EDZ-605 EFIS.
- Both flight director- and autopilot-coupled Category II approaches are approved using the Honeywell EDZ-605 EFIS displays.
- Category II approaches are not approved in the composite mode (REV selected).

NOTE: Crew qualification is required to conduct Category II approaches. The Honeywell EDZ-605 EFIS is compatible with the Sperry SPZ-500 Flight Guidance System.

- Operating in the composite mode (REV selected) is approved only with the flight director (single cue or cross-pointer) selected.
- Limit EFIS ground operation with either pilot's or copilot's DISP FAN annunciator illuminated to 10 minutes or until either EADI HOT or EHSI HOT annunciator illuminates (whichever occurs first).
- Dispatch is approved with any combination of two of the following symbol generators (SG) operational: pilot's SG, copilot's SG, or MFD SG. The hot annunciator associated with the two operational symbol generators must be extinguished.
- Do not dispatch with either the EADI HOT or EHSI HOT annunciator illuminated.
- Do not dispatch with both pilot's and copilot's DISP FAN annunciators illuminated.
- If the DISP FAN Light Illuminated on Ground abnormal procedures are followed, dispatch in visual meteorological conditions is allowed with one EFIS FAN (pilot or copilot) annunciator illuminated.
- Do not dispatch following a flight where either an EADI HOT or EHSI HOT annunciator illuminates until the condition is identified and corrected.
- Both the pilot's and the copilot's EADIs and EHSIs must be installed and operational in the normal (non-reversionary) mode for takeoff and flight into instrument meteorological conditions (IMC).
- The EDZ-605 system must be operational per a satisfactory preflight test as contained in the AFM normal procedures.
- The aircraft must have an operational, independently powered attitude gyro.
- Use the "T" speed display in the EADI for reference but do not use it to replace the airspeed indicator as a primary instrument. The copilot's "T" speed references the pilot's pitot/static system.

- The radar checklist must contain FAA-approved operating procedures. It is the operator's responsibility to ensure the checklist contents are consistent with current AFM revisions.
- On **units 001 to 074**, limit ground operation with or without engines operating when ambient temperatures are as shown below.

  Below 45°C . . . . NO LIMIT

  Between 45°C and 51°C . . . . ONE HOUR LIMIT

  Above 51°C . . . . NO OPERATIONS PERMITTED

J.E.T. ADI-330 Attitude Indicator

- Navigation information is limited to ILS localizer and glide-slope or BC localizer (NAV 1 or 2 only).
- Unless installed in place of the AI-804 standby gyro, the ADI-330 attitude indicator does not meet the instrument panel location requirements of FAR 121.305(j) for a third attitude instrument.

Standby Gyro Horizon

- Accomplish a satisfactory preflight test on the standby gyro system.

UNS-1 A/B Flight Management System

NOTE: The following are specific and individual limitations applicable to the various sensor modes of the UNS-1 Flight Management System. When all sensors are operating normally, composite navigation information is output. In this case, the limitations that apply are a composite of the limitations listed below.

- The UNS-1A or UNS-1B Operator's Manual, as applicable to the software version, must be available to the flight crew whenever navigation is predicated on the use of the UNS-1 FMS.

  Please refer to the applicable AFM supplement for pertinent software version and manual numbers.
- IFR FMS approaches must be performed in the FMS Approach Mode only, and in accordance with published area navigation approach procedures.
- The UNS-1 installation is not approved as the sole means of navigation. Therefore, when the UNS-1 is to be used as a primary means of navigation, or when coupled to the autopilot, flight director, or HSI, the navigation equipment required by the Federal Air Regulations (FARs) applicable to the specific type of operation must be installed and operating.
- The UNS-1 position information must be checked for accuracy (reasonableness) prior to use as a means of navigation and when a cross-check with other approved navigation equipment reveals an error greater than 3 NM, along-track or cross-track.
- Navigation shall not be predicated on the use of the UNS-1 during periods of Dead Reckoning.

Information shown in italics is not included in the AFM Limitations chapter.

- Following a period of dead reckoning (annunciated as POS UNCERTAIN on MSG page), position fix should be verified by visually sighting ground reference points and/or by using other navigation equipment such as RNAV, NDB, VOR/DME, or radar fix.
- The UNS-1 is not to be used as a primary reference during any operation in a terminal area or during departures from or approaches to airports unless the DME or Radio Reference Sensor (RRS) is operating and contributing to the solution.
- Jeppesen Data Base information must be kept current by monthly updates distributed by Universal Navigation Corporation or Jeppesen Incorporated.
- When longitude/latitude is transferred from the Jeppesen Data Base, the pilot must assure that is a reasonable position for the requested identifier.
- UNS-1 displayed VNAV information is advisory information only and is not valid below 18,000 ft unless it is barometrically corrected by interface to a digital air data computer or other source. With optional symbol generators, UNS-1 VNAV data can be displayed in the EFIS but cannot be coupled to the autopilot.
- If TAS input is not provided, VNAV information is not available and manual TAS entry is required for wind computations.
- Fuel display parameters are advisory only, and do not replace the primary fuel quantity and flow indicators.
- When using the HOLD function of the UNS-1, the airplane must be established on the final heading to the holding fix prior to activating the HOLD function.
- If the UNS-1 is configured to display VNAV data in the EFIS, the vertical angle limits on the UNS-1 configuration page must be set to 6° for approach and 8° for enroute.

OMEGA/VLF

- Provided the UNS-1 OMEGA/VLF sensor is receiving usable signals from at least two OMEGA navigation stations, the UNS-1 OMEGA/VLF sensor is demonstrated to be capable of and has been shown to meet the requirements of:
  - VFR/IFR RNAV operation within the conterminous United States and Alaska in accordance with enroute criteria of AC 20-130 or the criteria of AC 20-101C.
  - Flight in the NAT-MNPS Airspace in accordance with AC 120-33 or AC 91-49.
- The UNS-1 with OMEGA/VLF only operating is not to be used as a primary reference during operation into valleys, i.e., between peaks in mountainous terrain.

GPS

- The Global Positioning System (GPS) sensor is approved as a contributing sensor for navigation provided:
  - The GPS sensor is not the only sensor selected for use.
  - It is receiving four or more satellites.

> **CAUTION:** When operating the UNS-1 GPS/OMEGA/VLF system, proximity to buildings, hangars, power lines, etc., may cause interference with the operation of the system. Verify position coordinates prior to departure.

Electrical and Lighting

Battery Limitations

- Limit engine starts to three per hour.
- If the BATT O'TEMP annunciator illuminates during ground operation, do not take off until after the proper maintenance procedures have been accomplished.
- If a battery limitation is exceeded, accomplish a deep cycle (including a capacity check) to detect possible cell damage.
- Three generator-assisted cross-starts equal one battery start. If using a GPU for start, do not count a battery cycle.

CAUTION: Use of a GPU with voltage in excess of 28V DC or current in excess of 1,000A may damage the starter.

Prolonged Ground Operation

- Continuous ground operation of generator above 125A at ground idle speed (46% N_2) or 225A at flight idle speed (52% N_2) is prohibited.

Starter Cycle Limitations

GPU or Generator-Assisted Cross-Start:

Engine Starts . . . . TWO PER 30 MINUTES

Cycles of Operation . . . . . . TWO WITH A 30-SECOND REST PERIOD BETWEEN CYCLES

Battery Start:

Engine Starts . . . . THREE PER 30 MINUTES

Cycles of Operation . . . . . THREE WITH A 30-SECOND REST PERIOD BETWEEN CYCLES

Fuel

Anti-Ice Additive

WARNING: Anti-icing additives containing ethylene glycol monomethyl ether (EGME) or diethylene glycol monomethyl ether (DIEGME) are harmful if inhaled, swallowed or absorbed through the skin, and cause eye irritation. Also, they are combustible. Before using this material, refer to all safety information on the container.

- The minimum additive concentration for EGME shall be 0.06% by volume, and maximum concentration shall be 0.15% by volume. Fuel, when added to the tank, should have a minimum concentration of 0.06% by volume.
- Use not less than 20 fluid ounces of EGME additive per 260 gallons of fuel or more than 20 fluid ounces of EGME additive per 104 gallons of fuel.
- The minimum additive concetration for DIEGME shall be 0.10% by volume, and maximum concentration shall be 0.15% by volume. Fuel, when added to the tank, should have a minimum concentration of 0.10% by volume.
- Use not less than 20 fluid ounces of DIEGME additive per 156 gallons of fuel or more than 20 fluid ounces of DIEGME additive per 104 gallons of fuel.

CAUTION: Ensure that the additive is directed into the flowing fuel stream and that the additive flow is started after the fuel flow starts and is stopped before fuel flow stops. Do not allow concentrated additive to contact coated interior of fuel tank or aircraft painted surface.

NOTE: Military JP-4, JP-5, and JP-8 have refinery preblended anti-icing.

Approved Fuels

- Observe the limits shown in **Table 3-C**.

Condition	Per Canadian Pratt and Whitney Specification 204		Aviation Gasoline Per MIL-G-5572
	Jet A, A-1, A-2, JP-5, and JP-8	Jet B and JP-4	
Min. Fuel Temp. – Takeoff (°C)	-40	-54	-54
Min. Fuel Temp. ñ Starting (°C)	-40	-54	-54
Max. Fuel Temp. – (°C)	+50	+50	+32
Max. Altitude (ft)	45,000	45,000	18,000
Max. Asymmetric Fuel Differential for Normal Operations (lbs)	200	200	200
Emergency Asymmetric Fuel Differential (lbs) [1]	600	600	600
Fuel Control Density Adjustment for Optimum Engine Acceleration	0.81	0.79	0.73

Table 3-C; Approved Fuels and Associated Conditions

[1] Flight characteristic requirements were not demonstrated with a fuel imbalance above 200 lbs.

Aviation Gasoline

- All grades of MIL-G-5572 avgas are permitted for a maximum of 50 hours or 3,500 gallons between overhauls if the following occur.
  - Fuel temperature is within limits.
  - Maximum ambient air temperature at takeoff is +32°C.
  - Boost pumps are on. (To crossfeed, turn the boost pump off on the side opposite the selected tank.)
  - The hours avgas used are entered in the engine logbook. (For record-keeping purposes, assume one hour of engine operation equals 70 gallons of gasoline.)
  - Maximum operating altitude is 18,000 ft.

Boost Pumps

- The boost pumps must be on when the FUEL LOW LEVEL annunciators illuminate or when indicated fuel is 185 lbs or less.

Differential

Maximum Asymmetric
Fuel Differential in Flight . . . . 200 LBS

Maximum Asymmetric Fuel
Differential in an Emergency . . . . 600 LBS

Flight characteristic requirements were not demonstrated with fuel imbalance above 200 lbs.

Unusable Fuel

- Fuel remaining in the fuel tanks when the fuel quantity indicator reads zero is not usable in flight.

Hydraulics

Approved Fluids

- Hyjet, Hyjet W, III, or IV
- Skydrol 500A, B, B-4, C or LD-4

Ice and Rain Protection

Prolonged Ground Operation

- Limit ground operation of pitot/static heat to two minutes to preclude damage to angle-of-attack system.

Windshield Ice Protection Fluid

- Use TT-I-735 isopropyl alcohol for windshield anti-ice.

Landing Gear

Nose Tires

- Goodrich nose tire P/N 031-613-8 is the only nose tire approved.
- The nose tire must be inflated to 120 ± 5 PSI.

Oxygen

- The pressure-demand, sweep-on oxygen mask must be properly stowed to qualify as a quick-donning oxygen mask.

> **CAUTION**: Headsets, eyeglasses, or hats worn by the crew may interfere with the quick-donning capabilities of the optional oxygen masks.

- Continuous use of the supplemental oxygen system is prohibited above the following cabin altitudes:

  Carrying Passengers . . . . 25,000 FT

  Crew Only . . . . 37,000 FT

EROS Oxygen Mask

- Prior to flight, check the EROS oxygen mask and properly stow it in its receptacle to qualify it as a quick-donning oxygen mask.
- Continuous use of the supplemental oxygen system is prohibited above the following cabin altitudes:

  Carrying Passengers . . . . 25,000 FT

  Crew Only . . . . 40,000 FT

> **CAUTION**: Headsets, eyeglasses, or hats worn by the crew may interfere with the quick-donning capabilities of the oxygen mask. Unless carefully trimmed, mustaches and/or beards worn by crewmembers may interfere with proper sealing of the oxygen mask. Check mask fit and seal while on the ground prior to flight.

Powerplant – Pratt and Whitney Turbofan JT15D-5A

Approved Oils

- Use only the following oils:
  - Aero Shell Turbine Oil 500 and 560
  - Castrol 5000
  - Exxon Turbo Oil 2380
  - Mobil Jet Oil II and 254
  - Royco Turbine Oil 500 and 560
  - Oils listed in Pratt and Whitney Canada Inc. SB No. 7001.
- If oil replenishment with a dissimilar oil is necessary, it is permissible to use any approved oil brand if the total quantity of added oil does not exceed two U.S. quarts in any 400-hour period.
- If more than two U.S. quarts of oil is needed, and a dissimilar oil brand must be used, drain and flush the complete oil system, then refill with a single brand of approved oil according to engine Maintenance Manual instructions.

If oils of nonapproved brands or of different viscosities become intermixed, drain and flush the complete oil system, then refill with an approved oil according to the Engine Maintenance Manual instructions.

CAUTION: The engine manufacturer strongly recommends that when changing from an existing lubricant formulation to a third generation lubricant formulation a change be made only when an engine is new or freshly overhauled. For additional information on use of third generation oils, refer to the engine manufacturer's pertinent oil service bulletins.

Engine Fan Inspection

To ensure accurate fan speed thrust indication, inspect fan for damage prior to each flight.

Engine Operating Limits

Observe the limits shown in **Table 3-D**.

Thrust Setting		Operating Limits					
		Time Limit (minutes)	ITT (°C)	% Turbine RPM (N_2)	% Fan RPM (N_1)	Oil Pressure (PSIG) [2]	Oil Temperature (°C)
Takeoff		5	700	96	104 [4]	60 to 83 [3]	10 to 121
Maximum Continuous		Continuous	680	96	104 [4]	60 to 83	10 to 121
Idle	**Flight**	Continuous	580	52 minimum		40 minimum	-40 to 121
	Ground	Continuous	580	46 minimum		40 minimum	-40 to 121
Start			See Note 1				-40 minimum
Transient			700	96	106	See Note 3	-18 to 129

Table 3-D; Engine Operating Limits

[1] The maximum start limit is 700°C for two seconds. See **Figure 3-5**, page 3-43.

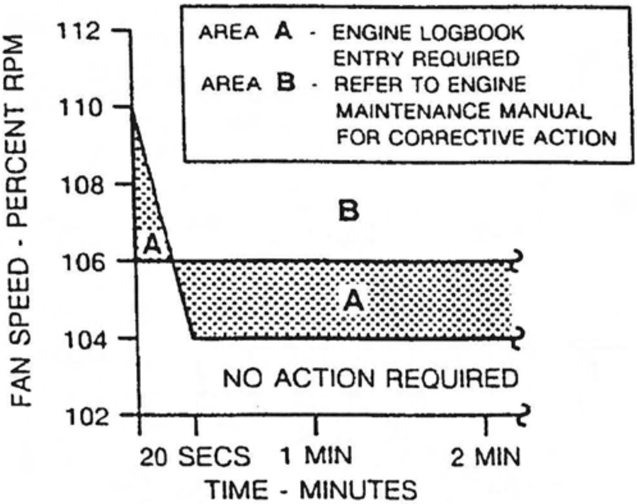
[2] Normal oil pressures are 60 to 83 PSIG above 52% turbine RPM. Oil pressures below 60 PSIG are undesirable and should be tolerated only for completion of the flight, preferably at a reduced power setting. Oil pressures below 40 PSIG are unsafe and require that either the engine be shut down or a landing be made as soon as possible using the minimum power required to sustain flight.

[3] The maximum transient oil pressure can be 95 PSIG for 90 seconds.

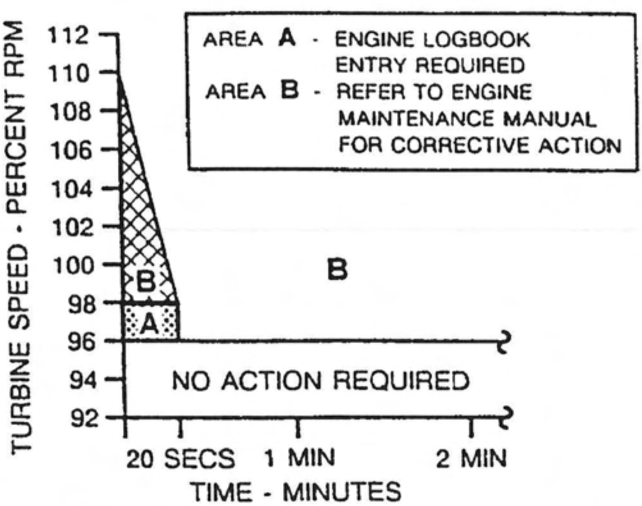
[4] Refer to the appropriate thrust setting charts in AFM Section IV for percent Fan RPM setting.

Engine Overspeed Limits

- Observe the limits shown in **Figure 3-4**.



FAN OVERSPEED LIMITS



TURBINE OVERSPEED LIMITS

3-4

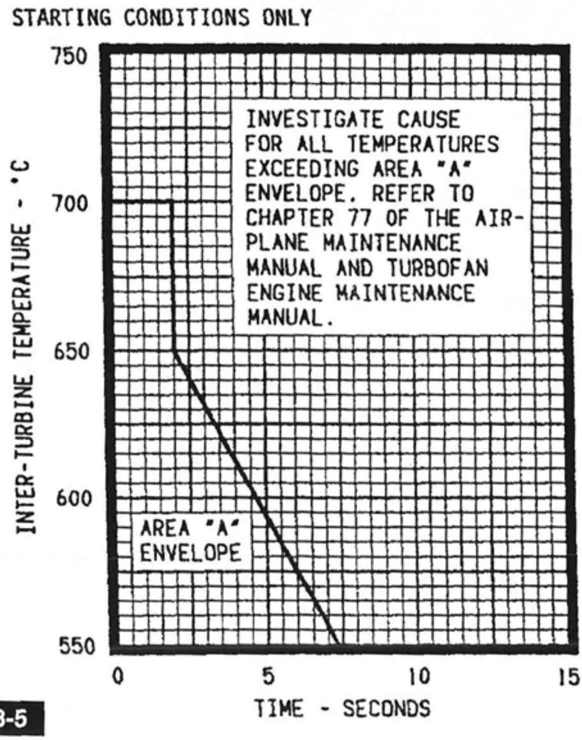
Ground Idle Switch

- The ground idle switch must be in HIGH during touch-and-go landings.
- The ground idle switch must be in HIGH during ground operation with engine anti-ice bleed ON.

ITT Limits

Minimum Oil Temperature for Starting . . . . -40°C

- Observe the limits shown in **Figure 3-5**.



3-5

All conditions except starting: if the inter-turbine temperature (ITT) exceeds 700°C during takeoff, or if 680°C is exceeded at any time other than takeoff, refer to Chapter 77 of the Maintenance Manual and Engine Maintenance Manual.

Prolonged Ground Operation

- Limit continuous engine ground static operation, up to and including five minutes at takeoff thrust, to ambient temperatures not exceeding ISA +39°C.

Pneumatic and Pressurization

Cabin Pressurization

Normal . . . . - 0.0 TO 8.9 ± 0.1 PSID

Flood Cooling System

- Do not operate the flood cooling system above 10,000 ft pressure altitude.
- Do not use the flood cooling system for cabin heating.

Freon Air Conditioner

- Do not operate the compressor above 18,000 ft.

Thrust Reverser

- Reduce reverse thrust power to idle reverse at 60 KIAS on landing roll.
- Limit maximum reverse thrust setting to 86% N_1 for ambient temperatures at or above -18°C and 79% N_1 for ambient temperatures below -18°C.
- Maximum allowable thrust reverser deployed time is 15 minutes in any one-hour period.
- Limit engine static ground operation to idle power if thrust reversers are deployed.
- Do not use thrust reversers during touch-and-go landings.
- Before every takeoff verify the thrust reversers are operational by using the Before Takeoff test in the AFM normal procedures.

Limitations – Citation SII

General Limitations

Authorized Operations

- Day and Night
- VFR and IFR Flight
- Flight Into Icing Conditions (**Figure 3-6**)
- Engine anti-ice must be on during ground and flight operations when icing conditions exist or are anticipated (visible moisture with OAT between +10°C and -30°C).

Maximum Baggage Loads

Nose Compartment:

With SBS550-30-15
(Anti-Ice System Improvement) . . . . 330 LBS

Without SBS550-30-15 . . . . 350 LBS

Aft Cabin . . . . 600 LBS

Tailcone Compartment:

Without Freon Air-Conditioning:

Forward of Cargo Net . . . . 300 LBS

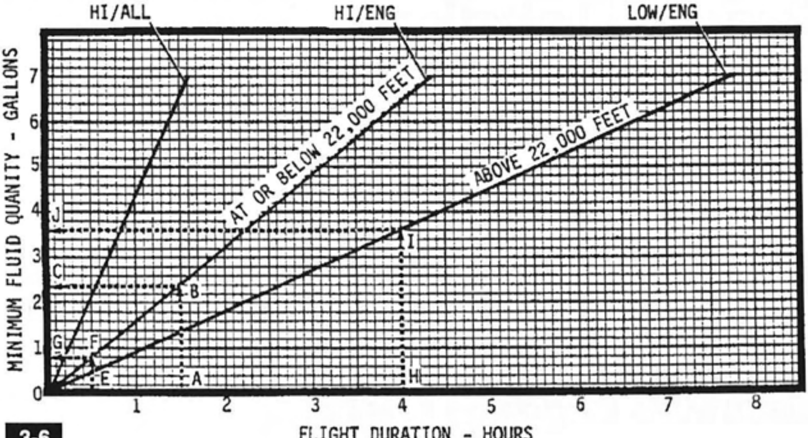
Aft of Cargo Net . . . . 200 LBS

TOTAL . . . . 500 LBS

With Freon Air-Conditioning . . . . 300 LBS

There is no distinction between forward or aft of cargo net.

Required Minimum Engine Ice Protection Fluid Quantity



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Certification Status

- FAR, Part 25

Emergency Exit

- The emergency exit door pin must be removed before flight.

Maneuvers

- No aerobatic maneuvers, including spins
- No intentional stalls above 25,000 ft or at engine speeds between 61.0 and 65.0% N_1

Flight Crew Requirements – Pilot/Copilot

- Pilot in command must have CE-500 type rating and meet FAR 61.58 requirements.
- The copilot shall posess a multi-engine rating, an instrument rating for flight above 18,000 ft or flight into instrument meterological conditions, and meet the requirements of FAR 61.55.
- Category II operation requires two pilots qualified in accordance with FAR 61.3.

Passenger Seat Position

- For all takeoffs and landings:
- Seats fully upright and outboard
- Seats aft of emergency exit must be in most aft position.

Towing

- Maximum nose gear towing turning angle limit is 95° either side of center. Forcing the nose gear beyond the towing stop (95° limit), shears the bolts attaching the steering gear assembly to the cylinder.

Operational Limitations

Maximum Weights

SII 001 to 085 without SBS550-11-1:

Ramp . . . . 14,900 LBS
Takeoff . . . . 14,700 LBS
Landing . . . . 14,000 LBS
Zero Fuel . . . . 11,000 LBS

SII 001 to 085 with SBS550-11-1; 086 and subsequent:

Ramp . . . . 15,300 LBS
Takeoff . . . . 15,100 LBS
Landing . . . . 14,400 LBS
Zero Fuel . . . . 11,200 LBS

Maximum takeoff and landing weights may be additionally restricted due to altitude, temperature, and field length.

- Takeoff weight is limited by most restrictive of:
  - maximum certified T/O weight
  - maximum T/O weight permitted by climb requirements
  - takeoff field length.
- Landing weight is limited by most restrictive of:
  - maximum certified landing weight
  - maximum landing weight permitted by climb requirements or brake energy limit
  - landing distance.

Center of Gravity Moment Envelope

SII 001 to 085 without SBS550-11-1:

Forward Limit:

At 9,600 lbs or less . . . . 15.0% MAC
(273.71" AFT OF DATUM)

At 14,700 lbs . . . . 19.92% MAC
(277.69" AFT OF DATUM)

There is a straight line variation between 15.0 and 19.92% MAC.

Aft Limit at 14,700 lbs or less . . . . 28.0% MAC
(284.23" AFT OF DATUM)

SII 001 to 085 with SBS550-11-1; 086 and subsequent:

Forward Limit:

At 9,600 Lbs . . . . 15.0% MAC
(273.71" AFT OF DATUM)

At 15,100 Lbs . . . . 20.3% MAC
(277.99" AFT OF DATUM)

There is a straight line variation between 15.0 and 20.3% MAC.

Aft Limit at 14,700 Lbs or Less . . . . 28.0% MAC
(284.23" AFT OF DATUM)

Speed Limits

M_{MO} above 29,315 ft . . . . 0.721M INDICATED

V_{MO} 8,000 to 29,315 ft . . . . 276 KIAS

V_{MO} below 8,000 ft . . . . 261 KIAS

Do not exceed these limits in any flight regime (climb, cruise, or descent) unless a higher speed is authorized for flight test or pilot training.

Maximum Maneuvering (V_A) . . . . SEE CHART (**Figure 3-7**, page 3-81)

- Confine the following to speeds below V_A:
  - full rudder application
  - full aileron control application
  - maneuvers involving angle of attack near stall.

Maximum Flap Extended (V_{FE}):

Full flaps, LAND (35°) 172 KIAS

Partial flaps, T.O./T.O.& APPR (7°/20°) 200 KIAS

7° flap performance is available on **SII 057 and subsequent and 001 to 056 with SBS550-27-2**.

Maximum Speedbrake Operation (V_{SB}) . . . . NO LIMIT

Minimum Control – Air (V_{MCA}) . . . . 83 KIAS

Minimum Control – Ground (V_{MCG}) . . . . 73 KIAS

Autopilot Operation 276 KIAS/0.721M

Landing Gear Speeds:

Without SBS550-32-8 (Increased Maximum Gear Extend Speed):

V_{LE} . . . . 172 KIAS

V_{LO} . . . . 172 KIAS

With SBS550-32-8:

V_{LE} . . . . V_{MO}

V_{LO} (Extending) . . . . 250 KIAS

V_{LO} (Retracting) . . . . 200 KIAS

With Gravel Runway Kit and SBS550-32-8:

V_{LE} . . . . 200 KIAS

V_{LO} . . . . 200 KIAS

Maximum Tire Ground Speed . . 165 KTS RECOMMENDED

Takeoff and Landing Operational Limits

Maximum Altitude . . . . 14,000 FT

Maximum Ambient Temperature . . . . ISA +39°C

Minimum Ambient Temperature . . . . -54°C

Maximum Crosswind . . . . DEMONSTRATED 29 KTS

Maximum Tailwind Components . . . . 10 KTS

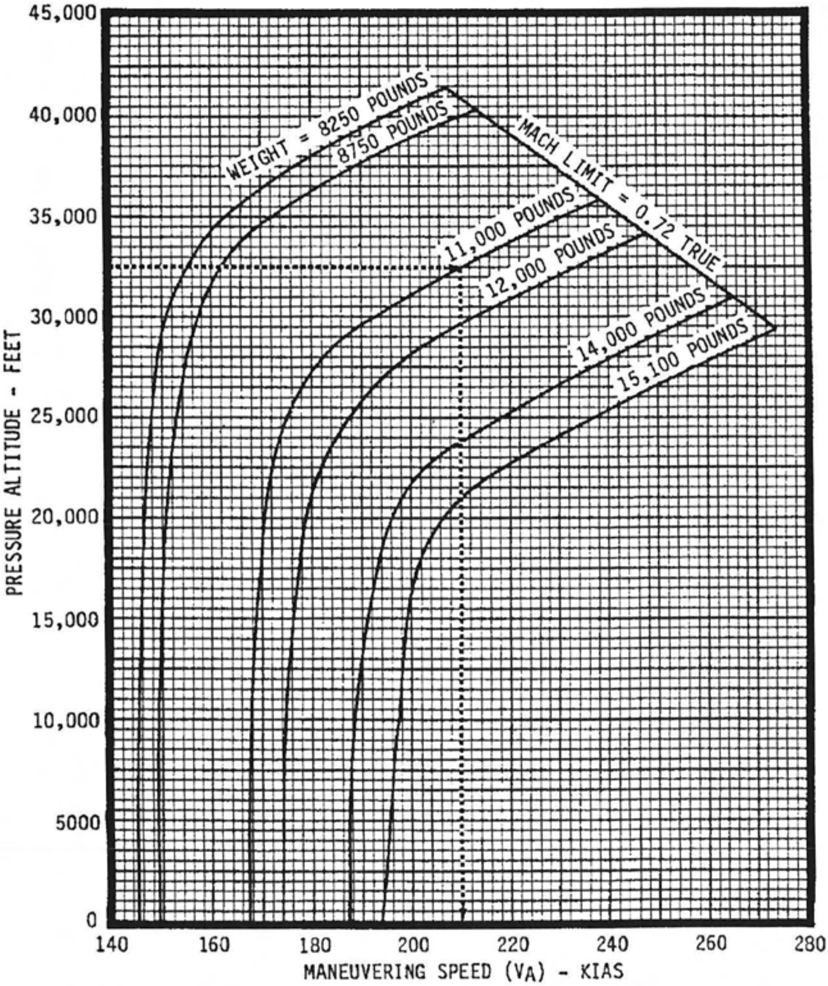
Maximum Water/Slush on Runway . . . . 0.5 IN

Maximum Crosswind with T/Rs deployed . . . . 25 KTS

- Autopilot/yaw damper must be off for takeoff/landing.
- Vertical navigation system must be off below 500 ft AGL.

Maximum Maneuvering Speeds

Citation SII



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Enroute Operational Limits

Maximum Operating Altitude . . . . 43,000 FT

Ambient Temperature Limits . . . . SEE GRAPH (**Figure 3-8**)

Generator Load 300A

Load Factors

In Flight, Flaps:

Up (0°) . . . . -1.52 TO +3.8 G

T.O./T.O. & APPR/ LAND (7° to 35°) . . . . 0.0 TO +2.0 G

7° flaps performance available on **SII 057 and subsequent and 001 to 056 with SBS550-27-2**.

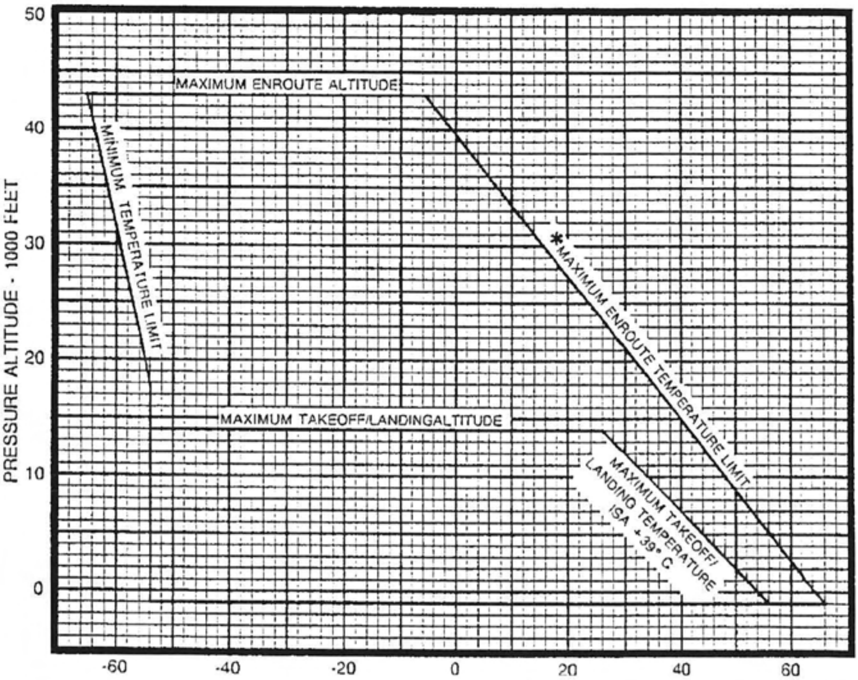
These accelerations limit angle-of-bank in turns and severity of pullup maneuvers.

During Landing, Flaps:

T.O. & APPR/LAND (20° to 35°) . . . . +3.5 G

Takeoff/Landing/Enroute Temperature Limits

Citation SII



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System Limitations

Avionics and Communications

Angle-of-Attack

- AOA may be used as reference, but does not replace the primary airspeed indicator.
- AOA can be used as reference for approach speed (1.3 V_{SI}) at all aircraft weights and CG locations with flaps at zero, takeoff/approach, and landing positions.
- If AOA or stick shaker is inoperative during warning system test, the system must be repaired before flight.

Autopilot

- One pilot must remain in his seat with seat belt fastened during all AP operations.
- AP current monitor must be functionally tested prior to inflight use.
- AP operation is prohibited above 14,500 ft if torque monitor does not test per AFM,III.
- Autopilot/yaw damper must be off for takeoff/landing.
- Vertical navigation system must be off below 500 ft AGL.

HF/ADF Systems

- The ADF bearing information may be erratic during HF transmissions. If this occurs, disregard ADF bearing during transmission periods.

Electrical and Lighting Systems

Battery

- If the BATT O'HEAT annunciator illuminates during ground operation, do not take off until proper maintenance is accomplished.
- Limit engine starts to three per hour. If the battery limitation is exceeded, accomplish a deep cycle with capacity check to detect possible cell damage. Refer to the Maintenance Manual for procedure.

> **NOTE**: Three generator-assisted cross-starts equal one battery start. Do not count an external power engine start as battery cycle.

Enroute Operating Limits

Maximum Generator Load 300A

GPU Limitation

- With GPU connected to aircraft, limit GPU output to a maximum of 1,000A and adjust voltage to 28V DC with no load. Exceeding these limits may damage the starter.

Starter Limitation

- With external power or generator-assisted cross-start as the starter power source, limit engine starts to two per 30 minutes with a 30-second rest between cycles.
- With the battery as the power source, limit engine starts to three per 30 minutes with a 30-second rest between cycles.

