King Air F90 | Limitations

TRAINING REFERENCE ONLY — NOT A SUBSTITUTE FOR THE AFM

This document is a training summary compiled from the aircraft's POH/AFM. In any conflict, the FAA Approved Airplane Flight Manual for the specific airplane, including all applicable Temporary Changes and Supplements, is the governing authority. Verify limitations against the AFM for the serial number being flown.

Source: Beechcraft Super King Air F90 Pilot's Operating Handbook and FAA Approved Airplane Flight Manual — Section II, Limitations (pages 2-3 through 2-28), including the Interim Addendum for the Elevator Trim System Check.

Contents

1. AIRSPEED

AIRSPEED LIMITATIONS

POH 2-3

The limitations included in this section have been approved by the Federal Aviation Administration, and they must be observed in the operation of the Beechcraft Super King Air F90.

SPEED	KCAS	KIAS	REMARKS
Maneuvering Speed Va (10,950 pounds)	169	171	Do not make full or abrupt control movements above this speed.
Maximum Flap Extension/Extended Speed Vfe — Approach Position - 32.5%	182	184	Do not extend flaps or operate with flaps in prescribed position above these speeds.
Maximum Flap Extension/Extended Speed Vfe — Full Down Position - 100%	142	144	Do not extend flaps or operate with flaps in prescribed position above these speeds.
Maximum Landing Gear Operating Speed Vlo — Extension	182	184	Do not extend or retract landing gear above the speeds given.
Maximum Landing Gear Operating Speed Vlo — Retraction	164	166	Do not extend or retract landing gear above the speeds given.
Maximum Landing Gear Extended Speed Vle	182	184	Do not exceed this speed with landing gear extended.
Air Minimum Control Speed Vmca	91	87	This is the lowest airspeed at which the airplane is directionally controllable when one engine suddenly becomes inoperative and the other engine is at take-off power. (See definition in Section I.)
Maximum Operating Speed Vmo	250	253	Do not exceed this airspeed in any operation.
Maximum Operating Speed Mmo	.48 Mach		Do not exceed this airspeed in any operation.

AIRSPEED INDICATOR MARKINGS*

MARKING	KCAS VALUE OR RANGE	KIAS VALUE OR RANGE	SIGNIFICANCE
Red Line	91	87	Air Minimum Control Speed (**Vmca**)
White Arc	81 to 142	80 to 144	Full-flap Operating Range
Wide White Arc	81 to 97	80 to 96	Lower Limit is the Stalling Speed (**Vso**) at maximum weight with Full Flaps (100%) and idle power.
Narrow White Arc	97 to 142	96 to 144	Lower Limit is the Stalling Speed (**Vs**) at maximum weight with Flaps Up (0%) and idle power. Upper Limit is the maximum speed permissible with flaps extended beyond Approach (more than 32.5%).
White Triangle	182	184	Maximum Flaps-to/at-Approach (32.5%) Speed
Blue Line	116	117	One-Engine-Inoperative Best Rate-of-Climb Speed
Red and White Hashmarked Pointer	250 KCAS (253 KIAS) or value equal to .48 Mach, whichever is lower**		Maximum Speed for any operation.

*The airspeed indicator is marked in IAS values.

**Airspeed is not to exceed the Red and White Hashmarked Pointer.

2. POWER PLANT

POWER PLANT LIMITATIONS

POH 2-4

POWER LEVERS

Do not lift the power levers in flight. Lifting the power levers in flight, or moving the power levers in flight below the flight idle position, could result in a nose-down pitch and a descent rate leading to aircraft damage and injury to personnel.

NUMBER OF ENGINES	2
ENGINE MANUFACTURER	Pratt & Whitney Canada Corp. (Longueuil, Quebec, Canada)
ENGINE MODEL NUMBER	PT6A-135

ENGINE OPERATING LIMITS

POH 2-5

The following limitations shall be observed. Each column is a separate limitation. The limitations presented do not necessarily occur simultaneously. Refer to Pratt and Whitney Engine Maintenance Manual for specific actions required if limits are exceeded.

OPERATING CONDITION	TORQUE FT-LBS (1)	MAXIMUM OBSERVED ITT °C	GAS GENERATOR RPM N1 (2) %	PROP RPM N2	OIL PRESS. PSI (3)	OIL TEMP. °C
STARTING	---	1090 (4)	---	---	---	-40 (min)
LOW IDLE	---	685	---	1200 (min)	40 (min)	-40 to 99
HIGH IDLE	---	---	---	---	---	-40 to 99
TAKEOFF AND MAX CONT (5)	2080	805	101.5	1900	85-105	10 to 99
MAX CRUISE	1940	805	101.5	1900	85-105	10 to 99
CRUISE CLIMB AND REC CRUISE	1940	805	101.5	---	85-105	0 to 99
MAX REVERSE (6)	2080	805	88.0	1815	85-105	0 to 99
TRANSIENT	2400	850 (4)	102.6	2090	---	---

FOOTNOTES:

(1) Maximum permissible sustained torque is 2080 ft-lbs. Propeller speeds (N2) must be set so as not to exceed power limitation.

(2) For every 10 °C below -30 °C ambient temperature, reduce maximum allowable N1 by 2.2%.

(3) When gas generator speeds are above 72% N1 and oil temperatures are between 60 °C and 70 °C, normal oil pressure is between 85 and 105 psi. Oil pressure between 40 and 84 psi is undesirable; it should be tolerated only for the completion of the flight, and then only at a reduced power setting. Oil pressure below 40 psi is unsafe; it requires that either the engine be shut down, or that a landing be made as soon as possible, using the minimum power required to sustain flight.

(4) These values are time-limited to two seconds.

