King Air 200

Cockpit Reference Handbook

CAE SimuFlite

August 2010

Notice: This King Air 200 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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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 loading schedule. 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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Cockpit Inspection

Control Locks . . . . REMOVED/STOWED

Trim Tabs (Elevator/Aileron/Rudder) . . . . 0 UNITS

CAUTION: The elevator trim system must not be manually, electrically, or by action of the autopilot forced past the limits indicated on the elevator trim indicator scale.

Fuel Control Panel CBs . . . . IN

Right Side Panel CBs . . . . IN

Landing Gear Switch Handle . . . . DOWN

Landing Gear Control CB . . . . IN

Electrical Switches . . . . OFF/AUTO

Oxygen System . . . . CHECKED

Passenger Manual Override . . . . PUSH OFF

Oxygen System Ready . . . . PULL ON

Crew Diluter Demand Masks . . . DON MASK/CHECK/STOW

Don oxygen mask. Check fit and operation. After performing oxygen mask check, stow the mask so that it is available for immediate use.

WARNING: Beards and mustaches should be carefully trimmed so that they will not interfere with proper oxygen mask sealing. The fit of the oxygen mask should be checked on the ground for proper sealing. Hats and “earmuff” type headsets must be removed prior to donning masks. Headsets and eyeglasses worn by crew members may interfere with quick-donning capabilities.

Oxygen Duration . . . . DETERMINE

NOTE: A bottle of 1,850 PSIG at 15°C is fully charged (100% capacity). Read % of capacity directly from the table. Read the oxygen pressure from the gage. Read IOAT (with battery ON). Determine the percent of usable capacity from the following graph (e.g., 1,100 PSI at 0°C equals 57%). Compute the oxygen duration in minutes from the table by multiplying the full bottle duration by the percent of usable capacity (e.g., pilot and copilot with masks set at 100% plus 6 passengers equals 10 people using oxygen).

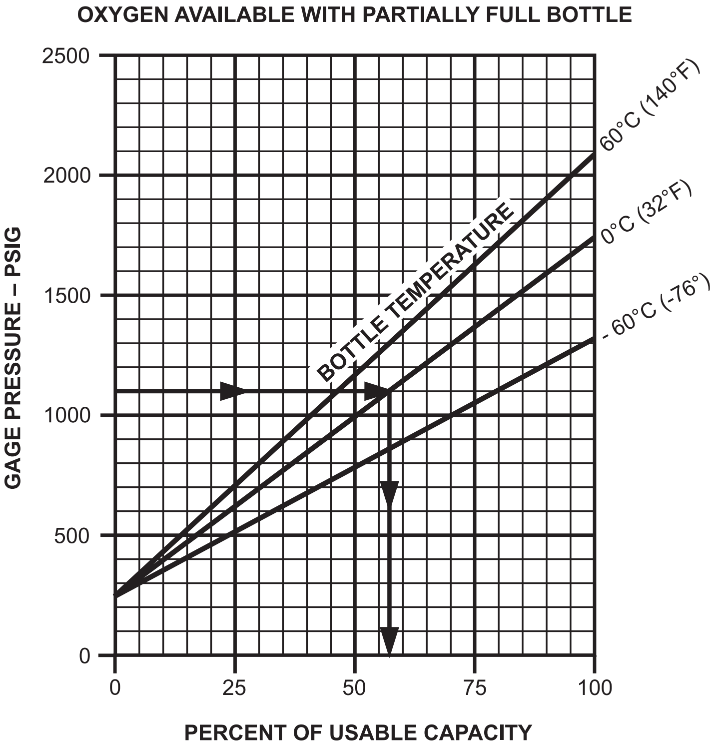


Fig. 2A-1; Oxygen Duration Chart

Stated Cylinder Size (cu ft)	‡ Number of People Using																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16‡	17‡
	Duration in Minutes																
22	151	75	50	37	30	25	21	18	16	15	13	12	11	10	10	*	*
49 or 50	334	167	111	83	66	55	47	41	37	33	30	27	25	23	22	20	19
66	445	222	148	111	89	74	63	55	49	44	40	37	34	31	29	27	26
76 or 77	514	257	171	128	102	85	73	64	57	51	46	42	39	36	34	32	30
115	772	386	257	193	157	128	110	96	85	77	70	64	59	55	51	48	45

Table 2A-1; King Air 200 Oxygen Duration with Full Bottle (100% Capacity)

Stated Cylinder Size (cu ft)	‡ Number of People Using																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16‡	17‡
	Duration in Minutes																
22	144	72	48	36	28	24	20	18	16	14	13	12	11	10	*	*	*
50	317	158	105	79	63	52	45	39	35	31	28	26	24	22	21	19	18
70	488	244	162	122	97	81	69	61	54	48	44	40	37	34	32	30	28
115	732	366	244	183	146	122	104	91	81	73	66	61	56	52	48	45	43

Table 2A-2; King Air B200 Oxygen Duration with Full Bottle (100% Capacity)

* Will not meet oxygen requirements

‡ For oxygen duration computations, count each diluter-demand crew mask in use as 2 (e.g., with 4 passengers and a crew of 2, enter the table at 8 people using).

Hot Battery Bus Check . . . . PERFORMED

Circuit Breakers . . . . IN

Firewall Fuel Valves . . . . CLOSE

Listen for operation. If valve movements are inaudible because of outside noise, use Noisy Ramp Procedures, following page.

Standby Pumps . . . . ON

Listen for operation.

> **NOTE:** On **BB-1096, 1098 and subsequent and BL-58 and subsequent,** standby pumps are not on the Hot Battery bus.

Battery Switch . . . . ON

FUEL PRESS annunciators illuminate.

Firewall Fuel Valves . . . . OPEN

FUEL PRESS annunciators extinguish.

Standby Pumps . . . . OFF

FUEL PRESS annunciators illuminate.

Crossfeed Switch . . . . . ALTERNATELY LEFT AND RIGHT

FUEL CROSSFEED annunciator illuminates and extinguishes and both FUEL PRESS annunciators extinguish.

Voltmeters . . . . PRESS TO TEST

Both voltmeters should read normal battery voltage of 24V. No voltage on one side indicates current limiter is out; 23V minimum for battery start; 20V minimum for external power start.

Flaps . . . . SELECTED UP/INDICATING UP

Fuel Quantity . . . . CHECKED

Battery Switch . . . . OFF

Parking Brake . . . . SET

Cockpit Fire Extinguisher . . . CHECK PRESSURE/SECURE

Noisy Ramp Procedure

Standby Pump CBs (see note, previous page) . . . . . PULL

Firewall Fuel Valves CBs . . . . PULL

Firewall Fuel Valves . . . . CLOSE

Standby Pumps . . . . ON

Battery Switch . . . . ON

FUEL PRESS annunciators illuminate.

Firewall Fuel Valves . . . . OPEN

FUEL PRESS annunciators extinguish.

Standby Pumps . . . . OFF

FUEL PRESS annunciators illuminate.

Standby Pumps CBs . . . . IN

Firewall Fuel Valves CBs . . . . IN

Crossfeed Switch . . . . . ALTERNATELY LEFT AND RIGHT

FUEL CROSSFEED annunciator illuminates and extinguishes and both FUEL PRESS annunciators extinguish.

Voltmeters . . . . PRESS TO TEST

Both voltmeters should read normal battery voltage of 24V. No voltage on one side indicates current limiter is out; 23V minimum for battery start; 20V minimum for external power start.

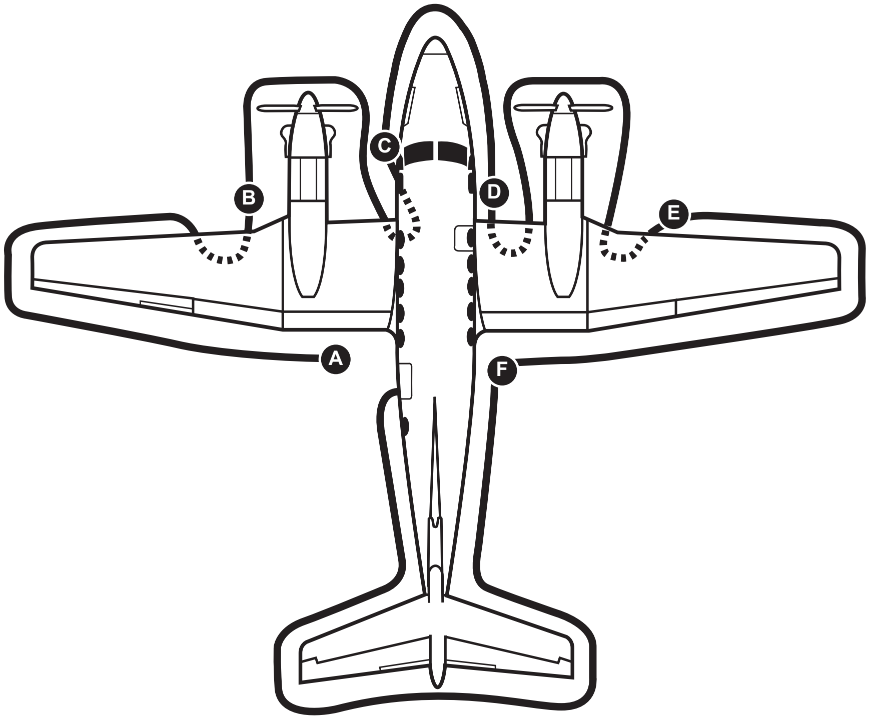
Flaps . . . . SELECTED UP/INDICATING UP

Fuel Quantity . . . . CHECKED

Battery Switch . . . . OFF

Parking Brake . . . . SET

Preflight Inspection Walkaround Path



External Inspection

Unfold the preflight inspection diagram for ease of reference. Each segment of the following preflight inspection checklist is identified by letters A through F to correspond to the diagram.

A Left Wing

Flaps . . . . FULLY RETRACTED/UNDAMAGED

Fuel Sump (aft of wheel well) . . . . DRAINED

Aileron . . . . NEUTRAL/UNDAMAGED/FREE MOVEMENT

Bonding Wires . . . . SECURE

Hinge . . . . NO EXCESS PLAY

Trim Tab . . . . ALIGNED WITH AILERON

The inboard end of each aileron may be up to $^{1}/_{2}$ inch above or below the outboard flap at the trailing edge when the flaps are properly rigged.

Flush Outboard Wing Tank Sump . . . . DRAINED

Fuel System Air Inlets . . . . CLEAR

Static Wicks . . . . SECURE/UNDAMAGED

NOTE: All wicks must be installed and in good condition when VLF/Omega equipment is used.

Wingtip Lights . . . . SECURE/UNDAMAGED

Main Fuel Tank . . . . NO LEAKAGE

Fuel Cap/Locking Tab . . . . SECURE/FACING AFT

Stall Warning Vane . . . . CONDITION CHECKED/ FREE MOVEMENT

Tie-Down and Chocks . . . . REMOVED

Outboard Deice Boot/Stall Strip . . . SECURE/UNDAMAGED

Recessed Fuel Vent/
Heated Ram Air Vent . . . . SECURE/UNDAMAGED

Wing Fuel Sump . . . . DRAINED

Landing Gear/Doors . . . . CHECKED

Tires/Wheel Assembly . . . . CHECK CONDITION

Brakes . . . . CHECK CONDITION

Strut . . . . PROPER INFLATION

Doors . . . . SECURE

Brake Lines/Brake Wear/Brake Deice Lines . . CHECKED

Inverter Cooling Louvers . . . . CLEAR

Fire Extinguisher Cylinder Pressure (if installed) . CHECKED

See Pressure versus Temperature chart in Servicing chapter.

Fuel Sump Strainer Drain (forward of wheel well) . . . DRAIN

Standby Pump Drain . . . . DRAIN

Firewall Fuel Filter . . . . DRAIN

Ice Light . . . . SECURE/UNDAMAGED

B Left Engine

Engine Oil . . . CHECK QUANTITY (no more than 4 quarts low)

Caplock Flange . . . CLOCKWISE TO STOP POSITION AFT

NOTE: To avoid overservicing the tank and high oil consumption, an oil level check is recommended within 30 min. after engine shutdown. Ideal interval is 15-20 min. If more than 30 min. has passed and the dipstick indicates that oil is needed, start the engine and run at ground idle for 5 min. then recheck the oil level.

NOTE: Service the oil system in accordance with Consumable Materials in the Handling, Service, & Maintenance section (8) of the AFM and P&WC SB 3001. DO NOT MIX different brands of oil (except as provided in Consumable Materials). Normal operating range is FULL to 4 quarts low. Maximum oil consumption is 1 quart in 10 hours of operation.

Left Cowling . . . . INSPECTED

Cowling Door . . . . OPEN

Linkage/Hoses/Accessories . . . . . CHECK CONDITION

Engine . . . . CHECK CONDITION

Bleed Valve Exhaust . . . . CLEAR

Cowling Bolt Alignment Arrows . . . . . . LOCK POSITION

Top Cowling Locks (inboard and outboard) . . . . SECURE

Left Exhaust Stack . . . . SECURE/UNDAMAGED

Covers/Prop Restraints . . . . REMOVE

Inlet Lip Heat Scupper . . . . SECURE

Propeller . . . . CONDITION CHECKED

Deice Boots . . . . SECURE/UNDAMAGED

Prop Seals . . . . NO LEAKAGE

Engine Air Intake Throat . . . . CLEAR/UNDAMAGED

Ice Vane . . . . RETRACTED

Bypass Door . . . . RETRACTED/
FLUSH WITH COWLING SURFACE

Right Exhaust Stack . . . . SECURE/UNDAMAGED

Inlet Lip Heat Scupper . . . . SECURE

Right Cowling . . . . INSPECTED

Cowling Door . . . . OPEN

Linkage/Hoses/Accessories . . . . . CHECK CONDITION

Engine . . . . CHECK CONDITION

Bleed Valve Exhaust . . . . CLEAR

Cowling Door . . . . CLOSE/SECURE

Cowling Bolt Alignment Arrows . . . . . . LOCK POSITION

Top Cowling Locks (inboard/outboard) . . . . . . SECURE

Generator Ram Air Scoop . . . . CLEAR

Nacelle Cooling Ram Air Inlets . . . . CLEAR

Auxiliary Fuel Tank . . . . NO LEAKAGE

Fuel Cap/Locking Tab . . . . SECURE/FACING AFT

Inboard Deice Boot/Stall Strip . . . . SECURE/UNDAMAGED

Heat Exchanger Inlet/Outlet . . . . . . CLEAR/UNDAMAGED

Auxiliary Fuel Tank Sump . . . . DRAINED

Hydraulic Fluid Level . . . . CHECKED

Hydraulic Landing Gear Service Door . . . . SECURE

Hydraulic Landing Gear Vent Lines . . . . CLEAR

Lower Antennas and Beacon . . . . SECURE

C Nose

Air Temperature Probe . . . . SECURE/UNDAMAGED

Pilot's Windshield . . . . CLEAN/UNDAMAGED

Windshield Wiper . . . . SECURE/PARKED

Left Avionics Access Panel . . . . SECURED

Air Conditioner Outlet Duct . . . . CLEAR

Pilot's Pitot Tube . . . . REMOVE COVER/CLEAR

Nose Gear/Door . . . . INSPECTED

  Door Hinges . . . . GOOD CONDITION

  Strut . . . . PROPER INFLATION

    Turn Limits . . . . VERIFY NOT EXCEEDED

    Turn Stop Plate . . . . . STRAIGHT/HOLES CIRCULAR

  Linkages . . . . CHECK CONDITION

Landing/Taxi Lights . . . . SECURE/UNDAMAGED

Radome . . . . INSPECTED

Copilot's Pitot Tube . . . . REMOVE COVER/CLEAR

Air Conditioning Ram Air Scoop Inlet . . . . CLEAR

Right Avionics Access Panel . . . . SECURE

Copilot's Windshield . . . . CLEAN/UNDAMAGED

Wiper . . . . SECURE/PARKED

D Right Engine

Auxiliary Fuel Tank Sump . . . . DRAINED

Battery Box Drain . . . . CLEAR

Battery Air Inlet Valve . . . . SECURE/NOT BINDING

Proper Valve Position . . . . FULLY OPEN AT 80°F (27°C)/ FULLY CLOSED AT 30°F (-1°C)

Inboard Deice Boot/Stall Strip . . . . UNDAMAGED/SECURE

Heat Exchanger Inlet/Outlet . . . . . . CLEAR/UNDAMAGED

Battery Exhaust . . . . CLEAR

Auxiliary Fuel Tank . . . . NO LEAKAGE

Fuel Cap/Locking Tab . . . . SECURE/AFT

Engine Oil . . . CHECK QUANTITY (no more than 4 quarts low)

Caplock Flange . . . CLOCKWISE TO STOP POSITION AFT

NOTE: To avoid overservicing the tank and high oil consumption, an oil level check is recommended within 30 min. after engine shutdown. Ideal interval is 15-20 min. If more than 30 min. has passed and the dipstick indicates that oil is needed, start the engine and run at ground idle for 5 min. then recheck the oil level.

NOTE: Service the oil system in accordance with Consumable Materials in the Handling, Service, & Maintenance section (8) of the AFM and P&WC SB 3001. DO NOT MIX different brands of oil (except as provided in Consumable Materials). Normal operating range is FULL to 4 quarts low. Maximum oil consumption is 1 quart in 10 hours of operation.

Left Cowling . . . . INSPECTED

Cowling Door . . . . OPEN

Linkage/Hoses/Accessories . . . . . CHECK CONDITION

Engine . . . . CHECK CONDITION

Air Conditioner Compressor/
Drive Belt . . . . CHECK CONDITION

Cowling Door . . . . CLOSE

Bleed Valve Exhaust . . . . CLEAR

Cowling Bolt Alignment Arrows . . . . LOCK POSITION

Top Cowling Locks (outboard/inboard) . . . . SECURE

Nacelle Cooling Ram Air Inlets . . . . CLEAR

Left Exhaust Stack . . . . SECURE/UNDAMAGED

Covers/Prop Restraints . . . . REMOVE

Inlet Lip Heat Scupper . . . . SECURE

Propeller . . . . CHECK CONDITION

Deice Boot . . . . SECURE/UNDAMAGED

Prop Seals . . . . NO LEAKAGE

Engine Air Intake . . . . CLEAR/UNDAMAGED

Ice Vane . . . . RETRACTED

Bypass Door . . . . RETRACTED/
FLUSH WITH COWLING SURFACE

Right Exhaust Stack . . . . SECURE/UNDAMAGED

Inlet Lip Heat Scupper . . . . SECURE

Right Cowling . . . . INSPECTED

Cowling Door . . . . OPEN

Linkage/Hoses/Accessories . . . . CONDITION CHECKED

Top Cowling Locks (inboard/outboard) . . . . SECURE

Cowling Bolt Alignment Arrows . . . . LOCK POSITION

Generator Ram Air Scoop . . . . CLEAR

E Right Wing

Ice Light . . . . SECURE/UNDAMAGED

Firewall Fuel Filter . . . . DRAINED

Fuel Sump Strainer Drain
(forward of wheel well) . . . . DRAINED

Standby Pump Drain . . . . DRAINED

Landing Gear/Doors . . . . CHECKED

Tires/Wheel Assembly . . . . CHECK CONDITION

Brakes . . . . CHECK CONDITION

Strut . . . . PROPER INFLATION

Doors . . . . SECURE

Brake Lines/Brake Wear/Brake Deice Lines . . . . CHECK

Fire Extinguisher Cylinder Pressure . . . . CHECKED

See Pressure vs. Temperature chart in Servicing chapter.

Recessed Fuel Vent/
Heated Ram Air Vent . . . . CLEAR/UNDAMAGED

Wing Fuel Sump . . . . DRAINED

Ground Power Unit Access Door . . . . . CLOSED/SECURE

Tie-Down and Chocks . . . . REMOVED

Outboard Deice Boot/Stall Strip . . . UNDAMAGED/SECURE

Main Fuel Tank . . . . NO LEAKAGE

Fuel Cap/Locking Tab . . . . SECURE/FACING AFT

Wingtip Lights . . . . SECURE/UNDAMAGED

Fuel System Air Inlet . . . . CLEAR

Static Wicks . . . . SECURE/UNDAMAGED

NOTE: All wicks must be installed and in good condition when VLF/Omega equipment is used.

Aileron . . . . NEUTRAL/UNDAMAGED/FREE MOVEMENT

Bonding Wires . . . . SECURE

Hinge . . . . NO EXCESS PLAY

Bendable Tab . . . . CHECK

Flush Outboard Wing Tank Sump . . . . DRAINED

Flaps . . . . FULLY RETRACTED/UNDAMAGED

Fuel Sump (aft of wheel well) . . . . DRAINED

Oil Breather Vent . . . . CLEAR

F Tail

Cabin Windows . . . . CHECK CONDITION

Emergency Escape Hatch . . . . SECURE

Oxygen Door . . . . SECURE

Right Static Ports . . . . CLEAR

Emergency Locator
Transmitter (ELT) Switch . . . . ARM POSITION

ELT Antenna . . . . SECURE/UNDAMAGED

Cabin Air Exhaust . . . . CLEAR

Ventral Fin Water Drains . . . . CLEAR

Tie-Down . . . . REMOVED

Lower Antennas/Beacon . . . . SECURE/UNDAMAGED

Empennage . . . . INSPECTED

Right Horizontal Stabilizer Deice Boot . . . . SECURE/
UNDAMAGED

Static Wicks . . . . SECURE/UNDAMAGED

NOTE: All wicks must be installed and in good condition when VLF/Omega equipment is used.

Stinger . . . . CHECK

Control Surfaces, Elevator,
and Rudder . . . . CONDITION CHECKED

Rudder Trim Tab . . . . ALIGNED WITH RUDDER

Elevator Trim Tabs . . . . VERIFY 0/NEUTRAL

Navigation/Strobe Lights . . . . . SECURE/UNDAMAGED

Tail Flood Lights . . . . SECURE/UNDAMAGED

Antennas . . . . SECURE/UNDAMAGED

Left Stabilizer Deice Boot . . . . . SECURE/UNDAMAGED

Drains (lavatory, oxygen, discharge, relief tube) . . . CLEAR

Left Static Ports . . . . CLEAR

Cabin Door/Seal . . . . CONDITION CHECKED

Cabin Windows . . . . CONDITION CHECKED

Cabin Inspection

Cabin Door . . . . LOCKED/SECURE

On **King Air 200C/B200C aircraft,** prior to first flight of day, check cabin/cargo door annunciator circuitry in accordance with Cabin/Cargo Annunciator Check in the Pilot's Operating Manual/AFM.

> **WARNING:** Only a crew member should close and lock the door.

Toilet Knife Valve (Monogram electric toilet) . . . . . . OPEN

Load and Baggage . . . . SECURE

Weight and Balance . . . . CHECKED

Cabin Fire Extinguisher . . . . CHARGED/SECURE

Cabin Seats and Belts . . . . . SECURE/GOOD CONDITION

Windows . . . . CLEAN/GOOD CONDITION

Passenger Oxygen Mask Compartments . . . . . CHECKED

Doors . . . . VERIFY CLOSED/LATCHED

Emergency Exit . . . . SECURE

Interior lock must be in the unlocked position to permit access from outside the aircraft in an emergency.

Passenger Briefing . . . . CONDUCT

Expanded Normal Procedures

Table of Contents

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 – UP, Flaps – UP).

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

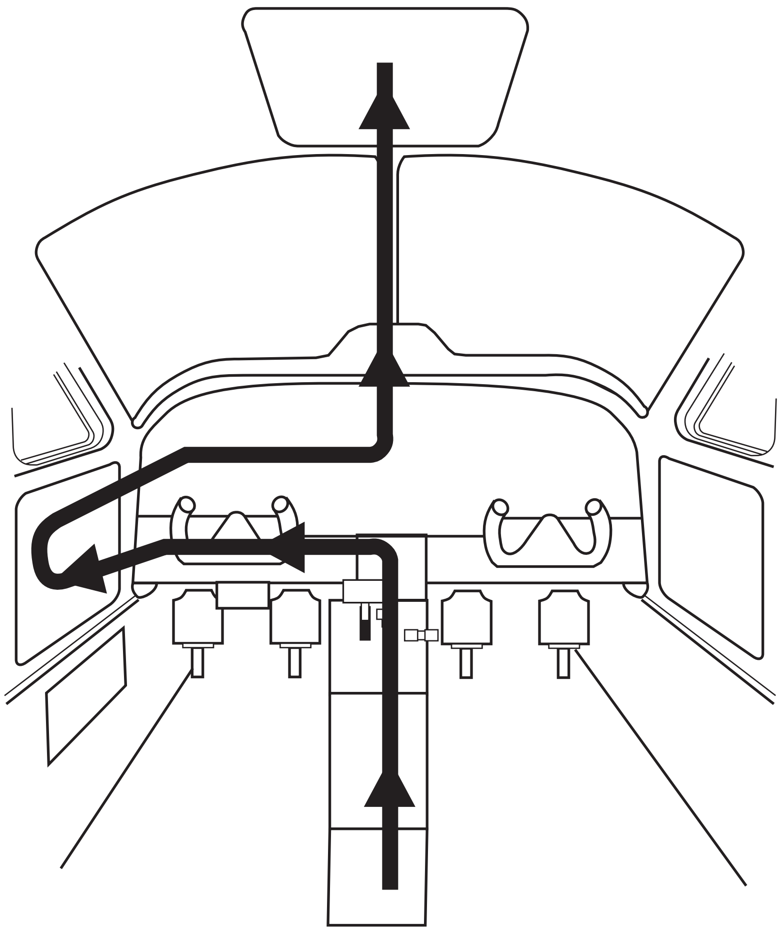
A challenge-response review of the checklist follows execution of the tasks; the pilot not flying (PNF) calls the item, and the appropriate pilot responds by verifying its condition (e.g., “Propeller Anti-Ice” [challenge] – “ON” [response]).

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 followed by the normal checklist as a done list
- use of normal checklists as “done” lists.

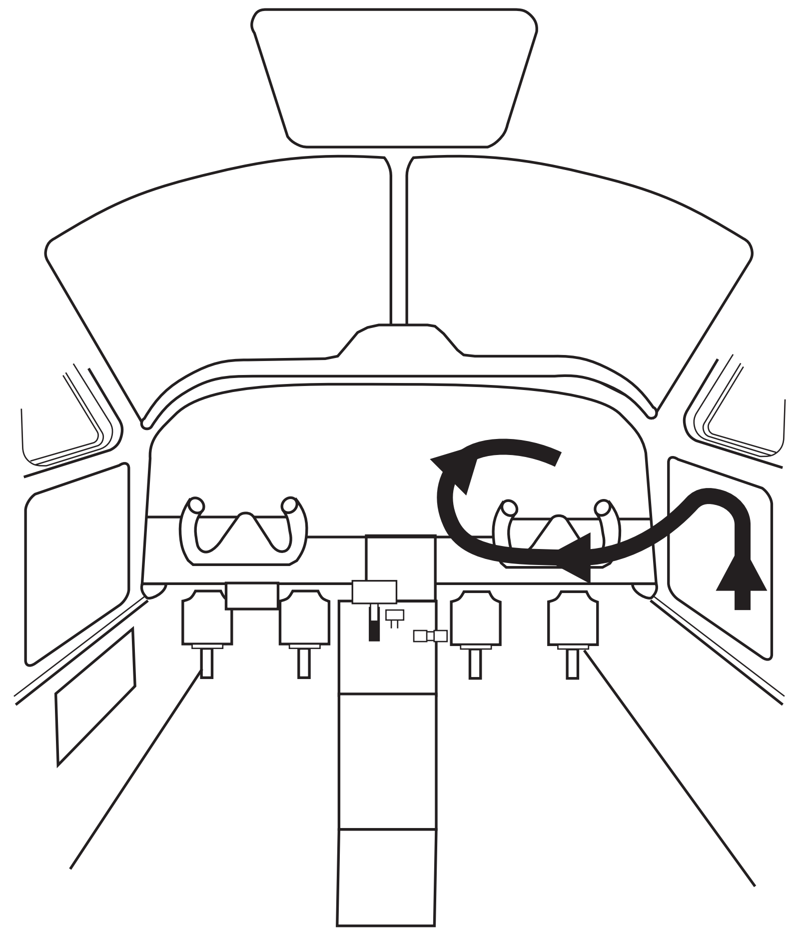
Cockpit Flow Pattern

Left Seat



Cockpit Flow Pattern

Right Seat



Normal Procedures

Before Starting Engines

Passenger Briefing . . . . COMPLETED

The passenger briefing should include the following items:

- Smoking
- Use of Safety Belts
- Seat Positions
- Normal and Emergency Exit Operation
- Fire Extinguishers
- Oxygen Use (if required)
- Survival Equipment (if required)
- Overwater Equipment (if required)

NOTE: This briefing is required to be given by the Pilot in Command, crewmember, or other person designated by the Certificate Holder before takeoff. It may be delivered by means of an approved playback device but must be supplemented by printed cards appropriate to the aircraft.

Cabin Door/Cargo Door Circuitry Check . . . COMPLETED

Refer to page **2B-45**.

Cabin Door/Cargo Door . . . . LOCKED

Electric Toilet (if installed) . . . . KNIFE VALVE OPEN

Load and Baggage . . . . SECURED

Weight and Center of Gravity . . . . CHECKED

Seats . . . . POSITIONED

Control Locks (Figure 3B-1) . . . . REMOVED

Seats/Rudder Pedals . . . . ADJUSTED

Position seat backs upright. Ensure lateral tracking seats are in the outboard position.

Seatbelts/Shoulder Harnesses . . . . FASTENED

Oxygen System Ready . . . . PULL ON

Oxygen System Preflight . . . . COMPLETED

Passenger Manual Drop Out . . . . PUSH OFF

Oxygen System Ready . . . . PULL ON

Crew Diluter Masks . . . . DON/CHECK FIT/ OPERATION/STOW

Oxygen Duration . . . . DETERMINE

A bottle of 1850 PSIG at 15°C is fully charged (100% capacity). Read duration directly from **Table 2B-1; Oxygen Duration table**.

Indicated Outside Air Temperature (battery ON) . . . CHECK

Usable Oxygen Capacity . . . DETERMINE FROM GRAPH

- Compute oxygen duration in minutes from **Table 2B-2; Oxygen Available with Partially Full Bottle** by multiplying the full bottle duration by the percent of usable capacity.
- Pilot and copilot are each counted as two people with diluter demand masks set at 100% or NORMAL mode.

Stated Cylinder Size (cu ft)	Number of People Using Oxygen[1]																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16[1]	17[1]
	Duration in Minutes																
22	144	72	48	36	28	24	20	18	16	14	13	12	11	10	*	*	*
49 or 50	317	158	105	79	63	52	45	39	35	31	28	26	24	22	21	19	18
66	422	211	140	105	84	70	60	52	47	42	38	35	32	30	28	26	24
76 or 77	488	244	162	122	97	81	69	61	54	48	44	40	37	34	32	30	28
115	732	366	244	183	146	122	104	91	81	73	66	61	56	52	48	45	43

Table 2B-1; Oxygen Duration

*Will not meet oxygen requirements.

1 For oxygen duration computations, count each diluter-demand crew mask in use as two
(e.g., with four passengers and two crew members, enter the table at eight people using oxygen.)

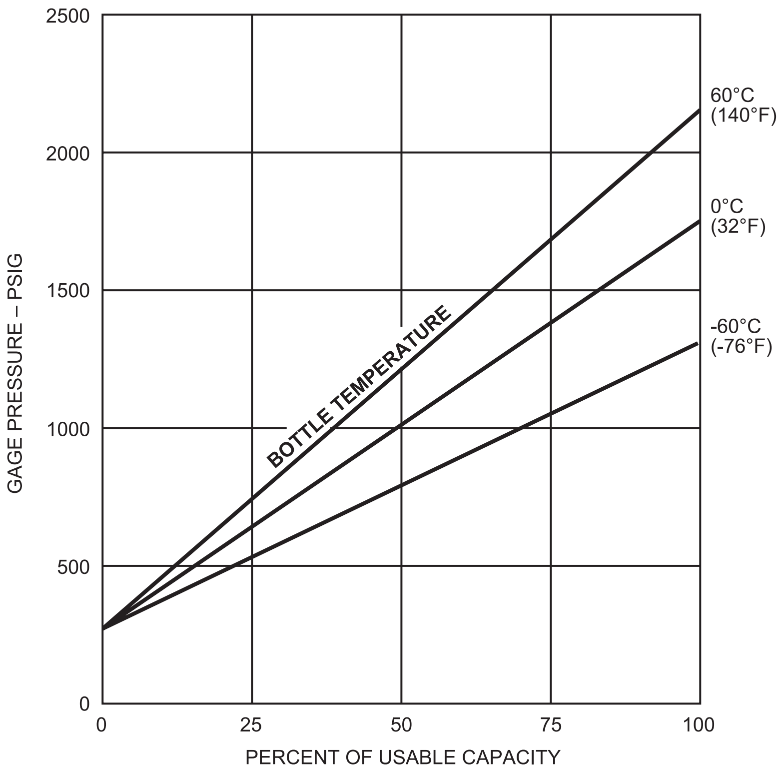


Table 2B-2; Oxygen Available with Partially Full Bottle

Fuel Panel Circuit Breakers . . . . IN

Pilot's Instrument Panel . . . . CHECKED

Compass Control . . . . SLAVED

TYPE I Prop Sync Switch (if installed) . . . . OFF

TYPE II Prop Sync Switch (if installed) . . . . ON

Pilot's Subpanel . . . . NORMAL

Mic Selector Switch . . . . NORMAL

Parking Brake . . . . CONFIRM SET

While applying brakes, push parking brake knob completely in, depress button on end of parking brake knob, and pull completely out.

Engine Ice Vanes . . . . EXTENDED

NOTE: The engine ice vanes should be extended for all ground operations to minimize ingestion of ground debris. Turn engine anti-ice OFF, when required, to maintain oil temperature within limits (**B200 only**).

Pilot Air Control . . . . AS REQUIRED

Defrost Air Control . . . . AS REQUIRED

Landing Gear Control . . . . DN

Landing Gear Relay Circuit Breaker . . . . IN

All Other Switches . . . . OFF

Avionics Panel Switches . . . . AS REQUIRED

Radar . . . . OFF OR STANDBY

Power Console . . . . CHECKED

Power Levers . . . . IDLE/FRICTION SET

Propeller Levers . . . . FULL FORWARD/FRICTION SET

Condition Levers . . . . . FUEL CUT OFF/FRICTION SET

Elevator/Aileron/Rudder Trim . . . . SET

Landing Gear Alternate Extension . . . . STOWED

Pedestal . . . . CHECK

Cabin Pressure Switch . . . . PRESS

Rudder Boost Switch . . . . ON

Elevator Trim Switch . . . . ON

Pressurization Controller . . . . SET

Copilot's Instrument Panel . . . . CHECKED

Compass Control . . . . SLAVED

Copilot's Clock (control wheel) . . . . CHECK/SET

Copilot's Subpanel . . . . CHECKED

Cabin Sign . . . . NO SMOKE/FSB

Vent Blower Switch . . . . AUTO

During operation in AUTO, MANUAL HEAT, or MANUAL COLD, the ventilation blower operates in the LOW position. For maximum cooling, select the ventilation blower to HIGH and the aft blower to ON. With the air conditioner on, maintain at least 60% (**200**) or 62% (**B200**) N_1 speed on the right engine. If below N_1 maximum speed, the AIR CND N_1 LOW annunciator illuminates and the air conditioner compressor clutch disengages.

NOTE: With the cabin temperature mode switch in AUTO, MAN HEAT, or MAN COOL, the ventilation blower operates at low speed. Placing the vent blower switch in HIGH increases air circulation. To obtain maximum cooling, place the ventilation blower in HIGH and the aft blower (if installed) ON. With air conditioning on, maintain the right engine at 60% N_1 or higher. If below minimum N_1 speed, the AIR COND N_1 LOW annunciator illuminates and the air conditioning clutch disengages. For maximum heating, the ventilation blowers should be in HIGH and the aft blower selected OFF.

Bleed Air Valve Switches . . . . OPEN OR ENVIR OFF

ENVIR OFF for more efficient cooling on the ground.

Cabin Temp Mode Control . . . . OFF

Use the radiant heat system only in conjunction with manual temperature control mode.

Cabin/Cockpit Air Control . . . . AS REQUIRED

If needed, divert cabin airflow to cockpit.

Copilot Air Control . . . . AS REQUIRED

Mic Selector Switch . . . . NORMAL

Oxygen Pressure . . . . CONFIRM

All Other Switches . . . . OFF

Copilot's CB Panel . . . . CHECKED

Pilot's Static Air Source . . . . NORMAL

Fire Extinguisher . . . . CHECKED

Fuel System Check (Quiet Ramp Procedure) . . CHECKED

Battery . . . . ON

L/R FUEL PRESS and L/R ICE VANE EXT annunciators illuminate.

Firewall Shutoff Valves . . . . CLOSE

Standby Pumps . . . . ON

Listen for operation. L/R FUEL PRESS annunciators illuminate.

Firewall Shutoff Valves . . . . OPEN

L/R FUEL PRESS annunciators extinguish.

Standby Pumps . . . . OFF

L/R FUEL PRESS annunciators illuminate.

Crossfeed . . . . ALTERNATELY LEFT/RIGHT

FUEL CROSSFEED Annunciators . . . . . . ILLUMINATE

L/R FUEL PRESSURE Annunciators . . . . EXTINGUISH

Crossfeed . . . . OFF

Auxiliary Tank Transfer . . . . AUTO

No Transfer Lights . . . . PRESS TO TEST

Fuel System Check (Noisy Ramp Procedure) . . CHECKED

Standby Pump CBs . . . . PULL

Firewall Fuel Valve CBs . . . . PULL

Firewall Shutoff Valves . . . . CLOSE

Standby Pumps . . . . ON

Battery Switch . . . . ON

FUEL PRESS annunciators illuminate.

Firewall Fuel Valves . . . . CLOSE

FUEL PRESS annunciators extinguish.

Standby Pumps . . . . OFF

FUEL PRESS annunciators illuminate.

Crossfeed Switch . . . . ALTERNATELY LEFT/RIGHT

FUEL CROSSFEED annunciator illuminates and extinguishes and both FUEL PRESS annunciators extinguish.

Battery Switch . . . . ON

Fuel Quantity . . . . CHECK MAIN/AUXILIARY

Hydraulic Fluid Sensor (if installed) . . . . TESTED

HYD FLUID LOW Annunciator . . . . ILLUMINATED

Beacon . . . . ON

DC Volts/Loadmeters . . . . VOLTAGE CHECKED/23V MIN

Check that voltage is a minimum of 23V for battery start and 20V for external power start. No voltage indicates that a current limiter is out.

Landing Gear Handle Lights . . . . TESTED

Annunciators . . . . TESTED

Stall Warning . . . . TESTED

Fire Detectors/Fire Extinguishers . . . . TESTED

Before Starting Engine Checklist . . . . . . COMPLETED

Starting Engines – Battery

See Limitations chapter for starter/generator limitations.

During engine start, crew duties should be defined and organized. The pilot monitors ITT, N_1, and 10 second time limit for light off; the copilot is responsible for starter time limits and all other indications or abnormalities. He provides verbal confirmation of oil pressure, ignition, and fuel pressure. This allows the pilot to concentrate on the two most important starting parameters; ITT and N_1. In addition, it prevents both pilots from looking at the same gage at the same time and leaving other indicators unmonitored.

CAUTION: If no ITT rise occurs within 10 seconds after moving the condition lever to LOW IDLE, move the condition lever to FUEL CUT-OFF. Allow 60 seconds for fuel to drain and starter to cool. Refer to Engine Clearing procedure (**2B-21**).

Right Ignition and Engine Start . . . . ON

Check the following:

- N_1 Rotation
- IGNITION ON annunciator illuminates
- FUEL PRESS annunciator extinguishes
- Propeller begins rotation
- N_1 Stabilized
- Oil pressure rises

Right Condition Lever . . . . LOW IDLE (12% N_1 MIN)

Move condition lever to LOW IDLE when N_1 indicates 12% or above. Ensure fuel flow is between 135 and 150 pph.

ITT and N_1 . . . . MONITOR/1,000°C MAX

CAUTION: If ITT appears likely to exceed 1,000°C, move condition lever to FUEL CUT-OFF. Leave ignition and Engine Start switches in ON position. Continue motoring the engine to reduce ITT. Refer to Engine Clearing procedure (**2B-21**).

NOTE: After aborting start attempt, allow 60 seconds delay for fuel draining, motor the engine for a minimum of 15 seconds, and allow the engine to stop completely before attempting another start.

Right Oil Pressure . . . . CHECKED

At low idle, engine oil pressure should indicate a minimum of 60 PSI.

Right Condition Lever . . . . HIGH IDLE

Ensure ITT is stabilized. To avoid excessive ITT, adjust the condition levers to a higher N_1 speed (approximately 60% N_1) during ground operation in high ambient temperatures, at high elevations, and during periods of high generator load.

If an abnormally high ITT occurs, particularly if accompanied by an N_1 decrease, turn off the generator and air conditioner compressor before attempting to accelerate the right engine.

Right Ignition and Engine Start . . . . .OFF (N_1 50% MIN)

Right Generator . . . . ON/CHARGE BATTERY/OFF

Generator OFF when loadmeter reads approximately 0.50.

CAUTION: Ensure the right generator is off for start. Energizing the left starter with the right generator operating causes damage or failure of the right 325A current limiter. The same is true for the right starter with the left generator operating.

NOTE: On **S/Ns BB-1439, 1444 and subsequent except 1463; BL-139 and subsequent**, the generator can be left on for the second engine start.

Left Ignition and Engine Start . . . . ON

Check the following:

- N_1 Rotation
- IGNITION ON annunciator illuminates
- FUEL PRESS annunciator extinguishes
- Propeller begins rotation
- N_1 Stabilized
- Oil pressure rises

Right Generator . . . . ON (L N_1 12% MIN)

Switch generator to ON position as left N_1 accelerates through 12%.

Left Condition Lever . . . . .LOW IDLE (L N_1 12% MIN)

Move condition lever to LOW IDLE when N_1 indicates 12% or above. Ensure fuel flow is between 135 and 150 pph. BATTERY CHG annunciator illuminates.

ITT and N_1 . . . . .MONITOR/1,000°C MAX

CAUTION: If ITT appears likely to exceed 1,000°C, move condition lever to FUEL CUT-OFF. Leave ignition and Engine Start switches in ON position. Continue motoring the engine to reduce ITT. Refer to Engine Clearing procedure (**2B-21**).

Left Oil Pressure . . . . CHECKED

At low idle, engine oil pressure should indicate a minimum of 60 PSI.

Left Ignition and Engine Start . . . . . . OFF (N_1 50% MIN)

Ensure all engine gages indicate normal.

DC Volts/Loadmeters . . . . CHECKED (27.5 TO 29V)

Push for volts to check DC voltage.

Left Generator . . . . RESET/THEN ON

On **S/N BB-037 and subsequent; BL-001 and subsequent**, if the battery charge annunciator does not extinguish within five minutes, check battery condition as follows:

Either Generator . . . . OFF

Voltmeter . . . . ENSURE 28V INDICATION

Battery Switch . . . . OFF MOMENTARILY/ NOTE LOADMETER DECREASE

If decrease exceeds 2.5%:

Battery . . . . CONTINUE CHARGING/ REPEAT ABOVE STEPS EVERY 90 SECS

Battery Charge Annunciator . . . EXTINGUISHED WHEN LOADMETER DECREASE BELOW 2.5%

Right Condition Lever . . . . LOW IDLE

Starting Engines – External Power

See Limitations chapter for starter/generator limitations.

During engine start, crew duties should be defined and organized. The pilot monitors ITT, N_1, and 10 second time limit for light off; the copilot is responsible for starter time limits and all other indications or abnormalities. He provides verbal confirmation of oil pressure, ignition, and fuel pressure. This allows the pilot to concentrate on the two most important starting parameters; ITT and N_1. In addition, it prevents both pilots from looking at the same gage at the same time and leaving other indicators unmonitored.

CAUTION: If no ITT rise occurs within 10 seconds after moving the condition lever to LOW IDLE, move the condition lever to FUEL CUT-OFF. Allow 60 seconds for fuel to drain and starter to cool. Refer to Engine Clearing procedure (**2B-21**).

Avionics Master Switch . . . . OFF

Left/Right Generator Switches . . . . OFF

Ensure both generator switches are in the OFF position.

Battery . . . . ON

The battery absorbs transient power surges.

CAUTION: Do not connect an external power source to the aircraft unless battery voltage indicates a charge of at least 20V. If the voltage is less than 20V, recharge or replace the battery before reconnecting a ground power unit.

NOTE: If the battery is partially discharged, the BATTERY CHARGE annunciator illuminates approximately 6 seconds after external power is on line. If the annunciator fails to extinguish within 5 minutes, perform the Ni-Cad Battery check (**2B-47**).

External Power . . . . OFF/CONNECTED

The ground power unit (GPU) should be off before connecting it to the aircraft.

CAUTION: Use only an external power source fitted with an AN-type plug.

External Power . . . . ON

Voltmeter . . . . 28 TO 28.4V

Verify GPU output voltage is set at 28.0 to 28.4 volts (**B200**) or 28.0 to 28.5 volts (**200**).

Propeller Levers . . . . FEATHER

Verify area near right propeller is clear before continuing start procedure.

R FUEL PRESS Annunciator . . . . EXTINGUISHED

Right Ignition and Engine Start . . . . ON

Check the following:

- N_1 Rotation
- IGNITION ON annunciator illuminates
- FUEL PRESS annunciator extinguishes
- Propeller begins rotation
- N_1 Stabilized
- Oil pressure rises

Right Condition Lever . . . . LOW IDLE (12% N_1 MIN)

Move condition lever to LOW IDLE when N_1 indicates 12% or above. Ensure fuel flow is between 135 and 150 pph. BATTERY CHG annunciator illuminates.

ITT and N_1 . . . . MONITOR/1,000°C MAX

CAUTION: If ITT appears likely to exceed 1,000°C, move condition lever to FUEL CUT-OFF. Leave ignition and Engine Start switches in ON position. Continue motoring the engine to reduce ITT. Refer to Engine Clearing procedure (**2B-21**).

NOTE: After aborting start attempt, allow 60 seconds delay for fuel draining, motor the engine for a minimum of 15 seconds, and allow the engine to stop completely before attempting another start.

Right Oil Pressure . . . . CHECKED

At low idle, engine oil pressure should indicate a minimum of 60 PSI.

Right Ignition and Engine Start . . . . .OFF (N_1 50% MIN)

Right Generator . . . . ON/CHARGE BATTERY/OFF

Left Ignition and Engine Start . . . . ON

Check the following:

- N_1 Rotation
- IGNITION ON annunciator illuminates
- FUEL PRESS annunciator extinguishes
- Propeller begins rotation
- N_1 Stabilized
- Oil pressure rises

L FUEL PRESS Annunciator . . . . EXTINGUISHED

Left Condition Lever . . . . .LOW IDLE (N_1 12% MIN)

Move condition lever to LOW IDLE when N_1 indicates 12% or above. Ensure fuel flow is between 135 and 150 pph. BATTERY CHG annunciator illuminates.

ITT and N_1 . . . . .MONITOR/1,000°C MAX

Left Oil Pressure . . . . CHECKED

At low idle, engine oil pressure should indicate a minimum of 60 PSI.

Left Ignition and Engine Start . . . . OFF (N_1 50% MIN)

External Power . . . . OFF/DISCONNECT/SECURED

After the second engine has been started, disconnect the ground power unit and secure the access door.

Left and Right Generators . . . . RESET/THEN ON

Propeller Levers . . . . FULL FORWARD

Engine Clearing

Condition Lever . . . . FUEL CUT OFF

Ignition/Engine Start . . . . STARTER ONLY/40 SEC MAX

CAUTION: Do not exceed starter limits..

Starter Use . . . . DO NOT EXCEED LIMITS

Starter Limitation – 40 secs ON/60 secs OFF/40 secs ON/60 secs OFF/40 secs ON/30 mins OFF.

Ignition/Engine Start . . . . OFF

Before Taxi

Propeller Beta Range may be used during taxi with minimum blade erosion up to the point where N_1 increases. Exercise care when taxiing on unimproved surfaces.

NOTE: If excessive engine ITT occurs during any one of the following conditions, adjust the condition levers for a higher N_1 speed:

- When high generator loads are required.
- During operations at high ambient temperatures.
- During operations at high field elevations.

NOTE: If excessive ITTs are encountered, particularly if accompanied by a decreasing N_1, the associated generator should be turned off before attempting to accelerate the engine. If the right ITT is high, also turn off the air conditioner by selecting the CABIN TEMP MODE switch to OFF.

Inverters . . . . CHECKED

Inverter No. 1 . . . . ON

Verify INVERTER annunciator extinguishes. Check that inverter voltage and frequency is within tolerance.

Inverter No. 2 . . . . ON

Verify INVERTER annunciator extinguishes. Check that inverter voltage and frequency is within tolerance.

26V AC may be checked with torque meters.

PC-17A Inverters: 115V AC +5/-7% – 400 Hz ±1%

PC-250 Inverters: 115V AC ±3% – 400 Hz ±1%

Inverters . . . . SELECT No. 1 OR No. 2

Loadmeters . . . . PARALLELED WITHIN 10%

Avionics Master . . . . ON

External Lights . . . . AS REQUIRED

Cabin Lights . . . . AS REQUIRED

Bleed Air Valves . . . . OPEN OR ENVIR OFF

ENVIR OFF for more efficient cooling on the ground.

Cabin Temp Mode . . . . AUTO

Cabin Temperature . . . . AS REQUIRED

Instruments . . . . CHECKED

Brake Deice (if installed) . . . . CHECKED

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

Bleed Air Valves . . . . OPEN

Condition Levers (if brake deice required) . . . HIGH IDLE

You may see a BLEED AIR FAIL light at low idle.

Pneumatic Gage . . . . CHECK

Brake Deice (annunciator illuminated) . . . . ON

Pneumatic Gage . . . . OBSERVE DECREASE

Brake Deice (annunciator extinguished) . . . . OFF

Pneumatic Gage RECOVERED

Condition Levers . . . . LOW IDLE

NOTE: Brake deice control valves may become inoperative if valves are not cycled periodically. One cycle of the valves is required daily regardless of the weather conditions.

Flight Controls . . . . CHECKED/FREE MOVEMENT

Check for proper direction of movement and freedom of travel.

Flaps . . . . CHECKED/SET

Flap Switch . . . . FULL DOWN

Check gage indication for flaps FULL.

Flap Switch . . . . APPROACH/UP

Check gage indication. Visually confirm flaps up.

Brakes . . . . RELEASED/CHECKED

Both pilot and copilot apply brakes to test for normal effectiveness.

Before Takeoff (Runup)

If possible, conduct engine runup on a hard surface free of sand and gravel, to avoid pitting of propeller blades and aircraft surfaces.

Avionics and Radar . . . . CHECKED

Call out the navaid, frequency, and course information for primary and secondary navigation radios. Ensure DME is properly set, set radar to standby or off, and initialize VLF.

Pressurization . . . . CHECKED/SET

Bleed Air Valves . . . . OPEN

Cabin Altitude Selector . . . . SET

Adjust so that CABIN ALT dial indicates an altitude of 1,000 ft below field pressure altitude.

Rate Control Selector Knob . . . SET INDEX AT 12 O'CLOCK

Cabin Pressurization Switch . . . . HOLD IN TEST

Cabin Climb Indicator . . . . CHECK FOR DESCENT INDICATION

Cabin Pressurization Switch . . . . RELEASE WHEN PRESSURIZATION CONFIRMED

Cabin Altitude Selector Knob . . . . ADJUST

Adjust selector knob so that inner scale (ACFT ALT) indicates planned cruise altitude plus 1,000 ft. If this setting does not result in an outer scale (CABIN ALT) indication of at least 500 ft above takeoff field pressure altitude, adjust as required.

Autopilot . . . . CHECKED

Control Wheel . . . . PULL TO MID-TRAVEL

Autopilot . . . . ENGAGE

Control Wheel . . . . PUSH FORWARD/HOLD

With the control wheel pushed forward, the trim wheel should move toward nose-up.

Control Wheel . . . . PULL AFT/HOLD

With the control wheel pushed forward, the trim wheel should move toward nose-down.

Pitch Wheel . . . . MOVE UP/DN

The control wheel should follow pitch wheel movement.

Turn Knob . . . . LEFT/RIGHT

The control wheel should follow turn knob movement.

HSI Heading Marker . . . . . SET UNDER LUBBER LINE

Flight Director . . . . SELECT HDG MODE

Heading Marker . . . . MOVE

The control wheel should follow heading marker movement.

Control Wheel Disconnect Switch . . . . PRESS

Autopilot . . . . DISENGAGES

If AP DISC light begins flashing, press AP-YD/TRIM switch to extinguish light.

Autopilot . . . . ENGAGE

Pitch Trim Switches .TOUCH

Autopilot should disconnect but yaw damper remains engaged.

Primary Controls . . . CHECK FREEDOM OF MOVEMENT

Elevator Trim . . . . CHECKED

> **WARNING:** Electric trim system operation should occur with movement of pairs of switches. Any elevator trim wheel movement while depressing only one switch indicates system malfunction. The elevator trim control switch must then be turned off and flight conducted using only manual trim wheel.

Elevator Trim . . . . ON

Pilot' and Copilot's Switches . . . . . CHECK OPERATION

Trim Quick Disconnect . . . . CHECK

ELECT TRIM OFF Annunciator . . . . ILLUMINATED

Elevator Trim . . . . OFF/THEN ON

ELEC TRIM OFF Annunciator . . . . EXTINGUISHED

Trim Tabs . . . . CONFIRM SET

Two to three units of up trim are normally required for approximately neutral control pressure at single engine climb speeds.

Primary Governors, Overspeed Governors, and Rudder Boost . . . . TESTED

Rudder Boost . . . . ON

Prop Governor Test Switch . . . HOLD IN PROP GOV TEST

ITT/Torque Limits . . . . OBSERVE

Left Power Lever . . . . INCREASE UNTIL STABLE AT 1870 ±40 RPM

Left Propeller Lever . . . . RETARD TO DETENT THEN FULL FORWARD

Verify the RPM, with the propeller control positioned at the top of the red hatched area on the throttle quadrant, corresponds with the bottom of the green arc (1,600 RPM).

Left Power Lever . . . INCREASE UNTIL RUDDER MOVES

Left Power Lever . . . . IDLE

Right Power Lever . . . . INCREASE UNTIL STABLE AT 1870 ±40 RPM

Right Propelled Lever . . . . RETARD TO DETENT THEN FULL FORWARD

Verify the RPM, with the propeller control positioned at the top of the red hatched area on the throttle quadrant, corresponds with the bottom of the green arc (1,600 RPM).

Right Power Lever . . . INCREASE UNTIL RUDDER MOVES

Right Power Lever . . . . IDLE

Prop Governor Test Switch . . . . RELEASE

Autofeather (if installed) . . . . CHECKED

NOTE: As propeller feathers, torque increases over 220 ft-lbs. This causes the propeller to cycle out of and then back into feather with associated on/off indications of the AUTOFEATHER annunciator.

Power Levers . . . . APPROX 500 FT-LBS TORQUE

Autofeather Switch . . . . HOLD TO TEST

L/R AUTOFEATHER Annunciators . . . . . . ILLUMINATED

Left Power Lever . . . . RETARD

At approximately 410 ft-lbs, R AUTOFEATHER annunciator extinguishes

At approximately 260 ft-lbs, both AUTOFEATHER annunciators extinguishes

Left Power Lever . . . . RESET

Replace left power lever to position which illuminates both AUTOFEATHER annunciators.

Right Power Lever . . . . RETARD
At approximately 410 ft-lbs, R AUTOFEATHER annunciator extinguishes
At approximately 260 ft-lbs, both AUTOFEATHER annunciators extinguishes

Power Levers . . . . RETARD BOTH

Autofeather (if installed) . . . . ARMED

Propeller feathering (manual) . . . . CHECKED

Check for positive and even response from both propellers.

Vacuum and Pneumatic Pressure . . . . CHECKED

Left Bleed Air Valve . . . . INSTR & ENVIR OFF

LBL AIR OFF Annunciator . . . . ILLUMINATED

Gyro Suction Gage . . . . IN GREEN ARC

Pneumatic Pressure Gage . . . . IN GREEN ARC

Right Bleed Air Valve . . . . INSTR & ENVIR OFF

R BL AIR OFF Annunciator . . . . ILLUMINATED

L/R BLEED FAIL Annunciators . . . . ILLUMINATED

Gyro Suction Gage . . . . ZERO

Pneumatic Pressure Gage . . . . ZERO

Left Bleed Air Valve . . . . OPEN

L BL AIR OFF Annunciator . . . . EXTINGUISHED

L/R BLEED FAIL Annunciators . . . . . EXTINGUISHED

Right Bleed Air Valve . . . . OPEN

R BL AIR OFF Annunciator . . . . EXTINGUISHED

Engine Ice Vanes . . . . CHECKED

Systems for Icing Flight . . . . CHECKED AS REQUIRED

The following checks should be completed in addition to the normal checklist items during cold weather operations. Please refer to AFM Section 4 for complete procedures to be accomplished during cold weather operation.

Auto Ignition . . . . CHECK

Power Levers . . . . IDLE

Auto Ignition . . . . ARM

L/R IGNITION ON annunciators illuminated.

Power Levers . . . ADVANCE ABOVE 360-460 FT-LBS

L/R IGNITION ON annunciators extinguished.

Power Levers . . . . IDLE

L/R IGNITION ON annunciators illuminated.

Auto Ignition . . . . OFF

L/R IGNITION ON annunciators extinguished.

Engine Anti-Ice . . . . CHECK

Engine Ice Vanes . . . . RETRACT

L/R ICE VANE EXT annunciators extinguished.

Engine Ice Vanes . . . . EXTEND

L/R ICE VANE EXT annunciators illuminated.

WARNING: Either the main or standby engine anti-ice actuator must be operational on each engine before takeoff.

Windshield Anti-Ice . . . . CHECK

Windshield Anti-Ice . . . . HIGH

Observe increase on left and right loadmeters.

Windshield Anti-Ice . . . . OFF/THEN NORMAL

Observe increase on left and right loadmeters.

Windshield Anti-Ice . . . . OFF

Electrothermal Propeller Deice . . . . CHECK

CAUTION: Do not operate propeller deice when the propellers are static.