Prolonged Ground Operation

- Continuous ground operation of a starter/generator above 225 amps is prohibited.

Fuel System

- Fuel remaining in the fuel tank when the quantity indicator reads zero is not usable in flight.

Anti-Ice Additive

- Anti-icing must be added to all fuels that do not contain the additive. Military JP-4, JP-5, and JP-8 have refinery pre-blended anti-icing.

WARNING: Anti-icing additives containing ethylene glycol monomethyl ether (EGME) or diethylene glycol monomethyl ether (DIEGME) are harmful if inhaled, swallowed or absorbed through the skin, and cause eye irritation. Also, they are combustible. Before using this material, refer to all safety information on the container.

Additive	Concentration Range	
	Minimum	Maximum
Hi-Flo EGME	20 fluid ounces per 260 gallons 0.06%	20 fluid ounces per 104 gallons 0.15%
DIEGME	20 fluid ounces per 156 gallons 0.10%	20 fluid ounces per 104 gallons 0.15%

CAUTION: Ensure that additive is directed into flowing fuel stream and additive flow is started after fuel flow. The additive should be stopped before fuel flow stops. Do not allow concentrated additive to contact coated interior of the fuel tank or the aircraft's painted surface.

Boost Pumps

- Turn on boost pumps when FUEL LEVEL LO annunciators illuminate or indicated fuel is 169 lbs or less.

Differential

Maximum Asymmetrical Difference . . . . 600 LBS

Aviation Gasoline

- All grades of MIL-G-5572 avgas are permitted for a maximum of 50 hours or 3,500 gallons between overhauls, provided:
  - pilot confirms the fuel temperature is within limits
  - maximum ambient air temperature at takeoff is +32°C.
  - boost pumps are on
  - hours of avgas usage is entered in the engine logbook
  - maximum operating altitude is 18,000 ft.

Jet Fuel

- The following fuels are approved per specification CPW 204, commercial kerosene:
  - Jet A, Jet A-1, Jet A-2, and Jet B
  - JP-4, JP-5, and JP-8.

Fuel Limitations and Adjustments

	Jet A, A-1, -2; JP-5, JP-8	Jet B; JP-4	Avgas
Min Fuel Temp., T.O.	-29°C	-54°C	-54°C
Min Fuel Temp., Start	-23°C	-54°C	-54°C
Max Fuel Temp	50°C	50°C	32°C
Max Altitude	43,000 ft	43,000 ft	18,000 ft
Max Asymmetric Fuel	200 lbs	200 lbs	200 lbs
Emergency Asymmetric Fuel	600 lbs	600 lbs	600 lbs
Fuel Control Density	0.81	0.79	0.73

Hydraulic System

Approved Fluids

- Skydrol 500 A, B, B-4, C or LD-4
- Hyjet, Hyjet W, III, or IV.

Ice and Rain Protection

Engine Anti-Ice System

- All surface anti-ice fluids meeting British Deicing Fluid Specification DTD 406 B (NATO Symbol S-745) are approved.
- Engine anti-ice is required for taxi, takeoff, and in flight when operating in visible moisture with OAT at +10°C to -30°C. (For sustained ground operations, operate for one out of four minutes at 65% turbine RPM.
- For flight into known/forecasted icing, the anti-ice fluid reservoir must be full. For all other flights, a minimum of 1.5 gallons or higher as determined from the TKS minimum quantity chart in the AFM.

Windshield Bleed Air Anti-Ice System

- Windshield bleed air is required to prevent ice on windshield when operating in visible moisture with OAT at +10°C to -30°C.
- Set the W/S BLEED switch to LO (260°F) when OAT is above -18°C (0°F).
- Set the W/S BLEED switch to HI (280°F) when OAT is -18°C (0°F) or below.

Windshield Alcohol Anti-Ice System

- Use TT-I-735 isopropyl alcohol for windshield anti-ice. The backup alcohol system is sufficient for 10 minutes.

Landing Gear and Brakes

Anti-Skid

- Anti-skid must be operative for takeoff and landing on sod/dirt or gravel runways.

Approved Nose Tires

- Goodyear 184F08-1 and 184F13-3
- Goodrich 031-613-8

Brakes

Emergency Air Pressure . . . . 1,800 TO 2,050 PSI

Tire Pressures

SII 001 to 085 without SBS550-11-1 (gross weight increase):

Nose/Main Wheels . . . . 120 ±5 PSI

SII 001 to 085 with SBS550-11-1; 086 and subsequent:

Main Wheels . . . . 125 ±5 PSI

Nose Wheel . . . . 120 ±5 PSI

Strut Inflation

Main Gear . . . . 1 TO 2 INCHES

Nose Gear . . . . 3-5 INCHES

Oxygen System

- The standard diluter-demand oxygen mask must be positioned around the neck above FL 250 to qualify as quick-donning.
- The optional pressure-demand sweep-on oxygen mask must be properly stowed to qualify as quick-donning.

Thrust Reversers

- Reduce reverse thrust power to idle reverse at 60 KIAS on landing roll.
- Limit maximum reverse thrust setting to 95% N_1 for ambient temperatures above -18°C and 92% N_1 for ambient temperatures below -18°C.
- Maximum allowable thrust reverser deployed time is 15 minutes in any one hour period.
- Limit engine static ground operation to less than 80% N_1 for ambient temperature at sea level above 51°C.
- Do not use thrust reversers during touch and go landings.
- Thrust reversing on sod/dirt or gravel runways is prohibited.
- Simultaneous use of drag chute and thrust reversers is prohibited.
- The aircraft's nose whell must be on the ground for drag chut operation.
- Maximum speed for drag chute deployment is 125 KIAS.
- If the chute is deployed or jettisoned above 110 kts, inspect the mechanism for possible damage.

> **NOTE**: The red line on the oil temperature indicator dictates oil temperature limitation. Some indicators are red-lined at 115°C and other at 121° . In either case, do not exceed the red line indication.

Powerplant – Pratt and Whitney Turbofan JT15D-4B

Engine Fan Inspection

- To ensure accurate fan speed thrust indication, inspect fan for damage prior to each flight.

Engine Operating Limits

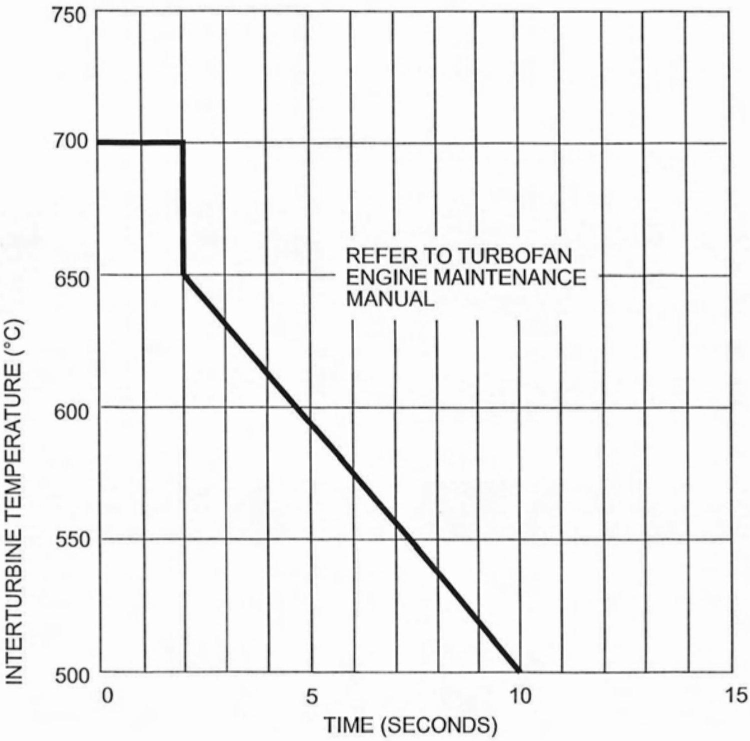
Thrust Setting	Time Limit	ITT Temp	N_2	N_1	Oil Press	Oil Temp
Takeoff	5 minutes	700°C	97% RPM	106% RPM	70 to 85 PSIG	10° to 121°C
Max Continuous	Continuous	680°C	97% RPM	106% RPM	70 to 85 PSIG	0° to 121°C
Idle	Continuous	580°C	49% RPM ±0.5%	—	35 PSIG (min)	-40° to 121°C
Start	—	700°C (2 sec)	—	—	—	-40°C (min)
Acceleration	—	710°C	97% RPM	106% RPM	—	0° to 121°C

Engine Overspeed Limits

State	Log Book Entry Required		Refer to Engine Maintenance Manual	
	Fan Speed	Turbine Speed	Turbine Speed	Fan Speed
Transient	106 to 112% RPM	96 to 98% RPM	Exceeds 99% RPM	Exceeds 112% RPM
Steady	106 to 108% RPM	—	Exceeds 97% RPM	Exceeds 108% RPM

Inter-Turbine Temperature Limits

Starting Conditions Only



- Starting ITT over 500°C is not normal; if this occurs, take action as illustrated in the starting envelope.
- All conditions except starting: ITT indications in excess of 710°C or 690°C for more than five minutes require reference to the Engine Maintenance Manual.

Engine Oil

- The following oils are approved for use:
  - Mobil Jet Oil II and 254
  - Exxon Turbo Oil 2380
  - Castrol 5000
  - Aeroshell Turbine Oil 500 and 560
  - Royco Turbine Oil 500 and 560
  - Engine oils listed in latest revision of Pratt and Whitney Canada Inc. SB 7001.

> **CAUTION:** The engine manufacturer strongly recommends that when changing from a existing lubricant formulation to a third generation lubricant formulation (e.g. Aeroshell/Royco Turbine Oil 560 or Mobil Jet 254), such a change be made only when an engine is new or freshly overhauled. For additional information refer to the engine manufacturer's pertinent oil service bulletins.

- When mixing brands of oil, use any listed approved oil brand if the total quantity of added oil does not exceed two U.S. quarts in any 400-hour period. If more than two U.S. quarts of dissimilar oil brands are needed, drain and flush complete oil system, then refill with a single brand of approved oil.
- If oils of nonapproved brands or of different viscosities become intermixed, drain and flush the complete oil system and refill with an approved oil.
- Minimum oil temperature for starting is -40°C (-40°F).

Limit continuous engine ground static operation, up to and including five minutes at takeoff thrust, to ambient temperatures not exceeding ISA +39°C.

- Continuous ground operation of starter/generator amperage above 325A is prohibited.
- Limit ground operation of pitot/static heat to two minutes to prevent damage to AOA system.
- Operation in GND bleed air mode with the right engine set at greater than 70% N_2 is prohibited.

Pneumatic and Pressurization Systems

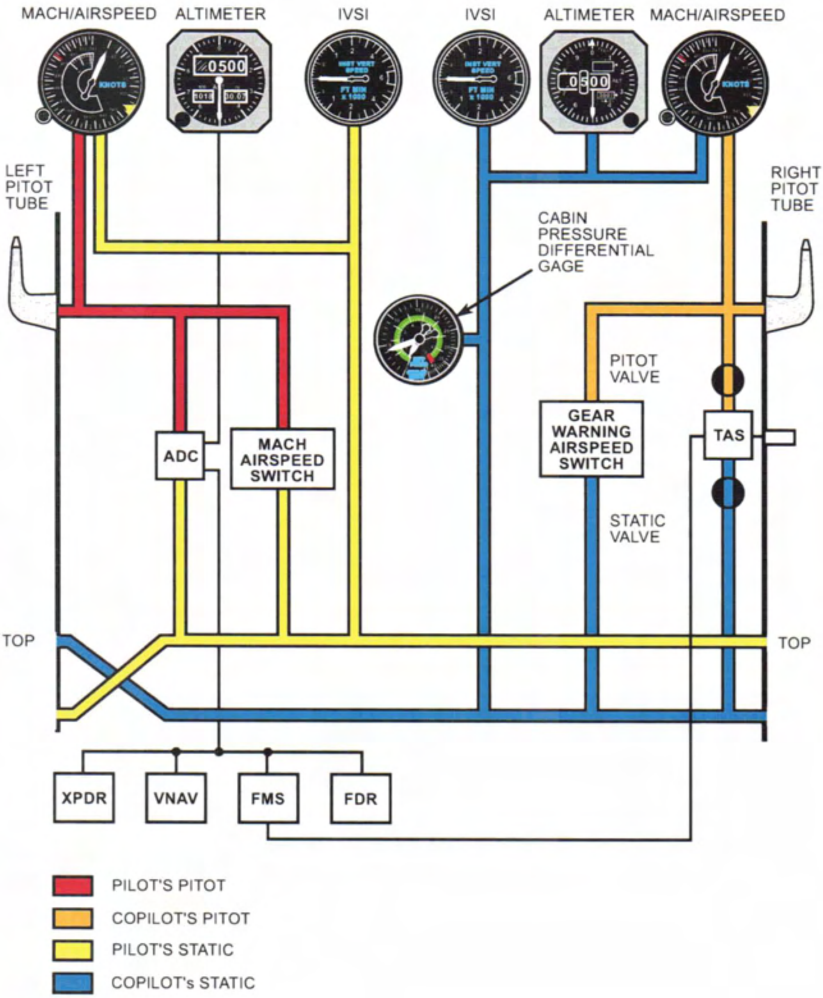
Cabin Pressurization Limits

Normal Cabin Pressurization . . . . 0.0 TO 8.8 PSID

Systems

Table of Contents

Pitot Static System



Pitot/Static System

An electrically heated pitot tube on each side of the aircraft nose supplies ram air pressure to the flight instruments.

The left pitot tube supplies the:

- pilot's Mach/airspeed indicator
- Mach/airspeed switch
- air data computer

The right pitot tube supplies the:

- copilot's Mach/airspeed indicator
- true airspeed (TAS) computer
- landing gear airspeed warning switch.

Static air sources include a static port on each side of the aircraft nose for the pilot's and copilot's static systems. The pilot and copilot static lines do not connect, but they do cross over within the aircraft so that the pilot's and copilot's static sources are on both sides of the aircraft.

The pilot's static system supplies the pilot's:

- Mach/airspeed indicator
- instantaneous vertical speed indicator (IVSI)
- Mach/airspeed switch
- air data computer.

The copilot's static system supplies the copilot's:

- Mach/airspeed indicator
- altimeter
- instantaneous vertical speed indicator (IVSI)
- landing gear airspeed warning switch
- cabin differential pressure gage
- true airspeed (TAS) computer.

Air Data Computer

The air data computer (ADC) receives pitot pressure (P_T) and static pressure (P_S) inputs from the pitot/static system and temperature data from a probe on the lower forward fuselage. The ADC converts and processes these inputs and then provides electrical driving signals for the:

- pilot's altimeter
- transponder (altitude reporting)
- altitude alerting system
- vertical navigation system
- optional flight data recorder (FDR)
- flight management system (FMS).

SPZ-500

The Honeywell SPZ-500 automatic flight control system (AFCS) combines the functions of an autopilot, flight director, yaw damper, and elevator trim system to provide automatic flight path and attitude control through the pitch, roll, and yaw axes. Various subsystems of the SPZ-500 AFCS include:

- air data system
- autopilot system
- flight director system
- flight instrumentation
- attitude and heading reference system.

Supplied with these inputs, the AFCS generates the appropriate pitch, roll, and yaw commands or cues to fly the aircraft from its actual attitude to a desired attitude.

EFIS

The standard electronic flight instrumentation system (EFIS) consists of:

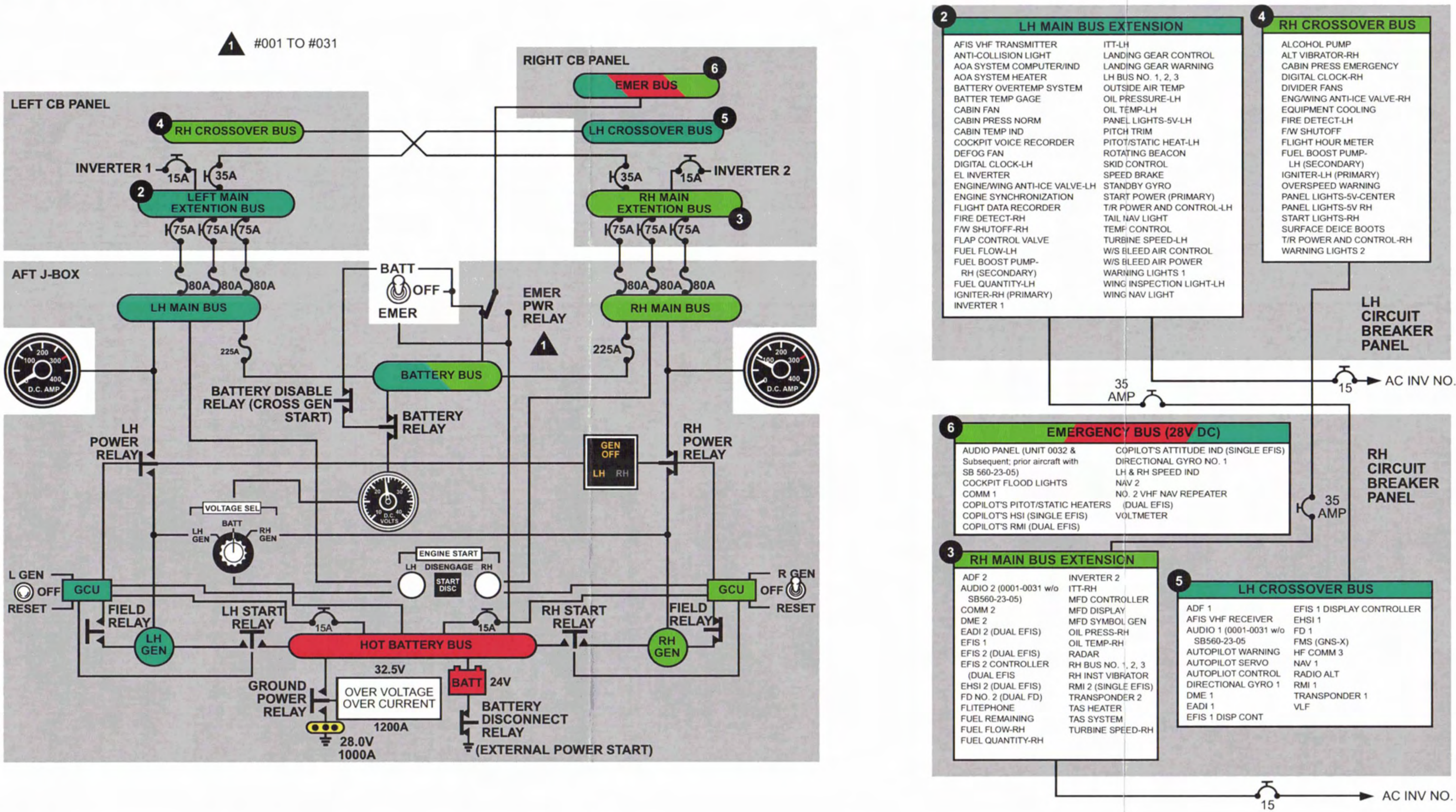
- pilot's electronic attitude director indicator (EADI) and horizontal situation indicator (EHSI)
- symbol generator (SG)
- display controller
- instrument remote controller.

One option adds a multifunction display (MFD) that has the capability to display radar and/or navigation information. The MFD can also display EHSI information if that display fails. The MFD symbol controller can also replace a failed EFIS symbol generator.

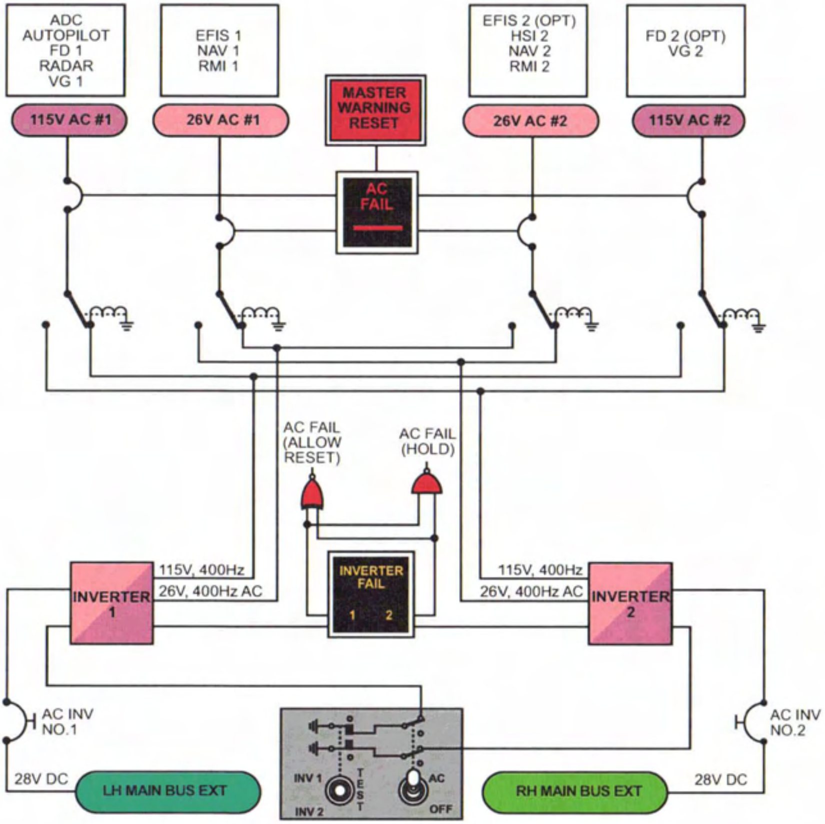
Another option is a five tube EFIS that consists of:

- pilot's EADI and EHSI
- copilot's EADI and EHSI
- MFD
- pilot's, copilot's, and MFD symbol generators
- two display controllers.

DC Electrical System

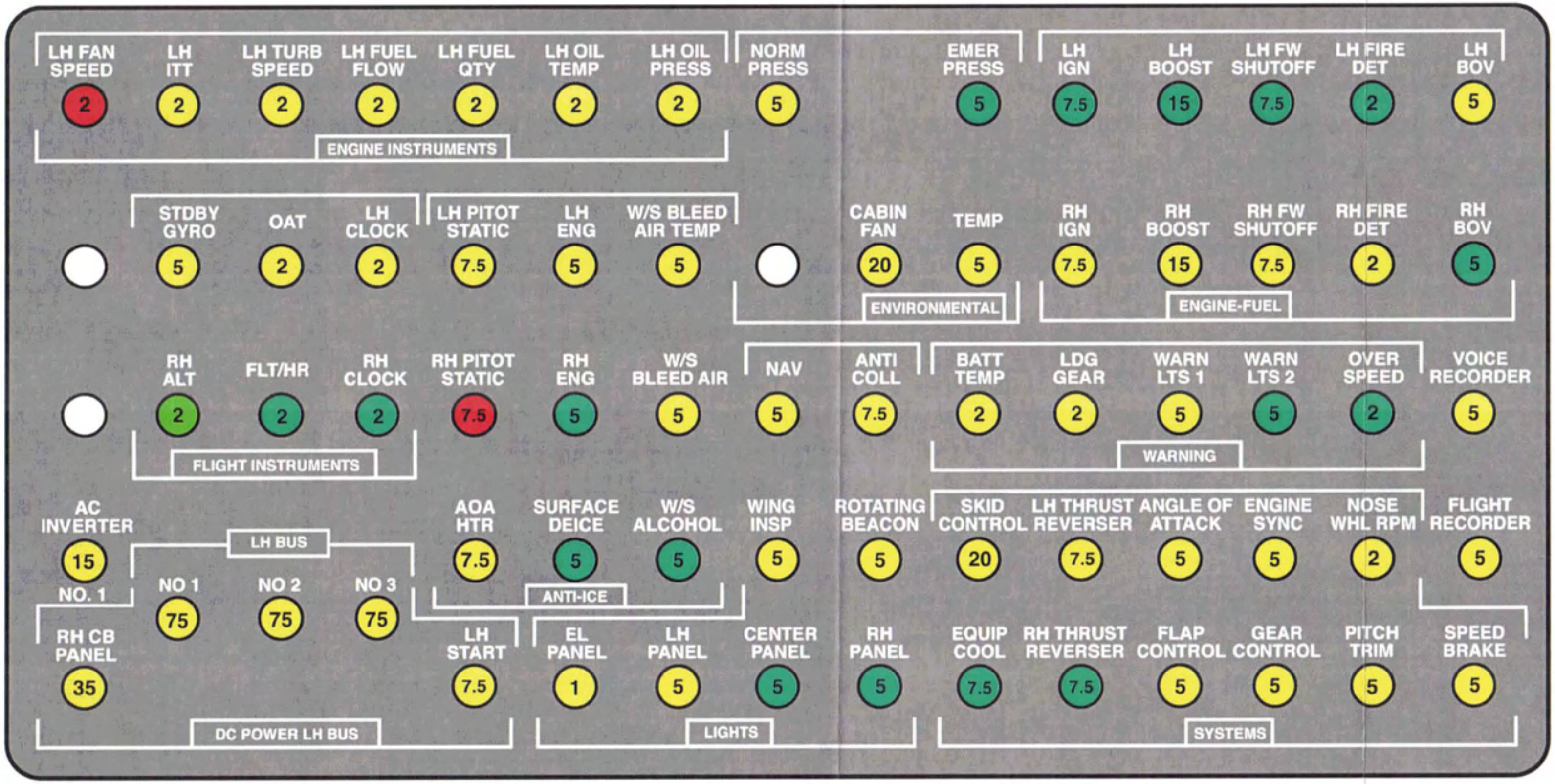


AC Electrical System



Circuit Breakers

Left CB Panel



EMERGENCY BUS

LH MAIN BUS EXTENSION

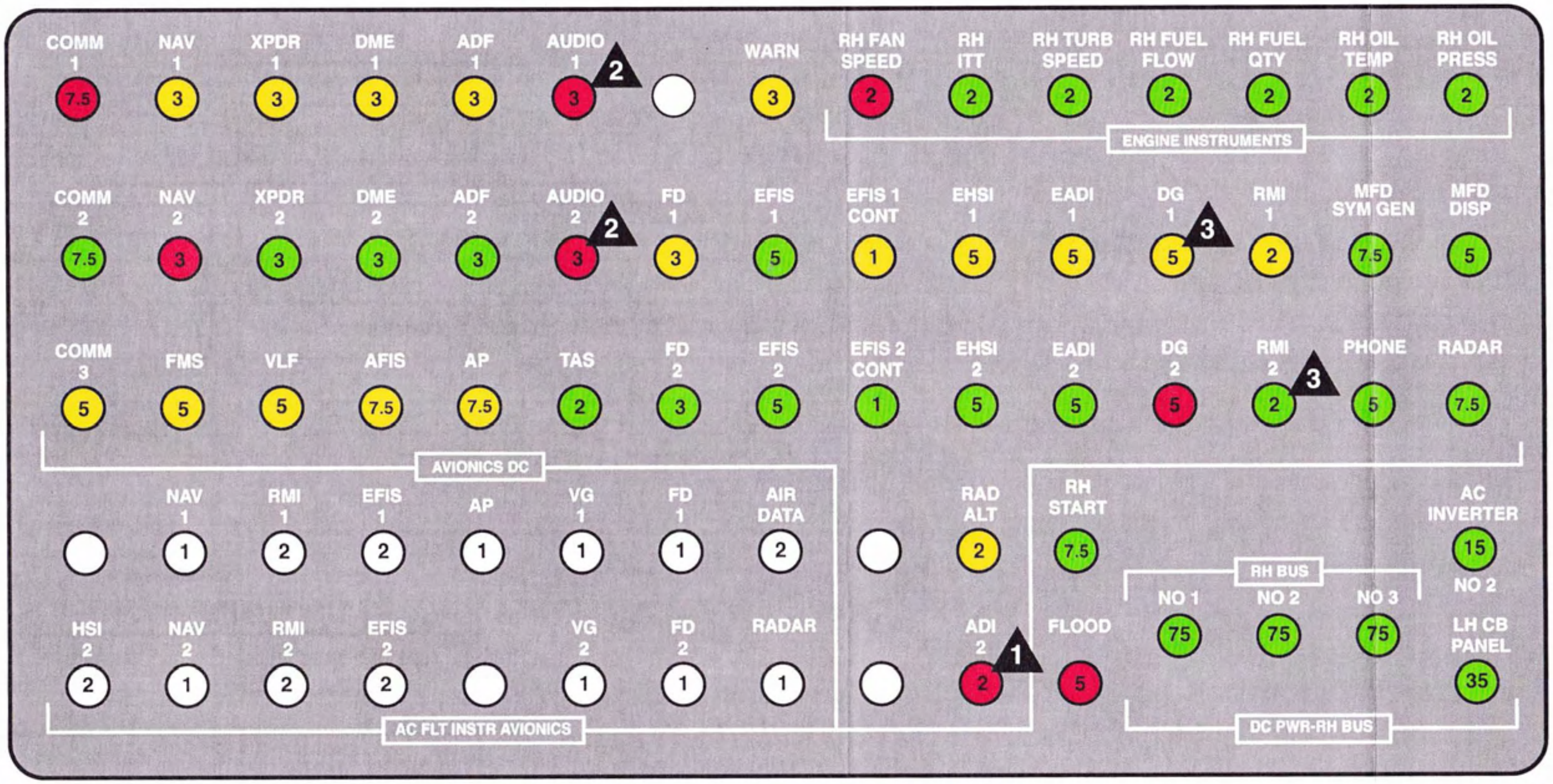
RH MAIN BUS EXTENSION

LH CROSSOVER BUS

RH CROSSOVER BUS

Circuit Breakers

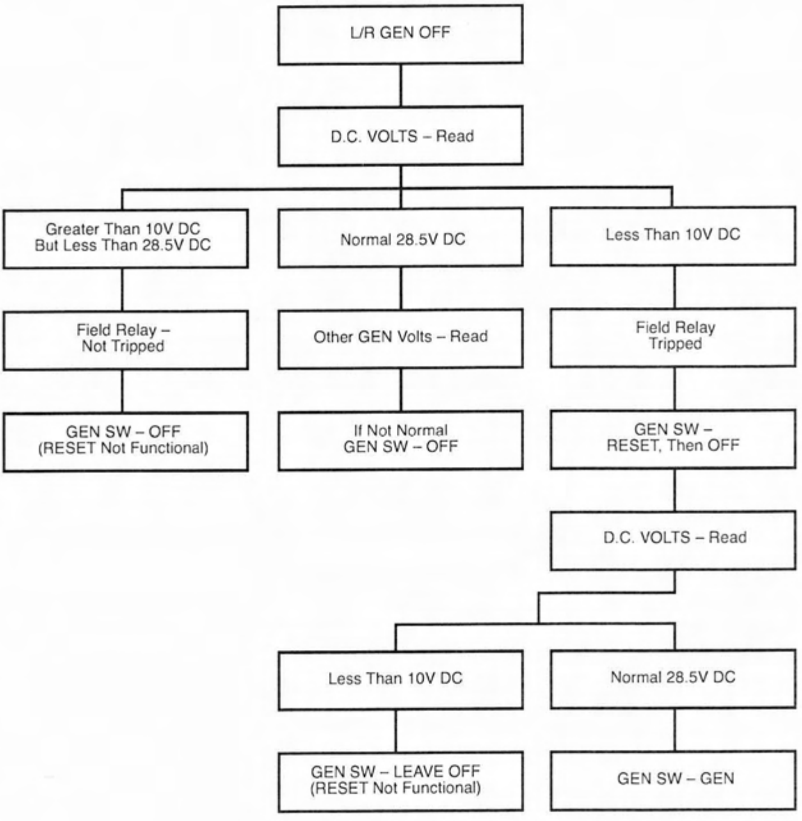
Right CB Panel



- EMERGENCY BUS
- LH MAIN BUS EXTENSION
- RH MAIN BUS EXTENSION
- LH CROSSOVER BUS
- RH CROSSOVER BUS

1. NOT INSTALLED WITH DUAL EFIS
2. 0001-0031 w/o SB 560-23-05
   AUDIO 1 - LH CROSSOVER BUS
   AUDIO 2 - RH MAIN BUS EXTENSION
3. DUAL EFIS INSTALLED
   DG 1 - EMER BUS
   RMI 2 - EMER BUS

Generator Reset Decision Procedure



DC System

Aircraft electrical system power sources include:

- one 24V DC, 44 amp-hour nickel-cadmium battery
- two 28.5V DC, 300 amp engine-driven starter/generators
- external power system.

Nine buses distribute power from the various DC power sources: Hot Battery, Battery, Emergency, Left and Right Main, Left and Right Main Bus Extension, and Left and Right Crossover.

Battery

On all aircraft, with the battery switch in BATT, the battery relay closes to supply power from the Hot Battery bus to the Battery bus. From the Battery bus, power flows to the Left and Right Main buses. The Left and Right Main buses, in turn, power their Main Bus Extensions and Crossover buses.

The battery disconnect relay automatically opens during a ground power unit start to remove the battery from the electrical system and avoid cycling of the battery. The relay closes automatically at the end of the start cycle.

On **units 001 to 031 without SB560-23-05**, placing the battery switch in the OFF position opens the emergency relay. Selecting the EMER position closes the emergency battery relay and power flows from the Hot Battery bus to the Emergency bus only.

On **units 001 to 031 with SB560-23-05 and units 032 and subsequent**, placing the battery switch in the OFF or BATT position allows power from the Left Main DC or Right Main DC bus to power the emergency bus through the Battery bus and relaxed emergency power relay.

Selecting the EMER position energizes the emergency battery relay to the other position. Power flows from the Hot Battery bus to the Emergency bus only.

If battery temperature exceeds 145°F (63°C), a temperature sensor in the battery case illuminates the BATT O'HEAT annunciator steadily; above 160°F (71°C), the annunciator flashes. A battery temperature gage provides continuous indication of battery temperature.

Starter/Generators

Two engine-driven starter/generators are the primary source of DC electrical power. During engine starting they function as starters. At the end of the start cycle, the generator control units (GCUs) enable the transition from starter to generator.

Each GCU provides:

- field weakening during engine start
- automatic starter shutoff
- voltage regulation at 28.5V DC
- generator load sharing (paralleling)
- overvoltage and ground fault protection
- reverse current protection.