(5) The Maximum Continuous rating is intended for emergency use at the discretion of the pilot.

(6) Reverse power operation is limited to one minute.

[Chart, footnote (2): GAS GENERATOR RPM (N1) LIMIT — MAXIMUM GAS GENERATOR SPEED (N1) ~ % (vertical axis 90 to 105) vs OUTSIDE AIR TEMPERATURE ~ °C (horizontal axis -60 to -20). Chart reference F90-601-519.]

FUEL PRESSURE

POH 2-6

Operation of either engine with its corresponding fuel pressure light (L FUEL PRESS or R FUEL PRESS annunciator) illuminated is limited to 10 hours before overhaul or replacement of the engine-driven fuel pump.

> **NOTE**
> Windmilling time need not be charged against this time limit.

GENERATOR LIMITS

POH 2-6

Maximum sustained generator load is limited as follows:

In Flight	1.00

GROUND OPERATION

GENERATOR LOAD	MINIMUM N1
0.0 to 0.9	58%
0.9 to 1.0	63%

PROPELLERS

POH 2-8

Applicability: Page revised August, 1983

NUMBER OF PROPELLERS	2
PROPELLER MANUFACTURER	Hartzell Propeller, Inc.

PROPELLER HUB AND BLADE MODEL NUMBERS

Serial Numbers	Model Number
HUB — LA-1 through LA-120 except LA-20 and LA-97	HC-B4TN-3B
HUB — LA-20, LA-97, LA-121 and after	HC-B4TN-3A or HC-B4TN-3B
BLADES — LA-1 through LA-130	T10173FB-10.5
BLADES — LA-131 and after	T10173FK-10.5

PROPELLER DIAMETER	92.0 inches only

PROPELLER BLADE ANGLES AT 30-INCH STATION — Feathered	+87.5° ±0.5°
PROPELLER BLADE ANGLES AT 30-INCH STATION — Reverse	−8.5° ±0.4°

PROPELLER ROTATIONAL SPEED LIMITS

POH 2-9

Applicability: Page revised May, 1979

Transients not exceeding 2 seconds	2090 rpm maximum
Reverse	1815 rpm maximum
All other conditions	1900 rpm maximum
Continuous operation on ground	1200 rpm minimum

PROPELLER ROTATIONAL OVERSPEED LIMITS

Applicability: Page revised May, 1979

The maximum propeller overspeed limit is 2090 rpm and is time-limited to two seconds. Sustained propeller overspeeds faster than 1900 rpm indicate failure of the primary governor. Sustained propeller overspeeds faster than 1976 rpm indicate failure of both the primary governor and the secondary governor.

POWER PLANT INSTRUMENT MARKINGS

POH 2-9

Applicability: Page revised May, 1979

INSTRUMENT	RED LINE MINIMUM LIMIT	GREEN ARC NORMAL OPERATING	RED LINE MAXIMUM LIMIT
INTERSTAGE TURBINE TEMPERATURE*	---	400 °C to 805 °C	805 °C
TORQUEMETER	---	400 ft-lbs to 1940 ft-lbs	2080 ft-lbs
PROPELLER TACHOMETER (N2)	---	1500 rpm to 1900 rpm	1900 rpm
GAS GENERATOR TACHOMETER (N1)	---	---	101.5%
OIL TEMPERATURE	---	10 °C to 99 °C	99 °C
OIL PRESSURE	40 psi	85 psi to 105 psi	105 psi

NOTE
*Starting Limit (Dashed Red Line): 1090 °C

3. FUEL

APPROVED FUEL GRADES AND ADDITIVE

POH 2-6

RECOMMENDED 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 (Formerly 80/87); 100LL Blue*; 100 Green (Formerly 100/130)
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

POH 2-7

1. Operation is limited to 150 hours between engine overhauls.
2. Operation is limited to 17,000 feet pressure altitude or below if either standby boost pump is inoperative.
3. Crossfeed capability is required for climbs above 17,000 feet pressure altitude.
4. Do not put aviation gasoline into the auxiliary tanks.

APPROVED FUEL ADDITIVES

ANTI-ICING ADDITIVE

Anti-icing additive conforming to Specification MIL-I-27686 is the only approved fuel additive.

Engine oil is used to heat the fuel upon 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. The graph below is supplied for use as a guide in preflight planning, based on known or forecast operating conditions, to allow the operator to become aware of operating temperatures where icing at the fuel control could occur. If the conditions should indicate that oil temperature versus OAT is such that ice formation could occur during takeoff or in flight, anti-icing additive per MIL-I-27686 must be mixed with the fuel at refueling to ensure safe operation.

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 0.060% and a maximum of 0.150%. Approved procedure for adding anti-icing concentrate is contained in Section IV.

JP-4 fuel per MIL-T-5624 has anti-icing additive per MIL-I-27686 blended in the fuel 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.

[Chart: MINIMUM OIL TEMPERATURE ~ °C (vertical axis 0 to 80) vs FUEL TEMPERATURE (OAT) ~ °C (horizontal axis -60 to 20), with PRESSURE ALTITUDE ~ FEET lines labeled S.L., 10,000, 20,000, 31,000. Chart reference E90-601-354.]

FUEL BIOCIDE ADDITIVE

Applicability: Page revised August, 1983

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.

See King Air F90 Maintenance Manual for concentrations to use and for procedures for adding BIOBOR JF to the airplane fuel.

FUEL MANAGEMENT

Applicability: Page revised August, 1983

1. Do not put any fuel into the auxiliary tanks unless the main tank system on both sides of the airplane is full.

2. Do not take off if fuel quantity gages indicate in yellow arc or less than 265 pounds of fuel in each main tank.

3. 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, crossfeeding of fuel will not be available from the side of the inoperative standby boost pump.