Automatic Prop Deice . . . . AUTO

Deice Ammeter . . . . CHECK

Monitor for 90 seconds to ensure automatic timer operation.

Manual Prop Deice Switch HOLD IN MANUAL POSITION

Small deflection on both loadmeters indicates system operation. Deice ammeter should indicate zero amps.

Manual Prop Deice Switch . . . . RELEASE

Deice Ammeter . . . . CHECK

Automatic Prop Deice . . . . OFF

Surface Deice System . . . . CHECK

WARNING: Do not cycle the boots during takeoff.

Condition Levers . . . . HIGH IDLE

Pneumatic Pressure . . . . CHECK

Surface Deice Switch . . . . SINGLE/RELEASE

Pneumatic pressure decreases momentarily. Visually check for boot inflation then hold down. The wing boots inflate in six seconds followed by the horizontal stabilizer boots in four seconds.

Surface Deice Switch . . . . MANUAL/HOLD

Pneumatic pressure decreases momentarily. Visually check for boot inflation.

Surface Deice Switch . . . . RELEASE

Condition Levers . . . . LOW IDLE

Stall Warning and Pitot Heat . . . . CHECK

CAUTION: Prolonged use of stall warning and pitot heat on the ground will damage the heating elements.

NOTE: To check stall warning and pitot heat operation, not loadmeter indications with switch operation. Load fluctuation is easier to observe on single generator.

Fuel Quantity . . . . CHECKED

Flight Instruments . . . . CHECKED

Engine Instruments . . . . CHECKED

Before Takeoff (Final Items)

Propeller Levers . . . . FULL FORWARD

Flaps . . . . SET

Trim . . . . SET

Two to three units of up trim is normally required for approximately neutral control pressure at single engine climb speeds.

Brake Deice (if installed) . . . . OFF

Left/Right Bleed Air . . . . OPEN

Aft Blower . . . . AS REQUIRED

Annunciators . . . . EXTINGUISHED/CONSIDERED

Ice Protection . . . . ON IF REQUIRED

Auto Ignition, L/R pitot heat, L/R fuel vent heat, stall warning heat.

Generator Load . . . . CHECKED

Engine Ice Vanes . . . . RETRACTED IF NOT REQUIRED

External Lights . . . . AS REQUIRED

Transponder . . . . ON

$V_1/V_R/V_2$/Minimum T/O Power . . . . CONFIRMED

Takeoff

Brakes . . . . HOLD

NOTE: Takeoff must be initiated from a full stop in order to meet performance data.

Power . . . . SET

Autofeather Annunciators (if installed) . . . ILLUMINATED

Brakes . . . . RELEASED

Landing Gear . . . . UP AT POSITIVE CLIMB
All gear and handle lights extinguish.

Flaps . . . . UP (V_{YSE} MIN)
Retract flaps above V_{YSE}. Flap gage indicates flaps up..

Climb

Yaw Damper . . . . ON

Climb Power . . . . SET

ITT/Torque/N_1 Limits . . . . MONITOR

NOTE: Increasing airspeed will cause torque and ITT increase.

Propeller . . . . 1,900 RPM

Propeller Synchrophaser . . . . ON

Autofeather . . . . OFF

Engine Instruments . . . . MONITOR

Cabin Sign . . . . AS REQUIRED

Cabin Pressurization . . . . CHECKED
Reset controller if necessary. Adjust rate knob if necessary.

Aft Blower . . . . AS REQUIRED

Lights . . . . AS REQUIRED

Cruise

Cruise Power . . . . SET/SEE TABLES & GRAPHS

NOTE: Do not lift power levers in flight.

Engine Instruments . . . . MONITOR

Auxiliary Fuel Gages . . . . MONITOR

Pressurization . . . . MONITOR

Descent

Pressurization . . . . SET

Cabin Altitude Selector Knob . . . . SET

Set to airport pressure altitude plus 500 ft. Approximately 75% N_1 is required to maintain pressurization schedule during descent. Refer to manufacturer's Pilot Operating Manual or the SimuFlite Operating Handbook for controller settings.

Rate Control Selector Knob . . . . AS DESIRED

Altimeter . . . . SET

Cabin Sign . . . . AS REQUIRED

Windshield Anti-Ice . . . . AS REQUIRED/NORMAL/HI

Set to NORMAL or HI well before descent into warm, moist air to aid in defogging.

Autofeather (if installed) . . . . ARMED

Fuel Balance . . . . CHECKED

Power . . . . AS REQUIRED

CAUTION: Avoid propeller operation in the range of 1,750 to 1,850 RPM because it may cause ILS glideslope interference.

Before Landing

Approach Speed . . . . CONFIRM

Pressurization (See Chart) . . . . CHECKED

Cabin Sign . . . . NO SMOKE/FSB

Flaps . . . . APPROACH

Landing Gear . . . . DN

Lights . . . . AS REQUIRED
Call out all lights that are turned on.

Prop Sync (Type 1) . . . . OFF

Radar . . . . AS REQUIRED

Surface Deice . . . . CYCLED AS REQUIRED

Normal Landing

Flaps . . . . DOWN

Airspeed . . . . NORMAL APPROACH SPEED

Yaw Damper . . . . OFF

Power Levers . . . . IDLE

Propeller Levers . . . . FULL FORWARD

Power Levers . . . BETA/REVERSE AFTER TOUCHDOWN

CAUTION: To ensure constant reversing characteristics, set propeller control in FULL INCREASE RPM position.

Brakes . . . . AS REQUIRED

Maximum Reverse thrust Landing

Refer to AFM Performance section for applicable landing distance charts.

Flaps . . . . DOWN

Airspeed . . . . NORMAL APPROACH SPEED

Yaw Damper . . . . HIGH IDLE

Condition Levers . . . . HIGH IDLE

Propeller Levers . . . . HIGH RPM

Power Levers . . . LIFT/REVERSE AFTER TOUCHDOWN

CAUTION: If possible, move propellers out of reverse at approximately 40 kts to minimize propeller blade erosion. Exercise care when reversing on runways with loose sand, dust, or snow on the surface. Flying gravel damages propeller blades; dust or snow may impair the pilot's forward field of vision at low aircraft speeds.

Brakes . . . . AS REQUIRED

Condition Levers . . . . LOW IDLE

Balked Landing

Power . . . . MAXIMUM ALLOWABLE

Airspeed . . . . 100 KTS

When clear of obstacles:

Normal Climb . . . . ESTABLISHED

Flaps . . . . UP

Landing Gear . . . . UP

After Landing

Auto Ignition . . . . OFF

Engine Ice Vanes . . . . EXTENDED

Lights . . . . AS REQUIRED

Ice Protection . . . . OFF

Transponder . . . . STANDBY

Radar . . . . STANDBY OR OFF

Trim Tabs . . . . SET

Flaps . . . . UP

Shutdown

Parking Brake . . . . SET

High brake temperatures may damage brakes if parking brake remains set.

NOTE: Avoid setting the parking brake when the brakes are hot from severe usage or when moisture conditions and freezing temperatures could form ice locks.

CAUTION: The parking brake should be left off and wheel chocks installed while the aircraft is unattended. Changes in ambient temperature can cause the brakes to release or exert excessive pressure.

Standby Boost Pumps/Crossfeed . . . . OFF

> **CAUTION:** The standby boost pumps and crossfeed are connected to the Hot Battery bus. Failure to turn these switches OFF discharges the battery.

Avionics Master . . . . OFF

Inverter . . . . OFF

Autofeather . . . . OFF

Lights . . . . OFF

Vent Blower . . . . AUTO

Cabin Temp Mode . . . . OFF

Aft Blower . . . . OFF

Radiant Heat . . . . OFF

Battery . . . . CHARGED

ITT . . . . . STABILIZED AT MIN TEMP FOR ONE MINUTE

> **CAUTION:** Monitor ITT during shutdown. If sustained combustion occurs, perform Engine Clearing procedure checklist. During shutdown, ensure the compressors decelerate freely. Do not close the fuel firewall shutoff valves for normal engine shutdown.

Condition Levers . . . . FUEL CUTOFF

Monitor ITT. Check for normal spool-down.

Propeller Levers . . . . FEATHER

Ensure propeller control operation. Listen for normal spool-down.

DC Volts/Loadmeters . . . . CHECK VOLTAGE

Voltmeters PRESS FOR VOLTS. No voltage indicates current limiter is out.

Overhead Panel Switches . . . . OFF

Oxygen System Ready . . . . PUSH OFF

Battery/Generator Switches . . . . . OFF BELOW 15% N_1

Control Locks . . . . INSTALLED

CAUTION: Towing the aircraft with a tug while control locks are installed can seriously damage the steering linkage.

CAUTION: Do not tow or taxi aircraft if gear shock struts are deflated.

Emergency Kit . . . . LOCKED

Electric Toilet . . . . SERVICED AS REQUIRED

Tiedowns/Chocks . . . . AS REQUIRED

CAUTION: High velocity winds can cause structural damage. When winds above 75 knots are expected, move the aircraft to a safe area. Hangar if possible.

External Covers . . . . AS REQUIRED

Propeller Locks . . . . AS REQUIRED

Oil Quantity Check . . . . AS REQUIRED

Traffic Pattern Checklist

After Landing/Taxiback

Auto Ignition . . . . OFF

Ice Protection . . . . AS REQUIRED

Flaps . . . . AS REQUIRED

Trims . . . . SET

Before Takeoff

Crew Briefing . . . . COMPLETED

Radios . . . . SET

Altitude Alerter . . . . SET (RH)

Flight Director . . . . SET

Flaps . . . . CHECKED (RH)

Trim . . . . CHECKED

Final Items:

Headings . . . . CHECKED

Auto Ignition . . . . ARMED

Ice Protection . . . . AS REQUIRED

Takeoff

Ignition Lights . . . . OFF (RH)

Autofeather Lights . . . . ON (RH)

Power . . . . SET (RH)

Engine Instruments . . . . CHECKED (RH)

Climb

Gear . . . . UP (RH)

Flaps . . . . UP (RH)

Landing/Taxi Lights . . . . **OFF**

Yaw Damper . . . . **ON (RH)**

Power . . . . **SET**

Approach

Crew Briefing . . . . **COMPLETED**

Altimeters . . . . **SET/CHECKED**

Autofeather . . . . **ARMED**

Flaps . . . . **APPROACH (RH)**

Before Landing

Landing Gear . . . . **DOWN (RH)/3 GREEN (BOTH)**

Landing/Taxi Lights . . . . **ON**

Final Items:

- Flaps . . . . AS REQUIRED
- Yaw Damper . . . . OFF
- Propellers . . . . FORWARD AT TOUCHDOWN (RH)

After Clearing Runway

Auto Ignition . . . . **OFF**

Engine Ice Vanes . . . . **EXTENDED**

Landing/Taxi Lights . . . . **AS REQUIRED**

Recognition/Strobe Lights . . . . **OFF**

Anti-Ice . . . . **OFF**

Trims . . . . **RESET (RH)**

Flaps . . . . **UP (RH)**

Radar/Transponder . . . . **STANDBY**

After Clearing Runway Checklist . . . . **COMPLETED**

Towing

Tow Bar . . . . CONNECTED

The tow bar connects to the upper torque knee fitting of the nose strut. Refer to **Figure 2B-1** for aircraft turning radius.

Control Locks . . . . REMOVED

Aircraft Steering . . . . BY HAND UNLESS CONNECTED TO TUG

Although the tug controls aircraft steering, someone should be in the pilot seat to operate the brakes in case of an emergency. Do not use propellers or control surfaces to push or move the aircraft.

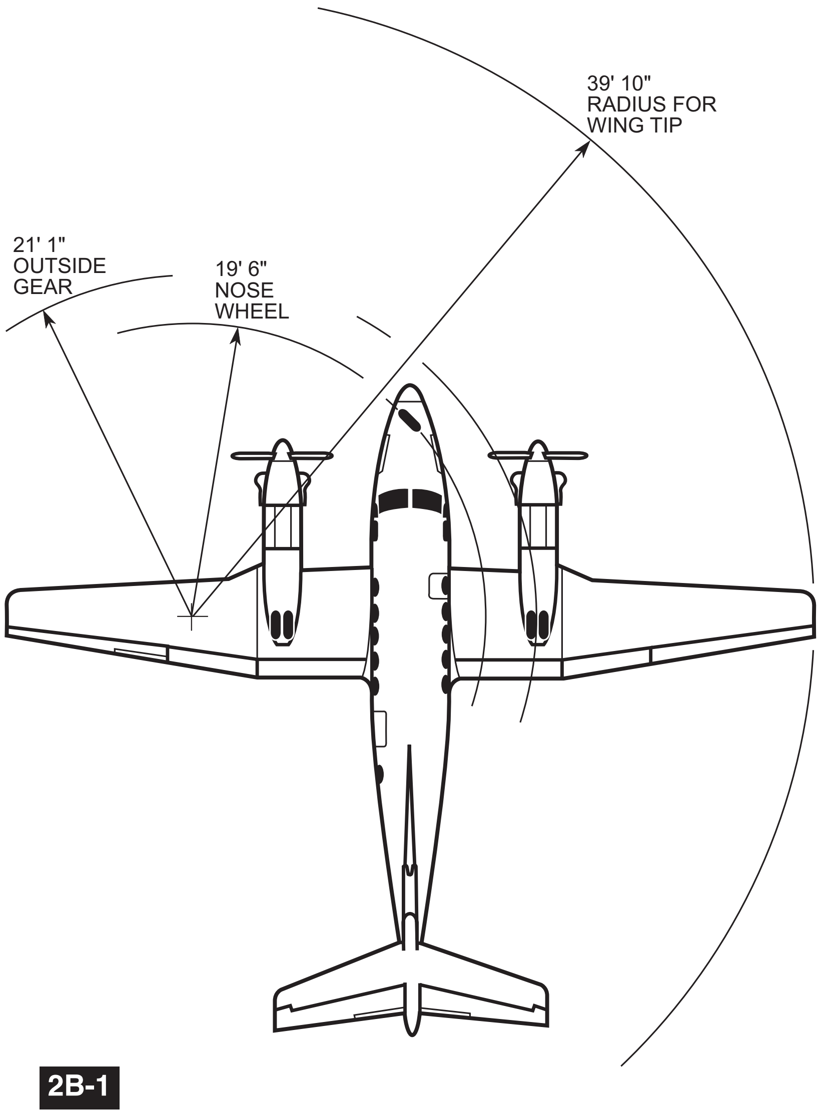
Exceeding the turn limit damages the nose gear and linkage. Maximum nosewheel turn angle is 48° left and right.

CAUTION: Towing the aircraft with a tug while control locks are installed can seriously damaged the steering linkage.

CAUTION: Do not tow or taxi aircraft if gear shock struts are deflated.

Towing Checklist . . . . COMPLETED

Aircraft Turning Radius



Mooring

Wheel Chocks . . . . INSTALL

Tie-downs . . . . SECURE

Secure tie-downs to three mooring eyes, one under each wing and one in the ventral fin.

Prop Restraints/Covers/Control Locks . . . . SECURE

The propeller may windmill even in light winds; a windmilling propeller is a safety hazard. Prolonged windmilling at zero oil pressure can damage bearings.

Secure the propeller with one blade down when mooring to allow moisture to drain from spinner.

CAUTION: High velocity winds can cause structural damage. When winds above 75 knots are expected, move the aircraft to a safe area; hangar it if possible.

NOTE: Do not set parking brakes during low temperatures when an accumulation of moisture may cause the brakes to freeze. Do not set brakes when they are hot from severe use.

Cabin Door Annunciator Circuitry Check (B200)

Battery Switch . . . . ON

Door . . . . OPEN/MECHANISM LOCKED

CABIN DOOR annunciator illuminates.

Door . . . . CLOSED AND LATCHED/NOT LOCKED

CABIN DOOR annunciator remains illuminated.

Door . . . . CLOSED AND LOCKED

Verify CABIN DOOR annunciator extinguishes.

Battery Switch . . . . OFF

Cabin/Cargo Door Annunciator Circuitry Check (B200C)

Battery Switch . . . . OFF

Cargo Door . . . . CLOSED AND LOCKED

Cabin Door . . . . CLOSED BUT NOT LOCKED

Verify that CABIN DOOR annunciator illuminates.

Cabin Door . . . . OPEN

Verify CABIN DOOR annunciator extinguishes.

Battery Switch . . . . ON

Cabin Door . . . . OPEN

Check that CABIN DOOR annunciator illuminates.

Cabin Door . . . . CLOSED AND LOCKED

Verify CABIN DOOR annunciator extinguishes.

Heating/Cooling System

Bleed Air Valves . . . . OPEN OR ENVIR OFF

Use ENVIR OFF for more efficient cooling on the ground.

Cabin Temperature Mode . . . . AUTO

Vent Blower . . . . AUTO

Radiant Heat or Aft Blower . . . . AS REQUIRED

Radiant heat should only be used with cabin temperature mode in manual.

Temperature Control . . . . AS REQUIRED

Cabin Air Control . . . . AS REQUIRED

NOTE: With the cabin temperature mode switch in AUTO, MAN HEAT, or MAN COOL, the ventilation blower operates at low speed. Placing the vent blower switch in HIGH increases air circulation. To obtain maximum cooling, place the ventilation blower in HIGH and the aft blower (if installed) ON. With air conditioning on, maintain the right engine at 60% N_1 or higher. If below minimum N_1 speed, the AIR COND N_1 LOW annunciator illuminates and the air conditioning clutch disengages. For maximum heating, the ventilation blowers should be in HIGH and the aft blower OFF.

Radiant Heat

Overhead radiant heat can be used in conjunction with an ground power unit to warm the cabin before engine starting. Radiant heat also provides supplemental in flight heating.

Defroster Air

Windshield Defroster Air Control . . . . PULL ON

Pilot, Copilot, and Cabin Air Controls . . . . OFF

Turn these controls OFF if increased defroster airflow is required.

Ni-Cad Battery Check

The BATTERY CHARGE annunciators illuminate when there is an above normal battery charging current. After engine start, battery charge current is high and the BATTERY CHARGE annunciators illuminate.

Either Generator . . . . OFF

DC Voltage . . . . 28 VOLTS

Battery Switch . . . . OFF MOMENTARILY/ NOTE LOADMETER DECREASE

If loadmeter decrease exceeds 2.5%:

Battery . . . . CONTINUE CHARGING

Battery Switch . . . . OFF MOMENTARILY/ NOTE LOADMETER DECREASE

Repeat every 90 seconds while noting decrease in loadmeter.

BATTERY CHARGE Annunciator . . . EXTINGUISHES WHEN LOADMETER DECREASE IS LESS THAN 2.5%

Sample Passenger Briefing

Welcome aboard. Our estimated time of arrival at __________ is ____________. We will be climbing to ____________. Enroute, weather is _____________.

Please ensure your seat belts are fastened during takeoff and landing. Please comply with the No Smoking and Seat Belt signs. We recommend for your comfort and safety that you fasten your seat belt anytime you are seated. Your aircraft has two exits: the main exit to the rear on the left side and a forward emergency exit on the right side. Operating instructions are on the exits as well as on the information card in your seat back pocket.

In the unlikely event we should lose pressurization, an oxygen mask will automatically be released from the overhead compartment. Place the mask over your mouth and nose. Breathe normally. Ensure the line attached to your mask has pulled the key that allows oxygen to flow to the mask.

Any crew member will be happy to assist you with any questions about the safety equipment as well as the beverage and snacks available for this flight.

Thank you for flying with us. Enjoy your flight.

Cold Weather Operation

Refer to the respective aircraft's Maintenance Manual for deicing and anti-icing solutions and procedures.

Preflight Inspection

Snow and ice on an airplane can seriously affect performance. Wing contour may be sufficiently altered by snow and ice accumulation where it affects wing lift qualities. Remove snow with a soft brush or mop. Do not remove snow and ice accumulations by chipping or mechanical means. Use of glycol-based deicing fluids is recommended. Deicing/anti-icing fluids conforming to specification MIL-A-8243 are recommended by the airframe manufacturer.

NOTE: Deicing/anti-icing fluid type and concentration and precipitation rate affect the effective treatment time. Refer to the applicable aircraft Maintenance Manual for recommended solutions and procedures for the removal of ice, snow, and frost.

In addition to the normal preflight inspection items, the following should be inspected during cold weather operations.

All Surfaces . . . . CLEAR OF SNOW AND ICE

Verify all surfaces are clear of snow and ice. Pay particular attention to the wings, horizontal stabilizer, and vertical stabilizer. Snow and ice accumulation can seriously affect aircraft performance.

Tires and Brakes . . . . CHECK FOR FREEZE-UP

If tire freeze-up occurs, anti-ice solutions may be used on the tires or brakes. Do not use anti-ice solutions that contain lubricants such as oil. Use of these solutions will decrease brake effectiveness.

Vents . . . . CLEAR

Pay particular attention to all vents, exhausts, and other openings. Remove accumulated snow or ice from these areas.

Control Surfaces and Hinges . . . . . . CLEAR OF SNOW/ FREEDOM OF MOVEMENT

Inspect all control surfaces and hinge areas for accumulated snow or ice. Control surfaces should move freely with no signs of binding. A thorough check of all flight controls should be made for complete freedom of movement.

Propellers and Hubs . . . . CLEAN/FREE TO ROTATE

Propeller blades and hubs should be free of ice. If engine inlet covers were not used during snow and freezing rain conditions, rotate the propellers by hand in the normal direction to ensure freedom of movement before engine start. After engine start exercise the propellers through low and high pitch, beta range, and into reverse range to flush any congealed oil through the system.

Taxi

Brake Deice System . . . . ON

If the optional brake deice system is installed, turn it on for taxiing, landing in snow, slush, or freezing rain.

Taxiing . . . . AVOID DEEP SNOW AND SLUSH

Avoid taxiing the aircraft in deep snow and slush to prevent forcing snow and slush into the brake assemblies and subsequent brake freezing.

Ground Speed . . . . SLOW

Taxi slowly to compensate for possible decreased braking action. Allow more clearance when maneuvering.

Flaps . . . . RETRACT

Taxi with the flaps retracted to prevent snow and slush thrown up by the wheels entering the flap mechanism. Thrown snow and slush can also damage the flaps' lower surfaces.

Before Takeoff . . . . CHECK FOR HAZARDS

Ensure the runway is clear of hazards such as snow drifts, glazed ice, and ruts.

Takeoff and Flight

Takeoff Distance . . . . . ALLOW ADDITIONAL DISTANCE

When using a runway covered with snow or slush, increase takeoff distance.

Landing Gear . . . . CYCLE AT 500 FT AGL

At 500 ft AGL, cycle the landing gear to dislodge moisture on the landing gear retraction components.

Ice Vanes . . . . EXTEND

When flying through visible moisture during takeoff, extend the inertial ice vanes to prevent engine ice ingestion.

Icing – AD 96-09-13 & AD 98-20-38

Severe icing may result from environmental conditions outside of those for which the airplane is certificated. Flight in freezing rain, freezing drizzle, or mixed icing conditions (supercooled liquid water and ice crystals) may result in ice build-up on protected surfaces exceeding the capability of the ice protection system, or may result in ice forming aft of the protected surfaces. This ice may not be shed using the ice protection systems, and may seriously degrade the performance and controllability of the airplane.

During flight, severe icing conditions that exceed those for which the airplane is certificated shall be determined by the following visual cues. If one or more of these visual cues exists, immediately request priority handling from Air Traffic Control to facilitate a route or an altitude change to exit the icing conditions.

- Unusually extensive ice accretated on the airframe in areas not normally observed to collect ice.
- Accumulation of ice on the upper surface of the wing aft of the protected area.
- Accumulation of ice on the propeller spinner farther aft than normally observed.

Since the autopilot may mask tactile cues that indicate adverse changes in handling characteristics, use of the autopilot is prohibited when any of the visual cues specified above exist, or when unusual lateral trim requirements or autopilot trim warnings are encountered while the airplane is in icing conditions.

All icing detection lights must be operative prior to flight into icing conditions at night (this supersedes any relief provided by the Master Minimum Equipment List [MMEL]).

The following weather conditions may be conducive to severe in-flight icing:

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

Procedures for Exiting the Severe Icing Environment

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

- Immediately request priority handling from Air Traffic Control to facilitate a route or an altitude change to exit the severe icing conditions in order to avoid extended exposure to flight conditions more severe than those for which the airplane is certificated.
- Avoid abrupt and excessive maneuvering that may exacerbate control difficulties.
- Do not engage the autopilot.
- If the autopilot is engaged, hold the control wheel firmly and disengage the autopilot.
- If an unusual roll response or uncommanded roll control movement is observed, reduce the angle-of-attack.
- Do not extend flaps during extended operation in icing conditions. Operation with flaps extended can result in a reduced wing angle-of-attack, with the possibility of ice forming on the upper surface farther aft on the wing than normal, possibly aft of the protected area.
- If the flaps are extended, do not retract them until the airframe is clear of ice.
- Report these weather conditions to Air Traffic Control.

Icing Flight – King Air 200

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

CAUTION: Due to distortion of the wing airfoil, stalling speeds should be expected to increase as ice accumulates. For the same reason, stall warning systems are not accurate and should not be relied on. Maintain a comfortable airspeed margin above normal stall speed when ice is on the aircraft. Maintain a minimum of 140 kts airspeed during operation in sustained icing conditions to prevent ice accumulation on unprotected surfaces. If windshield icing occurs, reduce airspeed to 226 kts or below.

Before Takeoff

Surface Deice System . . . . CHECK

DEICE Switch . . . . SINGLE THEN MANUAL

Deice Pressure Gage . . . . CHECK

Deice Boots . . . . VERIFY INFLATION

Wing deice boot inflation occurs for six seconds followed by the horizontal stabilizer boot for four seconds.

Brake Deice . . . . OFF

Engine Anti-Ice . . . . CHECK

Engine RPM . . . . 1,800 RPM

Ice Vanes . . . . EXTEND

Torque Indication . . . . NOTE DROP

Ice Vane Annunciators . . . . MONITOR

Ice Vanes . . . . RETRACT

Torque Indication . . . . NOTE INCREASE

Engine RPM . . . . REDUCE TO IDLE

Electrothermal Propeller Deice . . . . CHECK

Automatic Propeller Deice Switch . . . . AUTO

CAUTION: Do not operate propeller deice when the propellers are static.

Deice Ammeter . . . . 14 TO 18 AMPERES/MONITOR FOR ONE MINUTE

Monitor the deice ammeter for one minute to verify automatic timer operation.

On **S/Ns BB-2, 6 to 815, 817 to 824; BL-1 to BL-29**:

Manual Propeller Deice Switch . . . MOMENTARILY HOLD IN OUTER POSITION FOR 30 SECONDS THEN INNER POSITION FOR 30 SECONDS

On **S/Ns BB-816, 825 and subsequent; BL-30 and subsequent**:

Manual Propeller Deice Switch . . . . HOLD IN MANUAL POSITION FOR 90 SECONDS

Automatic Propeller Deice Switch . . . . OFF

> **NOTE:** Use of current for the manual (backup) system is not registered on the propeller deice ammeter. However, it will be indicated as part of the airplane's load on the loadmeter (small needle deflection) when the system is switched on.

In Flight

Surface Deice System . . . . SINGLE WITH ICE ACCUMULATION

When 1/2 to 1 inch of ice accumulates, place the surface deice switch in the SINGLE position. Either engine supplies sufficient air pressure for deice operation. If SINGLE position operation fails, use switch MANUAL position.

Engine Anti-Ice . . . . ON

Ice Vanes . . . . EXTEND

Extend ice vanes before visible moisture encountered at ambient temperatures of +5°C and below or at night when freedom from visible moisture is not assured and temperature is +5°C and below.

Yellow ICE VANE Annunciators . . . . NOT ILLUMINATED

If either engine's ice vane does not reach the selected position within 15 seconds, the respective L/R ICE VANE light will illuminate. Refer to Engine Ice Vane Failure procedure in the AFM or SimuFlite Operating Handbook.

Engine Torque . . . . INCREASE IF NECESSARY

If necessary, advance power levers to compensate for loss of engine torque with ice vane extension. Monitor engine ITT to prevent exceeding operating limitations.

> **CAUTION:** If in doubt, extend ice vanes. Engine icing can occur even though no surface icing is present. If freedom from visible moisture cannot be assured and ambient temperature is +5°C or below, activate engine anti-icing systems. Visible moisture is moisture in any form such as clouds, ice crystals, snow, rain, sleet, hail, or a combination of these. Ice vanes should be retracted at +15°C and above to ensure adequate engine oil cooling. Operation of strobe lights will sometimes show ice crystals not normally visible. Ambient temperatures can be as much as 10 to 15° colder than indicated outside air temperature.

Electrothermal Propeller Deice . . . . AUTO

Place the automatic propeller deice switch in the AUTO position. Continuous operation is permissible and the system will continue to operate until switch placed in OFF position. Relieve propeller imbalance by increasing RPM briefly. Repeat as necessary.

> **CAUTION:** If propeller deice ammeter fails to indicate 14 to 18 amperes (18 to 24 amperes for four-bladed propellers) or automatic timer fails, refer to AFM Emergency Procedures.

Fuel Vent Heat . . . . ON

Pitot Heat . . . . ON

Stall Warning Heat . . . . ON

Windshield Anti-Ice . . . . AS REQUIRED BEFORE ICE FORMS

Wing Ice Lights . . . . AS REQUIRED

Alternate Static Air Source . . . REFER TO EMERGENCY PROCEDURES IN AFM

Icing Flight – King Air B200

The Beechcraft King Super King Air B200 is approved for flight in icing conditions as defined by FAR 25, Appendix C. These conditions do not include, nor were tests conducted in, all conditions that may be encountered such as freezing drizzle, mixed conditions, or conditions defined as severe.

Some icing conditions not defined in FAR 25 have the potential of producing hazardous ice accumulations that exceed the capabilities of the aircraft's ice protection capabilities and/or create unacceptable aircraft performance. Flight into icing conditions that lie outside the FAR-defined conditions is not prohibited. However, pilots must be prepared to promptly divert the flight if hazardous ice accumulations occur.

Refer to Aircraft Flight Manual (AFM) Section II for icing flight limitations. Also refer to AFM Section IIIA for abnormal procedures involving ice protection equipment and operations outside the FAR 25, Appendix C icing envelope.

WARNING: Due to distortion of the wing airfoil, ice accumulations on the leading edges can cause a significant loss of rate-of-climb and speed performance as well as increases in stall speed. Even after cycling deicing boots, the ice accumulation remaining on the boots and unprotected areas of the airplane can cause large performance losses. For the same reason, the aural stall warning system may not be accurate and should not be relied on. Maintain a comfortable airspeed margin above normal stall speed. In order to minimize ice accumulation on unprotected wing surfaces, maintain a minimum of 140 kts during operation in sustained icing conditions. If windshield icing occurs, reduce airspeed to 226 kts or below. Before landing approach, cycle the deicing boots to shed any accumulated ice.

Before Takeoff (Runup)

Auto Ignition . . . . CHECK

Power Levers . . . . IDLE

Auto Ignition . . . . ARM

L/R IGNITION ON lights illuminate.

Power Levers . . . . ADVANCE TO OBTAIN ABOVE 360 TO 460 FT-LBS TORQUE

L/R IGNITION ON lights extinguish.

Power Levers . . . . IDLE

Engine Ice Vanes . . . . CHECK

Engine Ice Vanes . . . . RETRACT

Engine Ice Vanes . . . . EXTEND

Windshield Anti-Ice . . . . CHECK

Windshield Anti-Ice . . . . HI

Observe increase on left and right loadmeters.

Windshield Anti-Ice . . . . OFF THEN NORMAL

Observe increase on left and right loadmeters.

Windshield Anti-Ice . . . . OFF

Electrothermal Propeller Deice . . . . CHECK

> **CAUTION:** Do not operate propeller deice when the propellers are static.

Automatic Prop Deice . . . . AUTO

Deice Ammeter . . . . 14 TO 18 AMPS

Monitor ammeter for 90 seconds to ensure automatic timer operation.

On **S/Ns before BB-829**:

Manual Propeller Deice Switch . . MOMENTARILY HOLD IN INNER POSITION THEN OUTER

On **S/Ns 829 and subsequent; BL-37 and subsequent**:

Manual Propeller Deice Switch . . MOMENTARILY HOLD IN MANUAL POSITION

Use of current for the manual (backup) system is not registered on the propeller deice ammeter, however it will be indicated as part of the airplane's load on the loadmeters (small needle deflection) when the system is switched on.

Automatic Propeller Deice Switch . . . . OFF

Surface Deice System . . . . CHECK

Condition Levers . . . . HIGH IDLE

Pneumatic Pressure . . . . CHECK

Surface Deice Switch . . . . . . SINGLE THEN RELEASE

Pneumatic Pressure . . . . . MOMENTARY DECREASE

Deice Boots . . . . . . VISUALLY CHECK OPERATION

Wing deice boots inflate for 6 seconds followed by horizontal stabilizer boot inflation for 4 seconds.

Surface Deice Switch . . . . HOLD IN MANUAL

Pneumatic Pressure . . . . . MOMENTARY DECREASE

Deice Boots . . . . . . VISUALLY CHECK OPERATION

Surface Deice Switch . . . . RELEASE

Visually check that deice boots deflate and remain deflated.

Condition Levers . . . . LOW IDLE

WARNING: Do not cycle boots during takeoff.

Stall Warning and Pitot Heat . . . . CHECK

CAUTION: Prolonged use of stall warning and pitot heat on the ground will damage the heating elements.

In Flight

Engine Ice Protection . . . . ON

Before visible moisture is encountered or at night when freedom from visible moisture is not assured and ambient temperature is +5°C or below. Operation of strobe lights will sometimes show ice crystals not normally visible.

Engine Ice Vanes . . . . EXTEND

L/R ICE VANE EXT lights illuminate.

Engine Ice Protection Operation . . . . . . CHECK/ NOTE TORQUE DROP

If either engine's ice vane does not reach the selected position within 15 seconds, the respective L/R ICE VANE light will illuminate. Refer to Engine Ice Vane Failure procedure in the AFM or SimuFlite Operating Handbook.

WARNING: If in doubt, extend ice vanes. Engine icing can occur even though no surface icing is present. If freedom from visible moisture cannot be assured and ambient temperature is +5°C or below, activate engine anti-icing systems. Visible moisture is moisture in any form such as clouds, ice crystals, snow, rain, sleet, hail, or a combination of these. Operation of strobe lights will sometimes show ice crystals not normally visible. Ambient temperatures can be as much as 10 to 15° colder than indicated outside air temperature.

Auto Ignition . . . . ARM

Auto ignition must be ARMED for icing flight, precipitation, and operation during turbulence. To prevent prolonged operation of the ignitors with the system ARMED, do not reduce power levers below 500 ft-lbs torque.

Electrothermal Propeller Deice . . . . AUTO

The system may be operated continuously in flight and will function automatically until the switch is turned off.

Increasing engine RPM briefly relieves propeller imbalance caused by ice accumulation. Repeat as necessary.

> **CAUTION:** If the deice ammeter does not indicate 14 to 18 amps (18 to 24 amperes on four-bladed propellers) or the automatic timer fails to switch, refer to the AFM Abnormal Procedures or SimuFlite Operating Handbook.

Surface Deice . . . . SINGLE/MANUAL

When 1/2 to 1 inch of ice accumulates:

Surface Deice Switch . . . . . . SINGLE THEN RELEASE

Repeat as necessary.

If surface deice switch SINGLE position fails:

Surface Deice Switch . . . . HOLD IN MANUAL FOR SIX SECONDS THEN RELEASE

Repeat as necessary.

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

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

Windshield Anti-Ice . . . . NORMAL/HI

Maximum airspeed for effective windshield anti-icing is 226 kts.

Left/Right Fuel Vent Heat . . . . ON

Left/Right Pitot Heat . . . . ON

Stall Warning Heat . . . . ON

Ice Lights . . . . AS REQUIRED

Alternate Static Air Source . . . . AS REQUIRED

Before Landing

Surface Deice Switch . . . . SINGLE THEN RELEASE

Before landing approach cycle the wing deice boots to shed as much residual ice as possible regardless of the amount of ice remaining on the boots. Stall speeds can be expected to increase if ice is not shed from the deice boots.

Approach Speeds . . . . INCREASES IF RESIDUAL ICE REMAINS

Landing Distance . . . . INCREASES IF APPROACH SPEED INCREASES

Landing/Taxi Lights . . . . OFF

Yaw Damper . . . . ON (RH)

Power . . . . SET

Approach

Crew Briefing . . . . COMPLETED

Altimeters . . . . SET/CHECKED

Autofeather . . . . ARMED

Flaps . . . . APPROACH (RH)

Before Landing

Landing Gear . . . . DOWN (RH)/3 GREEN (BOTH)

Landing/Taxi Lights . . . . ON

Final Items:

Flaps . . . . AS REQUIRED

Yaw Damper . . . . OFF

Propellers . . . . FORWARD AT TOUCHDOWN (RH)

After Clearing Runway

Auto Ignition . . . . OFF

Engine Ice Vanes . . . . EXTENDED

Landing/Taxi Lights . . . . AS REQUIRED

Recognition/Strobe Lights . . . . OFF

Anti-Ice . . . . OFF

Trims . . . . RESET (RH)

Flaps . . . . UP (RH)

Radar/Transponder . . . . STANDBY

After Clearing Runway Checklist . . . . COMPLETED

Standard Operating Procedures

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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 King Air 200 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 to understand the aircraft systems/controls and to methodically accomplish the flow pattern.

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 the 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 – IDLE; Left Boost Pump – OFF").

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.

Aborted Takeoffs

The aborted takeoff 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.

In addition to the above, the PF usually executes an abort prior to 65 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.

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.

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

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 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 pitch or bank 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:

- Assigned Runway for Takeoff
- 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
- Instrument Departures Procedures
- MEL
- Abort

Holding Short (continued)

PF	PNF
Cleared for Takeoff	
	ACTION: Confirm Assigned Runway for Takeoff and Check Heading Indicator Agreement **CALL:** "Assigned Runway Confirmed, Heading Checked"
ACTION: Confirm Assigned Runway for Takeoff and Check Heading Indicator Agreement **CALL:** "Assigned Runway Confirmed, Heading Checked" **CALL:** "Takeoff Checklist"	
	ACTION: Complete Takeoff Checklist **CALL:** "Takeoff Checklist Complete

Takeoff Roll

PF	PNF
Setting Takeoff Power	
ACTION ”Set Power.”	
	CALL “Ignition lights off.”
	CALL “Autofeather lights on.”
	“Power set.”
Initial Airspeed Indication	
	CALL “Airspeed alive.”
At 65 KIAS	
	CALL “65 knots; power set.”
At V_1/V_R	
ACTION Move hand from throttles to yoke.	**CALL** “Rotate.”
ACTION Rotate to approximately 7° pitch attitude for take-off.	

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.

Climb (continued)

PF		PNF	
At V_{YSE} and 400 Ft Above Airport Surface (Minimum)			
		CALL	"V_{YSE}."
CALL	"FLAPS UP." (if selected)	CALL	"Flaps selected up." When flaps indicate up, "Flaps indicate up."
At 3,000 Ft Above Airport Surface and Clear of Traffic			
CALL	"Climb power."		
		ACTION	Set climb power
		CALL	"Climb power set."
CALL	"Climb checklist."		
		ACTION	Complete Climb checklist.
At Transition Altitude			
ACTION	Turn recognition lights off.		
CALL	"29.92 set."	**CALL**	"29.92 set."
		CALL	"Climb checklist complete."

Cruise

PF	PNF
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.")	
After Level Off and Acceleration	
CALL "Cruise checklist."	
	ACTION Complete Cruise checklist.
	CALL "Cruise checklist complete."
Altitude Deviation in Excess of 100 Ft	
	CALL "Altitude."
CALL "Correcting."	
Course Deviation in Excess of One Half Dot	
	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	
	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	
CALL "Altimeter set ____ "	**CALL** "Altimeter set ____ ."
	CALL "Transition Level checklist complete."
At 10,000 Ft	
	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

PF	PNF
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 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	
CALL "Approach checklist."	
	ACTION Complete Approach checklist.
	CALL "Approach checklist complete."
CALL "Flaps APPROACH."	
	CALL "Flaps APPROACH." When flaps indicate APPROACH,"Flaps indicate APPROACH."
At Initial Convergence of Course Deviation Bar	
CALL "Localizer/course alive."	**CALL** "Localizer/course alive."
At Initial Downward Movement of Glideslope Raw Data Indicator	
CALL "Glideslope alive."	**CALL** "Glideslope alive."
When Annunciators Indicate Localizer Capture	
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."

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 final 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)	
	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})
- no flight instrument flags with the landing runway or visual references not in sight
- landing configuration, except for full flaps (circling 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.

PF	PNF
At 200 Ft Above DA(H)	
	CALL "200 ft to minimums."
CALL "Check."	
At 100 Ft Above DA(H)	
	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."		
		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. Set flaps DOWN."		
		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.
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 Missed Approach (continued)

PF	PNF
At V_{YSE} 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."

Precision Approach Deviations

PF	PNF
± One Half Dot – Glideslope	
	CALL "One half dot (high, low) and (increasing, holding, decreasing)."
CALL "Correcting."	
± One Half Dot – 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 to flaps.
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.

Non-Precision Approach (continued)

PF	PNF
At FAF	
CALL "Outer marker." or "Final fix."	**CALL** "Outer marker." or "Final fix."
	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

PF	PNF
	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})
- 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 MDA

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

At 100 Ft Above MDA

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

Non-Precision Approach (continued)

PF	PNF
At MDA	
	CALL "Minimums. ____ (time) to go." or "Minimums. ____ (distance) to go."
CALL "Autopliot Engaged." (as required)	
	ACTION "Engage Autopilot
At Point Where PNF Sights Runway or Visual References	
	CALL "Runway (or visual reference) ____ o'clock."
CALL "Going visual. Land."	
CALL "Flaps DOWN." (or as briefed)	
	CALL "Flaps selected DOWN." When flaps indicate DOWN, "Flaps indicate DOWN."

If Missed Approach, (Non-Precision Missed Approach) follows on next page.

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.
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_{YSE} 400 Ft Above Airport Surface (Minimum)

PF		PNF	
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

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

Non-Precision Approach Deviations

PF	PNF

± One Half Dot – Localizer/VOR

PF	PNF
	CALL "One half dot (high, low) and (increasing, holding, decreasing)."
CALL "Correcting."	

± 5° At or Beyond Midpoint for NDB Approach

PF	PNF
	CALL "____ (degrees off course) (right, left) and (increasing, holding, decreasing)."
CALL "Correcting."	

V_{AP} ± _____

PF	PNF
	CALL "Speed (plus or minus) ____ (knots) and (increasing, holding, decreasing)."
CALL "Correcting."	

At or Below V_{REF}

PF	PNF
	CALL "V_{REF}." or "V_{REF} minus (knots below V_{REF})."
CALL "Correcting."	

Descent is ±200 FPM of Briefed Rate

PF	PNF
	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 to flaps.
		CALL	"Holding flaps."
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.

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."	
CALL "Flaps DOWN."	
	CALL "Flaps selected DOWN." When flaps indicate DOWN, "Flaps indicate DOWN."

Landing

PF		PNF	
At Point on Approach When PF Sights Runway or Visual Reference (Landing Assured)			
CALL	"Going visual. Land. Flaps – DOWN."		
		CALL	"Flaps selected DOWN." When flaps indicate DOWN, "Flaps indicate DOWN."
ACTION	Push autopilot and trim disconnect switch to first level.	**ACTION**	Continue with: ▪ speed check ▪ vertical speed check ▪ callouts ▪ gear down verification ▪ flap verification ▪ autopilot/yaw damper off.
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."

Landing (continued)

PF	PNF
At Touchdown	
	ACTION Move propeller levers full forward.
	CALL "Props full."
ACTION Move power levers to Beta or reverse, as required.	
At Propeller Reverse Minimum Speed (40 KIAS)	
	CALL "40 kts."
ACTION Move power levers out of reverse	

Maneuvers

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King Air Power Settings

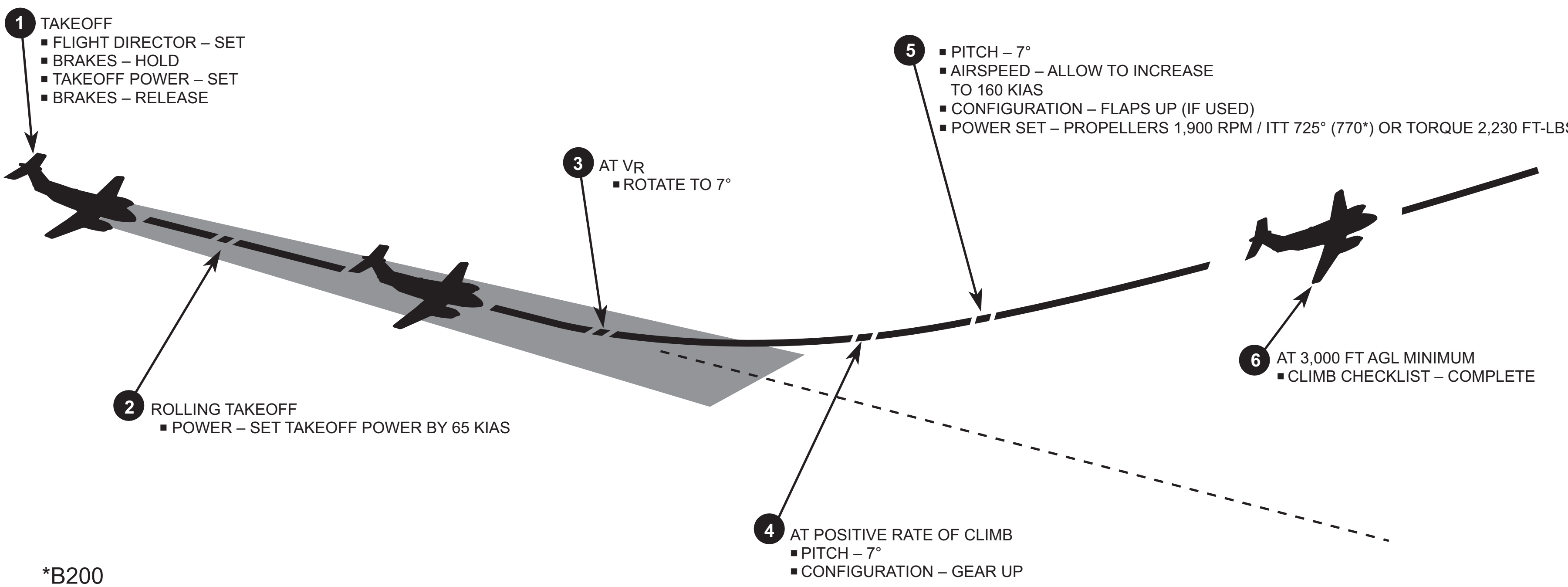
Power settings used in this chapter work in the aircraft as well as in the simulator. Speed varies slightly with attitudes, weight, OAT and individual aircraft. The 100# torque adjustment rule works in the speed ranges used in this chapter.

100# Torque = 150 FPM or 10 Knots

Two Engines	AIRSPEED	TORQUE	RPM	GEAR	FLAPS
Approach Area High Speed	150	700	1700	UP	0
Approach Area Low Speed	130	700	1700	UP	40%
ILS ñ OM Inbound (Gear @ G/S 650 FPM)	130	700	1700	DOWN	40%
Non-Precision FAF Inbound (Gear @ FAF 800/1000 FPM)	130	400	1700	DOWN	40%
Steep Turns	180	1100	1700	UP	0
Circle to Land/ MDA	130	1000	1700	DOWN	40%

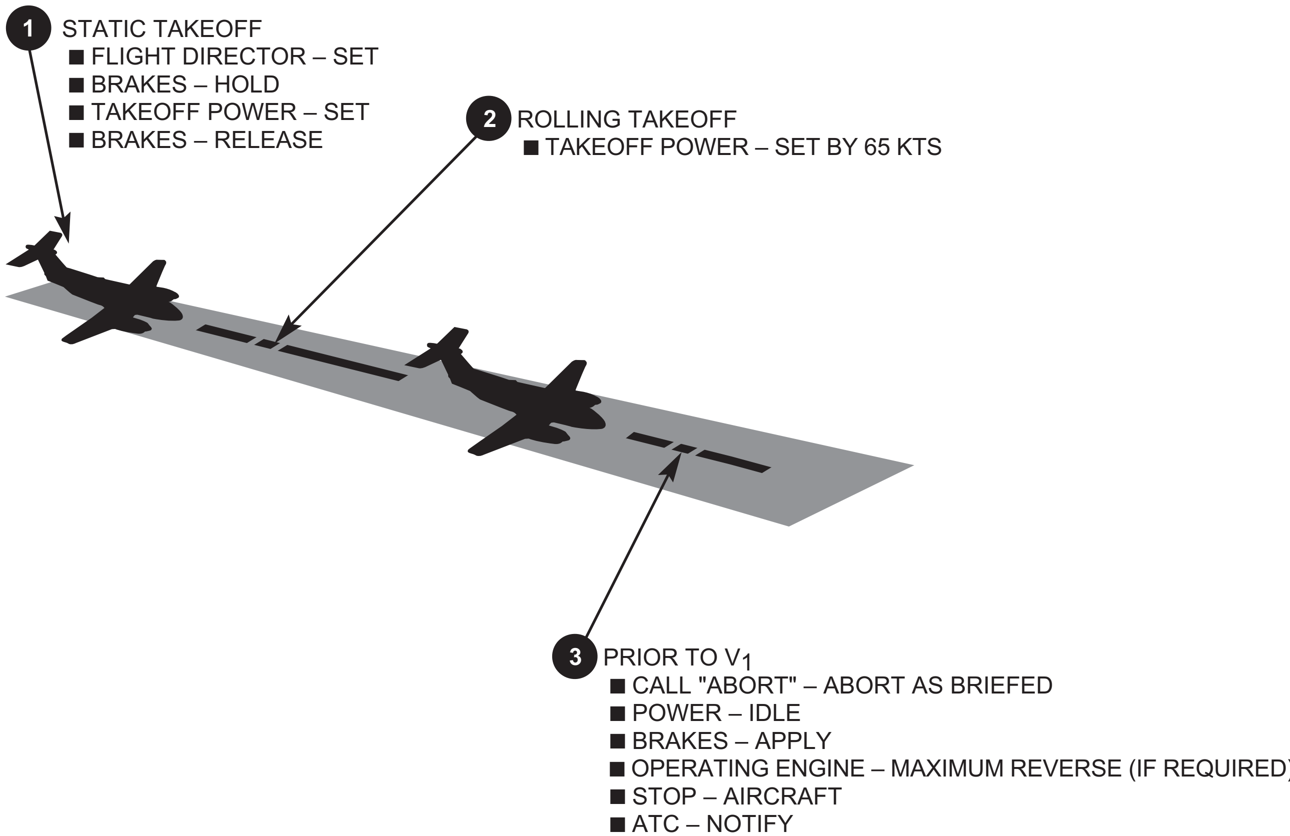
Single Engine	AIRSPEED	TORQUE	RPM	GEAR	FLAPS
Approach Area High Speed	150	1300	2000	UP	0
Approach Area Low Speed	130	1300	2000	UP	40%
ILS ñ OM Inbound (Gear @ G/S 650 FPM)	130	1300	2000	DOWN	40%
Non-Precision FAF Inbound (Gear @ FAF 800/1000 FPM)	130	1000	2000	DOWN	40%
Circle to Land/ MDA	130	1800	2000	DOWN	40%

Normal Takeoff

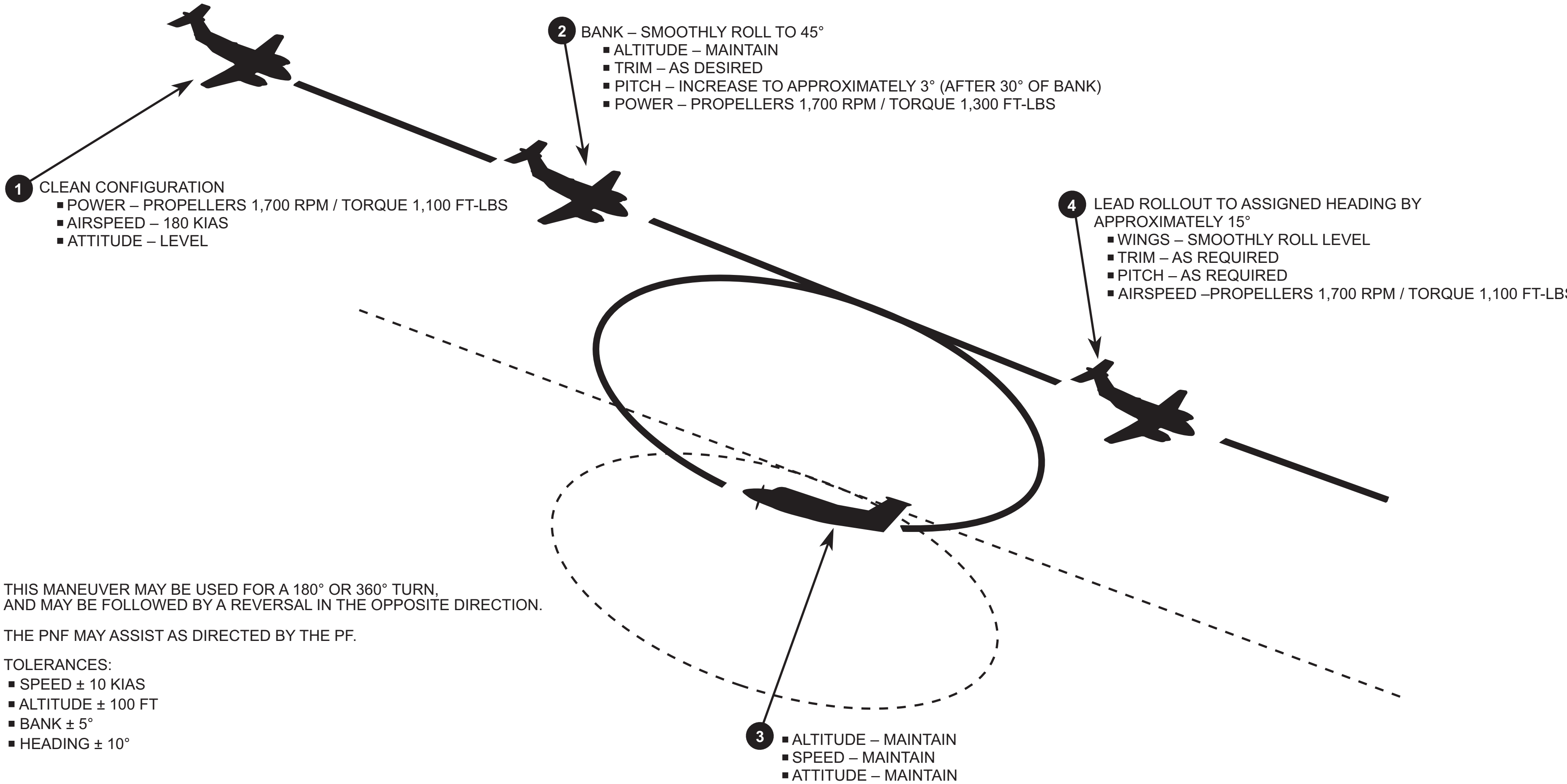


*B200

Rejected Takeoff



Steep Turns



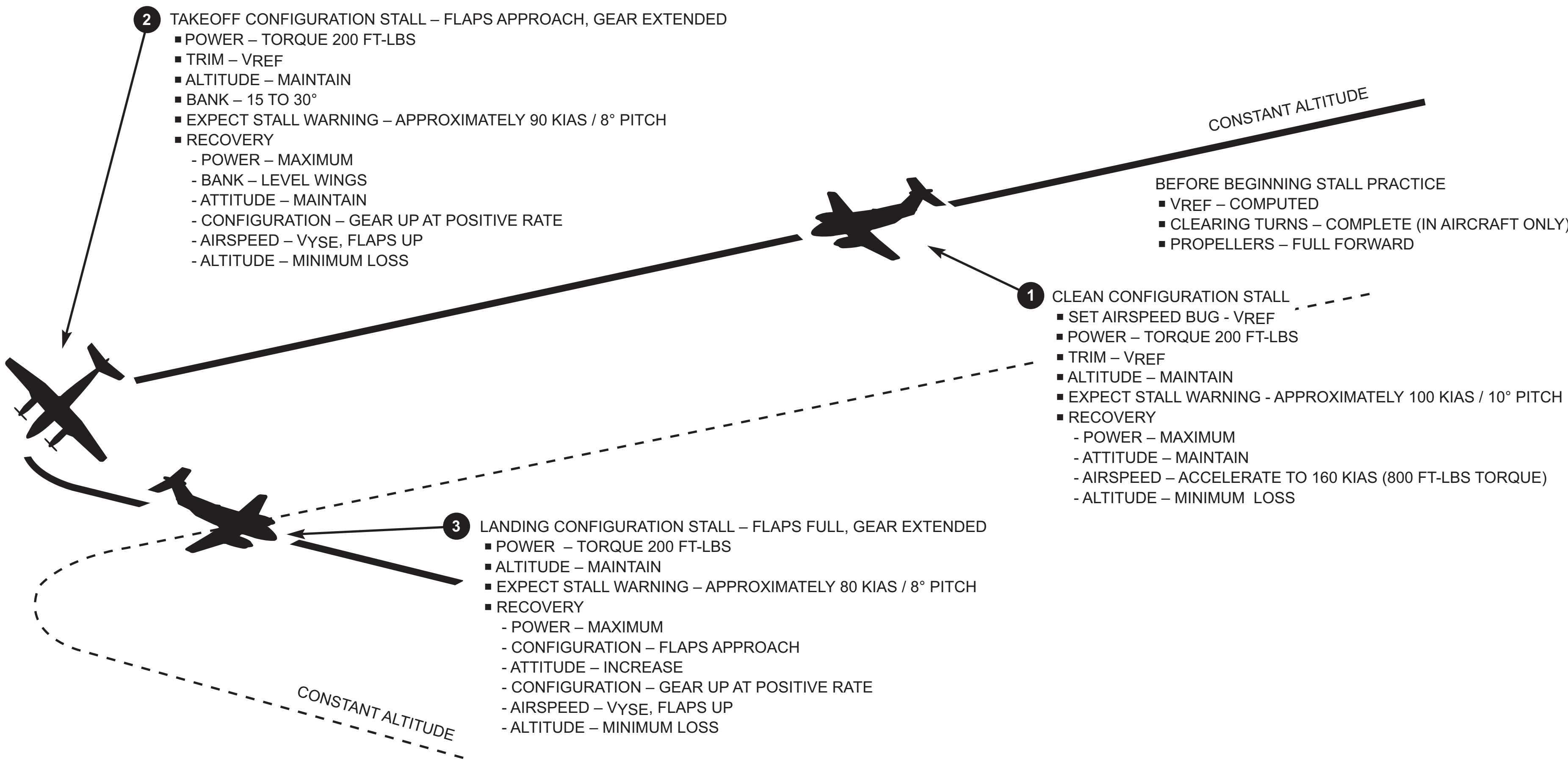
THIS MANEUVER MAY BE USED FOR A 180° OR 360° TURN, AND MAY BE FOLLOWED BY A REVERSAL IN THE OPPOSITE DIRECTION.