With the generator switch in GEN, regulation, protection, and Main bus connection are automatic. When generator output is correct, the power relay closes to connect the generator to its Main bus. The Main buses, in turn, cross tie through the Battery bus so that if one generator fails, the operating generator continues to power the entire electrical system.

If an overvoltage condition or feeder fault occurs or an ENG FIRE switch is pressed, the GCU opens the generator field relay to de-energize the generator and the power relay to disconnect the generator from its Main bus. The associated GEN OFF annunciator illuminates. Placing the generator switch in OFF also opens the power relay to disconnect the generator from its Main bus.

Momentarily holding the switch in RESET resets a generator field relay tripped from overvoltage, feeder fault, or when the ENG FIRE switch is pushed. Selecting RESET may also be necessary following a windmilling airstart.

External Power

With a 28V DC 1,000A GPU connected, external power supplies the Hot Battery bus through the closed external power relay.

When a generator comes on-line and begins supplying power to the DC buses, the external power relay opens to disconnect external power.

An external power overvoltage/overcurrent sensor protects the aircraft electrical system from overvoltage and overcurrent conditions. If GPU voltage exceeds 32.5V DC or current exceeds 1,200A, the sensor opens the external power disable relays to disconnect external power. Before external power can be reapplied, the overvoltage/overcurrent sensor must be reset by disconnecting the GPU from the aircraft.

AC Power

Two 375VA static inverters convert 28V DC into 115V AC, 400 Hz three-phase power and 26V AC, 400 Hz, single-phase power for avionic equipment and other equipment requiring AC power.

With the AC/OFF switch in the AC position, 28V DC from the Left and Right Main Bus Extension buses powers the No. 1 and No. 2 inverters respectively. The No. 1 inverter supplies its 115V and 26V AC buses and the No. 2 inverter supplies its 115V and 26V AC buses.

The No. 1 115V AC bus powers the autopilot, radar, air data computer (ADC), and the pilot's vertical gyro and flight director. The No. 2 115V AC bus powers the copilot's vertical gyro and flight director (dual EFIS aircraft). The No. 1 26V AC bus supplies the No. 1 navigation radio, remote magnetic indicator (RMI), and EFIS and the No. 2 26V AC bus supplies the No. 2 navigation radio, RMI, horizontal situation indicator (HSI), and optional copilot's EFIS.

Four AC BUS circuit breakers provide AC bus protection for the 115V and 26V AC buses. If a bus fault occurs, the associated CB opens to disconnect inverter output to the bus. An open AC bus CB illuminates the AC FAIL annunciator and triggers the Master Warning lights. Resetting the Master Warning light does not extinguish the AC FAIL annunciator.

If an inverter fails, the failed inverter's switching relays relax with loss of power and route AC power from the operating inverter to the failed inverter's buses. During an inverter failure, the associated INV FAIL annunciator and AC FAIL annunciator illuminate. Illumination of the AC FAIL annunciator also triggers the Master Warning lights. Resetting the Master Warning lights extinguishes the AC FAIL annunciator. The INV FAIL annunciator remains illuminated.

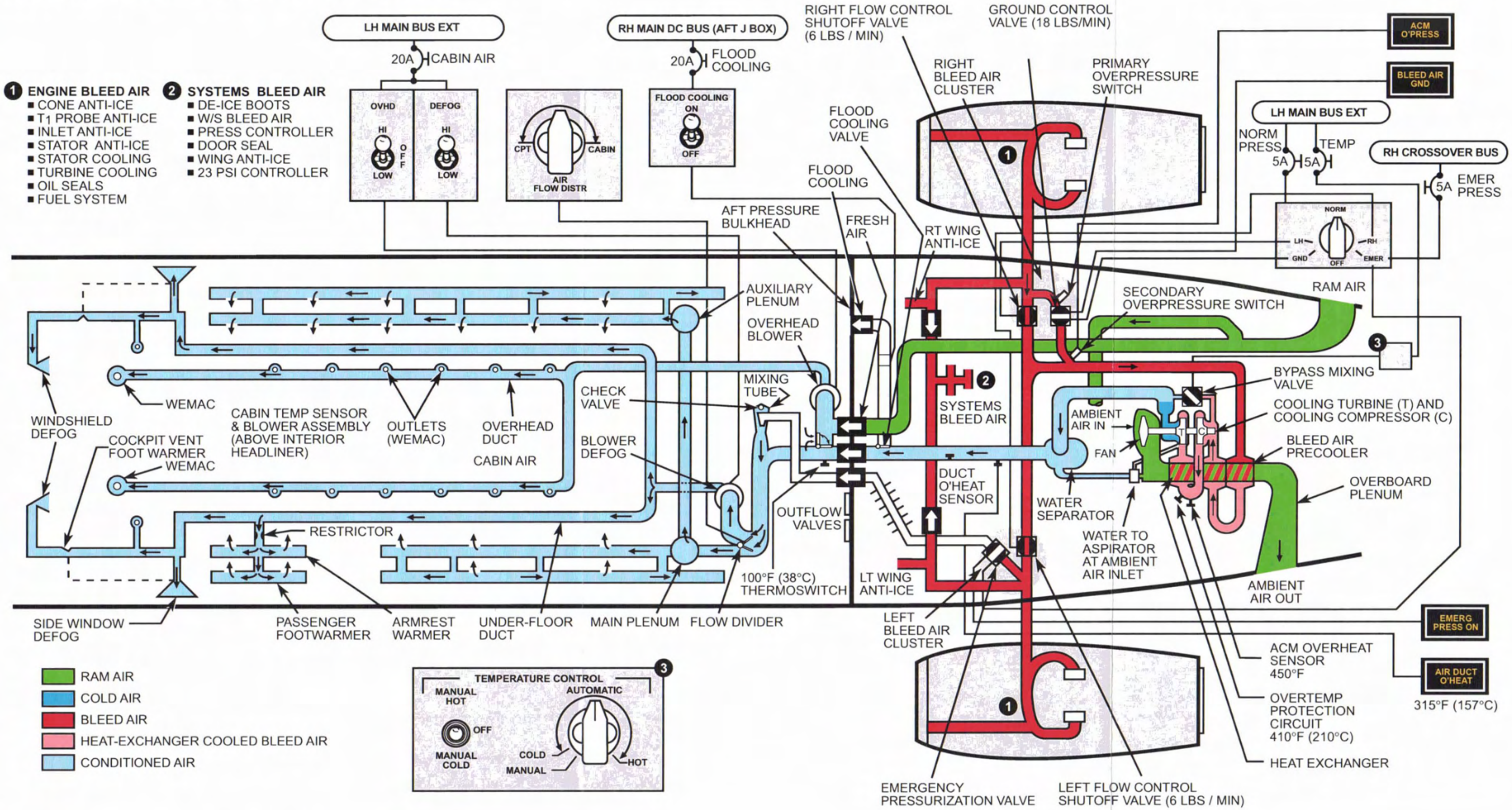
Loss of both inverters illuminates both INV FAIL annunciators, the AC FAIL annunciator, and triggers the Master Warning lights. Resetting the Master Warning lights does not extinguish the AC FAIL annunciator.

The spring-loaded inverter test switch allows preflight testing of the inverter switching system. Placing the switch in INV 1 or INV 2 interrupts the DC input to the selected inverter. The inverter loses power and its switching relays relax to route power from the operating inverter to the failed inverter's buses. Selecting the second inverter position after testing the first, fails the entire AC system.

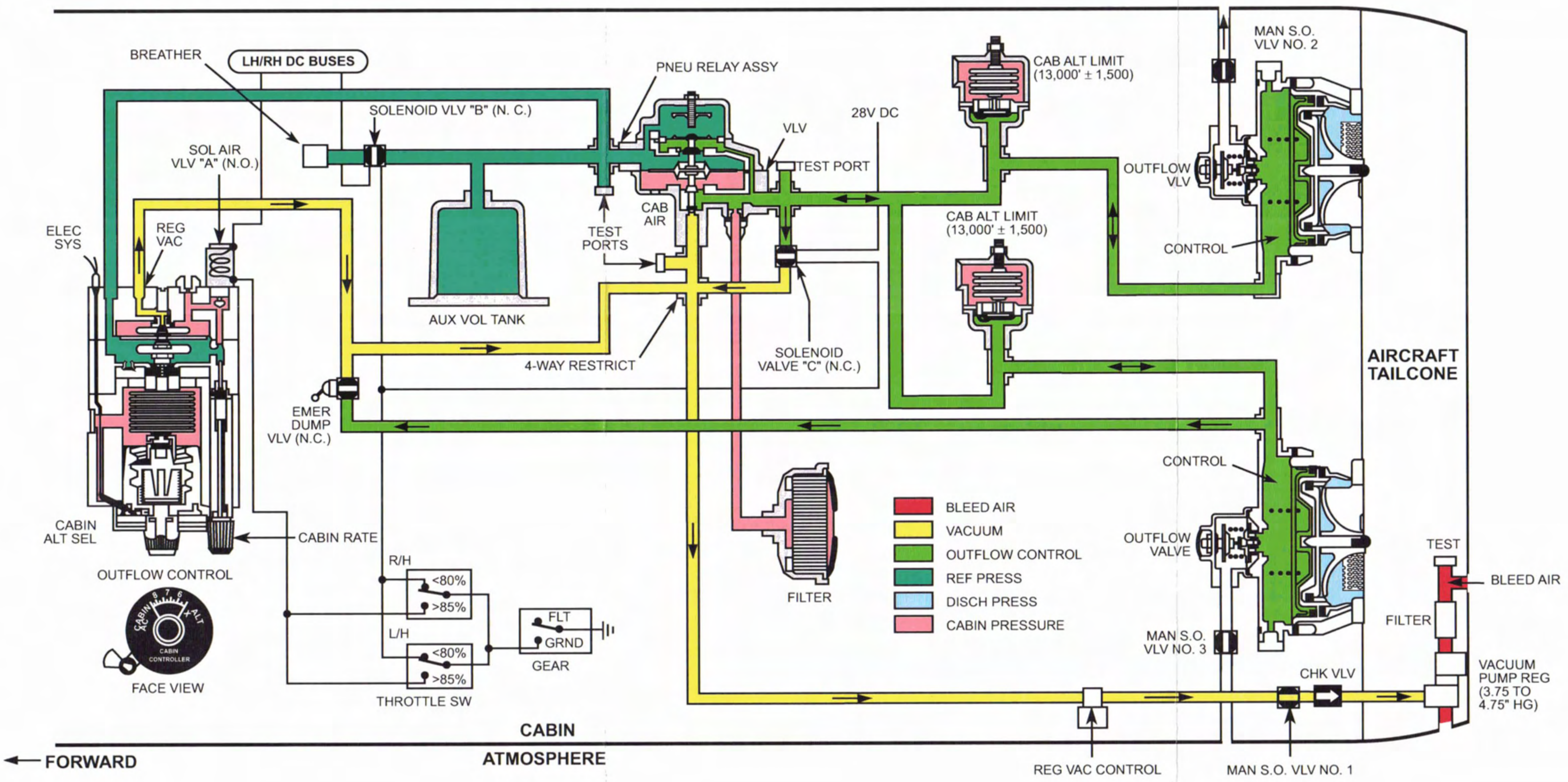
Electrical System

Power Source	Battery (1) – 24V DC, 20-cell, 44 amp-hour Starter/generators (2 engine-driven) – 28.5V DC, 300A AC inverters (2) – 26V and 115V AC, 400 Hz GPU – 28V DC, 600 to 1,000A
Distribution	DC buses Hot Battery Battery Emergency LH/RH Main LH/RH Main Extension LH/RH Crossover AC buses 115V AC Nos. 1/2 26V AC Nos. 1/2
Control	DC switches L GEN/R GEN BATT/OFF/EMER AVIONIC POWER ON/OFF (master) AC switches AVIONIC POWER AC/OFF (DC power to to inverters) AVIONIC POWER INV 1/TEST/INV 2
Monitor	DC Voltmeters and ammeter L/R GEN OFF annunciators BATT O'TEMP annunciator Master Warning AC AC FAIL annunciator INVERTER FAIL 1/2 annunciators Master Warning
Protection	Circuit breakers Current limiters Relays Generator control units

Pneumatic/Air Conditioning System



Pressurization System



Bleed Air Sources

Bleed air from each engine's centrifugal compressor flows through transfer tubes and elbow assemblies before entering the bleed air cluster. At the bleed air cluster, the bleed air flow splits to supply the:

- air conditioning and pressurization systems through flow control and shutoff valves
- emergency pressurization (left engine) through emergency pressurization valve
- ground air conditioning system (right engine) through ground shutoff valve
- airframe anti-icing and deicing systems (see Ice and Rain Protection).

The six-position PRESS SOURCE selector controls the flow control and shutoff, ground shutoff, and emergency pressurization valves (see **Table 4C-A**).

Position	Function
OFF	All flow control and shutoff valves closed.
GND	L/R flow control and shutoff valves closed; ground shutoff valve open with right engine operating and left squat switch in on ground mode. Ground air conditioning system operation.
LH	Left flow control and shutoff valve opened and right flow control and shutoff valve closed. Left engine supplies bleed air for air conditioning system.
NORM	L/R flow control and shutoff valves open and both engines supply bleed air for air conditioning system. Normal operating position.
RH	Right flow control and shutoff valve open and left flow control and shutoff valve closed. Right engine supplies bleed air for air conditioning system.
EMER	Emergency pressurization valve open and left and right flow control and shutoff valves closed. All bleed air routed into cabin for emergency pressurization.

Table 4C-A; PRESS SOURCE Switch Selection

Air Conditioning

On the ground with the PRESS SOURCE selector in the GND position, the left and right flow control and shutoff valves close and the ground shutoff valve opens. Bleed air from the right engine then flows through the open ground shutoff valve to the air cycle machine (ACM) precooler. If bleed air pressure exceeds 32 to 38 PSIG (right engine 72% N_2 RPM), the primary overpressure switch closes the ground shutoff valve to prevent system overpressurization. If the primary switch fails, the secondary overpressure switch closes the shutoff valve at 36 to 42 PSIG (right engine 74% N_2 RPM) and illuminates the AC OVER-PRESS annunciator.

With both engines operating and the PRESS SOURCE selector in the NORMAL position, the electrically controlled and pneumatically operated left and right flow control and shutoff valves open. Bleed air then flows through each valve at a flow rate of 6.0 PPM.

Hot bleed air flows through a ram air cooled precooler that provides the initial bleed air cooling. With the air conditioning system operating, a fan driven by the ACM forces air past the precooler and heat exchangers.

After flowing through the precooler, bleed air flows through the primary heat exchanger before reaching the ACM compressor. Compression of bleed air pressurizes it resulting in a temperature rise. An electrically controlled bypass valve downstream of the ACM compressor regulates bleed air flow through the rest of the ACM. The bypass valve, responding to commands from the temperature controller or crew inputs, opens or closes to decrease or increase bleed air flow through the ACM (see Temperature Control). Bleed air bypassed from the ACM mixes with cold conditioned air upstream of the water separator.

Air then flows through the secondary heat exchanger for additional cooling before it reaches the ACM turbine. Compressed bleed air expands across the turbine. The energy extracted drives the trubine and expansion cools the bleed air.

Conditioned air leaving the ACM enters the water separator where a coalescer removes water from the moisture-laden air. An ejector collects this water and sprays it on the heat exchangers to assist cooling.

Finally, conditioned air from the water separator enters the cabin through a check valve in~the aft pressure bulkhead. A temperature switch in the air duct illuminates the AIR DUCT O'HEAT annunciator if temperature reaches approximately 31 5°F.

After passing through the aft pressure bulkhead, overhead and underfloor ducts distribute conditioned air through the cabin and cockpit. The overhead ducts supply conditioned air through adjustable WEMAC ducts in the cabin and cockpit.

The underfloor ducting supplies the cockpit armrest, foot warmer, side window, and windshield defog outlets.

Temperature Control

With the TEMPERATURE CONTROL knob in the AUTOMATIC range, the temperature controller responds to temperature data provided by a sensor in the air conditioning duct and the cabin. In response to TEMPERATURE CONTROL knob setting, the controller opens or closes the bypass valve to increase or decrease cabin air temperature.

In the automatic mode, a 410°F temperature sensor monitors ACM compressor discharge temperature to prevent the ACM from overheating. If discharge temperature reaches 410°F, the sensor biases the temperature controller to provide a warmer cabin temperature than selected until the ACM cools. Selecting manual full cold when flying above 31,000 ft can result in an ACM overheat and shutdown because the 410°F sensor does not function in manual mode.

Placing the TEMPERATURE CONTROL knob in the MANUAL position allows the crew to manually control cabin temperature by directly opening or closing the bypass valve with the MANUAL HOT/MANUAL COLD switch. Holding the switch in the MANUAL HOT position for eleven seconds opens the bypass valve to increase cabin temperature; holding it in the MANUAL COLD position for eleven seconds closes the bypass valve to decrease cabin temperature. When released, the switch spring-loads to the OFF position with the bypass valve remaining in its last position.

Adjusting the AIR FLOW DISTR knob between the CKPT and CABIN positions operates a motor-driven flow divider that controls air flow from the underfloor supply duct into the cabin armrest and foot warmer manifolds.

Placing the DEFOG switch in HI or LOW activates a blower that increases airflow through the ducts to the cockpit foot warmers and windshield and side window defog outlets.

Flood Cooling (Optional)

Placing the FLOOD COOLING switch in the ON position energizes a blower fan and closes the normal air conditioning supply duct. Most of the conditioned air from the air conditioning system then flows through a grill in the aft pressure bulkhead. This system allows rapid cooling of the cabin on the ground and below 10,000 ft.

Freon Air Conditioning (Optional)

A Freon air conditioning system provides supplemental cabin cooling on the ground and in flight to 18,000 ft. With the MODE switch in the AC position, the compressor and forward blower run to cool the cabin. During air conditioning operation, the COMP ON light illuminates.

On the ground, only one operating generator is necessary to operate the system. In flight, both generators must be on-line. If one generator goes off-line, the compressor automatically shuts down.

Ram Air Supply

A ram air scoop in the vertical stabilizer fin supplies fresh air through a check valve to the air conditioning system and cabin. The check valve prevents cabin pressurization loss through the ram air ventilation system.

Pressurization

With the air conditioning system operating, a constant supply of pressurized air enters the cabin. The pressurization system then maintains a selected cabin altitude, climb rate, and descent rate by opening and closing two outflow valves on the aft pressure bulkhead. The system's 8.9 ± 0.1 PSID maximum cabin pressure differential provides an 8,000 ft cabin altitude at the aircraft's 45,000 ft maximum operating altitude.

Normal Operation

With an engine operating, bleed air directed through a pressure regulator and ejector supplies vacuum for operation of the pressurization system. After setting the CABIN RATE knob within the white band and the ACFT knob to the planned cruising altitude plus 1,000 ft, the pressurization controller governs cabin pressurization without further crew inputs.

With the throttles above 85% N_2 RPM and the squat switch in the ground mode, three solenoid valves actuate to supply ambient pressure and regulated vacuum to the pressurization system for pre-pressurization during takeoff.

As the aircraft climbs to altitude, the pressurization controller regulates cabin climb rate by opening and closing the outflow valves with control air amplified through a pneumatic relay.

If the pressurization system fails to control the outflow valves and cabin altitude increases to 13,500 ± 1,500 ft, two cabin altitude limit valves open to supply ambient pressure to the outflow valves. The decreasing vacuum to the outflow valves forces the outflow valves to the closed position.

During descent with the pressurization controller set to 500 ft above the landing field altitude, the system gradually bleeds cabin pressure to atmosphere to provide a comfortable descent rate. When the aircraft passes through the altitude setting, the system unpressurizes the cabin. At touchdown, the squat switch signals the pressurization controller to completely dump cabin pressure by fully opening the outflow valves.

Emergency Dump

Lifting the guard then moving the EMER DUMP lever up supplies vacuum to both outflow valves to open them and depressurize the cabin. With the PRESS SOURCE switch in any other position than OFF, the cabin altitude limit valves prevent cabin altitude from exceeding 13,000 ± 1,500 ft. Placing the PRESS SOURCE switch in OFF stops the pressurized air supply to allow the cabin to dump to ambient pressure.

Emergency Pressurization

If ACM compressor discharge temperature reaches 435°F, the left and right control and shutoff valves and the ground shutoff valve close to shutdown the ACM. The emergency pressurization valve then opens to supply hot bleed air from the left engine to the distribution system for cabin pressurization.

If cabin altitude climbs to 10,000 ± 350 ft, the CABIN ALT annunciator illuminates and the Master Warning lights flash.

If cabin altitude continues climbing, placing the PRESS SOURCE selector in the EMER position closes the left and right flow control and shutoff valves, opens the emergency pressurization valve and illuminates the EMERG PRESS ON annunciator. Hot bleed air obtained directly from the left engine flows into the distribution ducts to pressurize the cabin.

Air Conditioning System

Power Source	HP bleed air from either/both engine(s) Ram air
Distribution	Emergency pressurization duct Flood cooling duct Fresh air duct Overhead ducts Under-floor ducts
Control	Air cycle machine TEMPERATURE CONTROL rheostat MANUAL HOT/COLD switch Mixing valve (bypass modulating and shutoff valve) CPT/CABIN FLOW DISTR selector DEFOG fan OVHD fan PRESS SOURCE selector Bleed air shutoff/flow control valves
Monitor	Cabin temperature indicator Annunciators AIR DUCT O'HEAT BLD AIR GND EMERG PRESS ON ACM O'PRESS
Protection	Circuit breakers ACM O'PRESS ACM O'HEAT

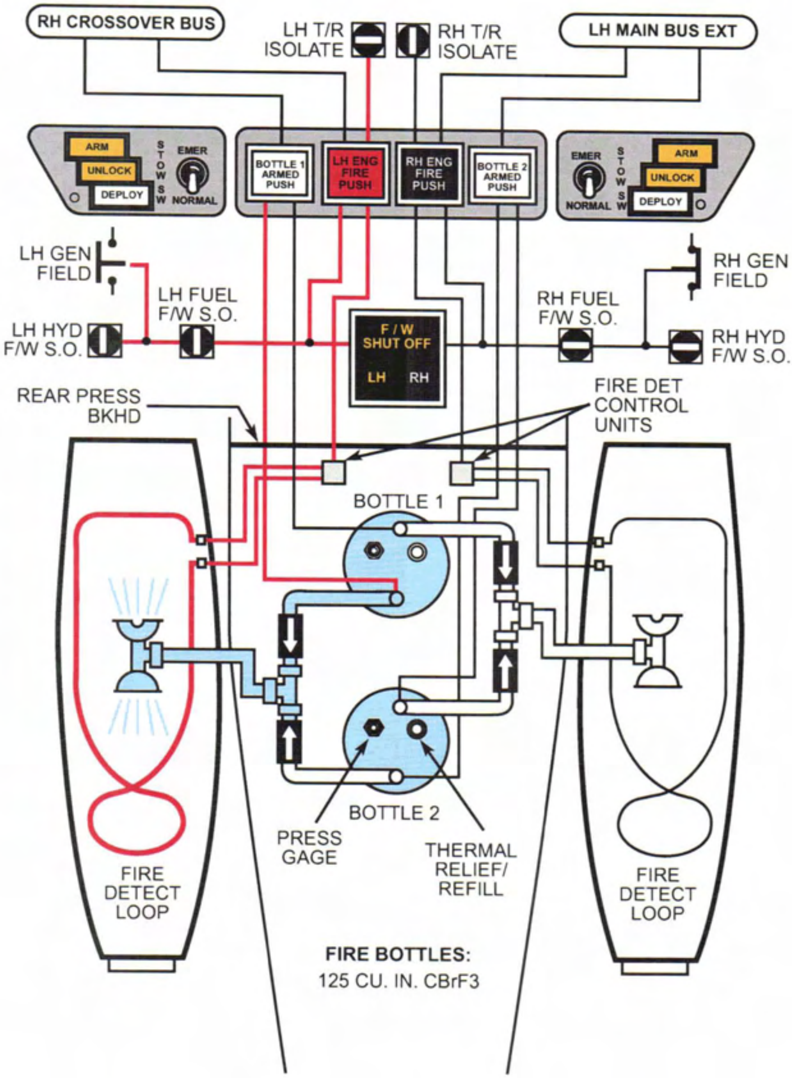
Bleed Air System

Power Source	HP bleed air from either/both engine(s)
Distribution	Door seal Engine anti-ice system Fuel System Left engine to cabin (EMER position) Pressurization controller Windshield bleed air Wing deice system
Control	Bleed air cluster valves Bleed air pressure regulator ENGINE ANTI ICE switches Lower forward door latch pin PRESS SOURCE selector SURFACE DEICE switch/ejectors W/S BLEED HI/LOW switch W/S BLEED AIR manual shutoff valvles
Monitor	Annunciators BLD AIR GND EMERG PRESS ON ENG ANTI-ICE LH/RH SURFACE DEICE W/S AIR O'HEAT
Protection	Circuit breakers

Pressurization System

Power Source	Emergency pressurization from left engine HP bleed air from either/both engine(s)
Distribution	Emergency pressurization duct Overhead ducts Under-floor ducts
Control	Aircraft pressurization controller CABIN RATE knob Control power (28V DC and vacuum) Landing gear squat switch (left) Outflow valves PRESS SOURCE rotary selector Pressure regulator Thottles
Monitor	Annunciators CABIN ALT 10,000 FT BLD AIR GND EMERG PRESS ON CABIN ALT/DIFF PRESS indicator Cabin rate-of-change indicator
Protection	Cabin altitude limit switches Circuit breakers Emergency dump valve Oxygen system Passenger oxygen system baro-sensor 10,000 ft cabin sensor

Fire Protection System



Fire Detection

The closed-loop engine fire detection system consists of a detector control unit connected to a stainless steel sensor tube that wraps around the engine combustion and accessory sections. The sensor tube contains a 28V DC energized wire centered in a semi-conductor material. At normal operating temperatures, the material's resistance is high and current does not flow from the center wire to the outer casing.

As temperature increases, the material's resistance decreases until current flowing from the center wire to the outer casing energizes the detector control unit fire relay. The relay closes and the associated ENG FIRE warning switchlight illuminates.

Lifting the plastic guard and then pressing the illuminated ENG FIRE warning switchlight closes the fuel and hydraulic firewall shutoff valves, de-energizes the generator field relay and thrust reverser isolation valve, and arms the fire extinguishing system (BOTTLE ARMED PUSH switchlight).

Fire Extinguishing

Two 125 cubic-inch, dual-head, single-shot fire extinguisher bottles contain Halon 1301 (bromotrifluoromethane) pressurized to 600 ± 75 PSI at 70°F (21°C) with nitrogen. Each bottle also has a pressure gage and combination fill and pressure release valve. Abnormally high temperatures in the tailcone melts the pressure release valve's fusible check valve to release bottle contents into the tailcone.

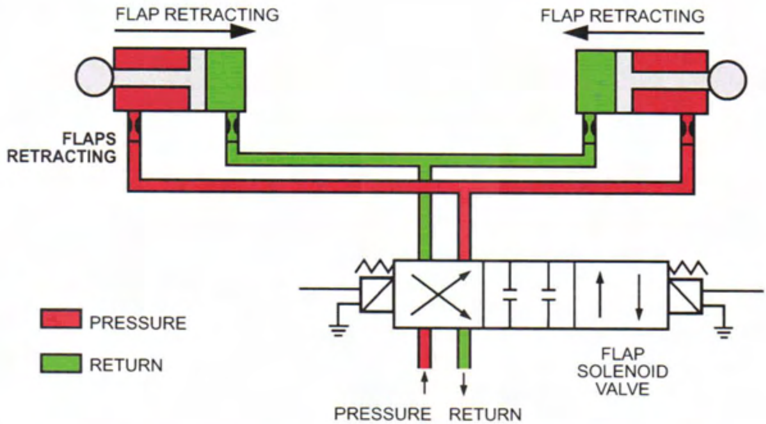
Pressing the illuminated ENG FIRE warning switchlight arms the fire extinguishing system and illuminates the BOTTLE 1/2 ARMED PUSH switchlights. Pressing an illuminated BOTTLE 1/2 ARMED PUSH switchlight supplies 28V DC to fire the selected bottle's explosive cartridge for the affected engine. Pressurized nitrogen then carries the fire extinguishing agent from the bottle through distribution lines to the engine nacelle. After the bottle discharges, the respective BOTTLE 1/2 ARMED PUSH switchlight extinguishes.

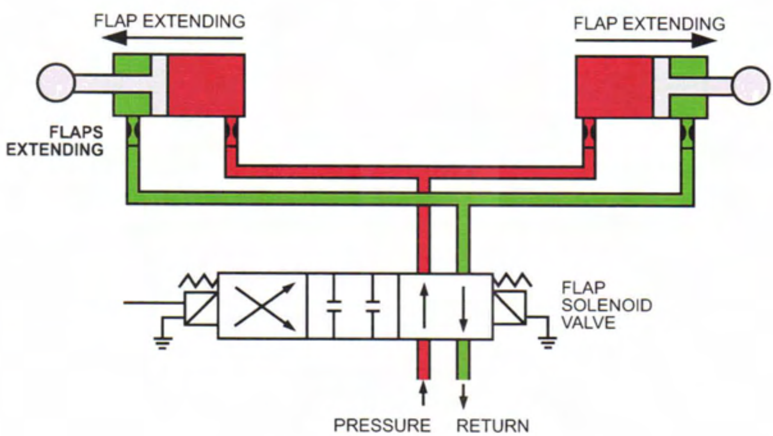
If the ENG FIRE warning switchlight remains illuminated after 30 seconds, pressing the other BOTTLE ARMED PUSH switchlight discharges the remaining bottle into the same engine nacelle.

Fire Protection System

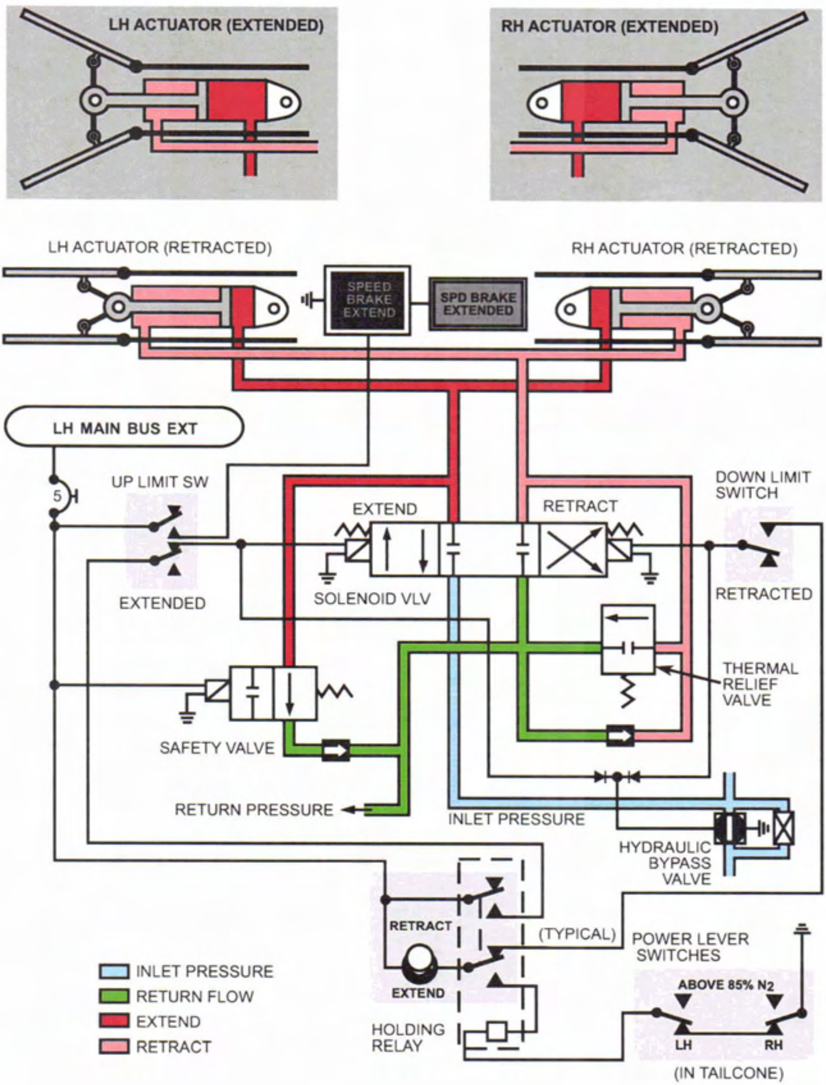
Source	$CBrF_3$
Distribution	Each $CBrF_3$ bottle to either engine via manifolds and spreader bar
Control	BOTTLE ARMED switchlights (1/2) ENG FIRE warning switchlights (L/R) Left Main Extension bus Right Crossover bus
Monitor	BOTTLE ARMED PUSH switchlights (1/2) $CBrF_3$ bottle gages ENG FIRE warning switchlights (L/R) FIREWALL SHUTOFF annunciators (L/R)
Protection	Field relay trip Fire detect control units (L/R) Fire detection loops (L/R) Firewall shutoff valves (closed) Fuel Hydraulic Thrust reverser isolation valve (closed)

Flaps System





Speedbrakes System



Primary Flight Controls

The mechanically controlled primary flight controls include the ailerons, elevators, and rudder. Pilot or autopilot inputs to the primary flight controls command the aircraft through the roll, pitch, and yaw axes.

Ailerons

Movement of either control wheel left or right from neutral transmits control inputs by cables to the aileron sector assembly. The aileron sector assembly, in turn, moves the ailerons through cables and aileron actuator assemblies.

Aileron Trim

Rotating the aileron trim wheel left or right from the neutral position mechanically positions the left aileron trim tab with cables connected to the tab's actuator.

Elevators

Moving either control column forward or aft from neutral operates cables connected to the elevator bellcrank. Movement of the bellcrank operates pushrods connected to the elevators.

Elevator Trim

Rotating the elevator trim wheel forward or aft mechanically drives the elevator trim tabs through cables connected to the trim tab actuators. Pressing the split elevator trim switch on the pilot's or copilot's control wheel drives the elevator trim tabs up or down through an electric motor connected to the control cables. Operation of the pilot's split elevator trim switch overrides the copilot's switch.