FUEL LIMITATIONS

Applicability: Page revised August, 1983

USABLE FUEL — Main Fuel System	388 gallons
USABLE FUEL — Auxiliary Fuel System	82 gallons
USABLE FUEL — Maximum Usable Fuel Quantity	470 gallons

4. OIL

OIL SPECIFICATION

POH 2-8

Applicability: Page revised August, 1983

Any oil specified by brand name in the latest revision of Pratt & Whitney Service Bulletin Number 1001 is approved for use in the PT6A-135 engine.

5. INSTRUMENT MARKINGS

MISCELLANEOUS INSTRUMENT MARKINGS

POH 2-10

Applicability: Page revised August, 1983

FUEL QUANTITY INDICATORS — Yellow Arc (No Takeoff Range)	0 to 265 pounds
CABIN DIFFERENTIAL PRESSURE GAGE — Green Arc (Approved Operating Range)	0 to 5.1 psi
CABIN DIFFERENTIAL PRESSURE GAGE — Red Arc (Unapproved Operating Range)	above 5.1 psi to end of scale
PNEUMATIC GAGE — Green Arc (Normal Operating Range)	12 to 20 psi
PNEUMATIC GAGE — Red Line (Maximum Operating Limit)	20 psi
VACUUM (SUCTION) GAGE — Narrow Green Arc (Normal from 15,000 to 30,000 feet MSL)	3.0 to 4.3 in. Hg
VACUUM (SUCTION) GAGE — (or) Narrow Green Arc (Normal from 15,000 to 35,000 feet MSL)	2.8 to 4.3 in. Hg
VACUUM (SUCTION) GAGE — Wide Green Arc (Normal from Sea Level to 15,000 feet MSL)	4.3 to 5.9 in. Hg
PROPELLER DEICE AMMETER — Green Arc (Normal Operating Range)	17 to 21 amperes
ENGINE INLET LIP BOOT AMMETER — Green Arc (Normal Operating Range)	14 to 18 amperes

6. WEIGHT AND BALANCE

WEIGHT LIMITS

POH 2-10

Applicability: Page revised August, 1983

Maximum Ramp Weight	11,030 pounds
Maximum Take-off Weight	10,950 pounds
Maximum Landing Weight	10,950 pounds
Maximum Zero Fuel Weight	9600 pounds
Maximum Weight in Baggage Compartment	403 pounds

CENTER-OF-GRAVITY LIMITS

POH 2-10

Applicability: Page revised August, 1983

AFT LIMIT: 164.0 inches aft of datum at all weights

FORWARD LIMITS: 154.8 inches aft of datum at 10,950 pounds, with straight line variation to 150.0 inches aft of datum at 9484 pounds. 150.0 inches aft of datum at 9484 pounds or less.

DATUM: The reference datum is located 160.0 inches forward of the wing main (forward) spar centerline.

MEAN AERODYNAMIC CHORD (MAC)

POH 2-11

Applicability: Page revised August, 1983

The leading edge of the MAC is 135.1 inches aft of the datum. The MAC length is 77.9 inches.

7. FLIGHT AND OPERATING LIMITS

LIMITATIONS TEMPORARY CHANGE

Applicability: INTERIM ADDENDUM for the Elevator Trim System Check to the 65-A90, B90, C90, E90, 200T/200CT FAA Approved Airplane Flight Manual and C90, C90A, F90, 200/200C, B200/B200C, B200T/B200CT, 300 and 1900/1900C Pilot's Operating Handbook and FAA Approved Airplane Flight Manual; January, 1987; signed for W. H. Schultz, Beech Aircraft Corporation, DOA CE-2

PREFLIGHT INSPECTION

COCKPIT

1. Control Locks - REMOVE

2. Elevator Trim:

a. All airplanes except 1900/1900C - SET TO "0" UNITS

b. 1900/1900C airplanes - SET TWO UNITS NOSE UP

CAUTION

The elevator trim system must not be forced past the limits which are indicated on the elevator trim indicator scale, either manually, electrically (except model 300) or by action of the autopilot (except model 300).

TAIL SECTION

NOTE

On model 65-A90, B90, C90, C90A and E90 airplanes, the elevator trim tab "0" (neutral) position is determined by observing that the alignment marks on the elevator trim tab pushrods align with the alignment marks on the elevator, when the elevator is resting against the downstops.

On F90, 200 Series, 300 and 1900/1900C airplanes, the elevator trim tab "0" (neutral) position is determined by observing that the trailing edge of the elevator trim tab aligns with the trailing edge of the elevator, when the elevator is resting against the downstops.

- Elevator Trim Tab - VERIFY "0" (NEUTRAL) POSITION

MANEUVER LIMITS

Applicability: Page revised August, 1983

The Beechcraft Super King Air F90 is a Normal Category airplane. Acrobatic maneuvers, including spins, are prohibited.

FLIGHT LOAD FACTORS AT 10,950 POUNDS

POH 2-11

Applicability: Page revised August, 1983

FLAPS UP THROUGH APPROACH	3.25 positive g's
FLAPS UP THROUGH APPROACH	1.30 negative g's
FLAPS BEYOND APPROACH THROUGH FULL DOWN	2.00 positive g's

MINIMUM FLIGHT CREW

POH 2-11

Applicability: Page revised August, 1983

Minimum Flight Crew	One Pilot

KINDS OF OPERATION LIMITS

POH 2-11

Applicability: Page revised August, 1983

The airplane is approved for the following types of operations when the required equipment is installed and operational as defined within the listing of REQUIRED EQUIPMENT FOR VARIOUS CONDITIONS OF FLIGHT contained in this LIMITATIONS Section of the handbook.