THE PNF MAY ASSIST AS DIRECTED BY THE PF.

TOLERANCES:

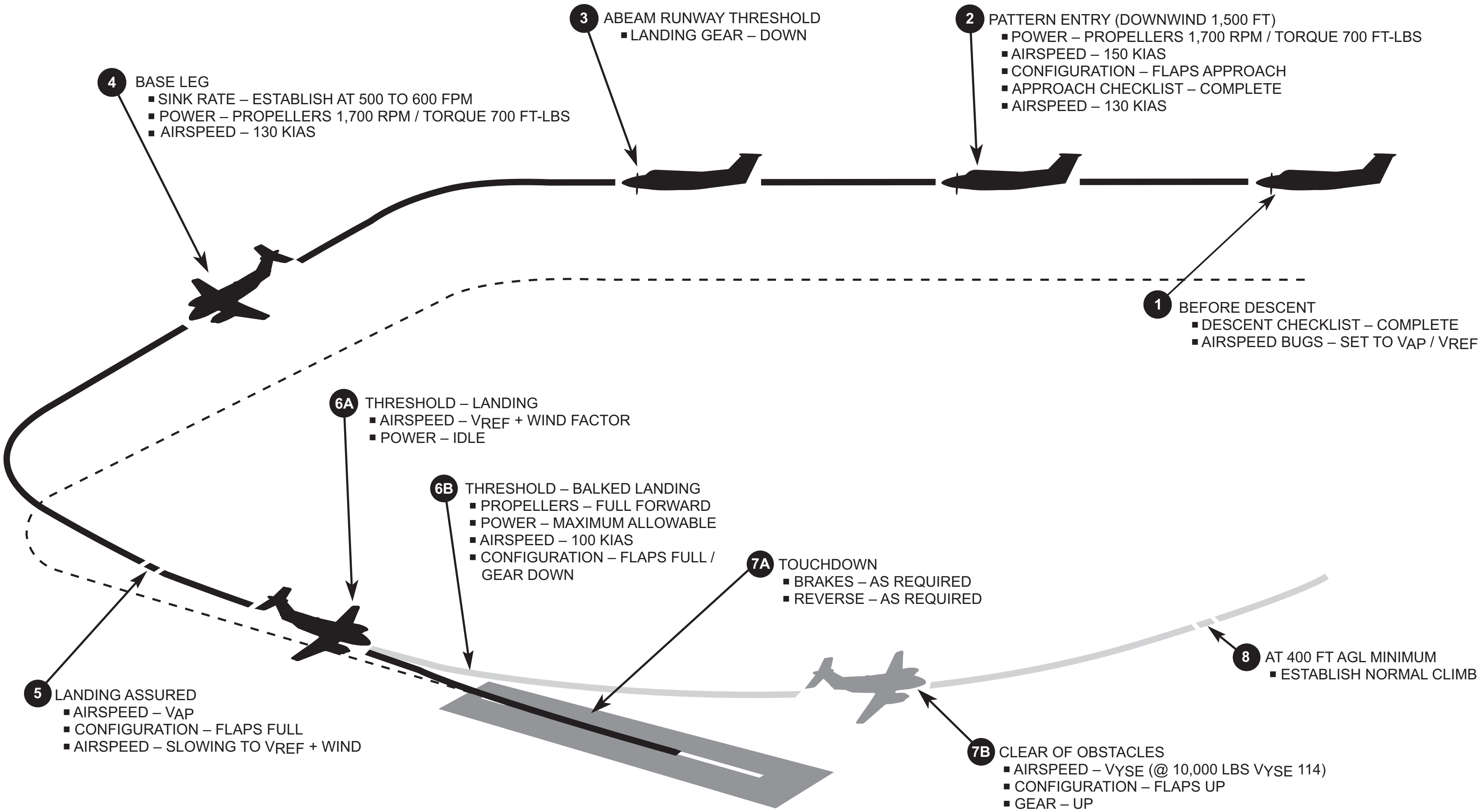
- SPEED ± 10 KIAS
- ALTITUDE ± 100 FT
- BANK ± 5°
- HEADING ± 10°

Approaches to Stalls

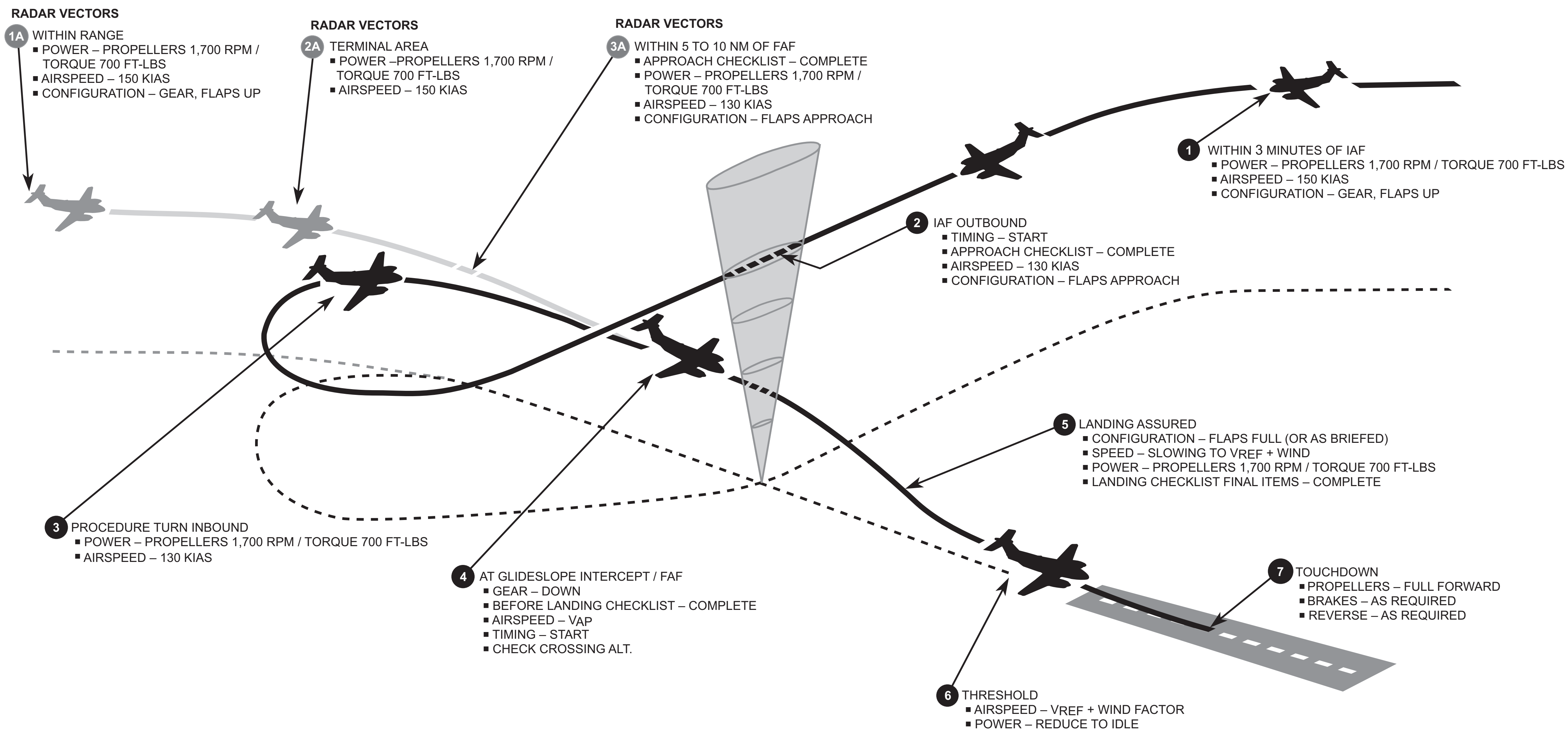


NOTE:
IN AIRCRAFT ONLY
- MINIMUM ALTITUDE 5,000 FT
- CONDUCT CLEARING TURNS

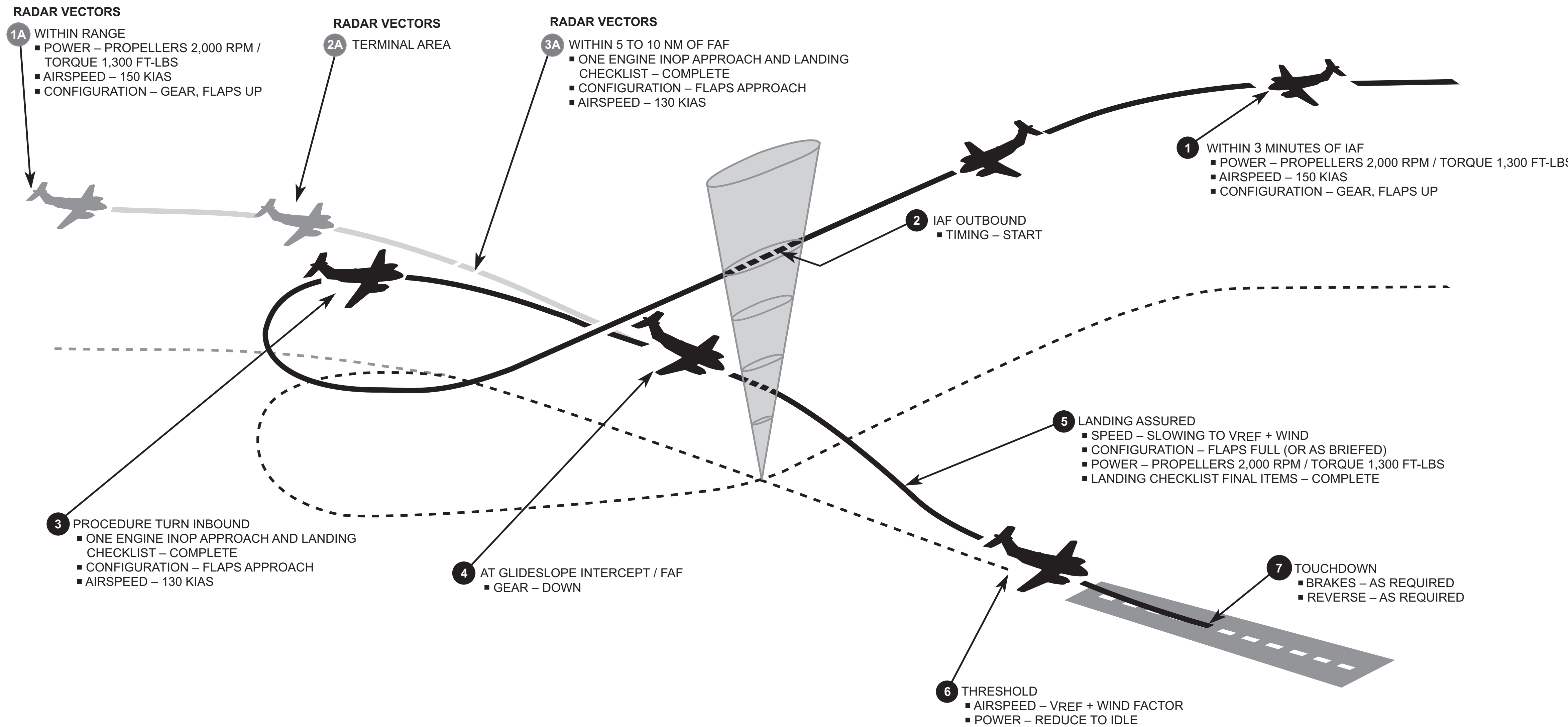
Visual Approach/Balked Landing



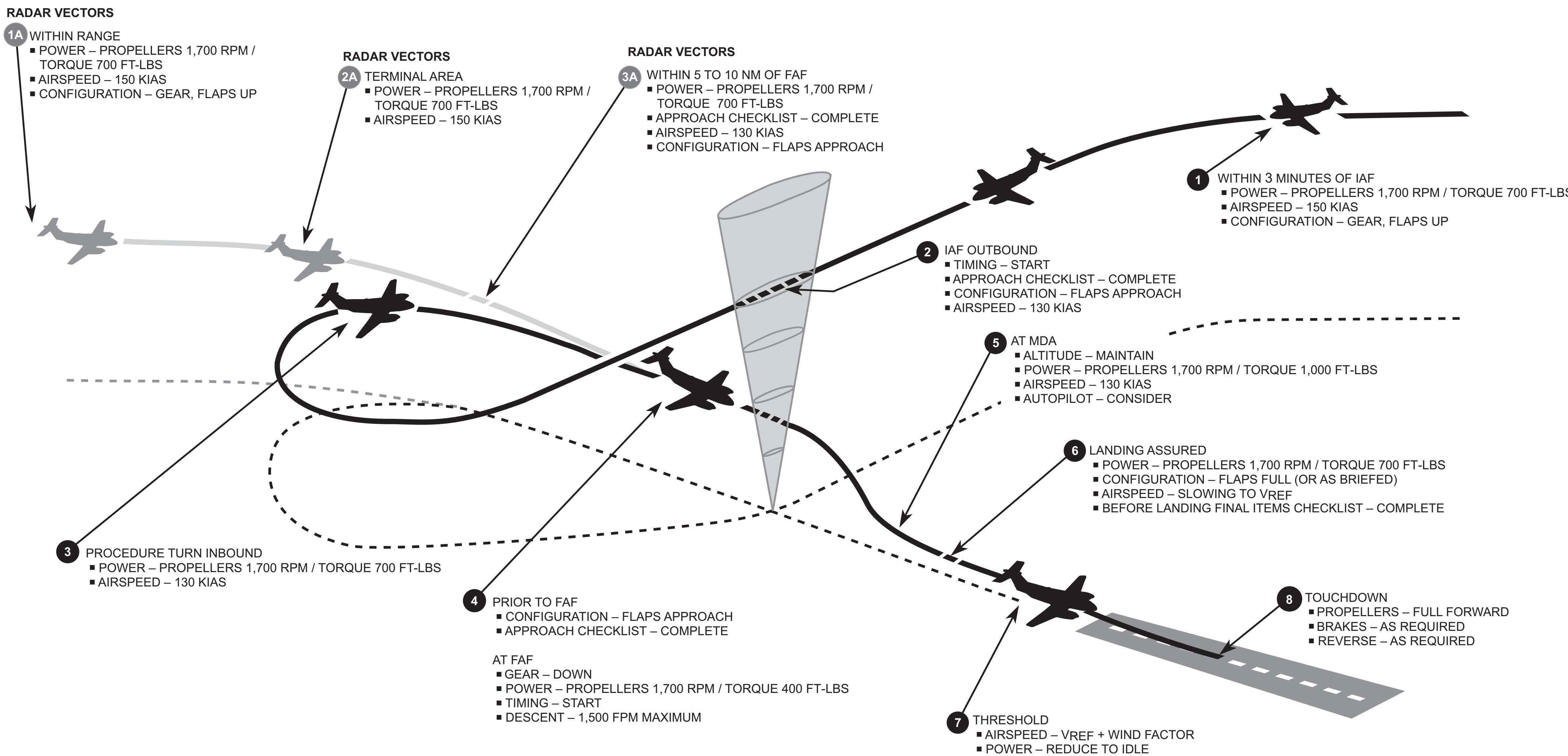
Two Engine ILS Approach and Landing



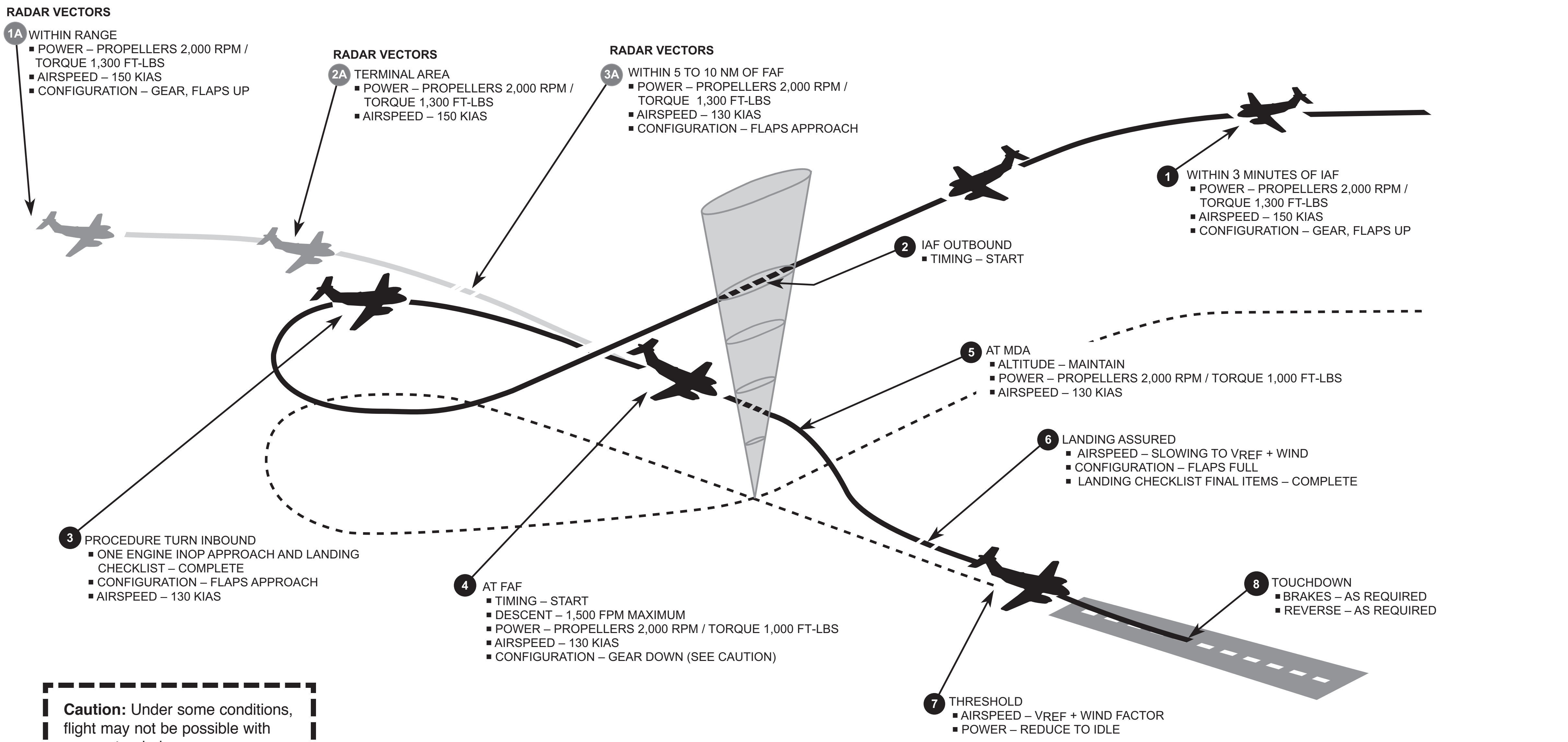
Single Engine ILS Approach and Landing



Two Engine Non-Precision Approach and Landing

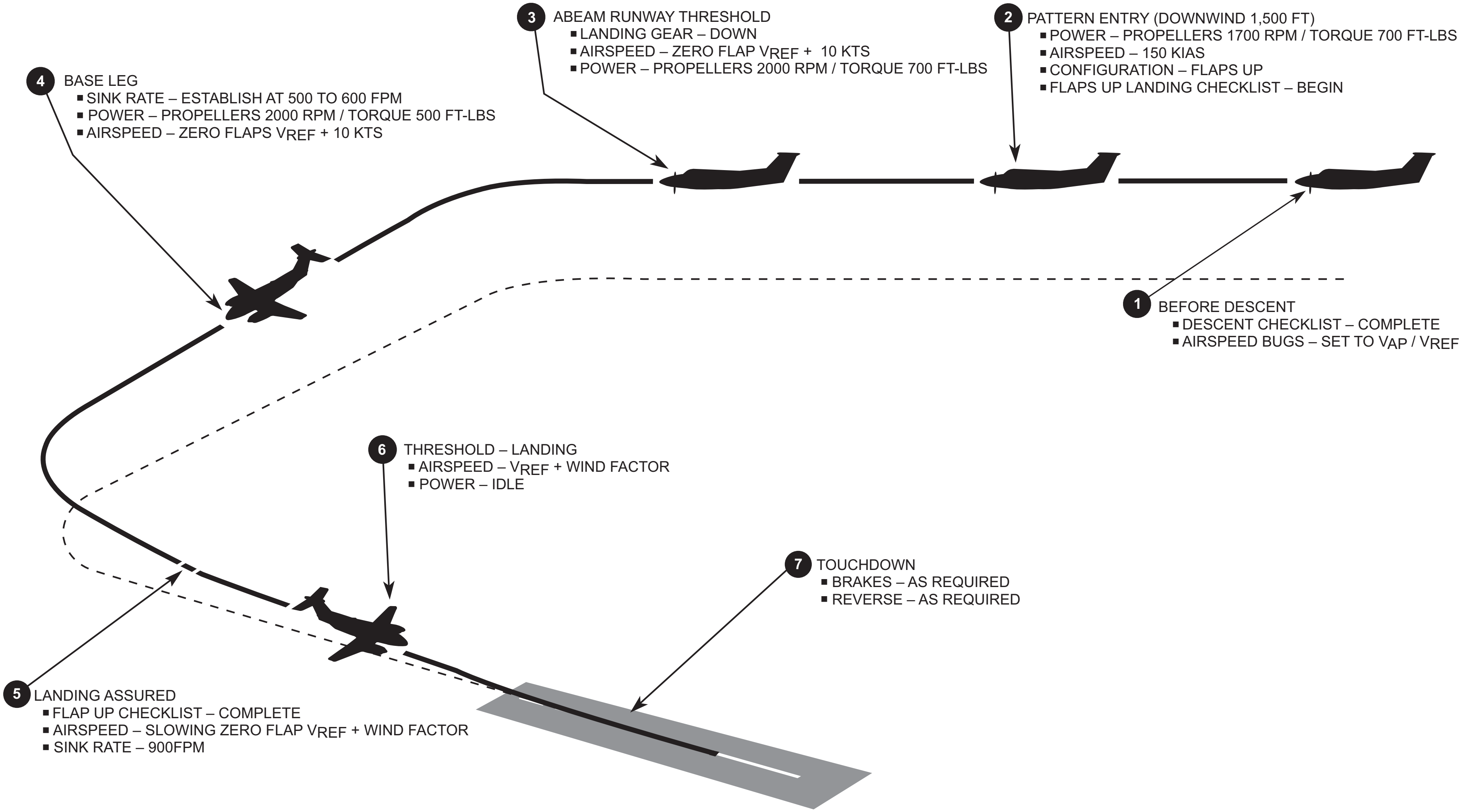


Single Engine Non-Precision Approach and Landing

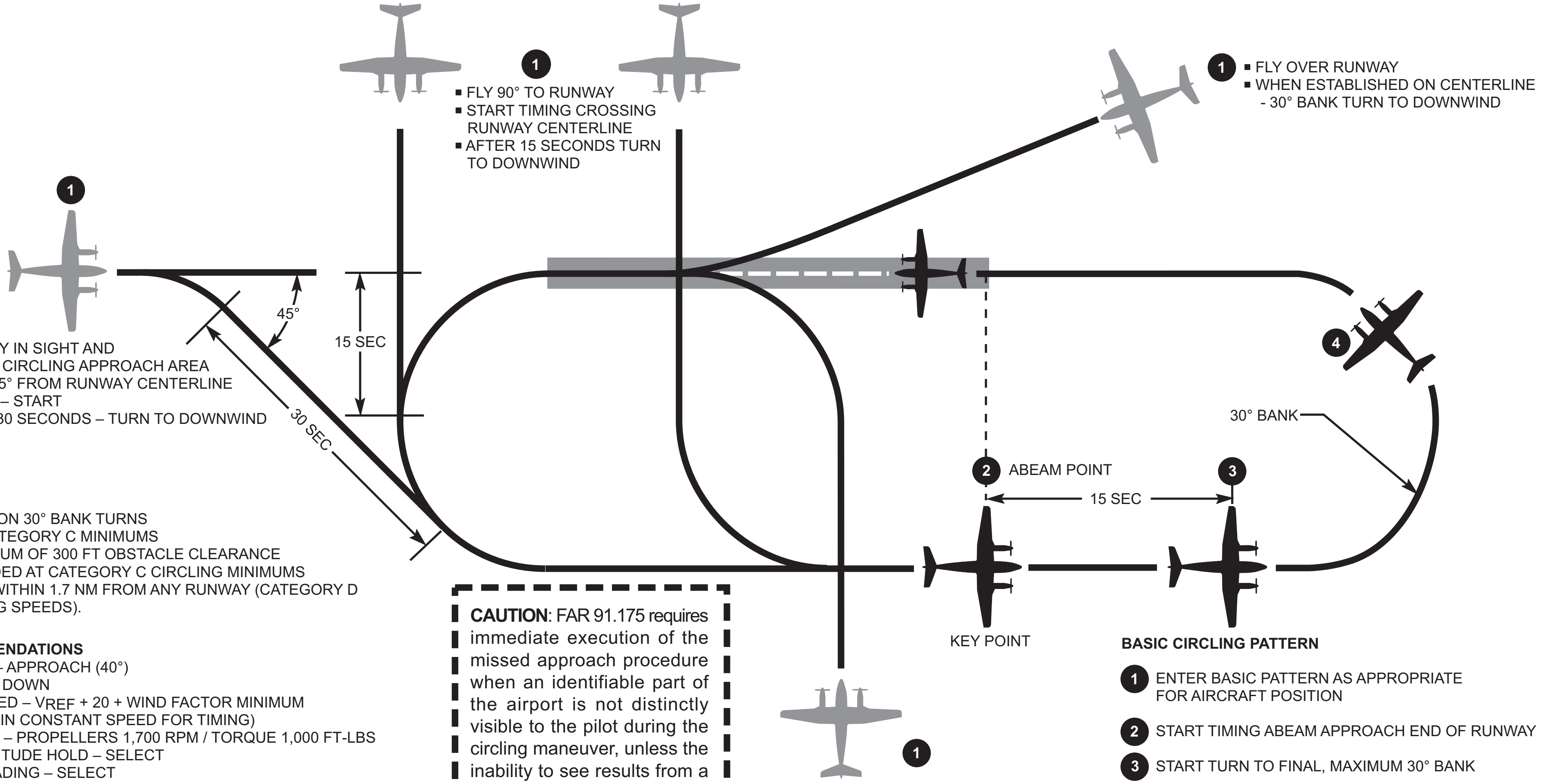


Caution: Under some conditions, flight may not be possible with gear extended.

Zero Flap Approach and Landing



Circling Approach/Circling Pattern



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

RECOMMENDATIONS
- FLAPS – APPROACH (40°)
- GEAR – DOWN
- AIRSPEED – V_{REF} + 20 + WIND FACTOR MINIMUM (MAINTAIN CONSTANT SPEED FOR TIMING)
- POWER – PROPELLERS 1,700 RPM / TORQUE 1,000 FT-LBS
- 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

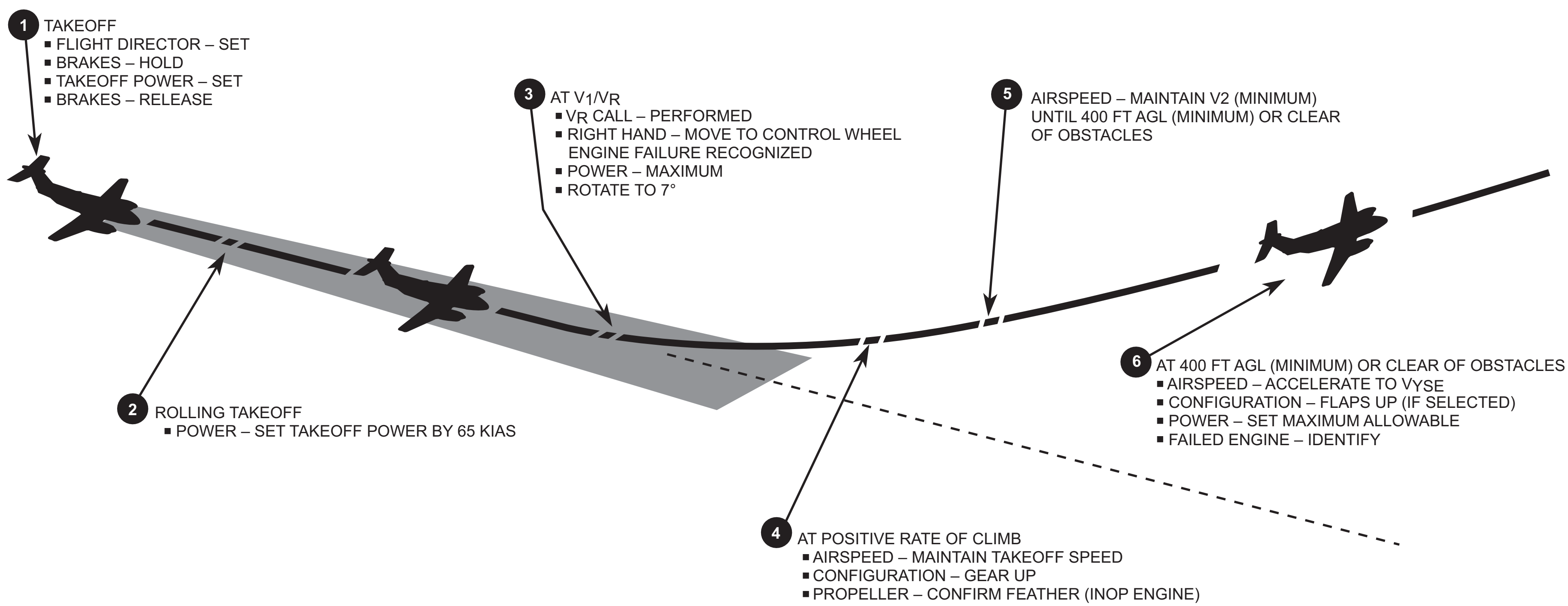
CAUTION: FAR 91.175 requires immediate execution of the missed approach procedure when an identifiable part of the airport is not distinctly visible to the pilot during the circling maneuver, unless the inability to see results from a normal bank of the aircraft during the approach.

NOTE: IF MISSED APPROACH NECESSARY AFTER BEGINNING THE CIRCLE, ENSURE AIRCRAFT REMAINS IN CLEARED AIRSPACE BY MAKING FIRST TURN TOWARD AIRPORT/ MISSED APPROACH COURSE.

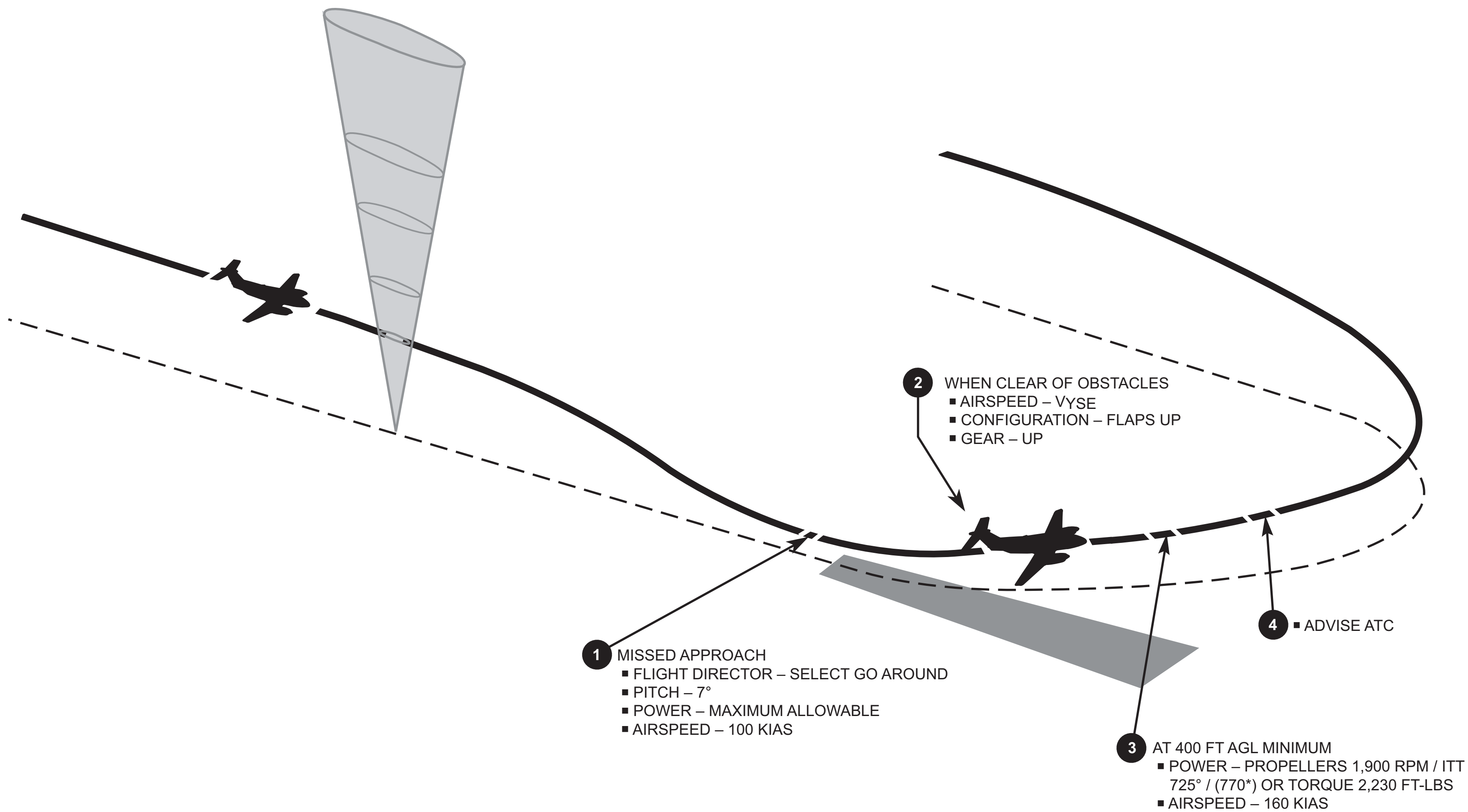
BASIC CIRCLING PATTERN

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
   - LANDING CHECKLIST FINAL ITEMS – COMPLETE
   - POWER – PROPELLERS 1,700 RPM / TORQUE 700 FT-LBS
   - 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

Engine Failure After Liftoff (Takeoff Continued)



Go-Around/Missed Approach



*B200

Limitations

Table of Contents

General Limitations

Airstair Door

- Do not open or check security by moving door handle while aircraft is pressurized and/or in flight.

  Handle is in locked position when arm is around plunger.

- See AFM Supplements section for limitations with the airstair door removed.

WARNING: Only a crew member should operate the door.

WARNING: Only one person should be on the airstair door stairway at any one time.

NOTE: No aircraft is certified for known severe icing.

Authorized Operations

- Day and Night VFR
- Day and Night IFR
- Known icing conditions
- FAR Part 91 operations when all pertinent information and performance considerations are complied with.
- FAR Part 135 operations when all pertinent information and performance considerations are complied with.

Baggage Limits

Maximum Weight in Baggage Compartment

Prior to BB-1052, BB-1091, and BL-58:

With Fold-up Seats . . . . 370 LBS

Without Fold-up Seats . . . . 410 LBS

BB-1052, BB-1091 and subsequent; BL-58 and subsequent; prior aircraft with Beech Kit #101-5068-1 installed:

With Fold-up Seats . . . . 510 LBS

Without Fold-up Seats . . . . 550 LBS

WARNING: Do not carry children in the baggage compartment unless secured in a seat.

Certification Status

- Normal Category, FAR Part 23

Cargo

- All cargo shall be properly secured by an FAA-approved cargo restraint system.
- Cargo must be arranged to permit free access to all exits and emergency exits.

WARNING: Unless authorized by applicable Department of Transportation regulations, do not carry hazardous material anywhere in the aircraft.

Cargo Door

- 200C/B200C - Do not open or check security by moving door handle while aircraft is pressurized and/or in flight.
- The cabin flooring section withstands loads of 200 pounds per square foot supported on the seat tracks. Floor areas where seat tracks are not present (walkways and aft baggage/utility area) supports 100 pounds per square foot loads.

> **NOTE:** Prior to first flight on the day, check cabin door/cargo door annunciator circuitry in accordance with Cabin/Cargo Door Annunciator Check in the AFM.

> **WARNING:** Only a crew member should operate the door.

Emergency Exit

- Emergency exit must be unlocked before takeoff.

Occupancy Limits

FAR Part 91 Operations (maximum, including crew) 15

FAR Part 135 Operations
(maximum) . . . . 9 Passengers Plus Crew

Passenger Seating

Couch/Passenger Seats

- Do not occupy couch as chaise lounge during takeoff and landing.
- Maximum weight of drawer contents is 30 lbs per drawer.
- The headrest should be positioned properly for the occupant.

Aft-Facing Seats

- Only aft-facing seats (placarded as such on the leg cross-member) are authorized in the aft-facing position.
- The seatback of each occupied aft-facing seat must be in the fully raised position and the headrest in the full-up position for takeoff and landing.

Lateral-Tracking Seats (if installed)

- Seat must be in outboard position for takeoff and landing.

Passenger Shoulder Harness

- Shoulder harness must be worn during takeoff and landing with seat in outboard position, seat back upright, and head-rest fully extended.

Maneuvers

- The Beechcraft Super King Air B200 and B200C are Normal Category Airplanes. Acrobatic maneuvers, including spins, are prohibited.

Minimum Flight Crew

- One pilot.

Structural Limitations

King Air 200

Maximum Cabin Pressure Differential . . . . 6.1 PSI

Cabin Door Forward and Aft Side Latches
(or bayonets) (4) Safelife (**200 only**) . . . . . . 6,000 HRS

Cabin Door Upper Latch Hooks (2) and
Attaching Hardware (**200 only**) . . . . 12,000 HRS

Cabin Door Cam-Lock Actuator Cable
Safelife (**200C only**) . . . . 9,000 HRS

Wing and Associated Structure
Fatigue Safelife . . . . 20,000 HRS

Windshield Frame Screws . . . . 12,000 HRS

All Wing Attach Bolts, Nuts, Barrel Nut Assemblies

Steel Components . . . REPLACE EVERY 6 CALENDAR YEARS OF INSTALLED BOLT AND NUT TIME

Inconel Components . . . REPLACE EVERY 15 CALENDAR YEARS OF INSTALLED BOLT AND NUT TIME

Refer to the Beechcraft Structural Inspection and Repair Manual and the Super King Air 200 Series Maintenance Manual for inspection and replacement procedures.

King Air B200

S/Ns Prior to BB-1193 and BL-73 except BB-1158 and BB-1167

Cabin and Door Forward and Aft Side Latches
(or bayonets) (4) Safelife (**B200 only**) . . . . . . 6,000 HRS

Cabin Door Upper Latch Hooks (2) and
Attaching Hardware (**B200 only**) . . . . 12,000 HRS

Cabin Door Cam-Lock Actuator Cable
Safelife (**B200C only**) . . . . 9,000 HRS

Wing and Associated Structure
Fatigue Safelife . . . . 15,000 HRS

Windshield Frame Screws . . . . 12,000 HRS

All Wing Attach Bolts, Nuts, Barrel Nut Assemblies:

Steel Components . . . REPLACE EVERY 6 CALENDAR YEARS OF INSTALLED BOLT AND NUT TIME

Inconel Components . . . REPLACE EVERY 15 CALENDAR YEARS OF INSTALLED BOLT AND NUT TIME

Refer to the Beechcraft Structural Inspection and Repair Manual and the Super King Air 200 Series Maintenance Manual for inspection and replacement procedures.

BB-1158, BB-1167; BB-1193 and subsequent; BL-73 and subsequent

Refer to Chapter 4 of the Super King Air 200 Series Maintenance Manual for structural limitations.

Windows and Windshield

King Air 200/King Air B200 prior to BB-1193 and BL-73 except BB-1158 and 1167

Fuselage Side Window

- If cracking, chipping, or stress crazing that can be felt with a fingernail occurs in either ply of the exterior window, replace the window according to instructions in the Maintenance Manual.
- If the window cannot be replaced prior to the next flight, pressurized flight is prohibited. Install the following placards to conduct unpressurized flight.
  - Install the following placard in clear view of the pilot:

    PRESSURIZED FLIGHT IS PROHIBITED DUE TO A DAMAGED WINDOW. CONDUCT FLIGHT WITH THE CABIN PRESS SWITCH IN THE DUMP POSITION.
  - Install the following placard next to the pressurization control:

    UNPRESSURIZED FLIGHT ONLY PERMITTED.
- If a crack exists in both the inner and outer plies of the exterior window, replace the window prior to further flight unless an appropriate “Ferry Permit” is obtained through the proper authority.

Crack in Side Window or Windshield

If it has been determined that a crack has developed in any side window or windshield:

- Maintain altitude at 25,000 ft or less.
- Reset pressurization controller to maintain 4.0 psi or less as required.

CAUTION: Prior to next flight, maintenance actions are required. Refer to the AIrworthiness Limitations in Chapter 4 of the Super King Air 200 Series Maintenance Manual.

NOTE: Visibility throught the windshield may be slightly impaired. Windshield wipers may be damaged if used on a cracked surface. Heating elements may be inoperative in the area of the crack.

Operational Limits

Maximum Operating Pressure Altitude

Normal Operations – King Air 200 Prior to BB-54, except 38, 39, 44 . . . . 31,000 FT

Normal Operations – King Air 200 BB-38, 42, 44, 54 and subsequent*; BL-1 and subsequent . 35,000 FT

*Also includes earlier aircraft with Beech kit Nos. 101-5007-1 and 101-5008-1 in compliance with Beechcraft Service Instruction No. 0776-341.

Normal Operations – King Air B200 . . . . 35,000 FT

King Air 200 with Aviation Gasoline:

Both Standby Boost Pumps Operative . . . . . . 31,000 FT

Either Standby Boost Pump Inoperative . . . . . 20,000 FT

Climbs without Crossfeed Capability . . . . 20,000 FT

Yaw Damper System Inoperative . . . . 17,000 FT

No restriction with Raisbeck AFT strakes installed.

V_{MCA} Demonstration Minimum . . . . 5,000 FT AGL

Cabin Pressurization Limit

King Air 200 – Maximum Cabin Pressure Differential . . . . 6.1 PSI

King Air B200 – Maximum Cabin Pressure Differential . . . . 6.6 PSI

Cabin Pressurization Controller

- Depressurize cabin before landing.
  (Use chart to determine correct pressure altitude setting)

Crosswind/Tailwind Components

Crosswind (maximum demonstrated) . . . . 25 KTS

Tailwind (takeoff/landing [maximum charted]) . . . . . 10 KTS

External Power Unit

- 28 to 28.5V DC output
- 400A continuous
- 1,000A surge

All B200s and subsequent

- 28 to 28.4V DC output
- 300A continuous
- 1,000A surge

Generator Limits

Maximum sustained generator load is limited as follows:

In Flight – Sea Level to 31,000 ft altitude 1.00/100%

In Flight – Above 31,000 ft altitude 0.88/88%

On Ground 0.85/85%

- During ground operation, observe the limitations shown in **Tables 3-A**, **3-B**, and **3-C** (following page).

Generator Load	Minimum Gas Generator RPM – N_1%	
	Without A/C	With A/C (right engine only)
King Air 200		
0 to 0.70	52	60
0.70 to .75	55	60
0.75 to 0.80	60	60
0.80 to 0.85	65	65
King Air B200		
0 to 0.75	56	62
0.75 to 0.80	60	62
0.80 to 0.85	65	65
BB1439 and sub		
0 to 0.75	61	62
0.75 to 0.80	61	62
0.80 to 0.85	65	65

Table 3-A; King Air 200 and B200 Generator Limits

Generator Load	Minimum Gas Generator RPM – N_1%		
	Without A/C	With A/C (right engine only)	If Flight (all altitudes)
0 to 0.75	IDLE	62	IDLE
0.75 to 1.00	63	68	85

Table 3-B; 300A Lear-Siegler Starter-Generator 23085-001 Limits

Type of Operation	Minimum N_1% RPM	Max Generator Load % of Load
Ground (from sea level to 5,000 ft[1])	52 55 65 70	50 66 90 100
Flight[2]	75	100

Table 3-C; 300A Lear-Siegler Starter-Generator 23069-016 Limits

1 Sea level to 5,000 ft., observe engine ITT limits when operating at low N1. Decrease high ITT by reducing accessory load and/or increasing N_1 speed.

2 This flight operation is for airspeeds of 116 KIAS and higher. Observe engine ITT limits.

Starter Limitations

- Standard Start Cycle:
  - 40 seconds ON/60 seconds OFF
  - 40 seconds ON/60 seconds OFF
  - 40 seconds ON then 30 minutes OFF

300-Amp Lear-Siegler (Optional)

- Standard Start Cycle:
  - 30 seconds ON/3 minutes OFF
  - 30 seconds ON/30 minutes OFF
- For engine wash:
  - 30 seconds ON/15 minutes OFF
- For engine soak:
  - 30 seconds ON/10 minutes OFF
  - 30 seconds ON/10 minutes OFF
  - 30 seconds ON/30 minutes OFF

OAT Limits

Sea Level to 25,000 ft Pressure Altitude . . . MAX ISA +37°C

Above 25,000 ft Pressure Altitude . . . . MAX ISA + 31°C

All Altitudes . . . . MIN -53.9°C

Airspeed Limitations

King Air 200

V_A, Maneuvering (12,500 lbs) . . . . . . 181 KIAS/182 KCAS

Do not make full or abrupt control movements above this speed.

V_{FE}, Maximum Flap Extension/Extended:

Approach – 40% . . . . 200 KIAS/200 KCAS

Full Down – 100% . . . . 146 KIAS/144 KCAS

Do not extend flaps or operate with flaps in prescribed position above these speeds.

V_{LO}, Maximum Landing Gear Operating:

Extension . . . . 181 KIAS/182 KCAS

Retraction . . . . 163 KIAS/164 KCAS

Do not extend or retract landing gear above the given speed.

V_{LE}, Maximum Landing Gear Extended . . 181 KIAS/182 KCAS

Do not exceed this speed with the landing gear extended.

V_{MCA}, Minimum Control Airspeed . . . . . . 86 KIAS/91 KCAS

This is the lowest airspeed at which the aircraft is directionally controllable with one engine at takeoff power when the other engine suddenly becomes inoperative with propeller windmilling.

V_{MO}/M_{MO}, Maximum Operating:

BB-2 to 198 without
Beech Kit 101-5033-1 . . . . 269 KIAS/270 KCAS
0.48 M

BB-199 and subsequent, BL-1
and subsequent; prior S/Ns
with Beech Kit 101-5033-1 . . . . . 259 KIAS/260 KCAS
0.52 M

Do not exceed these airspeeds or Mach numbers in any operation.

King Air B200/B200C

V_A, Maneuvering (12,500 lbs) . . . . . . 181 KIAS/182 KCAS

Do not make full or abrupt control movements above this speed.

V_{FE}, Maximum Flap Extension/Extended:

Approach – 40% . . . . 200 KIAS/200 KCAS

Full Down – 100% . . . . 157 KIAS/155 KCAS

Do not extend flaps or operate with flaps in prescribed position above these speeds.

V_{LO}, Maximum Landing Gear Operating:

Extension . . . . 181 KIAS/182 KCAS

Retraction . . . . 163 KIAS/164 KCAS

Do not extend or retract landing gear above the given speed.

V_{LE}, Maximum Landing Gear Extended . . 181 KIAS/182 KCAS

Do not exceed this speed with the landing gear extended.

V_{MCA}, Minimum Control Airspeed

Hartzell Propellers . . . . 86 KIAS/92 KCAS

McCauley Propellers . . . . 86 KIAS/91 KCAS

This is the lowest airspeed at which the aircraft is directionally controllable when one engine suddenly becomes inoperative and the other engine is at takeoff power.

V_{MO}/M_{MO}, Maximum Operating . . . . . 259 KIAS/260 KCAS
0.52 M

NOTE: S/Ns BB-2, BB-6 thru BB-733, BB-735 thru BB-792, BB-794 thru BB-828, BB-830, etc. (200s) Airspeed indicators marked in CAS values.

NOTE: B200 Airspeed indicators marked in IAS values.

All Models (at 12,500 lbs)

V_{MCG}, Ground Minimum Control . . . . 84 KIAS

V_{MCA}, Air Minimum Control . . . . 86 KIAS

Takeoff (Flaps 0%/Flaps 40%):

V_1/V_R (rotation) . . . . 95 KIAS/94 KIAS

50 ft . . . . 121 KIAS/106 KIAS

V_2 . . . . 121 KIAS/106 KIAS

V_{SSE}, Intentional One-Engine Inoperative . . . . 104 KIAS

V_Y, Two-Engine Best Rate-of-Climb . . . . 125 KIAS

V_{YSE}, One-Engine Inoperative Best Rate-of-Climb . . 121 KIAS

V_X, Two-Engine Best of Angle-of-Climb . . . . 100 KIAS

V_{XSE}, One-Engine Inoperative Best Angle-of-Climb . . 115 KIAS

Maximum Glide Range . . . . 135 KIAS

Turbulent Air Penetration . . . . 170 KIAS

Balked Landing . . . . 100 KIAS

Cruise Climb:

Sea Level to 10,000 ft . . . . 160 KIAS

10,000 to 20,000 ft . . . . 140 KIAS

20,000 to 25,000 ft . . . . 130 KIAS

25,000 to 35,000 ft . . . . 120 KIAS

Landing Approach:

Flaps 100% . . . . 103 KIAS

Flaps 0% . . . . 132 KIAS

Icing Conditions (minimum) . . . . 140 KIAS

Effective Windshield Deicing (maximum) . . . . . . 226 KIAS

Emergency Descent . . . . 181 KIAS

Manual Gear Extension . . . . 130 KIAS

Stall Speeds – Power Idle, 0° Angle-of-Bank:

100% Flaps . . . . 75 KIAS (V_{SO})

40% Flaps . . . . 85 KIAS

0% Flaps . . . . 99 KIAS (V_{S1})

Airstart (minimum) . . . . 140 KIAS

Autopilot Operation . . . . V_{MO}/M_{MO}

Flight with Cabin Entrance Door Removed . . . . . 205 KIAS

Static Wicks (King Air 200)

- One wick may be broken or missing from:
  - Each wing (includes aileron)
  - Each side of horizontal or vertical stabilizer (Maximum of 3 wicks may be missing).

Towing

- Do not tow the aircraft with rudder gust lock installed.
- Do not tow the aircraft if one or more landing gear struts are deflated.

NOTE: Exceeding the nosewheel deflection limit markings during towing operations damages the nose strut/linkage. Nosewheel deflection of approximately 10° or more with the rudder gust lock installed damages the nosewheel steering linkage.

Weight Limitations

Maximum Ramp . . . . 12,590 LBS

Maximum Takeoff

All Except FAR Part 135 Operations . . . . . . 12,500 LBS

FAR Part 135 Operations . . . . SEE CHART **(Figure 3-1)**

Maximum Landing . . . . 12,500 LBS

Maximum Zero Fuel:

King Air 200 . . . . 10,400 LBS

King Air B200 . . . . 11,000 LBS

Center of Gravity Limits

- The reference datum is 83.5 inches forward of the center of the front jack point.
- Aft limit – 196.4 inches aft of datum at all weights.
- Forward at 12,500 lbs – 185.0 inches aft of datum with straight line variation to 181.0 inches aft of datum at 11,279 lbs.
- Forward at 11,279 lbs or less – 181.0 inches aft of datum.

Flight Load Factor Limits

Flaps Up . . . . 3.17 POSITIVE Gs
1.27 NEGATIVE Gs

Flaps Down . . . . 2.00 POSITIVE Gs
1.27 NEGATIVE Gs;
0.0 G (**B200**)

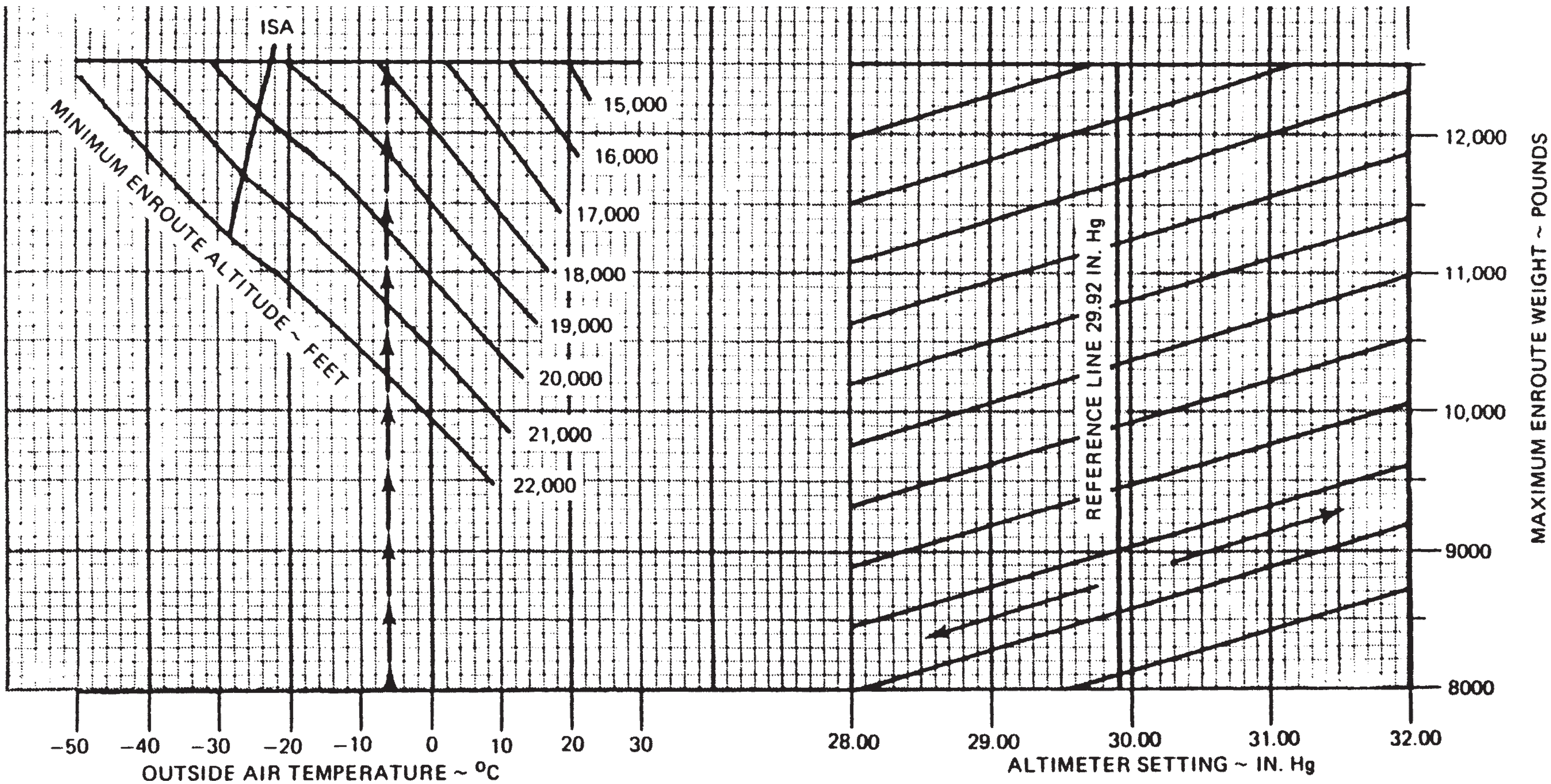
Mean Aerodynamic Chord

MAC Length . . . . 70.41 INCHES

Leading Edge of MAC . . . 171.23 INCHES AFT OF DATUM

FAR, Part 135 Operations

Maximum Enroute Weight



3-1

Systems Limitations

Autopilot – King Air 200

FAR Part 91 or FAR Part 135 Operations

- Refer to the FAA Approved Flight Manual Supplement in the AFM Supplements Section or applicable FAR.

Fuel System

Approved Fuel Anti-Icing Additive

- Use anti-icing additive conforming to Specification MIL-I-27686.

Minimum Temperature Limit

Engine oil is used to heat the fuel on entering the fuel control. Since no temperature measurement is available for the fuel at this point, it must be assumed to be the same as the OAT. Operations with Commercial Grade fuels are prohibited below the OAT indicated below unless approved anti-icing fuel aditives are used. Military Grade fuels have anti-icing additives blended in the fuel at the refinery, and no further treatment is necessary. Operations with Military Grade fuels below the temperatures indicated are prohibited.

- A minimum oil temperature of 55°C is recommended for optimum fuel heater operation at takeoff power.

COMMERCIAL GRADES	MILITARY GRADES
Jet A: -40°C	JP-4: -58°C
Jet A-1: -47°C	JP-5: -46°C
Jet B: -50°C	JP-8: -50°C

CAUTION: Anti-icing additive must be properly blended with the fuel to avoid deterioration of the fuel cells. The additive concentration by volume shall be a minimum of 0.06% and a maximum of 0.15%. Approved procedure for adding anti-icing concentrate is contained in AFM Section IV, Normal Procedures.

CAUTION: JP-4 fuel per MIL-T-5624 has anti-icing additive per MIL-I-27686 blended at the refinery, and no further treatment is necessary. Some fuel suppliers blend anti-icing additive in their storage tanks. Prior to refueling, check with the fuel supplier to determine whether or not the fuel has been blended. To assure proper concentration by volume of fuel on board, blend only enough additive for the unblended fuel.