If the system malfunctions, pressing the AP/TRIM DISC switch disconnects electrical power from the trim motor. The manual elevator trim wheel also overrides the electric pitch trim system.

Rudder

The rudder moves in response to rudder pedal and yaw damper inputs to provide yaw control. Movement of the rudder pedals moves the rudder through cables and a bellcrank.

Rudder Trim

Rotating the rudder trim wheel left or right from neutral mechanically positions the servo-type rudder trim tab to reduce pedal forces. An indicator shows trim tab position NOSE L or NOSE R from neutral. The rudder trim tab also functions as a servo tab in that it moves in the opposite direction of rudder deflection.

Control Lock

With ailerons, elevator, and rudder in the neutral position and throttles in the cutoff position, pulling the CONTROL LOCK T-handle out and rotating it 45° clockwise locks the flight controls and throttles. With the control lock engaged, maximum nosewheel tow limit angle is 60°.

Rotating the CONTROL LOCK T-handle counterclockwise and then pushing it in releases the control lock.

Secondary Flight Controls

Secondary flight controls include electrically controlled and hydraulically operated flaps and speedbrakes.

Flaps

The flaps have a 0 to 35° range of travel with FLAP handle detents at the UP (0°), T.O. (7°), T.O. & APPR (15°), and LAND (35°) positions. During flap operation between 15 and 25° (extension or retraction), the elevator trim flap/trim interconnect compensates for rapid pitch changes. Flap trim interconnect may be stopped by pressing the AP/TRIM DISC switch.

Moving the FLAP handle to extend or retract the flaps actuates a down-switch or up-switch. The appropriate switch closes and 28V DC power flows to the hydraulic system bypass valve and the flap solenoid valve. The bypass valve closes, hydraulic pressure builds to 1,500 PSI, and the flap solenoid valve shifts to direct hydraulic pressure to the appropriate side of the flap actuators. Under pressure the flap actuators position the flaps through a bellcrank on each flap's inboard end. Pushrods transmit bellcrank movement to the remaining flap bellcranks.

When flaps reach the position selected with the FLAP handle, a preselect cable assembly connected to the flap indicator deactuates the respective up or down switch. Then the flap solenoid valve closes, the hydraulic system bypass valve opens, and flap movement stops.

Speedbrakes

Placing the spring-loaded SPEED BRAKE switch in the EXTEND position energizes a holding relay that supplies 28V DC to energize the hydraulic system bypass, speedbrake solenoid, and speedbrake safety valves. The bypass valve closes and hydraulic pressure builds. When the solenoid valve energizes, it shifts to route hydraulic pressure to the speedbrake actuators that extend the speedbrakes. When the speedbrakes reach the extended position, up limit switches actuate to illuminate the SPEED BRAKE EXTEND annunciator, close the solenoid valve, and open the bypass valve. When the solenoid valve closes, it traps hydraulic fluid in the actuating system to hold the speedbrakes in the extended position.

Loss of electrical power with the speedbrakes extended opens the safety valve to release hydraulic pressure and allow the speedbrakes to blow down to the trail position.

Placing the SPEED BRAKE switch in the RETRACT position de-energizes the holding relay that supplies 28V DC power to shift the solenoid valve to the retract position and close the bypass valve. The hydraulic system pressurizes; hydraulic pressure flows through the solenoid valve to the speedbrake actuator retract ports to retract the speedbrakes. When the speedbrakes retract, the SPEED BRAKE EXTEND annunciator extinguishes, the bypass valve opens, and the solenoid valve closes to block hydraulic pressure to the actuators.

With the speedbrakes extended, advancing the throttles above approximately 85% N_2 automatically retracts the speedbrakes by releasing the SPEED BRAKE switch's holding relay. The holding relay then releases to the RETRACT position and the speedbrakes retract.

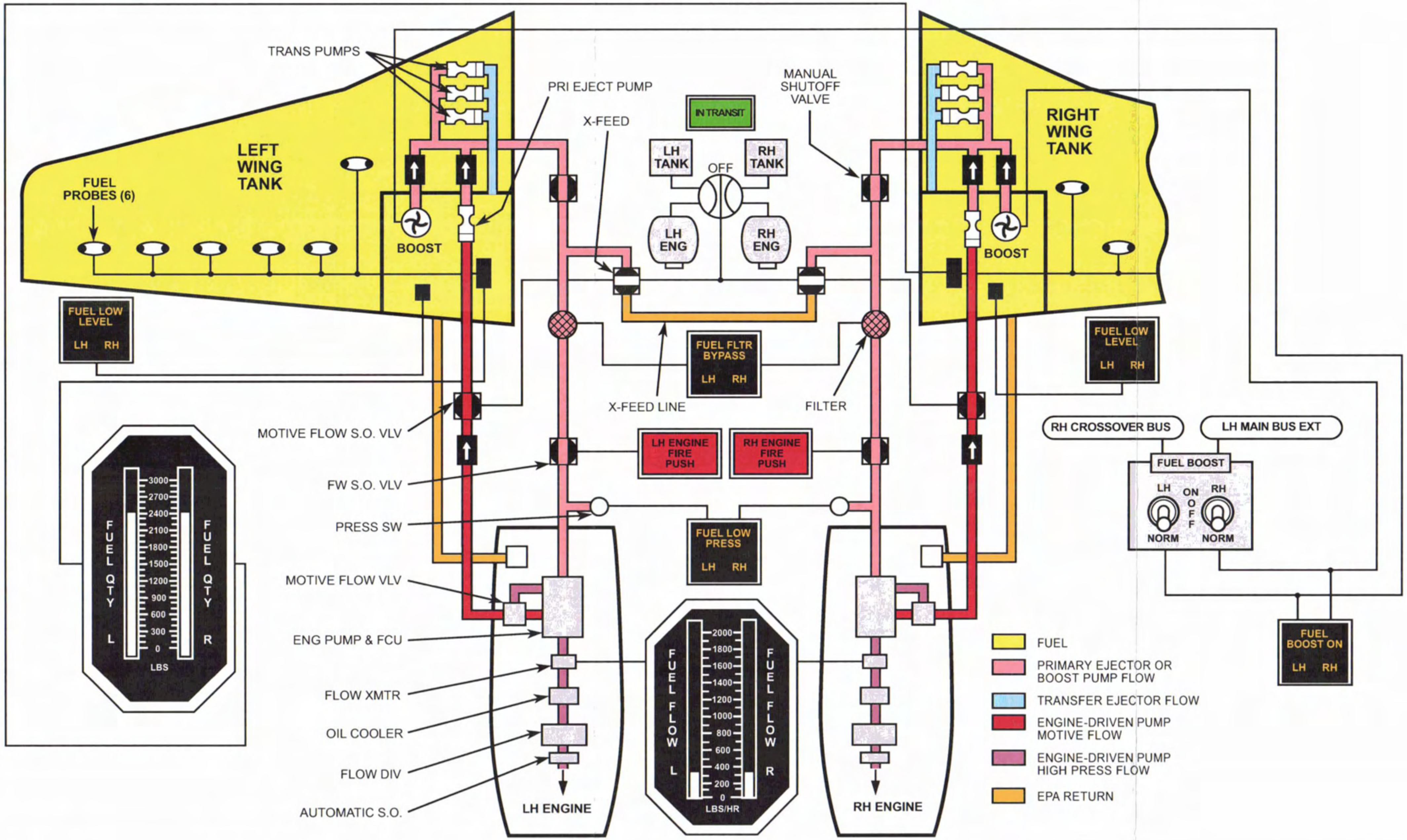
Flaps

Power Source	Hydraulic system Left Main Extension bus
Control	Flap selector handle Flap/trim interconnect
Monitor	Flap position indicator HYD PRESS ON annunciator Trim Wheel
Protection	Blow-up/trail capacity Circuit breakers

Speedbrakes

Power Source	Hydraulic system Left Main Extension bus
Control	Speedbrake switches 85% N_2 microswitch
Monitor	HYD PRESS ON annunciator SPEED BRAKE EXTEND annunciator
Protection	Auto-retract with throttles above 85% N_2 Circuit breakers Safety valve Thermal relief valve

Fuel System



TRANS PUMPS
PRI EJECT PUMP
X-FEED
IN TRANSIT
MANUAL SHUTOFF VALVE
LEFT WING TANK
RIGHT WING TANK
FUEL PROBES (6)
LH TANK
RH TANK
OFF
LH ENG
RH ENG
BOOST
BOOST
FUEL LOW LEVEL LH RH
FUEL FLTR BYPASS LH RH
FUEL LOW LEVEL LH RH
X-FEED LINE
FILTER
MOTIVE FLOW S.O. VLV
FW S.O. VLV
PRESS SW
MOTIVE FLOW VLV
ENG PUMP & FCU
FLOW XMTR
OIL COOLER
FLOW DIV
AUTOMATIC S.O.
LH ENGINE FIRE PUSH
RH ENGINE FIRE PUSH
FUEL LOW PRESS LH RH
RH CROSSOVER BUS
LH MAIN BUS EXT
FUEL BOOST
LH ON RH
OFF
NORM NORM
FUEL BOOST ON LH RH
FUEL QTY L
FUEL QTY R
3000 2700 2400 2100 1800 1500 1200 900 600 300 0
LBS
FUEL FLOW L
FUEL FLOW R
2000 1800 1600 1400 1200 1000 800 600 400 200 0
LBS/HR
LH ENGINE
RH ENGINE
FUEL
PRIMARY EJECTOR OR BOOST PUMP FLOW
TRANSFER EJECTOR FLOW
ENGINE-DRIVEN PUMP MOTIVE FLOW
ENGINE-DRIVEN PUMP HIGH PRESS FLOW
EPA RETURN

Fuel Storage

Each wing tank extends from the wing root to the wing tip. The tanks include all internal wing area forward of the rear spar except for the inboard leading edge and the area above the wheel wells. Gaps in the forward wing spar and ribs allow fuel to flow inboard. One-way flapper valves restrict fuel flow to prevent sudden weight and balance shifts during maneuvering. An overwing filler cap near each wing tip allows gravity fueling of the tanks.

Each tank holds 431 U.S. gallons of usable fuel for a total capacity of 862 U.S. gallons or 5,816 lbs at 6.75 lbs/gallon.

Each tank's venting system consists of a non-icing underwing air scoop, float valve, check valves, surge tank, and a vent line that extends from the inboard tank area to the surge tank.

An internal sump area in each wing tank's inboard section contains an electric boost pump, primary ejector pump, and six water drains. Each wing tank also has three transfer pumps that move fuel from the tank area into the sump area.

Fuel Indicating

Six capacitance-type fuel probes and a temperature compensator for each wing tank drive the vertical tape FUEL QTY indicators. The system, operating on 28V DC from the LH Main and RH Main DC buses, show tank quantity from 0 to 3,000 lbs.

A float switch in each wing tank sump illuminates its respective FUEL LOW LEVEL annunciator when fuel quantity drops to 185 lbs.

Fuel Distribution

During engine start with the boost pump switch in NORM or OFF, the electric boost pump supplies positive fuel feed to the engine-driven pump. Fuel flows from the sump area through a check valve, manual shutoff valve, fuel filter, and firewall shutoff valve. If the fuel filter begins clogging, a differential pressure switch closes at 3.75 PSID to illuminate the FUEL FILT BYPASS annunciator. At 4.75 PSID, the fuel filter bypass valve opens to route fuel around the filter.

After the engine starts, the generator control unit (GCU) de-energizes the electric boost pump. The primary ejector pump then supplies fuel from the sump area to the engine-driven pump. With the engine-driven pump operating, the primary ejector pump receives motive flow fuel through the motive flow valve and open motive flow shutoff valve.

If fuel pressure in the supply line drops below approximately 5 PSIG with the boost pump in NORM and the throttle out of cutoff, a pressure switch illuminates the LOW FUEL PRESS annunciator. The electric boost pump then energizes to supply fuel from the sump area to the engine-driven fuel pump. If the annunciator remains illuminated, the electric boost pump is inoperative.

Placing the boost pump switch in ON, regardless of throttle lever position and fuel pressure, supplies power to the electric boost pump from the Left Main Bus Extension and Right Crossover buses.

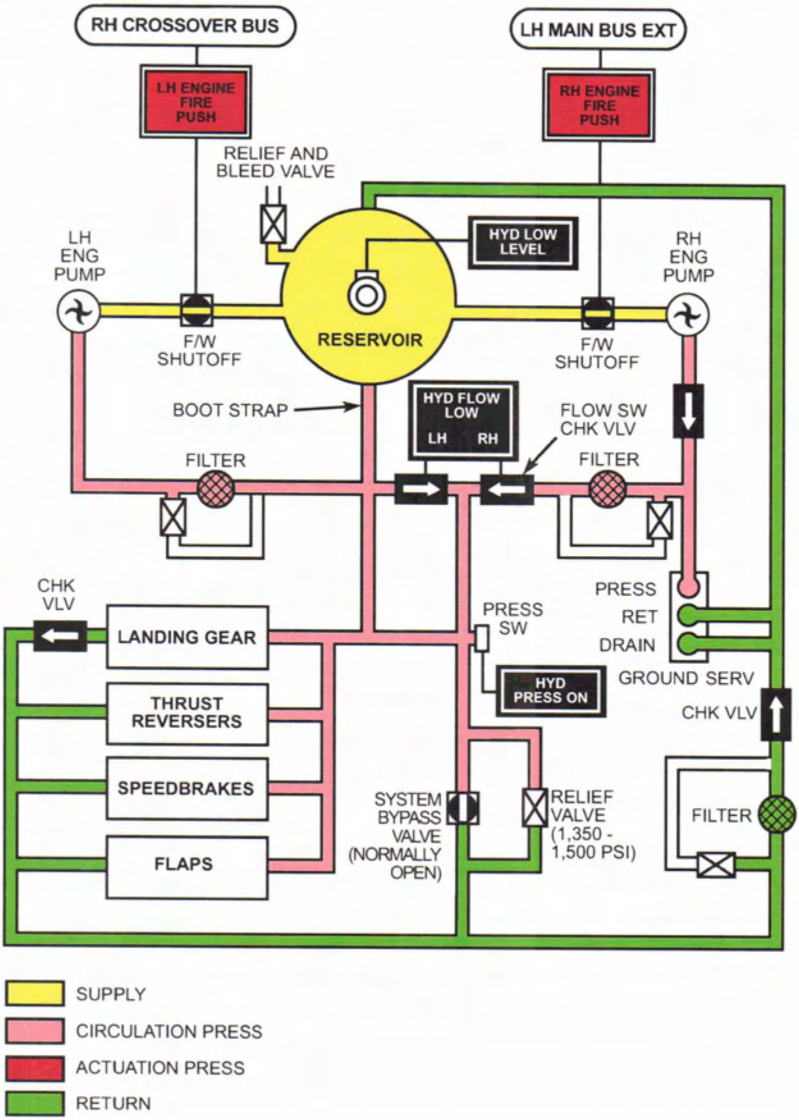
Placing the crossfeed switch in LH TANK or RH TANK cross feeds fuel from one tank to both engines. The selected tank's electric boost pump operates and both crossfeed valves open. After three seconds of operation, the opposite motive flow shutoff valve closes and fuel flows from the selected tank to both engines.

The green INTRANSIT light illuminates during crossfeed valve operation and when valve position does not agree with crossfeed switch position after power is supplied to the valves.

Fuel System

Power Source	Motive flow ejector pump Motive flow fuel
Distribution	Crossfeed manifold Fuel transfer motive flow Motive flow manifold Wing tank to respective engine (L/R) via engine manifold
Control	ENGINE START (L/R) switches ENG FIRE switchlights (L/R) FUEL BOOST switches (L/R) LH TANK/RH TANK crossfeed selector STARTER DISENGAGE switches (L/R) Throttles Fuel control unit (fuel cutoff)
Monitor	Annunciators FIREWALL SHUTOFF (L/R) FUEL BOOST ON (L/R) FUEL FILTER BYPASS (L/R) FUEL LOW LEVEL (L/R) FUEL LOW PRESS (L/R) Crossfeed INTRANSIT light FUEL FLOW gage FUEL QTY gage
Protection	Circuit breakers Prist Fuel filters Fuel firewall shutoff valves Motive flow shutoff valve .07 emergency cutoff

Hydraulic System



Hydraulic System

An open-center hydraulic system supplies 1,500 PSI pressure for operation of the:

- landing gear
- thrust reversers
- speedbrakes
- flaps.

With the engines running, each constant-displacement engine-driven hydraulic pump draws fluid from the self-pressurizing reservoir through an electrically operated firewall shutoff valve.

If reservoir fluid level drops to approximately the REFILL mark, the reservoir's low fluid level warning switch illuminates the HYD LOW LEVEL annunciator.

From each pump, pressurized fluid flows through a filter before reaching its flow switch check valve. If a pump's output drops to less than 0.45 GPM, the flow switch closes to illuminate the HYD FLOW LOW annunciator. Check valves prevent reverse flow from an operating pump to an inoperative pump.

After the flow check switch valve, the two engine-driven pump outputs combine at the normally open bypass valve. Fluid continues through the bypass valve and flows at approximately 60 PSI back to the reservoir through a filter.

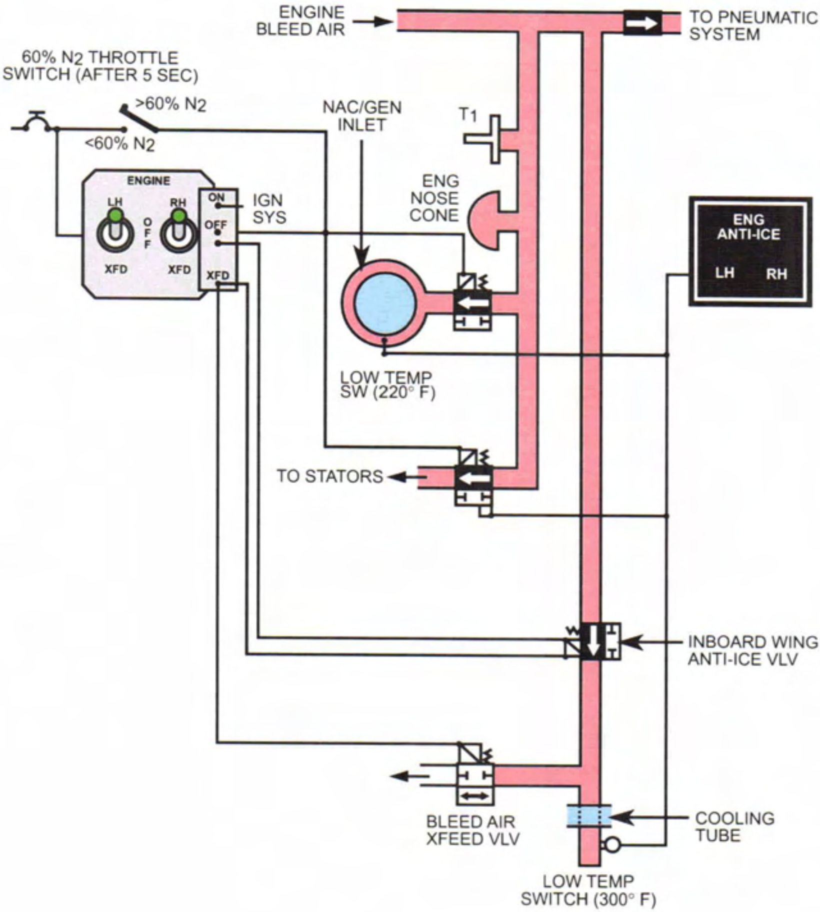
During landing gear, thrust reverser, or speedbrake operation, the electrically controlled bypass valve closes to pressurize the hydraulic system. When the pressure exceeds approximately 125 to 165 PSI, a pressure switch closes to illuminate the HYD PRESS ON annunciator. A pressure relief valve in-line with the bypass begins opening at 1,350 PSI and fully opens at 1,500 PSI to maintain system operating pressure.

After the landing gear, speedbrakes, or flaps cycle or the thrust reversers stow, electrical power is removed from the bypass valve returning the system to low pressure.

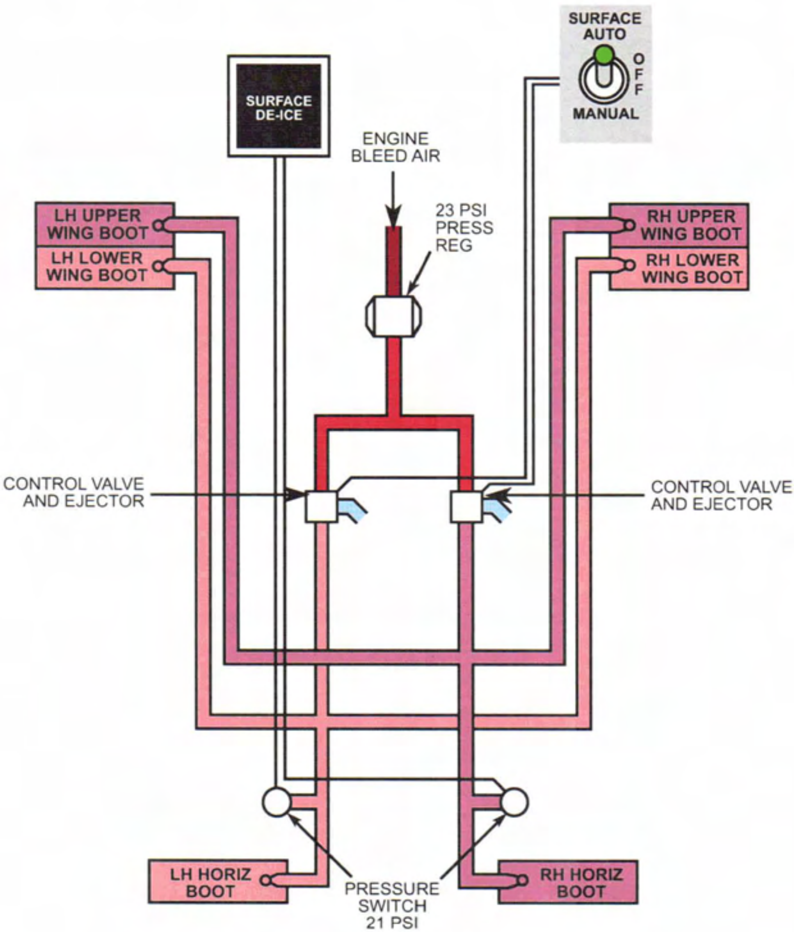
Hydraulic System

Power Source	Hydraulic reservoir fluid Engine-driven hydraulic pumps L/R (pressure)
Distribution	Hydraulic manifolds
Control	ENGINE FIRE PUSH L/R switchlights Landing gear handle Speedbrake switch Thrust reverser levers Flaps lever
Monitor	Annunciators HYD FLOW LOW SPEED BRAKE EXTEND HYD LOW LEVEL HYD PRESS ON F/W SHUT OFF LH/RH ARM/UNLOCK/DEPLOY (T/Rs) Flap position indicator Trim wheel
Protection	Bypass relief valve Bypass valve Circuit breakers Firewall shutoff valves Flaps (blow-up protection) Reservoir pressure relief valve Thermal relief Thrust reverser isolation valve

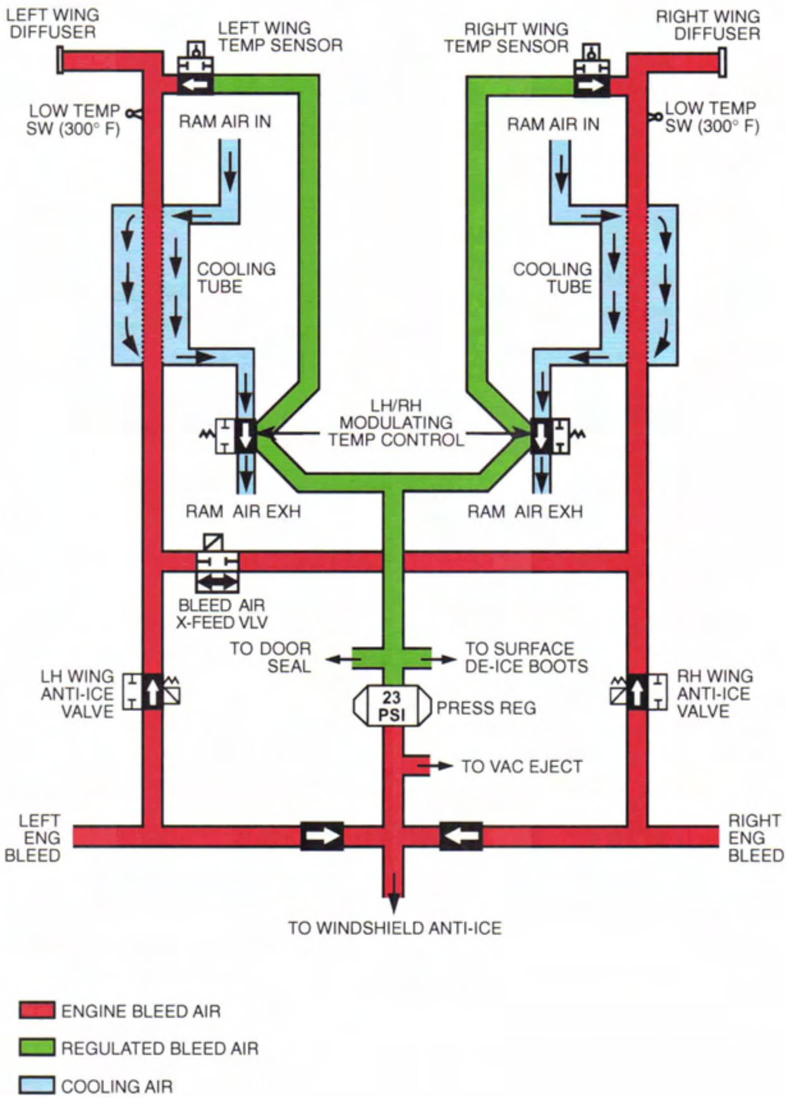
Engine Anti-Ice System



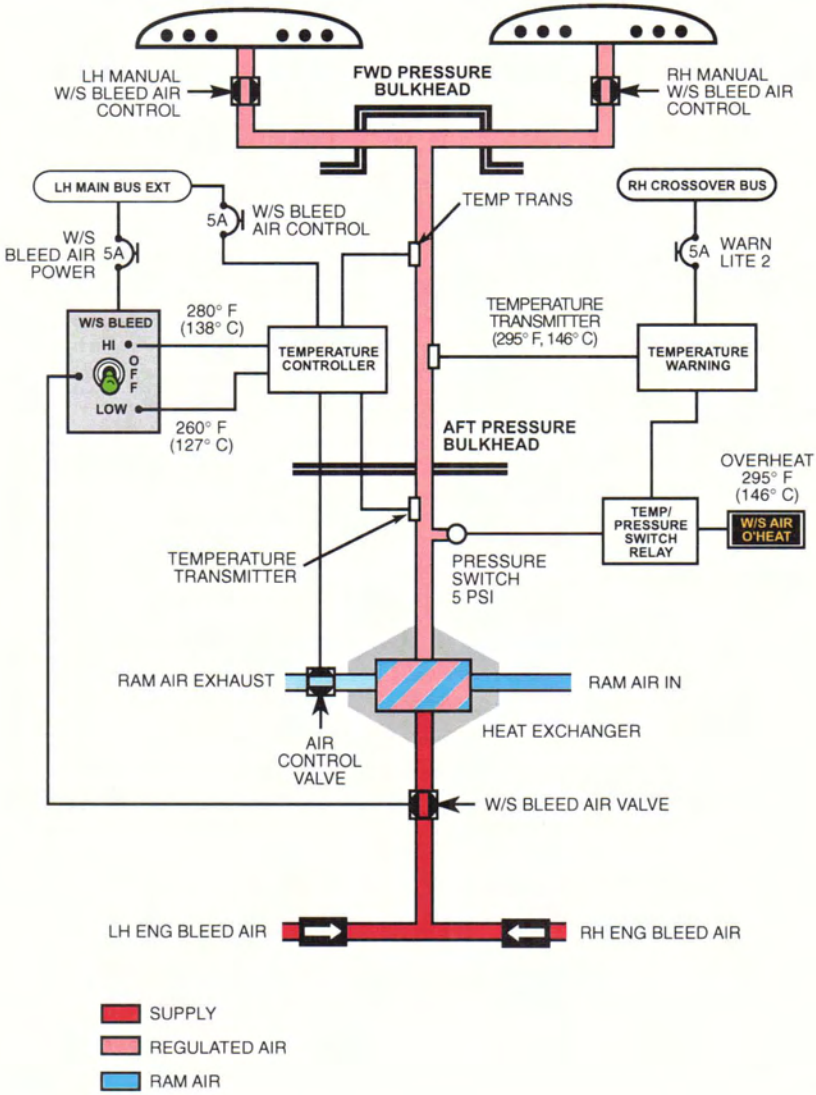
Surface Deice System



Wing Anti-Ice System

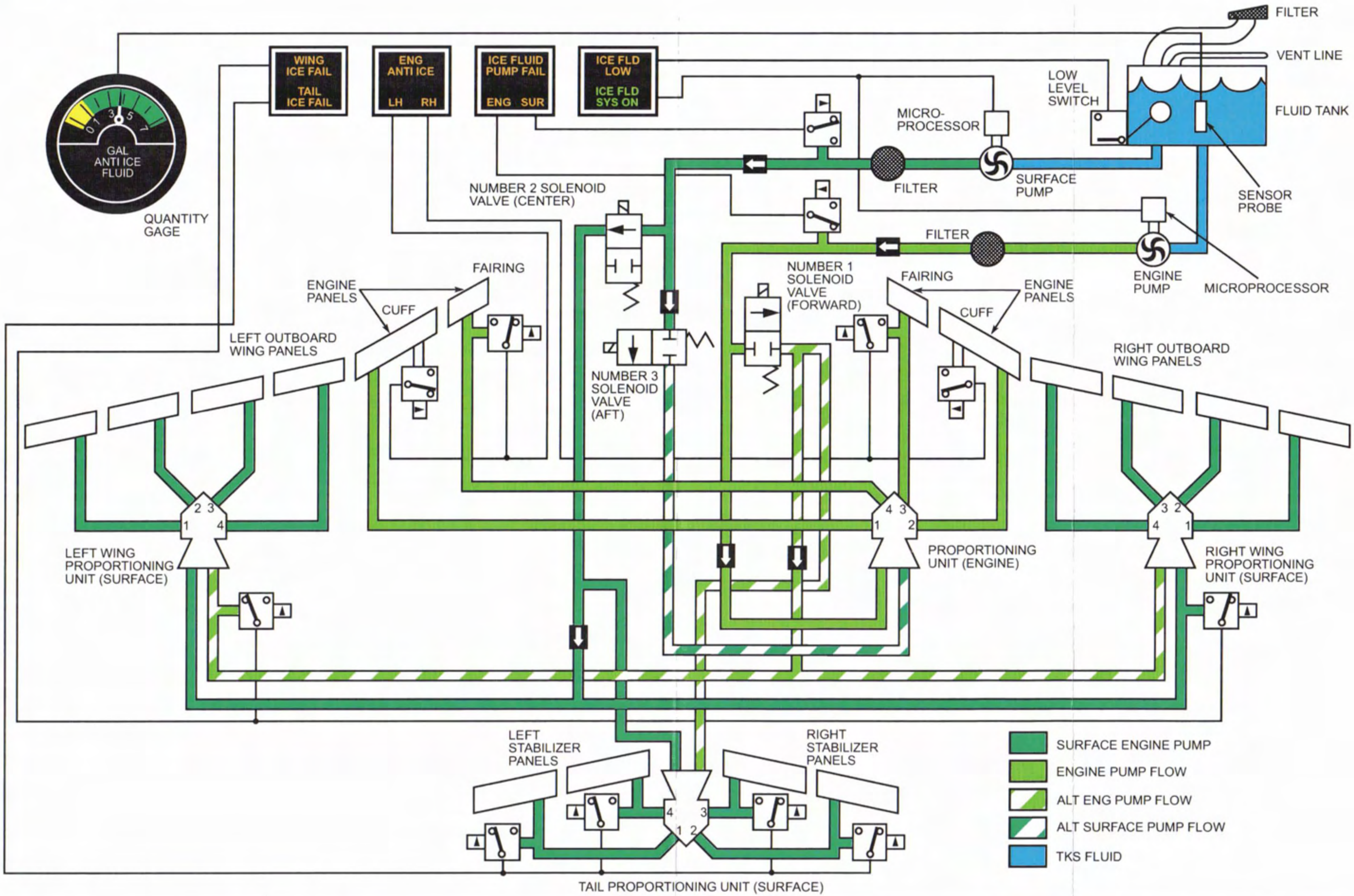


Windshield Bleed Air Anti-Ice System



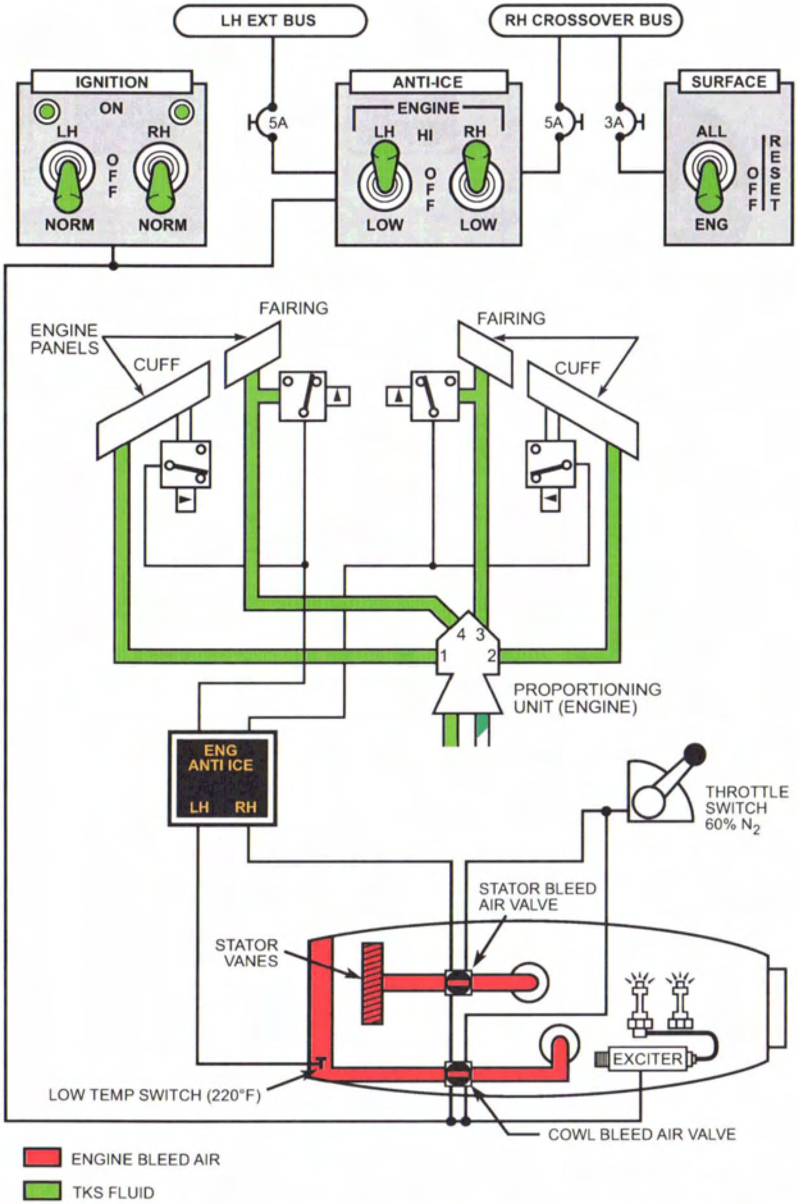
TKS Anti-Ice System

Citation SII



Engine Anti-Ice System

Citation SII



Ice and Rain Protection

Anti-icing protection is provided for the:

- engine bullet nose, temperature probe, inlet lip, and stator vanes
- inboard wing leading edges
- windshield
- pitot tubes, static ports, and angle-of-attack (AOA) probe.