1. VFR Day
2. VFR Night
3. IFR Day
4. IFR Night
5. Known Icing Conditions

MAXIMUM OPERATING PRESSURE-ALTITUDE LIMITS

POH 2-12

Applicability: Raytheon Aircraft page revised June, 2001

Normal Operation	31,000 feet
Operation with Aviation Gasoline: Both Standby Boost Pumps Operative	31,000 feet
Operation with Aviation Gasoline: Either Standby Boost Pump Inoperative	17,000 feet
Operation with Aviation Gasoline: Climbs without Crossfeed Capability	17,000 feet
Operation with Yaw Damp System Inoperative	17,000 feet

OUTSIDE AIR TEMPERATURE LIMIT

POH 2-12

Applicability: Raytheon Aircraft page revised June, 2001

Do not operate the airplane when the outside air temperature exceeds ISA + 37°C.

CABIN PRESSURIZATION LIMIT

POH 2-12

Applicability: Raytheon Aircraft page revised June, 2001

Maximum Cabin Pressure Differential	5.1 psi

MAXIMUM OCCUPANCY LIMIT

POH 2-12

Applicability: Raytheon Aircraft page revised June, 2001

Maximum Occupancy	Ten (10)

AFT-FACING SEATS

POH 2-12

Applicability: Raytheon Aircraft page revised June, 2001

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

STARTERS

POH 2-13

Applicability: Raytheon Aircraft page revised June, 2001

Use of the starter is limited to 40 seconds ON, 60 seconds OFF, 40 seconds ON, 60 seconds OFF, 40 seconds ON, then 30 minutes OFF.

AUTOPILOT LIMITATIONS

POH 2-13

Applicability: Raytheon Aircraft page revised June, 2001

Refer to the applicable FAA Approved Airplane Flight Manual Supplement in the SUPPLEMENTS Section.

STRUCTURAL LIMITATIONS

POH 2-13

Applicability: Raytheon Aircraft page revised June, 2001

Refer to Chapter 4 of the Beech King Air F90 Maintenance Manual.

LIMITATIONS WHEN ENCOUNTERING SEVERE ICING CONDITIONS (Required By FAA AD 98-04-24)

POH 2-13

Applicability: Raytheon Aircraft page revised June, 2001; required by FAA AD 98-04-24

> **WARNING**
> 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 protections systems, and may seriously degrade the performance and controllability of the airplane.

1. 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.

a. Unusually extensive ice accumulation of the airframe and windshield in areas not normally observed to collect ice.

b. Accumulation of ice on the upper surface of the wing, aft of the protected area.

c. Accumulation of ice on the engine nacelles and propeller spinners farther aft than normally observed.

2. Since the autopilot, when installed and operating, 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.

3. All wing icing inspection lights must be operative prior to flight into known or forecast icing conditions at night. [NOTE: This supersedes any relief provided by the Master Minimum Equipment List (MMEL).]

8. ICE AND RAIN PROTECTION

ICING LIMITATIONS

POH 2-12

Applicability: Raytheon Aircraft page revised June, 2001

Minimum Ambient Temperature for Operation of Deicing Boots	-40°C
Minimum Airspeed for Sustained Icing Flight	140 knots

Sustained flight in icing conditions with flaps extended is prohibited except for approach and landings.

The ice vanes shall be extended for operations in ambient temperatures of +5°C or below when flight free of visible moisture cannot be assured.

APPROVED AIRPLANE DEICING/ANTI-ICING FLUIDS

POH 2-12

Applicability: Raytheon Aircraft page revised June, 2001

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

9. PLACARDS

PLACARDS

Applicability: Page revised August, 1983

On Overhead Panel in Pilot's Compartment:

OPERATION LIMITATIONS — THIS AIRPLANE MUST BE OPERATED AS A NORMAL CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS. NO ACROBATIC MANEUVERS INCLUDING SPINS ARE APPROVED. THIS AIRPLANE APPROVED FOR VFR, IFR DAY & NIGHT OPERATION & IN ICING CONDITIONS.

> **CAUTION**
> STALL WARNING IS INOPERATIVE WHEN MASTER SWITCH IS OFF. STANDBY COMPASS IS ERRATIC WHEN WINDSHIELD ANTI−ICE AND /OR AIR−CONDITIONER AND/OR ELECTRIC HEAT IS ON.

Below Fuel Control Panel:

AIRSPEEDS

MAX GEAR EXTENSION	184 KNOTS
MAX GEAR RETRACT	166 KNOTS
MAX GEAR EXTENDED	184 KNOTS
MAX APPROACH FLAP	184 KNOTS
MAX FULL DOWN FLAPS	144 KNOTS
MAX MANEUVERING	171 KNOTS

Aft of Overhead Light Control Panel: OXYGEN — PASSENGER MANUAL O'RIDE / PULL ON SYS READY

On Pilot's and Copilot's Window Sills (Diluter Demand System):

> **WARNING**
> DO NOT SMOKE WHILE OXYGEN IS IN USE. WITH DILUTER-DEMAND CREW MASK FLOW STOPS WHEN BREATHING STOPS.

PLACARDS

Placards (continued)

Location	Placard Text
On Fuel Control Panel:	SEE MANUAL FOR FUEL CAPACITY
On Instrument Panel Adjacent to Each Gyroscopic Instrument (Depending on Gyro's Power Source) (Omitted When Power Source is Labeled on the Instrument Face or When Instrument has Built-in Adequacy of Power Indicating System):	AIR AC DC
On Curved Pedestal Adjacent to Power Levers:	CAUTION REVERSE ONLY WITH ENGINES RUNNING
On Pedestal Forward of Cabin Pressurization Controller:	WARNING DE-PRESSURIZE CABIN BEFORE LANDING

Page dated August, 1983.