Fuel Biocide Additive

Fuel biocide-fungicide BIOBOR JF in concentrations of 135 PPM or 270 PPM may be used in the fuel. BIOBOR JF may be used as the only fuel additive, or it may be used with the anti-icing additive conforming to MIL-I-27686 specification. Used together, the additives have no detrimental effect on the fuel system components.

Refer to the King Air 200 or Super King Air 200 Series Maintenance Manual and to the latest Pratt and Whitney Canada Engine Service Bulletin No. 3044 for concentrations to use and for procedures, recommendations, and limitations pertaining to the use of biocidal/fungicidal additives in turbine fuels.

Approved Engine Fuels

Commercial Grades . . . . Jet A, Jet A-1, Jet B

Military Grades JP-4, JP-5, JP-8

Emergency Engine Fuels

Commercial Aviation Gasoline Grades . . . . . 80 RED, 91/98, 100LL*, 100 GREEN, 115/145 PURPLE

Military Aviation Gasoline Grades . . . . 80/87 RED, 100/130 GREEN, 115/145 PURPLE

*In some countries, this fuel is colored Green and designated "100L."

Limitations on the Use of Aviation Gasoline

- Operation is limited to 150 hours between engine overhauls.
- Operation is limited to 20,000 ft pressure altitude (FL 200) or below if either standby pump is inoperative.
- Crossfeed capability is required for climbs above 20,000 ft pressure altitude (FL 200).
- Operation above 31,000 ft (FL 310) is prohibited.

Auxiliary Fuel

- Do not put any fuel into the auxiliary tanks unless the main tanks are full.

Fuel Crossfeed

- Crossfeeding of fuel is permitted only when one engine is inoperative.

WARNING: The airplane is approved for takeoff with one standby boost pump inoperative, but in such a case, crossfeed of fuel will not be available from the side of the inoperative standby boost pump.

Fuel Gages in the Yellow Arc

- Do not take off if fuel quantity gages indicate in the yellow arc or indicate less than 265 lbs of fuel in each main tank system.

Fuel Imbalance Between Wings

Maximum Allowable .1,000 LBS

Operating with Low Fuel Pressure

- Operation of either engine with its corresponding fuel pressure (L/R FUEL PRESS annunciator) illuminated is limited to 10 hours before overhaul or replacement of the engine-driven fuel pump. Windmilling time need not be charged against this time limit.

Ice and Rain Protection Systems

Sustained Icing Conditions Airspeed . . . 140 KTS MINIMUM

- On **King Air B200 S/Ns BB-743, 793, 829, 854 to 870, 874 to 891, 894, 896 to 911, 913 to 1438, 1440 to 1443; BL-37 to 138**, sustained flight in icing conditions is prohibited with flaps extended. This does not include approach and landing, if needed.

Optional Brake Deice System

- Do not operate system above 15°C ambient temperature.
- Do not operate system longer than 10 minutes (one deice timer cycle) with the landing gear retracted. If operation does not automatically terminate approximately 10 minutes after gear retraction, manually select the system off.
- Maintain 85% N_1 or higher during periods of simultaneous brake deice and wing boot operation. If inadequate pneumatic pressure is developed for proper wing boot inflation, select brake deice system off.

NOTE: The rudder boost system may not operate when the brake deice system is in use.

- Both sources of instrument bleed air must be in operation.
- Select brake deice system off during single engine operation.

Pneumatic Deice Boots

Minimum Ambient Temperature for Operation
of Deicing Boots . . . . -40°C

Ice Vanes (Inertial Separator System)

- The ice vanes shall be extended for operations in ambient temperature of +5°C or below when flight free of visible moisture cannot be assured.
- The ice vanes shall be retracted for operations in ambient temperatures of +15°C or above.
- On **King Air B200 aircraft**, ICE VANES LEFT and RIGHT shall be extended or ENGINE ANTI-ICE LEFT and RIGHT shall be ON for operation in ambient temperatures of +5°C or below when flight free of visible moisture cannot be assured.
- On **King Air B200 aircraft**, ICE VANES LEFT and RIGHT shall be retracted or ENGINE ANTI-ICE LEFT and RIGHT shall be OFF for all takeoff and flight operations in ambient temperatures of above +15°C.
- On **King Air 200/B200 S/Ns prior to BB-1439; prior to BL-138**, once the manual override system is activated (i.e., anytime the ICE VANE EMERGENCY MANUAL EXTENSION handle has been pulled out), do not attempt to operate the ice vanes electrically until the override assembly inside the engine cowling has been properly reset on the ground. Even after the manual extension handle has been pushed back in, the manual override system is still engaged.
- Ice vanes should be extended for all ground operations for all **B200** models. It is also recommended for all **200s**.

Instrument Markings

Fuel Quantity

Yellow Arc (No Takeoff Range) . . . . 0 TO 265 LBS

Cabin Pressure Differential Gage King Air 200 – before BB-195

Green Arc (approved operating range) . . . . . . 0 TO 6.0 PSI

Red Arc (unapproved operating range) . . . 6.0 PSI TO END OF SCALE

King Air 200 – BB-195 and subsequent; BL-1 and subsequent

Green Arc (approved operating range) . . . . . . 0 TO 6.1 PSI

Red Arc (unapproved operating range) . . . 6.1 PSI TO END OF SCALE

King Air B200

Green Arc (approved operating range) . . . . . . 0 TO 6.6 PSI

Red Arc (unapproved operating range) . . . 6.6 PSI TO END OF SCALE

Pneumatic Gage

Green Arc (normal operating range) . . . . 12 TO 20 PSI

Red Line (maximum operating limit) . . . . 20 PSI

Vacuum/Gyro Suction Gage King Air 200

Narrow Green Arc
(normal from 35,000 to 15,000 ft MSL) . . . 3.0 TO 4.3 IN HG

Wide Green Arc
(normal from 15,000 ft to sea level) . . . . 4.3 TO 5.9 IN HG

King Air 200 (alternate gage) and King Air B200

Narrow Green Arc
(normal from 35,000 to 15,000 ft MSL) . . . 2.8 TO 4.3 IN HG

Wide Green Arc
(normal from 15,000 ft to sea level) . . . . 4.3 TO 5.9 IN HG

35K Marked on Face of Gage at . . . . 3.0 IN HG

15K Marked on Face of Gage at . . . . 4.3 IN HG

Propeller Deice Ammeter

Green Arc (normal operating range) . . 14 TO 18 AMPERES
18 TO 24 AMPERES (**BB-1444 AND SUB**)

Landing Gear Cycle Limits (Hydraulic)

- Landing gear cycles (1 up – 1 down) are limited to one every 5 minutes for a total of 6 cycles followed by a 15 minute cool-down period.

Powerplant

- Number of Engines – 2
- Engine Manufacturer – Pratt & Whitney of Canada (Longueuil, Quebec, Canada)
- Engine Model Number PT6A-41 (**King Air 200**) or PT6A-42 (**King Air B200**)
- Do not lift power levers in flight.

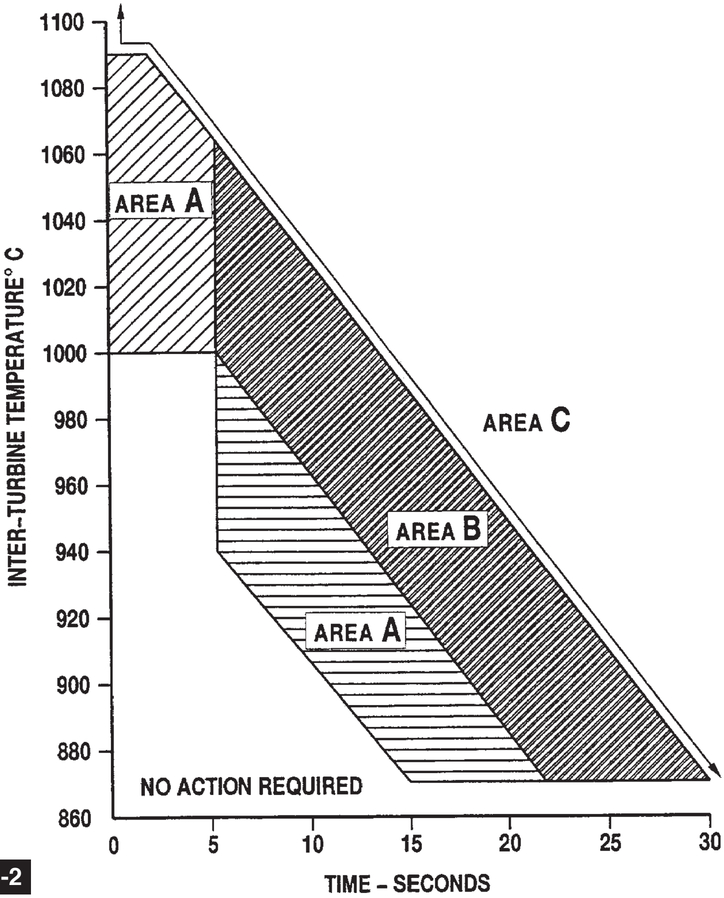
Engine Operating Limits

- The following limitations presented in **Figures 3-2, 3-3 and Tables 3D, 3E**, and **3F** shall be observed. Each column presents limitations. The limits represented do not necessarily occur simultaneously. Refer to Pratt & Whitney Engine Maintenance Manual for specific actions required if limits are exceeded.

Oil Specifications

- Any oil specified by brand name in the latest revision of Pratt & Whitney SB 3001 is approved for use in the PT6A-41 **(King Air 200)** or the PT6A-42 **(King Air B200)** engine.

Overtemperature Limits – Starting Conditions Only (PT6A-41 and -42)



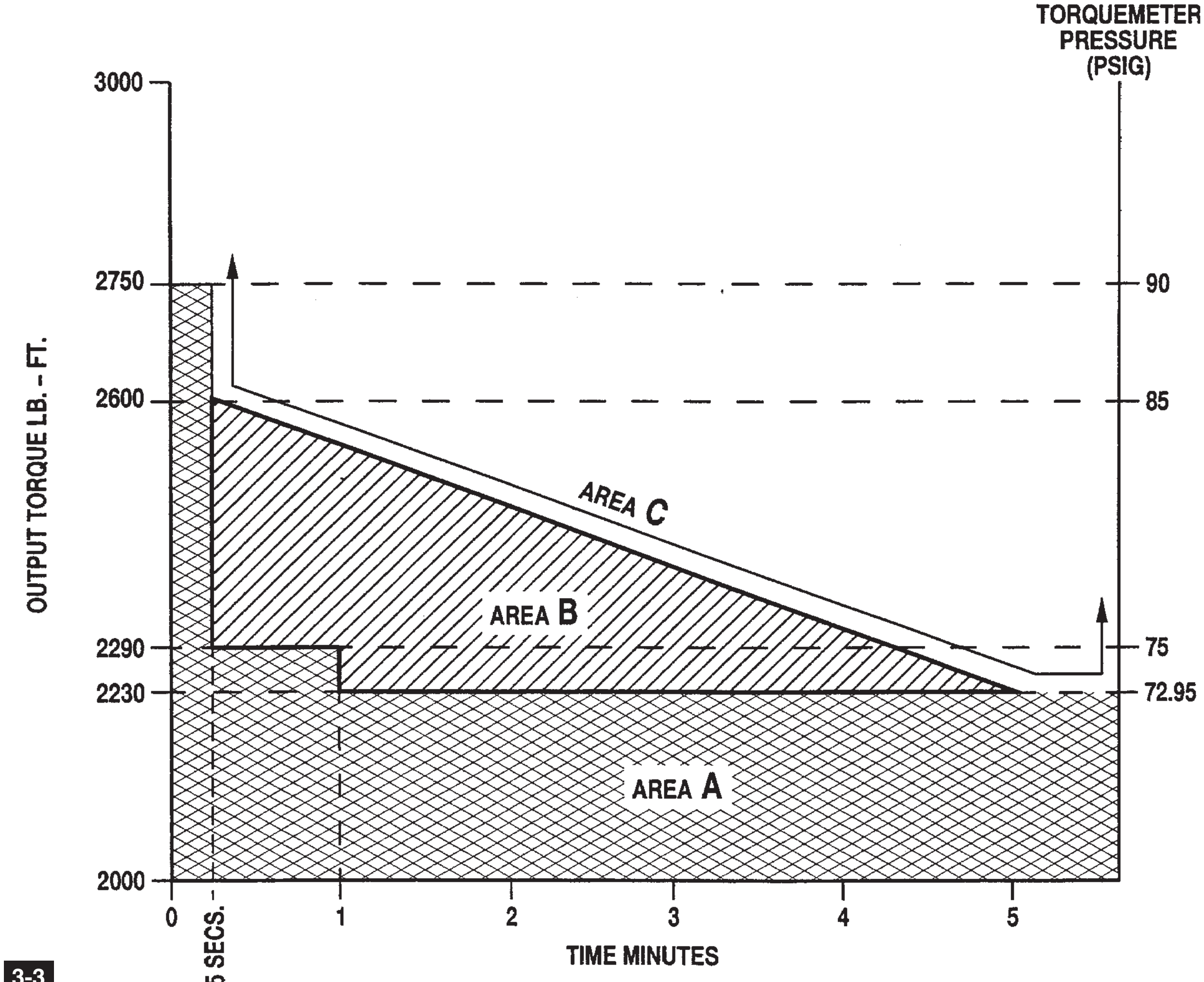
3-2

Adjustments:

AREA A	1.	Determine and correct cause of overtemperature.
	2.	Visually inspect through exhaust duct.
	3.	Record in engine log book.
AREA B		Perform hot section inspection.
AREA C		Return engine to overhaul.

NOTE: Interturbine temperatures shown make no allowance for instrument errors.

Overtorque Limits – All Conditions (PT6A-40, -41, -42 and -42A)



3-3

Adjustments:

AREA A		No action required.
AREA B	1.	Determine and correct cause of overtorque.
	2.	Record in engine log book.
AREA C		Return engine to overhaul.

Operating Condition	SHP	Torque (ft-lbs)[1]	Max Observed ITT (°C)	N_1 RPM	N_1 %	Prop RPM N_2	Oil Press (PSI)[2]	Oil Temp °C
Starting	–	–	1000[3]	–	–	–	–	-40 (min)
Low Idle	–	-	660[4]	19,500	52 (min)	–	60 (min)	-40 to 99
High Idle	–	–	–	–	[5]	–	–	-40 to 99
Takeoff[9]	850	2230	750	38,100	101.5	2000	105 to 135	10 to 99
Max Continuous and Cruise	850	2230[6]	750	38,100	101.5	2000	105 to 135	10 to 99
Cruise Climb and Rec Cruise	850	2230[6]	725	38,100	101.5	2000	105 to 135	0 to 99
Max Reverse[7]	–	–	750	–	88	1900	105 to 135	0 to 99
Transient	–	2750[3]	850	38,500[8]	102.6[8]	2200[3]	–	0 to 104[9]

Table 3-D; King Air 200 Engine Operating Limits (PT6A-41)

[1] Torque limit applies within range of 1,600 to 2,000 propeller RPM (N_2). Below 1,600 RPM, torque limited to 1,100 ft-lbs.

[2] When gas generator speeds are above 27,000 RPM (72% N_1) and oil temperatures are between 60 and 71°C, normal oil pressure are:

100 to 135 PSI below 21,000 ft and 85 to 135 PSI at 21,000 ft and above

During extremely cold starts, oil pressure may reach 200 PSI. Oil pressure between 60 and 85 PSI is undesirable; it should be tolerated only for the completion of the fight, and then only at a reduced power setting not exceeding 1,100 ft-lbs torque. Oil pressure below 60 PSI is unsafe; it requires that either the engine be shut down, or that a landing be made as soon as possible with minimum power to sustain flight. Fluctuations of ±10 PSI are acceptable.

[3] These values are time limited to 5 seconds.

[4] High ITT at ground idle may be corrected by reducing accessory load and/or increasing N_1 RPM.

[5] At approximately 70% N_1.

[6] Cruise torque values vary with altitude and temperature.

[7] This operation is time limited to one minute.

[8] These values are time limited to 10 seconds.

[9] These values are time limited to 5 minutes.

Operating Condition	SHP	Torque (ft-lbs)[1]	Max Observed ITT (°C)	N_1 RPM	N_1 %	Prop RPM N_2	Oil Press (PSI)[2]	Oil Temp °C[3,4]
Starting	–	–	1000[5]	–	–	–	–	-40 (min)
Low Idle	–	-	750[6]	21,000	56 (min)	–	60 (min)	-40 to 99
High Idle	–	–	–	–	70 (approx.)	–	–	-40 to 99
Takeoff	850	2230	800	38,100	101.5	2000	100 to 135	0 to 99
Max Continuous and Cruise	850	2230[8]	800	38,100	101.5	2000	100 to 135	0 to 99
Cruise Climb and Rec Cruise	850	2230[8]	770	38,100	101.5	2000	100 to 135	0 to 99
Max Reverse[9]	–	–	750	–	88	1900	100 to 135	0 to 99
Transient	–	2750[5]	850	38,500[10]	102.6[10]	2200[5]	–	0 to 104[11]

Table 3-E; King Air B200 Engine Operating Limits (PT6A-42); S/Ns BB-743, 793, 829, 854 to 870, 874 to 891, 894, 896 to 911, 913 to 1438, 1440 to 1443; BL-37 to 138

[1] Torque limit applies within range of 1,600 to 2,000 propeller RPM (N_2). Below 1,600 RPM, torque limited to 1,100 ft-lbs.

[2] When gas generator speeds are above 27,000 RPM (72% N_1) and oil temperatures are between 60 and 71°C, normal oil pressure are:

100 to 135 PSI below 21,000 ft and 85 to 135 PSI at 21,000 ft and above

During extremely cold starts, oil pressure may reach 200 PSI. Oil pressure between 60 and 85 PSI is undesirable; it should be tolerated only for the completion of the fight, and then only at a reduced power setting not exceeding 1100 ft-lbs torque. Oil pressure below 60 PSI is unsafe; it requires that either the engine be shut down, or that a landing be made at the nearest suitable airport with minimum power to sustain flight. Fluctuations of ±10 PSI are acceptable.

[3] A minimum oil temperature of 55°C is recommended for fuel heater operation at takeoff power.

[4] Oil temperature limits are -40°C and 99°C. However, temperature of up to 104°C are permitted for a maximum time of 10 minutes.

[5] These values are time limited to 5 seconds.

[6] High ITT at ground idle may be corrected by reducing accessory load or increasing N_1 RPM.

[7] At approximately 70% N_1.

[8] Cruise torque values vary with altitude and temperature.

[9] This operation is time limited to one minute.

[10] These values are time limited to 10 seconds.

[11] Values above 99°C are time limited to 10 minutes.

Operating Condition	SHP	Torque (ft-lbs)[1]	Max Observed ITT (°C)	N_1 RPM	N_1 %	Prop RPM N_2	Oil Press (PSI)[2]	Oil Temp °C[3,4]
Starting	–	–	1000[5]	–	–	–	–	-40 (min)
Low Idle	–	–	750[6]	22,875	61 (min)	[12]	60 (min)	-40 to 99
High Idle	–	–	–	–	[7]	–	–	-40 to 99
Takeoff[6]	850	2230	800	38,100	101.5	2000	100 to 135	0 to 99
Max Continuous and Cruise	850	2230[8]	770	38,100	101.5	2000	100 to 135	0 to 99
Cruise Climb and Rec Cruise	850	2230[8]	770	38,100	101.5	2000	100 to 135	0 to 99
Max Reverse[9]	–	–	750	–	88	1900	100 to 135	0 to 99
Transient	–	2750[5]	850	38,500[10]	102.6[10]	2200[5]	200	0 to 104[11]

Table 3-F; King Air B200 Engine Operating Limits (PT6A-42); S/Ns BB-1439, BB-1444 and subsequent except BB-1463; BL-139 and subsequent; BW-1 and subsequent

1 Torque limit applies within range of 1,600 to 2,000 propeller RPM (N_2). Below 1,600 RPM, torque limited to 1,100 ft-lbs.

2 When gas generator speeds are above 27,000 RPM (72% N_1) and oil temperatures are between 60 and 71°C, normal oil pressure are:

Below 21,000 ft 100 to 135 PSI; 21,000 ft and above 85 to 135 PSI

During extremely cold starts, oil pressure may reach 200 PSI. Oil pressure between 60 and 85 PSI is undesirable; it should be tolerated only for the completion of the fight, and then only at a reduced power setting not exceeding 1100 ft-lbs torque. Oil pressure below 60 PSI is unsafe; it requires that either the engine be shut down, or that a landing be made at the nearest suitable airport with minimum power to sustain flight. Fluctuations of ±10 PSI are acceptable.

3 A minimum oil temperature of 55°C is recommended for fuel heater operation at takeoff power.

4 Oil temperature limits are -40°C and 99°C. However, temperature of up to 104°C are permitted for a maximum time of 10 minutes.

5 These values are time limited to 5 seconds.

6 High ITT at ground idle may be corrected by reducing accessory load or increasing N_1 RPM.

7 At approximately 70% N_1.

8 Cruise torque values vary with altitude and temperature.

9 This operation is time limited to one minute.

10 These values are time limited to 10 seconds.

11 Values above 99°C are time limited to 5 minutes.

12 1,100 RPM for McCauley propeller and 1,180 RPM for Hartzell propeller.

Powerplant Instrument Markings

Instrument	Red Line Minimum Limit	Yellow Arc Caution Range	Green Arc Normal Operating Range	Red Line Maximum Limit
Interstage Turbine Temperature	–	–	400 to 750°C[1] 400 to 800°C[2]	750°C[1] 800°C[2]
Torquemeter	–	–	400 to 2230 ft-lbs	2230 ft-lbs
Propeller Tachometer	–	–	1600 to 2000 RPM	2000 RPM
Gas Generator Tachometer	–	–	61 to 101.5%[3]	101.5%
Oil Temperature	–	–	10 to 99°C	99°C
Oil Pressure	60 PSI	60 to 100 PSI[3]	105 to 135 PSI[1] 100 to 135 PSI[2] 85 to 135 PSI[3]	200 PSI 135 PSI[3]

[1] King Air 200

[2] King Air B200 S/Ns BB-743 to 1443 with exceptions; BL-37 to 138

[3] King Air B200 S/Ns BB-1439, 1444 and subsequent except 1463; BL-139 and subsequent; BW-1 and subsequent

[4] A dual-band yellow/green arc extends from 85 to 100 PSI, indicating the extended range of normal oil pressure for operation at, or above, 21,000 ft. A red diamond at 200 PSI indicates upper transient limit.

[5] Red line maximum limits are maximum continuous or cruise values. Transients may occur at higher values.

Powerplant Instrument Markings (cont.)

Instrument	Red Line Minimum Limit	Green Arc Normal Operating	Red Line Maximum Limit
Interstage Turbine Temperature	–	400 to 800°C	800°C[1]
Torquemeter	–	400 to 2230 ft-lbs	2230 ft-lbs
Propeller Tachometer (N_2)	–	1600 to 2000 RPM	2000 RPM
Gas Generator Tachometer (N_1)	–	–	101.5%
Oil Temperature	–	10° to 99°C	99°C
Oil Pressure[2]	60 PSI	100 to 135 PSI	200 PSI

S/Ns BB-1439, BB-1444 thru BB-1485, except BB-1463 and BB-1484; BL-139 and BL-140

[1] Starting Limit (Dashed Red Radial): 1000°C

[2] A dual-band yellow/green arc extends from 85 to 100 PSI, indicating the extended range of normal oil pressure for operation at, or above, 21,000 ft. A red diamond at 200 PSI indicates upper transient limit.

Instrument	Red Line Minimum Limit	Yellow Arc Caution Range	Green Arc Normal Operating Range	Red Line Maximum Limit
Interstage Turbine Temperature	–	–	400 to 800°C	800°C[1]
Torquemeter	–	–	400 to 2230 ft-lbs	2230 ft-lbs
Propeller Tachometer (N_2)	–	–	[3]	2000 RPM
Gas Generator Tachometer (N_1)	–	–	61 to 101.5%	101.5%
Oil Temperature	–	–	0° to 99°C	99°C
Oil Pressure[2]	60 PSI	60 to 100 PSI	85 to 135 PSI	135 PSI

S/Ns BB-1484, BB-1486 and subsequent; BL-141 and subsequent

[1] Starting Limit (Dashed Red Radial): 1000°C

[2] A dual-band yellow/green arc extends from 85 to 100 PSI, indicating the extended range of normal oil pressure for operation at, or above, 21,000 ft. A red diamond at 200 PSI indicates upper transient limit.

[3] 1180 to 2000 RPM (Hartzell propellers), 1100 to 2000 RPM (McCauley propellers).

Propellers

King Air 200

Number of Propellers 2

Manufacturer . . . . Hartzell Propeller, Inc.

Propeller Hub Model Numbers . . . . HC-B3TN-3G or HC-B3TN-3N

Propellers Blades

BB-2, BB-6 to BB-815, BB-817 to BB-824; BL-1 to BL-29

T10178B-3R

BB-816, BB-825 and subsequent; BL-30 and subsequent

T10178K-3R

Propeller Diameter . . . . 98.5 Inches Only

Propeller Blade Angles at 30-Inch Station

Feathered . . . . +90.0°

Reverse . . . . -9.0°

Propeller Rotational Speed Limits

Transients not exceeding 5-seconds . . . . 2,200 RPM

Reverse . . . . 1,900 RPM

All other conditions . . . . 2,000 RPM

Propeller Rotational Overspeed Limits

- The maximum propeller overspeed limit is 2,200 RPM and time-limited to five-seconds. Sustained propeller overspeeds faster than 2,000 RPM indicate failure of the primary governor. The flight may be continued at propeller overspeeds up to 2,080 RPM provided torque is limited to 1,800 foot-pounds. Sustained propeller overspeeds above 2,080 RPM are not approved.

King Air B200 - S/Ns BB-743 to 1143 with exceptions; BL-37 to 138

Number of Propellers 2

Manufacturer . . . . . Hartzell Propeller, Inc., Piqua, Ohio
McCauley Propeller, Vandalia, Ohio

Propeller Hub and Model Numbers

Propeller Diameter

Hartzell . . . . 98.5 Inches Only

McCauley . . . . 98.0 Inches Only

Propeller Blade Angles at 30-Inch Station

Hartzell Feathered . . . . +90.0°

Hartzell Reverse . . . . -9.0°

McCauley Feathered . . . . +86.8°

McCauley Reverse . . . . -10.0°

Propeller Rotational Speed Limits

Transients not exceeding 5-seconds . . . . 2,200 RPM

Reverse . . . . 1,900 RPM

All other conditions . . . . 2,000 RPM

Propeller Rotational Overspeed Limits

- The maximum propeller overspeed limit is 2,200 RPM and time-limited to five-seconds. Sustained propeller overspeeds faster than 2,000 RPM indicate failure of the primary governor. Flight may be continued at propeller overspeeds up to 2,080 RPM provided torque is limited to 1,800 foot-pounds. Sustained propeller overspeeds greater than 2,080 RPM are not approved.*

  *2,120 RPM (**BB-1444 and subsequent**).

King Air B-200 - S/Ns BB-1439 and subsequent with exceptions; BL-139 and subsequent; BW-1 and subsequent

Number of Propellers 2

Manufacturer . . . . . Hartzell Propeller, Inc., Piqua, Ohio
McCauley Propeller, Vandalia, Ohio

Propeller Hub and Blade Model Numbers

Hartzell Hub HC-E4N-3G

Hartzell Blades D9390SK-1R

McCauley Hub 4HFR34C771-X

McCauley Blades X-94LA-0

- The letter appearing in the place of the X represents minor variations in the propeller hub or blades. They do not effect the eligibility or interchangeability.

Propeller Diameter

Hartzell . . . . 93.0 INCHES (MAX)
92.0 INCHES (MIN)

McCauley . . . . 94.0 INCHES (MAX)
93.5 INCHES (MIN)

Propeller Blade Angles at 30-Inch Station

Hartzell Feathered . . . . +87.9°

Hartzell Reverse . . . . -11.2°

McCauley Feathered . . . . +87.5°

McCauley Reverse . . . . -10.0°

Propeller Rotational Speed Limits

Transients not exceeding 5-seconds . . . . 2,200 RPM

Reverse . . . . 1,900 RPM

All other conditions . . . . 2,000 RPM

Minimum Idle Speed

Hartzell Propellers . . . . 1,180 RPM

McCauley Propellers . . . . 1,100 RPM

Propeller Rotational Overspeed Limits

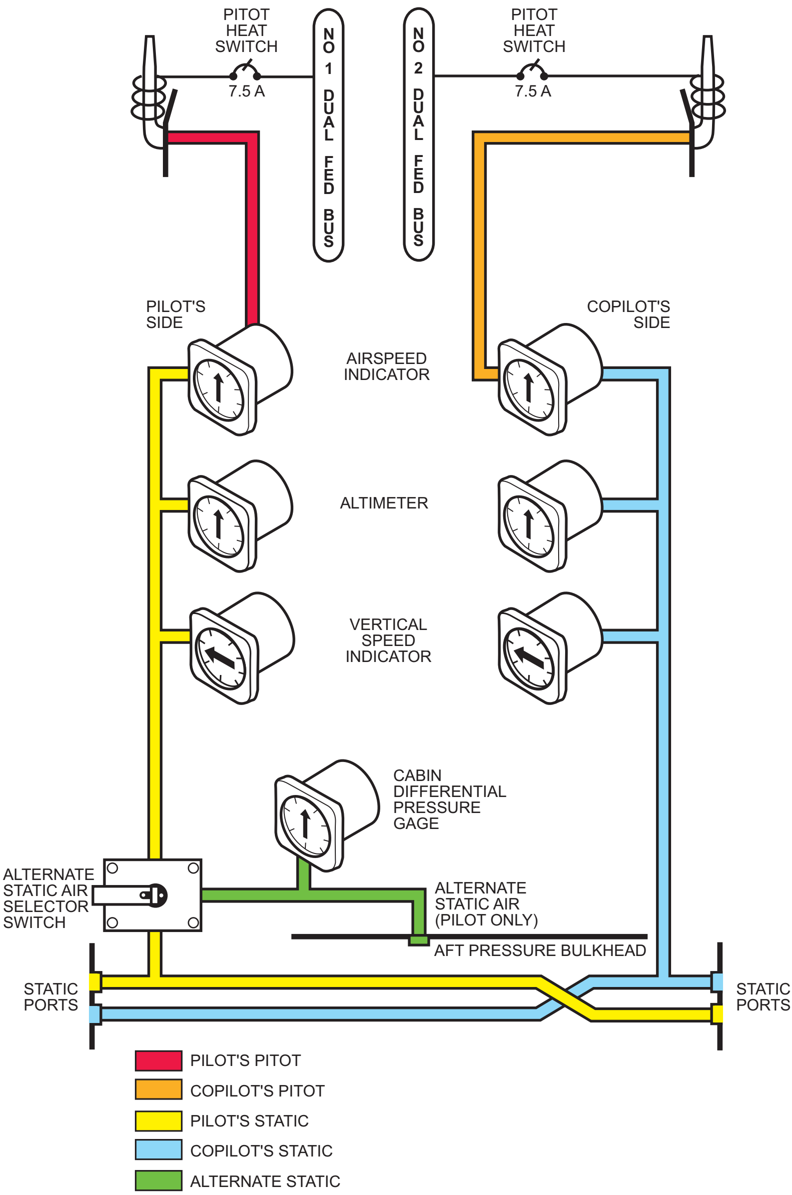
- The maximum propeller overspeed limit is 2,200 RPM and time-limited to five-seconds. Sustained propeller overspeeds faster than 2,000 RPM indicate failure of the primary governor. The flight may be continued at propeller overspeeds up to 2,080 RPM provided torque is limited to 1,800 foot-pounds. Sustained propeller overspeeds above 2,080 RPM (2,120 RPM; **SNs BB-1444 and subsequent**) are not approved.

Systems

Table of Contents

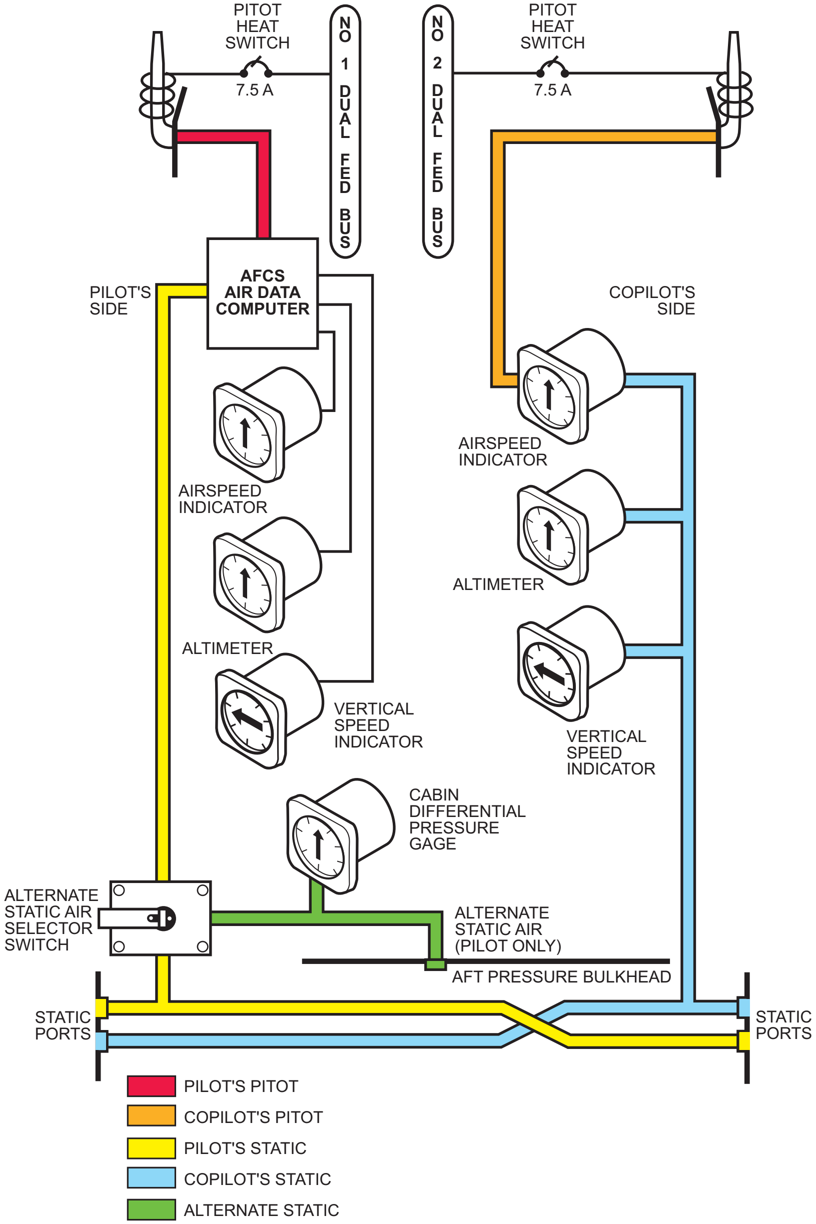
Pitot/Static System

Non-ADC Equipped



Pitot/Static System

ADC Equipped



Avionics

This section includes:

- pitot/static system
- avionics power
- communications and navigation equipment
- autopilot.

Please refer to the applicable manuals for more detailed information.

Pitot/Static System

A pitot mast on the left and right forward fuselage and static ports on the left and right rear fuselage provide ram and static pressure to the pitot/static system. Electrically powered heating elements warms the pitot masts to prevent ice formation. With the LEFT and RIGHT PITOT switches in ON, the pitot mast heating elements are powered. Static ports are unheated.

The pilot or left pitot supplies the pilot airspeed indicator and air data computer (if installed). The copilot or right pitot supplies the copilot airspeed indicator. On **S/Ns BB-324 to BB-452 without SI 1047**, the copilot's pitot mast also supplies the landing gear warning system's differential pressure switch.

The static ports supply pressure for the:

- airspeed indicators
- vertical speed indicators
- altimeter
- cabin pressure differential gage
- air data computer (if installed).

The PILOT'S STATIC AIR SOURCE valve handle can connect the pilot's pitot/static system to an alternate static source in the aircraft tailcone.

Air Data Computer

The air data computer processes ram and static air pressure inputs to provide electrical outputs for various flight and avionics equipment. These outputs include:

- indicated and true airspeed
- vertical speed
- pressure and barometric corrected altitude
- altitude alerting
- altitude and airspeed warnings.

The ADC then provides information from the outputs to the following:

- pilot's altimeter
- flight management system (if installed)
- flight guidance system (FGS)
- SAT/TAS indicator
- ATC transponders
- automatic flight control system (AFCS).
- Avionics Power

The aircraft battery and/or generators supply 28V DC to three avionics buses (Avionics Nos. 1, 2, and 3) when the AVIONICS MASTER PWR switch is on. If the AVIONICS MASTER PWR switch fails, pull the AVIONICS MASTER circuit breaker to restore power to the Avionics buses by de-energizing the avionics relays.

An optional ground communications electric power bus can supply power to the No. 2 communications radio and audio panel. This feature reduces battery load of radio use before engine start.

Another option is an auxiliary DC bus system to power essential avionics equipment if electrical load-shedding is required. With the generator and battery switches off, the AUX DC BUS switch in ON normally provides power directly from the Hot Battery bus to the No. 2 communications and navigation radios, audio panel, compass, and glareshield floodlights.

Communications Equipment

A typical communications equipment installation includes:

- two audio control panels
- two VHF communications transceivers
- radio telephone

Because of the wide variation of equipment found in these aircraft, please refer to the applicable manuals for more detailed descriptions and operating information.

Static Discharging

Static wicks on the aircraft structure and control surfaces minimize the effects of lightning strikes and static charges on avionics equipment and the aircraft structure. The wicks bleed off accumulated static charges to the atmosphere. Due to varying configurations, consult your MEL for number and position of static wicks.

Navigation

Navigation equipment provides aircraft direction and attitude information, determines aircraft position, and furnishes flight management.

Attitude and direction equipment use inertial and magnetic forces to sense and display aircraft heading and attitude. Equipment includes:

- magnetic compass
- turn and slip indicator
- gyro horizon/vertical gyro
- radio magnetic indicator
- vertical gyro system
- compass system.

Position determining equipment includes systems that operate independently of ground stations or with ground stations to determine aircraft position. Equipment includes:

- instrument landing system (ILS)
- very high frequency (VHF) navigation equipment
- automatic direction finding (ADF)
- distance measuring equipment (DME)
- transponder
- long range navigation equipment
- LORAN
- global positioning system (GPS)
- flight management system (FMS)
- weather radar.

Autopilot

The autopilot system provides automatic control and stabilization of the aircraft about the pitch, roll, and yaw axes. It positions the aircraft elevator, ailerons, and rudder in response to autopilot/flight computer steering commands. Selectable operating modes automatically maintain a desired altitude, pitch attitude or heading, and capture and track localizer, glideslope, and VOR signals.

Systems certified on this aircraft include:

- Collins AP-105
- Collins AP-106
- Collins APS-65
- Collins APS-80
- King KFC-300
- King KFC-400 (**B200 only**)
- Honeywell (Sperry) SPZ-200A
- Honeywell (Sperry) SPZ-4000.

A typical autopilot system consists of:

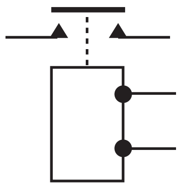
- autopilot or flight control computer
- autopilot controller
- airspeed sensor or air data computer (ADC)
- mode selector
- aileron, elevator, and rudder servo-actuators.

The autopilot system receives signals from the airspeed sensor or ADC, vertical accelerometer, vertical and directional gyros, and navigation receivers. With this data, the autopilot drives the servo-actuators to maintain a desired altitude, attitude, navigation path, or airspeed.

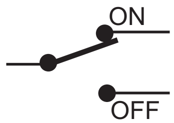
A typical autopilot system provides:

- yaw damping
- roll rate and bank angle limiting
- automatic capture and track of VOR, ILS, and localizer
- heading, roll, airspeed, and altitude capture and hold
- heading select
- soft ride.

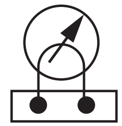
Schematic Symbols



RELAY COIL



SWITCH

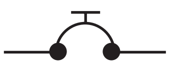


SHUNT WITH METER

CURRENT LIMITER

GROUND

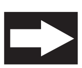
DIODE



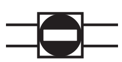
PUSH-PULL CIRCUIT BREAKER

SWITCH BREAKER

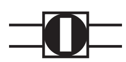
FUSE



CHECK VALVES

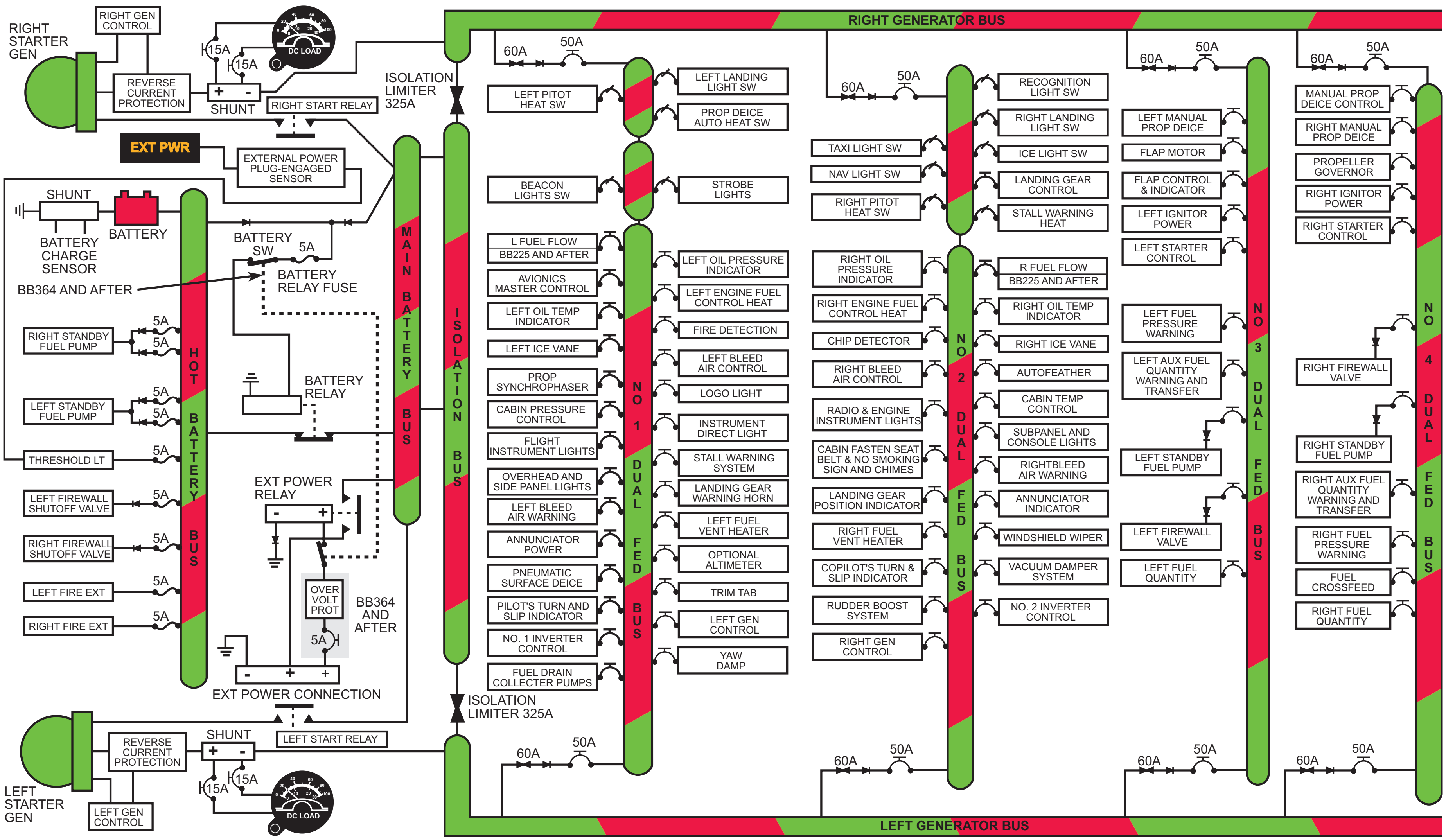


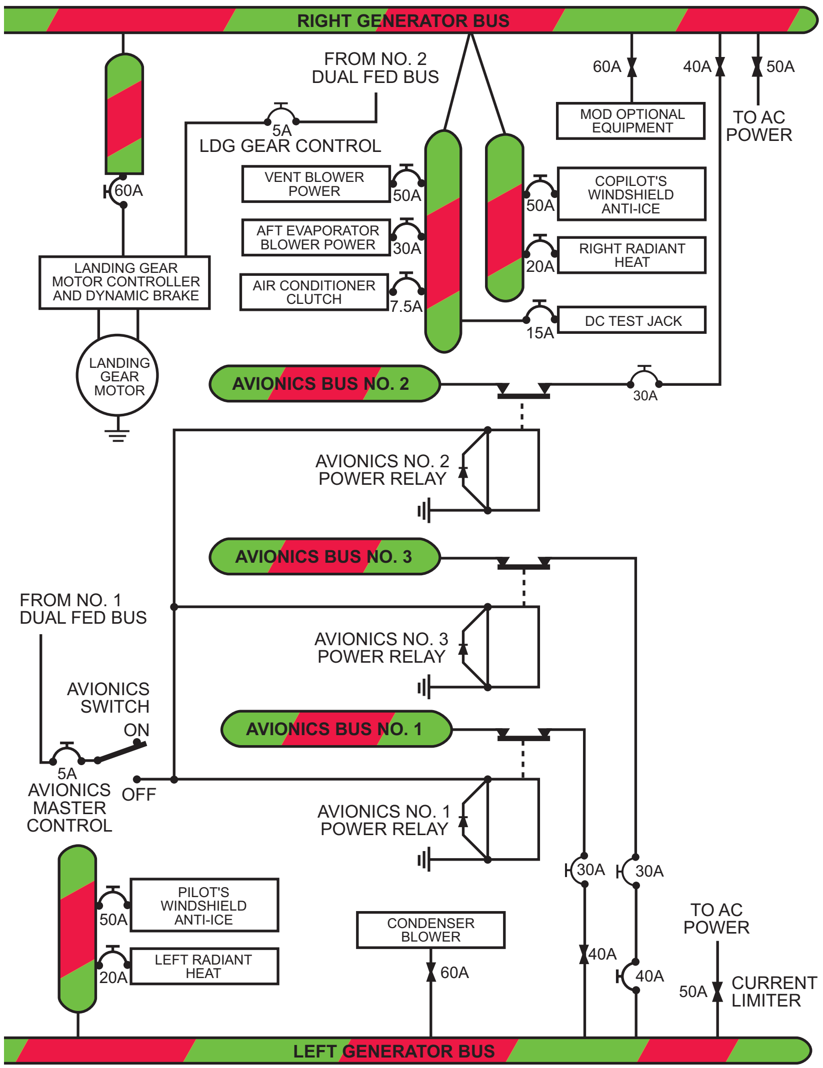
NORMALLY OPEN (NO)



NORMALLY CLOSED (NC)

DC Electrical System
King Air 200

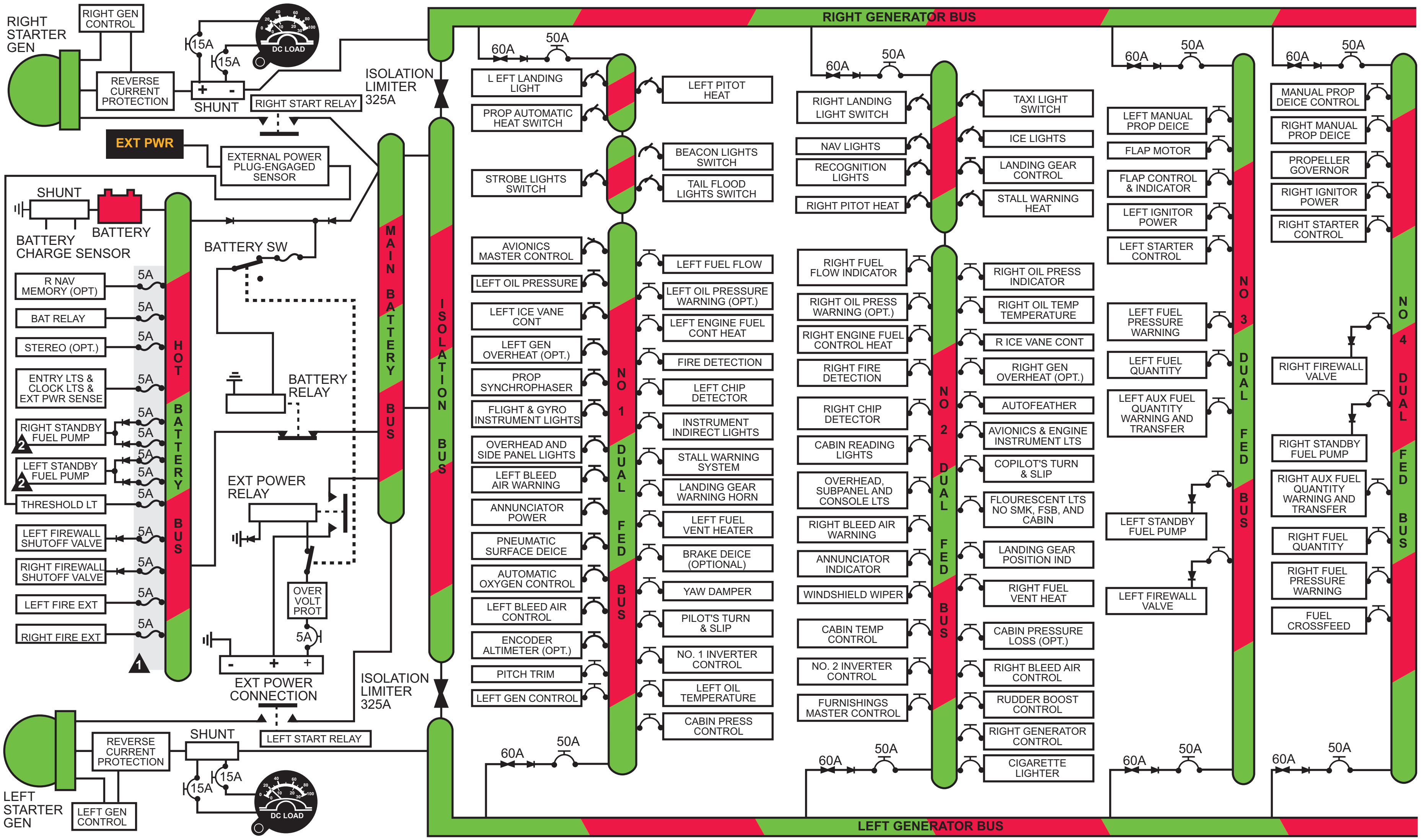




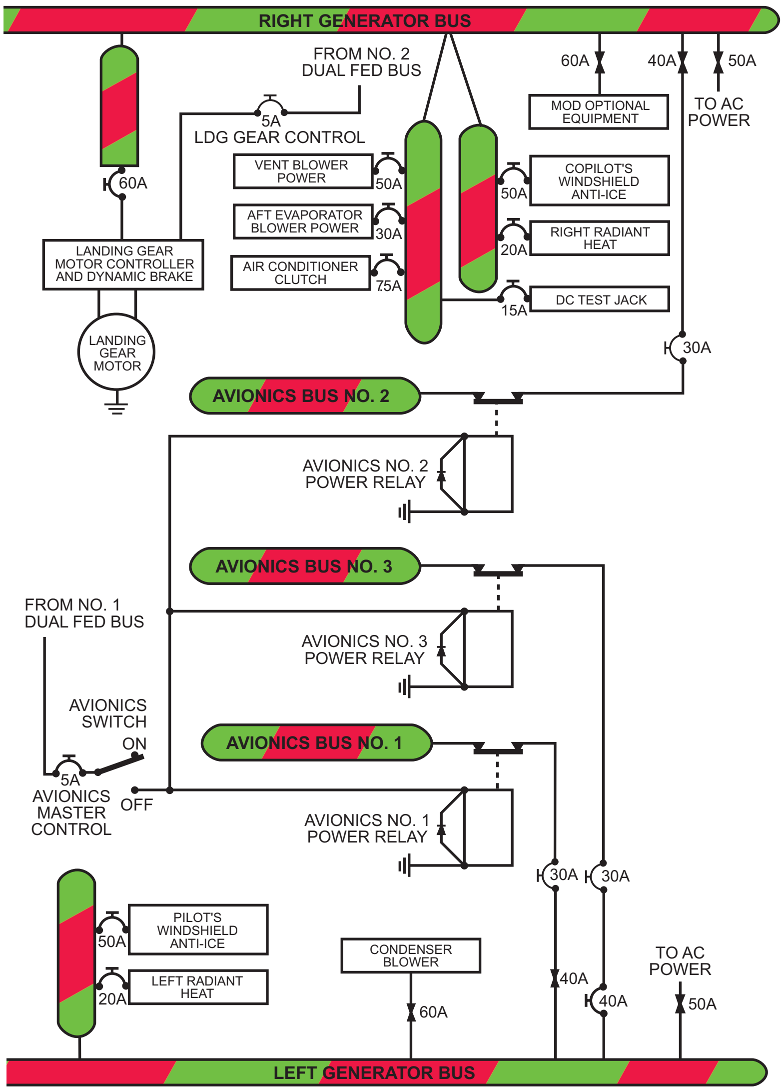
RIGHT GENERATOR BUS
FROM NO. 2
DUAL FED BUS
60A
40A
50A
TO AC
POWER
MOD OPTIONAL
EQUIPMENT
5A
LDG GEAR CONTROL
VENT BLOWER
POWER
50A
AFT EVAPORATOR
BLOWER POWER
30A
AIR CONDITIONER
CLUTCH
7.5A
COPILOT'S
WINDSHIELD
ANTI-ICE
50A
RIGHT RADIANT
HEAT
20A
DC TEST JACK
15A
60A
LANDING GEAR
MOTOR CONTROLLER
AND DYNAMIC BRAKE
LANDING
GEAR
MOTOR
AVIONICS BUS NO. 2
30A
AVIONICS NO. 2
POWER RELAY
AVIONICS BUS NO. 3
FROM NO. 1
DUAL FED BUS
AVIONICS NO. 3
POWER RELAY
AVIONICS
SWITCH
ON
AVIONICS BUS NO. 1
5A
AVIONICS
MASTER
CONTROL
OFF
AVIONICS NO. 1
POWER RELAY
30A
30A
PILOT'S
WINDSHIELD
ANTI-ICE
50A
LEFT RADIANT
HEAT
20A
CONDENSER
BLOWER
60A
40A
40A
TO AC
POWER
50A
CURRENT
LIMITER
LEFT GENERATOR BUS

DC Electrical System

King Air B200



1. ON BB-1096, BB-1098 AND SUBSEQUENT CIRCUIT BREAKERS REPLACE FUSES
2. ON BB-1097, BB-1095 AND PRIOR


RIGHT GENERATOR BUS
FROM NO. 2
DUAL FED BUS
60A
40A
50A
MOD OPTIONAL
EQUIPMENT
TO AC
POWER
5A
LDG GEAR CONTROL
VENT BLOWER
POWER
50A
AFT EVAPORATOR
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AND DYNAMIC BRAKE
LANDING
GEAR
MOTOR
50A
COPILOT'S
WINDSHIELD
ANTI-ICE
20A
RIGHT RADIANT
HEAT
15A
DC TEST JACK
30A
AVIONICS BUS NO. 2
AVIONICS NO. 2
POWER RELAY
AVIONICS BUS NO. 3
FROM NO. 1
DUAL FED BUS
AVIONICS NO. 3
POWER RELAY
AVIONICS
SWITCH
ON
AVIONICS BUS NO. 1
5A
AVIONICS
MASTER
CONTROL
OFF
AVIONICS NO. 1
POWER RELAY
30A
30A
50A
PILOT'S
WINDSHIELD
ANTI-ICE
20A
LEFT RADIANT
HEAT
CONDENSER
BLOWER
60A
40A
40A
TO AC
POWER
50A
LEFT GENERATOR BUS

Electrical System

DC System

DC electrical sources include:

- a 24V, 34 amp-hour nickel-cadmium battery
- two 250A 30V DC starter/generators
- an external DC power system.

These power sources supply the dual-fed bus system that distributes power to the aircraft through circuit breakers:

- Battery

The battery powers starting and emergency operation of essential equipment powered from the Hot Battery bus. With the BATT switch in ON, power flows from the battery through the battery relay to the Main Battery bus. The Main Battery bus then feeds the Isolation bus that, in turn, provides power to the Left and Right Generator buses. Once the Generator buses are powered, the four Dual-Fed buses are powered.

The Main Battery bus also supplies two starter circuits controlled by the engine starter switches and starter relays.

For nicad batteries, a battery charge current detector continuously monitors battery charging rate. If charging rate exceeds 7 amps for six seconds or more, the monitoring system illuminates the BATTERY CHARGE annunciator and triggers the flashing MASTER CAUTION annunciators. After a battery engine start, the BATTERY CHARGE annunciator normally illuminates after the operating engine generator is turned on.

Generators

The generators function as starters during engine starts. Once an engine is running, the generators provide DC power to the aircraft. GEN 1 and GEN 2 switches control the generators. The MASTER SWITCH gang bar turns off the battery and generator switches simultaneously.

Reverse-current protection prevents the generators from absorbing power from the Generator buses if the generators are not operating, or if generator voltage is less than bus voltage.

Voltage Regulation

On **aircraft BB-2 to 88**, a voltage regulation system consists of transistorized regulators, overvoltage relays, paralleling relays, and reverse current relays. These components provide:

- generator load paralleling
- reverse current cutout
- voltage regulation to 28.25 ±0.25V DC
- overvoltage protection
- under voltage protection
- starter/generator priority

The voltage regulators (one for each generator) maintain a constant level voltage output. The paralleling circuit functions when both generators are on-line. The circuit depresses the voltage of the high- output generator and increases that of the low-output generator until both are equal.

If generator output exceeds 32 to 34V, the overvoltage relay trips to take the generator off-line. Actuation of the overvoltage relay also removes voltage from the SW terminal of the reverse-current relay so it opens and removes the generator from the bus. If the overvoltage condition is the result of a voltage regulator malfunction, the overvoltage relays stops the condition. If generator output voltage drops below bus voltage, the reverse current relay isolates the generator from the bus to protect the generator.