Anti-icing systems must be operating before encountering icing conditions.

Pneumatically operated deicing boots remove ice accumulations from the outboard wing and horizontal stabilizer leading edges.

Engine

During engine operation, hot bleed air flowing to the engine T_1 probes and bullet nose cone provides continuous anti-icing. Turning the ENGINE ANTI ICE switches on removes power from the wing anti-ice valves (see Wing Anti-Icing). With the switches on, power set above 60% N_2 RPM, and bleed air pressure at or above 4 PSIG, after a five second delay the inlet bleed and inner stator bleed valves open and hot bleed air flows to warm the engine. Placing the ENGINE ANTI ICE switches in ON, LOW, or HI (**SII only**) removes power from the inlet and stator vane anti-ice valves. The valves do not open until power is above 60% N_2 RPM and bleed air pressure reaches a minimum of 8 PSIG or 4 PSIG (**SII only**). After the valves open, hot bleed air flows to warm the engine air inlet and stator vanes. When supplied with a 60 to 130 PSIG bleed air supply, the anti-ice valves regulate pressure to 14 to 18 PSIG or 11 to 14 PSIG (**SII only**) At power settings below 60% N_2 RPM, the valves close to prevent engine power loss.

With the ENGINE ANTI ICE switches on, the engine ignition activates to provide continuous ignition. With the ENGINE ANTI ICE switches ON or HI/LOW (**SII only**), the engine ignition system provides continuous ignition system operation and the inboard wing heating elements receive power (**except SII**).

During engine anti-icing, the appropriate ENGINE ANTI-ICE annunciators illuminate when engine inlet temperature is below approximately 220°F, the stator vane bleed air valve fails to open, or wing bleed air temperature is below 300°F.

Inboard Wing Anti-Icing

With the ENGINE ANTI ICE switches on, the wing anti-ice valves admit hot bleed air into the inboard wing leading edge ducting. From the anti-ice valve, bleed air travels through a ram air shroud before reaching the inboard leading edge. A temperature sensor in the ducting regulates bleed air temperature by opening and closing a temperature controller modulating valve.

If an engine fails, selecting XFD with the inoperative engine's ENGINE ANTI ICE switch opens a crossfeed valve that supplies bleed air from the operating engine to the opposite inboard wing leading edge and disables the cowling temperature and stator valve sensors on the selected side.

If bleed air temperature is too high, the sensor opens the modulating valve to admit more ram air through the shroud. If the bleed air leaving the shroud is too cool, the temperature sensor closes the modulating valve to reduce cooling air through the shroud. If the bleed air temperature in the leading edge fails to reach 300°F with the ENGINE ANTI ICE switches in ON, the appropriate ENG ANTI-ICE annunciator illuminates.

A piccolo tube in the inboard leading edge distributes bleed air to warm the leading edge. The air then exhausts through two scuppers. Three overtemperature switches in the leading edge provide overheat protection. If temperature reaches 160°F at any switch, the appropriate WING O'HEAT annunciator illuminates; the wing anti-ice valve closes. When temperature drops, the annunciator extinguishes and the valve opens. Ram air flows through the space separating the heated leading edge and the fuel tank. The ram air escapes through a small outboard scupper.

Surface Anti-Icing and Deicing

Placing the SURFACE DEICE switch in the AUTO position begins an 18 second timer that cycles bleed air to inflate outboard wing and horizontal stabilizer deice boots. During the first 6 seconds, the timer opens the control valve that supplies bleed air to the lower wing and left horizontal stabilizer deice boots. For the next 6 seconds the system is inactive. For the last 6 seconds, the timer opens the control valve that supplies bleed air to the upper wing and right horizontal stabilizer deice boots. During system operation, the SURFACE DEICE annunciator illuminates when bleed air pressure reaches 21 PSI.

Holding the SURFACE DEICE switch in MANUAL opens both control valves to inflate the deice boots for the upper and lower wing and left and right horizontal stabilizer.

On the **Citation SII**, a TKS fluid-based anti-icing system protects the wings and horizontal stabilizer from ice accumulation. The system has two separate delivery subsystems that obtain fluid from common 7.5 gallon capacity reservoir. The engine subsystem delivers fluid to the cuff and fairing panels and the surface subsystem supplies the outboard wing and horizontal stabilizer leading edges. The ENG ANTI-ICE and SURFACE ANTI-ICE switches control system operation (see **Table 4H-1**).

Engine		Surface	Results
LH	RH		
LOW	LOW	ENG	TKS to inboard leading edge, wing cuff, and fairing panels at reduced rate (above 22,000 ft); bleed air on.
HI	HI	ENG	TKS to inboard leading edge, wing cuff, and fairing panels at normal rate; bleed air on.
HI	HI	ALL	TKS to inboard leading edge, wing cuff, fairing, and all other panels at normal rate; bleed air on.

Table 4H-1; TKS Operation

With the system operating (ICE FLD SYS annunciator illuminated), two electric pumps draw fluid from the reservoir and provide it under pressure to their respective systems through a filter, check valves, and solenoid valves to proportioning units for the engine, left and right wing, and tail. The proportioning units ensure equal fluid delivery to the various panels. If pressure drops to one of the delivery systems, pressure switches illuminate the associated ENG ANTI ICE, WING ICE FAIL, or TAIL ICE FAIL annunciator. If the pressure downstream of a pump drops, the associated ENG/SUR ICE FLUID PUMP FAIL annunciator illuminates.

When reservoir fluid level drops and the low level switch actuates, the ICE FLD LOW annunciator illuminates to indicate approximately 20 minutes of fluid left.

Windshield Anti-Icing/Rain Removal

Selecting LOW or HI on the W/S BLEED switch supplies power to the windshield temperature controller. The controller then removes power from the windshield bleed air valve. The valve opens and bleed air flows through a heat exchanger before it reaches the manually operated shutoff valve. By regulating ram air flow through the heat exchanger, the system regulates bleed air temperature to approximately 127°C (LOW) or 138°C (HIGH).

With temperature data supplied by two sensors, the controller opens the air control valve to increase ram air flow and decrease bleed air temperature or closes the control valve to increase ram air flow and decrease bleed air temperature. If bleed air temperature exceeds 146°C or duct pressure exceeds 5 PSI with the bleed air valve closed, the W/S AIR O'HEAT annunciator illuminates.

Rotating the WINDSHIELD BLEED AIR control knobs from the OFF position opens the manually operated shutoff valves to regulate windshield air flow.

With the WINDSHIELD BLEED AIR knobs in MAX and the W/S BLEED switch in LOW, pulling the PULL RAIN knob out opens augmenter doors to increase the windshield anti-icing system airflow for rain removal.

An isopropyl alcohol-based fluid system provides a backup for the bleed air windshield anti-icing system. Placing the W/S ALCOHOL switch in ON supplies approximately 10 minutes of alcohol to the pilot's windshield.

Pitot/Static Anti-Icing

Turning the PITOT & STATIC switch on supplies 28V DC to the pitot tube, static port, and angle-of-attack probe heating elements. If a pitot tube or static port heating element fails, current sensors illuminate the appropriate LH/RH P/S HTR OFF annunciator. The annunciators also illuminate if the PITOT & STATIC switch is in OFF. The AOA HTR FAIL annunciator illuminates if the AOA probe heater fails.

In addition, heating elements in the water drain masts prevent ice accumulation when electrical power is available.

Engine Anti-Ice System

Power Source	Engine bleed air LH/RH Main Extension bus
Distribution	Each engine cowl (ring) Bleed air to inboard wing leading edge Bleed air to compressor stator vanes Bleed air to nose cone, T_1 probe
Control	ENG ANTI-ICE LH/RH switches
Monitor	WING O'HEAT annunciator ENG ANTI-ICE LH/RH annunciators Engine ITT/RPM Lights Engine ignition Wing inspection
Protection	Automatic bleed air valve closure below 60% N_2 Automatic 5-second thermal relay delay on acceleration above 60% N_2

Windshield Bleed Air System

Power Source	Bleed air (LH/RH bleed air clusters) Alcohol reservoir LH Main Extension bus
Distribution	Windshield nozzles
Control	Switches W/S BLEED W/S ALCOHOL Manual bleed air control valves Rain augmenter door handles
Monitor	Bleed air noise
Protection	Circuit breakers

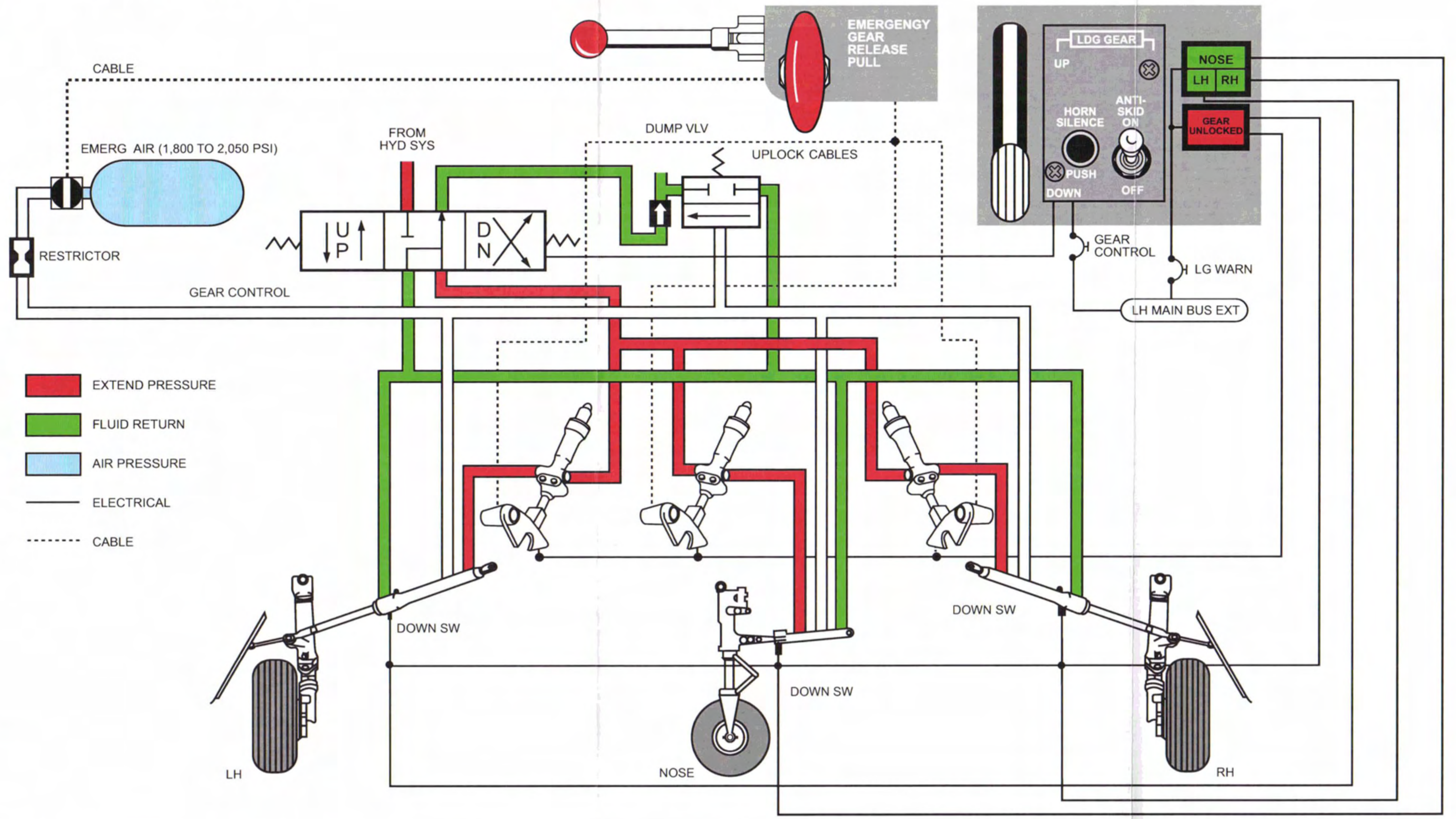
Surface Deice System

Power Source	Bleed air (L/R bleed air clusters) RH Crossover bus
Distribution	Wing boots (upper/lower) Horizontal stabilizer boots LH/RH
Control	SURFACE DEICE switch
Monitor	SURFACE DEICE annunciator Visual scan
Protection	Circuit breakers

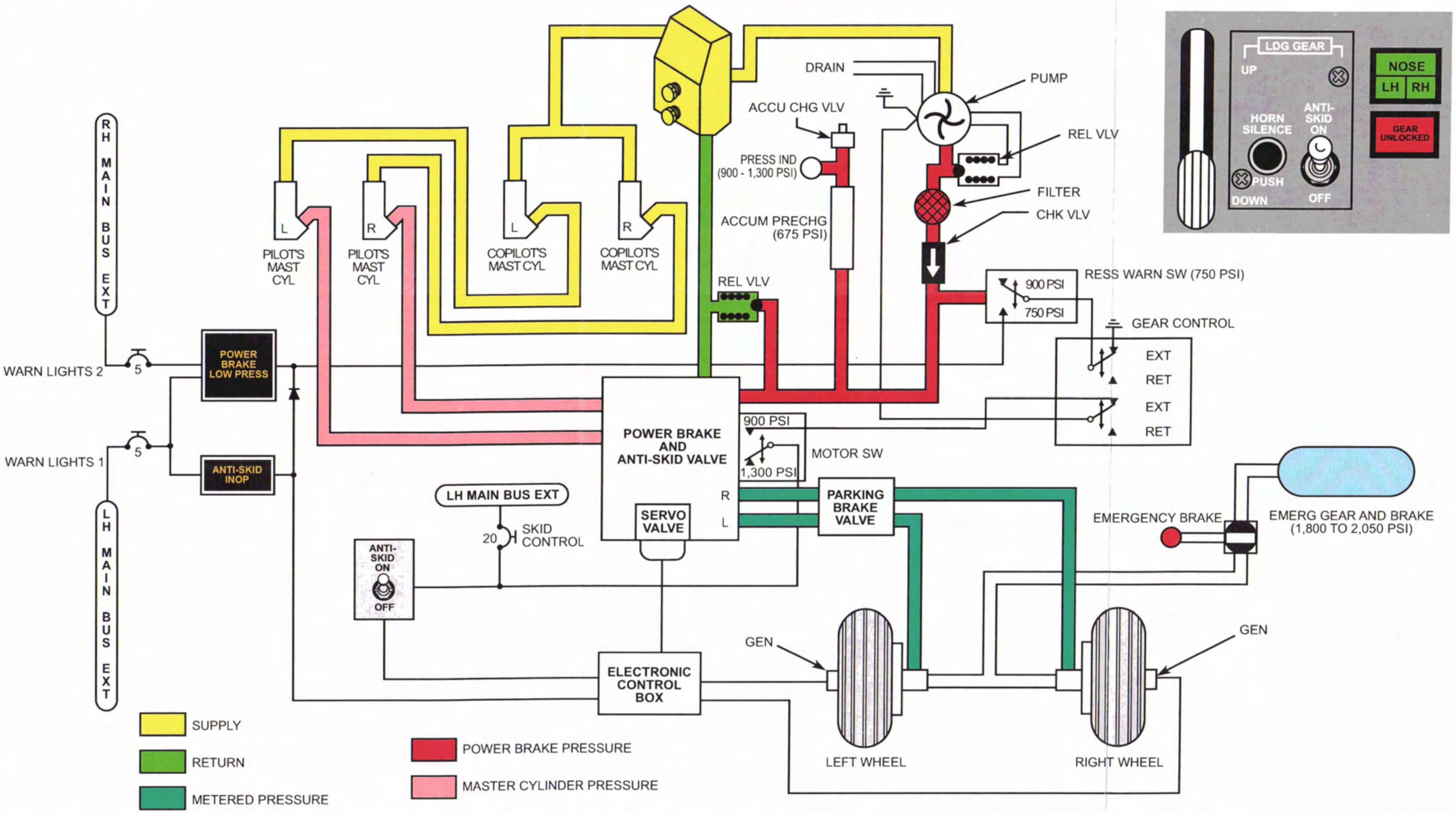
Pitot/Static Deice System

Power Source	LH Main Extension bus (pilot side) Emergency DC bus (copilot side)
Distribution	AOA heater LH/RH pitot tube LH/RH static ports
Control	PITOT & STATIC ANTI-ICE switch
Monitor	Annunciators P/S HTR OFF AOA HTR FAIL
Protection	Circuit breakers

Landing Gear System



Brake System



Landing Gear and Brakes

The aircraft has a tricycle-type landing gear consisting of a single wheel nose gear and single wheel main gear. A chined nosewheel tire deflects slush and rain away from the engine intakes. Each landing gear strut is an air/oil type that absorbs taxiing and landing shocks. Hydraulic pressure normally retracts and extends the landing gear. If the hydraulic system fails, free fall and pneumatic pressure extend the landing gear.

A mechanically operated nosewheel steering system positions the nose gear in response to rudder pedal movement.

The main gear has hydraulically operated disc brakes with an electrically operated anti-skid system. The anti-skid system provides maximum braking efficiency on all runway surfaces while minimizing wheel skid.

Landing Gear

Squat switches on the left and right main landing gear supply on-ground and in-air signals to various aircraft systems (**Table 4I-A**). Down-and-lock switches on the landing gear actuators and up-and-lock switches in the wheel wells control the gear indicating system and the landing gear system during retraction and extension.

Left Main Gear	Right Main Gear
Ground Idle Radar forced standby Outflow valves ground mode Emergency pressurization Bleed air ground Cross generator start disable Flight hour meter/digital clocks Landing gear handle solenoid lock Anti-skid system Stick shaker Thrust reversers	Stick shaker test Thrust reversers

Table 4I-A; Squat Switches

Retraction

After the aircraft leaves the ground and the landing gear struts extend, the left main gear squat switch opens to release the landing gear handle locking solenoid.

Pulling the landing gear handle out releases it from the detent. Moving the handle to the UP position begins the retraction sequence by actuating the landing gear retract switch. Then the red GEAR UNLOCK light illuminates, the hydraulic system bypass valve closes to increase hydraulic pressure to 1,500 PSI, and the landing gear control valve shifts to route hydraulic pressure to the landing gear actuator retract ports. Initial movement of the actuators unlocks the internal downlocks; the green LH, NOSE, and RH lights extinguish.

When the landing gear reaches the fully retracted position, mechanical uplocks engage the gear and hold it in the retracted position. The nose gear doors close when the nose gear completely retracts. The main gear doors follow the main gear as it retracts.

When the landing gear is up-and-locked, the nose and main gear up-and-lock switches actuate to extinguish the red GEAR UNLOCK light, de-energize the landing gear control valve, and open the hydraulic system bypass valve returning the system to open-center operation.

Extension

Pulling the landing gear control handle out to unlock it and moving it to the DOWN position begins the landing gear extension sequence by actuating the landing gear down switch. The red GEAR UNLOCK light illuminates, the hydraulic system bypass valve closes to pressurize the hydraulic system to 1,500 PSI, and the landing gear control valve shifts to the extend position. Hydraulic pressure then flows through the landing gear control valve to the uplock actuators. The uplocks release then direct pressure to the extend side of the landing gear actuators. The gear begins extending.

As the landing gear reaches the down-and-locked position, hydraulic pressure locks the landing gear with its internal down-locks. The down and lock switches actuate to extinguish the GEAR UNLOCK light, illuminate the LH, NOSE, RH gear lights, and open the hydraulic system bypass valve.

Abnormal Extension

Pulling the red AUX GEAR CONTROL T-handle below the pilot's instrument panel and rotating it 45° clockwise mechanically releases the landing gear uplocks to allow the landing gear to free-fall to the down-and-locked position. Yawing the aircraft assists gear extension and locking by exerting pressure on the landing gear through the gear doors. With the gear handle in the DOWN position, the green LH, NOSE, and RH gear position lights illuminate when the gear is down-and-locked.

Pulling the emergency gear blow down knob mechanically opens the emergency air bottle to direct pressurized nitrogen to the landing gear actuator pneumatic extend ports. It also shifts the dump valve to route hydraulic fluid to the reservoir. After abnormal gear extension, the landing gear system must be serviced and the bottle must be recharged to 1,800 to 2,050 PSI.

Nosewheel Steering

With the nose gear extended, the nosewheel steering system positions the nosewheel up to 20° left or right of center through rudder pedal movement. Deflecting a rudder positions a bell-crank between the pedals that connects through a bungee to a steering arm. Movement of the steering arm then moves the nosewheel through a universal joint and steering gears.

As the nose gear retracts, the universal joint pivots to center the nosewheel. When the nose gear fully retracts, the joint swivels to allow normal rudder pedal movement.

Wheels and Brakes

Inflate the nosewheel tire to 120 ± 5 PSI and the main wheel tires to 130 ± 5 PSI with dry nitrogen only.

Normal Braking

An independent hydraulic system supplies pressure to operate the brakes. With the landing gear handle in the down position and electrical power available, an electric motor-driven hydraulic pump, controlled by a pressure switch, pressurizes the system to 1,300 PSI. An accumulator, precharged to 675 PSI with nitrogen, maintains system pressure when the pump is not operating. If system pressure falls below 900 PSI, the pump motor energizes until system pressure builds to 1,300 PSI. If system pressure falls to 750 PSI, a pressure warning switch illuminates the PWR BRK PRESS LO annunciator.

Pressing on the toe brake of each rudder pedal mechanically operates a master cylinder that hydraulically controls braking effort supplied through the power brake and anti-skid valve. The power brake and anti-skid valve, in turn, supplies pressure proportional to braking effort to the brake assemblies. Under pressure, the braking assembly piston then extends against the pressure plate to force the stationary and rotating discs together.

With the ANTI-SKID switch ON, a transducer in each main wheel axle provides wheel speed signals to the anti-skid system control box. If the control box senses an excessive wheel deceleration indicative of an impending skid, it commands the anti-skid valve to reduce braking pressure to the wheels. When the wheel spins up to match the other wheel, the system restores normal braking pressure to both wheel brakes.

The anti-skid system also provides touchdown and locked wheel crossover protection. If the brakes are applied before touchdown, the system dumps pressure until the left squat switch actuates on touchdown. Above 40 kts groundspeed, locked wheel crossover protection compares left and right wheel speeds and dumps pressure when the slow wheel's speed is 50% or slower than the fast wheel.

If an anti-skid component fails, the ANTI-SKID INOP annunciator illuminates. After a system failure, the ANTI-SKID switch should be placed in OFF. Normal braking without anti-skid protection is still available.

Emergency Braking

Pulling the EMER BRAKE PULL handle below the pilot's instrument panel mechanically opens the brake valve assembly to release pressurized nitrogen into the supply lines. Pressure in the supply lines shifts a shuttle valve at each wheel brake assembly to stop normal hydraulic system pressure and to admit pressurized nitrogen into the brake assemblies. Braking pressure is proportional to handle extension. Anti-skid protection is not available.

Pulling the handle out completely supplies full pressure from the bottle for maximum braking. Releasing the handle shifts the brake valve assembly to vent pressure to atmosphere and release the brakes.

Parking Brakes

With the aircraft on the ground, the hydraulic system pressurized, and the the parking brake handle pulled out, applying toe pressure applies the brakes. Pulling the parking brake handle out shifts the parking brake valve to trap pressure and hold the brakes. Pushing the handle in releases the brakes.

Landing Gear System

Power Source	Hydraulic system fluid Left Main Extension bus
Distribution	Gear actuators
Control	Gear control handle Hydraulic bypass valve Landing gear control valve Landing gear horn silence Squat switch Test switch LDG GEAR position
Monitor	Emergency air pressure gage (preflight) GEAR UNLOCKED light (red) HYD PRESS ON annunciator Landing gear down lights (green) Landing gear horn
Protection	Circuit breakers Emergency air bottle (blow-down knob) Gear/flap warning horn Gear uplocks manual release (T-handle) Mechanical downlock

Brake/Anti-Skid System

Power Source	Independent hydraulic system Emergency air bottle LH Main Extension bus
Distribution	Brake actuators
Control	Brake pedals ANTI-SKID switch Parking brake handle Test switch ANTI-SKID position
Monitor	POWER BRAKE LOW PRESS annunciator ANTI-SKID INOP annunciator Emergency air pressure gage (preflight) Brake accumulator pressure gage (preflight) Brake pedal feel
Protection	Circuit breakers Emergency braking Filter and check valve in anti-skid electro-hydraulic pump

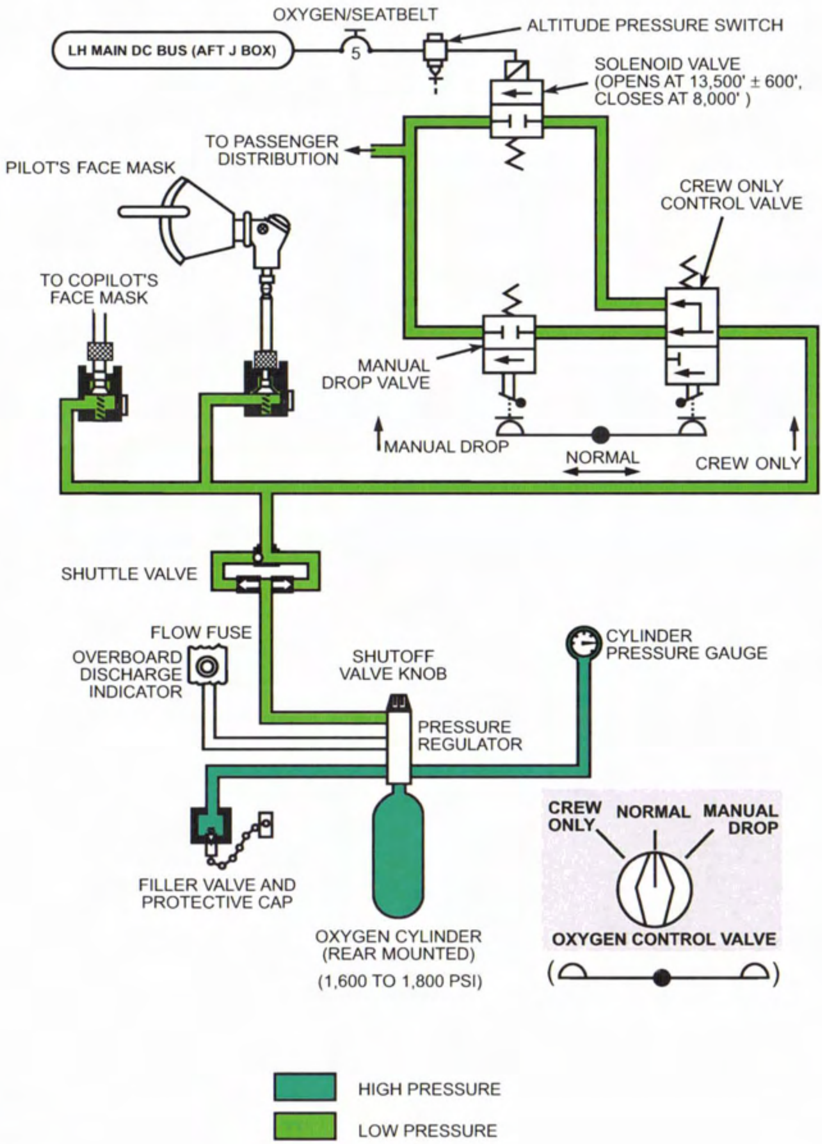
CAUTION: There is no anti-skid during emergency braking.

Nosewheel Steering

Power Source	Rudder pedals
Distribution	Rudder pedal cables Bellcrank in wheel well Spring-loaded bungee rod Steering arm to universal joint For nose gear centering and disconnection of rudder pedals from steering gears during landing gear retraction
Control	Rudder pedal deflection
Protection	Optional nosewheel spin-up system: gravel spray reduction

CAUTION: Do not attempt flight with sheared nosewheel bolts; violent nosewheel shimmy may occur and the nose gear may not center when retracted after takeoff.

Oxygen System



Oxygen Supply

From the 76 cubic foot oxygen bottle in the tailcone compartment, oxygen flows through a regulator assembly before it reaches the crew and passenger oxygen distribution systems. The regulator assembly has a shutoff valve, pressure regulator, and separate lines for oxygen pressure gage, filler valve, and overpressure rupture disc.

When the bottle supplies oxygen between 1,600 and 1,800 PSI, the pressure regulator reduces bottle pressure to approximately 70 PSI. If bottle pressure reaches 2,850 ± 150 PSI at 70°F or 2,600 ± 100 PSI at 160°F, the rupture disc bursts to release bottle contents overboard. When the disc ruptures, it dislodges a green indicator disc on the lower left rear fuselage to provide a visual indicator of bottle discharge. The filler valve and pressure gage allows normal servicing of the bottle without removal.

Distribution

After the regulator assembly, oxygen flows through redundant supply lines to the pilot and copilot oxygen outlets. If a supply line ruptures and excessive flow occurs, the line's flow fuse closes to prevent oxygen loss. Oxygen continues to flow through the opposite supply line and shuttle valve.

Crew System

The standard quick-donning diluter-demand crew oxygen mask has a built-in regulator and microphone. With the mask regulator in the NORM position, the regulator dilutes oxygen with cabin air according to cabin altitude. As cabin altitude increases, the regulator increases the oxygen to cabin air ratio until it provides 100% oxygen. Placing the regulator in the 100% position provides 100% oxygen regardless of cabin altitude. Placing the regulator in the EMER position supplies 100% oxygen at positive pressure. Each mask stores next to the crew member's seat when not in use.

The optional EROS mask operates similarly. The major difference is the EROS's inflatable harness. During donning, the harness inflates to assist in placement over the head, then deflates to make it snug against the user's face. When not required, the mask stores in a cup on the cabin divider behind each crewmember's head.

With the regulator set to N (normal), the regulator dilutes oxygen with cabin air according to cabin altitude. In the 100% position, it supplies 100% oxygen at positive pressure.

Passenger System

With the OXYGEN CONTROL VALVE in the NORMAL position, oxygen flows to the normally closed solenoid valve. If cabin altitude reaches 13,500 ± 600 ft, the altitude pressure switch closes to energize the passenger solenoid valve. The valve opens and oxygen flows to the passenger oxygen masks. The initial pressure surge actuates door release mechanisms to deploy the passenger oxygen masks. The masks fall and hang by their lanyards. Pulling on the lanyard releases a pin that allows oxygen flow.

When cabin altitude drops to approximately 8,000 ft, the altitude pressure switch opens and the solenoid valve closes. Oxygen flow to the passenger distribution system stops.