Placards (continued)

Location	Placard Text
On Floor Left of Pedestal:	LANDING GEAR ALTERNATE EXTENSION / 1. LIFT AND TURN HANDLE TO ENGAGE. / 2. PUMP HANDLE UP AND DOWN UNTIL THREE GREEN GEAR LIGHTS ILLUM.
Below Right Circuit Breaker Panel:	PILOT'S STATIC AIR SOURCE / NORMAL ALTERNATE / SEE FLIGHT MANUAL PERFORMANCE SECTION FOR INSTR CAL ERROR
Above Handle on Forward Side of Forward Partition and on Aft Side of Aft Partition:	KICK HERE FOR EMERGENCY EVACUATION

Page dated August, 1983.

PLACARDS

Placards (continued)

Location	Placard Text
On Left Upper Cabin Sidewall:	NO SMOKING FASTEN SEAT BELT
On Inside Surface of Each Passenger Oxygen Access Door (Serials LA-2 thru LA-125):	WARNING - DO NOT SMOKE WHILE OXYGEN IS IN USE / TO USE - PULL LANYARD PIN - DON MASK
On Emergency Exit Hatch Release Cover:	EMERGENCY DOOR RELEASE / CAUTION: DO NOT OPEN ESCAPE HATCH WHEN CABIN IS PRESSURIZED / OPEN COVER , PULL HOOKS TO OVERRIDE PRESSURE LOCK, PUSH BUTTON AND PULL HANDLE.

Page dated August, 1983.

PLACARDS

Placards (continued)

Location	Placard Text
On Emergency Exit Handle (Inside Emergency Exit Hatch Release Cover):	PUSH
On Shoulder Harness Assembly For All Cabin Chairs:	SHOULDER HARNESS MUST BE WORN DURING TAKE-OFF AND LANDING WITH SEAT IN OUTBD POSITION, SEAT BACK UPRIGHT AND HEADREST FULLY EXTENDED
On Cupholders and Tables When Installed:	STOW BEFORE TAKE - OFF AND LANDING
On Cupholders and Tables When Installed (alternate — the page prints "OR" between the two versions):	STOW BEFORE TAKE-OFF AND LANDING

Page dated August, 1983.

PLACARDS

Placards (continued)

Location	Placard Text
In Lavatory:	NOTICE FASTEN SHOULDER HARNESS AND SEAT BELT DURING TAKEOFF AND LANDING
On Outside Surface of First Aid Oxygen Access Door:	FIRST AID OXYGEN — PULL
On Inside Surface of First Aid Oxygen Access Door (Serials LA-2 thru LA-125):	WARNING - DO NOT SMOKE WHILE OXYGEN IS IN USE / TO USE - TURN VALVE ON - DON MASK / NOTE: CREW SYS MUST BE ON

Page dated August, 1983.

Placards (continued)

Location	Placard Text
On Center of Aft Bulkhead:	COMPARTMENT CAPACITY / TOTAL COMPARTMENT CAPACITY (INCLUDING BAGGAGE AND/OR PASSENGER AND/OR EQUIPMENT) NOT TO EXCEED 403 POUNDS / SEE WEIGHT AND BALANCE SECTION OF FLIGHT MANUAL FOR LOADING INSTRUCTIONS
Inside Airstair Door Between Folding Steps:	WHEN HANDLE IS IN LOCKED POSITION-ARM SHOULD BE AROUND PLUNGER AS SHOWN
Inside Airstair Door Behind Handle:	CAUTION DO NOT OPEN DOOR WHEN CABIN IS PRESSURIZED / CAUTION DO NOT ATTEMPT TO CHECK SECURITY OF CABIN DOOR BY MOVING DOOR HANDLE UNLESS CABIN IS DEPRESSURIZED AND AIRCRAFT IS ON THE GROUND / PUSH BUTTON & TURN HANDLE TO OPEN DOOR / (dial markings: OPEN — LATCH — LOCK; arrow labeled LOCK)

Total compartment capacity (including baggage and/or passenger and/or equipment)	NOT TO EXCEED 403 POUNDS

A revision change bar is printed in the left margin beside the COMPARTMENT CAPACITY placard. Page dated August, 1983.

Placards (continued)

Location	Placard Text
On Pilot's and Copilot's Oxygen Outlet:	OXYGEN
On Pilot's Window Sill:	TURN OFF STROBE LIGHTS WHEN TAXIING IN VICINITY OF OTHER AIRCRAFT OR DURING FLIGHT THROUGH FOG OR CLOUDS / STD POSITION LIGHTS TO BE TURNED ON FOR ALL NIGHT OPERATIONS
Inside Airstair Door Step:	LIFT STEP TO INSPECT DOOR LOCK

Page dated August, 1983.

On Aft Side of Aft Partition:

[Pictorial placard — two symbol panels: (left) a lit cigarette with a diagonal slash through it (NO SMOKING); (right) a seated occupant wearing a fastened seat belt (FASTEN SEAT BELT). No text on placard.]

On Center Front of Couch:

COUCH / NOT TO BE OCCUPIED AS CHAISE LONGUE DURING TAKE-OFF AND LANDING.

or:

Stitched to Aft End of Couch Cushion (airplanes equipped with a couch):

NOT TO BE OCCUPIED AS CHAISE LOUNGE DURING TAKE-OFF AND LANDING

> **NOTE**
> The two couch placards are printed with different spellings in the POH: the first reads "CHAISE LONGUE", the second reads "CHAISE LOUNGE". Reproduced as printed.