On **aircraft BB-89 and subsequent; BL-1 and subsequent**, generator control units (GCUs) and line contactor relays regulate voltage to provide:

- voltage regulation
- line contactor relay control
- generator load paralleling
- differential voltage and reverse current sensing and control
- overvoltage and overexcitation control
- start/generator priority.

Once the engine is running, the GCU uses residual voltage to build generator voltage to the point where it can actually regulate output voltage. Once generator output reaches this point, the GCU increases generator output until it reaches 28.25 ±0.25V DC. At this point, generator output can be connected to the associated Generator bus.

After the GEN switch is in ON, the GCU compares bus voltage to generator output voltage. When these voltages are nearly the same, the GCU closes the line contactor relay. Generator output is then connected to the respective Generator bus. With both generators on-line, the GCU equalizer relay energizes to enable load paralleling circuits. Both GCUs compare their respective generator's output voltage to the opposite generator. The GCUs then adjusts generator output voltage so both generators equally share the load within approximately 10%.

If a generator begins drawing current from the electrical system (i.e., reverse current condition), the GCU opens the line contactor relay to remove the generator from its Generator bus. Once the reverse current condition clears, the GCU automatically resets and the generator comes back on-line.

An overvoltage condition can occur when generator output voltage increases to 32V DC. If this occurs, the GCU will deenergize the generator and trip the line contactor. Once the overvoltage condition clears, the generator must be manually brought back on-line.

External Power

An appropriately rated ground power unit (GPU) can supply the aircraft electrical system through an external power receptacle on the right wing. The ground power unit (GPU) should be capable of providing a continuous load of 300A at 24 to 30V DC and 1,000A for 0.1 seconds during engine start. Use of an inadequate GPU will cause a voltage drop below the start relay's drop-out voltage. This may result in relay chatter and welded contacts. Similarly, a GPU that provides more than 350A continuous load will damage the external power relay and airplane power cables. Connecting a GPU illuminates the EXT PWR annunciator. With external power connected, the generators will not come on-line.

CAUTION: The output setting must not exceed 1,000A on external power sources with a higher current-carrying capability. Any current in excess of 1,000A may overtorque the starter-generator driveshaft or produce heat sufficient to shorten starter-generator life.

DC Power Distribution

The DC power distribution system includes:

- Hot Battery bus
- Main Battery bus
- Isolation bus
- Left and Right Generator buses
- Nos. 1, 2, 3, and 4 Dual-Fed buses
- Nos. 1 and 2 Avionics buses
- optional No. 3 Avionics bus.

The battery directly powers the Hot Battery bus. This bus is un-switched (i.e., always powered) and supplies power to items that may be operating with the battery switch OFF. With the battery switch ON, the closed battery contacts connect the battery to the Main Battery bus.

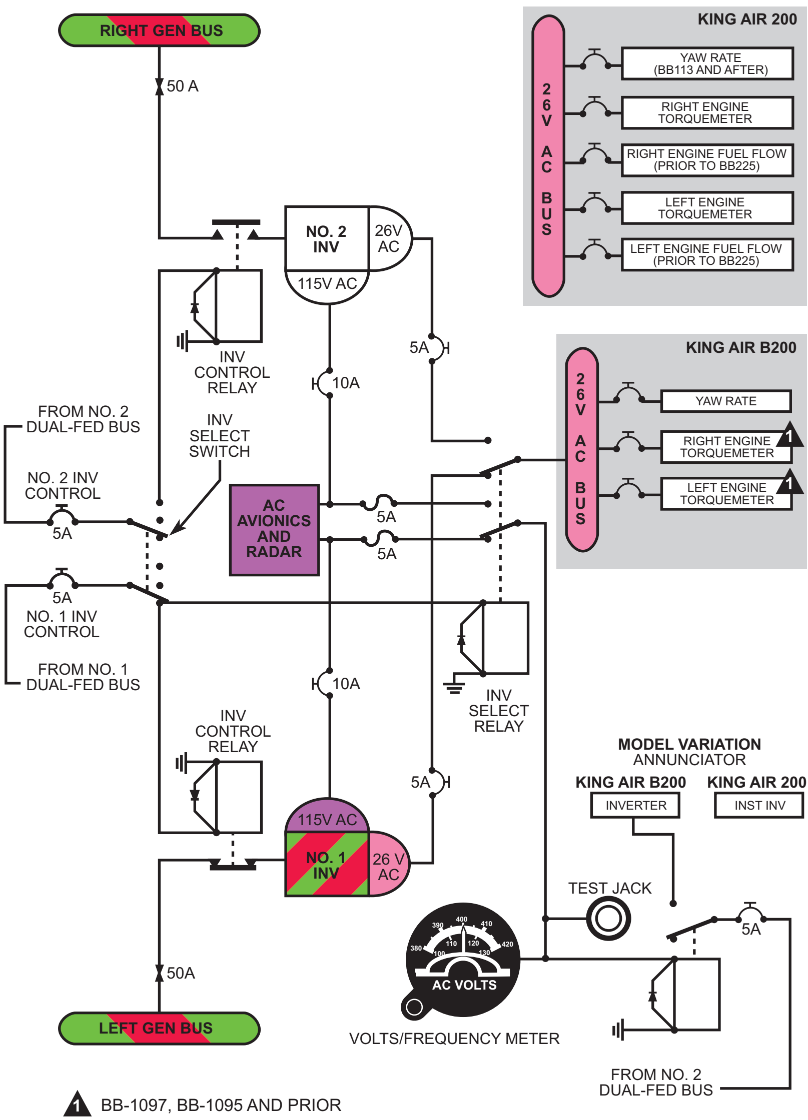
The primary load of the Main Battery bus is the left and right starter/generators during engine start. It also powers the Isolation bus. With a GPU connected to the aircraft, the Main Battery bus is powered through the closed external power relay.

The Isolation bus serves as a connection between the Left and Right Generator buses. High amperage current limiters between the Isolation bus and the Generator buses isolate the battery from a Generator bus fault.

Each of the four Dual-Fed buses receive power simultaneously from the Left and Right Generator buses. These buses are always powered from a combination of three sources. Typically, these sources are both generators or a generator and/or battery.

The left and right generators power, respectively, the Nos. 1 and 2 DC Avionics buses. The AVIONICS MASTER switch and avionics master power relays control this power. With the switch in ON, the relays de-energize to the normally closed position to ensure that if the switch fails, the relays provide continued power to the avionics equipment.

AC Electrical System



AC Power

Two 250VA or 750VA, 400 Hz static inverters supply 115V and 26V AC power. Each inverter operates on 28V DC. The Left Generator bus powers the No. 1 inverter while the Right Generator bus powers the No. 2 inverter.

Placing the INVERTER switch in the No. 1 or No. 2 position energizes the respective inverter's control relay. The relay closes so that Generator bus powers the inverter. The INVERTER switch also controls the inverter select relay to connect the 26V AC buses to the selected inverter and 115V AC to the voltage/frequency meter and inverter fail relay.

THE INVERTER or INST INV annunciator illuminates when 115V is lost at the annunciator relay.

MODEL

PC-250	**PC-17A**
250VA	750VA
115V ±3%	115V +5% or -7%
400 Hz ±1%	400 Hz ±1%

Electrical Systems

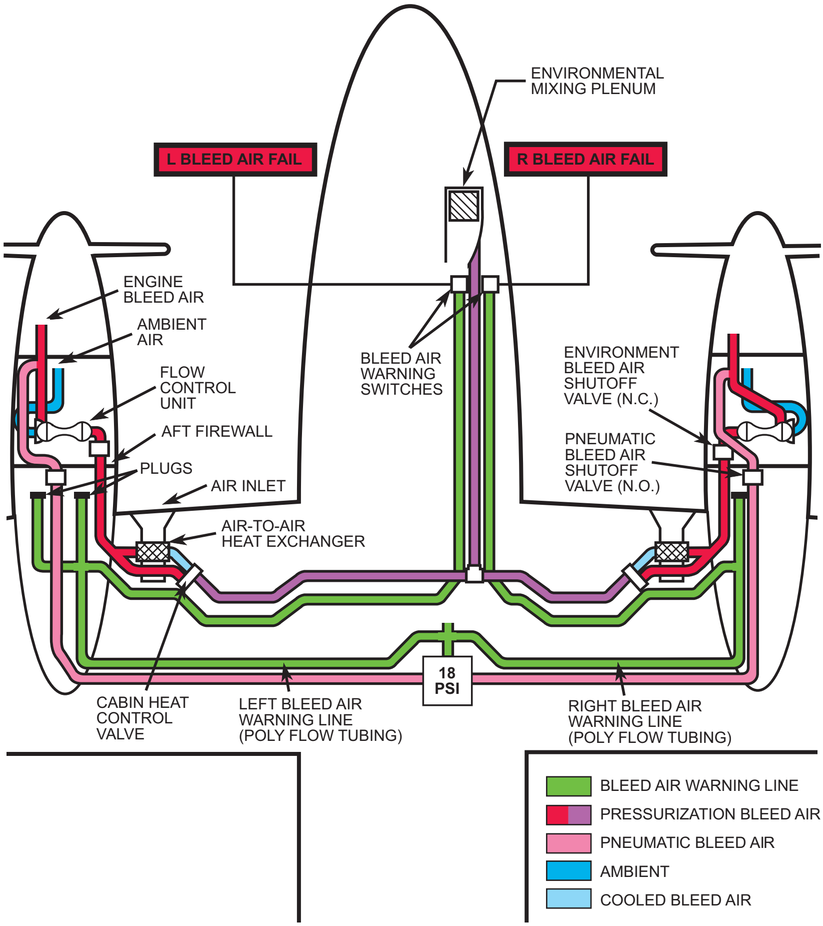
DC Electrical System

Power Source	Battery Starter/Generators (2) 250A (STD) External power unit
Distribution	Hot Battery bus Battery relay Main Battery bus Start Relays (left and right) Isolation bus Generator buses (left and right) Dual-Fed buses (No. 1 through 4) Avionic buses (No. 1, No. 2, and optional No. 3)
Control	Switches BATT IGNITION AND ENGINE START (L/R) Two-position GEN (1/2) – **BB-088 and prior** Three-position GEN (1/2) – **BB-089 and sub.**
Monitor	DC volt/loadmeter (L/R) GEN annunciators (L/R) EXT POWER annunciator Battery Charge annunciator
Protection	Voltage regulator Generator paralleling Reverse current sensing and control Over-voltage protection Over-excitation protection Under-excitation protection GPU Reverse polarity sensing Generator buses Isolation limiters (325A) Current limiters Circuit breakers Dual-fed buses Current limiters (60A) Circuit breakers (50A) Diodes (70A) Hot Battery bus Fuses or circuit breakers

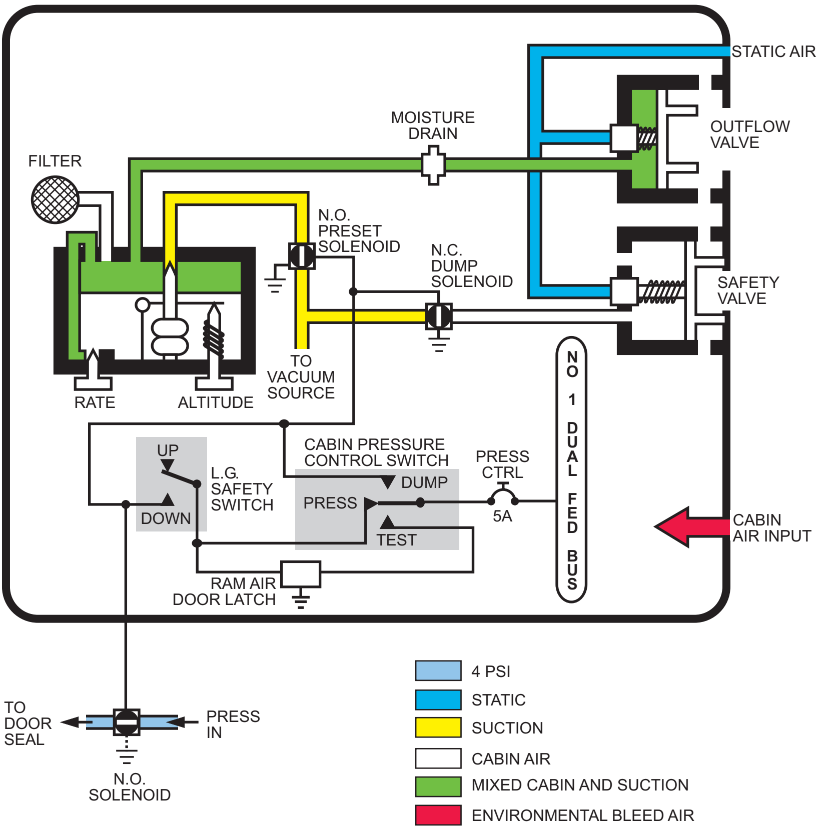
AC Electrical System

Power Source	Inverters (250VA – 750VA)
Distribution	Generator buses (L/R) Inverters Nos 1 and 2 26V AC bus 115V AC avionics
Control	INVERTER switch
Monitor	INVERTER annunciator Volt/Frequency meter
Protection	DC to inverter: 50A current limiter Inverter output: fuses and circuit breakers

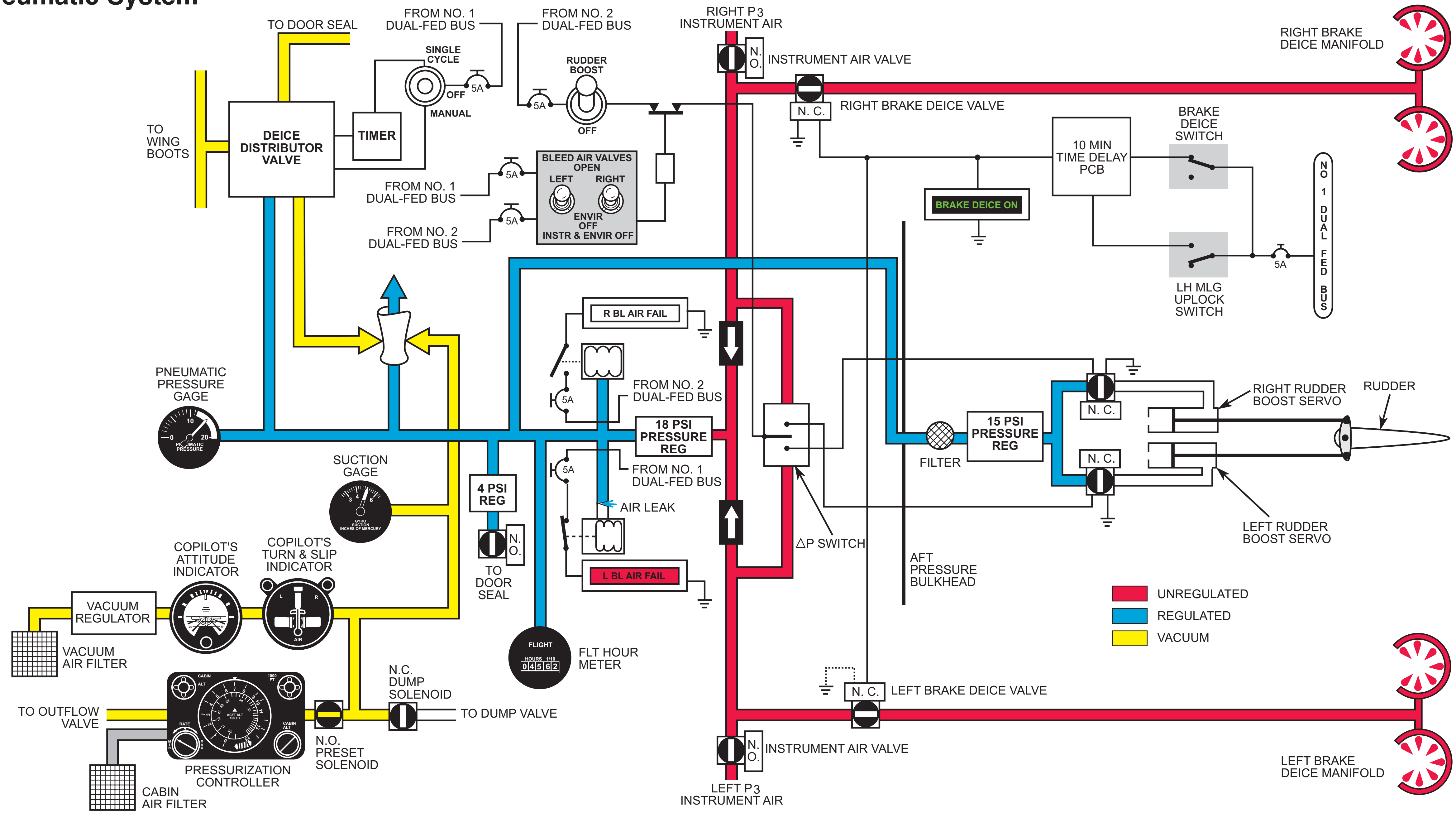
Bleed Air Warning System



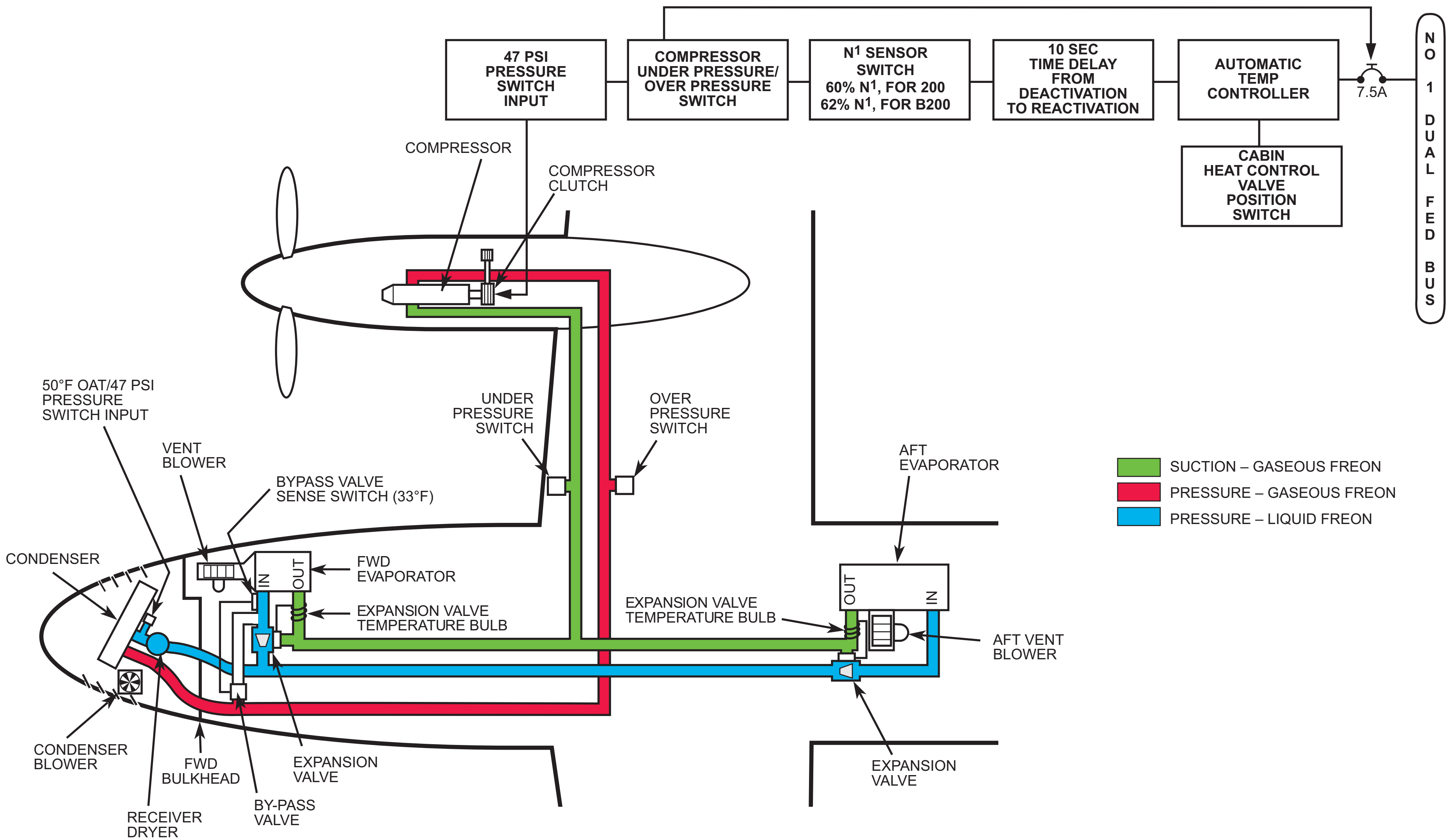
Pressurization System



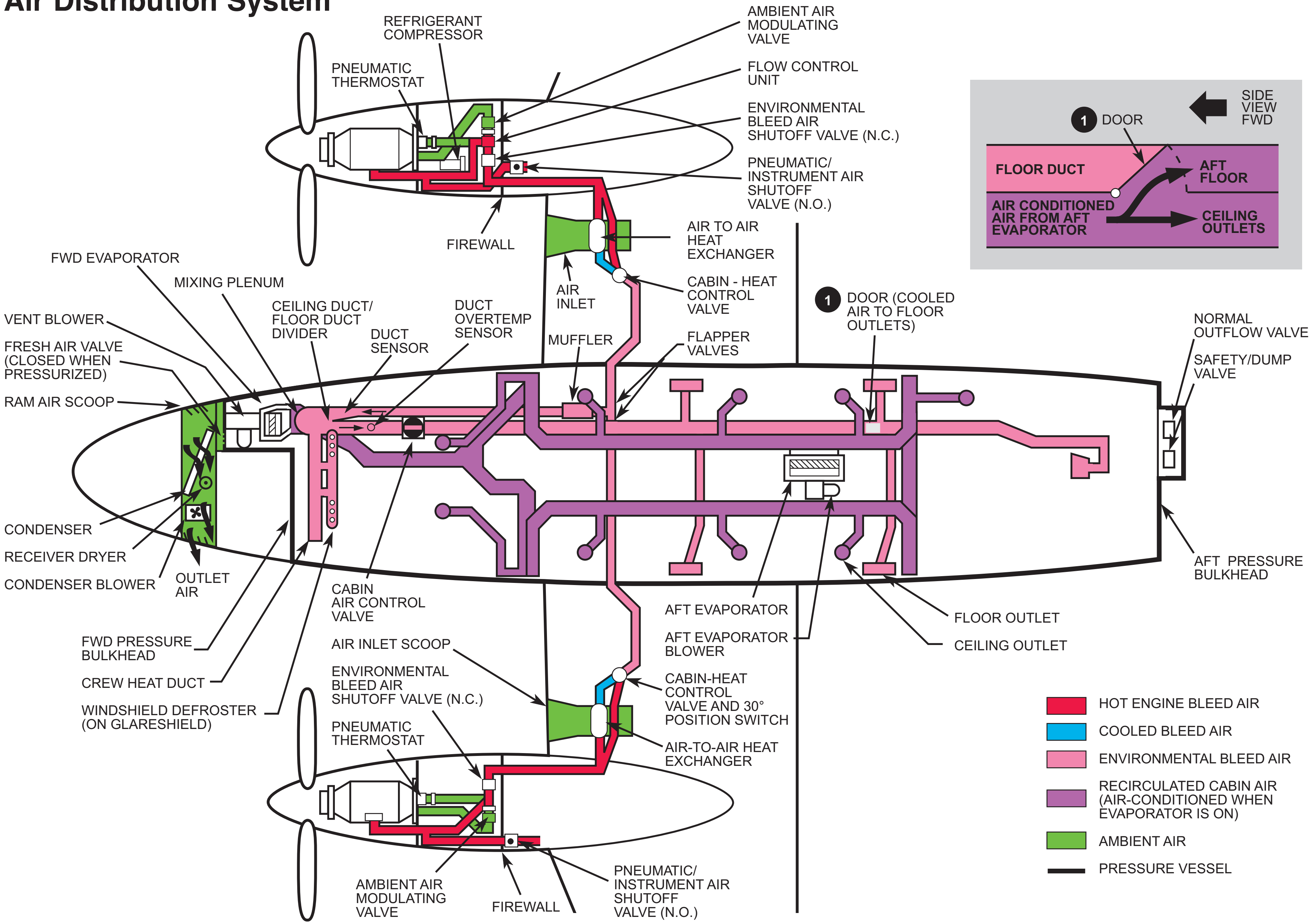
Pneumatic System



Air Conditioning System

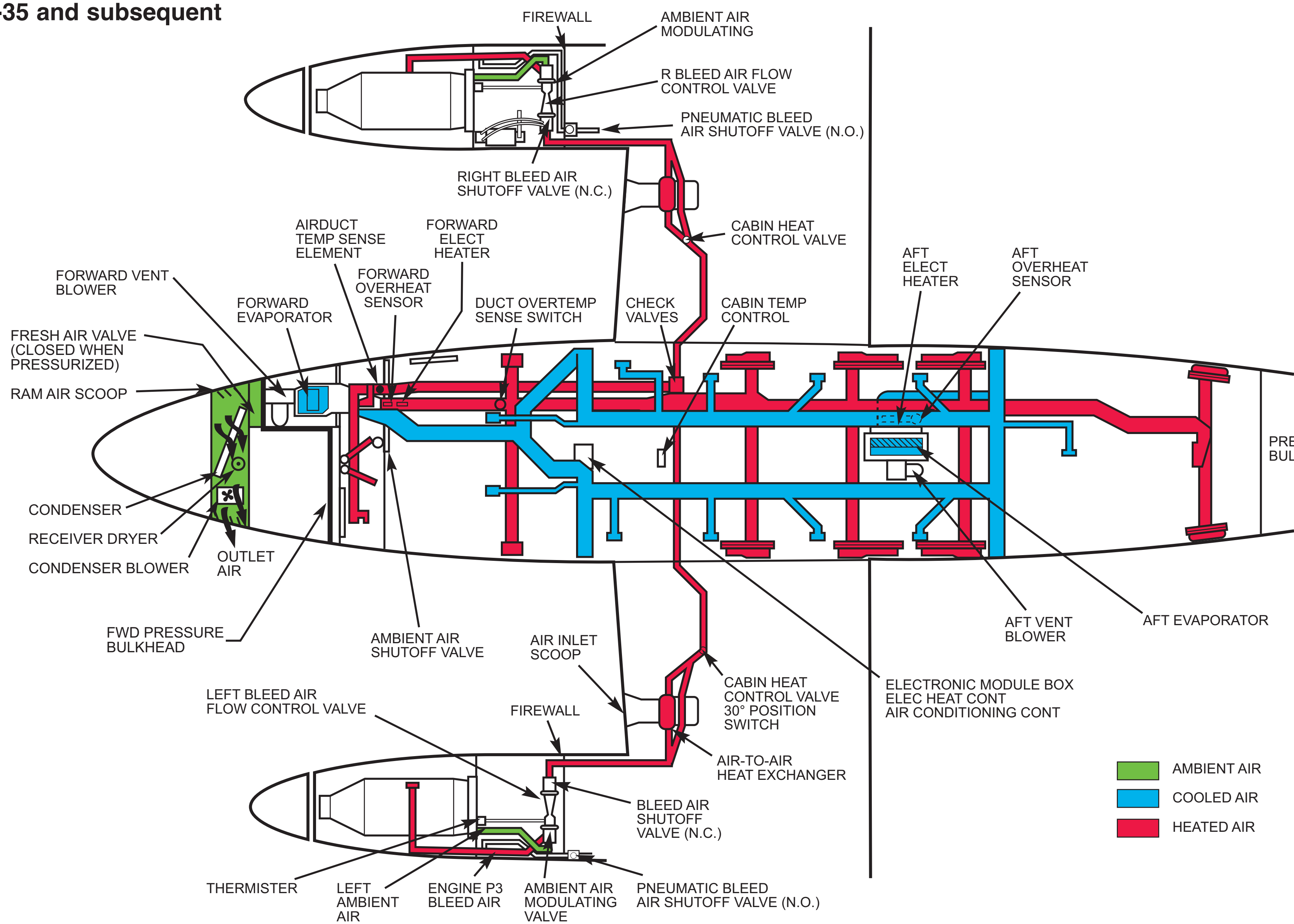


Air Distribution System



Air Distribution System

BB-1439, 1444 and subsequent; BT-35 and subsequent



Environmental Systems

This environmental section includes the following systems:

- bleed air supply (pneumatic system)
- heating system
- air conditioning system
- pressurization system

Bleed Air Supply

The bleed air system extracts bleed air from the engine's compressor section (P_3) and transfers it to various aircraft systems. The pneumatic side of the supply is for surface deice, rudder boost, brake deice, and door seal. In addition, a venturi-ejector in the system creates a vacuum source for the air-driven gyros, pressurization control, and deflation of the deice boots. The environmental supply is for air conditioning and pressurization.

A pair of BLEED AIR VALVES switches controls bleed air supply. With the switches in the OPEN position, both the ENVIR and INSTR shutoff valves open to supply engine bleed air. Placing the switches in ENVIR OFF stops bleed air flow to the environmental system (air conditioning and pressurization) by closing the environmental shutoff valve. Placing the switches in INSTR & ENVIR OFF stops bleed air flow completely by closing both environmental and pneumatic shutoff valves for the selected side. The ENVIR valve is a normally closed valve while the INSTR valve is a normally open valve.

The pneumatic instrument bleed air flows from the shutoff valve to a tee-fitting where the left and right engine bleed air supplies combine. Check valves in each supply line prevent reverse bleed air flow when an engine is not operating. The combined bleed air supply then flows through a 18 PSI pressure regulator. Bleed air from the 18 PSI regulator produces the vacuum.

The environmental system bleed air supply flows through a flow control unit (FCU). Based on atmospheric pressure and temperature, the FCU maintains the required bleed air flow by mixing bleed and ambient air in an ejector.

On **BB-2 to 1179; BL-1 to 69**, with weight-on-wheels, the ambient air modulating valve closes so that only bleed air flows through the FCU to ensure rapid cabin warmup during low ambient temperature operating conditions.

Once airborne, the modulating valve opens to admit ambient air into the FCU. To prevent a pressure surge caused by simultaneously opening of the left and right modulating valves, a time delay circuit delays right valve opening for six seconds. As ambient temperature decreases, the flow control valve gradually closes the modulating valve until at approximately -30°F ambient air flow ceases.

On **BB-1180 and subsequent; BL-70 and subsequent; earlier aircraft with Kit 101-5065-1 S**, placing the BLEED AIR SWITCHES in OPEN energizes the flow control unit's (FCU) electronic controller. The controller closes the bleed air modulating valve and opens the firewall shutoff valve so bleed air flows through the FCU. After the modulating valve closes completely, it slowly cycles open to provide the desired bleed air flow. With weight-on-wheels the ambient air modulating valve remains closed and only bleed air flows through the FCU.

Once airborne, the ambient air modulating valve opens to admit ambient air into the FCU. As aircraft altitude increases or ambient air temperature decreases, the controller drives the ambient air modulating valve toward the closed position until at approximately -30°F, the valve closes completely. The FCU's bleed air bypass valve opens to increase bleed air flow.

Heating and Air Conditioning

The air conditioning system provides conditioned air to the cabin and cockpit. In addition, the right engine drives a freon system for cooling. During unpressurized flight, a ram air scoop provides fresh air ventilation.

At maximum takeoff power, bleed air from the engine compressor section flows to the environmental flow control unit (FCU) at approximately 650°F and 120 PSI. The FCU directs the regulated and mixed bleed air to the cabin-heat control valve, which determines the amount of air that passes through the air-to-air heat exchanger. As the valve closes, more of the air mass passes through the exchanger to decrease the temperature of the air directed to the cabin.

With the CABIN TEMP MODE selector in AUTO, the heating and air conditioning systems operate automatically as the CABIN TEMP knob modulates the cabin heat control valve to maintain the proper temperature.. A temperature-sensing unit in the cabin along with the requested setting initiates a heat or cool command to the temperature controller. A duct anticipator temperature probe provides for constant temperature control.

Selecting a warmer cabin (toward INCR) signals the automatic temperature control to modulate the cabin heat control valves one at a time to allow bleed air to bypass the heat exchangers. Selecting a cooler cabin (toward DECR) signals the cabin heat control valves to pass bleed air through the air-to-air heat exchanger. If necessary, the freon air conditioning system is activated to reach the desired temperature.

When the evaporative-type freon air conditioning system is necessary, high pressure high temperature freon gas flows to a condenser coil where it is cooled to a liquid. The condensed liquid then flows through a receiver/dryer before being metered to flow through an evaporator to be cooled.

With the CABIN TEMP MODE selector in MAN HEAT or MAN COOL , manual control of the cabin temperature can be made with the MANUAL TEMP switch. Momentarily holding the MANUAL TEMP spring-loaded center return switch to INCR (hot) or DECR (cold) modulates the cabin heat control valves. Only one valve moves at a time. Allow approximately 30 seconds per valve (one minute total) for the valves to move to the full heat or full cold position. Cool air comes out of the overheat vents while the majority of warm air comes out of the floor vents. MAN COOL directs the air conditioner system to operate if the right engine speed is above 60% (**200**) to 62% (**B200**) N_1.

High and low pressure switches protect the air conditioning system. If a refrigerant over or under pressure condition occurs, the appropriate pressure switch actuates. Switch actuation that cuts power to the compressor clutch. The system also has temperature protection to prevent evaporator freezing. If evaporator temperature falls to approximately 33°F, the thermal switch actuates a bypass valve that routes hot refrigerant past the system's expansion valve.

Supplemental Heating

Optional radiant heating panels provide increased heating. The RADIANT HEAT switch controls the radiant heat panels usually located above the cabin windows and on the cargo door. Depending on the installation, thermal fuses or thermostats provide overheat protection for the panels.

On **aircraft BB-1439, 1444 and subsequent; BL-139 and subsequent**, an optional electric heating system warms the cabin during ground operations. With weight-on-wheels, place the CABIN TEMP MODE in MAN HEAT and the ELEC HEAT and AFT BLOWER switches on. When the electric heat system is turned on, the ELEC HEAT ON annunciator must extinguish before turning the AFT BLOWER switch off. If duct temperature reaches 118°F (48°C), overheat sensors shut the system down by de-energizing heater power relays and control switch.

Pressurization

The pressurization system controls cabin altitude, climb rate, and descent rate by operating outflow valves that vent conditioned air to the atmosphere.

The pressurization controller regulates the outflow valve opening to maintain the desired cabin rate-of-change during climb and descent and cabin pressure altitude during cruise. If a negative cabin pressure differential occurs, a negative pressure relief diaphragm opens to allow ambient air inflow into the cabin. This prevents cabin altitude being lower than aircraft altitude.

Aircraft with PT6-41 engines have a 6.1 PSI maximum cabin pressure differential while aircraft with PT6A-42 engines have a 6.6 PSI maximum cabin pressure differential. The pressurization system maintains approximately a 10,000 ft cabin altitude at 31,000 (PT6A-41) or 35,000 ft pressure altitude (PT6A-42). If the system malfunctions and cabin pressure differential exceeds the system's maximum value, a safety valve dumps excess pressure to atmosphere. Place the CABIN PRESS switch in DUMP to releases cabin pressure regardless of weight-on-wheels status.

Placing the CABIN PRESS switch in TEST bypassing the landing gear squat switch to test the system, which enables the aircraft to be pressurized on the ground.

Environmental Systems

Air Conditioning/Heating System

Power Source	Engine bleed air – heating Right engine – Freon system
Distribution	Engine compressor bleed air Environmental control unit Cabin Cockpit
Control	Switches BLEED AIR VALVES MANUAL TEMP VENT BLOWER AFT BLOWER RADIANT HEAT (prior to BB 1439) ELEC HEAT (BB 1439 and subsequent) CABIN TEMP MODE selector CABIN TEMP control selector Right engine RPM above 60%
Monitor	CABIN AIR gage Thermostat AIR CND_1 LOW annunciator
Protection	High and low pressure switches N_1 speed switch 47 PSI pressure switch

Bleed Air System

Power Source	Bleed air (each engine – station P_3)
Distribution	Prior to 18 PSI regulator Brake deice Rudder boost P switch After 18 PSI regulator Bleed air warning system Rudder boost servos Flight hour meter Door seal (if installed) Vacuum Deice boots
Control	BLEED AIR VALVE switches
Monitor	PNEUMATIC PRESSURE gage GYRO SUCTION gage
Protection	BL AIR FAIL annunciators Bleed air shutoff valves Relief valves Check valves

Pressurization System

Power Source	Bleed air (each engine – station P_3)

Distribution	Flow control unit
	    Air-to-air heat exchangers
	    Cockpit
	    Cabin

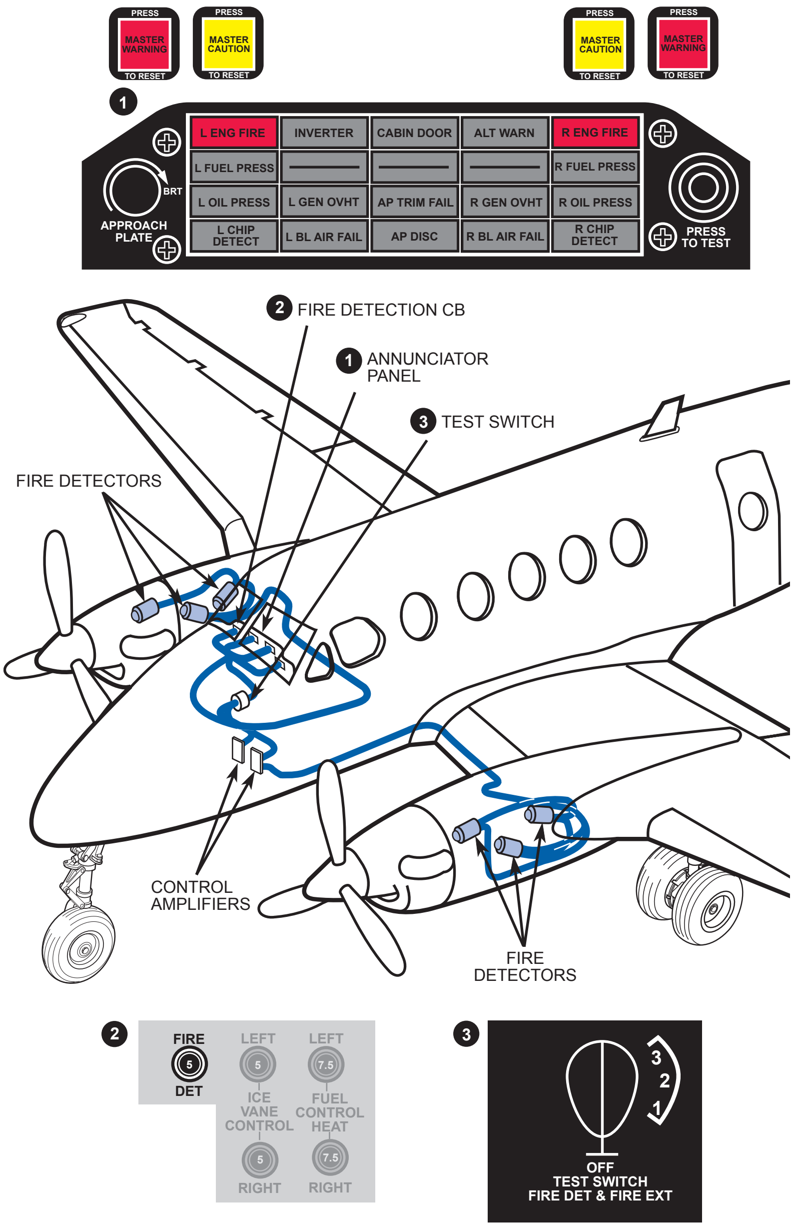
Control	Switches
	    BLEED AIR VALVES
	    CABIN PRESS
	Pressurization controller

Monitor	Cabin altitude and differential pressure gage Cabin VSI

Protection	BL AIR FAIL annunciators
	Bleed air shutoff valves
	CABIN ALT annunciator
	Squat switch
	Outflow/safety valves (negative/maximum
	    differential relief)
	Passenger oxygen mask auto deployment
	    system

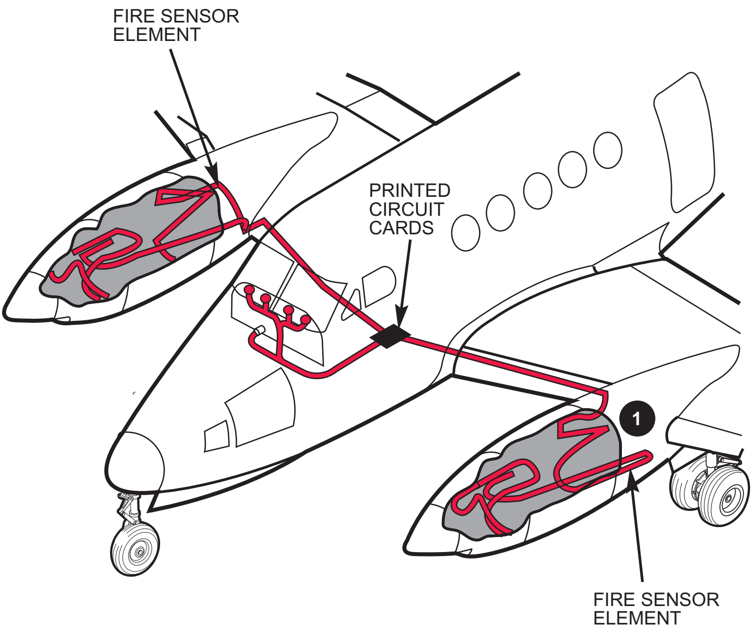
Fire Detection System

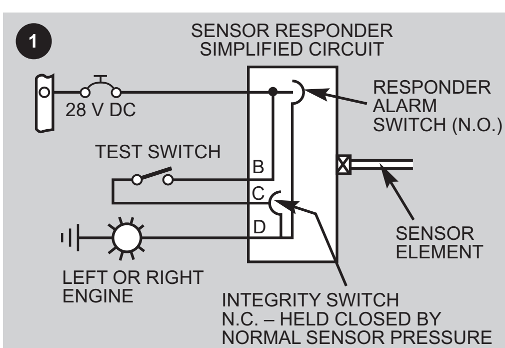
Prior to BB-1439



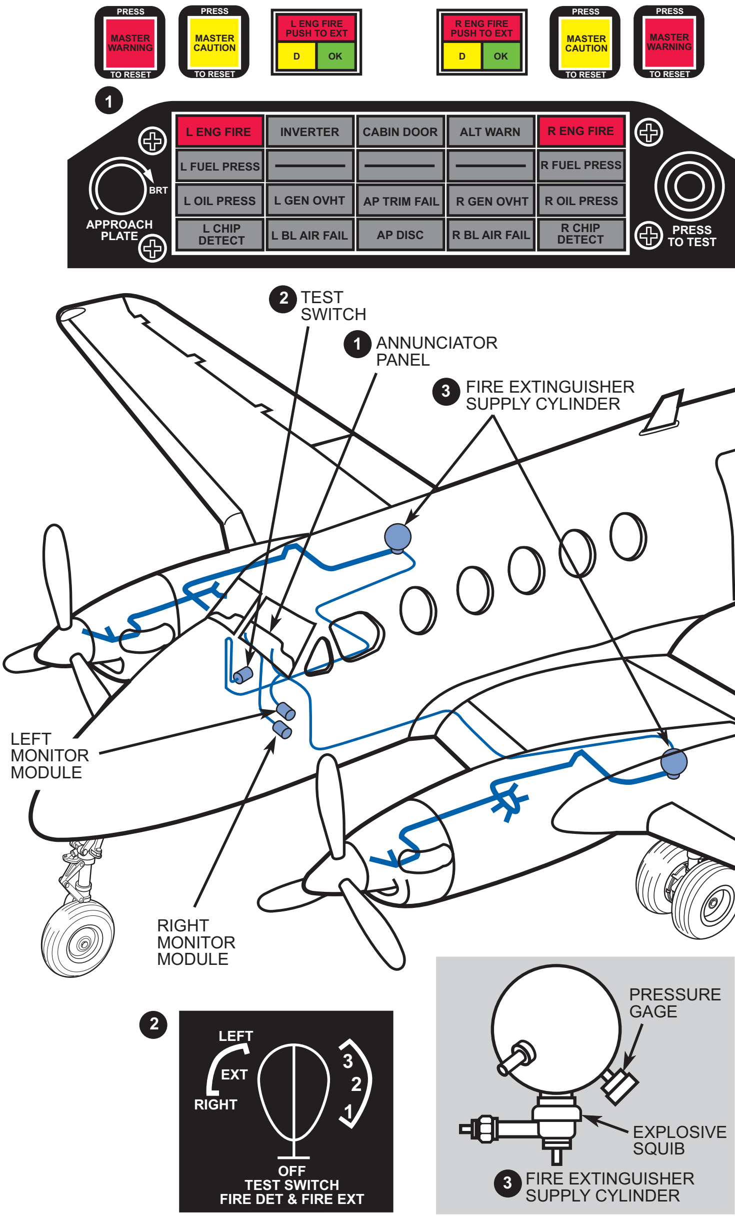
Fire Detection System

BB-1439, 1444 and subsequent;
BT-35 and subsequent;
BL-139 and subsequent





Fire Extinguishing System



Fire Protection Systems

Fire protection systems include:

- engine fire detection
- engine fire extinguishing
- bleed air warning.

Engine Fire Detection

Engine fire detection consists of either infrared sensitive photo-cells or temperature sensing elements. With either system, an engine fire illuminates the respective ENG FIRE or FIRE ENG light on the glareshield panel.

On **S/Ns BB-2 to 1438; BB-1440 to 1443; BL-1 to 138**, the detection system consists of three photo-cells strategically placed in each engine compartment. When sufficient infrared radiation strikes a cell, a control amplifier relay closes to illuminate the respective ENG FIRE or FIRE ENG light and the MASTER WARNING flashing lights. Once the fire extinguishes and infrared radiation decreases below a set level, the system resets and the FIRE light extinguishes.

On **S/Ns BB-1439; BB-1444 and subsequent; BL-130 and subsequent**, each engine's temperature sensing element consists of a sealed stainless steel tube. Within this tube is an inert gas and an inner core with an active gas. The sensing element connects to a responder that contains an alarm switch for detection and and integrity switch for testing.

Exposing a sensing element to temperatures of 450°F (232°C) along its entire length or 900°F (482°C) along a one-foot section expands the element's core gases. This closes the responder alarm switch to illuminate the respective ENG FIRE light and trigger the MASTER WARNING flashing lights. Once the sensing element cools below its trigger temperature, the ENG FIRE light extinguishes. The MASTER WARNING lights, however, do not extinguish until they are reset.

Engine Fire Extinguishing

If installed, the engine fire extinguishing system consists of a fire extinguisher bottle in each main wheel well. Spray nozzles connected to each bottle direct fire extinguishing agent to the engine accessory section and power sections. Each bottle contains approximately 2.5 lbs of Halon 1301 pressurized with dry nitrogen to 450 PSI at 60°F (pressurization is directly proportional to OAT).

The fire detection system illuminates the ENG FIRE PUSH TO EXT light. Pressing that light supplies DC power to the extinguisher bottle's explosive squib. The squib's detonation dislodges a sealing disc so that bottle contents flow to the spray nozzles. Once a bottle discharges, the respective D or DISCH caption illuminates.

Testing

Aircraft with a photo-cell detection system have a rotary TEST SWITCH with six positions: L and R EXT on left side of switch; 3, 2, 1 on right side of switch, and OFF. Aircraft with sensing elements have a switch labeled TEST SWITCH FIRE DET & EXT with positions of EXT L-R and DET L-R (**BB-1439, BB-144 to 1462**) or a switch labeled TEST SWITCH ENG FIRE SYS with OFF, EXT L-R and DET L-R positions (**BB-1463 and subsequent; BL-139 and subsequent**). Aircraft without extinguishing systems eliminate the EXT labels on the switches.

Rotating the TEST switch through positions 3, 2, and 1 or DET L-R illuminates the left and right red MASTER WARNING flashers, the red L and R ENG FIRE annunciators, and the red L and R ENG FIRE PUSH TO EXT lights (if installed). If any of the fire detection annunciators fail to illuminate at each test position, a malfunction exists in the detector circuits.

Rotating the switch to the L/R EXT or EXT L-R positions tests the fire extinguishing system. Illumination of the ENG FIRE light's D (DISCH) caption indicates the bulb is functioning; illumination of the OK caption indicates detector circuitry and squib-firing circuits are operational.

Engine Bleed Air Warning

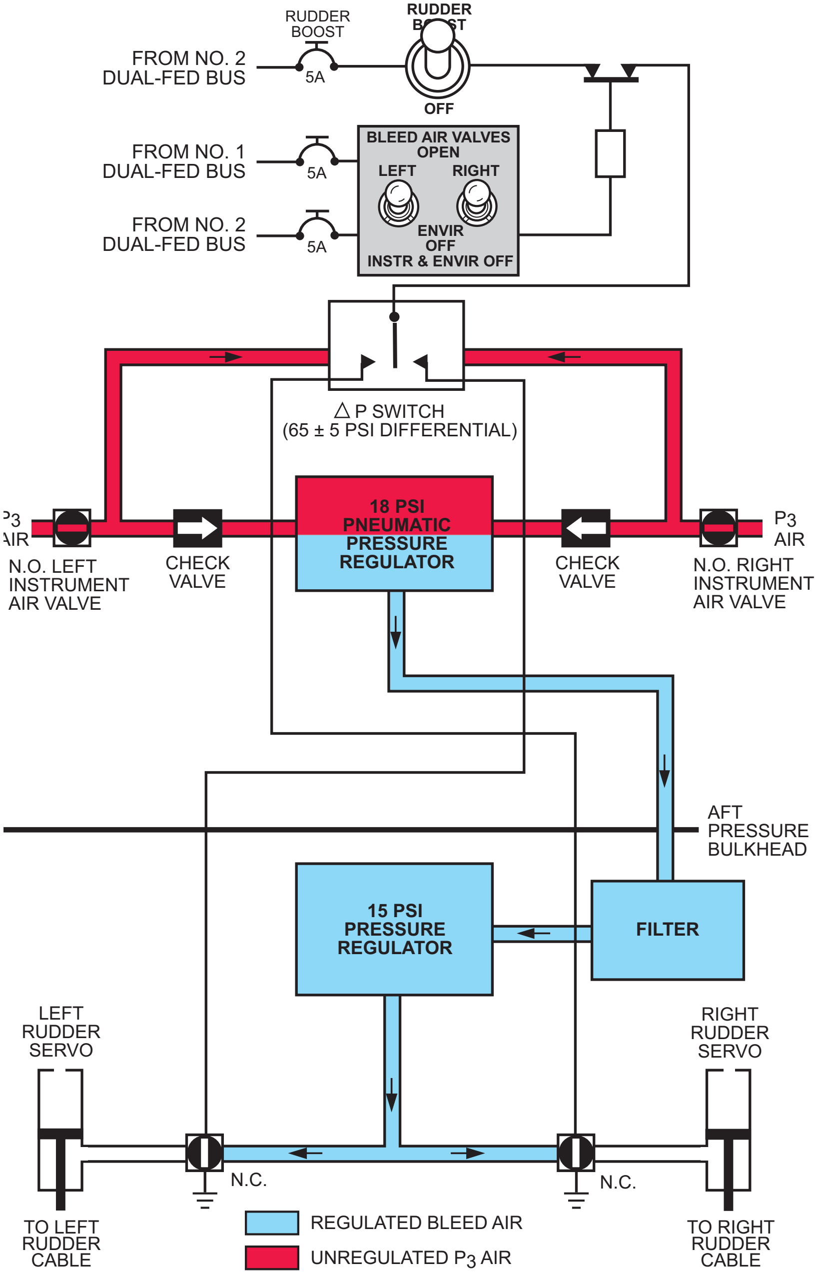
Polyflow tubing that parallels the bleed air lines from the firewall into the cabin provides a warning system for a bleed air leak. These parallel tubing lines are pressurized with instrument bleed air at approximately 18 PSI.

If a bleed air line ruptures, excessive heat (200°F) melts the adjacent tubing to release pressure. When pressure is reduced, a switch in the line under the copilot floor closes to illuminate the respective BL AIR FAIL annunciator.

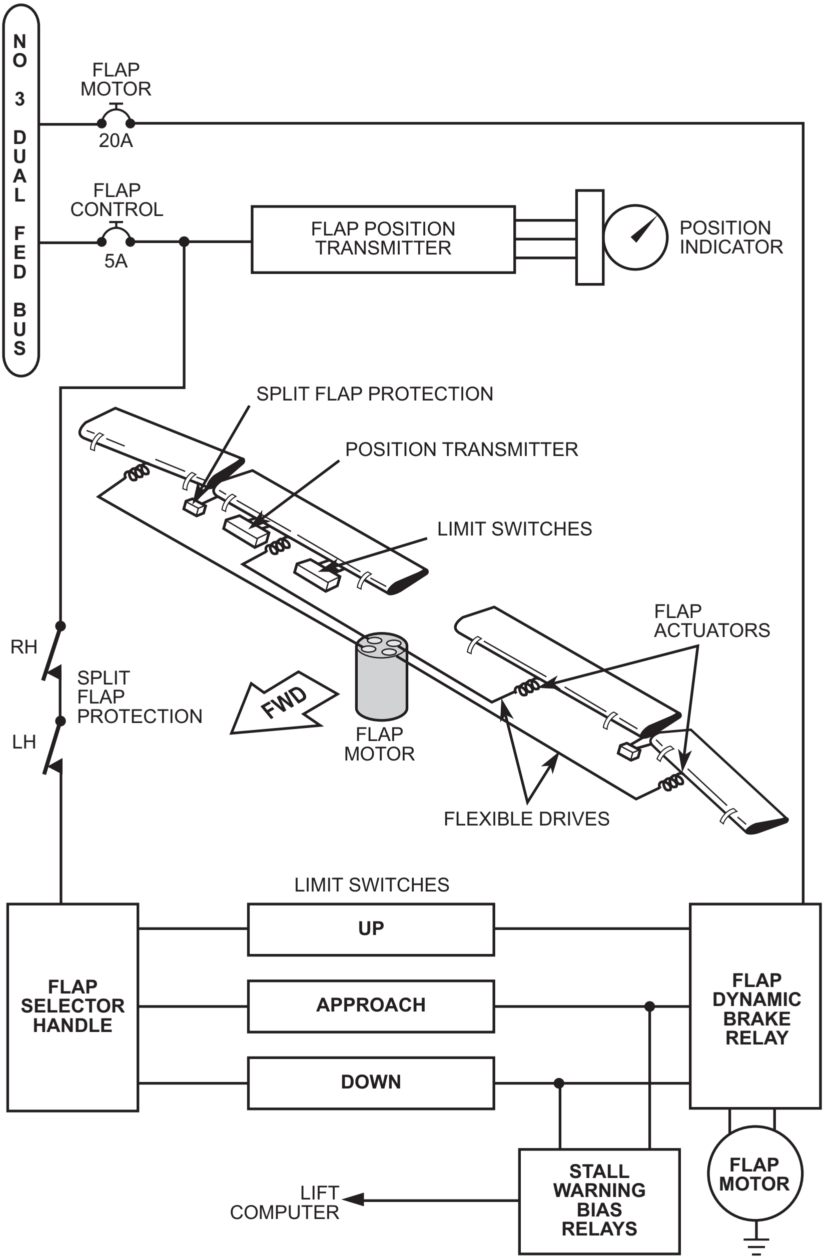
Fire Protection System

Power Source	No. 1 Dual-Fed bus – fire detection Hot Battery bus – optional fire extinguishing Portable hand fire extinguishers
Distribution	Extinguisher bottle to corresponding engine (no crossfiring)
Control	TEST SWITCH FIRE DET (& EXT, if installed) ENG FIRE-PUSH TO EXT (L/R) lens/switch (if installed)
Monitor	ENG FIRE (L/R) annunciators Red ENG FIRE-PUSH TO EXT (L/R) lens (if installed) Amber D lens to confirm electrical wiring continuity (if installed) Green OK lens to test system (if installed) MASTER WARNING (L/R) flashers
Protection	FIRE DET CB (5A) FIRE extinguisher fuse (if installed) (**prior to BB-1096**) FIRE EXTINGUISHER CB (5A) (if installed) (**BB-1096 and subsequent**)

Rudder Boost System



Flap System


NO 3 DUAL FED BUS
FLAP MOTOR
20A
FLAP CONTROL
5A
FLAP POSITION TRANSMITTER
POSITION INDICATOR
SPLIT FLAP PROTECTION
POSITION TRANSMITTER
LIMIT SWITCHES
FLAP ACTUATORS
RH
SPLIT FLAP PROTECTION
LH
FWD
FLAP MOTOR
FLEXIBLE DRIVES
LIMIT SWITCHES
UP
APPROACH
DOWN
FLAP SELECTOR HANDLE
FLAP DYNAMIC BRAKE RELAY
FLAP MOTOR
STALL WARNING BIAS RELAYS
LIFT COMPUTER

Flight Controls

Primary flight controls include the ailerons, elevators, and rudder. These control the aircraft through the pitch, roll, and yaw axes. Each of the primary flight controls has a mechanically operated trim system; the elevator trim system also has an electrically operated trim system. The flap system is the only secondary flight control system.

Related flight systems include the stall warning, rudder boost, and yaw damper systems.

Primary Flight Controls

Ailerons on the outboard trailing edge of each wing provide roll control mechanically through the control wheel or electrically through the autopilot servo. Rotating the control wheel left or right from neutral mechanically actuates the ailerons through a system of cables and bellcranks. Mechanical stops on the ailerons limit total movement to approximately 25° up and 15° down from neutral. The autopilot also actuates the ailerons through a servo connected to the aileron control circuit's cables.

A trim tab on the left aileron provides lateral trim capability. Rotating the AILERON TAB knob left or right from the neutral or "0" position mechanically drives the trim tab up or down respectively. Toward RIGHT drives the tab up for a left wing up movement; movement toward LEFT produces the opposite effect.

The elevators on the trailing edge of the T-tail horizontal stabilizer provide pitch control. Pushing the control column fore and aft from neutral mechanically deflects the elevators down and up through cables and bellcranks. Stops limit total elevator movement to approximately 20° up and 14° down from neutral. An autopilot servo connected to the control cables also operates the elevators.