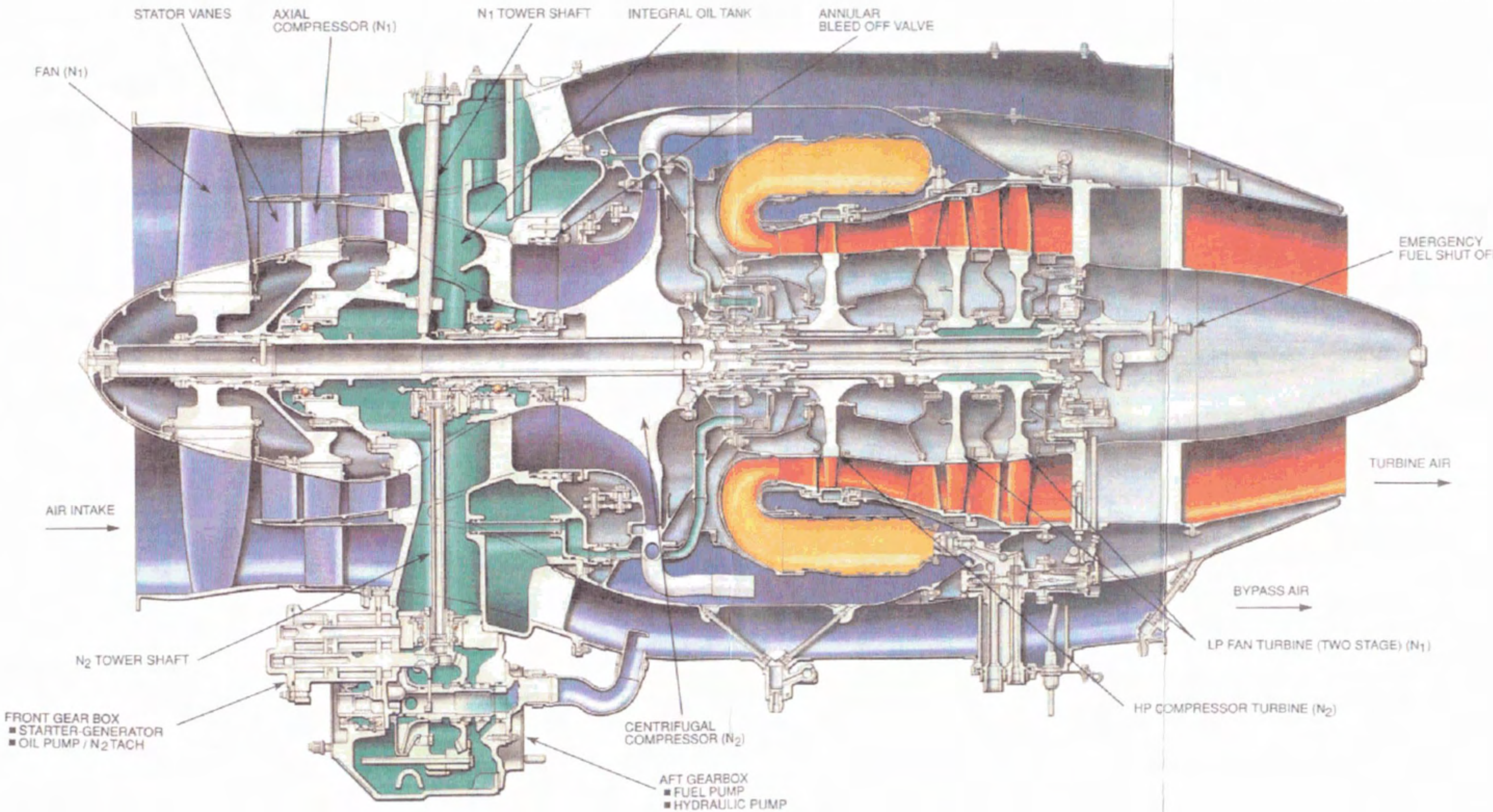
Placing the OXYGEN CONTROL VALVE in MANUAL DROP opens the manual drop valve; oxygen flows to the passenger masks regardless of cabin altitude.

Placing the OXYGEN CONTROL VALVE in the CREW ONLY position closes the valve to prevent flow to the passenger oxygen system regardless of cabin altitude.

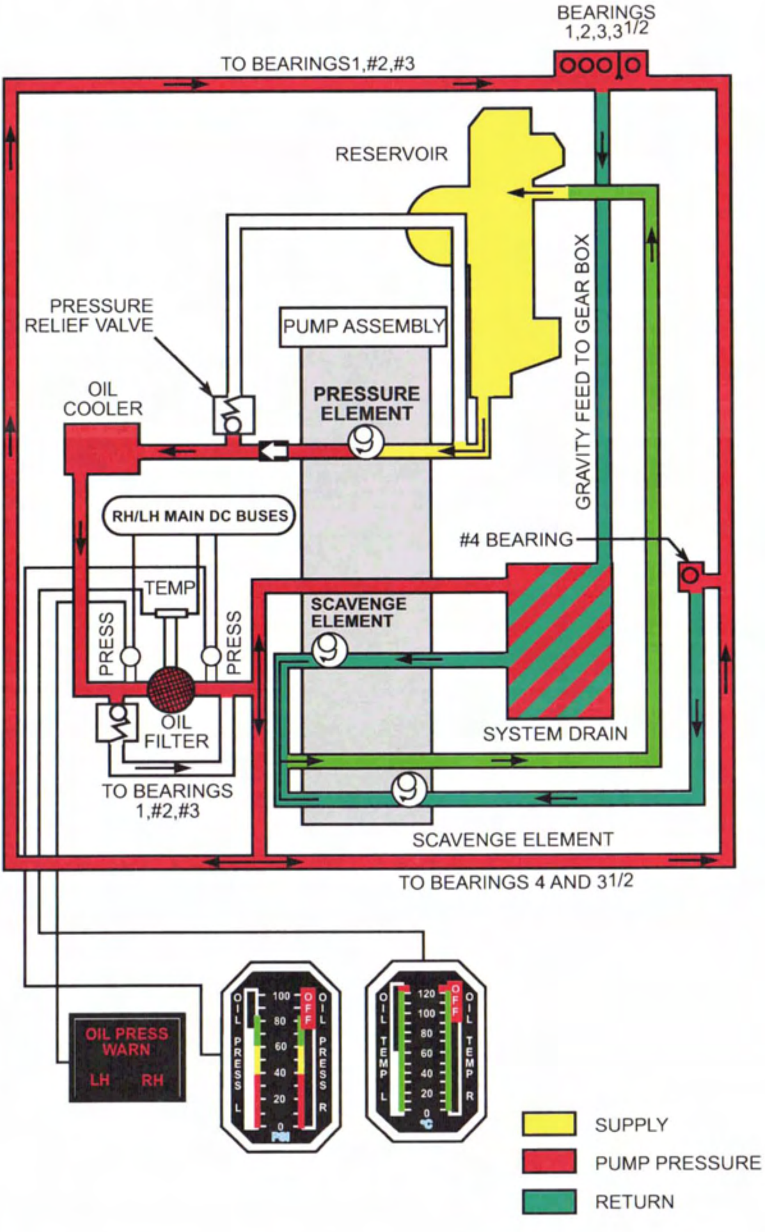
Oxygen System

Power Source	Left Main DC bus Pressurized oxygen in storage bottle
Distribution	Crew oxygen masks Passenger oxygen masks
Control	Altitude pressure switch/solenoid valve Oxygen control valve Oxygen cylinder shutoff valve Oxygen mask pressure regulator
Monitor	Crew oxygen flow indicator (in line to mask) Oxygen pressure gage
Protection	Circuit breaker Overpressure/overtemperature relief – overboard discharge disc

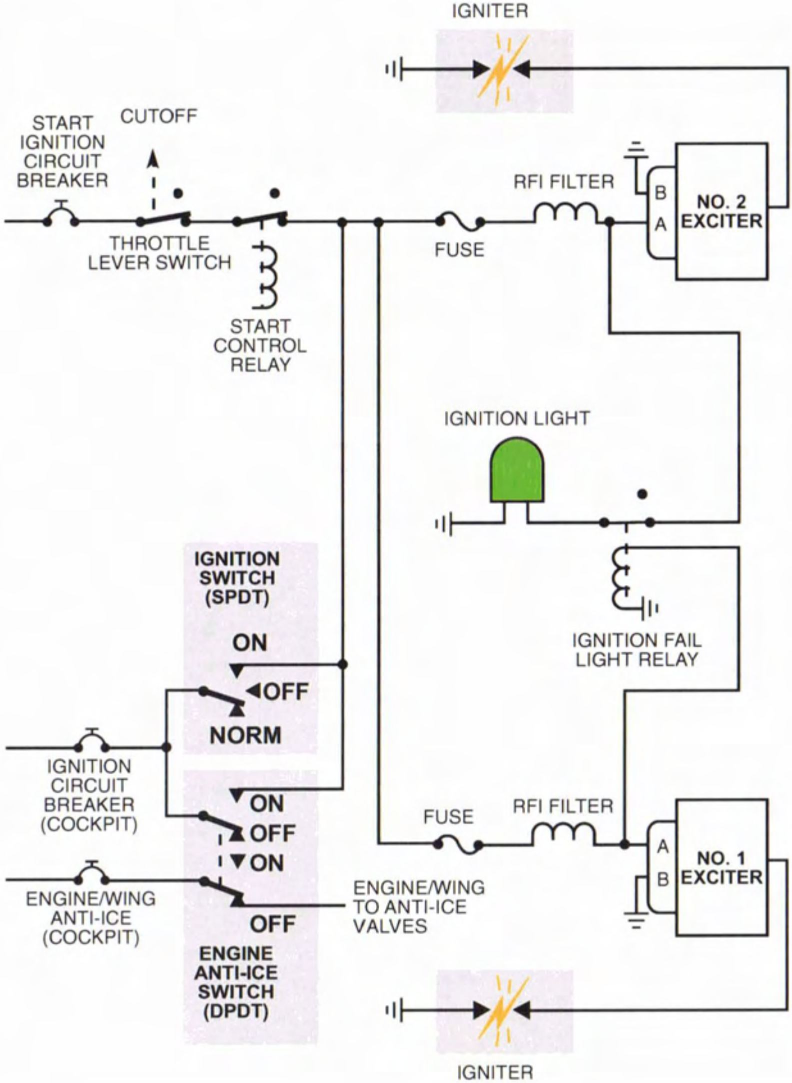
Pratt & Whitney JT15D-5A



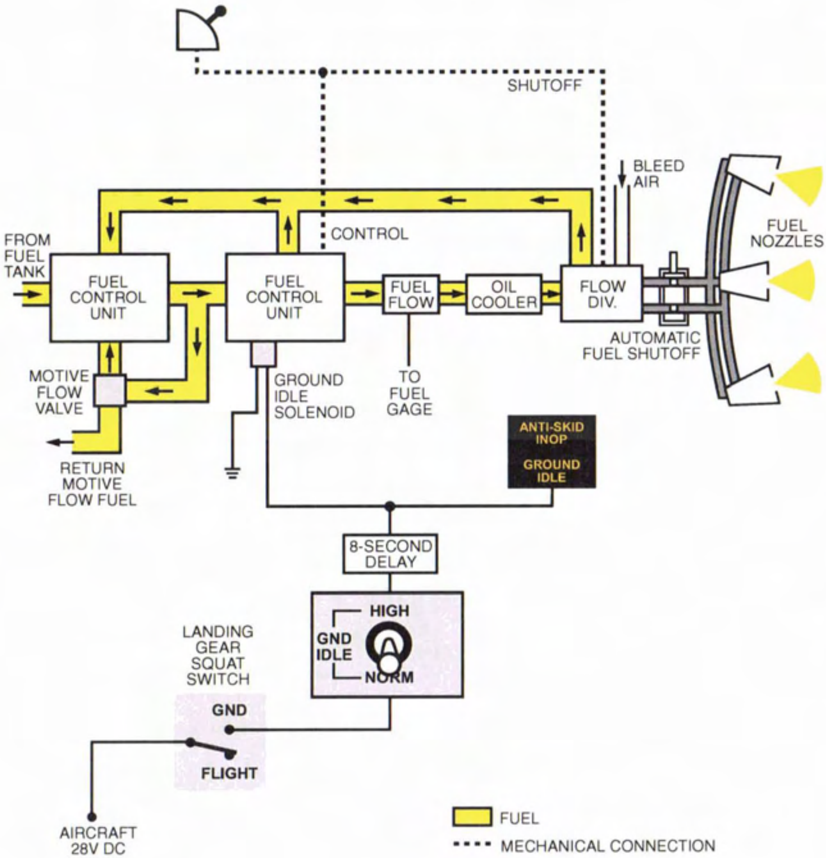
Lubrication System



Ignition System



Engine Fuel Control System



Powerplant

Two Pratt & Whitney of Canada JT15D-5A engines power the Citation V aircraft. The JT15D-5A is a lightweight, two-spool, medium bypass turbofan that produces 2,900 lbs of static take-off thrust at sea level.

Two Pratt & Whitney of Canada JT15D-4B engines power the Citation SII aircraft. The JT15D-4B is a lightweight, two-spool, medium bypass turbofan that produces 2,500 lbs of static take-off thrust at sea level.

After air enters the engine inlet, a front fan driven by the low pressure (LP) turbine accelerates the air rearward toward the axial and centrifugal compressors and the full-length, annular bypass duct. Approximately two-thirds of the total air flows around the engine core through the bypass duct.

After the air passes through the fan, a one-stage axial compressor, driven by the low pressure turbine, accelerates the air before passing it to the centrifugal compressor. The compressor, driven by the high-pressure (HP) turbine, slings air outward to accelerate it to a high-velocity centrifugal flow. The diffuser converts this high-velocity flow into a low-velocity axial flow before it reaches the combustion section.

A compressor bleed off valve prevents engine stalling and surging caused by rapid engine acceleration and deceleration. In response to N_2 speed, altitude, and engine acceleration and deceleration rates, a bleed off valve control opens and closes the annular bleed off valve through an actuator to bleed excess compressor air into the bypass duct to smooth air flow through the engine.

After entering the annular, reverse-flow combustion section, the airflow makes a 180° turn forward, then mixes with fuel introduced by the fuel nozzles. Initially ignited by two igniter plugs, the air/fuel mixture burns and expands. The hot combustion gases then flow to the exit duct where they make a 180° turn before reaching the HP turbine. As the high velocity gas stream passes through the turbine, the turbine rotates to extract energy to drive the centrifugal compressor and accessory gearbox. The combustion gases then flow through the two-stage LP turbine to rotate it. The LP turbine, in turn, drives the axial compressor and front fan. After exiting the turbine section, the gas stream enters the exhaust duct where it mixes with bypass air as forward thrust.

Lubrication System

The engine-driven oil pump draws oil from a 2.03 U.S. gallon tank and provides it under pressure through a fuel/oil cooler and filter to the engine bearings, bevel and spur gears, and accessory gearbox.

After lubricating, cooling, and cleaning the engine, oil drains from the bearings into the accessory gearbox. Oil from the No. 4 bearing drains into a sump where a separate scavenge element draws oil into the accessory gearbox. The oil pump's scavenge element then draws oil from the accessory gearbox and pumps it to the oil tank.

A breather system relieves excess air pressure from the lubrication system to prevent pump cavitation and excess system pressure.

Pressure and temperature transmitters in the lubrication system drive the vertical tape OIL PRESS and OIL TEMP gages and the OIL PRESS WARN annunciators. Below approximately 40 PSI, the respective OIL PRESS WARN annunciator illuminates.

Fuel and Fuel Control

Under pressure from the wing fuel system, fuel flows through the firewall shutoff valve to the engine-driven fuel pump at approximately 20 to 30 PSI. A pressure switch between the shutoff valve and pump illuminates the FUEL LOW PRESS annunciator if fuel pressure drops below approximately 5 PSI. If the boost pump switch is in the NORM position, low fuel pressure automatically turns the electric fuel boost pump on. The engine-driven fuel pump then delivers fuel at approximately 500 to 700 PSI through a filter to the hydromechanical fuel control unit (FCU). A motive flow valve downstream of the fuel pump supplies low pressure, high-flow motive flow fuel to the airframe fuel system's primary ejector pump.

Movement of the associated throttle lever controls the FCU. Each throttle lever has a mechanical stop that prevents inadvertent selection of CUTOFF and a latch that must be released to advance the throttle from CUTOFF to IDLE. In response to throttle movement, the FCU meters fuel based on engine N_2 speed, ambient pressure and temperature, compressor inlet temperature, and throttle position to provide efficient engine operation during starting, acceleration, and shutdown.

Metered fuel from the FCU flows through the fuel/oil cooler to the flow divider valve. A fuel flow transmitter between the FCU and cooler drives the vertical tape FUEL FLOW gage. The gage shows fuel flow from 0 to 2,000 pounds-per-hour (PPH).

In the flow divider valve, the fuel flow splits to supply the primary and secondary manifolds. The divider valve also controls fuel pressure to the primary manifold during engine start and ensures fuel does not reach the manifolds until it reaches a minimum pressure.

From the flow divider valve, fuel flows to the fuel manifold assembly. The assembly then distributes fuel to the twelve fuel nozzle primary and secondary passages. The fuel nozzles deliver a finely atomized spray of fuel into the engine's combustion chamber.

An emergency fuel shutoff system prevents engine overspeed by cutting fuel flow to the engine. Axial displacement of the low pressure turbine shaft 0.07 inches activates a trigger that closes the emergency fuel cutoff valve. Fuel flow stops and the engine shuts down.

Ignition

With the IGNITION switch in the NORM position during the engine start cycle, advancing a throttle above the cutoff position supplies power from the Hot Battery bus to two ignition exciters. Each exciter provides high-voltage electrical pulses to an ignition plug. The plug, extending into the combustion chamber, fires to ignite the fuel/air mixture. When the engine start cycle terminates, the ignition system deactivates.

Placing an IGNITION switch in ON supplies power for continuous ignition system operation. During ignition system operation, a green light above each switch illuminates. Placing an ENGINE ANTI-ICE switch on also provides ignition operation.

Engine Synchronizer

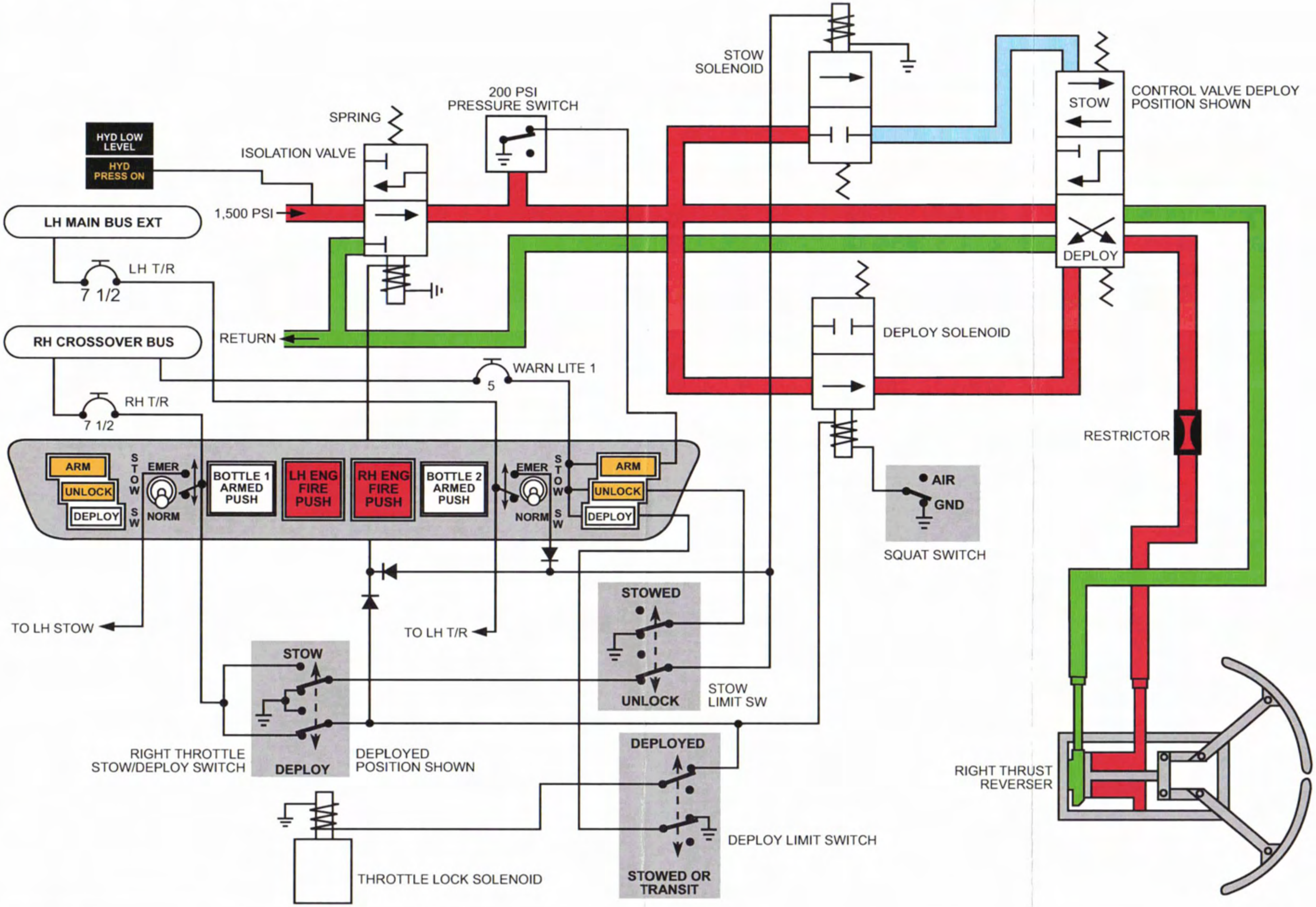
When operating, the engine synchronizer provides automatic N_1 or N_2 synchronization between the left (master) and right (slave) engines. With the ENGINE SYNC switch in FAN or TURB, the system compares the right engine's N_1 or N_2 speed (whichever is selected) to the left engine. If there is a speed mismatch, the system trims the right engine's FCU through an actuator to either increase or decrease engine speed. The system has a 1.5% N_1 or 1.0% N_2 RPM authority range. The system does not operate if slave engine speed, compared to the master, is out of this range. This prevents the right engine from synchronizing with a failing left engine.

Ground Idle

A ground idle system reduces engine idle speed on the ground to slow taxi speed and reduce brake wear. With the aircraft on the ground and the GND IDLE switch in NORM, the system reduces engine idle speed from 52% N_2 RPM to 46% N_2 RPM after an eight second delay. With the switch in NORM, the GROUND IDLE annunciator illuminates.

When the aircraft leaves the ground or the switch is in HIGH, the system deactivates.

Thrust Reverser System



Hydraulic System

An open-center hydraulic system supplies 1,500 PSI pressure for operation of the:

- landing gear
- thrust reversers
- speedbrakes
- flaps.

With the engines running, each constant-displacement engine-driven hydraulic pump draws fluid from the self-pressurizing reservoir through an electrically operated firewall shutoff valve.

If reservoir fluid level drops to approximately the REFILL mark, the reservoir's low fluid level warning switch illuminates the HYD LOW LEVEL annunciator.

From each pump, pressurized fluid flows through a filter before reaching its flow switch check valve. If a pump's output drops to less than 0.45 GPM, the flow switch closes to illuminate the HYD FLOW LOW annunciator. Check valves prevent reverse flow from an operating pump to an inoperative pump.

After the flow check switch valve, the two engine-driven pump outputs combine at the normally open bypass valve. Fluid continues through the bypass valve and flows at approximately 60 PSI back to the reservoir through a filter.

During landing gear, thrust reverser, or speedbrake operation, the electrically controlled bypass valve closes to pressurize the hydraulic system. When the pressure exceeds approximately 125 to 165 PSI, a pressure switch closes to illuminate the HYD PRESS ON annunciator. A pressure relief valve in-line with the bypass begins opening at 1,350 PSI and fully opens at 1,500 PSI to maintain system operating pressure.

After the landing gear, speedbrakes, or flaps cycle or the thrust reversers stow, electrical power is removed from the bypass valve returning the system to low pressure.

Hydraulic System

Power Source	Hydraulic reservoir fluid Engine-driven hydraulic pumps L/R (pressure)
Distribution	Hydraulic manifolds
Control	ENGINE FIRE PUSH L/R switchlights Landing gear handle Speedbrake switch Thrust reverser levers Flaps lever
Monitor	Annunciators HYD FLOW LOW SPEED BRAKE EXTEND HYD LOW LEVEL HYD PRESS ON F/W SHUT OFF LH/RH ARM/UNLOCK/DEPLOY (T/Rs) Flap position indicator Trim wheel
Protection	Bypass relief valve Bypass valve Circuit breakers Firewall shutoff valves Flaps (blow-up protection) Reservoir pressure relief valve Thermal relief Thrust reverser isolation valve

Thrust Reverser System

When deployed, the hydraulically operated and electrically controlled thrust reversers deflect engine thrust forward to decrease landing roll and brake wear.

Deploy

Before thrust reverser deployment can begin, the throttle levers must be in the idle position.

Pulling the thrust reversers levers up begins the deploy sequence by actuating the stow/deploy switches. The hydraulic system bypass valve then closes, hydraulic system pressure builds, and the HYD PRESS ON annunciator illuminates. The isolation valve then opens to admit pressurized fluid into the thrust reverser system hydraulic lines; the ARM lights illuminate once hydraulic pressure reaches 200 PSI. If one squat switch is in the on ground mode, the control valve then shifts to admit hydraulic pressure to the thrust reverser actuator deploy ports.

Initial movement of the thrust reverser actuators from the stowed position actuates the stow limit switches to the unlocked position and the UNLOCK lights illuminate. Under hydraulic pressure, the actuators continue moving to drive the thrust reverser doors to the deployed position. When the doors reach the fully deployed position, deploy limit switches actuate to illuminate the DEPLOY lights and release the throttle lock solenoid. Full range of reverse thrust is now available.

Stow

Moving the thrust reverser levers forward and down begins the stow sequence by actuating the stow/deploy switches. The control valves then shift to route hydraulic pressure to the thrust reverser actuator stow ports. As the thrust reversers begin stowing, the deploy limit switches de-actuate to extinguish the DEPLOY lights. When the reverser mechanism stows and locks, the stow limit switch de-actuates to extinguish the UNLOCK lights, close the isolation valve, and open the hydraulic system bypass valve. The ARM light extinguishes after the isolation valve closes and pressure in the thrust reverser system drops below 100 PSI.

Emergency Stow

If a thrust reverser unlocks or begins deploying in flight, the associated UNLOCK light illuminates, an automatic throttle retarding device between the thrust reverser mechanism and the throttle levers retards the throttle lever to the idle position.

Placing the associated EMER STOW SW switch in the EMER position supplies 28V DC from the opposite thrust reverser's CB to close the hydraulic system bypass valve, open the isolation valve, and shift the control valve to the stow position. Hydraulic pressure then forces the unlocked thrust reverser to the stowed position. During an emergency stow the ARM light remains illuminated and the bypass valve remains closed as long as the EMER STOW SW is in the EMER position.

Thrust Reverser System

Power Source	Engine thrust Target-type reverser doors
Distribution	Hydraulic system and control valves
Control	Left Main Extension bus Right Crossover bus Squat switch (either main gear) Thrust reverser levers
Monitor	ARM/DEPLY/UNLOCK T/R indicator lights HYD PRESS ON annunciator Rotary TEST switch, THRU REV position MASTER WARNING annunciators
Protection	Automatic throttle-retarding to idle thrust upon inadvertent deployment Circuit breakers EMER STOW switches Isolation valves Mechanical overcenter lock

Flight Planning

Table of Contents

Frequent or Planned Destinations Record

Airport ______________________________ Ident. __________

FBO __________________ Freq. ______ Tel: (   ) ________

Hotel ______________________________ Tel: (   ) ________

Catering ___________________________ Tel: (   ) ________

FSS ________________________________ Tel: (   ) ________

Airport ______________________________ Ident. __________

FBO __________________ Freq. ______ Tel: (   ) ________

Hotel ______________________________ Tel: (   ) ________

Catering ___________________________ Tel: (   ) ________

FSS ________________________________ Tel: (   ) ________

Airport ______________________________ Ident. __________

FBO __________________ Freq. ______ Tel: (   ) ________

Hotel ______________________________ Tel: (   ) ________

Catering ___________________________ Tel: (   ) ________

FSS ________________________________ Tel: (   ) ________

Notes ____

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____

____

Airport ______________________________ Ident. __________

FBO ________________ Freq. ______ Tel: (   ) ________

Hotel ______________________________ Tel: (   ) ________

Catering ____________________________ Tel: (   ) ________

FSS ________________________________ Tel: (   ) ________

Airport ______________________________ Ident. __________

FBO ________________ Freq. ______ Tel: (   ) ________

Hotel ______________________________ Tel: (   ) ________

Catering ____________________________ Tel: (   ) ________

FSS ________________________________ Tel: (   ) ________

Airport ______________________________ Ident. __________

FBO ________________ Freq. ______ Tel: (   ) ________

Hotel ______________________________ Tel: (   ) ________

Catering ____________________________ Tel: (   ) ________

FSS ________________________________ Tel: (   ) ________

Notes ____

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Flight Planning – General

Takeoff Weight Determination

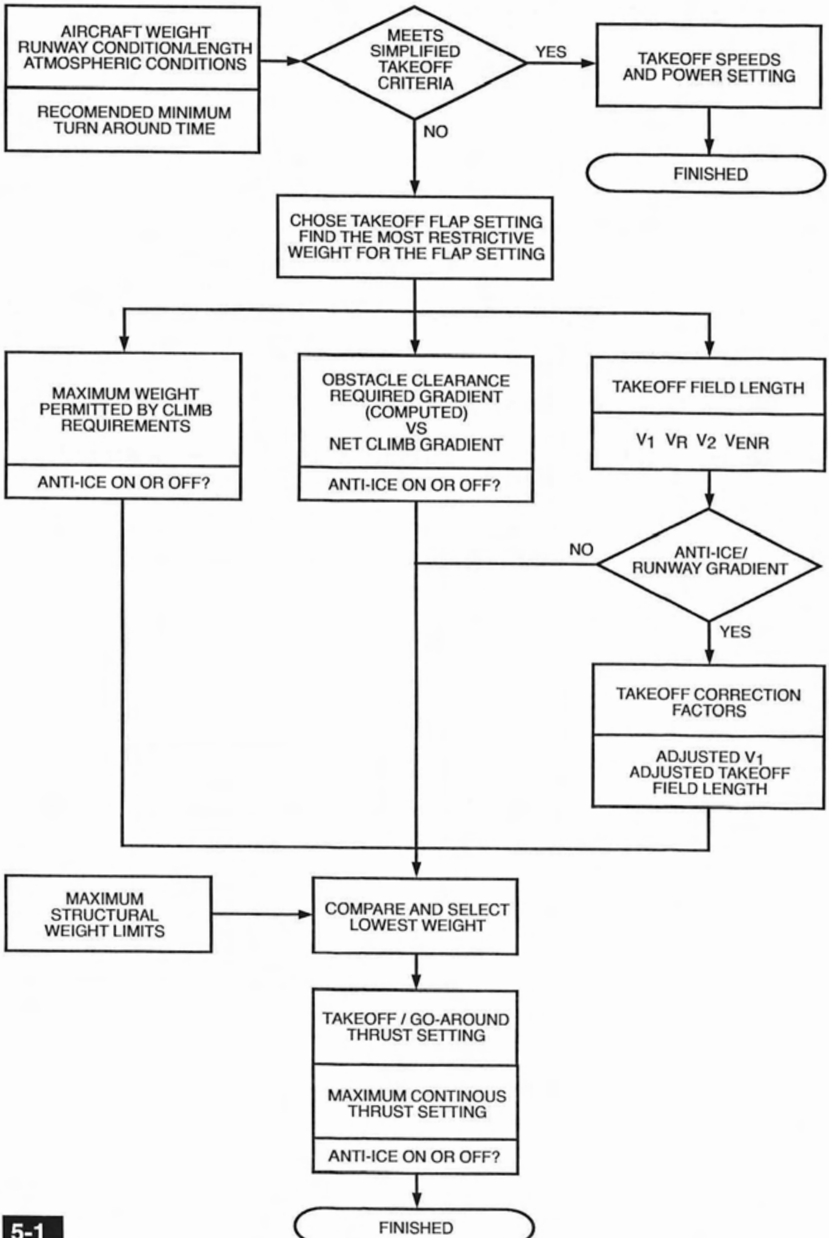
Charts in the Airplane Flight Manual (AFM), Performance Section IV, facilitate determination of the maximum takeoff gross weight permitted by FAR 25, as well as associated speeds and flight paths.

The flow chart (**Figure 5-1**) on the following page illustrates the steps to determine appropriate takeoff weight.

Takeoff weight (**Figure 5-2**, page 5-7) is limited by the most restrictive of the following:

- maximum certified takeoff weight
- maximum takeoff weight permitted by climb requirements
- takeoff field length.

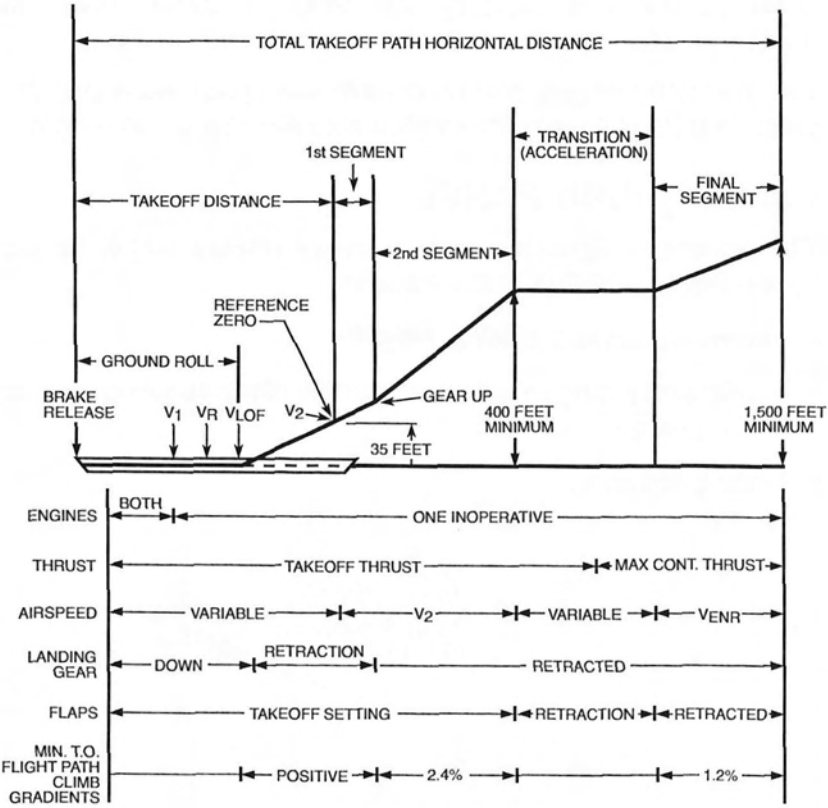
Takeoff Weight Determination Procedure



5-1

Takeoff Profile

One Engine Inoperative



5-2

Landing Weight Determination

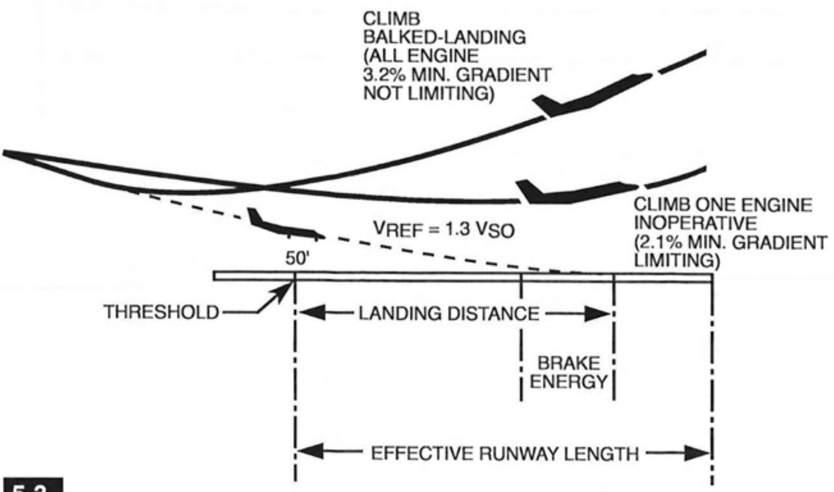
Charts in the Airplane Flight Manual (AFM), Performance Section IV, facilitate determination of approach and landing climb performance, landing field length requirements, and approach speed values.