10. KINDS OF OPERATION

REQUIRED EQUIPMENT FOR VARIOUS CONDITIONS OF FLIGHT

Federal Aviation Regulations Part 23 and Part 91 specify the minimum numbers and types of airplane instruments and equipment which must be installed and operable for various kinds of flight conditions. This includes VFR day, VFR night, IFR day, IFR night, and flight into known icing conditions.

Regulations also require that all airplanes be certificated by the manufacturer for operations under various flight conditions. At certification, all required equipment must be in operating condition and should be maintained to assure continued airworthiness. If deviations from the installed equipment were not permitted, or if the operating rules did not provide for various flight conditions, the airplane could not be flown unless all equipment was operable. With appropriate limitations, the operation of every system or component installed in the airplane is not necessary when the remaining operative instruments and equipment provide for continued safe operation. Operation in accordance with limitations established to maintain airworthiness can permit continued or uninterrupted operation of the airplane.

To enable the pilot to rapidly determine the FAA equipment requirements necessary for a flight into specific conditions, the following equipment requirements and exceptions are presented. It is the final responsibility of the pilot to determine whether the lack of, or inoperative status of, a piece of equipment will limit the conditions under which the airplane may be operated.

No distinction is made between standard and optional equipment. The "Number Installed" column indicates the number of items normally found on the airplane when that item is installed; however, in some cases the actual number may vary due to customized installations.

For the sake of brevity, the Required Equipment Listing does not include obviously required items such as wings, rudder, engines, landing gear, etc. Also, the list does not include items which do not affect the airworthiness of the airplane, such as galley equipment, entertainment systems, passenger convenience items, etc. However, it is important to note that ALL ITEMS WHICH ARE RELATED TO THE AIRWORTHINESS OF THE AIRPLANE AND NOT INCLUDED ON THE LIST ARE AUTOMATICALLY REQUIRED TO BE OPERATIVE.

LEGEND

Numbers refer to quantities required to be operative for the specified condition.

(-)	Indicates that the item may be inoperative for the specified condition.
(*)	Refers to the REMARKS AND/OR EXCEPTIONS column for explicit information or reference.
(V)	Indicates that the number of items installed varies.
(L)	Indicates that the item on the left side of the airplane is required to be operative.

COMMUNICATIONS

Required Equipment for Various Conditions of Flight — COMMUNICATIONS

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Static Discharge Wicks	15	-	-	6*	6*	6*	*Minimum required - one wick at the outboard end of each control surface plus top of vertical stabilizer.
VHF Communications System	2	*	*	*	*	*	*Per FAR 91

ELECTRICAL POWER

Required Equipment for Various Conditions of Flight — ELECTRICAL POWER

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
AC Volt/Frequency Meter	1	-	-	-	-	-	—
Battery	1	1	1	1	1	1	—
Battery Charge Annunciator	1	1	1	1	1	1	—
DC Generator	2	1	1	2	2	2	—
DC Generator Caution Annunciator	2	2	2	2	2	2	—
DC Loadmeter	2	2	2	2	2	2	—
DC Prop/Inlet Heat Ammeter	1	-	-	-	-	1	—
DC Volt Meter	1	-	-	-	-	-	—
Inverter	2	1	1	2	2	2	—
Inverter Warning Annunciator	1	-	-	1	1	1	—
Meter Select Switch	1	-	-	-	-	1	—

Required Equipment for Various Conditions of Flight — ENGINE INDICATING INSTRUMENTS

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Chip Detector Annunciator	2	2	2	2	2	2	—
Fuel Flow Indicator	2	2	2	2	2	2	—
Gas Generator Tachometer	2	2	2	2	2	2	—
ITT Indicator	2	2	2	2	2	2	—
Oil Pressure Indicator	2	2	2	2	2	2	—
Oil Temperature Indicator	2	2	2	2	2	2	—
Propeller Synchroscope	1	-	-	-	-	-	—
Propeller Tachometer	2	1	1	1	1	1	—
Torque Indicator	2	2	2	2	2	2	—
Oil Pressure Annunciator	2	2	2	2	2	2	—

Required Equipment for Various Conditions of Flight — ENVIRONMENTAL SYSTEMS

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Altitude Warning Annunciator	1	1	1	1	1	1	May be inoperative provided airplane remains unpressurized.
Cabin Rate-of-Climb Indicator	1	1	1	1	1	1	May be inoperative provided airplane remains unpressurized.
Differential Pressure/Cabin Altitude	1	1	1	1	1	1	May be inoperative provided airplane remains unpressurized.
Outflow Valve	1	1	1	1	1	1	May be inoperative provided airplane remains unpressurized.
Pressurization Air Source	2	1	1	1	1	1	May be inoperative provided airplane remains unpressurized.
Pressurization Controller	1	1	1	1	1	1	May be inoperative provided airplane remains unpressurized.
Safety Valve	1	1	1	1	1	1	May be inoperative provided airplane remains unpressurized.

In the POH the remark "May be inoperative provided airplane remains unpressurized." is printed once, joined by a single brace spanning all seven Environmental Systems rows above.