A mechanically or electrically operated pitch trim system drives the elevator trim tabs to reduce elevator control forces and trim the aircraft in the longitudinal axis. Rotating the ELEVATOR TAB wheel forward or aft from neutral mechanically drives the trim tab actuators. The jack-screw type actuators then extend or retract to move the elevator trim tabs in the necessary direction to pitch the nose up or down. With the ELEV TRIM switch in the ON position, the electric pitch trim system is activate. Actuating a set of TRIM switches toward the NOSE UP or NOSE DN position drives powers the electric trim tab actuator. The actuator's clutch then engages to connect the motor to the cable drum. The motor then operates the trim tab actuators through cables.

A bi-level, pushbutton, momentary-on trim disconnect switch is inboard of the dual-element thumb switch on the outboard grip of each control wheel. If an autopilot is installed, pressing the switch to the first level disconnects the autopilot and yaw damper system. Pressing the switch to the second level additionally disconnects the electric elevator-trim system. If no autopilot is installed, pressing the switch to the first level has no effect. The second level disconnects the elevator-trim system.

The rudder provides directional control of the aircraft about the vertical axis. A direct connect cable system from both sets of rudder pedals to the tail section drives the rudder. Deflecting a set of rudder pedals from neutral mechanically deflects the rudder to produce a yaw movement. Total rudder movement is approximately 25° left or right from neutral.

Rotating the RUDDER TAB wheel left or right from neutral mechanically moves the rudder trim tab to reduce rudder pedal control forces. Total tab deflection is approximately 15° left or right from neutral.

Rudder Boost and Yaw Damper

A rudder boost system pneumatically positions the rudder to compensate for asymmetric engine power differences. With the RUDDER BOOST switch in ON, the BLEED AIR VALVES switches in OPEN or ENVIR OFF, and engine bleed air available, the rudder boost system is active.

If engine power difference increases (i.e., failed engine), a differential pressure switch (ΔP) moves toward the low pressure side. Once pressure differential reaches approximately 60 ±4 PSI, the switch opens the opposite side's shutoff valve. The shutoff valve then supplies bleed air to the rudder servo to drive the rudder toward the engine producing more power.

With the BLEED AIR VALVE switch(es) in INST & ENVIR OFF the rudder boost relay interrupts pressure differential switch power supply to disengage the rudder boost system.

On aircraft without an autopilot, the rudder boost system also provides a yaw damping function. Bleed air passes through a 10 PSI pressure regulator before reaching a solenoid control valve and yaw control valve. With the YAW DAMP switch in ON and weight-off-wheels, the system's yaw sensor, amplifier, and control valve generate rudder inputs with the rudder boost servos to counteract aircraft yaw.

On aircraft with an autopilot, the yaw damping function is part of the autopilot. The yaw sensor, amplifier, control valve and related equipment are not present.

Flaps

Each wing contains two flaps on the trailing edge inboard of the ailerons. With flaps extended, stall speed decreases.

Selection of a flap position on the FLAP handle controls travel of the flaps by powering flap motor through limit switches and the flap motor relay. The flap motor drives a gearbox connected to four flexible driveshafts that, in turn, connect to jackscrew actuators at each flaps. To prevent overtravel, the flap motor has a dynamic braking system of two sets of motor windings.

Limit switches interrupt power to the flap motor when the desired position is reached. On **aircraft BB-2 to 187**, roller type microswitches limit flap travel. On **aircraft BB-188 and subsequent; aircraft with SI-1121-II**, open-cam type microswitches provide greater reliability in limiting flap travel.

A safety mechanism interrupts power if a split flap situation occurs. On **aircraft BB-2 to 424** this system cuts power by pulling one of the flap motor fuses. On **aircraft BB-425 and subsequent; BL-1 and subsequent**, flap asymmetry operates a flap safety switch.

The landing gear warning system provides an aural and visual warning of improper flight configurations. With the FLAP handle in UP, APPROACH, or DOWN, retarding the power levers below about 79% N_1 RPM setting with the landing gear retracted sounds the gear warning horn and flashes the landing gear lever light. With the FLAP handle in UP or APPROACH, pressing the horn silence button stops the horn. Advancing the power levers or extending the landing gear cancels the warning completely. With flaps down, the horn cannot be silenced by advancing the power levers or by pressing the horn silence button.

Stall Warning System

The stall warning system provides an audible warning to notify the crew of an impending stall.

With weight-off-wheels, an electrically heated lift transducer measures the aircraft's angle-of-attack (AOA). The system's lift computer then processes the transducer's inputs and modifies it based on flap setting. The lift computer adjusts the stall warning limits to the following:

- 5 to 13 kts above stall with flaps retracted (UP)
- 5 to 12 kts above stall with APPROACH flaps
- 8 to 14 kts above stall with flaps extended fully (DOWN).

If a stall is imminent, the lift transducer triggers the warning horn sounds.

With weight-on-wheels, placing the STALL WARN TEST switch in the test position magnetically deflects the lift transducer to the pre-stall position. If the system is working normally, the stall warning horn sounds.

> **NOTE:** Stall Warning system may be unreliable during operations in icing conditions with accumulation of ice on airframe surfaces.

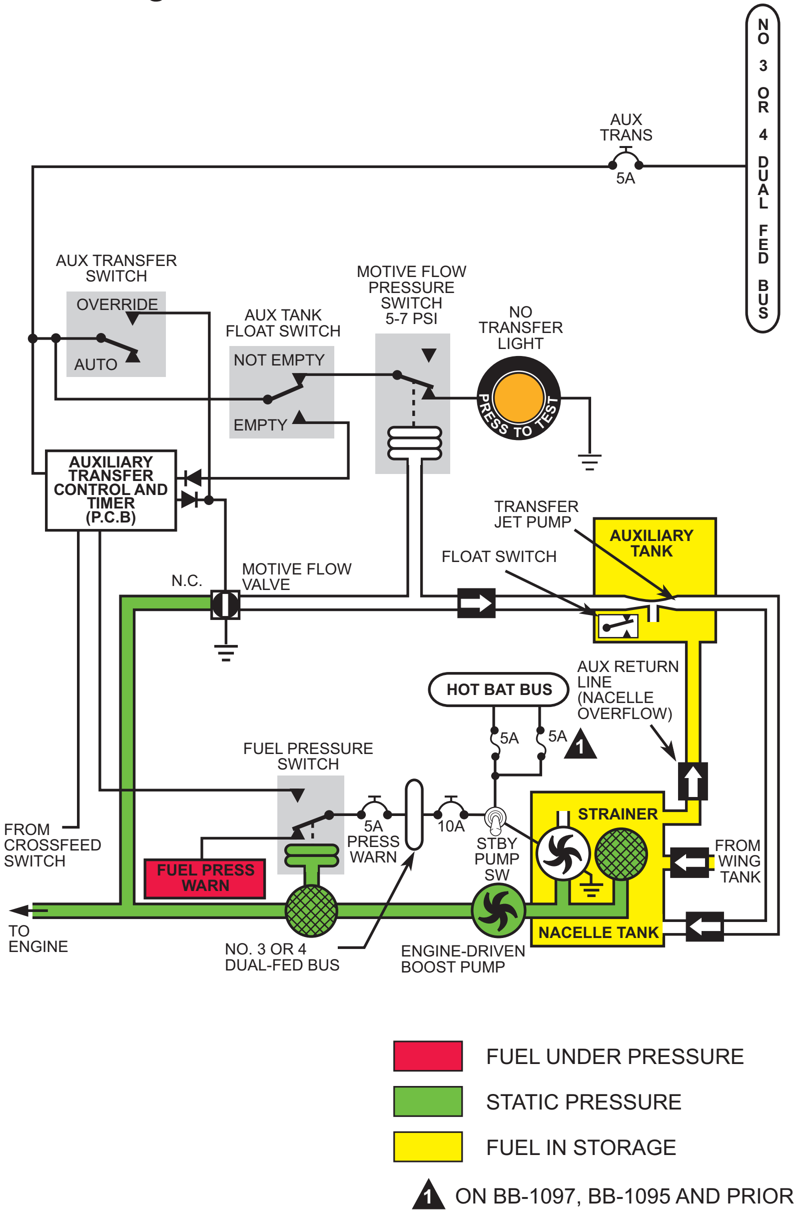
Flight Controls

Flap System

Power Source	No. 3 Dual-Fed bus – electric motor/control
Control	FLAP handle
Monitor	FLAP indicator
Protection	Circuit breakers FLAP CONTROL (5A) FLAP MOTOR (20A) Split flap protection Limit switches

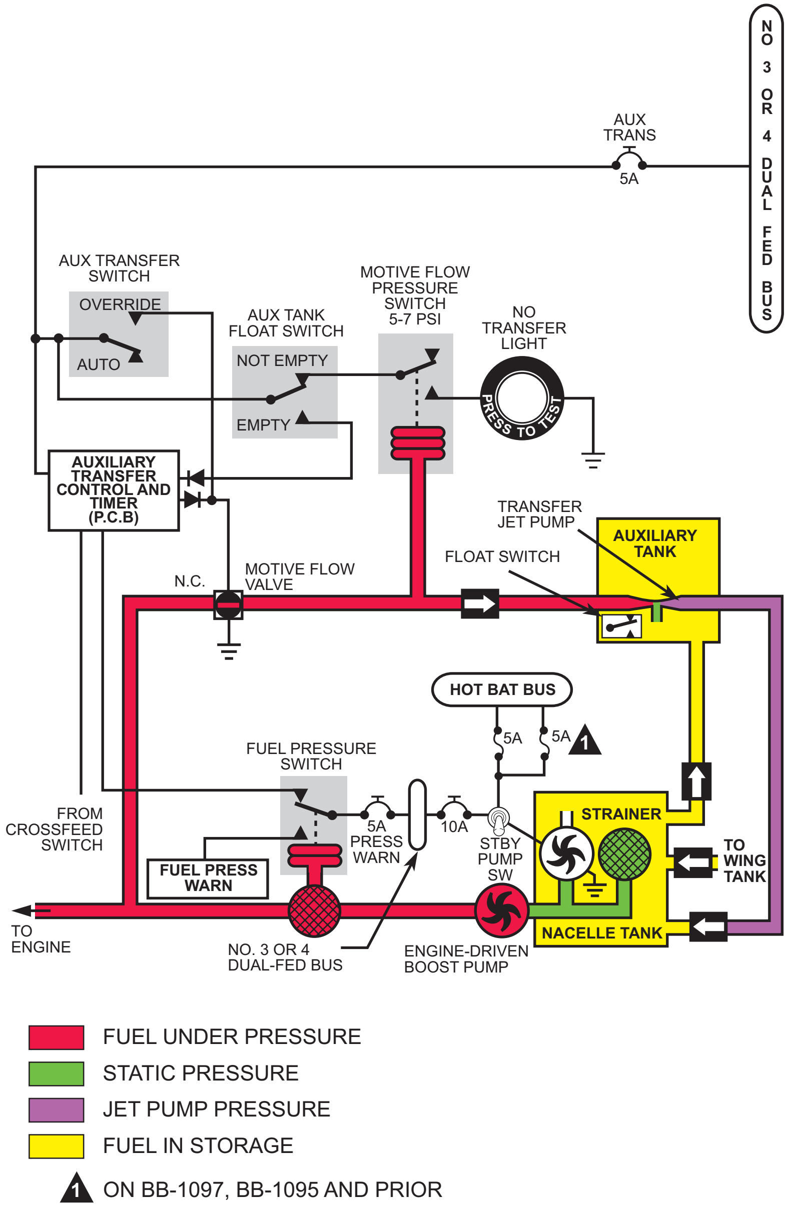
Auxiliary Fuel Transfer System

Before Engine Start – No Transfer

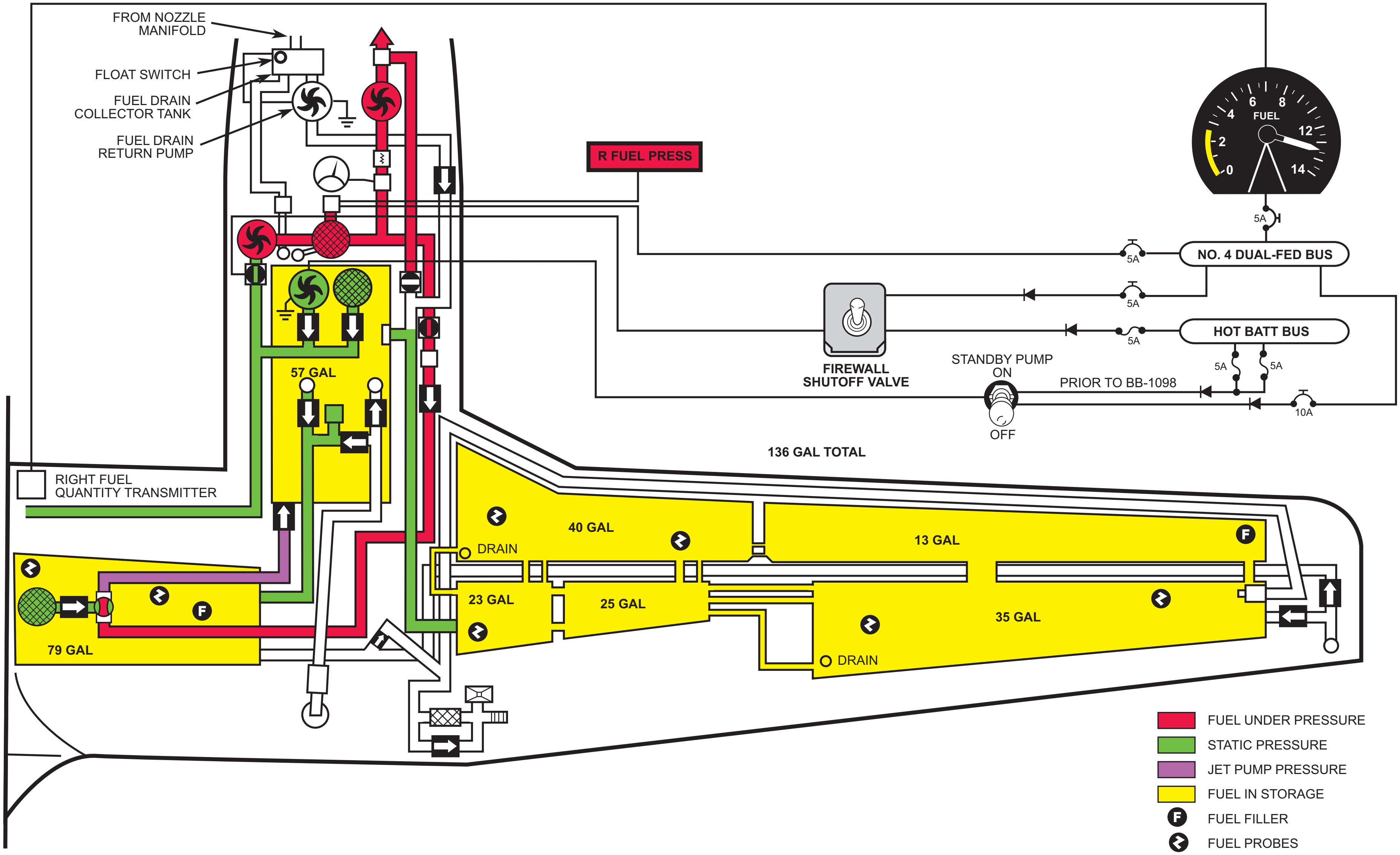


Auxiliary Fuel Transfer System

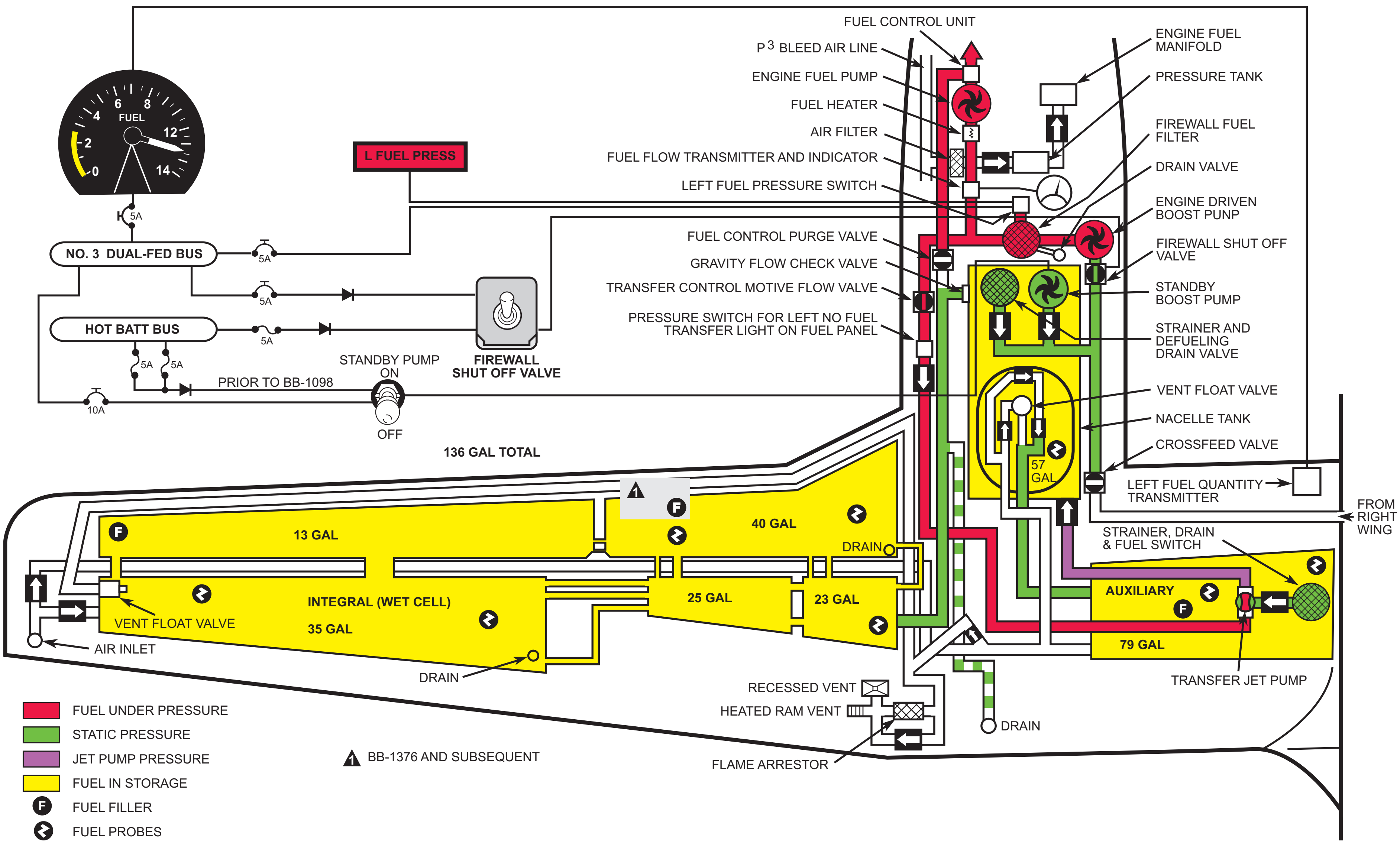
After Engine Start – Fuel Transferring



Fuel System
King Air 200



Fuel System
King Air B200



Fuel

The airframe fuel system includes fuel storage, venting, indicating, and distribution. Refer to the Powerplant chapter for engine fuel and fuel control systems. Refueling is covered in the Servicing chapter.

Storage

Wing and auxiliary fuel tanks hold a usable total of 544 or 650 U.S. gallons (with tip tanks). Each wing tank consists of five interconnected tanks and a nacelle tank behind the engine. These tanks are either bladder or integral type. Fuel from the wing tank gravity feeds into the nacelle tank.

From the nacelle tank, an engine-driven fuel boost pump supplies fuel under pressure to the engine through a firewall fuel shutoff valve. Placing a firewall shutoff valve switch in the CLOSED position electrically drives the valve closed.

The auxiliary fuel tank consists of a center section tank in each wing root. Because these tanks are lower than the rest of the fuel tanks, motive flow fuel powers a jet transfer pump to move fuel to the nacelle tank.

Optional wing tip tanks, which gravity drain into the outboard wing tank, are available.

Drain valves at tank low points permit fuel sampling and water removal. These drains are forward of the wheel well (nacelle tank), outboard of the nacelle (leading edge tank), halfway out on the wing (integral tank), and on the middle of the wing root (auxiliary tank). A drain valve permits removal of accumulated water from the gravity feed line that connects the wing and nacelle tanks. The optional tip tanks also have a drain valve at their lowest point.

Indicating

A capacitance-type fuel indicating system provides accurate measurement of fuel quantity regardless of fuel temperature and type. If installed, the tip tank fuel quantity system uses a simple float type quantity transmitter and a separate set of gages.

As fuel level rises and falls in a fuel tank, probe capacitance increases and decreases proportionately. The fuel indicating system then produces an output current to drive the fuel gages. Normally, the fuel gages display main tank quantity in pounds. Placing the fuel selector switch in AUXILIARY displays auxiliary fuel tank quantity.

For tip tank quantities, a fuel quantity transmitter provides a resistance value that corresponds to tank quantity. As fuel tank level falls from full, resistance drops until at the empty level there is near zero resistance. This output drives the associated TIP TANK FUEL gage.

Venting

The wing and auxiliary fuel tanks vent to atmosphere through a pair of vents on the wing underside near the engine nacelle. Each pair of vents has an unheated recessed vent and a heated ram air vent. If one vent clogs, the other continues to provide tank venting.

The outer wing tanks vent to each other and then to atmosphere through a vent float valve near the wing tip and a pair of vents on the lower wing surface. The float valve connects to a vent line running the length of the outboard wing section. The vent line then connects to an unheated recessed vent through a check valve and to a heated ram air vent through a flame arrestor.

An air inlet and two suction relief valves in the wing tip prevent fuel siphoning through the venting system. One of the pressure relief valves connects to the air inlet while the other one connects the float valve to a siphon break line.

The nacelle tank also has a vent float valve and two suction relief valves. From the float valve, a vent line connects this tank to the two wing vents.

When the auxiliary fuel tank is full, its float-operated check valve closes to prevent fuel loss through the venting system. The tank then vents to atmosphere through the vent line connected to the integral wing tank. As the fuel level in this tank drops, the check valve opens and the tank vents directly through the two wing vents.

The optional tip tanks vent through the wing system. Each tip tank has a vent float valve that closes when the tank is full. As fuel level drops, the float valve opens and the tank vents through the wing vent lines.

Tank	Gallons	Pounds	Liters	Kilograms
Left Auxiliary	79	529	299	1418
Left Main	193	1293	731	3466
Right Auxiliary	79	529	299	1418
Right Main	193	1293	731	3466
Total Usable	**544**	**3644**	**2060**	**9768**

Table F1; Usable Fuel Capacity

Tank	Gallons	Pounds	Liters	Kilograms
Left Auxiliary	79	529	299	1418
Left Main	193	1293	731	3466
Left Tip Tank	53	355	200	952
Right Auxiliary	79	529	299	1418
Right Main	193	1293	731	3466
Right Tip Tank	53	355	200	952
Total Usable	**650**	**4354**	**2460**	**11672**

Table F2; Usable Fuel Capacity – Aircraft with Tip Tanks

Distribution

Fuel either gravity flows from the wing tank or is pumped from the auxiliary tank to the nacelle tank. Each nacelle tank supplies fuel to its engine through the firewall fuel shutoff valve.

During engine operation, the engine's fuel boost pump draws fuel from the nacelle tank and provides it under pressure to the engine. If this pump fails, an electrically driven standby fuel boost pump in the nacelle tank provides pressurized fuel. The standby boost pump also moves fuel during crossfeed.

With the respective STANDBY PUMP switch on, 28V DC from the No. 3 Dual-Fed (left pump) or No. 4 Dual-Fed (right pump) powers the standby boost pump. If power is not available from these buses, the Hot Battery bus can also power the standby pumps. On **aircraft BB-1096, 1098 and subsequent**, the standby pumps are not on the Hot Battery bus.

A jet transfer pump transfers fuel from the auxiliary tank to the nacelle tank. With the engine-driven or standby fuel pumps operating, motive flow fuel operates the transfer pump. Placing an AUX TRANSFER switch in AUTO powers the associated motive flow valve after a 30 to 50 second delay. The motive flow valve opens directing pressurized fuel from the engine-driven or standby fuel pump to the jet transfer pump. The transfer pump moves fuel from the auxiliary tank to its nacelle tank. Excess fuel delivered by the transfer pump flows back into the auxiliary tank through a float valve and overflow line at the top of the nacelle tank.

A pressure switch downstream from the motive flow valve monitors fuel pressure in the motive flow fuel supply line. If a boost pump fails and fuel pressure fails to reach 6 ±1 PSI with fuel in the auxiliary tank, the pressure switch illuminates the NO TRANSFER light. Place the AUX TRANSFER switch in OVERRIDE bypasses the control circuitry to open the motive flow valve.

Once the auxiliary tank empties, the tank's float switch provides an empty signal to the control circuitry. After a 30 to 50 second delay, the motive flow valve closes.

A single-valve crossfeed system supplies fuel from an inoperative engine's tanks to the opposite engine. Its use is restricted to single engine operation. With an inoperative right engine, for example, place the CROSSFEED FLOW switch to the left. This action opens the crossfeed valve, energizes the right engine's electric boost pump, and closes the left engine's motive flow valve. Fuel under pressure then moves from the right side to the left side.

Fuel Systems

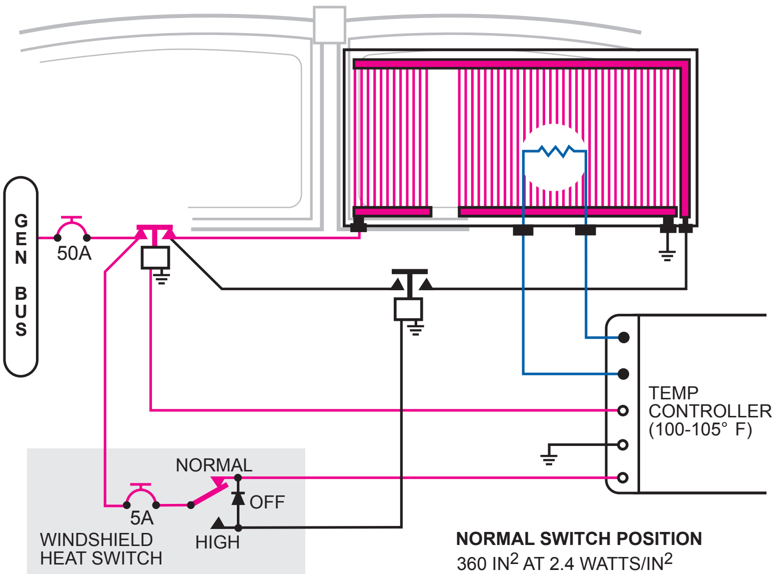
Main Fuel System

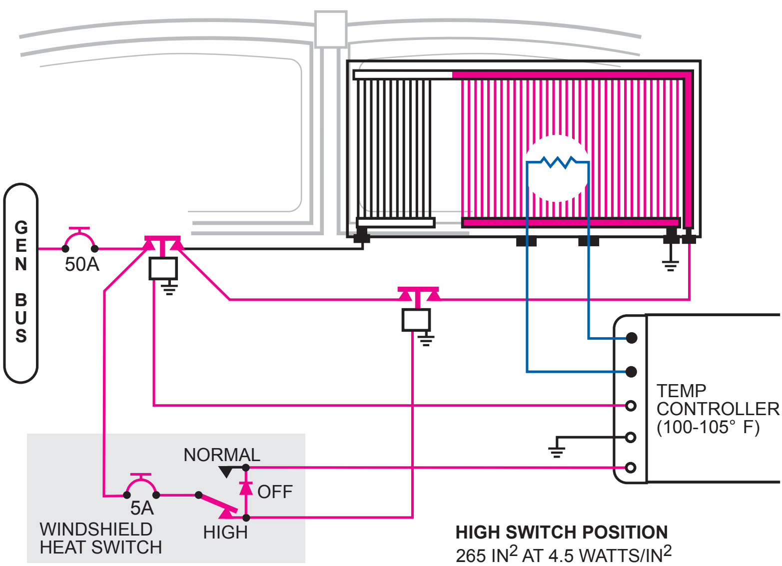
Power Source	Hot Battery bus (**BB 1097, 1095 and prior**) or No. 3 Dual-Fed bus Left standby pump Hot Battery bus (**BB 1097, 1095 and prior**) or No. 4 Dual-Fed bus Right standby pump Hot Battery bus and/or No. 4 Dual-Fed bus Crossfeed valve No. 3 and No. 4 Dual-Fed buses Firewall shutoff valves (L/R)
Distribution	Wing tanks (gravity feed) to nacelle tank Nacelletank to engine
Control	Switches STANDBY PUMP CROSSFEED FIREWALL SHUTOFF VALVES CROSSFEED (closes motive flow valve on receiving side, opens crossfeed valve, turns on standby boost pump on feeding sides, and eliminates crossfeed annunciator)
Monitor	Main fuel gages Fuel flow indicator Annunciators FUEL CROSSFEED FUEL PRESS
Protection	Circuit breakers Check valves Fuses Fuel drain system Fuel filters (pressure switches) Vent system Oil/Fuel heat exchanger

Auxiliary Fuel System

Power Source	Motive flow
Distribution	Auxiliary (center) tank (automatic transfer to nacelle tank with AUX TRANSFER switch in AUTO)
Control	Switches AUX TRANSFER OVERRIDE-AUTO (opens motive flow valve)
Monitor	Aux fuel gages NO TRANSFER lights
Protection	Circuit breakers Fuses

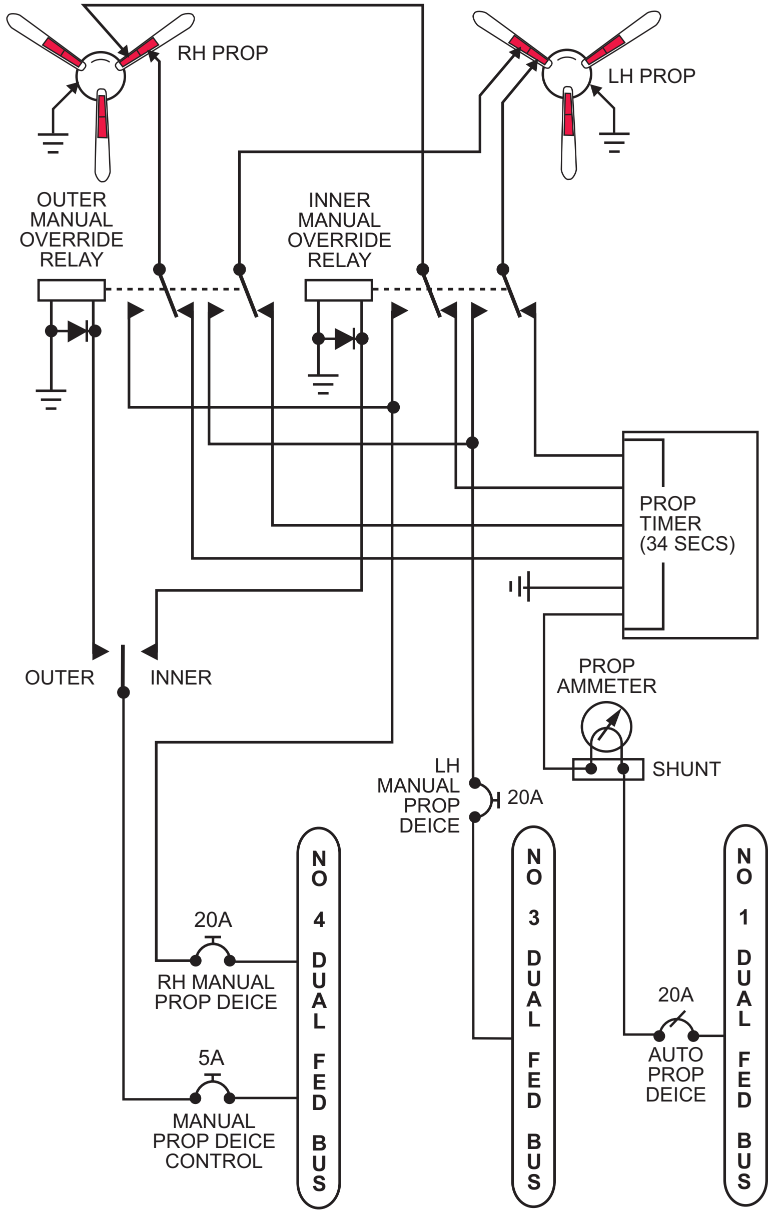
Windshield Anti-Ice System





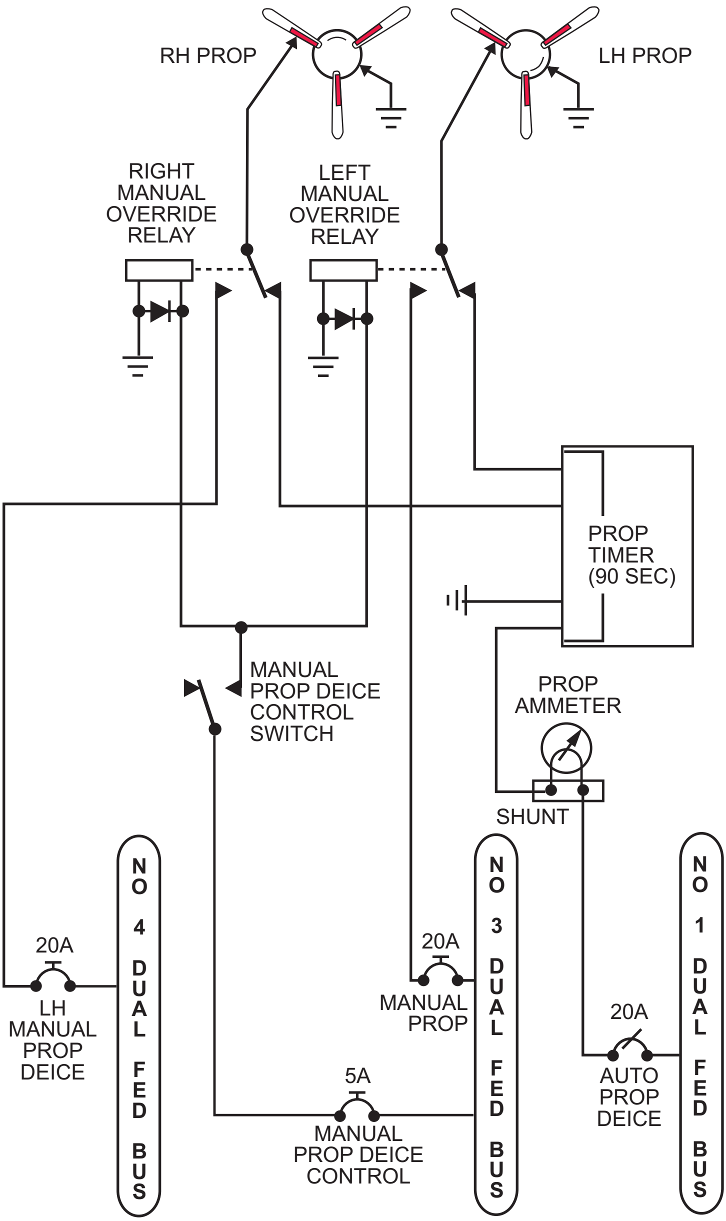
Propeller Deice System

King Air 200 BB-6 to BB-815; BB-817 to BB-824; BL-1 to BL-29



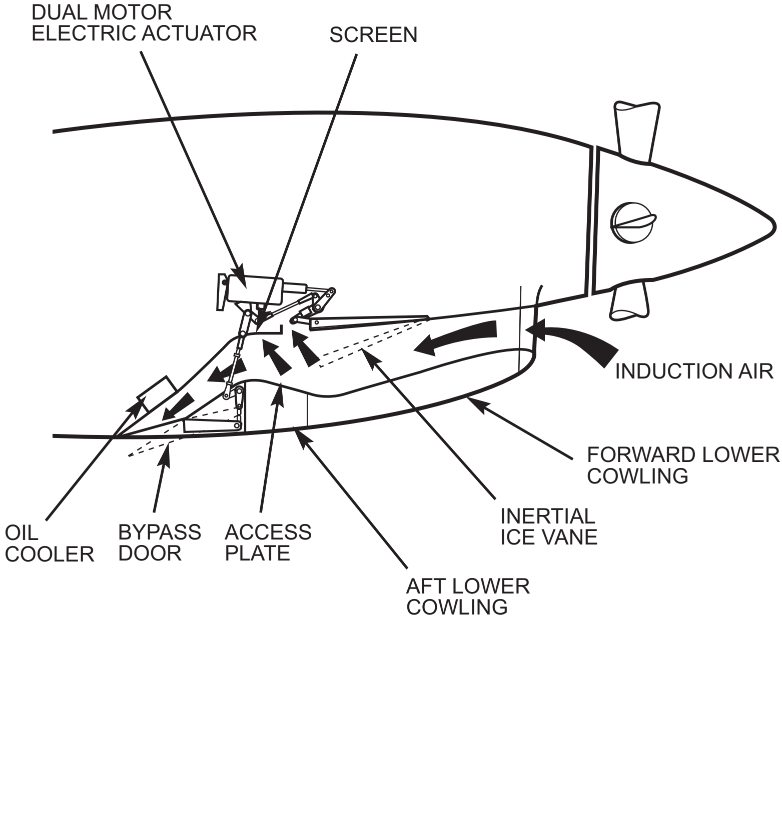
Propeller Deice System

King Air 200 BB-816; BL-30 and Subsequent

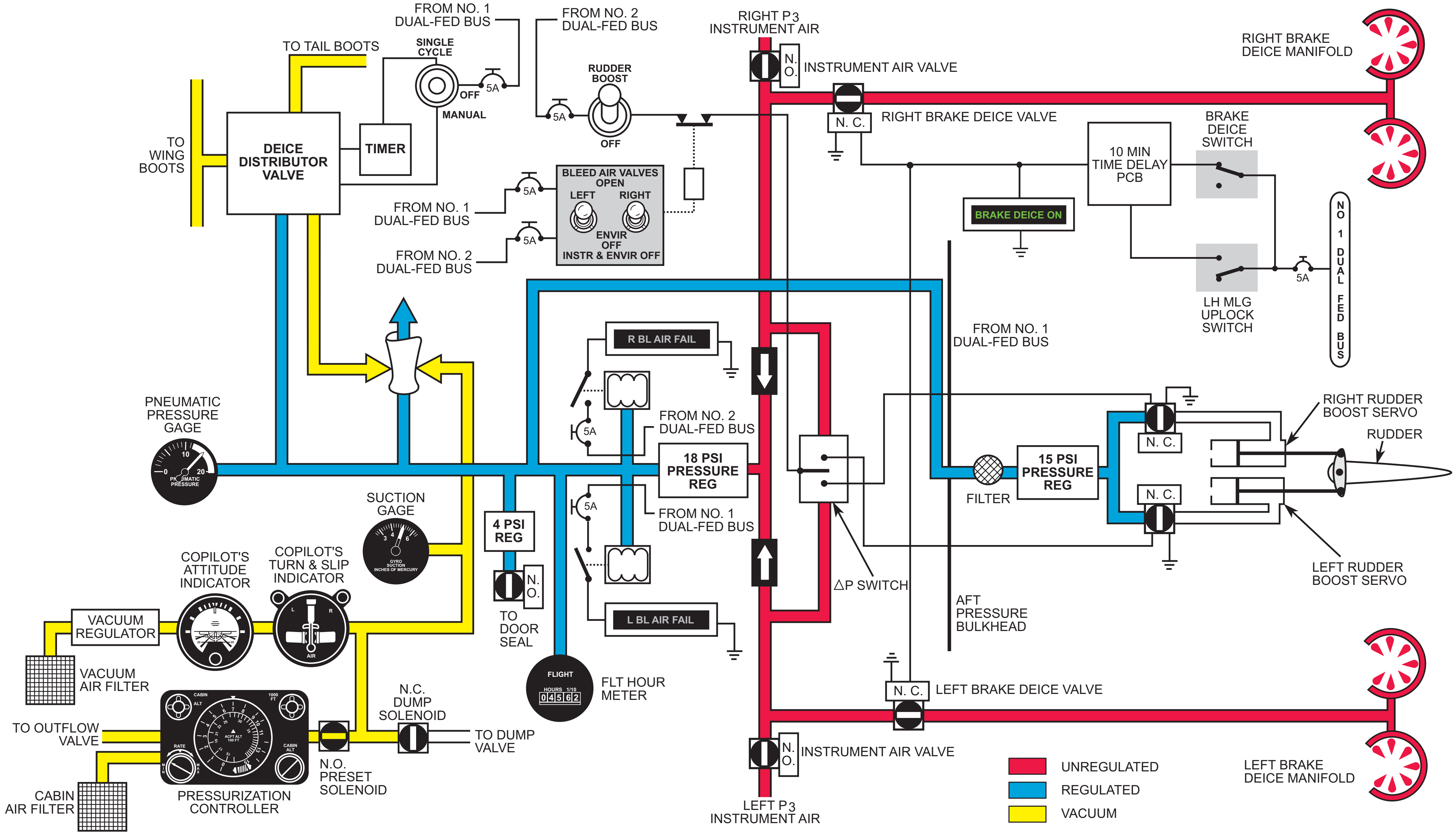


Dual-Motor Inertial Ice Separation System

BB-1439, 1444 and subsequent; BT-35 and subsequent; BL-139 and subsequent



Deice System



Ice and Rain Protection

Ice and rain protection systems include:

- wing and stabilizer deice boots
- engine air inlet lip heat
- engine inertial separators
- window and windshield heating
- pitot heat.

Wing and Stabilizer Deice Boots

A distributor valve controls the instrument air that inflates and deflates the wing and stabilizer deice boots. Engine bleed air regulated to 18 PSI supplies the pressure for inflation when the DEICE switch is in the SINGLE or MANUAL position. To deflate the boots, bleed air operates a venturi ejector to create a vacuum that deflates and holds the boots down when not in use.

The SINGLE cycle inflates the wing boots for six seconds. A timer switch then deflates the wing boots and inflates the horizontal stabilizer boots for four seconds. With the switch held in MANUAL, all boots inflate simultaneously and remain inflated until the switch is released.

Engine Air Inlet Lip Heat

On **S/Ns BB-2 to 1265; BL-1 to 28**, hot exhaust gases heat the lip around each air inlet to prevent ice formation during inclement weather. A scupper in each engine exhaust stack deflects the hot exhaust gases downward into the hollow lip (overboard at the 6 o'clock position) tube that encircles the engine air inlet.

On **S/N BB-1266 and subsequent and those with Kit 101-9048**, the engine exhaust scupper in the left exhaust stack deflects hot gases into the hollow lip and out through the right exhaust stack.

Engine Inertial Separators

An electrically actuated inertial vane system on each engine prevents ice or other foreign objects such as dust or sand from entering the engine inlet or ice from accumulating on the engine inlet screen. The system extends an ice vane and bypass door to accelerate ice and moisture laden air past the engine screen area to exit overboard through the bypass door.

The ice vane and bypass doors extend or retract simultaneously through a linkage system connected to electric actuators. When the ICE VANE switches are in EXTEND, two green advisory annunciators illuminate as the vane and door extend. When the ice vanes and bypass doors retract (switch in RETRACT), the annunciators extinguish.

A manual mechanical backup system operates the system by flexible cable. If the vanes and doors do not move with 15 seconds after actuation, an amber annunciator illuminates. Pull the ICE VANE CBs on the copilot CB panel to disable electric power and pull the manual T- handle for the appropriate engine to activate the system. If the manual positioning is successful, the amber annunciator extinguishes and the green annunciators illuminate.

Do not attempt to retract or extend electrically until the linkage is properly reset. The vane may be retracted with the manual system. With the manual system, the electric motor switch position must match the manual handle position for a correct annunciator readout. Maximum airspeed for manual extension of ice vanes is 160 kts.

On **S/Ns BB-1439, 1444 and subsequent; BL-139 and subsequent**, the vanes and bypass door are extended or retracted through a linkage system connected to an electric dual-motor actuator. Two switches with positions of MAIN or STANDBY control both the left and right engine system. When either position is selected, the remaining position is used to actuate the backup motor when the main motor is inoperable.

Propeller Deicing

An electrically heated boot for each propeller blade provides automatic and manual anti-ice protection for the propellers. The No. 1 Dual-fed bus powers the automatic system while the No. 3 and 4 Dual-fed bus powers the manual switch.

On **BB-2 to 815, 817 to 824, and 991; BL-1 to 29**, the propeller deicing system is an inner and outer heating element on each propeller blade. With the PROP switch in AUTO, the deicer timer cycles power for approximately 30 seconds each to the RH outboard, RH inboard, LH outboard, and LH inboard heating elements. If the automatic system fails, hold the PROP MAN switch in either INNER or OUTER to power the corresponding heating elements through a manual override relay.

On **BB-816, 825 to 990, 992 and subsequent; BL-30 and subsequent, and all four-bladed props**, each propeller blade has a single heating element. With the PROP switch in AUTO, the deicer timer cycles power to the right and then left propeller heating elements for 90 seconds each. If the automatic system fails, hold the PROP MAN in MANUAL to power the heating elements through the manual override relays.

Windshield Anti-Icing

Electric heating elements embedded in the windshield laminations provide protection against the formation of ice, while air from the cabin heating system prevents fogging. Heavy duty windshield wipers provide improved visibility during rainy flight conditions.

With the pilot or copilot WSHLD ANTI-ICE switch in NORMAL, an automatic temperature controller senses the windshield temperature and then attempts to maintain it at approximately 100 to 105°F by energizing the normal heat relay as necessary. In this mode, both the inboard and outboard areas of the windshield are heated.

With the switch in HI, the “high” heat relay switch is energized to apply heat to a more concentrated, essential viewing area of the windshield. The outboard two-thirds of the windshield is heated.

If the NORMAL position is insufficient to raise the windshield temperature above freezing, switching to HI nearly doubles the available heat to the smaller windshield area.

Brake Deice

An optional brake deice system uses instrument bleed air to warm the main wheel brakes to prevent ice and slush build-up.

With the BRAKE DEICE switch in ON, the left and right solenoid shutoff valves in the wheel well open to admit bleed air to a distributor manifold. The manifold then directs bleed air toward the brake assembly.

To prevent overheat damage, a timing circuit turns the deice system off 10 minutes after gear is retracted by closing the solenoid valve.

CAUTION: Use of brake deice during engine-out procedures substantially reduces the effectiveness of rudder boost assistance. Turn brake deice off for takeoff.

Pitot and Stall Warning Vane Anti-Icing

Electrical heating warms the pitot masts and stall warning vane. The static plates are unheated.

With the PITOT switches on, the No. 1 Dual-fed (left pitot) and No. 2 Dual-fed (right pitot) buses power the heating elements with 28V DC

With the STALL WARN switch on, the No. 2 Dual-fed bus powers the vane heating element. To prevent stall warning vane from overheating, a safety switch through the left main landing gear limits voltage. With weight-on-wheels, the heating element only receives 12V DC. Once airborne, the heating element receives 28V DC.

Ice and Rain Protection

Surface Deice System

Power Source	Bleed air No. 1 Dual-Fed bus
Distribution	Wing leading edge boots Horizontal stabilizer leading edge boots
Control	DEICE CYCLE switch SINGLE – inflation/deflation of wing boots, then horizontal stabilizer boots MANUAL – inflation of all boots simultaneously
Monitor	Visual monitoring for wing Pneumatic gages
Protection	Circuit breakers

Prop Heat System

Power Source	No. 1 Dual-Fed bus (auto) No. 3 and 4 Dual-Fed bus (manual)
Distribution	Heated boot for each propeller blade
Control	Switches PROP AUTO PROP MANUAL INNER/OUTER (**200 only**)
Monitor	Prop ammeter Loadmeters
Protection	Circuit breakers/circuit breaker switch (auto)

Brake Deice

Power Source	Engine P_3 bleed air
Control	BRAKE DEICE switch
Monitor	BRAKE DEICE ON annunciator
Protection	10-minute timer, CB

Pitot Heat

Power Source	Dual-Fed buses Nos 1/2
Control	PITOT circuit breaker switches
Protection	2-minute ground operation limit

Stall Warning Heat

Power Source	Dual-Fed bus No. 2
Control	STALL WARN circuit breaker switches Landing Gear safety switch
Protection	CIRCUIT BREAKER SWITCH

Fuel Vent Heat

Power Source	Dual-Fed buses Nos 1/2
Control	FUEL VENT circuit breaker switches

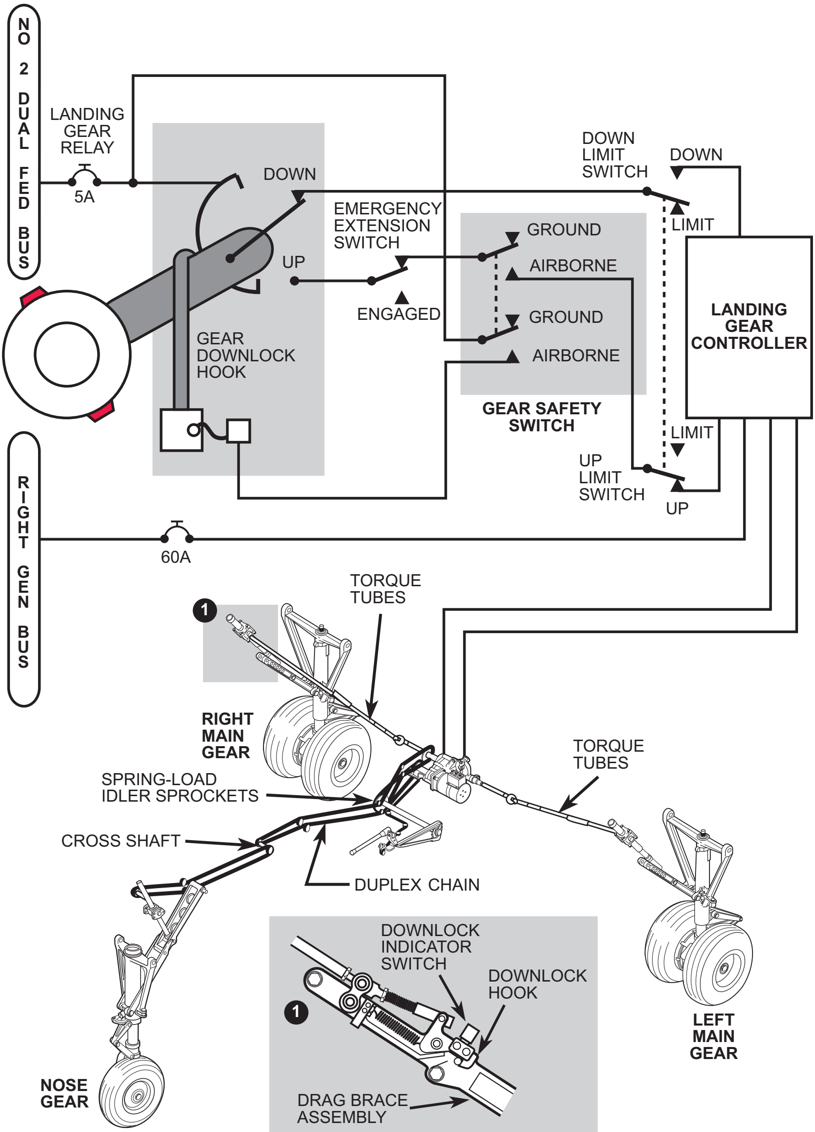
Windshield Heat

Power Source	L/R GEN bus
Control	WSHLD ANTI-ICE switches
Protection	Circuit breaker (5A) Temperature sensing element Temperature controller 50A current limiters

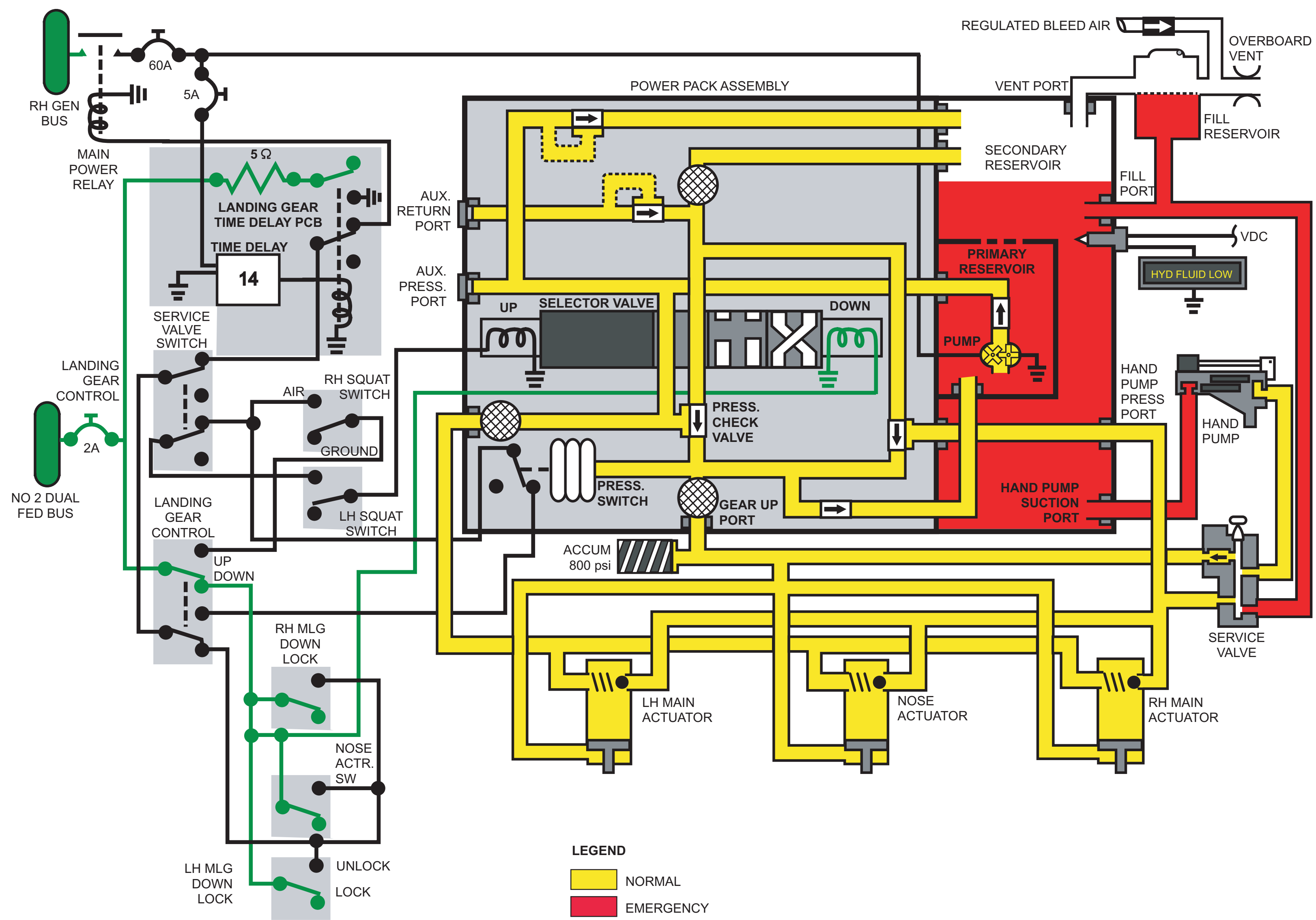
Ice Vanes

Power Source	Dual-Fed buses Nos 1/2
Control	ICE VANE switches VANE MANUAL PULL handle
Monitor	ICE VANE amber and green annunciators
Protection	Circuit breakers Manual override system

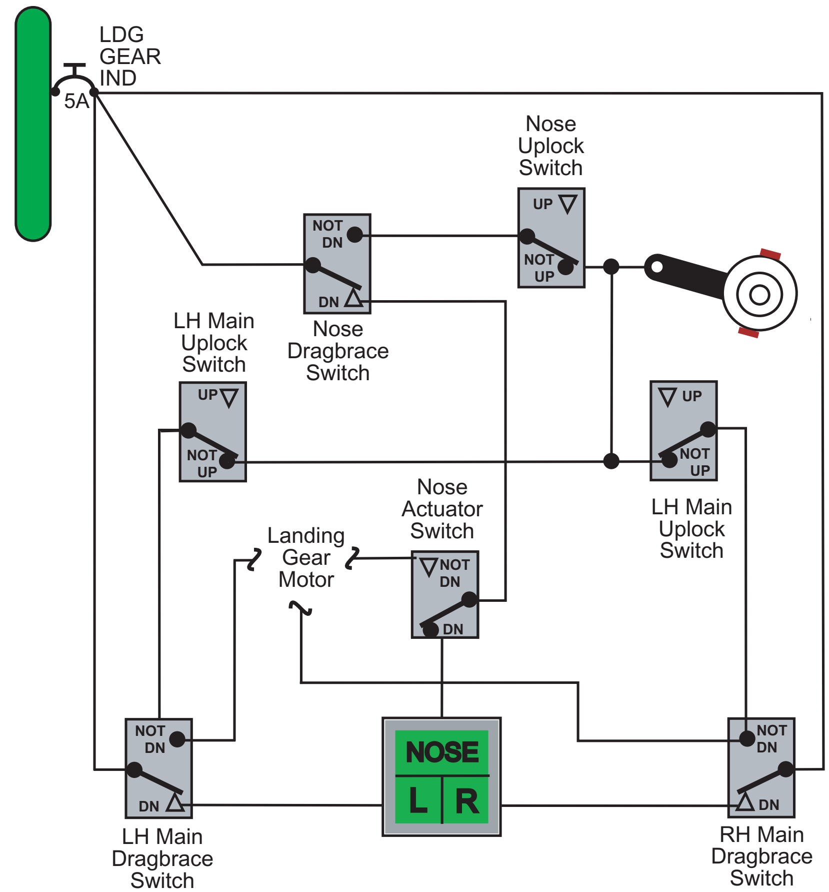
Electro-Mechanical Landing Gear System



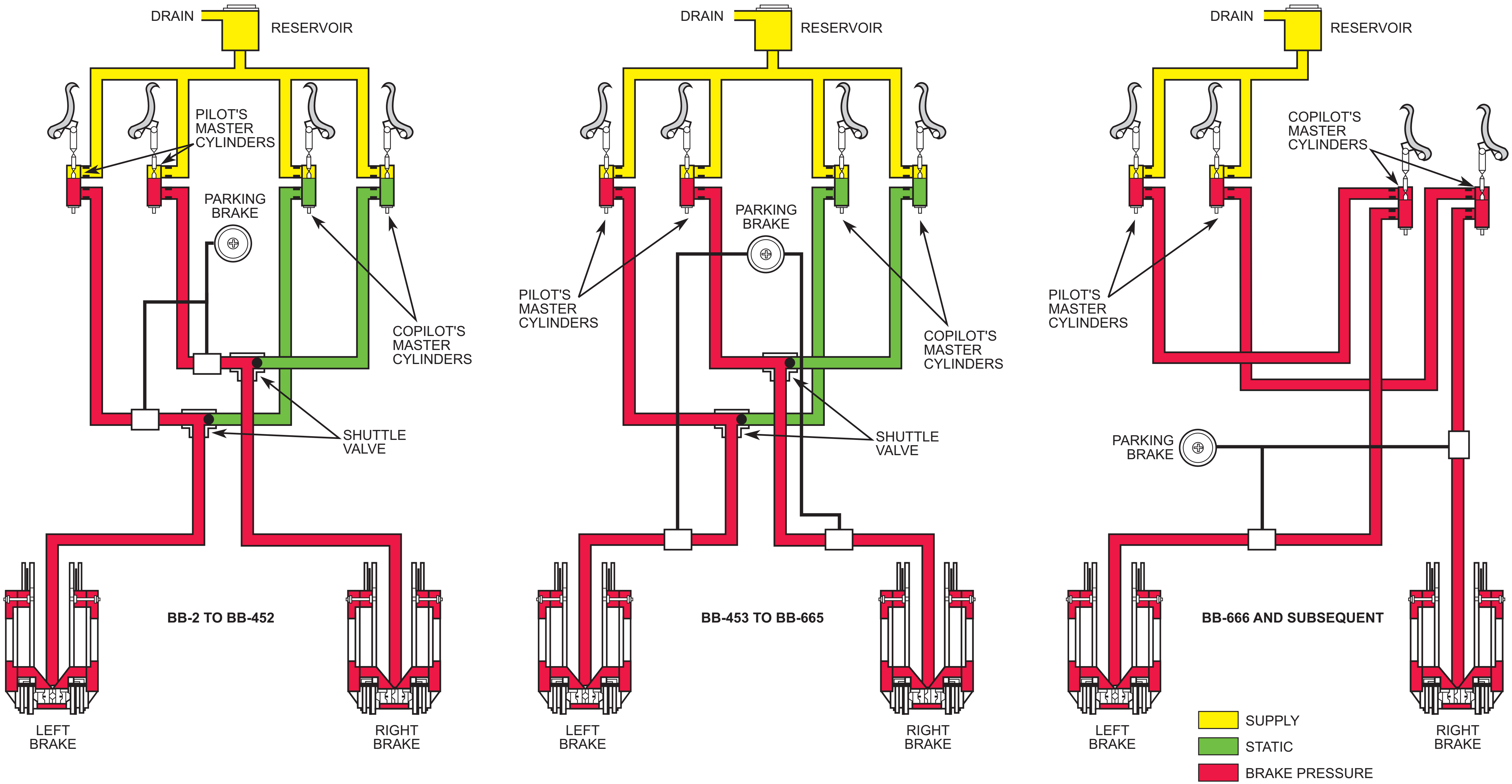
Hydraulic Landing Gear System



Hydraulic Gear Position Indication



Brake System



Landing Gear and Brakes

The aircraft has a tricycle-type landing gear that is, depending on aircraft serial number, either electrically or hydraulically operated. The nose and main gear have conventional air/oil struts to absorb taxi and landing shocks. A position indicating system provides indication of safe and unsafe landing gear configuration.