The flow chart (**Figure 5-4**) on the following page illustrates the steps to determine maximum allowable landing gross weight.

Landing Path Profile

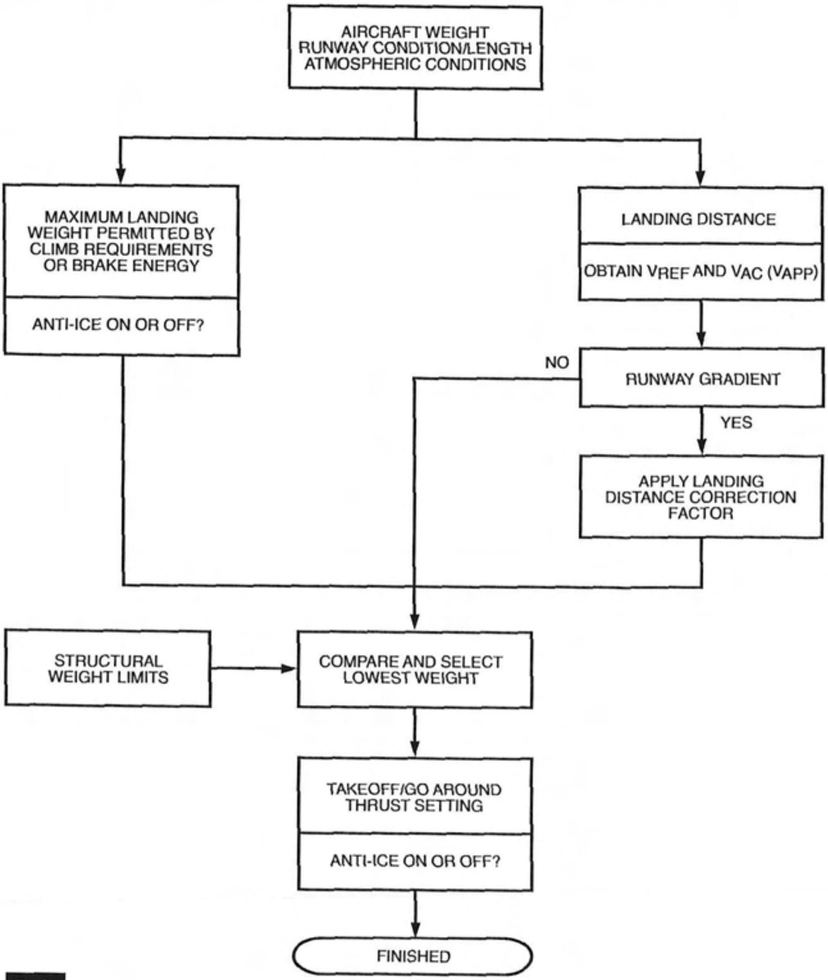
The maximum allowable landing weight (**Figure 5-3**) is limited by the most restrictive of the following:

- maximum certified landing weight
- maximum landing weight permitted by climb requirements or brake energy
- landing distance.



5-3

Landing Weight Determination Procedure



5-4

Sample Weight and Balance Loading Form

Payload Computations			
Item	**ARM**	**Weight (lbs)**	**Moment/ 100**
Occupants			
Seat 1	131.00	170	222.70
Seat 2	131.00	170	222.70
Seat _3_			
Seat _4_			
Seat _5_			
Seat _6_			
Seat _7_			
Seat _8_			
Seat ___			
Seat ___			
Toilet	345.00		
Baggage			
Nose			
Aft Cabin			
Tailcone			
Tailcone			
Cabinet Contents			
Payload			

Item	Weight (lbs)	Moment/ 100
1. BASIC EMPTY WEIGHT * Airplane CG = 310.07		
2. PAYLOAD		
3. ZERO FUEL WEIGHT (sub-total)(Do not exceed maximum zero fuel weight of 11,200 pounds (standard) or 12,200 pounds (optional)		
4. FUEL LOADING		
5. RAMP WEIGHT (sub-total) (Do not exceed maximum ramp weight of 16,100 pounds)		
6. LESS FUEL FOR TAXIING		
7. ** TAKEOFF WEIGHT (Do not exceed maximum takeoff weight of 15,900 pounds) * Airplane CG = ____ ***		
8. LESS FUEL TO DESTINATION		
9. ** LANDING WEIGHT (Do not exceed maximum landing weight of 15,200 pounds) * Airplane CG = ____ ***		

$$\text{* Airplane CG} = \frac{\text{MOMENT/100}}{\text{WEIGHT}} \times 100$$

** Totals must be within approved weight and center-of-gravity limits. It is the responsibility of the operator to ensure that the airplane is loaded properly. The Basic Empty Weight CG is noted on the Airplane Weighing Form. If the airplane has been altered, refer to the Weight and Balance Record for information.

*** Enter on the Center-of-Gravity Limits Envelope Graph to check if within approved limits (shaded area).

Weight and Balance Determination

To determine that an aircraft is within and remains within the gross weight and center of gravity limitations, follow the steps below to complete a loading schedule. Refer to the Weight and Balance Manual for loading tables and weight and balance data sheets.

1. Enter crew and passenger weights; use the Crew and Passenger Loading Table to determine the moment for each load station.
2. Enter cabinet contents weight; use the Cabinet Loading Table to determine the cabinet contents moment.
3. Enter weights for baggage loading the nose, aft cabin, and forward/aft tailcone compartments. Use the Baggage Loading Table to determine the moments for baggage loading in these areas.
4. Total the payload items and enter the totals on the loading form in two places: at the bottom of the left Payload Computations section and on row 2 of the right section.
5. Enter the basic empty weight and moment; obtain these figures from the latest aircraft weighing form or the latest weight and balance computation form.
6. Add the basic empty weight and moment to payload weight and moment; enter the total, which is zero fuel weight, in row 3. Check approved zero fuel weight limits on the CG limits envelope graph.
7. Determine the zero fuel weight center of gravity; divide moment by weight and multiply by 100.
8. Use the Fuel Loading Table to determine the moment for the amount of fuel being loaded for the flight; enter the fuel loading weight and moment.
9. Add zero fuel weight and fuel loading to obtain ramp weight. Check maximum ramp weight limits on the CG envelope graph.

10. Subtract the fuel and moment used for taxi (assume a standard 200-pound burnoff). Determine the taxi fuel moment by computing the difference in moments of fuel loaded and fuel remaining on board after taxi. Check the takeoff weight and moment for approved limits; divide the moment by the weight and multiply by 100. Then locate the weight versus center-of-gravity point on the CG limits envelope graph.
11. Determine the estimated fuel to destination weight. Determine the fuel to destination moment, which is the difference in moments of fuel remaining after taxi and the fuel remaining after reaching destination.
12. To determine landing weight and moment, subtract the fuel to destination weight and moment from takeoff weight and moment. Check these totals for approved limits; divide moment by weight and multiply by 100. Then locate the weight versus center of gravity point on the CG limits envelope graph.

International Flight Planning

Frequently Used International Terms

International Term	Explanation
ACC	Area Control Center
ADCUS	Advise Customs
AFIL	Air-Filed ICAO Flight Plan
ARINC	Aeronautical Radio Inc.
ATS	Air Traffic Services
BERNA	Swiss Radio Service
DEC	General Declaration (customs)
ETP	Equal Time Point (navigation)
FIC	Flight Information Center
FIR	Flight Information Region
GCA	Ground Controlled Approach
GEOMETER	A clear plastic attachment to a globe that aids in making surface measurements and determining points on the globe
IATA	International Air Traffic Association
ICAO	International Civil Aviation Organization
MET	See METAR
METAR	Routine Aviation Weather Reports
MNPS	Minimum Navigation Performance Specifications
NAT	North Atlantic

International Term	Explanation
NOPAC	North Pacific
OAG	Official Airline Guide
OKTA	Measure of cloud cover in eighths (five OKTAs constitute a ceiling)
OTS	Organized Track Structure
PPO	Prior Permission Only
PSR	Point of Safe Return (navigation)
QFE	Used in some nations; an altimeter setting that causes the altimeter to read zero feet when on the ground
QNE	Altimeter setting used at or above transition altitude (FL 180 in U.S.); this setting is always 29.92
QNH	Altimeter setting that causes altimeter to read field elevation on the ground
SITA	Societe Internationale de Telecommunications Aeronautiques; international organization provides global telecommunications network information to the air transport industry
SPECI	Aviation selected special WX reports
SSR	Secondary Surveillance Radar
TAF	Terminal Airdrome Forecast
UIR	Upper Information Region
UTA	Upper Control Area
WWV/WWVH	Time and frequency standard broadcast stations

International Operations Checklist

Aircrews are required to carry all appropriate FAA licenses and at least an FCC Restricted Radio Telephone Operations license. In addition, passport, visas, and an International Certificate of Vaccination are often required. The International Flight Information Manual (IFIM) specifies passport, inoculation and visa requirements for entry to each country.

The IFIM is a collection of data from Aeronautical Information Publications (AIP) published by the civil aviation authorities (CAA) of various countries.

The following detailed checklist should be helpful in establishing international operations requirements and procedures. You may want to use it to prepare your own customized checklist for your organization's planned destinations.

I. DOCUMENTATION

PERSONNEL, CREW

- ❒ Airman's certificates
- ❒ Physical
- ❒ Passport
- ❒ Extra photos
- ❒ Visa
- ❒ Tourist card
- ❒ Proof of citizenship (not driver's license)
- ❒ Immunization records
- ❒ Traveler's checks
- ❒ Credit cards
- ❒ Cash
- ❒ Passenger manifest (full name, passport no.)
- ❒ Trip itinerary
- ❒ International driver's license

AIRCRAFT

- ❒ Airworthiness certificate
- ❒ Registration
- ❒ Radio licenses
- ❒ MNPS certification
- ❒ Aircraft flight manual
- ❒ Maintenance records
- ❒ Certificates of insurance (U.S. military and foreign)
- ❒ Import papers (for aircraft of foreign manufacture)

II. OPERATIONS

PERMITS

- ❒ Flight authorization letter
- ❒ Overflights
- ❒ Landing
- ❒ Advance notice
- ❒ Export licenses (navigation equipment)
- ❒ Military
- ❒ Customs overflight
- ❒ Customs landing rights

SERVICES

Inspection

- ❒ Customs forms
- ❒ Immigrations
- ❒ Agricultural (disinfectant)

Ground

- ❒ Handling agents
- ❒ FBOs

- ❐ Fuel (credit cards, carnets)
- ❐ Maintenance
  - ❐ Flyaway kit (spares)
  - ❐ Fuel contamination check

Financial

- ❐ Credit cards
- ❐ Carnets
- ❐ Letters of credit
  - ❐ Banks
  - ❐ Servicing air carriers
  - ❐ Handling
  - ❐ Fuelers
- ❐ Traveler's checks
- ❐ Cash

COMMUNICATIONS

Equipment

- ❐ VHF
- ❐ UHF
- ❐ HF SSB
- ❐ Headphones
- ❐ Portables (ELTs, etc.)
- ❐ Spares

Agreements

- ❐ ARINC
- ❐ BERNA (Switzerland)
- ❐ SITA
- ❐ Stockholm

NAVIGATION

Equipment

- ❐ VOR
- ❐ DME
- ❐ ADF
- ❐ Inertial
- ❐ VLF/OMEGA
- ❐ LORAN
- ❐ GPS

Publications

- ❐ Onboard computer (update)
- ❐ En route charts (VFR, IFR)
- ❐ Plotting charts
- ❐ Approach charts (area, terminal)
- ❐ NAT message (current)
- ❐ Flight plans
- ❐ Blank flight plans

III. OTHER PUBLICATIONS

- ❐ Operations manual
- ❐ International Flight Information Manual
- ❐ Maintenance manuals
- ❐ Manufacturer's sources
- ❐ World Aviation Directory
- ❐ Interavia ABC
- ❐ Airports International Directory
- ❐ MNPS/NOPAC
- ❐ Customs Guide

IV. SURVIVAL EQUIPMENT

- ❒ Area survival kit (with text)
- ❒ Medical kit (with text)
- ❒ Emergency locator transmitter
- ❒ Floatation equipment
  - ❒ Raft
  - ❒ Life Jackets

V. FACILITATION AIDS

- ❒ U.S. Department of State
- ❒ U.S. Department of Commerce
- ❒ U.S. Customs Service
- ❒ National Flight Data Center (FAA) Notams
- ❒ FAA Office of International Aviation
- ❒ FAA Aviation Security

VI. OTHER CONSIDERATIONS

- ❒ Pre-flight planner
- ❒ Aircraft locks
- ❒ Spare keys
- ❒ Security devices
- ❒ Commissary supplies
- ❒ Electrical adapters (razors, etc.)
- ❒ Ground transportation
- ❒ Hotel reservations
- ❒ NBAA International Feedback cards
- ❒ Catering
- ❒ WX service
- ❒ Reservations
- ❒ Slot times

ICAO International Flight Plan Form

AIR TRAFFIC SERVICES
ICAO FLIGHT PLAN

SERVICES DE LA CIRCULATION AERIENNE
OACI PLAN DE VOL

PRIORITY / PRIORITE
<<≡ FF

ADRESSEE(S) / DESTINATAIRE(S)
<<≡

FILING TIME / HEURE DE DEPOT

ORIGINATOR / EXPEDITEUR
<<≡

SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND/OR ORIGINATOR / IDENTIFICATION PRECISE DU9DES0 DESTINATAIRE(S) ET/OU DE L'EXPEDITEUR

MESSAGE / TYPE DE MESSAGE
<<≡

7 AIRCRAFT IDENTIFICATION / IDENTIFICATION DE L'AERONEF

8 FLIGHT RULES / REGLES DE VOL

TYPE OF FLIGHT / TYPE DE VOL
<<≡

9 — NUMBER / NOMBRE

TYPE OF AIRCRAFT / TYPE D'AERONEF

WAKE TURBULENCE CAT
CAT. DE TURBULENCE DE SILLAGE

10 — EQUIPMENT / EQUIPMENENT
/
<<≡

13 — DEPARTURE AERODROME / AERODROME DE DEPART

TIME / HEURE
<<≡

15 — CRUSING SPEED
VITESSE CROISIERE

LEVEL / NIVEAU

→ ROUTE / ROUTE

<<≡

16 — DESTINATION AERODROME
AERODROME DE DESTINATION

TOTAL EFT / DUREE TOTALE ESTIMEE
HR. MIN.

→ ALTN AERODROME
AERODROME DE DEGAGEMENT

→ 2ND ALTN AERODROME
2EME AERODROME DE DEGAGEMENT
<<≡

18 — OTHER INFORMATION / RESEIGNEMENTS DIVERS

<<≡

SUPPLEMENTARY INFORMATION (NOT TO BE TRANSMITTED IN FPL MESSAGES)
RENSEIGMNEMENTS COMPLEMENTAIRES (A NE PAS TRANSMETTRE DANS LES MESSAGES SE PLAN DE VOL DEPOSE)

19 ENEURANCE / AUTONOMIE
HR. MIN.
—E /

PERSONS ON BOARD / PERSONNES A BORD
P /

EMERGENCY RADIO / RADIO DE SECOURS
R / UHF U VHF V ELBA E

SURVIVAL EQUIPMENT / EQUIPEMENT DE SURVIE
→ S / POLAR POLAIRE P | DESERT DESERT D | MARITIME MARITIME M | JUNGLE JUNGLE J

JACKETS / GILETS DE SAUVETAGE
→ J / LIGHT LAMPE L | FLUORES FLUORES F | UHF U | VHF V

DINGHIES / CANOTS
→ D / NUMBER NUMBRE → CAPACITY CAPACITE → COVER COUVERTURE C → COLOR COULEUR
<<≡

AIRCRAFT COLOUR AND MARKINGS / COUEUR ET MARQUES DE L'AERONEF
A /

REMARKS / REMARQUES
→ N /
<<≡

PILOT-IN-COMMAND / PILOTE COMMANDANT DE BORD
C /) <<≡

FILED BY / DEPOSE PAR

SPACE RESERVED FOR ADDITIONAL REQUIREMENTS / ESPACE RESERVE A DES FINS SUPPLEMENTAIRES

ICAO Flight Plan Form Completion – Items 7-19

Complete all ICAO flight plans prior to departure. Although the ICAO flight plan form is printed in numerous languages, the format is always the same.

Always enter cruising speed and cruising level as a group. In the body of the flight plan form, if one item changes, the other item must be re-entered to keep speed and level a matched pair.

Always enter latitude and longitude as 7 or 11 characters. If entering minutes of one, enter minutes of the other as well, even if zeros.

Significant points should not be more than one hour apart.

Consider entering overflight/landing permissions after RMK/ in Item 18.

Item 7: Aircraft Identification (7 characters maximum)

Insert (A) the aircraft registration marking or (B) aircraft operating agency ICAO designator followed by the flight identification.

A. Insert only the aircraft registration marking (e.g., EIAKO, 4XBCD, N2567GA) if one of the following is true:

- the aircraft's radiotelephony call sign consists of the aircraft registration marking alone (e.g., OOTEK)
- the registration marking is preceded by the ICAO telephone designator for the aircraft operating agency (e.g., SABENA OOTEK
- the aircraft is not equipped with radio.

B. Insert the ICAO designator for the aircraft operating agency followed by the flight identification (e.g., KL511, WT214, K7123, JH25) if the aircraft's radiotelephony call sign consists of the ICAO telephony designator for the operating agency followed by the flight identification (e.g. KLM 511, NIGERIA 213, KILO UNIFORM 123, JULIETT HOTEL 25).

Item 8: Flight Rules and Type of Flight (1 or 2 characters)

Flight Rules: Insert one of the following letters to denote the intended flight rules category:

I if IFR
V if VFR
Y if IFR first*
Z if VFR first*

*Note: Specify in Item 15 (Route) the point(s) where a flight rules change is planned.

Type of Flight: Insert one of the following letters to denote the type of flight when so required by the appropriate ATS authority:

S if scheduled air service
N if non-scheduled air transport operation
G if general aviation
M if military
X if other than the above

Item 9: Number (1 or 2 characters) and Type of Aircraft (2 to 4 characters) and Wake Turbulence Category (1 character)

Number of Aircraft: Insert number of aircraft if more than one.

Type of Aircraft: Insert the appropriate designator as specified in ICAO Doc 8643, Aircraft Type Designators. If no such designator has been assigned, or in case of formation flight comprising more than one aircraft type, insert ZZZZ, then specify in Item 18 the number(s) and type(s) of aircraft, preceded by TYP/.

Wake Turbulence Category: Insert / + H, M, or L:

- **/H** Heavy – maximum certificated T/O mass of 136,000 kg (300,000 lbs) or more
- **/M** Medium – maximum certificated T/O mass of less than 136,000 kg but more than 7,000 kg (between 15,500 and 300,000 lbs)
- **/L** Light – maximum certificated T/O mass of 7,000 kg or less (15,500 lbs)

Item 10: Equipment

Radio Communication, Navigation, and Approach Aid Equipment: Insert one of the following letters:

- **N** if COM/NAV/approach aid equipment is not carried or is inoperative.
- **S** if standard COM/NAV/approach aid equipment (VHF RTF, ADF, VOR, ILS, or equipment prescribed by ATS authority) is on board and operative;

and/or insert one of the following letters to indicate corresponding COMM/NAV/approach aid equipment is available and operative:

A	not allocated	**O**	VOR
B	not allocated	**P**	not allocated
C	LORAN C	**Q**	not allocated
D	DME	**R**	RNP type certification
E	not allocated		
F	ADF	**T**	TACAN
G	(GNSS)	**U**	UHF RTF
H	HF RTF	**V**	VHF RTF
I	Inertial Navig.	**W**	when prescribed by ATS
J	(Data Link)	**X**	when prescribed by ATS
K	(MLS)	**Y**	when prescribed by ATS
L	ILS	**Z**	Other (specify in Item 18)
M	Omega		

SSR Equipment: Insert one of the following letters to describe the operative SSR equipment on board:

- **N** None
- **A** Transponder Mode A (4 digits- 4 096 codes)
- **C** Transponder Mode A and Mode C
- **X** Transponder Mode S without aircraft ID or pressure-altitude transmission
- **P** Transponder Mode S with pressure altitude transmission, but without aircraft ID transmission
- **I** Transponder Mode S with aircraft ID transmission, but without pressure-altitude transmission
- **S** Transponder Mode S with both pressure altitude and aircraft ID transmission

Item 13: Departure Aerodrome (4 characters) and Time (4 characters)

Departure Aerodrome: Insert one of the following:

- ICAO four-letter location indicator of the departure aerodrome.
- If no location indicator assigned, insert ZZZZ, then specify in Item 18 the name of the aerodrome, preceded by DEP/.
- If flight plan submitted while in flight, insert AFIL, then specify in Item 18 the four-letter location indicator of the ATS unit from which supplementary flight plan data can be obtained, preceded by DEP/.

Time: Insert one of the following:

- for a flight plan submitted before departure: the estimated off-block time
- for a flight plan submitted while in flight: the actual or estimated time over the first point of the route to which the flight plan applies.

Item 15: Cruising Speed (5 characters), Cruising Level (5 characters), and Route

Cruising Speed: Insert the true air speed for the first or whole cruising portion of the flight in one of the following forms:

- Kilometers per hour: K + 4 figures (e.g., K0830)
- Knots: N + 4 figures (e.g., N0485)
- Mach number: M + 3 figures (e.g., M082) if prescribed by ATS.

Cruising Level: Insert the planned cruising level for the first or whole portion of the planned route using one of the following forms:

- Flight level: F + 3 figures (e.g., F085; F330)
- Standard metric level in tens of metres: S + 4 figures (e.g., S1130) if prescribed by ATS.
- Altitude in hundreds of feet: A + 3 figures (e.g., A045; A100)
- Altitude in tens of metres: M + 4 figures (e.g., M0840)
- For uncontrolled VFR flights: VFR

Route: Include changes of speed, level, and/or flight rules.

For flights along designated ATS routes:

- If the departure aerodrome is on or connected to the ATS route, insert the designator of the first ATS route.
- If the departure aerodrome is not on or connected to the ATS route, insert the letters DCT followed by the point of joining the first ATS route, followed by the designator of the ATS route.
- Insert each point at which a change of speed, change of level, change of ATS route, and/or a change of flight rules is planned. For a transition between lower and upper ATS routes oriented in the same direction, do not insert the point of transition.
- In each case, follow with the designator of the next ATS route segment even if it is the same as the previous one (or with DCT if the flight to the next point is outside a designated route), unless both points are defined by geographical coordinates.

Flights outside designated ATS routes:

- Insert points not normally more than 30 minutes flying time or 200 nautical miles apart, including each point at which a change of speed or level, a change of track, or a change of flight rules is planned.
- When required by ATS, define the track of flights operating predominantly in an east-west direction between 70°N and 70°S by reference to significant points formed by the intersections of half or whole degrees of latitude with meridians spaced at intervals of 10 degrees of longitude. For flights operating in areas outside those latitudes, define the tracks by significant points formed by the intersection of parallels of latitude with meridians normally spaced not to exceed one hour's flight time. Establish additional significant points as deemed necessary.

  For flights operating predominantly in a north-south direction, define tracks by reference to significant points formed by the intersection of whole degrees of longitude with specified parallels of latitude that are spaced at 5 degrees.
- Insert DCT between successive points unless both points are defined by geographical coordinates or bearing and distance.

Examples of Route Sub-entries

Enter a space between each sub-entry.

1. ATS route (2 to 7 characters): BCN1, B1, R14, KODAP2A
2. Significant point (2 to 11 characters): LN, MAY, HADDY
   - degrees only (7 characters – insert zeros, if necessary): 46N078W
   - degrees and minutes (11 characters – insert zeros if necessary): 4620N07805W
   - bearing and distance from navigation aid (NAV aid ID [2 to 3 characters] + bearing and distance from the NAV aid [6 characters – insert zeros if necessary]): a point 180 magnetic at a distance of 40 nautical miles from VOR "DUB" = DUB180040

3. Change of speed or level (max 21 characters):

   insert point of change/cruising speed and level – LN/N0284A045, MAY/N0305F180, HADDY/N0420F330, DUB180040/M084F350

4. Change of flight rules (max 3 characters):

   insert point of change (space) change to IFR or VFR – LN VFR, LN/N0284A050 IFR

5. Cruise climb (max 28 characters)

   insert C/point to start climb/climb speed / levels –

   C/48N050W / M082F290F350

   C/48N050W / M082F290PLUS

   C/52N050W / M220F580F620

Item 16: Destination Aerodrome (4 characters), Total Estimated Elapsed Time (EET, 4 characters), Alternate Aerodrome(s) (4 characters)

Destination aerodrome: insert ICAO four-letter location indicator. If no indicator assigned, insert ZZZZ.

Total EET: insert accumulated estimated elapsed time. If no location indicator assigned, specify in Item 18 the name of the aerodrome, preceded by DEST/.

Alternate aerodrome(s): insert ICAO four-letter location indicator. If no indicator assigned to alternate, insert ZZZZ and specify in Item 18 the name of the alternate aerodrome, preceded by ALTN/.

Item 18: Other Information

This section may be used to record specific information as required by appropriate ATS authority or per regional air navigation agreements. Insert the appropriate indicator followed by an oblique stroke (/) and the necessary information. See examples below.

- Estimated elapsed time/significant points or FIR boundary designators: EET/CAP0745, XYZ0830.
- Revised destination aerodrome route details/ICAO aerodrome location indicator: RIF/DTA HEC KLAX. (Revised route subject to reclearance in flight.)
- Aircraft registration markings, if different from aircraft I.D. in Item 7: REG/N1234.
- SELCAL code: SEL/_____ .
- Operator's name, if not obvious from the aircraft I.D. in Item 7: OPR/_____ .
- Reason for special handling by ATS (e.g., hospital aircraft, one-engine inoperative): STS/HOSP, STS/ONE ENG INOP.
- As explained in Item 9: TYP/_____ .
- Aircraft performance data: PER/_____ .
- Communication equipment significant data: COM/UHF Only.
- Navigation equipment significant data: NAV/INS.
- As explained in Item 13: DEP/_____ .
- As explained in Item 16: DEST/_____ , or ALTN/_____ .
- Other remarks as required by ATS or deemed necessary: RMK/____________ .

Item 19: Supplementary Information

Endurance: insert fuel endurance in hours and minutes.

Persons on Board: insert total persons on board, including passengers and crew. If unknown at time of filing, insert TBN (to be notified).

Emergency Radio, Survival Equipment, Jackets, Dinghies: cross out letter indicators of all items not available; complete blanks as required for items available. (jackets: L = life jackets with lights, J = life jackets with fluorescein).

ICAO Position Reporting Format

Outside the U.S., position reports are required unless specifically waived by the controlling agency.

Initial Contact (Frequency Change)

1. Call sign
2. Flight level (if not level, report climbing to or descending to cleared altitude)
3. Estimating (next position) at (time) GMT

Position Report

1. Call sign
2. Position (if position in doubt, use phonetic identifier. For oceanic reports, first report the latitude, then the longitude (e.g., 50N 60W)
3. Time (GMT) or (UST)
4. Altitude or flight level (if not level, report climbing to or descending to altitude)
5. Next position
6. Estimated elapsed time (EET)

US DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER	TIME STARTED	SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE/ SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUSING ALTITUDE
☐ VFR ☐ IFR ☐ DVFR					PROPOSED (Z)	ACTUAL (Z)	

8. ROUTE OF FLIGHT

9. DESTINATION (Name of airport and city)	10. EST TIME ENROUTE		11. REMARKS
	HOURS	MINUTES	

12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)	14. PILOTS NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
HOURS	MINUTES		17. DESTINATION CONTACT / TELEPHONE (OPTIONAL)	

18. COLOR OF AIRCRAFT	CIVIL AIRCRAFT PILOTS. FAR Part 91 requires you to file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in civil penality not to exceed $1,000 for each violation (Section 901 of the Federal Aviation Act of 1956, as amended). Filing of a VFR flight plan is recomended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.

FAA Form 7233-1 (8-82) CLOSE VFR FLIGHT PLAN WITH ________________ FSS ON ARRIVAL

FAA Flight Plan Form Completion Instructions

Block 1 Check the type flight plan. Check both the VFR and IFR blocks if composite VFR/IFR.

Block 2 Enter your complete aircraft identification, including the prefix "N," if applicable.

Block 3 Enter the designator for the aircraft, or if unknown, the aircraft manufacturer's name.

When filing an IFR flight plan for a TCAS equipped aircraft, add the prefix T for TCAS.
Example: T/G4/R.

When filing an IFR flight plan for flight in an aircraft equipped with a radar beacon transponder, DME equipment, TACAN-only equipment or a combination of both, identify equipment capability by adding a suffix to the AIRCRAFT TYPE, preceded by a slant (/) as follows:

/X no transponder

/T transponder with no altitude encoding capability

/U transponder with altitude encoding capability

/D DME, but no transponder

/B DME and transponder, but no altitude encoding capability

/A DME and transponder with altitude encoding capability

/M TACAN only, but no transponder

/N TACAN only and transponder, but with no altitude encoding capability

/P TACAN only and transponder with altitude encoding capability

/C RNAV and transponder, but with no altitude encoding

/R RNAV and transponder with altitude encoding capability

/W RNAV but no transponder

/G Global Positioning System (GPS)/Global Navigation Satellite System (GNSS) equipped aircraft with oceanic, en route, terminal, and GPS approach capability.

/E Flight Management System (FMS) with barometric Vertical Navigation (VNAV), oceanic, en route, terminal, and approach capability. Equipment requirements are:
(a) Dual FMS which meets the specifications of AC25-15, Approval of Flight Management Systems in Transport Category Airplanes; AC20-129, Airworthiness Approval of Vertical Navigation (VNAV) Systems for use in the U.S. National Airspace System (NAS) and Alaska; AC20-130, Airworthiness Approval of Multi-Sensor Navigation Systems for use in the U.S. National Airspace System (NAS) and Alaska; or equivalent criteria as approved by Flight Standards.
(b) A flight director and autopilot control system capable of following the lateral and vertical FMS flight path.
(c) At least dual inertial reference units (IRUs).
(d) A database containing the waypoints and speed/altitude constraints for the route and/or procedure to be flown that is automatically loaded into the FMS flight plan.
(e) An electronic map.

/F A single FMS with barometric VNAV, en route, terminal, and approach capability that meets the equipment requirements of /E (a) above.

Block 4	Enter your true airspeed (TAS).
Block 5	Enter the departure airport identifier code, or if code is unknown, the name of the airport.
Block 6	Enter the proposed departure time in Coordinated Universal Time (UTC). If airborne, specify the actual or proposed departure time as appropriate.
Block 7	Enter the appropriate IFR altitude (to assist the briefer in providing weather and wind information).
Block 8	Define the route of flight by using NAVAID identifier codes, airways, jet routes, and waypoints.
Block 9	Enter the destination airport identifier code, or if unknown, the airport name. Include the city name (or even the state name) if needed for clarity.
Block 10	Enter estimated time enroute in hours and minutes.
Block 11	Enter only those remarks pertinent to ATC or to the clarification of other flight plan information, such as the appropriate call sign associated with the designator filed in Block 2 or ADCUS.
Block 12	Specify the fuel on board in hours and minutes.
Block 13	Specify an alternate airport, if desired or required.
Block 14	Enter the complete name, address, and telephone number of the pilot in command. Enter sufficient information to identify home base, airport, or operator. This information is essential for search and rescue operations.
Block 15	Enter total number of persons on board (POB), including crew.
Block 16	Enter the aircraft's predominant colors.

Block 17 Record the FSS name for closing the flight plan. If the flight plan is closed with a different FSS or facility, state the recorded FSS name that would normally have closed your flight plan. Information transmitted to the destination FSS consists only of that in Blocks 3, 9, and 10. Estimated time enroute (ETE) will be converted to the correct estimated time of arrival (ETA).

Optional Record a destination telephone number to assist search and rescue contact should you fail to report or cancel your flight plan within 1/2 hour after your estimated time of arrival (ETA).

ICAO Weather Format

On July 1, 1993, the worldwide (ICAO) and North American aerodrome weather codes merged into a new international code for forecasts and reports. The new codes are the result of an effort to meet revised aeronautical requirements and reduce confusion in the aviation community.

The United States converted to METAR/TAF format on July 1, 1996 with terminal aerodrome forecast (TAF) replacing the terminal forecast airport and meteorological aviation routine weather report (METAR) replacing the airport surface observation (AOS).

Although the aviation community now uses a standard set of codes, some differences remain between U.S. and ICAO codes. For example, the following differences may remain in effect.

- ❐ Horizontal visibility is reported in statute miles (SM) in the U.S. code and in meters in the ICAO code. To avoid confusion, the suffix SM follows the visibility value if it is reported in U.S. code. Additionally, when forecast visibility in the U.S. exceeds six statute miles, the prefix P appears (e.g., P6SM - a visibility forecast greater than six statute miles).
- ❐ Runway visual range (RVR) is reported in feet (FT) in the U.S. code and in meters in ICAO code. When RVR is reported for a U.S. runway, the suffix FT is added (e.g., R27L/2700FT, runway 27 left RVR 2,700 ft). RVR is reported only in actual weather, not a forecast TAF.
- ❐ Ceiling and visibility okay (CAVOK) is not used in the U.S.
- ❐ Temperature, turbulence, and icing conditions are not forecast in a U.S. TAF. Turbulence and icing are forecast in Area Forecasts (FAS). Surface temperatures are forecast only in public service and agricultural forecasts.
- ❐ Trend forecasts are not included in U.S. METARs.