EQUIPMENT/FURNISHINGS

POH 2-26

Required Equipment for Various Conditions of Flight — EQUIPMENT/FURNISHINGS

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Emergency Locator Transmitter	1	*	*	*	*	*	*Per FAR 91
Seat Belts	V	*	*	*	*	*	*Per FAR 91
Shoulder Harness	V	*	*	*	*	*	*Per FAR 91

FIRE PROTECTION

POH 2-26

Required Equipment for Various Conditions of Flight — FIRE PROTECTION

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Engine Fire Extinguisher	2	-	-	-	-	-	—
Fire Detector System	2	2	2	2	2	2	—
Portable Fire Extinguisher	2	-	-	-	-	-	—

FLIGHT CONTROLS

POH 2-26

Required Equipment for Various Conditions of Flight — FLIGHT CONTROLS

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Flap Position Indicator	1	1	1	1	1	1	—
Flap System	1	-	-	-	-	-	—
Rudder Boost	1	-	-	-	-	-	—
Stall Warning Horn	1	1	1	1	1	1	—
Trim Tab Indicator - Rudder, Aileron, and Elevator	3	3	3	3	3	3	—
Yaw Damp	1	1	1	1	1	1	May be inoperative for flight at and below 17,000 feet.

FUEL

Required Equipment for Various Conditions of Flight — FUEL

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Crossfeed Annunciator	1	1	1	1	1	1	—
Crossfeed Valve	1	1	1	1	1	1	—
Engine Driven Boost Pump	2	2	2	2	2	2	—
Firewall Shutoff Valve	2	2	2	2	2	2	—
Fuel Pressure Warning Annunciator	2	2	2	2	2	2	—
Fuel Quantity Gage Selector Switch	1	1	1	1	1	1	—
Fuel Quantity Indicator	2	2	2	2	2	2	—
Jet Transfer Pump	2	*	*	*	*	*	*Required only if Aux Tanks contain fuel.
Motive Flow Valve	2	*	*	*	*	*	*Required only if Aux Tanks contain fuel.
Standby Fuel Boost Pump	2	2	2	2	2	2	—

ICE AND RAIN PROTECTION

Required Equipment for Various Conditions of Flight — ICE AND RAIN PROTECTION

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Airfoil Deice System (Wing and Horizontal Stabilizer)	1	-	-	-	-	1	—
Alternate Static Air Source	1	1	1	1	1	1	—
Auto Ignition System and Annunciators	2	2	2	2	2	2	—
Engine Air Inlet Heat	2	-	-	-	-	2	—
Engine Inertial Ice Vanes	2	2	2	2	2	2	—
Heated Fuel Vent	2	-	-	-	-	2	—
Pitot Heater	2	-	-	1	1	1	Pitot heater must be operative on side with an operative pneumatic (non-servoed) airspeed indicator.

Required Equipment for Various Conditions of Flight — ICE AND RAIN PROTECTION (Continued)

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Propeller Deice System (Auto)	1	-	-	-	-	1	—
Propeller Deice System (Manual)	1	-	-	-	-	1	—
Stall Warning Heater	1	-	-	-	-	1	—
Windshield Heat (Left and Right)	2	-	-	-	-	L	—
Windshield Wiper	2	-	-	-	-	-	—

LANDING GEAR POH 2-27

Required Equipment for Various Conditions of Flight — LANDING GEAR

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Gear Handle Lights	2	1	1	1	1	1	—
Landing Gear Aural Warning	1	1	1	1	1	1	—
Landing Gear Motor	1	1	1	1	1	1	—
Landing Gear Position Indication Lights	3	3	3	3	3	3	—

LIGHTS

POH 2-27

Required Equipment for Various Conditions of Flight — LIGHTS

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Cabin Door Caution Annunciator	1	1	1	1	1	1	—
Caution Flasher Lights	2	-	-	-	-	-	—
Cockpit and Instrument Lights	V	-	*	-	*	-	*Lights must illuminate all instruments and controls.
Landing Light	2	-	1	-	1	-	—
Passenger Notice System (Fasten Seat Belt and No Smoking)	2	2	2	2	2	2	—
Position Lights	3	-	3	-	3	-	—
Anticollision Light System	1	-	1	-	1	-	—
Strobe Lights	3	-	3	-	3	-	—
Taxi Light	1	-	-	-	-	-	—
Warning Flasher Lights	2	-	-	-	-	-	—
Wing Ice Lights	2	-	-	-	-	L	—
Recognition Lights	2	-	-	-	-	-	—

NAVIGATION INSTRUMENTS

POH 2-27

Required Equipment for Various Conditions of Flight — NAVIGATION INSTRUMENTS

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Airspeed Indicator	2	L	L	L	L	L	—
Clock	2	-	-	1	1	1	—
Directional Gyro	2	-	-	L	L	L	—
Distance Measuring Equipment	V	*	*	*	*	*	*Per FAR 91
Horizon Indicator	2	-	-	L	L	L	—
Magnetic Compass	1	1	1	1	1	1	—
Navigation Equipment	V	-	-	*	*	*	*Per FAR 91
Outside Air Temperature	1	1	1	1	1	1	—
Sensitive Altimeter	2	L	L	L	L	L	—
Transponder	V	*	*	*	*	*	*Per FAR 91
Turn and Bank Indicator	2	-	-	L	L	L	—
Vertical Speed Indicator	2	-	-	-	-	-	—

Required Equipment for Various Conditions of Flight — OXYGEN

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Oxygen System	1	*	*	*	*	*	*Per FAR 91, 23.

NOTE

The running head on printed page 2-28 reads "Section III / Emergency Procedures", but the page content is the continuation of the Section II Limitations Required Equipment listing. Reproduced as printed.