The nose is a single wheel assembly while the main gear is a two wheel assemblies with dual hydraulic brakes.

Mechanical Landing Gear

Aircraft BB-2 to 1192 except 1158, 1167; BL-1 to 72 have a mechanical landing gear system. A split-field electric motor drives a gearbox that, in turn, provides force to the nose and main gear actuators through a chain drive and torque tubes. One field drives the motor to retract the gear while the second drives the motor in the opposite direction to extend the gear.

A squat switch on the right main gear torque knee opens the landing gear control circuit when the strut is compressed (aircraft on ground). The squat switch also actuates a solenoid-operated downlock hook on the landing gear control switch to prevent the handle from being raised when the aircraft is on the ground. The hook automatically unlocks when the aircraft leaves the ground. If the downlock solenoid fails, press the red DOWNLOCK REL button alongside the landing gear handle to release the downlock.

Two red parallel-wired indicator lights in the landing gear control handle indicate that the gear is in transit or unlocked. The red lights extinguish in a GEAR UP condition.

The lights receive information from the normally-closed, up-position switches, one of which is in the upper portion of each wheel well. When the gear is in the fully retracted position, each strut actuates its respective switch and opens the circuit from the intransit light to ground. As the gear moves from the fully retracted position, the switches close and illuminate the intransit light. The intransit light extinguishes when the drag brace in each landing gear actuates its respective downlock switch.

Illumination of the landing gear intransit light indicates on or more of the following conditions:

- landing gear handle is in the UP position and aircraft on the ground with weight on gear
- one or both power levers are retarded below a preset 79% N_1 level and at least one landing gear is now down and locked
- any one or more landing gear is not fully retracted or in the down and locked position
- one or more of the landing gear is not down and locked and the flaps are selected past approach. Warning horn only can be silenced by retracting flaps or extending the landing gear.

If the normal landing gear system fails, the gear can be manually extended. Pull the LANDING GEAR RELAY CB on the pilot right panel and verify that the gear handle is in the DN position. Pull up on the EMERGENCY ENGAGE handle and turn clockwise about 60 to engage the emergency extension mechanism.

Pumping the manual extension lever mechanically drives the nose and main landing gear actuators through the motor gearbox, chain drive, and torque tubes. When the landing gear reach the extended position and the green down-and-locked lights illuminate, discontinue use of the manual extension lever to prevent damage to the landing gear operating mechanism.

Hydraulic Landing Gear

Aircraft BB-1158, 1167, 1193 and subsequent; BL-73 and subsequent; aircraft with kit 101-8018 have a hydraulically-operated landing gear system with an electric-driven hydraulic pump (powerpack), selector valve, hydraulic gear actuators, and related plumbing and valves.

Placing the landing gear lever to DN actuates the powerpack down solenoid. Fluid then flows to the extend side of the actuators. As the actuator piston extends the landing gear, fluid on the other side of the actuators exits through the retract port and flows back to the powerpack through retract plumbing. Fluid from the pump flows through the selector valve, opens a pressure check valve, and then allows the return fluid flow into the primary reservoir.

When the actuator piston positions to fully extend the gear, an internal mechanical lock in the nose gear actuator locks the actuator piston and holds the gear in the down position. The main gears are held in the extend position by this mechanical locking system. The downlock switches interrupt current to the power relay.

Moving the landing gear handle to UP provides hydraulic fluid under pressure to the retract side of the gear actuators. As the actuator pistons moves to retract the gear, the fluid in the other side of the actuators exists through the extend port and flows back to the powerpack through the extend plumbing. Fluid flows the powerpack through the selector valve and returns to the primary reservoir.

When the gear reaches the fully retracted position, hydraulic system pressure hold the gear in the up position. When hydraulic pressure reaches approximately 2,775 PSI, the uplock pressure switch opens the landing gear relay to interrupt current to the pump motor. The same pressure switch actuates the pump that increases hydraulic pressure if it drops below 2,475 PSI. The system also has a 14-second timer that interrupts current to the pump motor 14 seconds after it has started.

Up and down position switches on the nose and main landing gear illuminate the landing gear lever's red intransit light and the three green down-and-locked lights. Essentially, the intransit light illuminates when a landing gear up and down position switches are simultaneously de-actuated (i.e., with a landing gear transitioning between positions.

The red intransit light illuminates whenever:

- landing gear handle is in up position with weight-on-wheels
- any landing gear is between the fully retracted and down-and-locked position (i.e., intransit)
- landing gear is not down-and-locked with a power lever set below approximately 79% N_1
- landing gear is up and flaps extended past the approach position. Warning horn can be silenced only by retracting flaps or extending landing gear.

If the normal landing gear system fails, manually extend with a hand-operated hydraulic pump. Pull the LANDING GEAR RELAY CB on the pilot inboard subpanel to interrupt electrical power and then place the landing gear lever in the DOWN position. Remove the LANDING GEAR ALTERNATE EXTENSION hand pump handle from the securing clip and pump up and down until three green indicator lights illuminate. The hand pump supplies fluid to the extend side of the gear actuators. Refer to the actual checklist for detailed instruction for extension.

If the landing gear system hydraulic reservoir level drops to a critical level for more than four seconds, an optical sensor illuminates the yellow HYD FLUID LOW annunciator. When the annunciator illuminates, sufficient hydraulic fluid remains to manually extend the landing gear.

Brakes

Each main gear wheel carries a multiple disc brake assembly. Each assembly consists of two rotating discs keyed to the wheel, a piston housing, carrier and lining (stationary disc), and torque plate. The stationary disc and torque plate provide a friction surface for the rotating discs.

Depressing either set of brake pedals compresses the master cylinders' piston rod. Piston rod movement generates hydraulic pressure that flows through rigid and flexible lines to the brake assembly. The brake assembly pistons then extend to force the linings and discs together; braking occurs. Releasing brake pressure allows the brake assembly pistons to retract, the linings move away from the discs, and release of the brakes.

Aircraft BB-2 to 665; BL-1 to 8 have shuttle valves between the pilot's and copilot's brake master cylinders. In this arrangement brake pedal application shifts a shuttle valve to isolate the opposite side's master cylinders. The active pedals then provide the braking pressure. On **aircraft BB-666 and subsequent; BL-9 and subsequent**, the pilot's and copilot's master cylinders are in series so that pilot braking pressure first flows through the copilot's master cylinders before reaching the brake assemblies.

With pilot brake pedals depressed and brake pressure built-up, pulling the PARKING BRAKE handle out closes two parking brake valves. This traps brake pressure within the system to hold the parking brakes. Before releasing the parking brakes, depress the pilot brake pedals and then release the PARKING BRAKE handle.

Landing Gear and Brake Systems

Electro-Mechanical Landing Gear Systems

Power Source	No. 2 Duel-Fed bus Landing gear control relay Right Generator bus 28V DC split-field 1 $^{1}/_{2}$ HP motor
Control	LDG GEAR CONTROL handle EMERGENCY ENGAGE handle
Monitor	Gear handle light Gear warning horn Gear DOWN position lights
Protection	Landing gear relay (5A) Circuit breaker (80A) Right main gear squat switch Emergency engage handle Limit switches Dynamic brake relay Solenoid-operated down lock hook (landing gear handle)

Hydraulic Landing Gear System

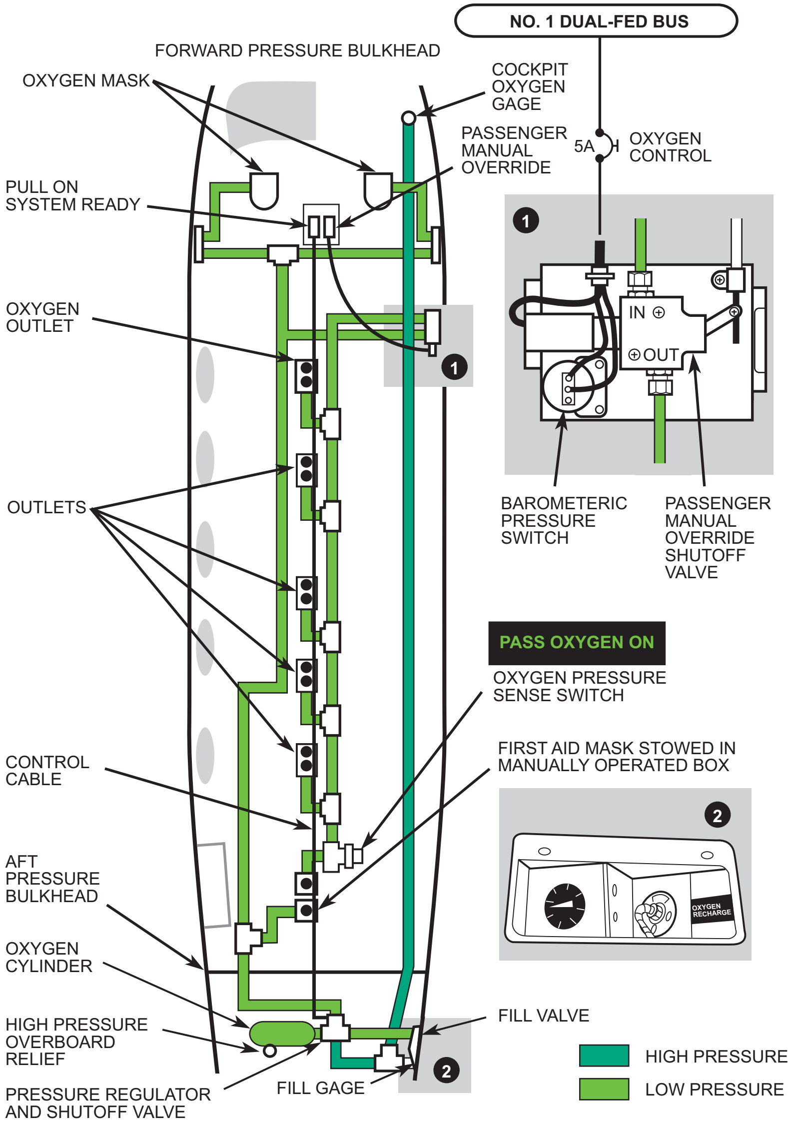
Power Source	Right Generator bus No. 2 Dual-Fed bus Landing gear control power relay Electric Motor-Driven Hydraulic Pump (Power Pack)
Distribution	Landing gear
Control	LDG GEAR CONTROL handle Pressure Switch Down-lock switches (3) Time delay module
Monitor	HYD FLUID LOW annunciator Accumulator precharge direct reading gage
Protection	Circuit breakers LANDING GEAR RELAY (5A) Landing gear powerpack (60A) Pressure switch Thermal relief valve Down-lock switches (3) Internal nose gear mechanical lock Squat switches (L/R) Low fluid level sensor Time delay module Solenoid-operated down-lock hook (landing gear handle)

Brake System

Power Source	Hydraulic pressure
Distribution	Master cylinders Parking brake valves
Control	Brake pedals PARKING BRAKE handle Emergency braking: reverse propeller for taxiing or slowing (-3° blade angle, zero thrust-top of red and white strips on throttle quadrant) Shuttle valves **S/N prior to BB-666**: valve adjacent to each set of pedals permit changing braking action from one to the other **S/N BB-666 and subsequent**: dual brakes plumbed in series to allow either set of pedals to perform

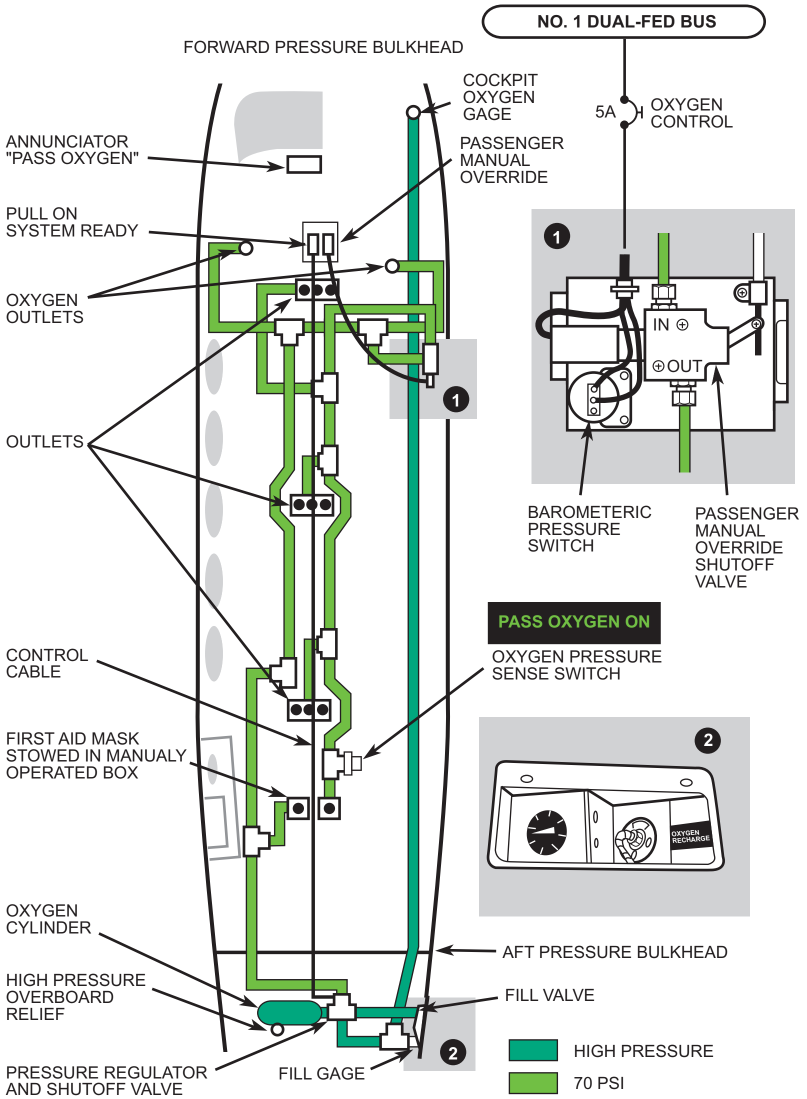
Oxygen System

King Air 200; B200



Oxygen System

King Air 200C (With Cargo Door)



Oxygen System

The oxygen bottle supplies both the passenger and crew oxygen systems through an integral pressure regulator. The bottle has high pressure ports for the fill line and bottle pressure gage. If it overpressurizes, a relief disc bursts to vent the oxygen overboard to the atmosphere.

Bottle size depends on aircraft model and options. On **aircraft BB-44 to 309, 311 to 328; earlier aircraft with kits 101-5006 and 101-5007 or with the autodeployment system installed**, the 22 ft^3 bottle is standard; 49, 64, or 76 ft3 bottles are options. On **aircraft BB-310, 239 to 1438, 1440 to 1443; BL-1 to 139**, the 22 ft^3 steel bottle is standard; 49, 64, 76, or 115 ft3 bottles are options. On **aircraft BB-1439, 1444 and subsequent; BL-139 and subsequent**, the 22 ft^3 bottle is standard; 50, 77, or 115 ft^3 bottles are options.

Crew System

Oxygen first flows through the bottle regulator where normal bottle pressure is reduced to 70 mechanically operated by the PULL ON SYS READY knob. With the knob pulled out, the shutoff valve opens and oxygen flow is available to crew masks and the first aid mask.

The crew oxygen masks are diluter-demand types that provide oxygen as the wearer inhales. Each mask has a NORMAL (N)/100% lever to control oxygen dilution. With the lever in NORMAL, the mask dilutes the oxygen with ambient air for use up to an altitude of 20,000 ft. Placing the lever in the 100% position provides undiluted oxygen.

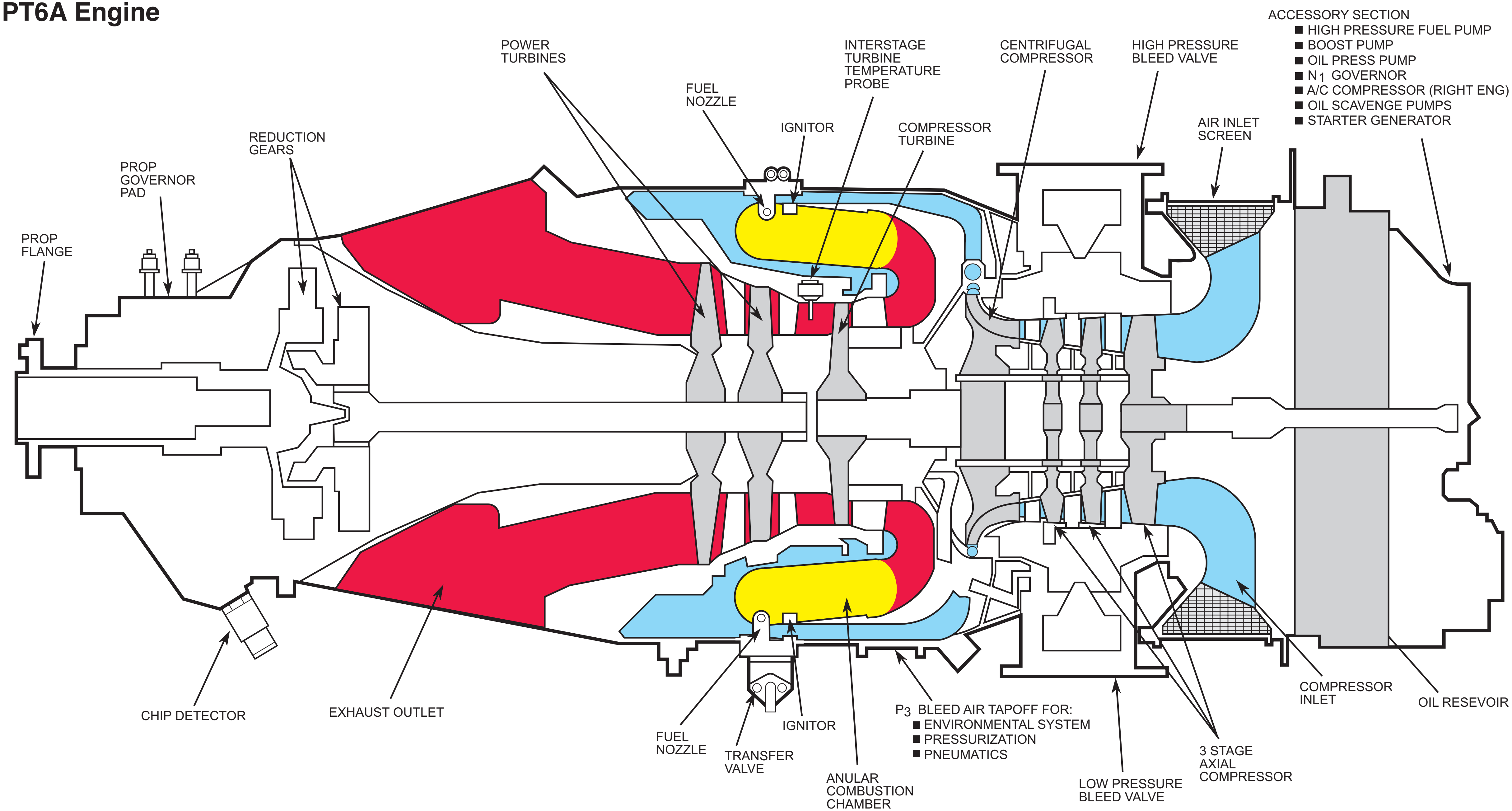
Passenger System

For the passenger oxygen system, oxygen continues its flow from the mechanically operated crew system shutoff valve to a second shutoff valve controlled by a barometric pressure switch. When cabin altitude reaches 12,500 ft, the barometric pressure switch opens the passenger shutoff valve and oxygen flows into the passenger mask autodeployment boxes. The pressure deploys the passenger masks and pulling the lanyard pin on the mask starts oxygen flow to the mask. Pressure in supply lines of the passenger system illuminates the green PASS OXY ON annunciator.

Override System

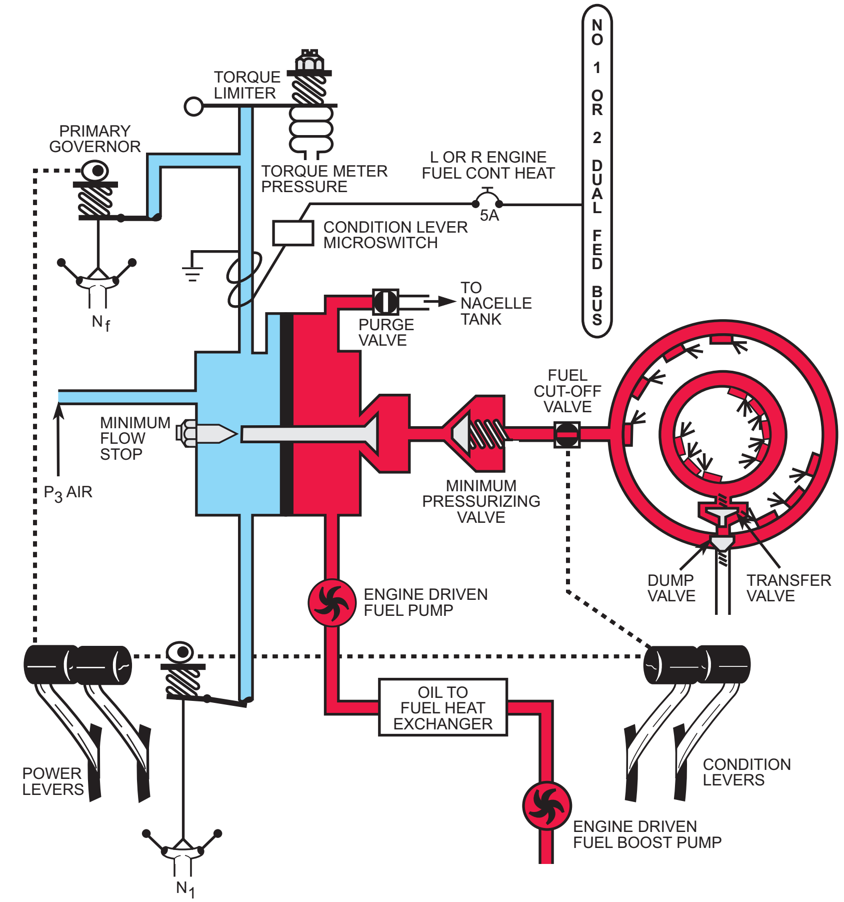
If the barometric switch fails, pull the PASSENGER OXYGEN O'RIDE knob to mechanically open the passenger system shut-off valve. When passenger oxygen is no longer required, push the O'RIDE knob in and pull the OXYGEN CONTROL CB to stop oxygen flow to the passenger system.

PT6A Engine

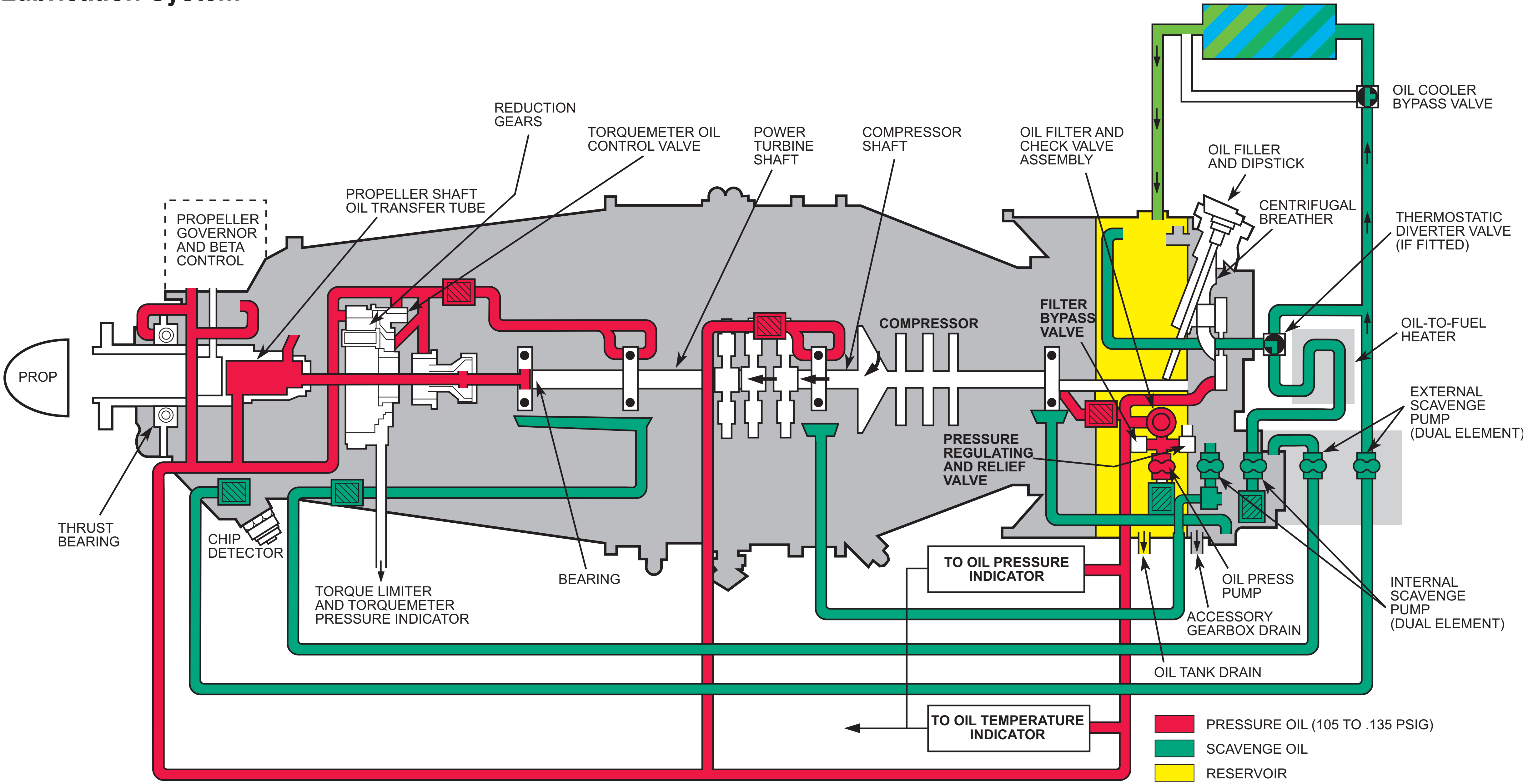


POWER TURBINES
INTERSTAGE TURBINE TEMPERATURE PROBE
CENTRIFUGAL COMPRESSOR
HIGH PRESSURE BLEED VALVE
ACCESSORY SECTION
■ HIGH PRESSURE FUEL PUMP
■ BOOST PUMP
■ OIL PRESS PUMP
■ N1 GOVERNOR
■ A/C COMPRESSOR (RIGHT ENG)
■ OIL SCAVENGE PUMPS
■ STARTER GENERATOR
FUEL NOZZLE
IGNITOR
COMPRESSOR TURBINE
AIR INLET SCREEN
REDUCTION GEARS
PROP GOVERNOR PAD
PROP FLANGE
CHIP DETECTOR
EXHAUST OUTLET
FUEL NOZZLE
TRANSFER VALVE
IGNITOR
ANULAR COMBUSTION CHAMBER
P3 BLEED AIR TAPOFF FOR:
■ ENVIRONMENTAL SYSTEM
■ PRESSURIZATION
■ PNEUMATICS
LOW PRESSURE BLEED VALVE
3 STAGE AXIAL COMPRESSOR
COMPRESSOR INLET
OIL RESEVOIR

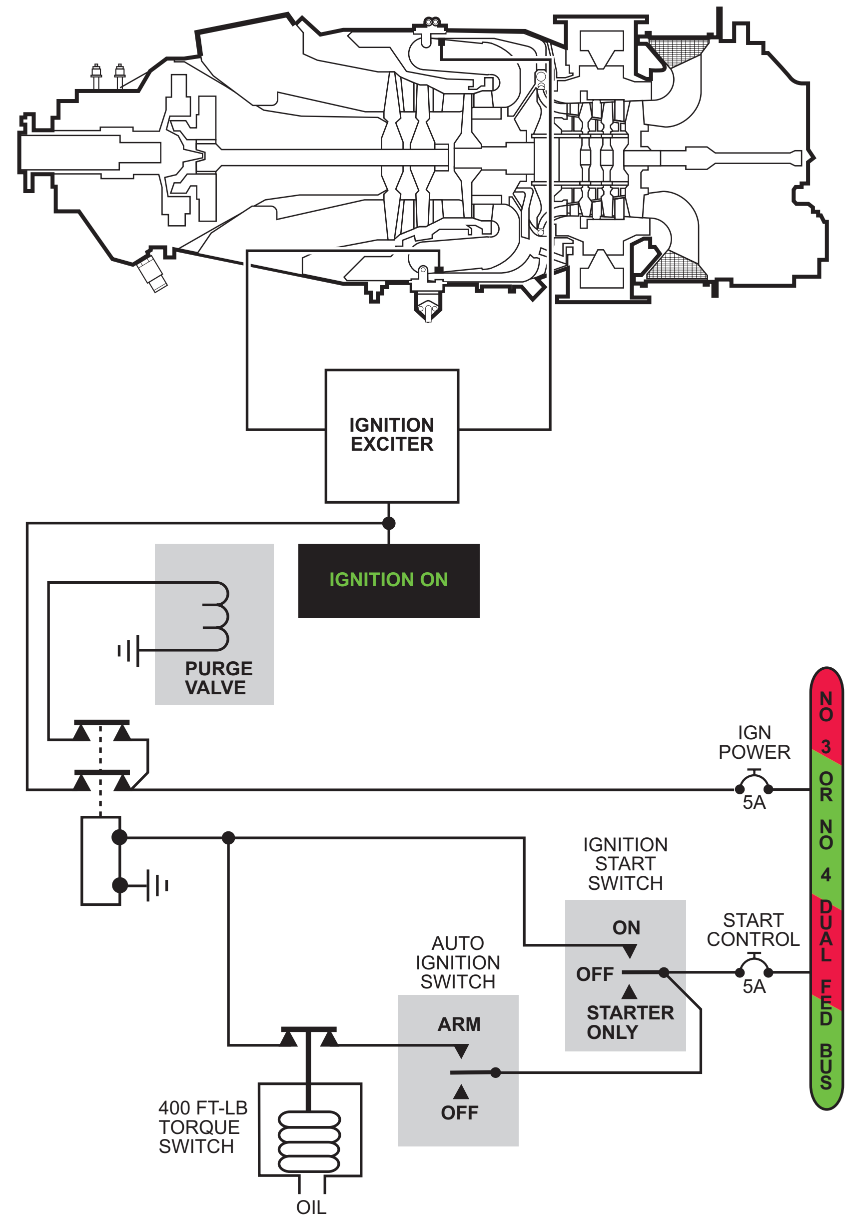
Fuel Control System



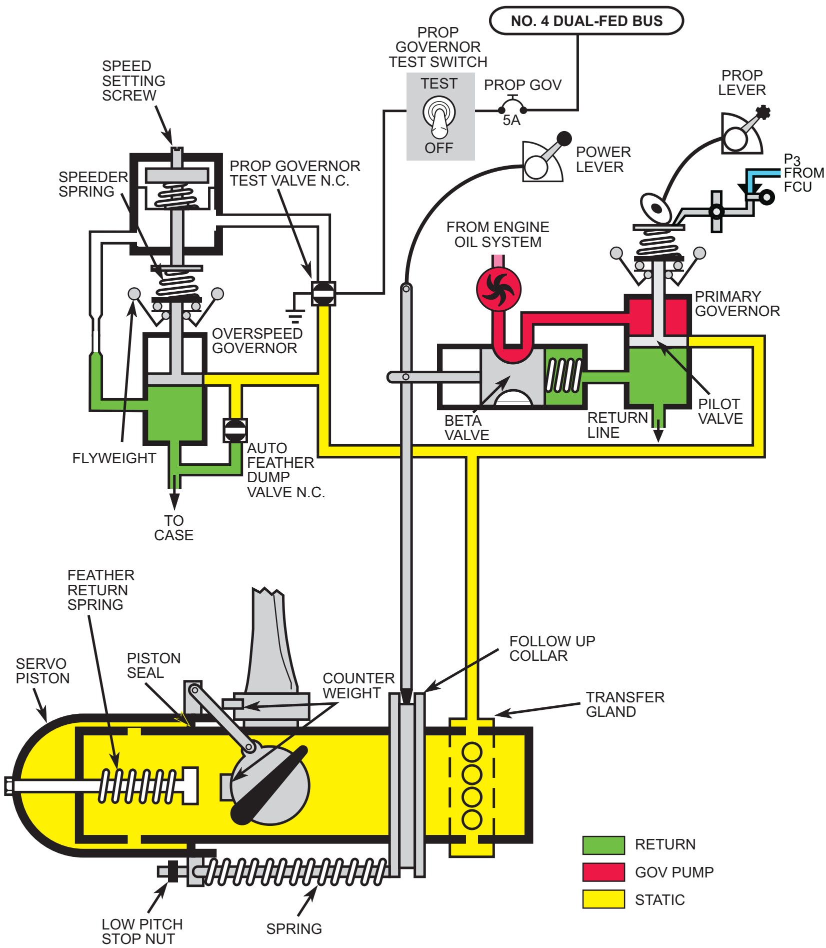
Lubrication System



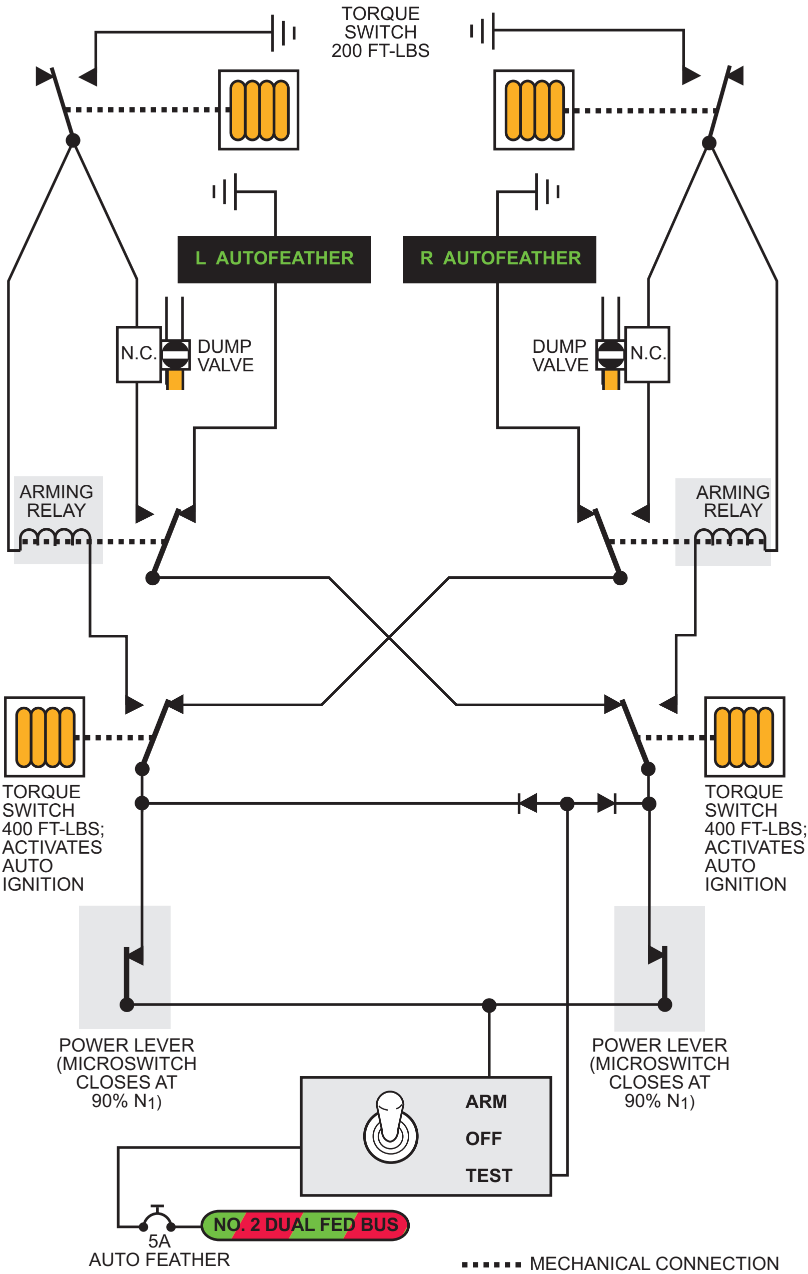
Ignition System



Propeller Systems



Autofeather System



Powerplant

Two Pratt & Whitney Canada (PWC) PT6A-41 or -42 turboprop engines power the aircraft. The PT6A is a lightweight, reverse-flow, free-turbine engine that drives a three or four-bladed constant-speed, full-feathering reversible propeller.

Each engine produces approximately 850 shaft-horsepower, 2,230 foot-pounds of torque, and approximately 135 lbs of jet thrust. The PT6A-41 and -42 engines are essentially the same except that the -42 engine's higher operating temperature provides better performance at high ambient temperatures.

Operation

The free-turbine turboprop engine compresses air, mixes it with fuel, and ignites the mixture to produce a high-temperature, high-speed gas.

The combustion cycle begins as air passes through an annular (ring- shaped) plenum chamber formed by the compressor inlet case. The air flows through the compressor where each successive compressor stage (stator and rotor pair) converts air velocity into increasing air pressure. After exiting the compressor section, vanes straighten the airflow before it reaches the combustion section.

As the high pressure air enters the annular combustion chamber, it changes direction 180° before mixing with fuel. A circular arrangement of 14 simplex atomizers spray fuel into the combustion chamber where air and fuel mix. Two igniters protruding into the combustion chamber spark to ignite the mixture. Once combustion is started, the igniters are no longer required because the combustion process is self-sustaining.

The rapidly expanding, high-temperature gases then reverse direction to travel through the exit zone. Inlet guide vanes straighten the gas flow before it reaches the single-stage compressor turbine. The turbine, in turn, drives the compressor through a shaft at the rear of the engine.

After passing through the compressor turbine, the gas flow drives the two-stage power turbine connected to the gearbox. The gearbox drives the propeller shaft. The exhaust gases exit the engine through the exhaust duct and stacks.

Powerplant Systems

Powerplant systems include:

- lubrication
- fuel and fuel control
- ignition
- engine air.

Lubrication

The engine's integral lubrication system provides filtered oil under pressure to lubricate, cool, and clean engine bearings and gearboxes. This system includes:

- oil tank
- centrifugal breather
- chip detector
- pressure pump
- pressure relief/pressurizing valve
- filter
- oil cooler
- fuel heater
- scavenge pumps.

The accessory gearbox powers the oil pump as it draws oil from the tank and provides it under pressure to the oil filter. An external pressure regulating and relief valve maintains oil pump delivery pressure within a set operating range. If oil pressure exceeds a set value (i.e., cold viscous oil), the relief valve opens to prevent excess system pressure by directing oil back to the tank.

The oil filter removes contaminants from the oil supply before it reaches the engine's bearings and gearboxes. If sufficient contamination accumulates on the filter element to restrict oil flow, a bypass valve bypasses oil around the filter element.

Oil lubricates the No. 1 bearing first. This bearing, like Nos. 2 and 3 bearings, has a fine strainer that prevents extraneous matter from reaching the bearings. Nozzles direct oil to all of the bearing faces to ensure efficient lubrication.

A common oil supply line from the oil filter outlet supplies the rest of the engine bearings through a boss on the engine case. From this boss, the oil supply splits into three lines to supply the Nos. 2, 3, and 4 bearings and gearbox, front accessories, and propeller, respectively.

After lubricating the bearings and gearboxes, oil drains by gravity into sumps. The centrifugal breather removes entrapped air from the bearing and gearbox sumps and vents it to atmosphere. Oil is then directed back to the tank by one of the scavenge pump elements. When oil is above a set temperature, a thermostatic bypass/check valve directs oil moved by the external scavenge pump through an oil cooler. Oil then flows from the cooler to the oil tank.

A pressure sensor and temperature bulb in the common supply line downstream of the filter drive the oil pressure and temperature gages.

Fuel and Fuel Control

The fuel and control system regulates fuel flow from the aircraft fuel system to the engine using:

- engine-driven boost pump
- oil-to-fuel heater
- engine-driven fuel pump
- fuel control unit (FCU)
- torque limiter
- flow divider and dump valve
- fuel manifold and nozzles.

The engine's boost pump draws fuel from its nacelle tank and provides it under pressure to the oil-to-fuel heater where it is heated by warm engine oil. As fuel temperature increases toward 70°F (21°C), the heater's bypass valve admits less oil into the heater. Once fuel temperature reaches 90°F (32°C), the bypass valve closes completely.

Fuel flows from the heater to the engine-driven fuel pump. Before entering the pump, fuel flows through a strainer. If the strainer clogs, a bypass valve routes fuel around the strainer. The pump pressurizes the fuel to approximately 800 PSI before it flows through a filter. Like the strainer, the filter also has a bypass valve. A transmitter between the boost pump and engine-drive pump measures fuel flow to the engine and drives the fuel flow indicator in the cockpit.

The pressurized fuel then enters the fuel control unit (FCU). Based on throttle lever position, ambient air pressure, engine torque, and other inputs, the FCU regulates necessary fuel flow for engine starting, acceleration, constant speed operation, deceleration, and shut-down.

A torque limiter monitors torquemeter oil pressure to provide engine protection. If the engine produces excessive torque, the limiter bleeds off governing air pressure within the FCU to reduce fuel flow.

From the FCU, metered fuel flows to the fuel divider and dump valve. A minimum pressurizing valve in the output line to the fuel divider maintains sufficient pressure to maintain correct fuel metering. The divider controls fuel supplied to the primary and secondary fuel manifolds. In turn, the manifolds supply their primary and secondary fuel nozzles.

During engine start, the flow divider supplies the primary manifolds. As the engine accelerates and fuel pressure proportionately increases, the divider begins supplying the secondary manifolds.

During engine shutdown, the divider dumps fuel. Once the dump valve opens, fuel flows into an EPA collector tank (**BB-2 to 665**), or pressure in a purge tank (**BB-665 and subsequent**) forces fuel from the manifolds into the combustion chamber. In this chamber fuel manifolds distribute the fuel to primary and secondary fuel nozzles. Each nozzle provides a finely atomized mist of fuel into the combustion section.

Ignition System

An engine's ignition system consists of an ignition exciter, leads, two igniters, ignition switch, and auto-ignition system. Place the IGNITION AND ENGINE START switch in ON to close the associated ignition power relay and power the ignition exciter; the IGNITION ON annunciator illuminates.

The exciter converts the relatively low voltage DC input into a high voltage output. The exciter's capacitor continues to charge until the stored energy is sufficient to jump a spark gap. The exciter then discharges to supply the igniters.

Place the switch in STARTER ONLY to supply power to the engine's starter only; the ignition system is unpowered.

An automatic ignition system monitors engine torque to provide automatic system operation if torque drops below 400 ft-lbs. With the ENG AUTO IGNITION switch in ARM. If torque drops below approximately 400 ft-lbs, the pressure switch energizes the ignition power relay to power the ignition exciter. Once torque exceeds 400 ft-lbs, the system de-activates.

Engine Air

Compressor interstage ($P_{2.5}$) air provides bearing compartment sealing and turbine disk cooling. Compressor discharge (P3) air supplies airframe services such as air conditioning and pressurization, discussed in the environmental section.

The relationship between $P_{2.5}$ and P_3 air control compressor bleed valves that discharge $P_{2.5}$ air to atmosphere to prevent engine stalling at low engine RPM settings. As engine power increases and airflow smooths, the valves slowly close until at high power settings (>90% N_1), they are completely closed.

Propellers

The aircraft's three or four-bladed constant speed, full-feathering, reversible propellers are manufactured by Hartzell or McCauley.

The propeller blades are attached to a hub, which has a servo piston, low pitch stop rod(s), low pitch stop collar, feathering spring, and beta yoke. The servo piston moves the blades to change pitch in response to oil pressure supplied by a primary governor. Counterweights on each propeller blade assisted by the feathering spring move the blades to the feathered position with loss of controlling oil pressure.

In response to propeller lever setting, the constant-speed primary governor hydraulically controls propeller (N_2) RPM by changing the propeller's pitch. The primary governor range is from 2,000 to 1,600 RPM.

The primary governor maintains selected propeller speed by decreasing or increasing blade angle respectively. Decreasing blade angle speeds the propeller while increasing the angle slows it.

If the primary governor fails to limit propeller speed, the overspeed governor acts at approximately 2,080 RPM to reduce oil pressure to the servo piston. Reduced oil pressure reduces propeller speed by moving the blades to a higher blade angle.

A mechanically monitored hydraulic stop sets the propeller's low pitch stop to prevent inadvertent propeller reversing.

Raising the power lever aft past the normal idle stop allows the propellers to move toward the reverse thrust setting. Oil pressure to the servo piston then drives the propellers through the zero thrust angle (beta range) to the full reverse blade angle. Pulling the power levers further aft increases engine power to the maximum reverse thrust range. The primary governor's fuel topping mode reduces engine thrust to limit propeller RPM to 95%

of selected RPM (1,900 RPM when selected RPM is 2,000). Fuel restriction by the fuel topping function prevents propeller overspeed.

Place the AUTO FEATHER switch in ARM position with both power levers above approximately 85 to 90% N_1 setting arms the autofeathering system.

As engine torque increases, that engine's high pressure switch energizes the opposite engine's arming-light-out relay and illuminate its AUTOFEATHER light. This interlock between the two engines prevents system arming until both engines are above the mentioned power setting as well as both engines autofeathering if a malfunction occurs. If an engine fails and torque drops, the respective high pressure switch at 400 ft-lbs de-energizes the opposite engine's arming-light-out relay, de-activates its autofeather system, and extinguish its AUTOFEATHER light.

As torque continues to fall, the low pressure switch energizes its autofeather control relay at 200 ft-lbs to route power to the respective overspeed governor's solenoid dump valve. Oil pressure is dumped back to the gearbox case and the feathering spring and centrifugal weights rapidly move the propeller to the feathered position.

Holding the AUTO FEATHER switch in the TEST position with N_1 RPM below 90% bypasses the power lever switches to verify operation of the pressure switches, control relays, and solenoid dump valves.

Aircraft BB-2 to 934 and 991; BL-1 to 41 have a Type I propeller synchrophaser that adjusts right propeller RPM to match the left.

Aircraft BB-935 and 990, BB-992 and subsequent; BL-42 and subsequent have a Type II synchrophaser that adjusts the slower propeller to the faster propeller's RPM.

A propeller synchroscope provides a visual indication of the synchronization.

The Type I synchrophaser receives propeller RPM from a magnetic pickup on the propeller overspeed governor and a phase pickup on the propeller bulkhead. The system then compares right propeller RPM (slave) to the left's (master). Within system authority range of approximately s propeller governor to match the left propeller's RPM.

On the Type II system, magnetic pickups generate an AC current proportional to propeller RPM. The control box compares waveforms of the AC inputs from each propeller's pickups and attempts to superimpose the waveforms (match propeller RPM) by varying propeller RPM. With propeller RPM within the 25 ±2 RPM authority range, the control box sends correction signals to increase the slower prop.

An electrically powered single or dual-element deice boot warms each propeller blade to prevent ice formation (see Ice and Rain Protection). Slip rings and brush assemblies deliver DC power to the deice boots.

Powerplant System

Power Source	Reverse flow, free turbine engines Pratt and Whitney PT6A-41 (**200**) Pratt and Whitney PT6A-42 (**B200**)
Distribution	Air from inlet screen to: Axial-flow compressor Centrifugal-flow compressor section Annular combustion chamber Hot, high-pressure gas from combustion chamber to: Single-stage, axial-flow turbine (to drive compressor and accesory section) Two-stage, axial-flow turbine (to drive power turbine shaft) Power turbine shaft drives Propeller Reduction gearbox
Control	Levers Power Propeller Condition (fuel control unit) Switches IGNITION AND ENGINE START (ON/OFF/STARTER ONLY) (L/R) ENG AUTO IGNITION (ARM/OFF) (L/R) ICE VANE (EXTEND/RETRACT) (L/R) PROP GOV (TEST/OFF)

Monitor	Engine operation ITT Torque Prop RPM N_1 RPM Indicators FUEL FLOW OIL TEMP OIL PRESS Warning annunciators ENG FIRE L/R FUEL PRESS L/R OIL PRESS L/R CHIP DETECT L/R Caution/advisory/annunciators ICE VANE L/R (amber) ICE VANE EXT L/R (green) AUTOFEATHER L/R IGNITION ON L/R
Protection	Engine operating parameters (overspeed, overtemperature, overtorque) N_1 governor (overspeed) Torque limiter (overtorque) Magnetic chip detector (oil contamination warning Oil-to-fuel heat exchanger (fuel warming-see Ice and Rain Protection) Fuel shutoff valves

Flight Planning

Table of Contents

Frequent or Planned Destinations Record

Airport ______________________________ Ident. ___________
FBO __________________ Freq. ______ Tel: (___)________
Fax: (___)________
Hotel _______________________________ Tel: (___)________
Fax: (___)________
Catering ____________________________ Tel: (___)________

Airport ______________________________ Ident. ___________
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Hotel _______________________________ Tel: (___)________

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Catering ____________________________ Tel: (___)________

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Flight Planning – General

Takeoff Weight Determination

Charts in the Airplane Flight Manual (AFM), Section V, facilitate determination of takeoff, climb, landing performance, as well as flight planning at various parameters of weight, power, altitude, and temperature.

Maximum takeoff weight is 12,500 lbs, unless restricted by the following graphs:

- Maximum Takeoff Weight Permitted by Enroute Climb Requirements
- Takeoff Weight to Achieve Positive One Engine Inoperative Climb at Liftoff
- Maximum Enroute Weight (FAR 135 operations)
- Takeoff Weight to Meet FAR 25 Takeoff Climb Requirements (Optional)

FAR 23 Climb Requirements are:

- Surface to 400 ft AGL . . . . POSITIVE
- At 1,500 ft AGL 0.75%
- Balked Landing Climb 2.5%

Takeoff Weight to Meet FAR 25 Takeoff and Climb Requirements

The following information has been presented to provide the option of limiting weight to obtain the performance specifications of FAR 25 during critical takeoff and initial climb flight segments.

> **NOTE:** Their use is not mandatory and full compliance with other regulations applicable for FAR 25 is not implied.

The criteria for limiting weight involves the selection from the Takeoff Weight graphs of the most adverse conditions of:

- One Engine Inoperative Climb
- Field Length to Acclerate-Stop
- Field Length to Accelerate-Go
- The takeoff flight path required to clear known obstacles beyond the runway

Performance graphs associated with the above conditions are:

- Takeoff Weight to Meet FAR 25 Takeoff Climb Requirements graphs
- Accelerate-Stop graphs
- Accelerate-Go graphs
- Net Gradient of Climb graphs

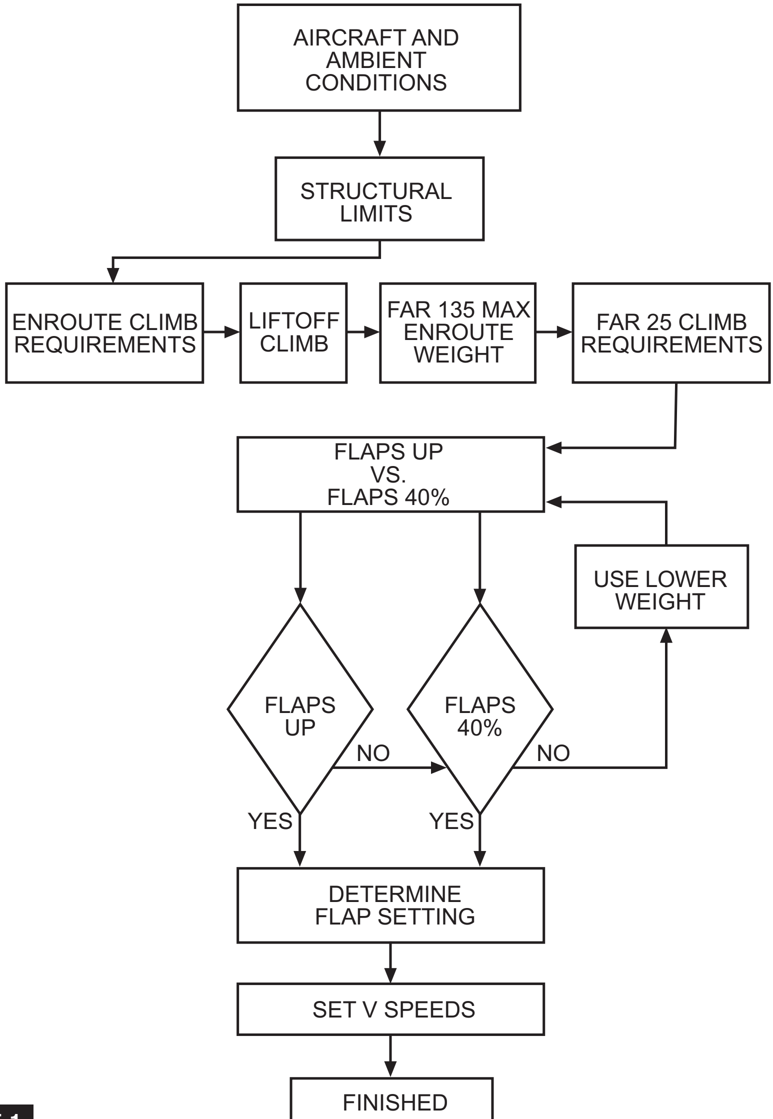
(Reference FAR 25.109, 25.111, 25.115, and 25.121)

The performance presented using this criteria is predicated on the autofeather system being armed and operable.

The Ground Minimum Control Speed (V_{MCG}) has been determined to be 84 knots. At this speed, control within 25 feet of the runway centerline is possible.

The flowchart on the following page illustrates the steps necessary to determine the maximum allowable takeoff weight.