- ❐ An altimeter setting in a U.S. METAR is in inches of mercury. In an ICAO METAR, it is in hectopascals (millibars). To avoid confusion, a prefix is always assigned: an A for a U.S. report or a Q for an ICAO report (e.g., A2992 or Q1013).
- ❐ In the U.S., remarks (RMKs) precede recent (RE) weather and wind shear (WS) information reported at the end of METARs.
- ❐ Low level windshear, not associated with convective activity, will appear in U.S., Canadian, and Mexican TAFs.

Sample TAF

A terminal aerodrome forecast (TAF) describes the forecast prevailing conditions at an airport and covers either a 9-hour period or a 24-hour period. Nine-hour TAFs are issued every three hours; 24-hour TAFs are issued every six hours. Amendments (AMD) are issued as necessary. A newly issued TAF automatically amends and updates previous versions. Also, many foreign countries issue eighteen hour TAFs at six hour intervals.

The following example has detailed explanations of the new codes.

KHPN 091720Z 091818 22020KT 3/4SM -SHRA
BKN020CB FM2030 30015G25KT 1500 SHRA
OVC015CB PROB40 2022 1/4SM TSRA OVC008CB
FM2300 27008KT 1 1/2SM -SHRA BKN020
OVC040 TEMPO 0407 00000KT 1/2SM -RABR
VV004 FM1000 22010KT 1/2SM -SHRA OVC020
BECMG 1315 20010KT P6SM NSW SKC

KHPN. ICAO location indicator. The usual 3 letter identifiers we are familiar with are now preceded by a K for the contiguous United States. Alaska and Hawaii will use 4 letter identifiers with PA and PH respectively. Changes are planned to incorporate alphabetic identifiers for those weather reporting stations where numbers and letters are now used (e.g., W10 changed to KHEF).

091720Z. Issuance time. The first two digits (**09**) indicate the date; the following four digits (**1720**) indicate time of day. All times are in UTC or Zulu.

091818. Valid period. The first two digits (**09**) indicate the date. The second two digits (**18**) are the hour that the forecast period begins. The last two digits (**18**) indicate the hour that the forecast expires. The example is a 24-hour forecast.

22020KT. Surface wind. The first three digits (**220**) are true direction to the nearest 10°. The next two digits (**20**) indicate speed. **KT** indicates the scale is in knots. TAFs may also use kilometers-per-hour (**KMH**) or meters per second (**MPS**). If gusts are forecast, a **G** and a two-digit maximum gust speed follow the five-digit wind reading (e.g., **22020G10KT**). Five zeros and the appropriate suffix indicate calm winds (e.g., **00000KT/KMH/MPS**).

> **NOTE:** Towers, ATIS and airport advisory service report wind direction as magnetic.

3/4SM. Prevailing horizontal visibility. Visibility (**3/4SM**) is in statute miles in the U.S. However, most countries use meters which appears with no suffix (e.g., **1200**).

-SHRA. Weather and/or obstruction to visibility. The minus sign (-) indicates light, a plus sign (+) indicates heavy, and no prefix indicates moderate. If no significant weather is expected, the group is omitted. If the weather ceases to be significant after a change group, the weather code is replaced by the code for no significant weather (**NSW**).

BKN020CB. Cloud coverage/height/type. The first three letters indicate expected cloud coverage. Cloud height is indicated by the second set of three digits; these are read in hundreds of feet (or multiples of 30 meters). When cumulonimbus is forecast, cloud type (**CB**) follows cloud height.

When an obscured sky is expected and information on vertical visibility is available, the cloud group is replaced by a different five-digit code (e.g., **VV004**). The first two digits are Vs. The three figures following indicate vertical visibility in units of 100 ft. For indefinite vertical visibility, the two Vs would be followed by two slash marks (**VV//**).

> **NOTE:** More than one cloud layer may be reported.

FM2030. Significant change expected in prevailing weather. The from code (**FM**) is followed by a four-digit time code (**2030**). Prevailing weather conditions consist a surface wind, visibility, weather, and cloud coverage.

PROB40 2022. Probability (**PROB**) and a two-digit code for percent (**40**) is followed by a four-digit code (**2022**) that indicates a beginning time (**20**) and an ending time (**22**) to the nearest whole hour for probable weather conditions. Only 30% and 40% probabilities are used; less than these are not sufficient to forecast; 50% and above support the normal forecast.

TEMPO. Temporary change followed by a four-digit time. Forecasts temporary weather conditions. Indicates that changes lasting less than an hour and a half may occur anytime between the two-digit beginning time and two-digit ending time.

Decoding TAFs

The latter half of the sample TAF is decoded based on the preceding information.

30015G25KT 1/2SM SHRA OVC015CB

- Surface winds, 300° true direction
- Mean speed, 15 kts
- Gusts, maximum gust 25 kts
- Visibility, 1/2 statute mile
- Moderate showers of rain
- Overcast at 1,500 ft with cumulonimbus clouds

FM2300 27008KT 1 1/2SM -SHRA BKN020 OVC040

- Significant change expected from 2300 hours
- Surface winds, 270° true direction at 8 kts
- Visibility, 1 1/2 statute mile
- Light showers of rain
- Broken clouds at 2,000 ft with a second overcast layer at 4,000 ft

TEMPO 0407 00000KT 1/4SM -RA BR VV004

- Temporary between 0400 and 0700 hours
- Calm winds
- Visibility 1/4 statute mile
- Light rain and mist
- Indefinite ceiling, vertical visibility 400 ft

FM1000 22010KT 1/2SM -SHRA OVC020

- Significant change expected from 1000 hours
- Surface winds, 220° true direction at 10 kts
- Visibility, 1/2 statute mile
- Light showers of rain
- Overcast skies at 2,000 ft

BECMG 1315 20010KT P6SM NSW SKC

- Change to the forecast conditions between 1300 and 1500 hours
- Expected surface winds, 200° true direction at 10 kts
- Visibility, more than 6 statute miles
- No significant weather
- Clear skies

Sample METAR

A routine aviation weather report on observed weather, or METAR, is issued at hourly or half-hourly intervals. A special weather report on observed weather, or SPECI, is issued when certain criteria are met. Both METAR and SPECI use the same codes.

A forecast highly likely to occur, or TREND, covers a period of two hours from the time of the observation. A TREND forecast indicates significant changes in respect to one or more of the following elements: surface wind, visibility, weather, or clouds. TREND forecasts use many of the same codes as TAFs.

Most foreign countries may append a TREND to a METAR or SPECI. In the U.S., however, a TREND is not included in a METAR or SPECI.

The following example indicates how to read a METAR.

KHPN 201955Z 22015G25KT 2SM
R22L/1000FT TSRA OVC010CB 18/16 A2990
RERAB25 BECMG 2200 24035G55

KHPN. ICAO location indicator.

201955Z. Date and time of issuance. METARs are issued hourly.

22015G25KT. Surface wind (same as TAF). If the first three digits are VAR, the wind is variable with wind speed following. If direction varies 60° or more during the ten minutes immediately preceding the observation, the two extreme directions are indicated with the letter V inserted between them (e.g., **280V350**).

NOTE: G must vary 10 kts or greater to report gust.

2SM. Prevailing horizontal visibility in statute miles. In the U.S., issued in statute miles with the appropriate suffix (**SM**) appended. When a marked directional variation exists, the reported minimum visibility is followed by one of the eight compass points to indicate the direction (e.g., **2SMNE**).

R22L/1000FT. The runway visual range group. The letter **R** begins the group and is followed by the runway description (**22L**). The range in feet follows the slant bar (**1000FT**). In other countries range is in meters and no suffix is used.

TSRA OVC010CB. Thunderstorms (**TS**) and rain (**RA**) with an overcast layer at 1,000 ft and cumulonimbus clouds.

> **NOTE:** More than one cloud layer may be reported.

18/16. Temperatures in degrees Celsius. The first two digits (**18**) are observed air temperature; the last two digits (**16**) are dew point temperature. A temperature below zero is reported with a minus (**M**) prefix code (e.g., **M06**).

A2990. Altimeter setting. In the U.S., **A** is followed by inches and hundredths; in most other countries, **Q** is followed by hectopascals (i.e., millibars).

RERAB25. Recent operationally significant condition. A two letter code for recent (**RE**) is followed by a two letter code for the condition (e.g., **RA** for rain). A code for beginning or ending (**B** or **E**) and a two-digit time in minutes during the previous hour. When local circumstances also warrant, wind shear may also be indicated (e.g., **WS LDG RWY 22**).

> **NOTE:** A remark (RMK) code is used in the U.S. to precede supplementary data of recent operationally significant weather.

> **NOTE:** RMK [SLP 013] breaks down SEA LVL press to nearest tenth (e.g., 1001.3 reported as SLP 013).

BECMG AT 2200 24035G55. A TREND forecast. The becoming code (**BECMG**) is followed by a when sequence (**AT 2200**) and the expected change (e.g., surface winds at 240° true at 35 kts with gusts up to 55 kts).

NOTE: For more information on METAR/TAF, consult the FAA brochure "New Aviation Weather Format METAR/TAF." Copies may be obtained by writing to: FAA/ASY-20, 400 7th Street, S.W. Washington, DC 20590.

Servicing

Table of Contents

Servicing Record

	DATE	QTY	DATE	QTY
Engine Oil				
Hydraulic Fluid				
Alcohol				

Servicing Record (continued)

	DATE	QTY	DATE	QTY
Pneumatic Bottle				
Oxygen				
Other				

Fuel

Capacities

Each Tank . . . . 2,900 LBS/431 U.S. GAL

Total . . . . 5,816 LBS/862 U.S. GAL

Unusable Fuel

Fuel remaining in the fuel tanks when the fuel quantity indicator reads zero is not usable in flight.

Fuel Types

Fuel conforming to any of the following specifications is approved for use in the Citation V. Mixing of jet fuel is permissible. See Limitations chapter, Approved Fuels and Associated Conditions.

Jet Fuel

Commercial jet kerosene per CPW 204 specification:

- Jet A, A-1, A-2, B
- JP-4, 5, 8

CAUTION: Anti-ice additive must be added to Jet A, A-1, A-2, and B fuels. Ensure the additive is properly blended and checked for concentration. See Fuel Additives. JP-4, 5, and 8 military fuels, however, contain factory-preblended anti-ice additive.

Aviation Gasoline

All grades of MIL-G-5572 avgas are permitted for a maximum of 50 hours or 3,500 gallons between overhauls if the following are accomplished.

- Fuel temperature is within limits.
- Maximum ambient temperature (T.O.) is +32°C (90°F)
- Boost pumps are on (To crossfeed, turn boost pumps off on the side opposite selected tank.)
- Hours avgas used are entered in engine logbook. For record-keeping purposes, assume one hour of engine operation equals 70 gallons gasoline.
- Maximum operating altitude is 18,000 ft.

Fuel Anti-Ice Additives

Concentrations

- The minimum additive concentration for EGME shall be 0.06% by volume, and maximum concentration shall be 0.15% by volume. Fuel, when added to the tank, should have a minimum concentration of 0.06% by volume.
- Use not less than 20 fluid ounces of EGME additive per 260 gallons of fuel or more than 20 fluid ounces of EGME additive per 104 gallons of fuel.
- The minimum additive concetration for DIEGME shall be 0.10% by volume, and maximum concentration shall be 0.15% by volume. Fuel, when added to the tank, should have a minimum concentration of 0.10% by volume.
- Use not less than 20 fluid ounces of DIEGME additive per 156 gallons of fuel or more than 20 fluid ounces of EGME additive per 104 gallons of fuel.

WARNING: Anti-icing additives containing ethylene glycol monomethyl ether (EGME) or diethylene glycol monomethyl ether (DIEGME) are harmful if inhaled, swallowed or absorbed through the skin, and cause eye irritation. Also, they are combustible. Before using this material, refer to all safety information on the container.

NOTE: Military JP-4, JP-5, and JP-8 have refinery preblended anti-icing.

Procedure for Adding Additives

1. Inhibiter . . . . ATTACH TO REFUEL NOZZLE

   Attach EGME (MIL-I-27686D, MIL-I27686E, or MIL-I-27686F) or DIEGME (MIL-I-85470A) inhibiter to refuel nozzle; ensure the blender tube discharges into the refueling stream.

CAUTION: Ensure that the additive is directed into the flowing fuel stream and that the additive flow is started after the fuel flow starts and is stopped before fuel flow stops. Do not allow concentrated additive to contact coated interior of fuel tank or aircraft painted surface.

While simultaneously fully depressing and slipping ring over blender trigger:

2. Refueling . . . . START

   Start refueling (minimum 30 gpm, maximum 60 gpm) while simultaneously fully depressing and slipping ring over blender trigger. A rate of less than 30 gpm may be used to top-off the aircraft.

Checking Additive Concentration

Prolonged aircraft storage results in a water buildup in the fuel that "leaches out" the additive. Excessive accumulations of water in the fuel tank sumps indicate this phenomenon. Use an anti-icing additive concentration test kit (available from Cessna) to check the concentration level. When checking the additive concentration, it is imperative that the test kit's instructions be followed explicitly.

Fueling/Defueling Procedures

Fueling

Required Fuel . . . . DETERMINE

Fuel Supply Unit . . . . GROUND

Fuel Supply Unit to Aircraft . . . . GROUND

Fuel Nozzles to Aircraft . . . . GROUND

Filler Cap . . . . REMOVE

Required Fuel . . . . ADD

Filler Cap . . . . REPLACE

Ground Wires . . . . REMOVE

Defueling – Force Method

Lower Engine Cowl . . . . REMOVE

Engine Fuel Supply Line (at fuel control) . . . DISCONNECT

Suction/Fuel Line . . . . ATTACH

Battery . . . . ON

External Power . . . . CONNECT

LH or RH Boost . . . . PumpON

Do not rely on the boost pump sound to determine cavitation because the sound varies with fuel depth. The boost pump must be submerged in fuel during defueling to ensure adequate cooling and lubrication.

CAUTION: To prevent possible damage to the boost pump, do not operate the boost pump after the LOW FUEL PRESS annunciator illuminates.

Required Fuel . . . . REMOVE

Boost Pump . . . . OFF

Suction/Fuel Line . . . . REMOVE

Fuel Supply Line . . . . CONNECT

Engine Cowl . . . . REPLACE

If required, remove residual fuel from wing sump drain valves.

Defueling – Suction Method

Filler Cap . . . . REMOVE

Suction Line . . . . INSERT

Required Fuel . . . . REMOVE

Suction Line . . . . REMOVE

Filler Cap . . . . REPLACE

Defueling – Transfer (Crossfeed) Method

Determine if space is available in the opposite wing tank to accept the quantity of fuel to be transferred.

Battery . . . . ON

External Power . . . . CONNECT

Boost Pump Switches . . . . NORMAL

Do not rely on the boost pump sound to determine cavitation because the sound varies with fuel depth. The boost pump must be submerged in fuel during defueling to ensure adequate cooling and lubrication.

Throttles . . . . CUTOFF

Crossfeed . . . . LH OR RH TANK

To crossfeed, turn the boost pump off on the side opposite the selected tank.

CAUTION: To prevent possible damage to the boost pump, do not operate the boost pump after the FUEL LOW PRESS annunciator illuminates.

When FUEL LOW PRESS annunciator illuminates:

Crossfeed . . . . OFF

External Power . . . . DISCONNECT

Battery . . . . OFF

Ground Power Unit

Voltage/Amperage . . . . 28V DC/800 TO 1,000A

Always disconnect the GPU from the aircraft when the GPU is turned off.

Hydraulic Fluid

Service hydraulic system with approved fluids. Mixing hydraulic fluids does not impair system operation. Maintenance personnel normally service the main hydraulic reservoir; servicing requires equipment that delivers hydraulic fluid under pressure.

Approved Hydraulic Fluids

- Hyjet, Hyjet W, III, or IV
- Skydrol 500 A, B, B-4, C, or LD-4.

CAUTION: Skydrol hydraulic fluid, when heated to approximately 270°, decomposes into acids and other products that can damage the metal structure.

Capacities

Hydraulic System . . . . 3.90 U.S. GAL

Hydraulic Reservoir . . . . 0.65 U.S. GAL

Brake System Reservoir . . . . 0.25 U.S. GAL

The reservoir and sight gage are in the tailcone. The gage has three level marks:

REFILL . . . . 0.2 GAL

HYD LEVEL LOW annunciator illuminates at this level.

FULL . . . . 0.5 GAL

OVERFILL . . . . 0.6 GAL

Landing Gear and Brakes

Gear/Brake Accumulator Preloads

Brake . . . . 675 ± 25 PSI

Emergency Gear/Brake . . . . 1,800 TO 2,050 PSI

Emergency Gear and Brake Bottle

Service the emergency gear and brake bottle with high pressure nitrogen through the bottle charging valve (right baggage compartment aft liner). Refill the bottle to 2,050 PSI when the pressure gage reads below 1,800 PSI.

Tire and Strut Inflation

Main Wheel Tire Inflation . . . . 130 ± 5 PSI

Nosewheel Tire Inflation . . . . 120 ± 5 PSI

Main Strut Inflation (fully fueled) . . . . 1 TO 2 INCHES

Nose Strut Inflation (fully fueled) . . . . 5 INCHES

Oil

Approved Engine Oils

Use only the following oils:

- Aero Shell Turbine Oil 500 and 560
- Castrol 5000
- Exxon Turbo Oil 2380
- Mobil Jet II and 254
- Royco Turbine Oil 500 and 560
- Oils listed in Pratt & Whitney Canada Inc. SB No. 7001.

CAUTION: The engine manufacturer strongly recommends that when changing from an existing lubricant formulation to a third generation lubricant formulation, a change be made only when an engine is new or freshly overhauled. For additional information on the use of third generation oils, refer to the engine manufacturer's pertinent oil service bulletins.

Capacity

Oil Tank . . . . 2.03 U.S. GAL

Usable Oil . . . . 1.21 U.S. GAL

Replenishing Oil System

If oil replenishment with a dissimilar oil is necessary, it is permissible to use any approved oil brand if the total quantity of added oil does not exceed two U.S. quarts in any 400-hour period.

If more than two U.S. quarts of oil is needed, and a dissimilar oil brand must be used, drain and flush the complete oil system. Refill with a single brand of approved oil according to engine Maintenance Manual instructions.

If oils of non-approved brands or of different viscosities become intermixed, drain and flush the complete oil system. Refill with an approved oil according to engine Maintenance Manual instructions.

Oil Tank Access Door . . . . OPEN

Filler Cap . . . . UNLOCK

Dipstick . . . . WITHDRAW

Oil Level . . . . CHECK

Oil Tank . . . . REFILL

Dipstick . . . . INSERT

Filler Cap . . . . LOCK

Oil Tank Access Door . . . . CLOSE

Oxygen

The oxygen filler valve is inside a small access door in the right nose baggage compartment. Maintenance personnel fill the bottle with MIL-O-27210 Type I breathing oxygen. Check the cockpit gage during servicing to prevent overfill.

Maximum Pressure . . . . 1,800 PSI

A fully serviced system reads between 1,600 and 1,800 PSI (green arc on gage).

Minimum Pressure . . . . 400 PSI

Have the system serviced when the gage indicates out of the green arc or pressure drops below 400 PSI. If the bottle depletes, it must be purged.

WARNING: Smoking is prohibited during oxygen use. In addition, certain fatty materials such as oil, grease, soap, lipstick, and lip balm are serious fire hazards when in contact with oxygen.

Windshield Alcohol

An alcohol reservoir is behind the right nose baggage compartment next to the brake reservoir. To service, remove the liner and reservoir filler plug, then add alcohol until level with the neck of plug. Filling to above the sight gage provides a reserve supply to perform preflight or operational checks without replenishing the reservoir.

Type . . . . TT-I-735 ISOPROPYL ALCOHOL

Reservoir Capacity . . . . 2 QTS

Emergency Information

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MedAire,™ Inc.
Inflight Medical Support

Airway

Breathing

Circulation

The ABCs of Emergency CPR

Establish victim's unresponsiveness.

Gently shake victim and shout, "Are you all right?"

AIRWAY

Open airway: lift chin, tilt head. (*With neck injury, lift chin but do not tilt head.*)

Look for chest movement.

Listen for sound of breathing.

Feel for breath on your cheek.

BREATHING

Head tilt position – pinch victim's nose shut while lifting chin with your other hand.

Give two full breaths while maintaining airtight seal with your mouth over victim's mouth.

Note: *A pocket mask can be used instead, but proper head position and air-tight seal must be maintained.*

CIRCULATION

Locate carotid artery pulse; hold 10 seconds. If no pulse:

Begin external chest compressions by locating hand position two fingers above notch and placing heal of hand on breastbone.

Perform 15 compressions of 1 1/2 to 2 inches at a rate of 80 to 100 compressions per minute. (Count, "One *and* two *and* three *and* …," etc.) Come up smoothly, keeping hand contact with victim's chest at all times.

Repeat the cycle of two breaths, 15 compressions until victim's pulse and breathing return. If only the pulse is present, continue rescue breathing until medical assistance is available.

Heart Attack

Signals

Pressure, squeezing, fullness, or pain in center of chest behind breastbone.

Sweating

Nausea

Shortness of breath

Feeling of weakness

Actions for Survival

Recognize signals

Stop activity and lie or sit down

Provide oxygen if available

If signals persist greater than two minutes, get victim to medical assistance

Choking

If victim can cough or speak:

encourage continued coughing

provide oxygen if available.

If victim cannot cough or speak

perform Heimlich maneuver (abdominal thrusts):

1. stand behind victim; wrap arms around victim's waist
2. place fist of one hand (knuckles up) in upper abdomen*
3. grasp fist with opposite hand
4. press fist into upper abdomen* with quick, inward and upward thrusts
5. perform maneuver until foreign body is expelled

provide supplemental oxygen if available.

**If victim is pregnant or obese, perform chest thrusts instead of abdominal thrusts.*

Emergency Equipment Record

Emergency Equipment	Location	Date Last Serviced
First Aid Kit		
Fire Extinguisher(s)		
Fire Axe		
Life Raft		
Life Vests		
Therapeutic Oxygen		
Overwater Survival Kit		
Other		

Conversion Tables

Table of Contents

Distance Conversion

Meters/Feet

Meters	Feet | Meters	Feet
.3048	1	3.2908
.61	2	6.58
.91	3	9.87
1.22	4	13.16
1.52	5	16.45
1.83	6	19.74
2.13	7	23.04
2.44	8	26.33
2.74	9	29.62
3.1	10	32.9
6.1	20	65.8
9.1	30	98.7
12.2	40	131.6
15.2	50	165.5
18.3	60	197.4
21.3	70	230.4
24.4	80	263.3
27.4	90	296.2
31	100	329
61	200	658
91	300	987
122	400	1316
152	500	1645
183	600	1974
213	700	2304
244	800	2633
274	900	2962
305	1000	3291

Statute Miles/Kilometers/Nautical Miles

Statute Miles	Kilometers	Nautical Miles
.62137	1	.53996
1.24	2	1.08
1.86	3	1.62
2.49	4	2.16
3.11	5	2.70
3.73	6	3.24
4.35	7	3.78
4.97	8	4.32
5.59	9	4.86
6.21	10	5.40
12.43	20	10.80
18.64	30	16.20
24.85	40	21.60
31.07	50	27.00
37.28	60	32.40
43.50	70	37.80
49.71	80	43.20
55.92	90	48.60
62.14	100	54.00
124.27	200	107.99
186.41	300	161.99
248.55	400	215.98
310.69	500	269.98
372.82	600	323.98
434.96	700	377.97
497.10	800	431.97
559.23	900	485.96
621.37	1000	539.96

Kilometers/Nautical Miles/Statute Miles

Kilometers	Nautical Miles	Statute Miles
1.8520	1	1.1508
3.70	2	2.30
5.56	3	3.45
7.41	4	4.60
9.26	5	5.75
11.11	6	6.90
12.96	7	8.06
14.82	8	9.21
16.67	9	10.36
18.52	10	11.51
37.04	20	23.02
55.56	30	34.52
74.08	40	46.03
92.60	50	57.54
111.12	60	69.05
129.64	70	80.56
148.16	80	92.06
166.68	90	103.57
185.20	100	115.08
370.40	200	230.16
555.60	300	345.24
740.80	400	460.32
926.00	500	575.40
1111.20	600	690.48
1296.40	700	805.56
1481.60	800	920.64
1666.80	900	1035.72
1852.00	1000	1150.80

Weight Conversion

Lbs/Kilograms

Lbs	Kgs Lbs	Kgs
2.2046	1	.4536
4.40	2	.91
6.61	3	1.36
8.82	4	1.81
11.02	5	2.27
13.23	6	2.72
15.43	7	3.18
17.64	8	3.63
19.84	9	4.08
22.0	10	4.5
44.1	20	9.1
66.1	30	13.6
88.2	40	18.1
110.2	50	22.7
132.3	60	27.2
154.3	70	31.8
176.4	80	36.3
198.4	90	40.8
220	100	45
441	200	91
661	300	136
882	400	181
1102	500	227
1323	600	272
1543	700	318
1764	800	363
1984	900	408
2205	1000	454

Fuel Weight to Volume Conversion

U.S. Gal/Lbs; Liter/Lbs; Liter/Kg

TURBINE FUEL Volume/Weight

(up to 5 lbs variation per 100 gallons due to fuel grade and temperature)

U.S. Gal	Lbs / U.S. Gal	Lbs	Ltr	Lbs / Ltr	Lbs	Ltr	Kg / Ltr	Kg
.15	1	6.7	.57	1	1.8	1.25	1	.8
.30	2	13.4	1.14	2	3.6	2.50	2	1.6
.45	3	20.1	1.71	3	5.4	3.75	3	2.4
.60	4	26.8	2.28	4	7.2	5.00	4	3.2
.75	5	33.5	2.85	5	9.0	6.25	5	4.0
.90	6	40.2	3.42	6	10.8	7.50	6	4.8
1.05	7	46.9	3.99	7	12.6	8.75	7	5.6
1.20	8	53.6	4.56	8	14.4	10.00	8	6.4
1.35	9	60.3	5.13	9	16.2	11.25	9	7.2
1.5	10	67	5.7	10	18	12.5	10	8
3.0	20	134	11.4	20	36	25.0	20	16
4.5	30	201	17.1	30	54	37.5	30	24
6.0	40	268	22.8	40	72	50.0	40	32
7.5	50	335	28.5	50	90	62.5	50	40
9.0	60	402	34.2	60	108	75.0	60	48
10.5	70	469	39.9	70	126	87.5	70	56
12.0	80	536	45.6	80	144	100.0	80	64
13.5	90	603	51.3	90	162	113.5	90	72
15	100	670	57	100	180	125	100	80
30	200	1340	114	200	360	250	200	160
45	300	2010	171	300	540	375	300	240
60	400	2680	228	400	720	500	400	320
75	500	3350	285	500	900	625	500	400
90	600	4020	342	600	1080	750	600	480
105	700	4690	399	700	1260	875	700	560
120	800	5360	456	800	1440	1000	800	640
135	900	6030	513	900	1620	1125	900	720
150	1000	6700	570	1000	1800	1250	1000	800

Volume Conversion

Imp Gal/U.S. Gal; U.S. Gal/Ltr; Imp Gal/Ltr

Imp Gal	U.S. Gal / Imp Gal	U.S. Gal	U.S. Gal	Ltr / U.S. Gal	Ltr	Imp Gal	Ltr / Imp Gal	Ltr
.83267	1	1.2010	.26418	1	3.7853	.21997	1	4.5460
1.67	2	2.40	.52	2	7.57	0.44	2	9.09
2.49	3	3.60	.79	3	11.35	0.66	3	13.64
3.33	4	4.80	1.06	4	15.14	0.88	4	18.18
4.16	5	6.01	1.32	5	18.92	1.10	5	23.73
5.00	6	7.21	1.59	6	22.71	1.32	6	27.28
5.83	7	8.41	1.85	7	26.50	1.54	7	31.82
6.66	8	9.61	2.11	8	30.28	1.76	8	36.37
7.49	9	10.81	2.38	9	34.07	1.98	9	40.91
8.3	10	12.0	2.6	10	37.9	2.2	10	45.6
16.7	20	24.0	5.3	20	75.7	4.4	20	91.0
24.9	30	36.0	7.9	30	113.5	6.6	30	136.4
33.3	40	48.0	10.6	40	151.4	8.8	40	181.8
41.6	50	60.1	13.2	50	189.2	11.0	50	227.3
50.0	60	72.1	15.9	60	227.1	13.2	60	272.8
58.3	70	84.1	18.5	70	265.0	15.4	70	318.2
66.6	80	96.1	21.1	80	302.8	17.6	80	363.7
74.9	90	108.1	23.8	90	340.7	19.8	90	409.1
83	100	120	26.4	100	379	22	100	455
167	200	240	53	200	757	44	200	909
249	300	360	79	300	1136	66	300	1364
333	400	480	106	400	1514	88	400	1818
416	500	601	132	500	1893	110	500	2273
500	600	721	159	600	2271	132	600	2728
583	700	841	185	700	2650	154	700	3182
666	800	961	211	800	3028	176	800	3637
749	900	1081	238	900	3407	198	900	4091
833	1000	1201	264	1000	3785	220	1000	4546

Temperature Conversion

Celsius/Fahrenheit

°C	°F	°C	°F	°C	°F	°C	°F	°C	°F
-54	-65	-32	-26	-10	14	12	54	34	93
-53	-63	-31	-24	- 9	16	13	55	35	95
-52	-62	-30	-22	- 8	18	14	57	36	97
-51	-60	-29	-20	- 7	19	15	59	37	99
-50	-58	-28	-18	- 6	21	16	61	38	100
-49	-56	-27	-17	- 5	23	17	63	39	102
-48	-54	-26	-15	- 4	25	18	64	40	104
-47	-53	-25	-13	- 3	27	19	66	41	106
-46	-51	-24	-11	- 2	28	20	68	42	108
-45	-49	-23	- 9	- 1	30	21	70	43	109
-44	-47	-22	- 8	0	32	22	72	44	111
-43	-45	-21	- 6	1	34	23	73	45	113
-42	-44	-20	- 4	2	36	24	75	46	115
-41	-42	-19	- 2	3	37	25	77	47	117
-40	-40	-18	0	4	39	26	79	48	118
-39	-38	-17	1	5	41	27	81	49	120
-38	-36	-16	- 3	6	43	28	82	50	122
-37	-35	-15	- 5	7	45	29	84	51	124
-36	-33	-14	- 7	8	46	30	86	52	126
-35	-31	-13	- 9	9	48	31	88	53	127
-34	-29	-12	-10	10	50	32	90	54	129
-33	-27	-11	-12	11	52	33	91	55	131

International Standard Atmosphere (ISA)

Altitude/Temperature

Altitude (ft)	ISA (°C)	Altitude (ft)	ISA (°C)	Altitude (ft)	ISA (°C)	Altitude (ft)	ISA (°C)
S.L.	15.0	11,000	-6.8	22,000	-28.5	33,000	-50.3
1,000	13.0	12,000	-8.8	23,000	-30.5	34,000	-52.3
2,000	11.0	13,000	-10.7	24,000	-32.5	35,000	-54.2
3,000	9.1	14,000	-12.7	25,000	-34.5	36,000	-56.2
4,000	7.1	15,000	-14.7	26,000	-36.5	37,000	-56.5
5,000	5.1	16,000	-16.7	27,000	-38.4	38,000	-56.5
6,000	3.1	17,000	-18.7	28,000	-40.4	39,000	-56.5
7,000	1.1	18,000	-20.6	29,000	-42.4	40,000	-56.5
8,000	-0.8	19,000	-22.6	30,000	-44.4	41,000	-56.5
9,000	-2.8	20,000	-24.6	31,000	-46.3	42,000	-56.5
10,000	-4.8	21,000	-26.6	32,000	-48.3	43,000	-56.5

Altimeter Setting Conversion

Hectopascals or Millibars/Inches of Mercury

1 hectopascal = 1 millibar = 0.02953 inch of mercury

Hectopascals or Millibars	0	1	2	3	4	5	6	7	8	9
	Inches of Mercury									
880	25.99	26.02	26.05	26.07	26.10	26.13	26.16	26.19	26.22	26.25
890	26.28	26.31	26.34	26.37	26.40	26.43	26.46	26.49	26.52	26.55
900	26.58	26.61	26.64	26.67	26.70	26.72	26.75	26.78	26.81	26.84
910	26.87	26.90	26.93	26.96	26.99	27.02	27.05	27.08	27.11	27.14
920	27.17	27.20	27.23	27.26	27.29	27.32	27.34	27.37	27.40	27.43
930	27.46	27.49	27.52	27.55	27.58	27.61	27.64	27.67	27.70	27.73
940	27.76	27.79	27.82	27.85	27.88	27.91	27.94	27.96	27.99	28.02
950	28.05	28.08	28.11	28.14	28.17	28.20	28.23	28.26	28.29	28.32
960	28.35	28.38	28.41	28.44	28.47	28.50	28.53	28.56	28.58	28.61
970	28.64	28.67	28.70	28.73	28.76	28.79	28.82	28.85	28.88	28.91
980	28.94	28.97	29.00	29.03	29.06	29.09	29.12	29.15	29.18	29.21
990	29.23	29.26	29.29	29.32	29.35	29.38	29.41	29.44	29.47	29.50
1000	29.53	29.56	29.59	29.62	29.65	29.68	29.71	29.74	29.77	29.80
1010	29.83	29.85	29.88	29.91	29.94	29.97	30.00	30.03	30.06	30.09
1020	30.12	30.15	30.18	30.21	30.24	30.27	30.30	30.33	30.36	30.39
1030	30.42	30.45	30.47	30.50	30.53	30.56	30.59	30.62	30.65	30.68
1040	30.71	30.74	30.77	30.80	30.83	30.86	30.89	30.92	30.95	30.98
1050	31.01	31.04	31.07	31.10	31.12	31.15	31.18	31.21	31.24	31.27

Notice: This Citation V/SII Cockpit Reference Handbook is to be used for aircraft familiarization and training purposes only. It is not to be used as, nor considered a substitute for, the manufacturer's Pilot or Maintenance Manuals.

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