Required Equipment for Various Conditions of Flight — PROPELLERS

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Autofeathering Armed Light	2	-	-	-	-	-	—
Autofeathering System	1	-	-	-	-	-	—
Propeller Governor Test Switch: (Serials LA-2 thru LA-120, except LA-20, LA-97, and airplanes equipped with Kit 90-9070-1) — Low Pitch Indicator Test	1	1	1	1	1	1	—
Propeller Governor Test Switch: (Serials LA-2 thru LA-120, except LA-20, LA-97, and airplanes equipped with Kit 90-9070-1) — Flight-Idle Stop Test	1	1	1	1	1	1	—
Propeller Flight Idle Low-Pitch Stop (Serials LA-2 thru LA-120, except LA-20, LA-97 and airplanes equipped with Kit 90-9070-1)	2	2	2	2	2	2	—
Propeller Test Switch: (Serials LA-20, LA-97, LA-121 and after and those airplanes equipped with Kit 90-9070-1) — Ground Idle Stop	1	1	1	1	1	1	—
Propeller Test Switch: (Serials LA-20, LA-97, LA-121 and after and those airplanes equipped with Kit 90-9070-1) — Governor	1	1	1	1	1	1	—
Propeller Overspeed Governor	2	2	2	2	2	2	—
Propeller Flight Idle Low-Pitch Stop	2	2	2	2	2	2	—
Propeller Synchrophaser	1	-	-	-	-	-	—
Reverse Not Ready Annunciator	1	1	1	1	1	1	—

Required Equipment for Various Conditions of Flight — VACUUM

SYSTEM and/or COMPONENT	Number of items installed	VFR Day	VFR Night	IFR Day	IFR Night	Known Icing Conditions	REMARKS and/or EXCEPTIONS
Instrument Bleed Air Source	2	-	1	1	1	2	—
Suction Gage	1	-	1	1	1	1	—
Vacuum System	1	-	1	1	1	1	—

11. V-SPEED DEFINITIONS (GENERAL REFERENCE)

Takeoff and Initial Climb

V-Speed	Name	Meaning
V1	Takeoff decision speed	Maximum speed at which a reject may be initiated; at or above it the takeoff must be continued.
Vr	Rotation speed	Speed at which the pilot rotates to raise the nose.
Vlof	Lift-off speed	Speed at which the aircraft first becomes airborne.
V2	Takeoff safety speed	Target climb speed with the critical engine inoperative.
V2min	Minimum takeoff safety speed	Lowest allowable **V2**.
Vef	Engine-failure speed	Speed at which the critical engine is assumed to fail (certification).
Vmu	Minimum unstick speed	Slowest speed at which the aircraft can safely lift off.
Vfto	Final takeoff speed	Speed in the final takeoff / climb segment.

Climb Performance

V-Speed	Name	Meaning
Vx	Best angle of climb	Most altitude gained per distance over the ground.
Vy	Best rate of climb	Most altitude gained per unit of time.
Vxse	Best angle, single-engine	**Vx** with one engine inoperative (multiengine).
Vyse	Best rate, single-engine	**Vy** with one engine inoperative — the **blue line**.

Stall Speeds

V-Speed	Name	Meaning
Vs	Stall speed	Minimum steady flight speed at which the aircraft is controllable.
Vs0	Stall speed, landing configuration	Stall with full flaps and gear down — bottom of the white arc.
Vs1	Stall speed, clean configuration	Stall in a specified (usually clean) configuration — bottom of the green arc.
Vsr	Reference stall speed	Certification reference stall speed.
Vsse	Safe single-engine speed	Minimum speed for intentionally cutting one engine.
Vsw	Stall warning speed	Speed at which the stall warning activates.

Airspeed Indicator Limit Speeds

V-Speed	Name	Meaning
Va	Design maneuvering speed	Maximum speed for full or abrupt control inputs without overstress.
Vno	Maximum structural cruising speed	Normal operating limit — top of the green arc, start of the yellow arc.
Vne	Never-exceed speed	The red line — never exceed.
Vfe	Maximum flap-extended speed	Top of the white arc.
Vle	Maximum landing-gear-extended speed	Maximum speed flying with the gear down.
Vlo	Maximum landing-gear-operating speed	Maximum speed to extend or retract the gear.
Vmo / **Mmo**	Maximum operating limit speed / Mach	Maximum operating airspeed and Mach number.

Approach and Landing

V-Speed	Name	Meaning
Vref	Landing reference speed	Threshold-crossing speed, typically 1.3 x **Vs0**.
Vapp	Approach speed	Target speed on final approach.
Vbg	Best glide speed	Speed for maximum glide distance (best lift-to-drag ratio).

Multiengine Control

V-Speed	Name	Meaning
Vmc / **Vmca**	Minimum control speed (airborne)	Minimum speed to maintain control with the critical engine inoperative — red radial line.
Vmcg	Minimum control speed (ground)	Minimum control speed on the takeoff roll.
Vmcl	Minimum control speed (landing)	Minimum control speed in the landing configuration.
Vmbe	Maximum brake energy speed	Maximum speed from which the brakes can absorb a rejected takeoff.

Design and Certification Speeds

V-Speed	Name	Meaning
Vb	Design gust-intensity speed	Turbulence-penetration design speed.
Vc	Design cruising speed	Certification design cruising speed.
Vd / **Vdf**	Design / demonstrated diving speed	Certification dive speed.
Vf	Design flap speed	Certification design flap speed.
Vh	Maximum level-flight speed	Maximum speed in level flight at maximum continuous power.

> **NOTE**
> These are certification design speeds. They are rarely referenced in day-to-day operations.

Airspeed Indicator Colour Markings

V-Speed	Name	Meaning
White arc	Flap operating range	**Vs0** to **Vfe**.
Green arc	Normal operating range	**Vs1** to **Vno**.
Yellow arc	Caution range	**Vno** to **Vne** — smooth air only.
Red line	Never exceed	**Vne**.
Blue line	Best rate, single-engine	**Vyse** (multiengine).
Red radial	Minimum control speed	**Vmc** (multiengine).

> **NOTE**
> The colour markings are defined by the V-speeds above, so a change to a limitation speed changes the arc.