Takeoff Weight Determination Procedure



5-1

Flaps UP vs. Flaps 40%
One Engine Inoperative

Example:

Associated Conditions:

- Runway Length (Paved, Level, Dry) . . . . . . 4,700 FEET
- Pressure Altitude . . . . 6,000 FEET MSL
- Temperature . . . . 20°C
- Takeoff Weight . . . . 12,OOO LBS
- Zero Wind
- No Obstacle
- Standard Gear

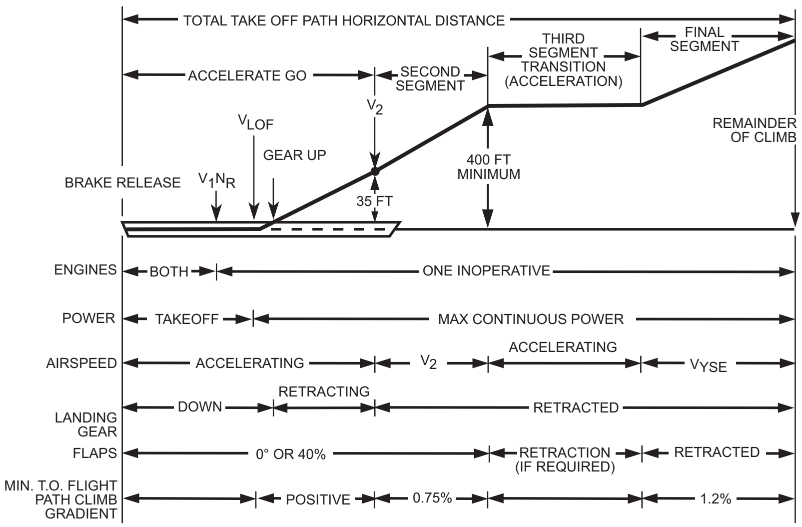
	Distances	
	Flaps UP	Flaps 40%
Ground Roll	2820	2700
Accelerate-Stop	4600	4600
Accelerate-Go[1]	9800	7400
Climb Gradient	3.2%	2.1%
V_2	119	105

In this example, the most significant effect of using flaps 40% for takeoff is a reduced Accelerate-Go figure which will result in achieving a larger margin of safety on this particular runway. Should an engine suddenly fail at V_1, the airplane would not lift off until passing the end of the runway if flaps were not used for takeoff. By selecting Flaps Approach for takeoff, Accelerate-Stop becomes limiting and remains within the available runway length.

[1] Air distance is 50% of Takeoff Field Length

Minimum Climb/Obstacle Clearance

One Engine Inoperative



5-2

Landing Gross Weight Determination

Charts in the AFM, Section V, facilitate determination of approach and landing performance, landing field requirements, and approach speed values.

When using the charts in Section V, remember the following important issues:

Climb – Balked Landing Chart

- Balked landing climb speed is 100 kts. (21 kts below V_{YSE} at gross weight)
- Flaps and gear are left in the landing configuration until obstacles are cleared. Flap and gear retraction occurs while transitioning to a normal climb attitude, airspeed, and power configuration.
- There is a 10°C penalty for operations with ice vanes extended

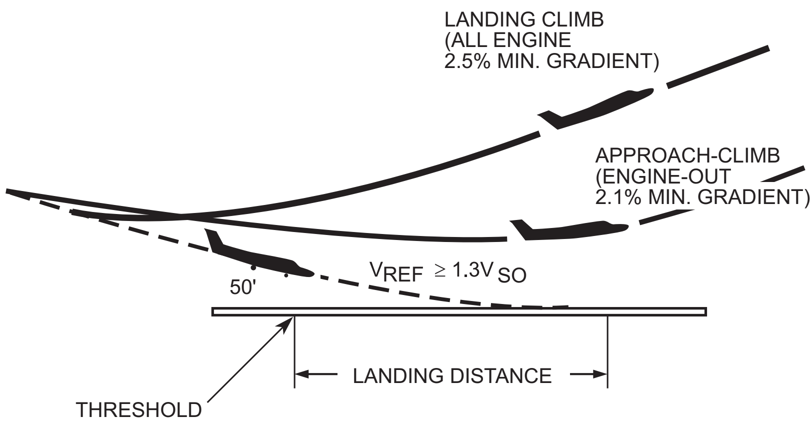
Normal Landing Distance without Propeller Reversing

- Power is retarded to maintain an 800 foot-per-minute (fpm) rate of descent. 900 fpm needed with flaps UP.
- Landing distances assume using maximum braking without sliding the tires.

Normal Landing Distance with Propeller Reversing

- Power is retarded to maintain 1,000 fpm rate of descent.
- Landing distances assume using maximum braking without sliding the tires.
- Maximum propeller reverse is applied until reaching a complete stop.

Landing Path Profile



5-3

Sample Weight and Balance Loading Form

SERIAL:		REGISTRATION NO:	DATE:	
REF	ITEM	WEIGHT *( )	ARM (IN)	MOM/100 *( )
1.	BASIC EMPTY WEIGHT			
2.	CREW			
3.	PASSENGERS OR CARGO			
4.	BAGGAGE			
5.	CABINET CONTENTS			
6.	**SUB TOTAL** ZERO FUEL CONDITION DO NOT EXCEED 11,000 LBS (**B200**) 10,400 LBS (**200**)			
7.	FUEL LOADING			
8.	**SUB TOTAL** RAMP CONDITION			
9.	LESS FUEL FOR START, TAXI, AND TAKEOFF	90		177
10.	**TOTAL** TAKEOFF CONDITION			
11.	FUEL LOADING (FROM LINE 7)			
12.	MINUS TOTAL FUEL USED TO DESIGNATION INCLUDING START, TAXI, AND TAKEOFF			
13.	FUEL REMAINING (MOM/100 FROM USABLE FUEL TABLE)			
14.	PLUS ZERO FUEL WEIGHT (FROM LINE 6)			
15.	LANDING CONDITION			

* ENTER UNITS USED IN LB & LB-IN OR KG & KG-IN.

Weight and Balance Determination

To determine than an aircraft is (and remains) within the gross weight and center of gravity limitations, use the checklist below to complete a loading schedule (sample on opposite page).

1. Record the basic empty weight and moment from the Basic Empty Weight and Balance form (or from the latest superceding forms). The moment must be divided by 100 to correspond to Useful Load Moment tables presented in the AFM.

2. Record the weight and corresponding moment of each item to be carried. These values are found on the Useful Load Weight and Moment tables.

3. Total the weight column and moment column. The total weight, without usable fuel, must not exceed the Maximum Zero Fuel Weight for the aircraft.

   All weight in excess of this limitation must be fuel.

4. Enter the desired fuel loading weight and moment from the Useful Load Weights and Moments – Usable Fuel table.

   The auxiliary tanks may be used only when the main tanks are completely filled.

5. Subtract 90 lbs of fuel at an average moment of 177 to allow for fuel consumption for Start, Taxi, and Takeoff to arrive at the Takeoff Condition. The total takeoff weight must not exceed the maximum allowable takeoff weight and the total moment must be within the minimum and maximum moments shown on the Moment Limits vs. Weight table or graph.

6. Using the data supplied in the Performance Section of the AFM, calculate the fuel remaining at the landing destination by subtracting the total weight of fuel consumed (including Start, Taxi, and Takeoff fuel) from the original fuel loading.

7. For Landing condition weight and balance, add the Landing Fuel weight and moment to the Zero Fuel weight and moment values. The landing moment must be within the minimum and maximum moments shown on the Moment Limits vs. Weight table for that weight.

   If the total moment is less than the minimum moment allowed, useful load items must be shifted aft or forward load items reduced. If the quantity or location of load items is changed, the calculations must be revised and the moments rechecked.

Weight – Shift Calculations

Should either the takeoff or landing weight and balance fall outside specified limitations, use the following methods to bring the aircraft load back into allowable limits.

1. Determine the necessary distance the CG must be moved to bring the airplane back into limits by subtracting the maximum moment from the calculated moment (or for forward CG problems; calculated moment from the minimum moment).
2. Divide the moment difference by the calculated takeoff weight and multiply that value by 100. The result is the distance the CG must be shifted.
3. Determine the required distance to move a specific weight by multiplying Takeoff Weight and the desired shift in CG. Divide this product by the weight to be moved.

$$\frac{\textbf{Weight to be Shifted}}{\textbf{Takeoff Weight}} = \frac{\textbf{Desired Change in CG}}{\textbf{Weight Arm Distance}}$$

4. The result is the minimum distance required for a specific weight to be moved in order to shift the center of gravity by the required amount.

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)
  - ❒ Prist
  - ❒ Methanol
  - ❒ Anti-ice/De-ice
- ❒ 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

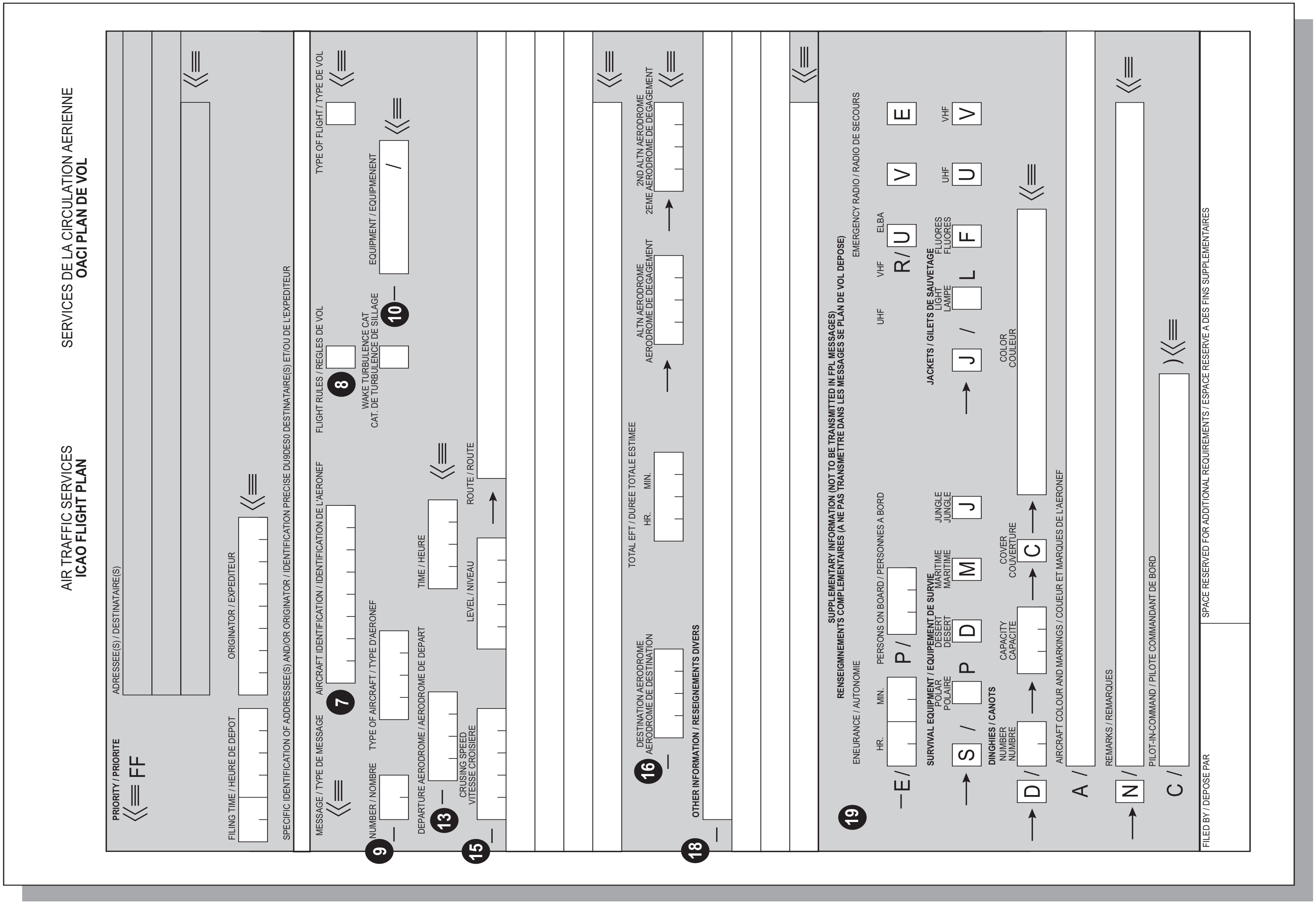
V. FACILITATION AIDS

- ❐ 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



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)

FAA Flight Plan Form

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 penalty 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 Mode C

/U transponder with Mode C

/D DME, but no transponder

/B DME and transponder, but no Mode C

/A DME and transponder with Mode C

/M TACAN only, but no transponder

/N TACAN only and transponder, but with no Mode C

/P TACAN only and transponder with Mode C

/Y LORAN, VOR/DME, or INS only, but with no transponder

/C LORAN, VOR/DME, INS, and transponder, but with no Mode C

/I LORAN, VOR/DME, INS, and transponder with Mode C

ADVANCED RNAV WITH TRANSPONDER AND MODE C (if an aircraft is unable to operate with a transponder and/or Mode C, it will revert to the appropriate code listed above under Area Navigation

/E Flight Management System (FMS) with enroute, 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 US National Airspace System (NAS) and Alaska' AC20-130, Airworthiness Approval of Multi-Sensor Navigation Systems for use in the US 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 plan.

(c) At least dual inertail 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 enroute, terminal, and approach capability that meets the equipment requirements of /E, (a) through (d), above. (U.S. and U.S. territories only unless otherwise authorized).

/G Global Positioning System (GPS)/Global Navigation Satellite System (GNSS) equipped aircraft with enroute and terminal capability.

/R Required Navigational Performance (Denotes capability to operate in RNP designated airspace and routes).

/W Reduced Vertical Separation Minima (RVSM).

/Q Required Navigation Performance (RNP) and Reduced Vertical Separation Minima (RVSM) (Indicate approval for application of RNP and RVSM separation standards). It should be noted that /Q is for automation purposes only and will not be filed by system users. FAA processors will convert the combination of /R + /W to = /Q.

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

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).

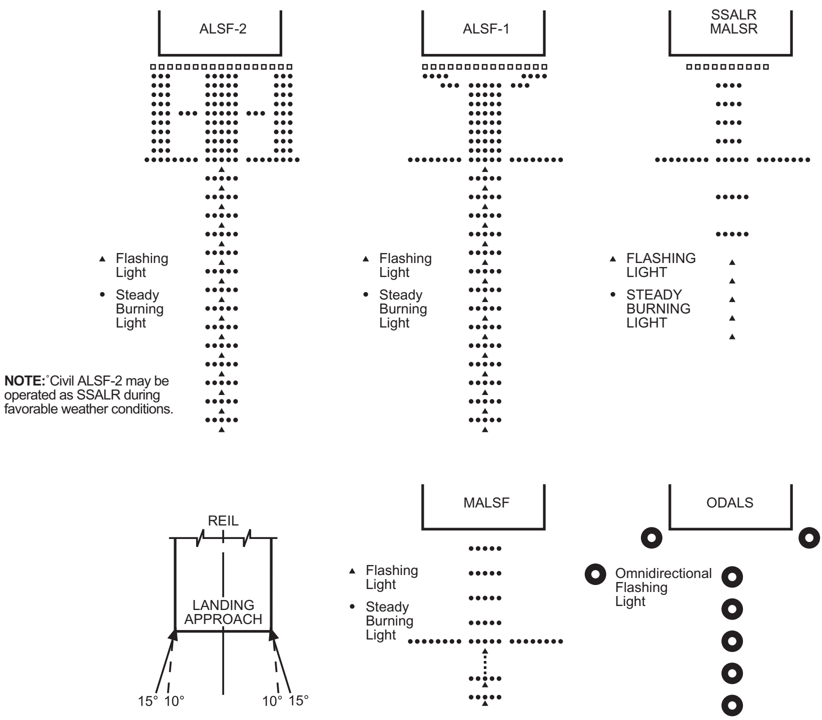
> **NOTE:** For more information on METAR/TAF, consult the FAA brochure “New Aviation Weather Format METAR/TAF.” Copies may be obtained by writing to: FAA/ASY-20, 400 7th Street, S.W. Washington, DC 20590.

Aeronautical Lighting and Visual Aids

Approach Light Systems (ALS)

ALS provide the basic means to transition from instrument flight to visual flight for landing. Operational requirements dictate the sophistication and configuration of the approach light system for a particular runway.

ALS are configurations of signal lights starting at the landing threshold and extending into the approach area to a distance of 2,400-3,000 feet for precision instrument runways and 1,400-1,500 feet for non-precision instrument runways. Some systems include sequenced flashing lights which appear to the pilot as a ball of light traveling towards the runway at high speed (twice a second).



In-Runway Lighting

Runway Centerline Lighting System (RCLS). Runway centerline lights are installed on some precision approach runways to facilitate landing under adverse visibility conditions. They are located along the runway centerline and are spaced at 50-foot intervals. When viewed from the landing threshold, the runway centerline lights are white until the last 3,000 feet of the runway. The white lights begin to alternate with red for the next 2,000 feet, and for the last 1,000 feet of the runway, all centerline lights are red.

Touchdown Zone Lights (TDZL). Touchdown zone lights are installed on some precision approach runways to indicate the touchdown zone when landing under adverse visibility conditions. They consist of two rows of transverse light bars disposed symmetrically about the runway centerline. The system consists of steady-burning white lights which start 100 feet beyond the landing threshold and extend to 3,000 feet beyond the landing threshold or to the midpoint of the runway, whichever is less.

Taxiway Lead-Off Lights. Taxiway lead-off lights extend from the runway centerline to a point on an exit taxiway to expedite movement of aircraft from the runway. These lights alternate green and yellow from the runway centerline to the runway holding position or the ILS/MLS critical area, as appropriate.

Land and Hold Short Lights. Land and hold short lights are used to indicate the hold short point on certain runways which are approved for Land and Hold Short Operations (LAHSO). Land and hold short lights consist of a row of pulsing white lights installed across the runway at the hold short point. Where installed, the lights will be on anytime that LAHSO is in effect. These lights will be off when LAHSO is not in effect.

Taxiway Lights

Taxiway Edge Lights. Taxiway edge lights are used to outline the edges of taxiways during periods of darkness or restricted visibility conditions. These fixtures emit blue light.

> **NOTE:** At most major airports these lights have variable intensity settings and may be adjusted at pilot request or when deemed necessary by the controller.

Taxiway Centerline Lights. Taxiway centerline lights are used to facilitate ground traffic under low visibility conditions. They are located along the taxiway centerline in a straight line on straight portions, on the centerline of curved portions, and along designated taxiing paths in portions of runways, ramp, and apron areas. Taxiway centerline lights are steady burning and emit green light.

Clearance Bar Lights. Clearance bar lights are installed at holding positions on taxiways in order to increase the conspicuousness of the holding position in low visibility conditions. They may also be installed to indicate the location of an intersecting taxiway during periods of darkness. Clearance bars consist of three in-pavement steady-burning yellow lights.

Runway Guard Lights. Runway guard lights are installed at taxiway/runway intersections. They are primarily used to enhance the conspicuousness of taxiway/runway intersections during low visibility conditions, but may be used in all weather conditions. Runway guard lights consist of either a pair of elevated flashing yellow lights installed on either side of the taxiway or a row of in-pavement yellow lights installed across the entire taxiway, at the runway holding position marking.

> **NOTE:** Some airports may have a row of three or five in-pavement yellow lights installed at taxiway/runway intersections. They should not be confused with clearance bar lights described in paragraph ìRunway Guard Lightsî.

Stop Bar Lights. Stop bar lights, when installed, are used to confirm the ATC clearance to enter or cross the active runway in low visibility conditions (below 1,200 feet Runway Visual Range). A stop bar consists of a row of red, unidirectional, steady-burning in-pavement lights installed across the entire taxiway at the runway holding position, and elevated steady-burning red lights on each side. A controlled stop bar is operated in conjunction with the taxiway centerline lead-on lights which extend from the stop bar toward the runway. Following the ATC clearance to proceed, the stop bar is turned off and the lead-on lights are turned on. The stop bar and lead-on lights are automatically reset by a sensor or backup timer.

CAUTION: Pilots should never cross a red illuminated stop bar, even if an ATC clearance has been given to proceed onto or across the runway.

NOTE: If, after crossing a stop bar, the taxiway centerline lead-on lights inadvertently extinguish, pilots should hold their position and contact ATC for further instructions.

Servicing

Table of Contents

Servicing Record

	DATE	QTY	DATE	QTY
Engine Oil				
Brake Fluid				
Oxygen				

Servicing Record (continued)

	DATE	QTY	DATE	QTY
Other				
Other				
Other				

The following procedures are for reference purposes only. Always refer to the Aircraft Flight Manual, aircraft Maintenance Manual, and engine Maintenance Manual for current procedures, precautions, and approved servicing materials.

Fire Extinguisher Cylinder

During the exterior preflight inspection, check that the engine fire extinguisher cylinders are properly serviced. A cylinder is in each main gear wheel well aft of the main gear. An undercharged or fully discharged cylinder requires removal and servicing by an approved agency with a proper charge of 2.5 lbs of bromotrifluoromethane ($CbrF_3$) and pressurized with dry nitrogen to 450 PSI at 70°F (21.1°C). The bottle cannot be serviced in the aircraft. Refer to **Table 6-A** for cylinder pressures at corresponding temperatures.

Temperature		Indicated Pressure (PSI)
*F	*C	
-40	-40	190-240
-20	-29	220-275
0	-18	250-315
20	-7	290-365
40	4	340-420
60	16	390-480
80	27	455-550
100	38	525-635
120	49	605-730
140	60	700-840

Table 6-A; Pressure Versus Temperature

CAUTION: If the engine ingests fire extinguishing compound, it must be cleaned, removed, and disassembled for a thorough internal cleaning. If the engine fire extinguisher is discharged, the engine baffling will prevent entry of the compound into the engine; thus, only an external engine washing is required. Most incidences of fire extinguisher compound ingestion are the result of ground personnel using an external fire extinguisher during engine operation.

Fuel

Approved Fuels

Commercial . . . . JET A, A-1, B

Emergency Fuels . . . . . . 80 RED; 91/98, 100LL BLUE; 100 GREEN; 115/145 PURPLE

In some countries 100LL blue is designated 100L and colored green.

Military JP-4, 5, 8

JP-4 contains factory-blended anti-icing additive.

Emergency Fuels . . . . 80/87 RED; 100/130 GREEN; 115/145 PURPLE

Use the lowest octane emergency fuel available.

CAUTION: JP-4 fuel per MIL-T-5624 contains factory-blended anti-icing additive; no further treatment is necessary. Some fuel suppliers blend anti-icing additive in their storage tanks. To ensure proper concentration by volume of fuel on board, blend only enough additive for the unblended fuel.

Fuel Capacities

System	Lbs.*	U.S. Gals	Kg	Liters
Main	2586	386	1173	1461
Auxiliary	1058	158	480	598
Total	3645	544	1653	2059

Table 6-A; Usable Fuel Quantities

*6.7 lbs/gallon

Use of Jet B, JP-4, and Aviation Gasoline

When using Jet B, JP-4, or aviation gasoline, the fuel quantity indicators will not show correct fuel quantity. When using these fuels, an approximate fuel quantity can be determined by:

- multiplying indicated fuel quantity by 0.96 when using Jet B or JP-4
- multiplying indicated fuel quantity by 0.94 when using aviation gasoline.

Fuel Imbalance (Lateral)

Maximum Allowable Between Wing Systems . . . 1,000 LBS

Refueling/Defueling

Filling the Tanks

Aircraft/Refueling Unit . . . . GROUNDED

Ensure the aircraft is grounded, refueling unit is grounded, and that the refueling unit is grounded to the aircraft.

Main Tanks (Outboard) . . . . REFUEL

CAUTION: To prevent damage to the filler neck, do not let fueling nozzle rest against side of filler. To prevent damage to the fuel tank bladder, do not insert fueling nozzle more than three inches.

Auxiliary Tanks (Inboard) . . . . REFUEL

Do not put any fuel into the auxiliary tanks unless the main tanks are full.

Fuel Drain Points . . . . . . CHECK FOR CONTAMINATION

Allow a three-hour settle period if possible.

NOTE: Clean any spilled fuel/additive off of tires to prevent tire deterioration.

Fuel Draining

Draining the Main Fuel System

Filler Caps . . . . REMOVE

Cover on Bottom of Nacelle . . . . REMOVE

Adapter Plug Behind Cover . . . . REMOVE

AN832-12 Union . . . . SCREW INTO ADAPTER

Defuel . . . . ACCOMPLISH

Defuel using one of three methods:

- gravity feed
- aircraft defueling unit
- mechanical pump.

Draining the Main Fuel System (S/Ns Prior to BB-85 without SI 0725-295)

Filler Cap . . . . REMOVE

Right Side Cowling . . . . OPEN

Flexible Fuel Line at Oil-to-Fuel Heater . . . . DISCONNECT

Standby Fuel Pump (if operative) . . . . ON

If standby fuel pump is inoperative, connect another pump to flexible line or accomplish the following.

Filler Caps . . . . REMOVE

Drain Plug at Nacelle Sump Strainer . . . . REMOVE

Gravity Feed . . . . ACCOMPLISH

Draining the Auxiliary Fuel System

The auxiliary fuel tank can be drained:

- by transferring fuel to the associated main tank with a standby fuel pump
- through the wing center section filler cap with an external pump and hose
- by removing the auxiliary tank sump drain plug and allowing fuel to drain into a suitable container.

> **NOTE:** The fuel crossfeed will not transfer fuel between the left and right fuel systems.

Blending Anti-Icing Additive to Fuel

The following procedure must be used when blending anti-icing additive with fuel during refueling. Use only anti-icing additives that conform to specification MIL-I-27686.

Use a HI-FLO PRIST blender Model PHF-204.

Additive Container . . . . REMOVE CAP CONTAINING TUBE AND CLIP ASSEMBLY

Pistol Grip . . . . ATTACH

Tube . . . . PRESS INTO BUTTON

Tube End . . . . CLIP TO FUEL NOZZLE

Trigger . . . . PULL FIRMLY/LOCK IN PLACE

Refueling . . . . BEGIN

Additive Flow . . . . BEGIN

> **CAUTION:** Ensure the additive is directed into the flowing fuel stream. Start additive flow after fuel flow starts; stop before fuel flow stops. Do not allow concentrated additive to contact coated interior of fuel cells or aircraft painted surfaces. Use not less than 20 fluid ounces of additive per 260 gallons of fuel or more than 20 fluid ounces per 104 gallons of fuel.

Fueling Rate . . . . 30 TO 60 GPM

A rate of less than 30 GPM may be used when topping off tanks.

Adding Biocide to Fuel

Biobor JF is a fuel biocide and not an anti-icing agent. Biobor JF can be used periodically at concentrations up to 135 parts-per-million (PPM) when the aircraft is operated in environments conducive to fungal or microbial growth or there is evidence of fuel contamination (i.e., dirty sump drains, clogged filters, unusual odor, or growth seen in fuel tanks).

As a single-dose shock treatment, Biobor JF can be used in concentrations up to 270 PPM to clean out and sterilize a contaminated fuel system. After all fungal or microbial growths are killed, Biobor JF can be used at a 135 PPM concentration to prevent new growth.

When used to sterilize the fuel system, the additive blended fuel should remain in contact with all fuel tank surfaces for at least 72 hours. If the airplane is flown, Biobor JF should be added during refueling to ensure a 72 hour biocide treatment.

Refer to aircraft Maintenance Manual and **Tables 6-B** and **6-C** for blending charts for 135 and 270 PPM Biobor JF concentrations.

CAUTION: Ensure that the additive is directed into the flowing fuel stream; start additive flow after fuel flow starts and stop before fuel flow stops. Do not allow concentrated additive to contact coated interior of fuel cells or airplane surfaces. Use not less than 20 fl oz of additive per 260 gallons of fuel or more than 20 fl oz of additive per 104 gallons of fuel.

Turbine Fuel		Biobor JF @ 270 PPM			Biobor JF @ 135 PPM		
LBS	GALS	LBS	GALS	FL OZ	LBS	GALS	FL OZ
670	100	0.18	0.02	2.63	0.09	0.01	1.32
1340	200	0.36	0.04	5.26	0.18	0.02	2.63
2010	300	0.54	0.06	7.89	0.27	0.03	3.95
2680	400	0.72	0.08	10.53	0.36	0.04	5.26
3350	500	0.90	0.10	13.16	0.45	0.05	6.58
6700	1000	1.81	0.21	24.46	0.90	0.10	13.16
13400	2000	3.62	0.41	52.92	1.81	0.21	24.46
16750	2500	4.52	0.52	66.08	2.26	0.26	33.04
33500	5000	9.04	10.3	132.16	4.52	0.52	66.08
67000	10000	18.09	2.07	264.47	9.05	1.03	132.31

Table 6-B; Biobor JF Blending Ratios

Fuel	Fuel Density at 15°C		Oz per 1000 gallons fuel	Gallons of fuel treated per quart
	G/ML	LBS/GAL		
JP-4	0.7601	6.343	25.37	1261
Kerosene	0.8045	6.714	26.86	1191

Table 6-C; Biobor JF Addition Levels for Various Fuels – Biobor JF Rates at 270 PPM

Ground Power Unit

The ground power unit (GPU) should be capable of providing a continuous load of 300A at 24 to 30V DC and 1,000A for 0.1 seconds during engine start. Use of an inadequate GPU will cause a voltage drop below the start relay's drop-out voltage. This may result in relay chatter and welded contacts. Similarly, a GPU that provides more than 350A continuous load will damage the external power relay and airplane power cables.

CAUTION: The output setting must not exceed 1,000A on external power sources with a higher current-carrying capability. Any current in excess of 1,000A may overtorque the starter-generator driveshaft or produce heat sufficient to shorten starter-generator life.

When using an external power source:

- use only a negatively grounded unit. If polarity unknown, check with a voltmeter before connecting to the airplane
- before connecting the GPU, turn off all radio equipment and generator switches but leave the battery on to absorb transient voltage spikes
- if battery voltage indicates less than 20V, the battery must be removed and serviced before using external power
- the generators must be OFF and the battery switch ON when starting engines with external power
- if the GPU does not have a standard AN plug, check plug polarity. The positive lead must connect to the external power receptacle's center post, negative lead to the front post, and positive voltage of 24 to 28V DC to the external power receptacle's polarizing pin.

CAUTION: Voltage is required to energize the avionics master power relays to remove power from the avionics equipment. Therefore, never apply external power to the airplane without first applying battery power. If the battery is removed from the airplane or the battery switch is in the OFF position, connect an external battery parallel to the GPU before energizing the GPU.

CAUTION: The battery may be damaged if exposed to voltages higher than 30V for extended periods of time.

Connecting GPU

Avionics MASTER PWR Switch . . . . OFF

GEN Switches . . . . OFF

Battery Switch . . . . ON

Volt/Loadmeter (Battery Voltage) . . . . 20V MINIMUM

Ground Power Voltage . SET 28.25 ± 0.25V (King Air 200) or 28.0 to 28.4V (King Air B200)

Ground Power Unit . . . . . OFF/CONNECT TO AIRCRAFT

Ground Power Unit . . . . ON

Volt/Loadmeter . . . . MONITOR

Monitor to ensure voltage reading remains greater than battery voltage (28.25 ± 0.25 volts).

Disconnecting GPU

Right Propeller . . . . FEATHER

Ground Power Unit . . . . OFF/DISCONNECT

External Power Access Door . . . . SECURE

GEN Switches . . . . RESET/ON

Right Propeller Control . . . . FULL FORWARD

Oil – Engine

NOTE: If the engine is cold-soaked, oil level is full when the dipstick reads one quart low. Overfilling may cause an oil discharge through the breather.

Approved Engine Oils

The following oils comply with Pratt & Whitney Canada (P&WC) specification PWA521, Type II oil (5 centistoke). These oils are fully approved for use in P&WC commercially operated PT6A-41 and -42 engines. Refer to the latest revision of P&WC SB 3001 for a current list of approved oils.

- Aeroshell Turbine Oil 500
- Aeroshell Turbine Oil 560
- Castrol 205
- Exxon Turbo Oil 2380
- Mobil Jet Oil 254
- Mobil Jet Oil II
- Royal Turbine Oil 560
- Roy Turbine Oil 500
- Turbonycoil 525-2A.

NOTE: When switching to another approved brand, drain and flush complete oil system and refill in accordance with engine Maintenance Manual instructions.

CAUTION: When changing from an existing lubricant formulation to a “third generation” lubricant formulation, P&WC strongly recommends that such a change should only be made when an engine is new or freshly overhauled.

CAUTION: Do not mix different brands of oil when adding or changing oil. Different brands of oil may be incompatible because of the difference in their chemical structures. Should oils of different brands become intermixed in the engine, drain and flush the entire engine oil system and refill with an approved lubricant.

Engine Oil Capacity

Total . . . . 14.2 QTS/13.4 LTRS

Refill . . . . 12.7 QTS/12.0 LTRS

Undrainable . . . . 1.5 QTS/1.4 LTRS

Operating Range . . . . Full to 4 QTS Low

Oil Consumption

Maximum . . . . 1 QT/10 HRS
0.95 LTRS/10 HRS

Oil Servicing

Check the oil level after the oil has been changed or the engine has remained stationary for more than 12 hours.

Engine . . . . RUN AT IDLE FOR 2 MINUTES

Engine . . . . SHUT DOWN

Oil Access Door . . . . OPEN

The oil access door is on the upper aft cowling.

Dipstick . . . . REMOVE

The dipstick is behind an access door on the aft engine cowl and is marked for the last five quarts. Minimum oil quantity operating range is four quarts low. Replenish oil through the dipstick opening; do not fill past the full mark.

Oil Quantity . . . . CHECK

Oil . . . . ADD TO ONE QUART MARK ON DIPSTICK

Add only oil of the same brand as that already in the engine. Normal oil level is to the one quart mark on the dipstick. Overfilling the engine may cause oil discharge through the breather until satisfactory oil level is reached.

CAUTION: Remove any spilled oil immediately to prevent tire deterioration.

Dipstick . . . . REPLACE/VERIFY SECURE

Access Door . . . . CLOSE AND SECURE

Oxygen

Approved Oxygen

Use only MIL-O-27210 aviator's breathing oxygen.

WARNING: Do not use medical or industrial oxygen. These types of oxygen may contain moisture which could freeze the system valves and lines.

Oxygen Cylinder Servicing

Observe the following precautions during oxygen servicing.

WARNING: Avoid making sparks and keep all burning cigarettes or fire away from the vicinity of the airplane. Make sure that the oxygen shutoff valve in the flight compartment is in the closed position. Inspect the filler connection for cleanliness before attaching it to the filler valve. Make sure that your hands, tools, and clothing are clean, particularly of grease or oil, for these contaminants may ignite upon contact with pure oxygen under pressure. As a further precaution against fire, open and close all oxygen valves slowly. Observe all precautions when servicing the oxygen system.

- always ground the system to be serviced and the servicing equipment before connecting the filler adapter
- close the oxygen cylinder manual shutoff valve
- ensure that airplane electrical power is off. Do not operate electrical switches or connect/disconnect ground power unit (GPU) during oxygen servicing

- do not service the oxygen system if fueling or other flammable fluid servicing is in progress
- do not service the system too fast. Rapid charging can create a dangerous overheat condition. Fill the system slowly by adjusting the charging rate with the oxygen servicing cart pressure regulator valve.

Fill the oxygen cylinder slowly to prevent overheating. Fill the following cylinder sizes to corresponding maximum pressures (at 70°F/21.1°C).

22 Cubic-Foot Cylinder . . . . 1,800 PSI

49 Cubic-Foot Cylinder . . . . 1,850 PSI

64 Cubic-Foot Cylinder . . . . 1,850 PSI

76 Cubic-Foot Cylinder . . . . 1,850 PSI

For each 1°F increase in temperature, increase maximum pressure 3.5 PSI. For each 1°F decrease in temperature, decrease maximum pressure 3.5 PSI. If oxygen pressure drops below 50 PSI, a system purge is required.

Landing Gear and Brakes

Brake System

The brake system reservoir is on the upper left forward side of the avionics compartment. Service the reservoir with MIL-H-5606 hydraulic fluid.

Reservoir Cap . . . . REMOVE

Fluid Level . . . . CHECK

With the reservoir fully serviced, fluid level should read full on the dipstick.

Fluid . . . . REPLENISH IF NECESSARY

Reservoir Cap . . . . REPLACE

Remove and replace the reservoir cap by hand. Using tools may damage the cap and reservoir resulting in a fluid leak.

Tires

CAUTION: Tires that have picked up a fuel, hydraulic fluid, or oil film should be washed down as soon as possible with a detergent solution to prevent deterioration of the rubber.

Inflation

Check tire inflation daily when they are cool. Wait at least 2 hours (3 hours in hot weather) after a flight before checking tire pressure.

Nose Gear . . . . 55 TO 60 PSI

Standard Main Gear . . . . 96 ±2 PSI

High Flotation Main Gear . . . . 62 ±2 PSI

Strut Extension

The following minimum/maximum strut extensions apply to an empty aircraft with full fuel and oil tanks.

Nose Gear . . . . 3.00 TO 3.50 INCHES

Standard Main Gear . . . . 3.93 TO 4.19 INCHES

High Flotation Main Gear **(S/Ns BB-74 to 105 except BB-76)** . . . . 4.70 TO 4.95 INCHES

High Flotation Main Gear **(all other S/Ns)** . . . . 5.56 TO 5.93 INCHES

Deicing/Anti-Icing

Approved Airplane Deicing/Anti-Icing Fluids

- SAE AMS 1424 Type I
- ISO 11075 Type I
- SAE AMS 1428 Type II
- ISO 11078 Type II
- SAE AMS 1428 Type IV.

  Only the following Type IV fluids are approved:

  – Clariant Safewing MP IV 1957

  – Clariant Safewing MP IV 2001

  – UCAR ULTRA+ (Approved for use down to -15°C)

  – Octagon Max Flight Type IV

Deicing and Anti-Icing Fluid Application

Airplane deicing fluids may be used diluted or undiluted according to manufacturer's recommendations for deicing. For anti-icing purposes, the fluids should always be used undiluted. Deicing fluids may be applied either heated or unheated.

> **NOTE:** Type II and Type IV deicing fluids should only be applied at low pressure by trained personnel with proper equipment.

If a sprayer is not available, deicing fluid may be brushed or painted onto the airplane's surface.

Emergency Information

Table of Contents

Credits: The content of this section is reprinted from the Aeronautical Information Manual, Change 2, Effective: January 25, 2001 (www.faa.gov/ATpubs/AIM/index.htm).

Emergency Information

Pilot Responsibility and Authority

The pilot in command of an aircraft is directly responsible for and is the final authority as to the operation of that aircraft. In an emergency requiring immediate action, the pilot in command may deviate from any rule in 14 CFR Part 91, Subpart A, General, and Subpart B, Flight Rules, to the extent required to meet that emergency.

- REFERENCE-14 CFR Section 91.3(b).

If the emergency authority of 14 CFR Section 91.3(b) is used to deviate from the provisions of an ATC clearance, the pilot in command must notify ATC as soon as possible and obtain an amended clearance.

Unless deviation is necessary under the emergency authority of 14 CFR Section 91.3, pilots of IFR flights experiencing two-way radio communications failure are expected to adhere to the procedures prescribed under "IFR operations, two-way radio communications failure".

- REFERENCE-14 CFR Section 91.185.

Emergency Conditions

An emergency can be either a distress or urgency condition as defined in the Pilot/Controller Glossary. Pilots do not hesitate to declare an emergency when they are faced with distress conditions such as fire, mechanical failure, or structural damage. However, some are reluctant to report an urgency condition when they encounter situations which may not be immediately perilous, but are potentially catastrophic. An aircraft is in at least an urgency condition the moment the pilot becomes doubtful about position, fuel endurance, weather, or any other condition that could adversely affect flight safety. This is the time to ask for help, not after the situation has developed into a distress condition.

Pilots who become apprehensive for their safety for any reason should request assistance immediately. Ready and willing help is available in the form of radio, radar, direction finding stations, and other aircraft. Delay has caused accidents and cost lives. Safety is not a luxury! Take action!

Transponder Emergency Operation

When a distress or urgency condition is encountered, the pilot of an aircraft with a coded radar beacon transponder, who desires to alert a ground radar facility, should squawk MODE 3/A, Code7700/Emergency and MODE C altitude reporting and then immediately establish communications with the ATC facility.

Radar facilities are equipped so that Code 7700 normally triggers an alarm or special indicator at all control positions. Pilots should understand that they might not be within a radar coverage area. Therefore, they should continue squawking Code 7700 and establish radio communications as soon as possible.

Intercept and Escort Procedures

The concept of airborne intercept and escort is based on the Search and Rescue (SAR) aircraft establishing visual and/or electronic contact with an aircraft in difficulty, providing in-flight assistance, and escorting it to a safe landing. If bailout, crash landing or ditching becomes necessary, SAR operations can be conducted without delay. For most incidents, particularly those occurring at night and/or during instrument flight conditions, the availability of intercept and escort services will depend on the proximity of SAR units with suitable aircraft on alert for immediate dispatch. In limited circumstances, other aircraft flying in the vicinity of an aircraft in difficulty can provide these services.

If specifically requested by a pilot in difficulty or if a distress condition is declared, SAR coordinators will take steps to intercept and escort an aircraft. Steps may be initiated for intercept and escort if an urgency condition is declared and unusual circumstances make such action advisable.

It is the pilot's prerogative to refuse intercept and escort services. Escort services will normally be provided to the nearest adequate airport. Should the pilot receiving escort services continue on to another location after reaching a safe airport, or decide not to divert to the nearest safe airport, the escort aircraft is not obligated to continue and further escort is discretionary. The decision will depend on the circumstances of the individual incident.

Search and Rescue

General

SAR is a lifesaving service provided through the combined efforts of the federal agencies signatory to the National SAR Plan, and the agencies responsible for SAR within each state. Operational resources are provided by the U.S. Coast Guard, DOD components, the Civil Air Patrol, the Coast Guard Auxiliary, state, county and local law enforcement and other public safety agencies, and private volunteer organizations. Services include search for missing aircraft, survival aid, rescue, and emergency medical help for the occupants after an accident site is located.

National Search and Rescue Plan

By federal interagency agreement, the National Search and Rescue Plan provides for the effective use of all available facilities in all types of SAR missions. These facilities include aircraft, vessels, pararescue and ground rescue teams, and emergency radio fixing. Under the Plan, the U.S. Coast Guard is responsible for the coordination of SAR in the Maritime Region, and the USAF is responsible in the Inland Region. To carry out these responsibilities, the Coast Guard and the Air Force have established Rescue Coordination Centers (RCCs) to direct SAR activities within their regions. For aircraft emergencies, distress, and urgency, information normally will be passed to the appropriate RCC through an ARTCC or FSS.

Coastguard Rescue Coordination Centers

Alameda, CA 510-437-3701	Miami, FL 305-415-6800
Boston, MA 617-223-8555	New York, NY 212-668-7055
Cleveland, OH 216-902-6117	New Orleans, LA 504-589-6225
Honolulu, HI 808-541-2500	Portsmouth, VA 757-398-6390
Juneau, AK 907-463-2000	Seattle, WA 206-220-7001
San Juan, PR 809-729-6770	

Air Force Rescue Coordination Centers

Air Force Rescue Coordination Center – 48 Contiguous States

Langley AFB, Virginia Telephone Numbers	
Commercial	804-764-8112
WATS	800-851-3051
DSN	574-8112

Air Command Rescue Coordination Center – Alaska

Elmendorf AFB, Alaska Telephone Numbers	
Commercial	907-552-5375
DSN	317-552-2426

Joint Rescue Coordination Center – Hawaii

HQ 14th CG District Honolulu Telephone Numbers	
Commercial	808-541-2500
DSN	448-0301

Emergency and Overdue Aircraft

ARTCCs and FSSs will alert the SAR system when information is received from any source indicating that an aircraft is in difficulty, overdue, or missing.

> Radar facilities that provide radar flight following or advisories consider the loss of radar and radios, without service termination notice, to be a possible emergency. Pilots receiving VFR services from radar facilities should be aware that SAR may be initiated under these circumstances.
>
> A filed flight plan is the most timely and effective indicator that an aircraft is overdue. Flight plan information is invaluable to SAR forces for planning a search and executing search efforts.

Prior to departure on every flight, local or otherwise, someone at the departure point should be advised of your destination and route of flight if other than direct. Search efforts are often wasted and rescues delayed because of pilots who thoughtlessly take off without telling anyone where they are going. File a flight plan for your safety.

According to the National Search and Rescue Plan, “The life expectancy of an injured survivor decreases as much as 80 percent during the first 24 hours, while the chances of survival of uninjured survivors rapidly diminishes after the first 3 days.”

An Air Force Review of 325 SAR missions conducted during a 23-month period revealed that “Time works against people who experience a distress but are not on a flight plan, since 36 hours normally pass before family concern initiates an (alert)”.

Survival Equipment

For flight over uninhabited land areas, it is wise to take and know how to use survival equipment for the type of climate and terrain.

If a forced landing occurs at sea, chances of survival are governed by the degree of crew proficiency in emergency procedures and by the availability and effectiveness of water survival equipment.

Ground-Air Visual Code for Use by Survivors

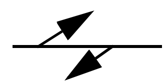
NO.	MESSAGE	CODE SYMBOL
1	Require assistance	**V**
2	Require medical assistance	**X**
3	No or Negative	**N**
4	Yes or Affirmative	**Y**
5	Proceeding in this direction	↑

IF IN DOUBT, USE INTERNATIONAL SYMBOL SOS

INSTRUCTIONS

1. Lay out symbols by using strips of fabric or parachutes, pieces of wood, stones, or any available material.
2. Provide as much color contrast as possible between material used for symbols and background against which symbols are exposed.
3. Symbols should be at least 10 feet high or larger. Take care to lay out symbols exactly as shown.
4. In addition to using symbols, make every effort to attract attention by means of radio, flares, smoke, or other available means.
5. On snow covered ground, signals can be made by dragging, shoveling or tramping. Depressed areas forming symbols will appear black from the air.
6. Pilot should acknowledge message by rocking wings from side to side.

Ground-Air Visual Code for Use by Ground Search Parties

NO.	MESSAGE	CODE SYMBOL
1	Operation completed.	**LLL**
2	We have found all personnel.	**<u>LL</u>**
3	We have found only some personnel.	**++**
4	We are not able to confirm. Returning to base.	**XX**
5	We have divided into two groups. Each proceeding in direction indicated.	
6	Information received that aircraft is in this direction.	→ →
7	Nothing found. Will continue search.	**NN**

NOTE: These visual signals have been accepted for international use and appear in Annex 12 to the Convention on International Civil Aviation.

Observance of Downed Aircraft

Determine if crash is marked with a yellow cross; if so, the crash has already been reported and identified.

If possible, determine type and number of aircraft and whether there is evidence of survivors.

Fix the position of the crash as accurately as possible with reference to a navigational aid. If possible, provide a geographic or physical description of the area to aid ground search parties.

Transmit the information to the nearest FAA or other appropriate radio facility.

If circumstances permit, orbit the scene to guide in other assisting units until their arrival or until you are relieved by another aircraft.

Immediately after landing, make a complete report to the nearest FAA facility, or Air Force or Coast Guard Rescue Coordination Center. The report can be made by a long distance collect telephone call.

Obtaining Emergency Assistance

A pilot in any distress or urgency condition should immediately take the following action, not necessarily in the order listed, to obtain assistance:

1. Climb, if possible, for improved communications, and better radar and direction finding detection. However, it must be understood that unauthorized climb or descent under IFR conditions within controlled airspace is prohibited, except as permitted by 14 CFR Section 91.3(b).
2. If equipped with a radar beacon transponder (civil) or IFF/SIF (military):
   - Continue squawking assigned MODE A/3 discrete code/VFR code and MODE C altitude encoding when in radio contact with an air traffic facility or other agency providing air traffic services, unless instructed to do otherwise.
   - If unable to immediately establish communications with an air traffic facility/agency, squawk MODE A/3, Code 7700/Emergency and MODE C.
3. Transmit a distress or urgency message consisting of as many as necessary of the following elements, preferably in the order listed:
   a. If distress, MAYDAY, MAYDAY, MAYDAY; if urgency, PAN-PAN, PAN-PAN, PAN-PAN.

b. Name of station addressed.
c. Aircraft identification and type.
d. Nature of distress or urgency.
e. Weather.
f. Pilot's intentions and request.
g. Present position, and heading; or if lost, last known position, time, and heading since that position.
h. Altitude or flight level.
i. Fuel remaining in minutes.
j. Number of people on board.
k. Any other useful information.

After establishing radio contact, comply with advice and instructions received. Cooperate. Do not hesitate to ask questions or clarify instructions when you do not understand or if you cannot comply with clearance. Assist the ground station to control communications on the frequency in use. Silence interfering radio stations. Do not change frequency or change to another ground station unless absolutely necessary. If you do, advise the ground station of the new frequency and station name prior to the change, transmitting in the blind if necessary. If two-way communications cannot be established on the new frequency, return immediately to the frequency or station where two-way communications last existed.

When in a distress condition with bailout, crash landing or ditching imminent, take the following additional actions to assist search and rescue units:

Time and circumstances permitting, transmit as many as necessary of the message elements in page 7-11 subparagraph 3. above, and any of the following that you think might be helpful:

- ELT status.
- Visible landmarks.
- Aircraft color.

- Number of persons on board.
- Emergency equipment on board.

Actuate your ELT if the installation permits.

For bailout, and for crash landing or ditching if risk of fire is not a consideration, set your radio for continuous transmission.

If it becomes necessary to ditch, make every effort to ditch near a surface vessel. If time permits, an FAA facility should be able to get the position of the nearest commercial or Coast Guard vessel from a Coast Guard Rescue Coordination Center.

After a crash landing, unless you have good reason to believe that you will not be located by search aircraft or ground teams, it is best to remain with your aircraft and prepare means of signaling search aircraft.

Two-way Radio Communications Failure

It is virtually impossible to provide regulations and procedures applicable to all possible situations associated with two-way radio communications failure. During two-way radio communications failure, when confronted by a situation not covered in the regulation, pilots are expected to exercise good judgment in whatever action they elect to take. Should the situation so dictate, they should not be reluctant to use the emergency action contained in 14 CFR Section 91.3(b).

Whether or not two-way communications failure constitutes an emergency depends on the circumstances; in any event, it is a determination made by the pilot. 14 CFR Section 91.3(b) authorizes a pilot to deviate from any rule in Subparts A and B to the extent required to meet an emergency.

In the event of two-way radio communications failure, ATC service will be provided on the assumption that the pilot is operating in accordance with 14 CFR Section 91.185. A pilot experiencing two-way communications failure should (unless emergency authority is exercised) comply with 14 CFR Section 91.185 quoted below:

General. Unless otherwise authorized by ATC, each pilot who has two-way radio communications failure when operating under IFR shall comply with the rules of this section.

VFR Conditions. If the failure occurs in VFR conditions, or if VFR conditions are encountered after the failure, each pilot shall continue the flight under VFR and land as soon as practicable.

> **NOTE:** This procedure also applies when two-way radio failure occurs while operating in Class A airspace. The primary objective of this provision in 14 CFR Section 91.185 is to preclude extended IFR operation by these aircraft within the ATC system. Pilots should recognize that operation under these conditions may unnecessarily as well as adversely affect other users of the airspace, since ATC may be required to reroute or delay other users in order to protect the failure aircraft. However, it is not intended that the requirement to "land as soon as practicable" be construed to mean "as soon as possible". Pilots retain the prerogative of exercising their best judgment and are not required to land at an unauthorized airport, at an airport unsuitable for the type of aircraft flown, or to land only minutes short of their intended destination.

IFR Conditions. If the failure occurs in IFR conditions, or if "VFR conditions" above cannot be complied with, each pilot shall continue the flight according to the following:

Route.

By the route assigned in the last ATC clearance received;

If being radar vectored, by the direct route from the point of radio failure to the fix, route, or airway specified in the vector clearance;

In the absence of an assigned route, by the route that ATC has advised may be expected in a further clearance; or

In the absence of an assigned route or a route that ATC has advised may be expected in a further clearance, by the route filed in the flight plan.

Altitude. At the HIGHEST of the following altitudes or flight levels FOR THE ROUTE SEGMENT BEING FLOWN:

The altitude or flight level assigned in the last ATC clearance received;

The minimum altitude (converted, if appropriate, to minimum flight level as prescribed in 14 CFR Section 91.121(c)) for IFR operations; or

The altitude or flight level that ATC has advised may be expected in a further clearance.

NOTE: The intent of the rule is that a pilot who has experienced two-way radio failure should select the appropriate altitude for the particular route segment being flown and make the necessary altitude adjustments for subsequent route segments. If the pilot received an “expect further clearance" containing a higher altitude to expect at a specified time or fix, maintain the highest of the following altitudes until that time/fix:
(1) the last assigned altitude; or
(2) the minimum altitude/flight level for IFR operations.

Upon reaching the time/fix specified, the pilot should commence climbing to the altitude advised to expect. If the radio failure occurs after the time/fix specified, the altitude to be expected is not applicable and the pilot should maintain an altitude consistent with I or 2 above. If the pilot receives an "expect further clearance" containing a lower altitude, the pilot should maintain the highest of I or 2 above until that time/fix specified in subparagraph “Leave clearance limit”, below.

Leave Clearance Limit.

When the clearance limit is a fix from which an approach begins, commence descent or descent and approach as close as possible to the expect further clearance time if one has been received, or if one has not been received, as close as possible to the Estimated Time of Arrival (ETA) as calculated from the filed or amended (with ATC) Estimated Time en Route (ETE).

If the clearance limit is not a fix from which an approach begins, leave the clearance limit at the expect further clearance time if one has been received, or if none has been received, upon arrival over the clearance limit, and proceed to a fix from which an approach begins and commence descent or descent and approach as close as possible to the Estimated Time of Arrival as calculated from the filed or amended (with ATC) Estimated Time en Route.

Transponder Operation During Two-way Communications Failure.

If an aircraft with a coded radar beacon transponder experiences a loss of two-way radio capability, the pilot should adjust the transponder to reply on MODE A/3, Code 7600.

The pilot should understand that the aircraft may not be in an area of radar coverage.

Reestablishing Radio Contact.

In addition to monitoring the NAVAID voice feature, the pilot should attempt to reestablish communications by attempting contact:

On the previously assigned frequency, or

With an FSS or ARINC1.

If communications are established with an FSS or ARINC, the pilot should advise that radio communications on the previously assigned frequency have been lost giving the aircraft's position, altitude, and last assigned frequency and then request further clearance from the controlling facility. The preceding does not preclude the use of 121.5 MHz. There is no priority on which action should be attempted first. If the capability exists, do all at the same time.

Aircraft Rescue and Fire Fighting Communications

Discrete Emergency Frequency

Direct contact between an emergency aircraft flight crew, Aircraft Rescue and Fire Fighting Incident Commander (ARFF IC), and the Airport Traffic Control Tower (ATCT) is possible on an aeronautical radio frequency (Discrete Emergency Frequency [DEF]) designated by Air Traffic Control (ATC) from the operational frequencies assigned to that facility.

Emergency aircraft at airports without an ATCT (or when the ATCT is closed) may contact the ARFF IC (if ARFF service is provided), on the Common Traffic Advisory Frequency (CTAF) published for the airport or the civil emergency frequency 121.5 MHz.

Radio Call Signs

Preferred radio call sign for the ARFF IC is "(location/facility) Command" when communicating with the flight crew and the FAA ATCT.

EXAMPLE:
LAX Command.
Washington Command.

ARFF Emergency Hand Signals

RECOMMEND EVACUATION - Evacuation recommended based on ARFF IC's assessment of external situation.

Arm extended from body, and held horizontal with hand upraised at eve level. Execute beckoning arm motion angled backward. Nonbeckoning arm held against body.

NIGHT - same with wands.

RECOMMEND STOP - Recommend evacuation in progress be halted. Stop aircraft movement or other activity in progress.

Arms in front of head - Crossed at wrists.

NIGHT - same with wands.

EMERGENCY CONTAINED - No outside evidence of dangerous condition or "all-clear."

Arms extended outward and down at a 45 degree angle. Arms moved inward below waistline simultaneously until wrists crossed, then extended outward to starting position (umpire's "safe" signal).

NIGHT - same with wands.

Air Traffic Control Tower Light Gun Signals

Color and Type of Signal	Movement of Vehicles, Equipment and Personnel	Aircraft on the Ground	Aircraft in Flight
Steady green	Cleared to cross, proceed or go	Cleared for takeoff	Cleared to land
Flashing green	Not applicable	Cleared for taxi	Return for landing (to be followed by steady green at the proper time)
Steady red	STOP	STOP	Give way to other aircraft and continue circling
Flashing red	Clear the taxiway/runway	Taxi clear of the runway in use	Airport unsafe, do not land
Flashing white	Return to starting point on airport	Return to starting point on airport	Not applicable
Alternating red and green	Exercise extreme caution	Exercise extreme caution	Exercise extreme caution

Emergency First Aid

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 the victim's mouth.

> **NOTE:** A pocket mask can be used instead, but proper head position and airtight seal must be maintained.

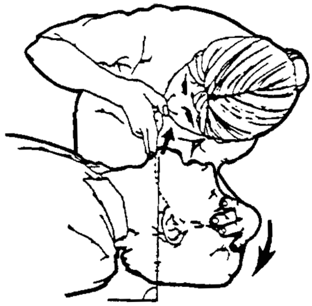
Circulation

Locate carotid artery pulse; hold 10 seconds. If no pulse:

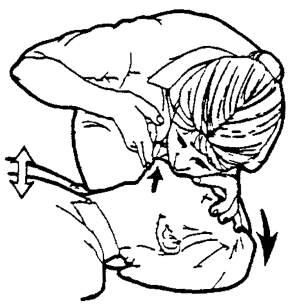
- Begin external chest compressions by locating hand position two fingers above notch and placing heel of hand on breastbone.
- Perform 15 compressions of 1½ to 2 inches at a rate of 80 to 100 compressions per minute. (Count, "One *and* two *and* three *and*...," etc.) Come up smoothly, keeping hand 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.

MedAire,™ Inc.
Inflight Medical Support

Airway



Breathing



Circulation

B3CRH-EM001i

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 longer than two minutes, get victim to medical assistance.

Choking

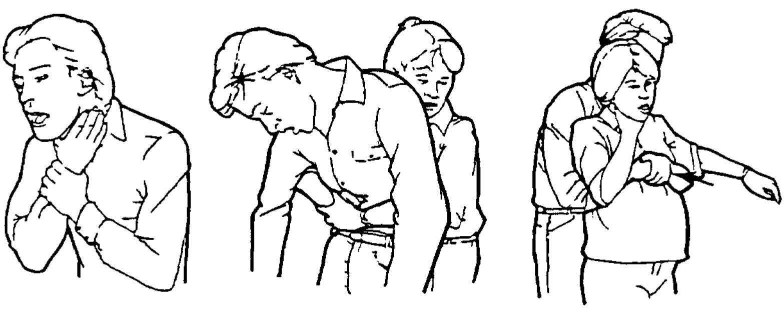
If victim can cough or speak:

- 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.*



B3CRH-EM002i

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

Cabin Altitude